BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	AS 2021-003
PETITION OF MIDWEST	)	
GENERATION, LLC FOR AN	)	
ADJUSTED STANDARD FROM	)	(Adjusted Standard)
845.740(a) AND FINDING OF	)	
INAPPLICABILITY OF PART 845	)	

NOTICE OF FILING

To: See attached Service List

PLEASE TAKE NOTICE that I have today electronically filed with the Office of the Clerk of the Pollution Control Board Midwest Generation, LLC's Motion to Incorporate Certain Exhibits and Testimony, a copy of which is served upon you.

Dated: July 28, 2023 MIDWEST GENERATION, LLC

By: __/s/Kristen L. Gale _____

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BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	
Petition of Midwest Generation, LLC	)	
for an Adjusted Standard from 845.740(a)	)	
and Finding of Inapplicability of Part 845	)	PCB AS 2021-003
for the Waukegan Station	)	
	)	
	)	

MIDWEST GENERATION LLC'S MOTION TO INCORPORATE CERTAIN EXHIBITS AND TESTIMONY FROM *SIERRA CLUB ET AL. V. MIDWEST GENERATION, LLC*, PCB 13-15, INTO THE PCB 21-03 DOCKET

Pursuant to 35 Ill. Admin. Code § 101.500 and § 101.306, Midwest Generation, LLC ("MWG") requests that the Hearing Officer enter an Order granting their Motion to Incorporate Exhibits 901, 903, 907, 1701 and 1702 and the hearing transcripts for February 1 and 2, 2018 and June 12-14, 2023, from *Sierra Club et al. v. Midwest Generation, LLC*, PCB 13-15, into the PCB AS 2021-003 Docket because these documents are authentic, credible, and relevant to this proceeding. In support of this Motion, MWG states as follows:

1. Board Rule 101.306(a) provides:

> Upon the separate written request of any person or on its own initiative, the Board or hearing officer may incorporate materials from the record of another Board docket into any proceeding. The person seeking incorporation must file the material to be incorporated with the Board in accordance with Section 101.302(h). The person seeking incorporation must demonstrate to the Board or the hearing officer that the material to be incorporated is authentic, credible, and relevant to the proceeding. Notice of the request must be given to all identified participants or parties by the person seeking incorporation. 35 Ill. Adm. Code 101.302(a).

2. Waukegan Station's Grassy Field, which is the subject of the present proceedings, is also a subject of an enforcement action in front of the Board, *Sierra Club v. Midwest Generation, LLC*, PCB 13-15, which alleges violations of the Illinois Environmental Protection Act (415 ILCS 5) as

amended by the Coal Ash Pollution Prevention (CAPP) Act (Illinois Public Act 101-0171) ("Act") and Part 620 of the Board rules.

3. In the *Sierra Club* proceedings, MWG introduced reports from three experts at Hearing, and each provided expert testimony including detailed and specific discussions about the Grassy Field at the Waukegan Station. The exhibits and testimony are:

a. Testimony of John Seymour, February 1 and 2, 2018 (PCB 21-3 Adjusted Standard Ex. 29 & 30)
b. Testimony of Douglas Dorgan and Michael Maxwell, June 12-14, 2023 (PCB 21-3 Adjusted Standard Ex. 31, 32, & 33)
c. Exhibit 901 – Presentation of Expert John Seymour (Feb. 1, 2018) (PCB 21-3 Adjusted Standard Ex. 34)
d. Exhibit 903 – Expert Report of John Seymour, P.E. Geosyntec Consultants (Nov. 2, 2015) (PCB 21-3 Adjusted Standard Ex. 35)
e. Exhibit 907 – John Seymour Update to Appendix B of Expert Report – Updated Risk Analysis (Feb. 2018) (PCB 21-3 Adjusted Standard Ex. 36)
f. Exhibit 1701: Expert Report on Relief and Remedy, Douglas Dorgan, L.P.G. and Michael Maxwell, P.G., Weaver Consultants Group (April 22, 2021) (PCB 21-3 Adjusted Standard Ex. 37)
g. Exhibit 1702: "Remedy Assessment, Midwest Generation", Weaver Consultants Group Presentation, Douglas Dorgan, Jr., L.P.G., Michael Maxwell, L.P.G. (June 12, 2023) (PCB 21-3 Adjusted Standard Ex. 38)

4. Exhibits 901, 903, 907, 1701 and 1702 and the hearing transcripts for February 1 and 2, 2018 and June 12-14, 2023 are authentic. MWG retrieved the hearing transcripts from the Board website and has a copy of the original exhibits.

5. Exhibits 901, 903, 907, 1701 and 1702 and the hearing transcripts for February 1 and 2, 2018 and June 12-14, 2023 are credible. The Hearing Officer in the proceeding admitted the exhibits, and all parties had an opportunity for examination of the testimony at hearing.

6. Exhibits 901, 903, 907, 1701 and 1702 and the hearing transcripts for February 1 and 2, 2018 and June 12-14, 2023 are relevant. Each pertain factually to the same area that is the subject of MWG's current Petition for an Adjusted Standard, Waukegan Station's Grassy Field.

7. When material from another docket is relevant, a motion to incorporate should be granted. *ExxonMobil Oil Corp. v. IEPA, 2011 WL 4615015*, PCB 11-86, at *1 (Sept. 29, 2011). Here, the testimony and exhibits listed above, which were admitted in the *Sierra Club* proceeding and were subject to cross examination, will assist the Board in determining MWG's Petition for an Adjusted Standard.

8. MWG has attached a copy of the testimony and exhibits pursuant to Section 101.306, and listed each as Exhibits 29-38 to be consistent with the exhibits attached to MWG's Response to the Illinois EPA's Recommendation.

WHEREFORE, Midwest Generation, LLC respectfully requests the Hearing Officer order the Exhibits 901, 903, 907, 1701 and 1702 and the hearing transcripts for February 1 and 2, 2018 and June 12-14, 2023, from *Sierra Club et al. v. Midwest Generation, LLC*, PCB 13-15 to be incorporated into the docket for this matter.

Respectfully submitted,

MIDWEST GENERATION, LLC

Petitioner,

By: /s/ Kristen L. Gale
One of its Attorneys

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CERTIFICATE OF SERVICE

The undersigned, an attorney, certifies that a true copy of the foregoing Notice of Filing, and Midwest Generation, LLC's Motion to Incorporate Certain Exhibits and Testimony was electronically filed by delivery of a fileshare (Dropbox) on July 28, 2023 with the following:

Don Brown, Clerk of the Board
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and that copies were sent via Dropbox on July 28, 2023 to the parties on the service list.

Dated: July 28, 2023 /s/Kristen L. Gale

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Exhibit 29

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ILLINOIS POLLUTION CONTROL BOARD
August 31, 2017

SIERRA CLUB, ENVIRONMENTAL LAW & POLICY CENTER, PRAIRIE RIVERS NETWORK AND CITIZENS AGAINST RUINING THE ENVIRONMENT,	)	No. PCB 13-15
Complainants,	)	
vs	)	
MIDWEST GENERATION, LLC,	)	
Respondent.	)	

REPORT OF THE PROCEEDINGS had at the hearing on a motion of the above-entitled cause before the Honorable BRADLEY HALLORAN, Hearing Officer of said Court, Room 9-040, The Thompson Center, Chicago, Illinois, on the 1st day of February, 2018, at the hour of 9:00 a.m.

Electronically signed by Steven Brickey (501-307-281-8473) 1857f99a-fd04-4245-801e-85f6dcc7fbe2

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I N D E X

THE WITNESS: FREDERICK VEENBAAS

PAGE

Cross-Examination by Ms. Dubin..... 7

Redirect Examination by Ms. Gale..... 65

Recross-Examination by Ms. Dubin..... 72

THE WITNESS: RICHARD GNAT

PAGE

Direct Examination by Ms. Gale..... 82

Cross-Examination by Mr. Wannier..... 180

Redirect Examination by Ms. Gale..... 209

Recross-Examination by Mr. Wannier..... 211

THE WITNESS: JOHN SEYMOUR

PAGE

Direct Examination by Ms. Nijman..... 213

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E X H I B I T S

	Marked for Identification
Complainants' Exhibit No. 720	38
Complainants' Exhibit No. 721	44
Complainants' Exhibit No. 722	46
Complainants' Exhibit No. 264	61
Respondent's Exhibit No. 809-812.....	88
Respondent's Exhibit No.'s 800-802	115
Respondent's Exhibit No. 803	117
Respondent's Exhibit No. 804	119
Respondent's Exhibit No. 805	121
Respondent's Exhibit No. 813	130
Respondent's Exhibit No. 810	134
Respondent's Exhibit No. 900	215
Respondent's Exhibit No. 902	219
Respondent's Exhibit No. 903	232
Respondent's Exhibit No. 904	233
Respondent's Exhibit No. 905	234
Respondent's Exhibit No. 906	235

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HEARING OFFICER HALLORAN: Good morning, everyone. My name is Brad Halloran. I'm a Hearing Officer with the Illinois Pollution Control Board. I'm also assigned to this matter entitled Sierra Club, Environmental Law & Policy Center, Prairie Rivers Network and Citizens Against Ruining the Environment, complainants, versus Midwest Generation, LLC, respondent. It's docketed as PCB 13-15. It's a citizen enforcement water.

Today is February 1st, 2018. This hearing is continued on record from yesterday January 31st, 2018. I do want to note for the record we have attorney advisor Jason James in the room as well as Alisa Liu from our technical unit.

With that said, I know we had Mr. Veenbaas still on the stand under direct by Midwest Ms. Gale. May we proceed?

MS. GALE: Yes, and I rested. We had no further questions last night.

HEARING OFFICER HALLORAN: Okay. I didn't know if that was just for then or --

MS. GALE: I'm sorry. Yes.

HEARING OFFICER HALLORAN: Thank

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you, Ms. Gale. Could you swear in Mr. Veenbaas again, please.

WHEREUPON:

FREDERICK VEENBAAS

called as a witness herein, having been first duly sworn, deposeth and saith as follows:

HEARING OFFICER HALLORAN: Thank you. Ms. Dubin?

C R O S S E X A M I N A T I O N

BY MS. DUBIN

Q. Thank you for being here, Mr. Veenbaas. Now, I just want to jump into terminology.

My first question is, can the term slag be used interchangeably with the term ash?

A. No, slag was generally -- slag was a bi-product of a cyclone boiler generally whereas bottom ash was generally the term from a pulverized coal boiler.

Q. Have you --

A. They can be used interchangeably. Some people do do it that way, but that's how it is supposed to be used.

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Q. And you've used the term interchangeably with ash in the past, correct?

A. I generally use bottom ash for bottom ash.

Q. But at times you have?

A. Potentially, yes.

Q. And my next question, are you familiar with the term cap as in capping a pond?

A. Yes.

Q. And capping a pond means that cover is placed over the top of the pond, correct?

A. That's my understanding, yes.

Q. And when a cover is placed over the top of a pond, it is not open to the sky, correct?

A. That is true, yes.

Q. And does capping a pond make the pond impervious to rainwater that would enter the pond vertically from above?

A. Most likely, yes.

Q. And, finally, if a pond is capped, that means it's not open to the sky?

A. Yes. But, again, I want to make sure we understand. When you cap a pond, you render the pond useless because you're putting a

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cap over it. So water flow can't go through it. So you don't cap things that are in service.

Q. So I wanted to discuss a few of the ash areas. So, first off, if you don't mind taking a look at Complainants' Exhibit 19-D. It should be the top one right there and I put a Post It note where I'd like you to take a look. The Bates page is MWG 45813 and that is a site plan of the Waukegan station.

A. MWG 13-15?

Q. Yeah, and then 45813. Do you see a site plan there?

A. 813. Yes, I do.

Q. Now, if you look at about the bottom -- oh, gosh. I'll direct you towards a better page. I apologize.

A. This is 13 like you mentioned.

Q. There should be a better site plan. I would take a look at the -- this is the page.

A. Page 14.

Q. Yes, this should be easier for you.

A. Okay.

Q. So, for the record, that's 45814.

A. Okay.

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Q. Now, if you take a look at the bottom left corner of that site plan, do you see an area called the slag/fly ash storage area?

A. Yes.

Q. And there is -- there has been ash located in this area, correct?

A. I've seen pictures where ash is located there. They're from like the 1960's.

Q. And ash hasn't been removed from this area, correct?

A. I cannot say that. I don't know.

Q. You've not seen any evidence that ash has been removed from this area?

A. No. Right now it's a grassy field. We actually land helicopters on it.

Q. I'm sorry. So have you seen evidence that ash has been removed?

A. No.

Q. And this area is unlined, correct?

A. I don't know. It's -- it's an old field. I have no sense of what is there.

HEARING OFFICER HALLORAN: Sir, can you keep your voice up, please?

THE WITNESS: Sure.

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HEARING OFFICER HALLORAN: Thanks.

BY MS. DUBIN:

Q. Have you seen any evidence that this area is lined?

A. No.

Q. And is this area capped?

A. It's a field with grass on it. That's all I can speak to.

Q. And is -- is it impervious to rainwater or is grass impervious to rainwater that comes vertically from above?

A. No. I mean, it's soil. I would assume the grass can only grow when the water hits the ground and allows the roots to grow. So I don't know if it's impervious. I can't tell you.

Q. Now, I'd like to ask a few questions about the Will County ponds.

A. Sure.

Q. Now, there used to be four active electric generating units at Will County, correct?

A. That's correct.

Q. And what were these units named?

A. They were named unit one, unit two, unit three and unit four.

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Q. And what ponds or areas accepted ash from unit one?

A. The ponds were designated by one north, one south. Those are the two ponds that received ash from unit one.

Q. And what ponds received ash from unit two?

A. Again, one north and one south were the two ponds that received ash from unit two.

Q. Are there other areas that received ash from unit two?

A. Let me back up a bit.

Q. Sure.

A. The ponds we received it -- there was a retention pad that received the ash, where the ash fell out and was managed there and the fines from the -- that process went to the two ponds. So you saw ash, but it was ash in a very fine particulate mode. The actual bulk of the slag, of the bottom ash, was -- actually resided on the pad next to it.

Q. And what ponds -- I'm sorry. Did I ask you about unit three?

A. No, you didn't yet.

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Q. What ponds accepted ash from unit three?

A. Unit three the ponds, excuse me, ponds two south and three south received ash from -- bottom ash from unit three.

Q. Are there any other areas that received ash from unit three?

A. No.

Q. And, finally, unit four, which ponds receive ash from unit four?

A. Unit four -- the ash from unit four went to ponds two south and three south. This is bottom ash by the way, not fly ash.

Q. Now, I'd like you please to take a look at 19-D, which should be in front of you or I apologize. We're going to skip ahead. No need to take a look at 19-D.

I wanted to ask, are you familiar with the practice of using a pond as a flow-thru?

A. Yes.

Q. And what does that mean?

A. I don't know if you're referring to pond one north at Will County, is that where we're

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going?

Q. Yes.

A. After they retired units one and two at Will County, they left pond one north in service as a flow-thru to provide flow back to the wet well of the ash recycle system.

Q. Does a -- does a flow-thru prevent ash from freezing?

A. It prevents the water from freezing, yes.

Q. Why would you want to prevent the water from freezing?

A. If you're using it as a flow-thru device, you want to be able to have water flow through it, but if there is no movement of it, then it would freeze.

Q. And just to be sure, so where would the water flow through -- flow to from pond one north?

A. The water would flow from the pad or the piping going to the pad where the slag used to reside and it would go into a trench, the inlet of the pond on the east side of the pond and would flow to the west side of the pond.

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Q. So the pad -- by the pad, you mean the retention --

A. The retention pad, yes.

Q. And you said it flows to a trough, is that correct?

A. There is a trough on the exit side of the pad where the water from the pad could be directed to either one north or one south. The whole time I was at Will County it went to one north.

Q. So just to get the chain of events correct, and correct me if I'm wrong, so it flows from the pad to the trough to one north?

A. Right.

Q. And then after one north, where does it go?

A. It goes on the outlet trough, concrete structure, and then it flows to the basement of the ash recycling building, which we commonly call the wet well, and there it provides suction for ash recycle pumps and they pump the water back into the building and for reuse as ashless water.

Q. And is that outlet trough lined?

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A. No.
Q. Are you -- now, you said that pond one north is retired, correct?
A. Yes.
Q. And is one north capped?
A. I haven't been at Will County in a couple of years. So I can't tell you that.
Q. Based off of your experience when you left Will County, was one north capped?
A. No, it was not.
Q. And do you know when they -- have they ceased to use one north as a flow-thru?
A. I'm not sure, no. I haven't been there.
Q. And when you left, were they still using it as a flow-thru?
A. I believe so.
Q. I'd like to discuss very quickly there was a time when pond one north overflowed, correct?
A. Yes.
Q. And the overflow went towards the Des Plaines -- Des Plaines River? Gosh. I never know now to pronounce that.

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A. Des Plaines.

Q. Des Plaines. That's what I thought. Okay. The overflow went to the Des Plaines River?

A. The pond leaked on the northside of the pond and went down to the sewage plant area where it pooled and a small amount went from the pooling area around the sewage treatment plant and then down towards the river.

Q. By leaked, what do you mean?

A. The pond level was high and it went over the berm of the pond and went downward towards the sewage treatment plant.

Q. Now, this was an unpermitted discharge, correct?

A. Yes, it was.

Q. I'd like to jump to one south. You mentioned that one south is retired, correct?

A. It's not being used. It was never used when I was there.

Q. Okay.

A. I don't know if I can use the word retired. I just know it wasn't used.

Q. And, to your knowledge, I guess based off of your time when you left Will County,

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was anything in the pond at that time?

A. The pond, I assume, was full of fines from the unit one and unit two slag system.

Q. And are you aware of whether it still contains fines?

A. I'm not aware either way. I have not been there in a few years.

Q. And I just want to jump back to one north to make sure I covered that same question.

A. Sure.

Q. When you left Will County, was one -- did one north have any ash in it?

A. Yes, it did.

Q. And are you aware of whether it continues to have ash in it?

A. I'm not aware.

Q. And back to one south. To your knowledge when you left Will County, is one south capped?

A. It was not capped.

Q. And, to your knowledge, is it capped now?

A. I have no knowledge of that.

Q. I'd like to briefly discuss a couple

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of ponds if you don't mind pulling out Exhibit 18-D, which is the phase two site assessment for Will County. If you don't mind jumping, please, to Bates 5739. That should be a site plan, correct?

A. Okay. Yes.

Q. Now, I'd like you to take a look in the bottom left corner of the plant. You'll see something -- two ponds that are kind of sort of oddly shaped called pond one and pond two, do you see those?

A. Yes.

MS. GALE: I would object to the extent this is outside my direct. Outside the scope of the direct.

HEARING OFFICER HALLORAN: I'll allow latitude. Thank you. You may proceed.

MS. DUBIN: Thank you.

BY MS. DUBIN:

Q. Now, pond one and pond two, are you familiar with those ponds?

A. Yes.

Q. And what do you call those ponds?

A. We call them settling ponds or

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actually when I was there they were called SO2 ponds.

Q. And have they ever been referred to as spent slurry ponds, to your knowledge?

A. Not to my knowledge.

Q. Now, what did the -- did these ponds store any content when you were at Will?

A. Not when I was there, no.

Q. Did they store flue gas bi-product when you were there?

A. I'm unaware of that.

Q. Would you mind passing me -- yeah. So I'm going to hand you -- did you take a deposition in this matter?

A. Yeah.

Q. I'm going to hand you -- I'm going to hand you your deposition.

Now, you were deposed in this matter on February 20th, 2015, correct?

A. Yes.

Q. And you were sworn in to this deposition, correct?

A. Mm-hmm. What page am I looking for?

Q. If you don't mind turning to page 26

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and then line 12 to 14. And actually you can jump to question 7 -- or line 7.

Q. I want to make use of a map, sir, just to make sure we are all talking about the same thing here. Do you see on that map where it refers to pond one and pond two at the bottom?

A. Yes.

Q. Are those the ponds that you were stating before were used for flue gas bi-product?

A. Yes.

A. Mm-hmm.

Q. Does this refresh your recollection?

A. Your question was, was I aware of any product in the ponds. I'm not aware of that. I'm aware of the use of the ponds historically, but I'm not aware of any material in the ponds. I think there's a distinction there.

Q. Mm-hmm. All right. I'd like to jump to --

A. We're done with that exhibit?

Q. Yes, sir. Now, when these ponds -- now, you had a suspicion that there was an underground leak between those ponds, correct?

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A. Yes, I had a suspicion that the ponds never dried out, they just retained water and since we did not use the ponds, they were not part of any process in the plant, we found it to be curious that the pond levels kind of maintain -- they just didn't go down over time.

Q. And have you seen any evidence of the flue gas bi-product being removed from the ponds?

A. No.

Q. So you didn't conduct any investigation to determine if there was a leak between the two ponds, correct?

A. No. No.

Q. And, to your knowledge, are these ponds capped?

A. I have no knowledge of that. I have not been there in a couple of years. I haven't seen them.

Q. And when you were at Will County, were those ponds capped?

A. They were not.

Q. And when you were at Will County, were those ponds lined?

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A. I'm not aware of a lining.
Q. So you've seen no evidence of a liner for --
A. No.
Q. -- those ponds, correct?
A. I'm not aware of a liner.
Q. Now, you discussed the ponds at Waukegan yesterday, the east and west ash ponds?
A. Yes.
Q. Now, the bottom of the ponds you mentioned have -- I'm just asking to make sure that I'm not misstating your testimony.
The bottoms of the ponds at Waukegan have a cushion layer, correct?
A. That's my understanding, yes.
Q. And for -- for now when I say the ponds at Waukegan, I'm only referring to the east and west ponds just for this sort of line of questioning.
A. I understand.
Q. So the bottom of the ponds at Waukegan you mentioned have a warning layer, correct?
A. That's my understanding, yes.

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Q. There is no geotextile installed between these layers, correct?

A. I'm not sure.

Q. Now, the -- the warning layer is made of sand, is that correct?

A. No, the warning layer is made of limestone, a white limestone.

Q. And then the -- the caution layer then is made of sand?

A. Yes, that's my understanding.

Q. And is it possible for the limestone layer to migrate through the sand layer?

MS. GALE: Objection. Calls for speculation.

HEARING OFFICER HALLORAN: He can answer if he's able.

BY THE WITNESS:

A. I don't have any sense of that at all.

BY MS. DUBIN:

Q. Now, there is HDPE liner installed on the bottom of the pond, correct?

A. The bottom and the sides of the pond, yes.

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Q. And there -- is there anything else installed on the sides of the pond?

A. We have posts that are installed that denote the incline of the pond bank going upwards.

Q. And is there anything else?

A. No. That's all I can think of.

Q. So is there a cushion layer installed on the side of the ponds?

A. I'm not sure.

Q. And a warning layer?

A. I'm not sure.

Q. Now, has ash ever been in direct contact with the liner on the sides?

A. Yes.

Q. Now, I'd like to turn a little bit to inspections. You mentioned yesterday that part of your responsibilities are folks would report up -- if operators saw inspections, they would report up and -- or if they saw liner tears during inspections, they would report up and that report would reach you, correct?

A. Yes.

Q. And you also said that as part of

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your CCA duties you were to report holes or tears in the liner below the water line, correct?

A. Yes.

Q. Now, when folks reported up to you, that's -- you consider that sort of a formal protocol?

A. Not really. It's -- they're supposed to, but in order to get the -- I don't make the repairs. Somebody else is responsible for the repairs. So they would generally go to both of us. I would be informed of a situation, but I would not be responsible for the repairs.

Q. Now, do you remember any damage in the -- to the east pond in 2013?

A. Maybe. Yes. Maybe. Was this in my deposition?

Q. It was.

A. Yes, there were some tears at that time.

Q. And do you know how many tears?

A. I'm not going to speculate. There were a couple, I think, yes.

Q. And do you know what part of the pond those tears --

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A. Generally, the tears occur above the water line on the sides of the pond. So that's probably as I remember where they might have been.

Q. I'd like to turn please to Complainants' Exhibit 103. That should be the next exhibit on your table. If you don't mind taking a look at this e-mail, it's already been introduced into evidence. Whenever you're ready.

A. One moment.

Q. I'm sorry?

A. I'll be with you in a moment.

Q. Sure.

A. Okay. I'm ready.

Q. I just want to get a little bit of background on the incident discussed here.

So in the bottom e-mail, it is sent from Wayne Alilla?

A. Yes.

Q. And where -- does he work at the Waukegan plant?

A. At the time he did, yes.

Q. Now, he mentions he is writing to Christopher Lux. "Chris, in a safety meeting with Todd, we discussed some possible rips in the east

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ash pond and two rips in the west ash pond liner," do you see where it says that?

A. Yes.

Q. Now, the rips -- one of the rips in the west ash pond was about five feet long, correct? And I'll mention it doesn't say that in the e-mail.

A. Possibly.

Q. And you mentioned in your deposition if you don't mind turning to page 87 of your deposition just to clarify since I know that was closer in time to what we're discussing now. Lines 12 to 16. It says

Q. Let's go to the two rips in the west ash pond. Can you tell me a little bit more about those?

A. It is my understanding that there are two rips. One is about five feet long and the other one is two feet long.

MS. GALE: Can he please -- can the entire answer be read into the record?

HEARING OFFICER HALLORAN: Yes, sustained. Granted.

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BY MS. DUBIN:

Q. "They're again visual and above the water line, although the pond right now is out of service. So there is no ash contact in this area."

Now, yesterday, you mentioned that it takes one to two weeks to fix liners, is that correct, or on average?

A. On average, it depends on the time of the year. If the weather is really cold -- I think the process is temperature dependent and it may take longer in those times of the year.

Q. Why is it -- what do you mean by temperature dependent?

MS. GALE: Objection to foundation.

HEARING OFFICER HALLORAN: Ms. Dubin?

BY MS. DUBIN:

Q. So you just mentioned to repair liner tears it's temperature dependent --

A. Mm-hmm.

Q. -- so what do you mean by temperature dependent?

A. The process by which the plastic is

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repaired requires a certain temperature, some high temperatures and in the cold weather it's very difficult to achieve those temperatures and, thus, difficult to effect a repair.

Q. So what temperature is needed?

A. I'm not sure.

Q. And why -- why are higher temperatures necessary?

A. As I stated before, the process by which the repairs are made requires a high temperature and it's hard to do that when the temperatures are -- the ambient temperatures are really cold.

Q. And how long are you aware of any -- what is the longest length of time in your experience at Waukegan you've seen a tear go unrepaired?

A. First you have to understand I'm not responsible for making the repairs. Chris Lux does that. So I cannot really speak authoritatively to that question.

Q. Liner tears are reported to you?

A. Yes, they are and we have a policy of repairing them as quickly as we can as soon as

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possible.

Q. Now, when you were deposed in this matter, you mentioned that -- you were deposed in this matter February 20th, 2015, correct?

A. Yes.

Q. Do you remember there being liner tears at Waukegan at the time of your deposition?

A. What page are you on?

Q. We will head to page 79. Let me make sure that's where the discussion starts. Seventy-nine line 11. "Currently we have a couple small holes, maybe less than -- less three inches in diameter that exists in the east pond," does that refresh your recollection?

A. Yes.

Q. Now, was it your understanding that this was caused by a pump?

A. It was possibly caused by a pump. I don't know if it was categorically determined to be the case.

Q. Were you aware of any -- did anybody take -- undertake an investigation to figure out exactly what caused it?

A. I'm not aware of that.

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Q. And there are no protocols when placing a pump to avoid liner damage, are there?

A. Generally we don't place pumps -- well, we try to place pumps on the horizontal part of the pond. That's where the dewatering is needed, but I'm not aware of any protocol.

Q. What do you mean by the horizontal part of the pond?

A. That would be the base -- the floor of the pond.

Q. And you mentioned that dewatering is needed, why is it needed?

A. The bottom ash retains moisture. When you drain the pond and you start excavating the pond, you -- the moisture comes out of the ash and you have to continually dewater it to make sure that you can deliver a dry product from the excavator into the truck.

Q. And is this at both ponds in Waukegan?

A. Yes.

Q. So you mentioned -- do you remember when these holes were fixed?

A. I don't remember. I assume roughly

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the same time as the other ones. We probably bring the vendor out at the same time, but I don't have a -- since I'm not responsible for the repairs, it's hard for me to answer that question.

Q. Now, feel free to read your deposition to verify, but at the time of your deposition you thought that it might not be until the middle of March at the earliest, is that correct?

A. Yes.

Q. Now --

MS. GALE: Objection. Misstates testimony in his deposition.

MS. DUBIN: Let me take a look.

HEARING OFFICER HALLORAN: Sustained for now.

MS. DUBIN: You're right. I apologize.

BY MS. DUBIN:

Q. If you jump to page 80 lines 11 and 12 and I guess for context we'll start at 9.

Q. Do you know those have not yet been prepared, is that correct?

A. No, we are having --

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probably looking at repairing them in the middle of March.

So --

MS. GALE: Keep reading.

BY MS. DUBIN:

Q. "The issue is we have to be above a certain temperature to perform the repairs. The chemicals that they use for this kind of repair only work above a certain temperature."

A. Which I just stated.

Q. Yeah. So there was vegetation growing on these holes, is that correct?

MS. GALE: Objection. Vague.

HEARING OFFICER HALLORAN: Sustained.

BY MS. DUBIN:

Q. It might be easiest just to jump to your deposition to kind of hear your statement. So page 79 and I'll read the entire -- the entire response question starting at line 14.

Q. Where in the east pond are these located?

A. I was told they exist. I have never seen them. I was also told they are

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above the water line. Again, I've been told they have vegetation growing on them.

Is that correct?

A. That's what the deposition says, yes.

Q. And how does vegetation grow on a liner tear?

MS. GALE: Objection. Foundation.

HEARING OFFICER HALLORAN: Ms. Dubin? No. He can answer if he's able.

BY THE WITNESS:

A. It's possible there is material underneath the liner that would support a growth. We have vegetation that grows on the ash, too, around the -- on the sides as well. I want to remind you also that I was told about these things. I never visually saw them.

BY MS. DUBIN:

Q. If you don't mind looking at Complainants' Exhibit 105. It's already been introduced into evidence and it should be right in front of you. I can make sure.

A. I have it.

Q. I'll give you a moment to review it.

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Whenever you're ready, but no rush.

A. I'm ready.

Q. I'd like you to take a look at the second e-mail down on the first page and it's an e-mail sent from Christopher Lux on Monday, March 6th, 2015, do you see that?

A. Yes.

Q. And were you one of the people that he sent this to?

A. Yes.

Q. Now, this e-mail states that Hayes and CAAW will begin -- do you pronounce it CAAW or C-A-A-W? If you don't know, no problem. I just want to make sure.

A. I don't know.

Q. Sure. "So Hayes and CAAW will begin ash pond liner repairs this Friday pending a precipitation event. If the repairs are not completed on Friday, a short day of repair may be needed on Saturday."

Now, are these -- I just wanted to see might this refresh your recollection about whether or not the repairs -- or the tears that we discussed during your deposition are the ones

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being referred to here?

A. It's possible. I don't see an itemized listing of the different things they're repairing. So it's hard for me to speak specifically to that, but this is definitely a time when they would have done it.

Q. We'll set that exhibit aside. You also said yesterday that it's been about three to four years since you were aware of a liner tear occurring?

MS. GALE: Objection. Mischaracterizes the testimony.

HEARING OFFICER HALLORAN: Could you read the question back, Mr. Brickey, please.

(Whereupon, the record was read as requested.)

HEARING OFFICER HALLORAN: Ms. Dubin?

BY MS. DUBIN:

Q. Do you know when the most recent liner tear occurred?

A. I don't. I think what I was trying to convey yesterday was it's been a couple of years since I've heard of any tears. Obviously

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there were tears we referred to in the deposition, but in 2017 and part of '16 I don't remember hearing about any repairs or tears.

Q. Between now and your deposition, can you remember any tears occurring?

A. Possibly. It's possible, yes.

Q. I'd like to place in front of you Complainants' Exhibit -- Complainants' Exhibit 720.

(Document marked as Complainants' Exhibit No. 720 for identification.)

MS. DUBIN: Now, Ms. Gale and I came to an agreement about how the exhibit would be organized just because it was a Midwest Gen produced exhibit and we wanted to make sure it was being characterized in a manner that they were comfortable with as far as how it was put together.

HEARING OFFICER HALLORAN: Thank you, Ms. Dubin.

BY MS. DUBIN:

Q. Now, I'd like you to first -- I'll give you a moment to review it.

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MS. GALE: Can we go off the record, please?

HEARING OFFICER HALLORAN: Sure.

(Whereupon, a break was taken after which the following proceedings were had.)

HEARING OFFICER HALLORAN: We're back on the record. The parties have come to an agreement regarding Complainants' Exhibit 720 and I guess you'll mark it later, but we're just going to be talking about Bates stamp 60892, correct?

MS. GALE: And keep going, do you want to identify them all for the record?

MS. DUBIN: Sure. So did you mention 60892?

MS. GALE: I want to take that out.

MS. DUBIN: So we're going to be discussing 60899, 60900, 60901 and 60902.

HEARING OFFICER HALLORAN: Okay.

BY MS. DUBIN:

Q. If you don't mind reviewing this and let me know when you're ready.

A. All right. I'm ready.

Q. Thank you. So what are the

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documents that I've placed in front of you?

A. These documents are a completed copy of what we call a CCR ash inspection.

Q. And would you mind turning to the second page in this packet, which is 60 -- 60900 and would you mind, please, jumping to the bottom of the page in the rectangle?

A. Uh-huh.

Q. Is that your name where it states operator name?

A. Yes.

Q. And this is dated October 28th, 2015, is that correct?

A. Yes.

Q. Did you fill out this -- this inspection form?

A. Yes.

Q. If you don't mind, please, looking at number 16 on this page that says "Visible damage to the pond liners." The box under -- for the east ash pond the box for yes is checked, correct?

A. That's correct.

Q. And would you mind, please, if you

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remember, describing what this damage was?

A. I'm having a hard time recalling, but I think it was a rip or a tear.

Q. And number 17, it says "If you did check a box in 16, describe in detail (pond specific location, size, et cetera)," would you mind reading what it says in box 17?

A. "A corner of northeast some damage. No water in the pond."

Q. And do you remember -- does this box include the size of the tear?

A. No.

Q. Do you remember the size of the tear?

A. I don't remember.

Q. I'd like to now jump --

A. I just say there was no water in the ponds. There was no issue with any contact. So it was a pond waiting to be cleaned.

Q. I'd like to jump to the next page, please. You've already reviewed this one as well?

A. This is 01?

Q. Yes, 60901 and 60902.

A. Okay.

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Q. Go ahead. So I'd like you to jump to the very back of the packet 60902.

Do you see at the bottom of the page what the date of this is?

A. I see a date. It's -- is it 11/1/15?

Q. That's my understanding of the date.

A. It's not totally clear.

Q. Now, would you mind looking in box 16 underneath east ash pond, there is a box checked yes, do you see that?

A. I do see that.

Q. Now, do you believe that this is -- is it your understanding that this tear is the same tear that was discussed on October 28th?

A. It should be. It could be. Let's put it that way.

Q. And --

A. Again, in an out-of-service ash pond with no water.

Q. And are you able to -- so the following box, box 17, what does that box say if you're able to read it?

A. It looks like east basin northeast

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corner on return to pump house.

Q. And does it state the size of that tear?

A. No.

Q. And so this was, I guess, within under three years, correct?

A. Uh-huh.

Q. If you don't --

MS. DUBIN: Complainants move to enter exhibit -- Complainants' Exhibit 720.

HEARING OFFICER HALLORAN: Ms. Gale?

MS. GALE: No objection.

HEARING OFFICER HALLORAN: Thank you, Ms. Gale. Complainants' Exhibit 620 is admitted.

MS. DUBIN: It's actually 720, sir.

HEARING OFFICER HALLORAN: I'm sorry. 720.

MS. DUBIN: No problem.

BY MS. DUBIN:

Q. We're now placing in front of you Complainants' Exhibit 721.

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for identification.)

MS. DUBIN: Again, Ms. Gale, and I communicated about this exhibit as well.

BY MS. DUBIN:

Q. So I'll give you a moment to review this.

A. Okay. Go ahead.

Q. This is another inspection checklist, is that correct?

A. Yes.

Q. Now, would you mind please jumping to the second page Bates number -- for the record, Complainants' Exhibit 721 is Bates number 60942 and 60943 and would you mind taking a look at the 60943 and if you don't mind looking at the bottom this is dated December 23rd, 2015, is that correct?

A. That's correct.

Q. Now, are you -- this is within the last three years, correct?

A. Yes.

Q. Now, if you look at line 16, there

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is a box that is checked yes under east ash pond and just for the record it looks like there is a no that is scribbled out and then a yes with an X mark. If you don't mind looking at box 17, it says "If yes --

MS. GALE: Objection. He hasn't had a chance to answer the question.

MS. DUBIN: Sure.

BY THE WITNESS:

A. I guess it could be checked yes. I think it's undetermined I suppose, but, yeah, it's possible it's checked yes. It could be checked no. Let's say this, there's two checks on the page. I'm not sure which is the proper one.

BY MS. DUBIN:

Q. In line 17, it says "If yes, describe in detail." And do you see that area scribbled out?

A. Yes.

Q. Is there any -- do you see any explanation on this checklist of which box is checked because it appears unclear?

A. I think it's undetermined what this page is really saying with all the scribble out.

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I'm not sure we're going to -- I'm just not sure what this thing really states at some point.

Q. Do you remember any liner tear at this time or during this time December 23rd, 2015?

A. I do not. I don't know when the tear was effected from the previous October, November one. So I can't speak to this.

Q. Okay.

MS. DUBIN: Complainants move to enter Complainants' Exhibit 721.

HEARING OFFICER HALLORAN: Ms. Gale?

MS. GALE: No objection.

HEARING OFFICER HALLORAN: Thank you. Complainants' Exhibit 721 is admitted.

MS. DUBIN: Now, I'd like to place in front of you Complainants' Exhibit 722.

HEARING OFFICER HALLORAN: Thank you.

(Document marked as Complainants' Exhibit No. 722 for identification.)

BY MS. DUBIN:

Q. I'll give you a moment to review it. Just let me know when you're ready.

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A. I'm ready.

Q. So what is this document?

A. This is a computer printout of an ash pond inspection -- an incomplete ash pond inspection I might add that was performed on June 18th of '16.

Q. And do you see the second line from the bottom, it says "East ash pond visible liner -- visible damage to the pond liner" and then yes, correct?

A. Yes, I see that. Again, this is -- there should be 30 items, at least 30 items on this page, 29 or 30, 31 items on there and this is an incomplete inspection.

Q. Do you know why the document is incomplete?

A. I do not know why. I mean, I can speculate which I don't like to do, but it's possible the operator was called into the plant and had to stop the inspection or it's possible the computer that she was working with didn't work. I can't -- I don't know. But those are two likely explanations.

Q. We can -- and do you remember any

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liner tear at the time of this inspection?

A. No, I do not.

MS. DUBIN: We can set aside Complainants' Exhibit 722. I'll withdraw it.

HEARING OFFICER HALLORAN: Thank you.

BY MS. DUBIN:

Q. Now, part of your job concerns meeting environmental regulations at Waukegan, correct.

A. Yes.

Q. I'd like you, please, to take a look at Complainants' Exhibit 106, is that in front of you?

A. Yes, it is.

Q. I'll give you a moment to review it and, for the record, this is an exhibit that has already been entered into evidence.

A. Give me a moment.

Q. Yeah. Absolutely.

A. I'm ready.

Q. Now, I'd like you to -- did your name appear on any of these e-mails?

A. Yes.

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Q. So your name appears on the top e-mail, correct?

A. Yes, it does.

Q. Friday, September 12th, 2014?

A. Yes.

Q. For the record, this is Bates page 4458 that we're looking at. Do you remember the incident being described in this e-mail?

A. I do.

Q. And there were about six piles of coal ash -- there were six piles stacked here, correct?

A. It said several piles in the e-mail.

Q. Do you remember how many piles?

A. I don't.

Q. In your deposition -- I guess what is -- I guess --

A. I think six and several are pretty close.

Q. Do you remember how big in diameter they were?

A. Probably five, six feet.

Q. For the sake of time, we'll just kind of keep plugging along.

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And do you remember how high they were?

A. A couple of feet maybe.

Q. If you don't mind jumping to your deposition just so we can get through what you mentioned before.

A. What page?

Q. 106. And then lines 12 to 13, please. We'll start at nine

Q. So you personally saw those piles?

A. Yes.

Q. How big were the piles?

A. Probably six, eight feet in diameter, about four feet high.

Does that refresh your recollection?

A. Sure, they basically -- they dropped the ash on the ground and the ash spread out.

Q. And who was --

A. I don't see a huge difference between five feet or six feet.

Q. I know. But just for the record, for accuracy sake. Do you know who dumped the ash

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on the ground?

A. Right. So if you go back to the e-mail at that time, we were in a large environmental -- rerouting ductwork on unit seven to relocate the precipitator from hot to cold. And as a result of doing this, we were cleaning out a lot of ductwork to do that and we had contracted the entire job to Hayes Mechanical and, in turn, they subcontracted work to Veolia to do cleaning, to clean the areas which they were working on which was this ductwork and apparently they did not relay the message or the direction to their subcontractor about our policy of not dumping fly ash on the ground. So this is a response to that issue that they did not respond well to.

Q. Thank you.

A. I need to say also that the ash was removed very quickly after the discovery and put in the boxes, which was the policy and is the policy right now.

Q. And do you remember how long it was there prior to discovery?

A. I can't speak to that. I can't

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really speak to it. A couple of days maybe. I don't know.

Q. We'll jump now to dredging. You mentioned dredging yesterday. Now, to your knowledge, are the practices at Will and Waukegan identical or have they been in the past?

A. I believe so. We use the same type of equipment in both places and by the same contractor.

Q. And --

A. By the way, that contractor sometimes subcontracts his work, but generally it's the same process.

Q. And you would describe that as heavy equipment, is that correct?

A. I don't know what heavy means. It was a front end loader and some trucks all with rubber tires.

Q. And are these dump trucks?

A. Yes. Most likely they would be dumping type trucks, yes.

Q. How large are these dump trucks?

A. Oh, boy. I possibly said this in a deposition. Three or four cubic yards maybe. I

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don't know. In that range.

Q. And you said that there is a ramp installed and used for dredging, is that correct?

A. Yes.

Q. And what exactly is it -- what goes down the ramp?

A. Trucks.

Q. The dump trucks?

A. And also the front end loader. That's how you access the pond.

Q. And I just want to clarify from yesterday. So you mentioned getting one-third and I want to mention what that one-third is. Do the trucks go down the entire length of the ramp?

MS. GALE: Objection to vague.

HEARING OFFICER HALLORAN: Yeah, sustained. Rephrase. Thank you.

MS. DUBIN: Sure.

BY MS. DUBIN:

Q. Do the trucks -- dump trucks -- the ramp leads you to the bottom of the pond, is that correct?

A. That's correct.

Q. Do the dump trucks reach the bottom

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of the pond?

A. Yes.

Q. And do they get about a third of the way into the pond?

A. Right, they try to meet up at some point with the front end loader, which has a bucket. So they can load the truck back into the trailer or into the compartment of the truck.

Q. Just to make sure it's clear. So you mean one-third of the way along the bottom of the pond?

A. Yes.

Q. Now, you need to pump water out during ash removal, correct?

A. Yes.

Q. And during the course of removal, you've used pumps to dewater, correct?

A. Yes.

Q. And you've used pumps in various areas to dewater, is that correct?

A. Yes.

Q. And when you mentioned -- by various areas, how does the water kind of get to various -- various areas? And I can clarify.

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These -- does the water when it -- seep from one area of the pond to another area of the pond?

MS. GALE: Vague. Objection. Vague.

HEARING OFFICER HALLORAN: Rephrase.

MS. DUBIN: Sure.

BY MS. DUBIN:

Q. Is the -- when you use the pumps to dewater, do you dewater the entire pond?

A. No, you -- no, you don't.

Q. And so when you mentioned that you dewater various areas, that means you kind of -- you would dewater one point and then a different point?

A. Right. When you disturb the ash in the pond, you tend to get water coming out of that area. So that's why you have to move a pump and dewater the area.

Q. And a lot of the time after you pump water out of the ash, the water will continue to fill in, correct?

MS. GALE: Objection. Vague.

HEARING OFFICER HALLORAN: I think you can rephrase that, Ms. Dubin. Thank you.

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BY MS. DUBIN:

Q. So after you've pumped water out of an area, does the water reappear?

A. Generally not. It's usually trapped by the ash itself. So when that area is pumped down and loaded into trucks and you go to the next area, it will -- and you disturb that area, then you will see water again. It's trapped within the ash or around the ash I should say.

Q. Now, I'd like to discuss drainage systems with respect to the relined ponds.

Are you familiar with the practice of installing a drainage system beneath pond liners?

A. I understand that could take place, yes.

Q. And a drainage system contains riprap, correct?

MS. GALE: Objection. Foundation.

HEARING OFFICER HALLORAN: I'm sorry, Ms. Gale?

MS. GALE: I'm sorry. Withdrawn.

BY THE WITNESS:

A. I -- I'm not an expert on underdrain

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systems. I guess they could, but I really don't know.

MS. DUBIN: And could we go off the record for just 30 seconds?

HEARING OFFICER HALLORAN: Sure.

(Whereupon, a break was taken after which the following proceedings were had.)

HEARING OFFICER HALLORAN: We're back on the record.

MS. DUBIN: We're almost finished.

HEARING OFFICER HALLORAN: Thank you.

BY THE WITNESS:

A. May I qualify my answer? My job as it's been and continues to be is as an observer of ash ponds, not a direct participant in the design and relining, even cleaning. I just see these things happening because I drive by, but I'm not involved in the design or the construction or the installation of liners or underdrain systems.

BY MS. DUBIN:

Q. So you've -- so is there a drain system in the east ash pond at Waukegan?

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A. I'm not sure.

Q. And is there a drain system beneath the liner in the west ash pond?

A. I'm not sure.

Q. And during your time at Will County, was there a drain system located beneath pond 3S?

A. I don't think so.

Q. And during your time at Will County -- and are you aware of any drain system being there now?

A. I'm not sure of that.

Q. And was there a drain system installed beneath the liner at pond 2S at Will County?

A. Probably not.

Q. Okay. Just two more questions about exhibits. The first one is Exhibit -- Respondent's Exhibit 605. I have a brief question about that.

A. 605 right here.

MS. GALE: Yeah, it's right here.

MS. DUBIN: Perfect. Sorry about that.

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BY MS. DUBIN:

Q. And are you familiar with this document?

A. May I look at it?

Q. Yeah, absolutely.

A. It's possible I have it. I don't really remember this.

Q. If you don't mind taking a look at page 23620.

A. Yes.

Q. You'll see a table there.

A. Mm-hmm.

Q. Would you mind taking a look at the bottom line of the table.

A. Sure. I see the bottom line.

Q. Your name appears on the bottom line of the table?

A. Yes.

Q. And so you were involved in this memo, correct?

MS. GALE: Objection. Mischaracterizes the document.

HEARING OFFICER HALLORAN: Rephrase.

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BY MS. DUBIN:

Q. What was your involvement in this project?

A. Just as a contact. I was the licensed wastewater operator in Will County and the ponds are part of -- licensed part of the system. So I was a subject matter expert in their use.

Q. And so they spoke with you -- they got information from you when writing this memo?

A. Who is they?

Q. The authors of the memo.

A. I don't remember talking to them.

Q. Do you know why you were listed on the -- in this memo?

A. As I stated before, I was the licensed wastewater operator, the NPDES permit operator, there and I, as such, was a subject matter expert in their use.

Q. And I'd like to now just turn to one more exhibit and this is Complainants' Exhibit 264.

HEARING OFFICER HALLORAN: Complainants' exhibit?

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MS. DUBIN: Complainants' Exhibit 264. This is our last exhibit, just a couple more questions.

HEARING OFFICER HALLORAN: No, that's fine. I just didn't hear it.

(Document marked as Complainants' Exhibit No. 264 for identification.)

BY THE WITNESS:

A. Yes.

BY MS. DUBIN:

Q. So I'd like you please to take a look at page 14527.

A. All right.

Q. Now, to the left of the -- now, this is a drawing -- or representation of Waukegan, is that correct?

A. Yes.

Q. And the area with the hashmarks, is it your understanding that those are the east and west ash ponds at Waukegan?

A. They look to be that way, yes.

Q. Now, if you go to the left of those ponds, you'll see a circle drawn in this figure,

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do you see that?

A. Is it like a handwritten circle?

Q. Yes, it's handwritten.

A. Sure. I see that.

Q. Do you know what this circle was meant to signify?

A. No.

Q. Is it your understanding that this is a circle that is in the area of the -- where you've seen the former slag/fly ash storage area at Waukegan?

A. Can you restate that?

Q. Sure. Would you mind -- where generally is the -- on this map is the former slag/fly ash storage area?

A. Again, from a historical basis, that area to the west of the west basin was used as a slag retention area.

MS. DUBIN: Mind if I have just 30 -- go off the record for 30 seconds and then I'll be finished.

HEARING OFFICER HALLORAN: Okay. Thank you.

MS. DUBIN: Thank you.

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HEARING OFFICER HALLORAN: Off the record.

(Whereupon, a break was taken after which the following proceedings were had.)

HEARING OFFICER HALLORAN: We're back on the record.

BY MS. DUBIN:

Q. Now, if you don't mind looking at page 14528. Do you see a circle around the east and west ash pond and a little bit beyond those drawn?

A. Yes, I see that circle.

Q. Do you know if this circle is meant to signify the extent of the ash pond in 1961?

MS. GALE: Objection. Foundation.

MS. DUBIN: Sure.

HEARING OFFICER HALLORAN: Go ahead. Sustained.

BY MS. DUBIN:

Q. If you don't mind taking a look at the bottom right-hand corner at the title of this, it says 1961 aerial photo, correct?

A. Yes.

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Q. So is it your understanding that the circle drawn here is meant to signify where ash is located onsite?

MS. GALE: Same objection. Foundation.

HEARING OFFICER HALLORAN: He can answer if he is able.

BY THE WITNESS:

A. I guess it's possible. I don't know what their intents were. I can't -- I don't know what they thought, but it's possible. It's interesting to see the Boiler manufacturer and the Tannery there, too, isn't it.

MS. DUBIN: No further questions.

HEARING OFFICER HALLORAN: Thank you.

MS. DUBIN: Thank you for your time.

HEARING OFFICER HALLORAN: Thank you. Do you need a moment, Ms. Gale?

MS. GALE: Just a moment.

HEARING OFFICER HALLORAN: Sure. Let's go off the record.

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(Whereupon, a break was taken after which the following proceedings were had.)

HEARING OFFICER HALLORAN: We're back on the record, Ms. Gale.

R E D I R E C T E X A M I N A T I O N

BY MS. GALE

Q. Mr. Veenbaas, you're almost finished. Ms. Dubin asked you a few questions about the flow-thru at pond 1N, do you recall that?

A. Yes.

Q. Now, that flow-thru, is that allowed by the NPDES permit?

A. Yes, it was still part of the path and it was submitted in the permit, yes.

Q. And you mentioned an outlet trough and what was that outlet trough made of?

A. Concrete.

Q. So it's all concrete?

A. Yes.

Q. So that's a liner?

A. Yes. Maybe yes.

Q. And then you discussed the overflow

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from pond 1N, do you recall that?

A. Yes.

Q. Did the station notify the agency?

A. Yes, we did. We had to write a letter of noncompliance for an unpermitted discharge.

Q. To your recollection, any response from the agency?

A. No.

Q. To your recollection, any violation notice in front of the agency?

A. None.

Q. I want to go to the SO2 ponds that were discussed, do you recall that conversation?

A. Yes.

Q. I think you said they were not used when you were there, do you remember that?

A. Yes.

Q. And Ms. Dubin pointed out some pages of your deposition. I believe she pointed out pages 26 and 27. I want you to go back to page 20. And can you please read to yourself on page 20 starting at line 18 all the way down to line -- page 21 line 12.

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A. All right.

Q. All right. So does that refresh your recollection?

A. Yes.

Q. Were those flue gas scrubber ponds ever used?

A. I can't say. I mean, they were not used when I was there.

Q. They were not used when you were there. And did you see any material in those that looked like flue gas scrubber bi-product?

A. I don't even know what that looks like, but, no, I didn't see any material in there.

Q. And so just -- and I think you said in your deposition on line 5 through line 8.

Q. So by 1999, they were no longer in use?

A. Well, before that even, yes.

Q. You don't know when they stopped being used?

A. No.

So they were -- they were -- they weren't used before you arrived at Will County, were they?

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A. Not that I know of, no.
Q. Okay.
A. Basically what they were, they were -- they stocked them with fish and people used to fish in them. That's how I know they were closed, but they had really nice bass in them.
Q. So could they more likely be natural?
A. It's possible, yes.
Q. So if they were natural, would there be a reason to line them?
A. Probably not.
MS. DUBIN: Objection.
HEARING OFFICER HALLORAN: Ms. Dubin?
MS. DUBIN: That's okay. He already answered.
BY MS. GALE:
Q. I now want to flip to the discussion you had on page 79 of your deposition. Ms. Dubin asked you lines 14 through 18 and I'm just going to read into the record lines 19 and 20 to continue it. "Over the water lines, above the water lines," is that your recollection?

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A. Yes.
Q. So was that -- were those areas in contact with any water?
A. No, they were not contacted with water. They were above the water line.
Q. And just to confirm we were talking about a couple of small holes that were discussed in the deposition that were less than three inches?
A. Yes.
Q. Mr. Veenbaas, when you say you are not aware of something, you're not aware either way, correct?
A. Right.
Q. So you simply have no knowledge when you say that?
A. Yes.
Q. And the tears Ms. Dubin asked you about in the exhibits introduced today, were they all repaired?
A. Yes. As far as I know they were, yes.
Q. Were they all above the water line?
A. Yes, they were all above the water

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line.

Q. And they were all above ash?

A. Yes, they were.

Q. So where were they again? Remind us.

A. They were above the water line, above the ash line.

Q. Towards the top of the pond?

A. Towards the top near the road, that circle on the ponds.

Q. If they were near the road, why would a tear occur up at the top?

A. It's a possibility of a snow plow hitting them. Possibility of a truck or something running wide on the road and damaging them that way. It's speculation.

Q. Sure. When a pond is out of service, is there less concern about a tear because it's not being in use?

A. Yes, if you don't have any water involved and there is no contact with water.

Q. You were asked about a couple inspection sheets that were introduced here.

At Waukegan, how often do you

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ask those inspections -- the CCR inspections to occur?

A. We like to have them done three times a week. The minimum is one. That's by law, but we try to do more than that just to make sure we have a good sense of what is going on with the ponds.

Q. And estimating since the CCR rules started requiring inspections, about how many sheets of inspections do you have in your operating record?

A. I would say several hundred, I guess.

Q. Several hundred?

A. Yeah.

Q. Close to thousands?

A. Maybe, yes.

Q. And I believe you were asked a couple of questions about dredging.

Just to clarify when you observed the contractor dredging, do they stay away from the sides?

A. Yes. Again, as I stated in my testimony, we have pylons or poles that denote

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where the incline going upwards from the bottom of the pond is and the contractors stay away from the sides because they know where that pole -- where the incline starts.

MS. GALE: Nothing further.

HEARING OFFICER HALLORAN: Thank you, Ms. Gale. Ms. Dubin?

MS. DUBIN: I do have just a couple of follow-up questions.

R E C R O S S E X A M I N A T I O N

BY MS. DUBIN

Q. First, you mentioned troughs being lined with concrete. Can fluid permeate through the concrete?

MS. GALE: Objection. Foundation.

HEARING OFFICER HALLORAN: Ms. Dubin?

BY MS. DUBIN:

Q. Is there any fluid that flows through the concrete?

MS. GALE: Same objection.

HEARING OFFICER HALLORAN: Overruled. You may answer if you're able.

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BY THE WITNESS:

A. If you're saying were there cracks in the concrete, no, there were not.

BY MS. DUBIN:

Q. Is concrete permeable?

MS. GALE: Objection. Foundation.

HEARING OFFICER HALLORAN: He can answer if he's able. Overruled.

BY THE WITNESS:

A. In my world, it's impermeable.

BY MS. DUBIN:

Q. And are you aware of any ash ponds being lined with concrete?

MS. GALE: Objection. Foundation.

HEARING OFFICER HALLORAN: I don't know about that. I think it's vague. Ms. Dubin?

BY MS. DUBIN:

Q. Is -- is concrete used as a material for lining ash ponds?

MS. GALE: Objection. Vague.

BY MS. DUBIN:

Q. To your knowledge.

MS. GALE: Anywhere?

HEARING OFFICER HALLORAN:

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Sustained.
BY MS. DUBIN:
Q. Are you aware of any pond -- ash ponds that are lined with concrete?
MS. GALE: Asked and answered and vague.
HEARING OFFICER HALLORAN: I didn't hear the asked and answered. Can you -- if he can answer, he can answer.
BY THE WITNESS:
A. I don't know what your definitions are. I mean, if you were to look at poz-o-pac, that could be a concrete-like substance, but it's not. It's a trademark substance, but it looks like concrete, but we have used poz-o-pac in our ash ponds at Will County and other places.
BY MS. DUBIN:
Q. If we don't mind jumping back to page 21 of your deposition, this is where you discuss SO2 ponds and this is confidential. So I'm just going to have you read and not out loud and this was a page that Ms. Gale had pointed him towards earlier.
If you don't mind just reading

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21 lines 13 through 23.

A. Okay.

Q. So have you seen any evidence of the contents or the bi-product that was stored in the pond of having been removed?

MS. GALE: Objection. Assumes facts not in evidence.

HEARING OFFICER HALLORAN: I'm sorry, Ms. Gale?

MS. GALE: Assumes facts not in evidence.

HEARING OFFICER HALLORAN: Ms. Dubin?

MS. DUBIN: I think we discussed earlier that this -- had stored content or at the very least we read it during Ms. Gale's rebuttal or rehabilitation and I just wanted to see because it's confidential I'm not sure how we can handle this just because I'm not sure if we should be reading it aloud. We could just maybe submit these pages into evidence or what is the best way to handle that?

HEARING OFFICER HALLORAN: Let's see if he can answer, is that okay?

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MS. DUBIN: Yes.

HEARING OFFICER HALLORAN: If you can answer, Mr. Veenbaas, please do so. Overruled.

BY THE WITNESS:

A. Can you restate the question?

BY MS. DUBIN:

Q. Sure. Are you aware of content being stored in those ponds?

A. No. There was a process there that occurred in the '70s, but I'm not sure how far the process went or how they used it. I don't know much about that whole situation.

Q. So, sorry, I'm just trying to figure out how to not restate something that is confidential.

I guess what were those ponds installed for?

MS. GALE: Objection. Assumes facts not in evidence.

HEARING OFFICER HALLORAN: Overruled. You can answer if able.

BY THE WITNESS:

A. Again, my -- my knowledge of this

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area is antidotal and historic. I knew that a process exists. I knew people who worked on it in the '70s, but I have no firsthand knowledge of what happened, how it happened, what the design of it was, whether the ponds were constructed or not. I just know from an antidotal point that those ponds were called the SO2 ponds. That was the jargon of the station.

BY MS. DUBIN:

Q. And from conversations with those people, did they mention that those ponds stored anything?

A. No, I had no conversations with anybody about these ponds relative to their work in that system.

Q. And I guess then based off of what you know or are aware of, what were those ponds installed to do?

MS. GALE: Objection. Assumes facts not in evidence.

HEARING OFFICER HALLORAN: He may answer if he's able.

BY THE WITNESS:

A. Again, I'm not sure. I'm not sure

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how the process worked. I don't even know what the bi-products were. It didn't last very long. It only lasted about a year and they closed it down.

BY MS. DUBIN:

Q. I feel there is sort of an impasse a little bit only because, again, this is a confidential section of your deposition transcript and it contradicts what you've testified to before.

MS. NIJMAN: Objection. Misstates.

MS. GALE: Misstates the deposition and misstates what he said today. I think the witness has repeatedly testified that he's only heard this from other people at the station. He has no other knowledge about what these ponds -- whether they were even completed and actually created.

HEARING OFFICER HALLORAN: That's what I've been hearing for the last five minutes. Ms. Dubin?

MS. DUBIN: Yes. So my concern is that what he is saying now might, at least for context, be a little bit different from what he

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has been deposed on and said in his deposition. If you look at pages -- page 20 line 22 through 21 line 4 and so, again, because this is confidential, but you referred us to this page earlier. I just don't know how to handle -- I'd like to kind of just point out the fact that there is something a little bit different on here.

MS. GALE: And, again, we object. We disagree that there is any discrepancy between what he testified to four years ago, which was I think in the '70s there was a pilot flue program, but it was not used while I was there. I think. I don't know. That is all he said in his deposition. If she wants to read in those lines, that's okay.

MS. DUBIN: All right. We'll read them in. Thank you. Would you be okay with me starting at 18, the question for context?

MS. GALE: Sure.

BY MS. DUBIN:

Q. Okay.

Q. Now, I want to ask you about a few more. SPD 8 on this map down at the bottom there, what did you -- what were those -- what was

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SPD 5? I'm sorry. I apologize.

SPD 5 on this map down on the bottom there, what did you -- what were those -- what was SPD 5 known to you as?

A. There was I think in the '70s there was a pilot flue gas scrubber operation and those ponds were installed to handle the flue gas scrubber, ash or bi-product, but they were not in use while I was there.

Does that refresh your recollection of those areas?

MS. GALE: Objection. That's exactly what he has been testifying to.

HEARING OFFICER HALLORAN: I agree. I'm not sure -- if he can answer, fine. I'm not sure where we're going with this, Ms. Dubin.

BY THE WITNESS:

A. I don't know much more I can say. I won't say any more. I think I've already testified to it.

BY MS. DUBIN:

Q. I'll move on. Now, you mentioned that all of the ash tears were located near the road, is that correct?

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A. Yes. Near the upper part of the line, yes.

Q. But when we spoke earlier, there were some instances that you didn't remember, correct?

A. Yes.

Q. So how did you know that these were located near the road?

A. I was thinking it was more of a mechanism standpoint from the tear it could have been caused by equipment or tires, but that's my main reason for saying it that way.

Q. But you don't know with certainty that these --

A. I can tell you with certainty they were all above the water line.

Q. And --

MS. DUBIN: No further questions.

HEARING OFFICER HALLORAN: Thank you, Ms. Dubin. Ms. Gale?

MS. GALE: Nothing further.

HEARING OFFICER HALLORAN: Thank you, Mr. Veenbaas. It's been fun, but I think you're finished. Let's go off the record for a

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minute. Thanks.

(Whereupon, a break was taken after which the following proceedings were had.)

HEARING OFFICER HALLORAN: We're back on the record. We're back from lunch. Ms. Gale?

MS. GALE: Yes, Midwest Generation calls Rich Gnat.

HEARING OFFICER HALLORAN: Mr. Gnat, please raise your right hand and Mr. Brickey will swear you in.

WHEREUPON:

RICHARD GNAT

called as a witness herein, having been first duly sworn, deposeth and saith as follows:

D I R E C T E X A M I N A T I O N

BY MS. GALE

Q. Mr. Gnat, can you just state and spell your last name?

A. Gnat, G-N-A-T, like that bug.

Q. What is your first name?

A. Richard.

Q. Mr. Gnat, who do you work for?

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A. KPRG & Associates.

Q. What is your position?

A. I'm a principal and my technical background is geology, hydrogeology.

Q. What educational degrees do you have?

A. I have an undergraduate in earth sciences from Northeastern Illinois University, a graduate degree in geosciences from the University of Illinois at Chicago and some postgraduate courses in hydrogeology from Eastern Michigan University.

Q. And can you just generally describe to me what you do at KPRG?

A. I am one of the owners of the company and our company specializes in soil and groundwater impact issues.

Q. And, generally, what kind of industries or companies do you work for?

A. We work primarily for the private sector. We do a little bit of work for municipalities, but primarily for the private sector, industry, the energy sector within the industry and also property transactions.

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Q. Okay. And you said power industry, does that include Midwest Generation?

A. That is correct, yes.

Q. Including the power plants that are the subject of this matter?

A. Yes.

Q. Related to the plants at issue here, what have -- what have you done generally?

A. KPRG has done a number of different projects at these facilities, but primarily here we do the groundwater monitoring and reporting aspect for the ash ponds at the facilities.

Q. And so you're familiar with the stations that are the subject here of this matter?

A. Yes, I am.

Q. Have you ever visited them?

A. Yes, I have.

Q. Generally, how often?

A. It depends on the year and what projects we might be doing at a facility, but, for example, at Joliet 29, at the Joliet station, I'm there several times a year, maybe five, six, seven times a year. At other stations, I may be there once a year.

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Q. And, generally, when did -- when did you start visiting the stations?

A. I believe our first work with Midwest Generation started somewhere in late 2002, earlier 2003 timeframe.

Q. And you were here last October, do you remember that?

A. Yes.

Q. And you established that KPRG conducts the groundwater sampling at the stations, do you recall that?

A. Yes.

Q. And regarding those groundwater sampling at the stations, when did you begin that work?

A. This work I believe we began towards the early part of 2012 if my recollection is correct.

Q. And did someone conduct the groundwater sampling before then?

A. Yes, they did.

Q. Who was that?

A. Patrick Engineering.

Q. And, to your recollection, when did

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they start sampling?

A. I believe that was the fourth quarter of 2010.

Q. And you said quarter, so how often are samples collected since fourth quarter 2010?

A. On a quarterly basis.

Q. What does a quarterly basis mean?

A. Once every three months.

Q. So from fourth quarter 2010 through second quarter 2017, to your recollection, how many rounds of sampling have been conducted at the stations?

A. I believe that's 27 quarters of sampling.

Q. And so when KPRG collects the groundwater samples, how does KPRG collect the groundwater samples?

A. Well, the first thing that we do is collect a round of water levels from all the monitoring wells and then groundwater sampling is initiated. We have -- most of the wells at the facilities we have outfitted with dedicated sampling systems. So it's a low flow bladder pump type sampling. There are a couple of wells at a

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few of the stations that don't have enough water column in the well to facilitate a pump and with those we would collect those with a bailer or a peristaltic pump.

Q. And once the samples are collected, what does KPRG do with them?

A. The samples are put directly into laboratory prepared containers depending on the sampling program, either filtered or unfiltered, and those containers are transported under chain of custody to the analytical laboratory for analysis.

Q. And once it's at the analytical laboratory, what does the laboratory do with those samples?

A. The laboratory inventories the sample, accepts them in and then performs the analyses required on the chain of custody and those reports are then provided back to KPRG and Midwest Generation.

Q. And how are those reports -- and by reports, you mean the results of the samples?

A. Correct.

Q. How do those reports get to KPRG?

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A. We get them in both a PDF file as well as an Excel file and the data is downloaded directly from the Excel file into our data sheets. So there is no manual transcription. It's a direct download from the laboratory.

Q. Mr. Gnat, I want to actually direct your attention to Midwest Generation Exhibit's 809, 810 and 811 and 812 generally and I'll give you a moment.

(Documents marked as Respondent's Exhibit No.'s 809-812 for identification.)

HEARING OFFICER HALLORAN: Ms. Gale, what was exhibits --

MS. GALE: Midwest Generation Exhibit's 809, 810, 811 and 812 and just for your information I won't actually be moving to admit these until much later in the direct.

HEARING OFFICER HALLORAN: Okay. Thank you.

BY THE WITNESS:

A. Okay.

BY MS. GALE:

Q. Generally speaking, what are

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Exhibit's 809 through 812?

A. These are summary data tables from all the groundwater -- various groundwater monitoring that we perform at the four facilities; Exhibit 809 being Joliet 29, 810 being Powerton station, 811 Waukegan station and 812 Will County station.

Q. And you said earlier that you download the information from the analytical company in an Excel spreadsheet, is that what these are?

A. That is correct, yes.

Q. Okay. And I believe last October we discussed some of the different categories of wells at the stations. Just to refresh all of our recollections, generally speaking, what are the different categories of wells at, for instance, Joliet -- Waukegan station?

A. Sure. At all four stations, we have what are called CCA monitoring wells, or Compliance Commitment Agreement monitoring wells. This is the well network that was agreed to be sampled on a quarterly basis within the context of the Compliance Commitment Agreement that was

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entered between Midwest Generation and Illinois EPA. Then we have a series of wells, some of which may overlap with the CCA wells, some of which don't. We call those our CCR wells and those are the wells that are identified as part of the new CCR rule developed by the US EPA Coal Combustion Residual rule.

So we have a CCR monitoring program and then in the case of Waukegan there is a subset of wells which we call the ELUC wells, E-L-U-C, and those are monitoring wells that were installed as part of an ELUC agreement between Midwest Generation and the property to the west, which was under site investigation and was determined to be impacting groundwater beneath the Midwest Generation site.

Q. Okay. And you mentioned the CCR wells versus the CCA wells and last fall we discussed the difference between the analytical method in those wells, but, again, briefly what is the difference?

A. There are two differences. There is a slight difference in the actual parameters listed between the two -- between the CCA and the

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CCR list, but for the most part they overlap pretty much. The main differences that under the CCA sampling we field filter the samples prior to preservation for metals analyses and that gives you dissolved metal analysis.

Under CCR, the federal requirement says that we are to analyze for total metals. So, therefore, the samples aren't -- aren't filtered in the field. They're poured directly onto the preservative within the lab container.

Q. Okay. And in this dataset, I guess I should ask first, did you assist in the creation of these tables?

A. These tables are created by my company by folks in my office and I do QA the tables as we put them together.

Q. And, by that, I'm talking about Exhibit's 809, 810 and 811 and 812 Midwest Generation exhibits.

A. Correct.

Q. And in Midwest Generation Exhibit's 809 through 812 comparing the CCA analysis versus CCR analysis if a well was analyzed pursuant to

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CCR analysis, is that reflected in the data tables?

A. That is correct. What we have in these tables if there is a well that is both sampled for CCA and CCR all that data is summarized in the data tables and at the bottom it's the CCA analysis. You'll see that it was -- there is a note that it was field filtered -- or that there is no field filtering. There are certain wells which we analyze for CCR parameters that are included here, but not part of the CCA program and that table it's specified -- at the footnote of the table, it's specified that those are not field filtered samples.

So all the data that we collect from the various wells from the two programs is in here and the distinction between which one is filtered versus not filtered is within the context of the field note -- footnote of the table.

Q. So I think I understood you correctly, if I understand you, if it is a CCA well those analyses are reflected in the exhibit, but if that well is also sampled via CCR, are those results in the exhibit?

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A. They're all CCA. They will all be dissolved metals results.

Q. So what does that mean for each -- for that individual well, how many results would there be?

A. If that well was installed through -- because some wells were installed after the fourth quarter of 2010, but let's say we have a monitoring well that was installed in the fourth quarter of 2010 through second quarter of 2017 we would have 27 quarters of data for that well in this table.

Q. And it wouldn't include the other data for the CCR analysis for that well, correct?

A. That is correct.

Q. And just to confirm when you conduct -- or excuse me. When KPRG conducts the CCA and CCR sampling, at what times do they conduct those samplings?

A. The samples are done concurrently as we're sampling for one program. You know, the field crew is out there and they will have a note, okay, this is a CCR well, sampling for that, a CCA well, sampling for that. And if it's a well that

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is for both, they will pull up a set of samples for CCA filter, a set of examples for CCR unfiltered.

Q. Generally speaking, last fall complainants introduced a series of various monitoring results. I believe they're on the table in front of you, do you recall that?

A. Yes, I do.

Q. And that data in -- generally speaking, is the data in those series of monitoring results reflected in these Excel spreadsheets prepared by KPRG?

A. Yeah, I'll just quickly check here to verify, but, yes, these exhibits here are individual reports for specific quarters or the fourth quarter annual type report from within our sampling program and these data tables here summarize all of the quarters that were done. So what you would have in these reports is a subset of the full package, which is in -- in the exhibit here.

Q. And you mentioned earlier that Patrick Engineering conducted the sampling before you -- Patrick Engineering conducted the sampling

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before KPRG took over?

A. Yes.

Q. Are those groundwater monitoring results from Patrick Engineering's sampling in the spreadsheets?

A. Yes, they are.

Q. And when you began in 2012, did you review Patrick Engineering's groundwater monitoring results?

A. Yes, we did. When the violation notices were issued, we were brought in along with several other companies to review the current status and we identified a number of transcription errors and corrected those errors.

Q. And by transcription errors, what do you mean?

A. It appears that at that time data was being received by the engineering company and placed by -- transcribed by hand into data tables and with the volume of data coming in, it was inherent to have some transcription errors and we found quite a few of them.

Q. And were those errors corrected?

A. Yes, they were.

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Q. Is the correct information in these spreadsheets?

A. Yes, it is.

Q. Okay. So for all the stations; Joliet 29, Powerton, Waukegan and Will County, to be clear, if a person wants to go to one place for all the relevant groundwater data, where would that be?

A. That would be within these data tables here. This is -- these packets include all the wells and all the sampling done for those wells.

Q. And you are pointing to Midwest Generation 809, 810, 811 and 812?

A. That is correct.

Q. All right. Mr. Gnat, moving onto another part.

Generally, when you're looking at groundwater, how do you determine its flow?

A. What we normally do, like I said, the first step in a round of groundwater samples we'll go out and collect a series of water levels from the monitoring wells. Those water levels are plotted on a map along the well and we also

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consider the surrounding area surface waterbodies and so on and we contour our groundwater flow maps. The water levels being elevations relative to mean sea level and we basically plot contours of equal elevation, equal head to create a groundwater contour map.

Q. And I believe you said this, but I just want to confirm.

Do you also consider the presence of surface water in your creation of the flow?

A. Yes, we do.

MS. GALE: Can I get the Joliet 29 groundwater flow map on the screen, please.

BY MS. GALE:

Q. There is a screen in front of you for ease on eyes.

Mr. Gnat, can you describe for me what you see on the screen, please?

A. This is a groundwater contour map for the April 2017 round of groundwater sampling. On this map, we have the monitoring wells that are sampled as part of the Compliance Commitment Agreement, the CCA program, and all of the water

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level elevations on those wells. And then the blue lines are the contour lines, the estimated lines of equal elevation, and those parallel the river and then the pink lines with the arrows are the groundwater flow lines in this flow map, which are, you know, roughly perpendicular -- perpendicular to the contour lines.

Q. And do you see under the words intake channel and Des Plaines River there are numbers, what are those?

A. Correct. That's -- that's plus or minus 505. That's an approximate elevation of the Des Plaines River and the intake channel in this area. It is part of the lock and dam system. So elevations are kept fairly -- fairly consistent through that lock and dam system.

Q. And is that the consideration of the surface water that you were talking about?

A. That is correct, yes.

Q. And do you take similar consideration of the surface water like this at the other stations?

A. Correct, where ones that are on the lock and dam system like this we take that into

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consideration, yes.

Q. Do you measure the surface water levels at each groundwater sampling event?

A. No, we do not.

Q. Why not?

A. It's not part of the program. We relatively know the placement of the surface waterbody and we can certainly complete a groundwater contour map relative to our regulated units without knowing the absolute level -- water level of that surface waterbody.

Q. And I believe you said up gradient well and down gradient well. Can you generally describe what you mean when you call it an up gradient well and a down gradient well?

A. Sure. The up gradient wells -- groundwater will flow from a higher elevation to a lower elevation or a higher head to a lower head. So up gradient wells will be wells that have water levels at a higher elevation than the wells down gradient and in particular of -- let's just, for example, use our regulated units here which are being monitored. The water levels -- the highest water levels are the ones that are up gradient or

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up flow direction of the unit and the lower water levels are down flow or down gradient.

Q. And, Mr. Gnat, how would you define background in groundwater?

A. You know, that -- it depends on what the purpose of your study is going to be you determine how you need to establish background. So, for example, the purpose of this particular monitoring well network, the purpose of this network is to determine and provide data as to whether or not the ponds may be leaking. That's what we need to monitor for.

So you do your up gradient well placement, especially knowing this is an old industry area, your up gradient well placement needs to be done close to the unit that you're going to be valuating so that you understand what that water quality is right before it flows past the unit that you're trying to evaluate.

MS. GALE: And, Mr. Hearing Officer, I just neglected to reflect that the screen that we are looking at is actually contained in Exhibit 246-M at MWG 13-15_62326.

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BY MS. GALE:

Q. So in an industrial area, would you use background from a municipal drinking water well?

A. That for the purposes of what we're -- what we're sampling for here, no, I would not.

Q. Why not?

A. Municipal water wells are developed and screened in a completely different manner than a monitoring well is and those are water wells for municipal water systems.

Q. And in this matter with regard to these four stations that are the subject of this matter, regarding the installation of the wells, what was the purpose of the study?

A. These monitoring wells were installed for the purposes of monitoring whether or not the ponds may or may not be leaking.

Q. Okay. And the results that came from those groundwater monitoring wells, how does Midwest Generation and Illinois EPA compare the results?

A. The results are compared to the

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Class 1 drinking water standards.

Q. And why is that?

A. Because the data from the monitoring wells has been somewhat -- it's hard to determine whether or not an ash pond is impacted or how it is impacted. The best level of measurement that we've been held against at that point and was the basis of the notice of violations by Illinois EPA has been the Class 1 drinking water standard.

Q. Mr. Gnat, you were here when Dr. Kunkel testified, correct?

A. Yes.

Q. And you're aware Dr. Kunkel created a background for the stations that are the four stations that are subject to this matter, correct?

A. Yes.

Q. Do you know how he created the background?

A. My understanding is Dr. Kunkel was using a median value that was part of an Illinois EPA publication and they -- that publication had some water quality median data developed for some various parameters from a series of sand and gravel municipal wells that were screened in sand

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and gravel and on a set of municipal wells that were screened in dolomite bedrock.

Q. The median value, what is your understanding of the background from that document related to the background, just median -- is there another consideration of that value?

A. The median is -- first, to understand what a median value is. You would take all the data in your background dataset, order it from highest to lowest and take the absolutely center value of that dataset. That's your median. But to really understand what that means you also have to understand what is the average of that dataset and what is the range of that dataset from which that that median was developed and all of that then puts the median into a context of some sort.

Q. And the community water supply wells that Dr. Kunkel relied upon, that's a statewide median?

A. Correct, it was generated from sand and gravel aquifer wells across a good part of the state, but certainly there are whole parts of the state that didn't have any data within that

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dataset.

Q. Mr. Gnat, can you open up Complainants' Exhibit 405, which should be in the binder entitled Kunkel exhibits. I'm pointing you to Figure 4, which is on page 7 Complainants' Exhibit 405.

A. Yes.

Q. And can you just tell us what that title is?

A. Sure. Figure 4 is titled Inorganic Water Quality Data Within Illinois Sand and Gravel Aquifers and the right-hand side of that figure is a map of the State of Illinois with a series of black dots which identify the community or municipal water supply wells from which data was used for this study.

Q. Okay. And those black dots, can you generally describe where they are?

A. Sure. They're located and centered around various river valleys. They're -- primarily the southern part of the state is poorly represented, but let's just look at relative to our plant sites. Up in the very far northeast corner where the Waukegan station would be, it

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looks like there might be one, maybe two samples from that location. There is absolutely no data from Cook County, Will County or DuPage County, which -- and our Joliet station and Will County station are from Will County. You know, those are the three most populated, most heavily industrialized areas in the state. There is absolutely no samples from those areas and then from where the Powerton station is that -- that part of the state is fairly well-represented with samples it appears.

Q. You can put that away. Thank you. You mentioned a range of values in considering a background.

So when Dr. Kunkel stated he would see values above the median background, does it necessarily mean it's above the range?

A. No, it does not.

Q. Can you give an example of that?

A. Sure. The median I believe that was being used for sand and gravel aquifers was 0.12 mg/L for boron. If something has 0.36 mg/L for boron, it can be easily said, boy, that's three times the median background. Well, that's

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correct. However, that -- all it is is above the median, but that background dataset had values ranging up to 0.7 in and of itself. So to say that that was above background, I think is a little bit incorrect. It's above the median for the background.

Q. So today for these sites, what would be a better comparison for the groundwater results coming in?

A. The comparison that we have been using and that Illinois EPA has been using has been the Class 1 drinking water standard.

Q. I just want to talk generally about GMZ's and ELUC's. We had mentioned earlier, and I think you just mentioned, that Illinois EPA issued violation notices to Midwest Generation based upon the groundwater monitoring results, do you recall that testimony?

A. Yes.

Q. And in response Midwest Generation entered into CCA's and agreed to take certain actions, were you involved with those actions?

A. Yes. In some of them, yes.

Q. What was -- how were you involved?

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A. Midwest Generation requested KPRG's assistance in, you know, first reviewing some of the data so that was already generated, the basis of the violations of notice, their notices of violation, and then we were also requested to assist in the development of the submittal packages for Groundwater Management Zones and for ELUC's, Environmental Land Use Controls.

Q. And what is a Groundwater Management Zone?

A. Groundwater Management Zone is an institutional tool as part of a remediation that is usually associated with an active remediation and that tool designates an area of groundwater that has been effected and within that designated area the Class 1 groundwater standard no longer becomes applicable.

Q. And yet once the GMZ is established, do you still compare the results of the Class 1 standard?

A. Sure. The Class 1 standard is used as -- as the form of measure for comparison purposes and ideally once all the values go below the Class 1 standard we can apply for removal of

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the Groundwater Management Zone designation.

Q. And you also mentioned an Environmental Land Use Control, which we call an ELUC, what is that?

A. That is another tool in the remediation box and institutional control tool which in this case it identifies that the designated parcel of land within the ELUC will have certain use restrictions and in our case the use restriction was not to allow the placement of any drinking water or potable water wells within that area. That is then -- once it's agreed upon with the DNR -- I'm sorry -- with the IEPA, it is registered directly onto the deed of the property.

Q. And what is the purpose of a use restriction in an ELUC?

A. The purpose, especially in the case of not allowing any potable water wells, is to basically remove any receptor, any risk -- receptor risk associated with that.

Q. Okay. We're going to move onto station by station. I first want to talk about the Joliet 29 wells.

MS. GALE: Can we get the Joliet 29

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map up? Thank you.

BY MS. GALE:

Q. At Joliet 29, how many wells are there?

A. There are 11 monitoring wells.

Q. And are they reflected on this map which is the map figure from exhibit -- Complainants' Exhibit 246-M?

A. Yes, they are.

Q. What are the up gradient monitoring wells?

A. In this case, the up gradient monitoring wells are MW-08, MW-10, excuse me, and MW-11.

Q. And what are the down gradient monitoring wells?

A. Down gradient monitoring wells would be MW-01, 02, 03, 04, 05, 06, 07 and 09.

Q. And in looking at the figure, what is the flow of groundwater at Joliet 29?

A. The flow is in a southerly direction.

Q. Towards what?

A. Towards the intake channel or the

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Des Plaines River.

Q. Last fall we discussed a number of groundwater monitoring reports and, in particular, as it relates to Joliet 29 they were exhibit -- excuse me -- Complainants' Exhibit 25-E, second quarter 2011 report; Complainants' Exhibit 243-M, the third quarter 2013 report; Complainants' Exhibit 244-M, the fourth quarter 2015 report; Complainants' Exhibit 245-M, the fourth quarter 2016 report; and Complainants' Exhibit 246-M, the second quarter 2017 report, do you recall that testimony?

A. Yes.

Q. And what is the timeframe of the groundwater monitoring results in these reports?

A. The overall timeframe on the groundwater monitoring is from the fourth quarter of 2010 through the second quarter of 2017 within these tables and within the reports that were issued.

Q. Okay. And turning to Midwest Generation Exhibit 809. Are the groundwater monitoring results reflected in the exhibits I just listed in -- with Midwest Gen Exhibit 809?

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A. Yes, they are.

MS. GALE: Mr. Hearing Officer, we move to admit Midwest Gen 809.

MR. WANNIER: No objection.

HEARING OFFICER HALLORAN: Thank you. Respondent's Exhibit 809 is admitted. No objection.

BY MS. GALE:

Q. Mr. Gnat, if you recall your testimony from last fall, what is adjacent to the north of the ash ponds?

A. At Joliet 29?

Q. I'm sorry. At Joliet 29, yes.

A. Yes, that's Channahon Road. I think that's US 6. Highway US 6.

Q. And can you remind us in the winter in Chicago what is spread on roads?

A. Salt. Road salt.

Q. And, again, to your recollection, what have you generally observed related to salt -- or I take that back. Strike that. What is a constituent of salt?

A. Chloride is one of the main constituents of salt.

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Q. To your recollection, what have you generally observed related to chlorides in the Joliet 29 groundwater samples?

A. Chloride is part of our groundwater monitoring list and I believe over the number of quarters that we've sampled that we have seen some temporal variation in chloride suggesting that the chloride we're seeing may be associated with the spreading of road salt.

Q. Okay. Great. Earlier you said you assisted Midwest Generation in preparing the GMZ applications, was that true for Joliet 29?

A. Yes.

Q. And was the GMZ established?

A. Yes, it was.

Q. After the GMZ was established, has Illinois EPA ever contacted you regarding any concern with the GMZ?

A. No, they have not.

Q. Okay. Mr. Gnat, in October, you told us that you inspected the northeast area at Joliet 29, do you recall that testimony?

A. Yes, I do.

Q. And you identified -- you identified

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various inspection reports from the northeast area, do you recall that testimony?

A. Yes.

Q. And, in particular, those exhibits were Complainants' Exhibit's 248, 249, 250 and 251, is that correct?

A. I don't remember the exhibit numbers offhand.

MS. GALE: Mr. Hearing Officer, I know these were split up in groupings, but were we still using N for those exhibits?

HEARING OFFICER HALLORAN: I believe -- we can go off the record.

(Whereupon, a break was taken after which the following proceedings were had.)

HEARING OFFICER HALLORAN: Back on the record.

MS. GALE: To correct what I just said, those were exhibits 248-N, 249-N, 250-N and 251-N and they should be on your table and I will help you find them.

MR. WANNIER: Your Honor, to clarify the record in case there is any confusion, we

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don't remember if we called it -- if we used the N after the group exhibit was removed and so we are happy to represent that 248 should be equivalent to 248-N, et cetera.

MS. GALE: I just want to make it easy for everybody.

MR. WANNIER: Yeah.

HEARING OFFICER HALLORAN: All right. Thank you. We may revisit this later, but you may proceed.

MS. GALE: Okay.

BY MS. GALE:

Q. Do you remember seeing those?

A. Yes, I do.

Q. Were you shown all the reports related to your inspections?

A. No, I was not.

MS. GALE: Mr. Hearing Officer, similar to what Ms. Franzetti did, I have checked with counsel, I would like to treat Midwest Generation Exhibit's 800, 801 and 802 together with your permission and my understanding there is no objection from complainants.

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(Documents marked as Respondent's Exhibit No.'s 800-802 for identification.)

MR. WANNIER: That's correct.

HEARING OFFICER HALLORAN: 800, 801 and 802?

MS. GALE: Mm-hmm.

HEARING OFFICER HALLORAN: That's fine. Thank you, yeah.

BY MS. GALE:

Q. In October, you discussed your inspections from 2009, 2010 and 2011. Here, can you just tell us what Midwest Generation Exhibit's 800, 801 and 802 are?

A. Sure. Exhibit 800 is the follow-up documentation for the exhibit that was presented earlier and this is the erosion repair documentation KPRG report dated September 26th, 2009, documenting the repair of any of the erosion features noted in our inspection report from 2009.

Exhibit 801 is a KPRG letter dated September 16th, 2010, to Midwest Generation documenting the erosion repairs performed that year as a follow-up to the inspection that was

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presented back in October of last year. So that documents that all of those items were properly addressed.

Exhibit 802 is a letter from KPRG to Midwest Generation dated September 22nd, 2011, also erosion repair documentation providing the specific documentation addressing the items that were identified in our inspection report for that year, which were the ones that were discussed in October. And then 803 --

Q. Wait.

A. Sorry.

Q. 800 to 802.

A. Sorry. I was on a roll.

Q. You were on a roll. Who prepared these reports 800, 801 and 802?

A. KPRG did.

Q. If you look at the second page, whose signature is on -- who signed the reports?

A. That is my signature.

MS. GALE: Mr. Hearing Officer, we move to admit Midwest Generation Exhibit's 800, 801 and 802.

HEARING OFFICER HALLORAN:

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Mr. Wannier?

MR. WANNIER: Your Honor, can we go off the record just briefly?

HEARING OFFICER HALLORAN: Sure.

(Whereupon, a break was taken after which the following proceedings were had.)

HEARING OFFICER HALLORAN: We're back on the record. Any objection, Mr. Wannier, to 800, 801, 802 of Midwest?

MR. WANNIER: No objection relying on opposing counsel's representation that this was not attempted to be introduced back in October, which we believe.

HEARING OFFICER HALLORAN: Okay. Thank you. Admitted. Thank you.

(Document marked as Respondent's Exhibit No. 803 for identification.)

BY MS. GALE:

Q. Mr. Gnat, can you turn to Midwest Generation's Exhibit 803?

A. Okay.

Q. What is this?

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A. This is a letter from KPRG to Midwest Generation dated September 26th, 2012, and it is a -- our inspection summary and erosion runoff -- erosion repair for that year as well.

Q. And turning to the second page, which is Bates numbered MWG 13-15_19475 at the bottom of the page, what is your observation of the prior repairs?

A. What we stated there is all other areas along the cover that have undergone repair over the last four years appear to be in good condition with no additional detrimental erosion effects being displayed at this time.

Q. So what does that mean to you?

A. That the repairs that were performed were done correctly and are holding up well.

MS. GALE: Mr. Hearing Officer, we move to admit Midwest Generation Exhibit 803.

HEARING OFFICER HALLORAN: Mr. Wannier?

MR. WANNIER: No objection based on the same representation.

HEARING OFFICER HALLORAN: Thank you. Respondent's Exhibit 803 is admitted.

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BY MS. GALE:

Q. Mr. Gnat, can you please turn to Midwest Generation Exhibit 804.

For the record, that's MWG 13-15_19483.

(Document marked as Respondent's Exhibit No. 804 for identification.)

BY THE WITNESS:

A. Yes.

BY MS. GALE:

Q. What is this?

A. This is a 2013 inspection summary letter from KPRG & Associates to Midwest Generation dated August 21st, 2013.

Q. And that's your signature at the bottom?

A. Yes, it is.

Q. What -- according to this report, what did you see on August -- excuse me. In your inspection in 2013?

A. In this report, we did not identify any areas on the cover that we felt needed any redressing or any repair from erosion or rilling

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over the course of the year.

Q. And if you look in the second paragraph, third sentence "All areas of previous repair were also closely inspected and the repairs have held up well and do not require any redressing," is that what you also did? You also looked at the old repairs?

A. That is correct, yes.

Q. And so what was your conclusions about the old repair?

A. That they're holding up quite fine and they did not need to be repaired or redressed.

MS. GALE: Mr. Hearing Officer, we move to admit Midwest Generation Exhibit 804.

MR. WANNIER: Again, no objection based on that representation.

HEARING OFFICER HALLORAN: Thank you, Mr. Wannier. Respondent's Exhibit 804 is admitted.

MS. GALE: Thank you.

BY MS. GALE:

Q. Mr. Gnat, can you please turn to Midwest Generation Exhibit 805. That's MWG 13-15_44147.

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(Document marked as Respondent's Exhibit No. 805 for identification.)

BY THE WITNESS:

A. Okay.

BY MS. GALE:

Q. What is this?

A. This is a letter from KPRG to Midwest Generation dated August 28th, 2014. It was the 2014 inspection summary letter.

Q. And what were your conclusions in this letter?

A. Similar as to the ones for 2013 where we did not notify any new areas of rilling or any erosional features that needed any repair and that the inspection of the repairs from the previous years also indicated that those are -- areas are fine and did not need to be redressed.

Q. And who signed this letter?

A. I did.

MS. GALE: Mr. Hearing Officer, we move to admit Midwest Generation Exhibit 805.

HEARING OFFICER HALLORAN: Mr. Wannier?

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MR. WANNIER: Again, no objection based on that representation.

HEARING OFFICER HALLORAN: So noted. Respondent's Exhibit 805 is admitted.

BY MS. GALE:

Q. Mr. Gnat, did you conduct an inspection in 2015 of the northeast area at Joliet 29?

A. Yes, I did.

Q. What did you see generally?

A. In 2015, I believe it was still in good condition and I do not recall having to do any repairs.

Q. And in 2016, did you conduct an inspection?

A. Yes -- yes, I did and I believe in 2016 it was in good condition. It had one area that I said I needed to go back in spring and make sure that it -- it was still the way it looked after the snow melt in the spring. I went back in the spring and the area hadn't changed any.

Q. For the past eight years of conducting your inspections of the northeast area and Joliet 29, has Midwest Generation ever

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disagreed with your conclusions?

A. No, they have not.

Q. Has Midwest Generation ever rejected one of your recommendations to repair?

A. No, they did not.

Q. Okay. And in your years that -- in the years that repairs were required, what was the cause of the erosion?

A. That was surface water runoff from the cap and surface water running. It's graded to be draining towards the river and surface water erosion.

Q. Where does that surface water come from?

A. Rainwater, snow melt.

Q. Was it water from the river?

A. No, it was not.

Q. And when you were out at the Joliet 29 station, have you ever seen any indication of river water flooding over the northeast area?

A. No.

Q. Do you recall Dr. Kunkel's testimony about your reports and inspections of that northeast area?

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A. Yes, I do remember parts of his testimony.

Q. What is your understanding of what he said?

A. My understanding is that he had indicated that some of the erosion features that we're talking about were caused by flooding from the Des Plaines River.

Q. Is there any basis in your reports prepared by KPRG to make that conclusions?

A. No.

Q. Do you recall Dr. Kunkel's testimony that there is contamination in the Joliet 29 wells as a result of the alleged ash in the northeast area of the site?

A. I believe he made a statement similar to that, yes.

Q. To your knowledge, is there any evidence that groundwater from the northeast area is flowing towards the Joliet 29 groundwater monitoring wells?

A. No.

Q. Regarding the Des Plaines River, I think you mentioned earlier there is a lock and

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dam system in the Des Plaines River?

A. Yes.

Q. What is your familiarity with the lock and dam system?

A. It's a system of locks and dams that locks in place for navigational purposes and dams installed, for amongst other reasons, for the flood control in the area and controlling water level fluctuations.

Q. So what does that result in?

A. That results in fairly stable -- or fairly stable pools of water within a stretch of river that is between two sets of locks and dams. So that water level is fairly controlled so that when you do have large precipitation events, they try and minimize as much as possible as to what that fluctuation is going to be to try to help control flooding in the area.

Q. And, to your knowledge, since sampling began in 2010, has there been a huge flood event in the Des Plaines River, a large flood event?

A. Not to my knowledge.

Q. Again, you were here when Dr. Kunkel

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testified, did you hear testimony regarding large flow discharge on the Des Plaines, do you recall that testimony?

A. I -- I recall he talked about an increase in discharge.

Q. And do you recall he testified there would be large fluctuations in the groundwater and the groundwater would rise and fall particularly in between sampling events?

A. Yes.

Q. Given the control of the lock and dam system on the river, would there be large sways in the groundwater that he -- in the groundwater that he described?

A. That -- the whole purpose of that system is to try and control those larger, fast increases in water levels within river bodies, within surface waterbodies so, you know, to the extent that the lock and dam systems purpose is to try to control that quick rise in water level to minimize flooding effects.

Q. And given the number of rounds of groundwater sampling, which have been 27 I believe you said, what have you seen in relation to the

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groundwater levels at Joliet 29?

A. Sure. Over 27 rounds, one of the things that I think was being described was if you have increased rise in the water level in the river, that will push water out into the bank of the stream and mix in with the groundwater. The question is what is the degree of that that happens. I mean, it's a well-known phenomena, but what is the degree of that stuff happening? You would see that is what is called a reversal of groundwater flow. Over 27 quarters of sampling, 27 rounds of groundwater measurements, we have not documented a reversal of groundwater flow beneath the ash ponds at Joliet station. The flow quarter to quarter is consistent from the north to the south towards the Des Plaines River, not the other way.

Q. Excellent. We are done with Joliet 29. We're going to move onto Powerton.

MS. GALE: Can I get the silty clay contour Powerton map up. For the record, Mr. Hearing Officer, these maps were part of a demonstrative that we filed earlier in the week and the reason why I say this is because the

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exhibits that have been entered have various groundwater contouring, but that oftentimes -- I guess -- sometimes did not take into consideration all of the -- all the wells present because there are so many different types of wells. So our demonstrative that we filed earlier this week does take into consideration all the wells.

HEARING OFFICER HALLORAN: Mr. Wannier?

MR. WANNIER: I'm sorry. So are you --

MS. GALE: It doesn't have an exhibit number attached to it.

MR. WANNIER: This does not have an exhibit number?

HEARING OFFICER HALLORAN: Let's go off the record.

(Whereupon, a break was taken after which the following proceedings were had.)

HEARING OFFICER HALLORAN: We're back on the record. Thank you.

BY MS. GALE:

Q. Mr. Gnat, on the screen in front of

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you, what do you see?

A. This is a groundwater contour map of the silt and clay unit at the Powerton station.

Q. Okay. First of all, how many wells are there at the Powerton station?

A. Between the CCA network and the provisional CCR wells, we have 19 wells within the area here.

Q. Okay. So you said that this is the silty clay contour map. Well, I'll ask it this way.

What is the groundwater flow at Powerton?

A. The Powerton station was determined to be a little bit more complicated. We ended up having two actual flow units or two groundwater flow units, but they're directly hydraulically connected to each other. The first one is a silty clay unit which is not a continuous unit which means it's not found throughout the whole study area here. So it was discontinuous and that -- that has one set of water levels and we have some wells screened within that unit and then there is a larger sandy gravel unit beneath that which is

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continuous beneath the site.

Q. And continuing with Midwest Generation demonstrative Exhibit 813, what are the wells in the silty clay unit?

(Document marked as Respondent's Exhibit No. 813 for identification.)

BY THE WITNESS:

A. The monitoring wells on this map that have a water level attached to them are the ones that are screened in the silty clay unit and those would be monitoring well's 8, monitoring well 6, 15, 14 and 12, I believe.

BY MS. GALE:

Q. Mr. Gnat, do you recall when it was discovered that there were two groundwater units?

A. Yes, after the notices of violation were issued, KPRG and several other companies were brought in to be -- to take a second look at all the information. Patrick Engineering was having a hard time understanding the flow system here because they were trying to develop groundwater flow maps using water levels from all of their monitoring wells.

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When we started looking at the construction drawings and the boring logs for the monitoring wells, we determined that a subset of those wells was actually screened in this discontinuous silty clay unit. So if we isolated, excuse me, the water levels from those wells and looked at that as one unit and isolated those from all the other wells which are screened down in that sandy gravel unit, that -- that it became a little more apparent and a little bit easier to understand that we actually had within that silty clay unit we had water at a higher elevation and it was flowing in a westerly direction and if you just looked at the water levels within the underlying sandy gravel unit, those water levels were a little bit lower than what we saw in that silt and the groundwater was flowing in a northerly direction with some northwesterly, northeasterly components as the further you go north.

Q. I believe you said Patrick was having some trouble understanding. Do you recall what their initial observations were?

A. They -- I believe their initial

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observations were they could not make a good determination of what was going on with the groundwater flow system. I really do not remember what their actual observations were.

Q. That's fine.

MS. GALE: Can we bring up the sand unit and actually, Mr. Hearing Officer, I was wrong. These maps are part of Complainants' 260-O, as in opossum. They're figure -- and they're on Midwest Gen 13-15_62538 and 62539.

HEARING OFFICER HALLORAN: So we're withdrawing?

MS. GALE: Yeah, we're withdrawing 813.

HEARING OFFICER HALLORAN: Thank you.

MS. GALE: And 62540.

BY MS. GALE:

Q. Mr. Gnat, I'm showing you the gravelly sand unit at Powerton which is located at MWG 13-15_62540 and Complainants' Exhibit 260-O, as in open, what is your -- what is the -- what is the groundwater flow here?

A. This is a map for May 2017 for the

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gravelly sand unit as opposed to that silty clay unit we just looked at and in this particular map you can see that groundwater flow is in a northerly direction, but there is some component of divergence there. Flow --

Q. What do you mean -- sorry. Go ahead.

A. Flow to the north, some flow to the west, a little bit of flow to the northeast.

Q. And at Powerton, what are the up gradient monitoring wells?

A. The up gradient monitoring wells, and that depends on the unit, you know, but the overall up gradient monitoring wells are MW-16 and MW-9, MW-18 and then, for example, you know, some wells would be down gradient of say, for example, the ash bypass basin, MW-11 is down gradient of that, but it's certainly up gradient still of the ash surge basin. So some of the wells do double duty, so to speak.

Q. Last fall, again, we discussed a number of groundwater monitoring reports regarding Powerton, do you recall that testimony?

A. Yes.

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Q. And those exhibits were Complainants' Exhibit 24.5-E, the second quarter -- the amended second quarter 2012 report; Complainants; Exhibit 256-O, as in open, the second quarter of 2013 report; Complainants' Exhibit 257-O, the second quarter 2015 report; Complainants' Exhibit 258-O, the fourth quarter 2016 report; Complainants' Exhibit 259-O, first quarter 2017 report; and Complainants' Exhibit 260-O, the second quarter 2017 report. Do you recall that testimony?

A. Yes.

Q. And do you recall the timeframe of the groundwater monitoring results in those reports?

A. The timeframe the groundwater monitoring has been from fourth quarter of 2010 through the second quarter of 2017.

Q. And turning to Midwest Generation Exhibit 810, Powerton Excel spreadsheets groundwater monitoring results.

(Document marked as Respondent's Exhibit No. 810 for identification.)

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BY MS. GALE:

Q. Are the groundwater monitoring results from the ones I just listed in Midwest Generation Exhibit 810?

A. Yes. Yes, they are.

Q. Okay. You said there were some new CCR wells at Powerton, what are those?

A. Well's MW-17, MW-18 and MW-19 were installed to support the new CCR rules.

Q. And if you turn to page 33 of Midwest Generation Exhibit 810 through 35 --

A. Okay.

Q. -- what do you see there?

A. This is the groundwater data generated upon the installation of those monitoring wells.

Q. So what is the timeframe for them?

A. That timeframe is -- for well 17, November 2015 through the second quarter of 2017, the same for MW-18 and I believe MW-19 was installed a little bit later. Yeah, MW-19 from November 2016 through the second quarter of 2017.

Q. So the groundwater results from Powerton for all of the wells, are they contained

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in Midwest Generation Exhibit 810?

A. Yes, they are.

MS. GALE: Midwest Generation moves for the admission of Midwest Generation Exhibit 810.

HEARING OFFICER HALLORAN: Mr. Wannier?

MR. WANNIER: No objection.

HEARING OFFICER HALLORAN: Respondent's Exhibit 810 is admitted.

BY MS. GALE:

Q. Mr. Gnat, were you here when Mark Kelly testified?

A. Yes, I was.

Q. And did you hear his testimony regarding using deicing materials at Powerton?

A. Yes, I remember this.

Q. And we discussed earlier the chlorides at Joliet 29 could be due to salt from Route 9, can you describe whether that's occurring at Powerton?

A. That is certainly, you know, again finding chloride in a number of the wells and it appears to have some seasonal or temporal

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variation to it that usually in our neck of the woods closely corresponds to the use of road salt during winter -- winter months.

Q. And do you recall his discussion about the east yard basin --

A. Yes, I do.

Q. -- which it was discussed in Midwest Generation Exhibit 711?

A. Yes, I do.

Q. Does that help in your conclusion you just stated about chlorides at Powerton?

A. Yes. I mean, that's consistent. Chloride was detected within the east yard runoff basin and that collects runoff from that whole area including all the roadways and so on which as Mr. Kelly indicated those are pretty heavily salted during the winter months.

Q. Mr. Gnat, can you please turn back to Midwest Generation Exhibit 810 and look at monitoring well 16, which is on page -- starts on page 31 -- starts on page 31 and goes through 32, page 32.

A. Okay.

Q. Looking at the results for nitrates,

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what do you recognize?

A. Nitrates are being detected at this location at concentrations above the Class 1 drinking water standard.

Q. To your knowledge, what are nitrates typically from?

A. From -- especially in our area, from fertilizer use.

Q. And by our area, what do you mean?

A. Illinois. Midwest.

Q. And --

A. Agriculture farming areas.

Q. In particular Pekin, does that also apply?

A. The Pekin area is within an agricultural community, sure.

Q. Let's look at the result of boron in MW-16.

A. Okay.

Q. What do you see there?

A. Boron in this well has quite a range of concentrations starting out, the non-detect to 0.13 and so and then we actually have concentrations in this location going up hit a

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high of one part per billion or 1.0 mg/L -- not parts per billion. Parts per million. In November 2015 and then a little back down again.

Q. Just to confirm, I believe you said earlier monitoring well 16 is up gradient?

A. Yes, monitoring well 16 was installed as an up gradient monitoring well at the request of Illinois EPA.

Q. So seeing boron at 1.0 mg/L, what does that mean?

A. To me, this shows that we do have some boron entering the property or entering the area at a level that gets up to one part per million boron.

Q. You can close that. Thank you. So Powerton as part of the response to CCA, did -- what did you assist in establishing at Powerton?

A. We assisted in establishing the Groundwater Management Zone, the ELUC, or Environmental Land Use Control, and we also installed that additional up gradient monitoring well that IEPA requested.

Q. And was the GMZ established at Powerton?

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A. Yes, it was.
Q. And after the GMZ was established, has Illinois EPA ever indicated any issues with the GMZ at Powerton?
A. No, they have not.
Q. And you said that you assisted in establishing the ELUC at Powerton, was it established?
A. Yes, it was.
Q. And upon establishment of the ELUC, what does that mean?
A. That once approved by Illinois EPA, the ELUC is placed on the deed and that restricts the possibility of installing a potable water well within the area designated.
Q. And, again, what is the purpose of the restriction?
A. The purpose is to remove any potential receptor.
MS. GALE: Mr. Hearing Officer, we're at a good breaking point. I don't know if you want to take the opportunity for lunch.
HEARING OFFICER HALLORAN: How do you feel about that, Mr. Wannier?

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MR. WANNIER: We're fine. I guess that will allow us to start earlier in the afternoon.

HEARING OFFICER HALLORAN: We can be back here at 1:10.

MR. WANNIER: Sure.

HEARING OFFICER HALLORAN: Off the record. Have a good lunch.

(Whereupon, a break was taken after which the following proceedings were had.)

HEARING OFFICER HALLORAN: We're back. It's about 1:15. We just came back from lunch. Mr. Gnat is still on the stand and Ms. Gale is continuing her direct.

MS. GALE: Can I get on the screen going back to Powerton actually the groundwater sand unit which is in Complainants' Exhibit 260-O on Midwest Gen 13-15_62540.

BY MS. GALE:

Q. Mr. Gnat, are you familiar with the term mounding?

A. Yes, I am.

Q. What is it?

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A. Mounding is an area of additional recharge to an aquifer, which then when you look at it can show divergent flow going in various directions away from that area.

Q. Have you ever reported seeing mounding at Powerton?

A. Well, on this figure here, what we're seeing is an area if you follow the contour 447 kind of loops up and around to the east of where the ash surge basin is and that's an area which shows some divergent groundwater flow from there going to the east, to the north and the west. So that is certainly an area where you see that type of a divergent flow pattern.

Q. Have you investigated why that is occurring?

A. Yes, we -- the way we interpret this is it's a function of that silty ash -- I'm sorry. That silty clay unit that sits above the sand and gravel and that unit is discontinuous as I had said before. So it's not -- it doesn't occur over the whole area. It's in a small, more isolated part of the study area and that particular feature goes right along side the east side of where that

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silty clay unit pitches out. So any of the monitoring wells if you remember that we had water levels from the silty clay unit and we had the groundwater flow going to the west, those were all wells that were along the eastern -- western side there of the ash surge basin and tucking up a little bit along the southside of that ash surge basin.

All the monitoring wells to the east of that are -- didn't see that unit. So what we have is that is the defining edge of that silty clay unit. So we have -- rather than water precipitation, water that infiltrates down through the ground getting caught up within that silty clay unit giving us higher water levels, it's actually recharging down into that underlying sand and gravel unit. So right -- that's basically marking that eastern edge of the silty clay giving extra recharge then down to the underlying sand and gravel and that's where you see the -- the divergent flow there.

Q. So is there mounding occurring in this diagram?

A. Due to the pitch out of that silty

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clay unit.

Q. So the mounding is caused by the silty clay unit?

A. Correct.

Q. Thank you. All right. Moving onto Waukegan. Actually, we are going to --

MS. GALE: Can we put the Waukegan groundwater map up. Mr. Hearing Officer, I'm handing out Midwest Generation Exhibit 813, which is the same map you see on the screen there.

MR. WANNIER: Just to be clear, this is replacing what had been previously marked, but was withdrawn as 813, right?

MS. GALE: Yes.

MR. WANNIER: Okay.

BY MS. GALE:

Q. Mr. Gnat, what do you see on Midwest Generation Exhibit 813?

A. This exhibit shows a groundwater contour map dated May 5th, 2017, developed by KPRG.

Q. And how many wells are at Waukegan?

A. Between all the different wells there are 16 monitoring wells there.

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Q. And what are the CCA wells?

A. The CCA wells, the ones that are monitored in accordance with the Compliance Commitment Agreement, are monitoring well's 1 through 4, 5, 6 and 7.

Q. Okay. Mr. Gnat, last fall again we all saw various monitoring reports that relate to Waukegan CCA's and those were Exhibit's 29-E, third quarter 2012 report; 267-P, the second quarter 2013 report; Complainants' Exhibit 268-P, the second quarter 2015 report; Complainants' Exhibit 269-P, the fourth quarter 2016 report; and Complainants' Exhibit 270-P, the second quarter 2017 report, do you recall that testimony?

A. Yes.

Q. And, again, what is the timeframe of those groundwater monitoring results?

A. Yes, through the fourth quarter of 2010 through the second quarter of 2017.

Q. And are the results from the exhibits I just listed contained within Midwest Generation Exhibit 812, the Waukegan Excel spreadsheet?

A. Exhibit 811, I believe.

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Q. I'm sorry. 811. Thank you.
A. Yes, they are.
Q. Can you take a look and just, for example, at monitoring well one on the first quarter 2017, has there been a change in the analysis?
MR. WANNIER: Objection. Vague.
HEARING OFFICER HALLORAN: Can you rephrase maybe.
BY MS. GALE:
Q. Monitoring well -- okay. The first quarter 2017, to your knowledge, what changes in analysis occurred at the Waukegan station?
A. The Waukegan station ash ponds underwent some additional modifications that the Illinois EPA issued a construction permit for and within that construction permit were some specific groundwater monitoring requirements which were similar, but a little bit different, again, from the CCA requirements and so we talked with Illinois EPA and they said to shift over to the requirements within the construction permit and so that monitoring started the first quarter of 2017 and, again, the main difference there being that

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we were analyzing for total metals. So the samples were not being field filtered.

Q. And are those results reflected in Midwest Gen Exhibit 811?

A. Yes.

Q. And at Waukegan, I think you mentioned earlier that you sampled the ELUC wells, correct?

A. Correct.

Q. What are those?

A. The ELUC wells I believe are well's 10, 11, 14 and 15.

Q. And we haven't --

A. And 12.

Q. And 12. Thank you. Aren't there also monitoring well's 8 and 9 that are sampled?

A. Yes.

Q. And, again, last fall we looked at monitoring results from those wells. Those were Complainants' Exhibit 216-I through 220-I and then Complainants' Exhibit 229-K through 235.5-K, do you recall that testimony?

A. Yes, I do.

Q. And are the results from monitoring

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well's 8, 9 and ELUC Tannery wells contained within Midwest Gen Exhibit 811?

A. Yes, they are.

MS. GALE: Mr. Hearing Officer, we move to admit Midwest Generation Exhibit 811.

MR. WANNIER: No objection.

HEARING OFFICER HALLORAN: Thank you. Respondent's Exhibit 811 is admitted.

BY MS. GALE:

Q. Mr. Gnat, we've listed monitoring well's 1 through 12 and 14 through 16. What happened to monitoring well 13?

A. Monitoring well 13 wasn't installed for the initial ELUC there. It's either been destroyed or buried. Nobody can find it.

Q. And what is the new CCR well at Waukegan?

A. MW-16.

Q. And are the results for MW-16 also in Midwest Gen Exhibit 811?

A. I believe so, yes. Yes, they are.

Q. The ELUC wells -- Mr. Gnat, why are they called the ELUC wells?

A. Those wells were installed by the

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consultant that was doing the work on the Tannery site investigation immediately west of the Midwest Gen property and as part of their investigation they determined that there was migration of various metals onto the Midwest Gen property and as part of their remediation they wanted to implement an institutional control of an ELUC that extends onto the Midwest Gen property and those monitoring wells were installed as part of that ELUC.

Q. Who installed the ELUC monitoring wells?

A. The consultant for the Tannery site. I don't remember who that was.

Q. Not you?

A. No.

Q. And you said there was historic contamination. To your knowledge, what is that historic contamination?

A. There are various metals that are coming onto the Midwest Gen property above standard which I believe includes arsenic, barium, I don't quite remember the full suite of parameters that were included there.

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Q. Does KPRG have boring logs for the ELUC wells?

A. No, we do not.

Q. Mr. Gnat, without boring logs, is there a method by which a consultant can determine the subsurface of the ELUC area -- the ELUC wells?

MR. WANNIER: Objection. Calls for an expert opinion. This is not a testifying expert.

HEARING OFFICER HALLORAN: Overruled. He may answer if he's able.

BY THE WITNESS:

A. If there are borings in the immediate area that are sufficient and go deep enough, you can make some interpretations off of those borings.

BY MS. GALE:

Q. And how would you go about doing that?

A. Well, you would obtain whatever information you can as to where those borings are located and review the boring logs and try and determine is that area sufficiently covered relative to the well that you're looking at.

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Q. And what sort of factors are you looking at to determine whether it's sufficiently covered?

A. How close or what the proximity of that boring is to the specific well boring or borings and then also how -- how deep are those borings versus the monitoring well.

Q. Mr. Gnat, do you recall the testimony last fall by Dr. Kunkel on relying upon the ENSR phase two boring logs to conclude on the subsurface of the ELUC wells?

A. Yes.

Q. Do you recall Dr. Kunkel stated that he relied upon boring logs in the ENSR phase two to determine the contents of the ELUC wells?

A. Yes.

Q. Can you please pull out Exhibit 19-D, which should be on your pile. I'll assist you.

Please go to Figure 5, which is at MWG 13-15_45817. What are we looking at here?

A. That is an ENSR site plan map that shows various boring locations.

Q. It's called the soil boring

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monitoring well site plan?

A. Yes.

Q. What is the scale of this site plan?

A. There is no scale.

Q. What does that mean?

A. That means that the locations are all relative and there is really no way to tell what the actual distances are one point to another on this map.

Q. To your knowledge from visiting the Waukegan station, approximately how big is it?

A. I believe it's a couple hundred acres.

Q. And this map is on an 8 x 11 sheet of paper. When comparing a map of a station such as Waukegan on an 8 x 11 sheet of paper that is a couple hundred acres, what would the distance on the map approximately be?

A. You know, there is no scale here. It is hard to tell. You know, half an inch could be a hundred feet. I don't know.

Q. So how can a person compare the location of boring logs from a site plan that is not to scale?

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A. It would be hard to do. There is a lot of guesswork at that point.

Q. Would you recommend it -- Strike that.

Have you reviewed the boring logs in Exhibit 19-D?

A. Yes, I have.

Q. Based upon your review of the boring logs, what is your observation of how the ELUC wells are screened?

A. I can't make a determination on how they're screened and the reason is because the boring logs that would be in the vicinity of those wells when I reviewed those boring logs they are four foot deep boring logs and so I can't make any interpretation on anything deeper than four feet.

Q. And are the ELUC wells deeper than four feet?

A. Yes, they are.

Q. And, to your recollection, and we can certainly turn to the boring logs if we need a reminder, what is contained within the boring logs near the ENSR wells?

A. If I remember correctly, the -- they

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are four foot boring logs and they show various either silty sands or sands and then some coal as well and I think there was up to two feet of coal layer here or there and there were certainly no ash that was logged in those monitoring wells.

Q. Thank you.

A. I'm sorry. Not monitoring wells. Borings.

Q. Thank you. You can put that away. Mr. Gnat, again looking at the map which is Midwest Gen Exhibit 813, what are the up gradient monitoring wells at Waukegan?

A. Up gradient being of the ash ponds?

Q. Yes, thank you.

A. Well's 5, 6, 8, 9, 10, 12, 11, 14 and 15.

Q. And what are the down gradient monitoring wells?

A. Excuse me. Down gradient monitoring wells would be well's 1 through 4, 7 being slightly side gradient and well 16.

Q. Looking at the figure in Midwest Gen Exhibit 813, what is the groundwater flow?

A. Groundwater flow beneath the ash

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pond area is to the east, southeast.

Q. Further west, how does that groundwater flow?

A. There is some divergence. There is some groundwater flow component that goes to the north, northwest towards the intake channel of Lake Michigan there into the plant or that might be the outfall and so there is some groundwater flow going in that direction as well.

Q. Mr. Gnat, we handed out this exhibit because it's not contained in the exhibits described previously, in particular the ones related to the CCA wells.

Can you explain why -- how this exhibit, Midwest Exhibit 813, is different from the maps that are in the previously entered exhibits?

A. Well, when we were initially doing the CCA monitoring and that being focused on the ash pond area, we basically were just highlighting the wells associated with that CCA monitoring and drawing the groundwater flow map with those wells. Taking a step back and taking the information -- water level information from all of the monitoring

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wells in the area that are outside of the CCA monitoring as well and putting that onto that map, that's how this map was generated to include all of that water level data.

Q. Right. So this map includes all the water level data from all the wells?

A. Correct.

Q. And looking at your flow, is it possible for some of the water from the western edge of the property to get to the eastern edge of the property? The groundwater. Excuse me.

A. Yes.

Q. Can you explain how, please?

A. Sure. The -- the groundwater flow -- the blue lines on this map are the lines of -- the groundwater contour lines are lines of equal elevation are ahead of the groundwater in the aquifer. The yellow lines are the flow lines and that flow path of groundwater is generally you would view it as periradicular to the blue contour lines. So if you follow the middle yellow arrow there which takes you from the eastern portion of the site where you've got well's 14 and 10, ELUC well's 14 and 10, there is clearly a flow path

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that takes water from that part of the site and moves it beneath the ash pond area.

Q. Okay. You can put that down. Mr. Gnat, we've been talking about the CCA process.

What did you assist in establishing at Waukegan as part of the Waukegan CCA?

A. The ELUC, Environmental Land Use Control.

Q. And, again, upon establishment of the ELUC, what does that mean?

A. That any -- that area has got now a land use restriction on it, it's on the deed and it restricts the ability of the installation of a potable water well on that part of the property removing any potential receptor.

Q. Sorry. Once again back to Midwest Generation Exhibit 813. Did KPRG create this map?

A. Yes, we did.

MS. GALE: Mr. Hearing Officer, we move to admit Midwest Generation Exhibit 813.

HEARING OFFICER HALLORAN: Mr. Wannier?

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MR. WANNIER: No objection.

HEARING OFFICER HALLORAN: Thank you. Respondent's Exhibit 813 is admitted.

BY MS. GALE:

Q. Mr. Gnat, can you please turn to Exhibit 806 in your binder?

A. Okay.

Q. What is this?

A. This is a document prepared by KPRG & Associates dated July 22nd, 2004, to Midwest Generation. It's a soil pile sampling summary.

Q. And who signed it on page 12812?

A. I did.

Q. Did you assist in the preparation?

A. Yes, I did.

Q. Can you turn to page Midwest Gen MWG 13-15_12811. The bottom of the page, what -- what is this regarding?

A. We were requested -- we were requested to collect some ash samples from around the pond area, one being from some ash that was staged just north of the pond as it was I guess being excavated and some from the bottom ash within the pond.

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Q. And you took the samples, did you analyze the samples?

A. Yes, we analyzed the samples for the ASTM neutral leach parameters to make a determination as to whether or not that material can be beneficially reused and we also analyzed the samples for Wisconsin Protocol B disposal parameters in case it could not be reused and would have to be disposed of in a landfill.

Q. I believe you said -- how did KPRG analyze the samples? What was the sampling analysis?

A. Well, for the determination of whether or not it could be beneficially reused, there is an ASTM standard, neutral leachate test, NLT, the exact number of the standard eludes me right now. So we used that analysis for that portion and in Wisconsin the Protocol B is a list of parameters that you analyze for the part of landfill disposal permits. So it includes TCL -- TCLP analysis, PCB analysis and so on just to document for the landfill that they can accept it as a nonhazardous waste.

Q. And the neutral leachate -- ASTM

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neutral leach standard, to your knowledge -- why did KPRG choose that analysis to determine whether it could be used as coal combustion bi-product?

A. That is the analytical protocol that is specified in the State of Illinois statutes and IEPA to make that determination.

Q. Can you please turn to the next page MWG 13-15_12812.

A. Yes.

Q. The first full paragraph there, what were the results of the neutral leach parameter test? Excuse me.

A. It states here that the results indicated that the neutral leach test results did not display any significant metals leachability.

MS. GALE: Mr. Hearing Officer, we move to admit Midwest Gen Exhibit 806.

HEARING OFFICER HALLORAN: Mr. Wannier?

MR. WANNIER: Your Honor, we -- would it be possible to ask just a couple clarifying questions about the redacted portions of this exhibit?

HEARING OFFICER HALLORAN: Ms. Gale?

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MS. GALE: Well, my recollection is that this was not objected to in our original exchange of exhibits with Mr. Gnat.

MR. WANNIER: We just want to make sure that none of the redacted portions have to do with the sites that are at issue here.

HEARING OFFICER HALLORAN: Let's go off the record a minute.

(Whereupon, a break was taken after which the following proceedings were had.)

HEARING OFFICER HALLORAN: We're back on the record.

MR. WANNIER: No objection to admission.

HEARING OFFICER HALLORAN: Thank you, Mr. Wannier. Respondent's Exhibit 806 is admitted.

BY MS. GALE:

Q. Thank you. Mr. Gnat, just from my recollection, have you visited the Waukegan station?

A. Yes, I have.

Q. And are you familiar with the

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neighbors of the Waukegan station?

A. Yes, I am.

Q. Can you please turn to Midwest Gen Exhibit 807.

A. Okay.

Q. What is this?

A. This is a map prepared by KPRG using a 1974 aerial photograph that identifies some of the surrounding properties around the Midwest Gen Waukegan station.

Q. And when was this prepared?

A. January of 2013.

Q. And looking at Midwest Gen 807, can you please describe the immediate neighbor to the Waukegan station?

A. To the north is the former Johns Manville site. That's the Superfund site. To the west is the Tannery site that we've been referring to. That's the former Greiss-Pfleger Tannery. Also to the west there of the ash pond is the former General Boiler property. Those two were Illinois EPA sites.

Then you have a little bit further to the south the former North Shore Gas

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North Plant, MGP. MGP being manufactured gas plant. I believe that's a Superfund site and then you've got to the south you have the North Shore Sanitary District property. I believe they're under a different name now. I think they changed their name. And then south of there is the former Johnson Motor Site, also known as Johnson Marine. That's another Superfund site.

MS. GALE: Mr. Hearing Officer, we move to admit Midwest Gen Exhibit 807.

HEARING OFFICER HALLORAN: Mr. Wannier?

MR. WANNIER: No objections.

HEARING OFFICER HALLORAN: Thank you. Respondent's Exhibit 807 is admitted.

MS. GALE: Can we put on the screen the groundwater flow map from Exhibit 281-Q for Will County.

BY MS. GALE:

Q. Mr. Gnat, do you recognize that on the screen?

A. Yes, I do.

Q. What is that?

A. That is a groundwater contour map

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for the May 2017 event drawn by KPRG and the date is June 2017.

Q. And, for the record, that is in Complainants' Exhibit 281-Q and the map is located at MWG 13-15_62473.

Mr. Gnat, at Will County, how many wells are there?

A. There are a total of 12 monitoring wells at Will County.

Q. And at Will County, what are the up gradient wells?

A. The up gradient wells are well's 1 through 6.

Q. And what are the down gradient wells?

A. Well's 7 through 12 and well's 11 and 12 are not on this figure.

Q. They are not on this figure. Mm-hmm. We'll get to that. Looking at this figure, what is the flow of groundwater?

A. The flow of groundwater is to the west.

Q. Okay. Mr. Gnat, what are the CCA wells at Will County?

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A. The CCA wells are the ones that are on this map well's 1 through 10.

Q. Last fall, again, we discussed a number of groundwater reports for Will County. Those were Exhibit's 30-E, the second quarter 2012 report; Complainants' Exhibit 278-Q, second quarter 2013 report; Complainants' Exhibit 279-Q, the second quarter 2015 report; Complainants' Exhibit 280-Q, the second -- excuse me -- the fourth quarter 2016 report and Complainants' Exhibit 281-Q, the second quarter 2017 report. Do you recall testifying about those reports?

A. Yes, I do.

Q. Can you please flip in your book to Midwest Gen Exhibit 812.

A. Okay.

Q. Are the groundwater monitoring results from the exhibits I just named contained within an Excel spreadsheet that is Midwest Gen Exhibit 812?

A. Yes, they are.

Q. And I think you said there are two new CCR wells, what are those?

A. Well's 11 and 12.

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Q. And if you flip to page 21 of 21, are the results for monitoring well's 11 and 12 contained within Midwest Gen Exhibit 812?

A. Yes, they are.

MS. GALE: Mr. Hearing Officer, we move to admit Midwest Gen 812.

MR. WANNIER: No objections.

HEARING OFFICER HALLORAN: Thank you. Respondent's Exhibit 812 is admitted.

BY MS. GALE:

Q. So, Mr. Gnat, after we have gone through Exhibit's -- Midwest Gen Exhibit's 809, 810, 811 and 812, if I wanted one place to go for all the groundwater data relevant to this case, where would that be?

A. That should be contained in these data tables.

Q. Thank you. At -- in response to the CCA's which we've been discussing, what did you assist in establishing at Will County?

A. I assisted in establishing the Groundwater Management Zone and the Environmental Land Use Control.

Q. Okay. And just remind ourselves,

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upon the establishment of a Groundwater Management Zone at Will County, what does that mean?

A. That's an institutional control as part of a more active remedy and that allows for groundwater quality to -- Class 1 standards do not apply.

Q. And after the GMZ was established at Will County, has Illinois EPA ever contacted you with regards to any concern with regard to the GMZ?

A. No.

Q. You said you assisted in establishing the ELUC at Will County, was that established?

A. Yes, it was.

Q. And, again, upon establishment of the ELUC, what does that mean?

A. That ELUC restricted the installation of any groundwater or any water -- potable water well within the area defined by the ELUC removing any human receptor.

Q. Mr. Gnat, on your table there if you can find Exhibit -- Complainants' Exhibit 284. And Complainants' Exhibit 284 starts at MWG

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13-15_49565. This is CCB determination support document that KPRG prepared, do you recognize talking about this last fall?

A. Yes, I do.

Q. And in this analysis -- excuse me. What were you analyzing in Complainants' Exhibit 284 or what was KPRG analyzing?

A. We were requested to collect some -- some bottom ash samples and we -- to determine whether or not they could be used for beneficial reuse. So we analyzed for the, excuse me, ASTM D3987-85 which is the neutral leach testing method specified in the Illinois statutes.

Q. Okay. And turning to the results page which is on page MWG 13-15_49568.

A. Okay.

Q. What were the results of the analysis?

A. That we had several conclusions here. One, that the ash deposits were consistent and homogamous. The data showed no outliers and based on our statistical analysis and the data itself that the material meets the requirements for beneficial reuse.

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Q. Mr. Gnat, we've talked a few times about this ASTM 3987 analysis and I believe you said it's because it's the analysis required by an Illinois statute termed CCB?

A. Yes.

Q. And, in fact, we know which one that is. If you turn to the first page of Complainants' Exhibit 284, in the second paragraph can you tell us what is -- what that statute number is?

A. The statute is 415 ILCS 5/3.135.

Q. Great. Mr. Gnat, can you please flip to Midwest Gen Exhibit 808 in your binder.

A. Okay.

Q. What is this?

A. This is the actual ASTM standard for the method specified in the code that we just talked about.

Q. And by actual, what do you mean?

A. This is the ASTM publication that defines the method.

Q. So it is the complete document, is that what you mean?

A. Yes.

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Q. And where can you get this standard or where could I get -- where -- did KPRG acquire this standard?

A. Yes. For the most part, you have to pay ASTM for the standard, but I believe I actually pulled this one off the Internet.

Q. So it's publicly available?

A. Yes.

Q. And what is this test used for?

A. Well, this test is the method that is specified in Illinois determination of whether or not coal ash can be used for beneficial reuse and if it can be classified as a coal combustion bi-product for beneficial reuse.

Q. Is it used on any other materials other than coal -- coal ash?

A. It may be. That's what I use it for.

Q. Is it used to determine hazardous waste?

A. No. No. This is not the method for determining hazardous waste.

Q. And looking at the top the D3987-85 (reapproved) 2004, do you know what those numbers

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mean?

A. Yeah, I believe -- ASTM has its own numbering system for its different standards. D I believe is for materials, 3987 is the number assigned to the method and '85 is the year in which it was written and in this case it was reapproved in 2004 with no changes to that '85 -- to the '85 version.

Q. To your knowledge, was -- did -- was it -- what happened in 2012 for the ASTM standard?

A. The ASTM standard -- modified standard was issued -- I believe ASTM D3987-12 was issued. So there was a slight modification in that standard relative to the procedure.

Q. So as this was adopted in '85, reapproved in 2004 and then up until it was reissued in 2012, from 1985 through 2011, how many changes to the sections of this method would there have been?

A. None.

Q. Can you please look in Section 4, the significance in use section on the first page of Midwest Gen Exhibit 808.

A. Yes.

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Q. What is that?

A. That is called significance and use.

Q. And what is contained within that entire section?

A. This is a section that's in most of ASTM's standards and it's a list of limitations and just kind of gives some notice as to what the uses of the test may or may not be and it's just that. It's for guidance. It's for the person that is going to use the standard to understand some of the potential limitations.

Q. And what do these limitations mean as to the usefulness of the sampling analysis?

A. That you need to consider these limitations in your interpretations and your use of the standard.

Q. Does it mean it's not useful?

A. No.

Q. Why not? Why is it not useful?

A. I mean, it is useful.

Q. Okay.

A. I'm sorry. I must have misunderstood the question. It is useful for anybody to understand what the potential, you

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know, risks are, limitations are to the test. So that as you're applying your interpretations you -- you are applying them correctly and so that's where that section comes in. It's qualifying out -- ASTM is qualifying out what the basis of the test is.

Q. You mentioned earlier that the standard changed in 2012, do you know the difference between the 3987-85, which was reapproved in 2004, and the new 3987-12?

A. Yes, I believe the only difference there was in the analytical procedure where the new test specified a modified temperature window I believe in which that analysis needs to be performed in the lab.

Q. And I see in some of these samples analyzed, in particular in Exhibit 284, it was -- used the '85.

Did you investigate whether the analysis conducted after 2012 complied with the new 2012 revision?

A. Yes, I called the lab up and talked with the lab. We went over the change in method there and the lab went through its data and

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determined that it was using the correct temperature range and so it met the requirements of the new standard or the modified standard as well.

Q. What does that mean, would the results have been any different?

A. No, the results meet the -- meet the standard requirements, the modified standard requirements.

Q. Mr. Gnat, do you recall that Dr. Kunkel had a discussion -- discussed the ASTM standard in his testimony?

A. Yes, I do.

Q. And do you recall that he relied upon two abstracts that were identified in his testimony as Complainants' Exhibit 409 and 410?

A. Yes, I do.

Q. Do abstracts contain all of the information related to a sampling standard analysis?

A. No. No. They're just what they say. They're an abstract, certain portions of it pulled out.

Q. So what is an abstract -- what is

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your understanding of an abstract?

A. It -- it pulls out certain portions of the document to highlight what is in the document, but it is not a complete copy of the document.

Q. Mr. Gnat, can you open the Kunkel binder again and we'll turn to Complainants' 409. What is that?

A. This is an abstract it appears here of the ASTM standard that we've been talking about and this is the '85 with the 2014 re-approval.

Q. And so that's not the complete version of the standard, is it?

A. No. No. It's just a small synopsis of Section 2 and Section 1 scope and Section 2 and then some key words.

Q. And does the -- what you're looking at in Complainants' Exhibit 409 contain the limitations that are in Section 4 of Midwest Gen Exhibit 808?

A. No. No. Those are not included at all.

Q. Do you recall -- do you recall testimony that the 2012 ASTM procedure for the

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shake test had some caveats in it that weren't in the previous version?

A. Yes.

Q. Was that correct?

A. No, I believe the abstract that was being referred to -- I'm sorry -- that's Exhibit 410. That is the abstract for this test method that was -- where the test method was revised in 2012 and that abstract includes -- that was pulled off the Internet includes the significant use limitations that I just talked about or that we talked about that were in Section 4 of the older version of the ASTM standards.

So the difference between the two abstracts was that the one pulled for the 2004 version didn't include in that abstract this significance and use limitation section and in 2012 they decided to include it in the abstract online.

Q. And just because it wasn't in the abstract for the 2004 version, does that mean it wasn't in the complete version?

A. No, it was clearly in the complete version we were looking at originally and when I

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compared the verbiage between this and what was in the older complete version, it's the exact same verbiage word for word.

Q. And looking at Midwest Gen Exhibit 808, even with these limitations, who relies upon this standard to conduct analysis?

A. This is the standard that is specified by the State of Illinois and US EPA to use for the determination of whether or not a coal combustion waste can be used or classified as a coal combustion bi-product for beneficial reuse.

MS. GALE: Mr. Hearing Officer, we move to admit Midwest Gen Exhibit 808.

HEARING OFFICER HALLORAN: Mr. Wannier?

MR. WANNIER: No objections.

HEARING OFFICER HALLORAN: Okay. Thank you. Respondent's Exhibit 808 is admitted.

BY MS. GALE:

Q. Mr. Gnat, back to talking about the Will County station.

To your recollection, did you conduct or did KPRG conduct a phase one and phase two neighboring property at Will County?

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A. Yes, we did.

MS. GALE: Can we bring up the map of -- Will County map?

BY MS. GALE:

Q. This is a map of Will County and it is part of Complainants' Exhibit 667.

MS. NIJMAN: Respondent's.

MS. GALE: I'm sorry. Midwest Gen 667.

BY MS. GALE:

Q. Where did -- where was the phase one and phase two of the neighboring property conducted looking at this map?

A. It was -- if you look towards the northside of the Will County station property, you've got the Des Plaines River to the west and then you'll see part of an island there in the Des Plaines River. That's the property on that island.

Q. And, to your recollection, what did KPRG find out about the property?

A. That was -- it's an industrial use property. It was a former 55-gallon drum recycling activity and our phase two work found

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various groundwater and soil contamination on that property associated with the old use of the property and contaminants included volatile organic compounds, metals, various polyaromatic hydrocarbons and PCB's.

Q. Finally, Mr. Gnat, based upon your years of working with Midwest Gen, how would you describe Midwest Generation's attitude and treatment as it relates to environmental compliance?

A. Midwest Generation for us has been a great client to work with. They're very knowledgeable and they're very proactive when it comes to environmental compliance and trying to comply with all the regulations.

MS. GALE: Can I have a moment, please? No further questions.

HEARING OFFICER HALLORAN: Thank you. Mr. Wannier, do you want a moment to collect your thoughts?

MR. WANNIER: That would be great.

HEARING OFFICER HALLORAN: We're off the record.

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(Whereupon, a break was taken after which the following proceedings were had.)

HEARING OFFICER HALLORAN: We're back on the record. Mr. Wannier is about to cross Mr. Gnat.

C R O S S E X A M I N A T I O N

BY MR. WANNIER

Q. Okay. Good afternoon.

A. Good afternoon.

Q. So I'm going to start by going sort of back through some of the questions that you were asked just this afternoon and this morning.

I think the first question is Exhibit's 809 through 812 you were asked several questions about those tables of groundwater data.

A. Yes.

Q. And I guess my question is I know that you -- they include both CCR and CCA data and that's indicated in the bottom of the sheets.

My question is, if the same well was tested both using the filtered sample and using the unfiltered sample, which of those two data points would be in the tables that you

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assembled?

A. The unfiltered sample.

Q. Okay.

A. No. I'm sorry. The filtered sample.

Q. Okay. So the filtered sample?

A. Correct.

Q. So if there were both a filtered sample and an unfiltered sample analysis of the same monitoring well at the same time, then the un- -- than the unfiltered sample would not show up in the tables that you prepared, is that correct?

A. That is correct.

Q. Okay.

A. And the reason being just I believe from previous testimony of Dr. Kunkel's he saw that -- when he looked at both the filtered and unfiltered data, that he really saw no difference between it. So for duplicity purposes, we just included the filtered sample data.

Q. Okay. And so when did you prepare these charts in Exhibit's 809 through 812?

A. These are cumulative over the course

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of all of the sampling. So as each sampling is done, the table is updated and so this is basically an endpoint at the end of the second quarter 2017 of all of our data.

Q. Thank you. And do you share these in the regular course of your business with Midwest Generation?

A. Yes, I do.

Q. So I guess just to clarify. As these were being prepared, you would send sort of constantly updated versions to them as part of your work for them?

A. With each quarter of sampling, we issue a quarterly report and that quarterly report includes that next quarter of data. Now, for purposes of, you know, as you see these tables get very long, within each quarterly report we include the new data for that quarter and the previous eight quarters. So the following one, you know, the table just kind of moves along, but at the end of the day if you just blow up one of our spreadsheets and hit the button you'll print out what you have at the back of your --

Q. Got it. Thank you. And you said

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you conduct -- I believe you said you conduct quality assurance on downloads of the lab results?

A. Right. When -- when the --

Q. Sorry. Go ahead.

A. When the lab package comes in, I certainly look at any of the qualifiers within that lab package to get an understanding of any lab issues and the data is provided within an Excel spreadsheet which is then directly downloaded into our database. So there is no manual transcription of those numbers.

Q. Okay. Thank you. Can you turn back to Complainants' Exhibit 246-M.

A. Thank you.

Q. Specifically -- sorry. We don't have it yet. Do you have it in front of you?

A. Yes, I do.

Q. And if you can turn specifically to I believe it was 62326.

A. 62326?

Q. 26, yes. As you recall, this was a map of groundwater contours at Joliet 29 that you were asked questions about earlier today?

A. Yes.

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Q. Okay. Now, if you look at the intake channel, you were also asked about the plus or minus signs at the beginning of that elevation.

A. Mm-hmm.

Q. And I believe you indicated that indicated some uncertainty, is that correct?

MS. GALE: Objection. Mischaracterizes his testimony.

BY MR. WANNIER:

Q. You can correct me if I'm wrong.

HEARING OFFICER HALLORAN: Overruled. Go ahead. I'm sorry.

THE WITNESS: I'm sorry.

BY THE WITNESS:

A. That is what would be called kind of an average pool level elevation based on the lock and dam system in the area there. So it's -- it's an estimated value. It could be 504.

BY MR. WANNIER:

Q. Is there a range on that uncertainty?

A. I don't know if I can quantify that.

Q. Okay. And what about the one -- do you see the Des Plaines River value also given

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there, is there a range on uncertainty on that figure value?

A. These are both -- so it's intake channel off the Des Plaines River. It's the -- the same -- same question, same answer.

Q. Okay. So you couldn't quantify that uncertainty either?

A. Correct.

Q. And how did -- how did you measure the surface water elevation that you have depicted in this map? Did you measure this surface water level?

A. I did not measure that, no.

Q. Where did that come from?

A. Again, from just general information between topographic maps and information off of various data in the area. You know, there isn't a specific gauge station right in the area of the plant here.

Q. Okay. And, to your knowledge, and I understand you collected this from other sources, does this figure represent an average elevation for that portion of the Des Plaines River and channel?

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A. I couldn't speak to that.

Q. Okay. So you wouldn't know if it represented a maximum or an average?

A. No.

Q. Okay. And we can go to them if you want to refresh your recollection, but we'll try first without.

You -- we also talked, as you remember, about contour maps at Waukegan and Will County and Powerton, do you recall that?

A. Yes.

Q. And do you remember in the Powerton contour analysis, do you provide any surface water elevations?

A. I do not believe there is a specific elevation on that map, no.

Q. Okay. And are you -- are -- do you have any knowledge about the elevation of relevant surface waters near Powerton?

A. I would have to go back to the USGS topographic map and take a look at that to be able to put a better number on it.

Q. Okay. Have you -- have you looked at the USGS topographical map to determine the

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listed surface water elevations for any areas near Powerton?

A. We have looked at it. I wouldn't remember -- I can't tell you what that number would be.

Q. Okay. Would you have used that number when determining the groundwater contours at Powerton?

A. Certainly knowing the surface waterbody is there, yes.

Q. Okay. But it's not in any chart that you provided?

A. No, it's not.

Q. Okay. Similarly, I guess the same question at Waukegan, did you provide any surface water elevation data for Lake Michigan or other surface waters near Waukegan?

A. No. We did not pull off a number and put it on that map, no.

Q. Okay. And have you -- would -- were you to try to find a surface water elevation, would you also be using the USGS surveys?

A. I go to the USGS survey and if we felt it became a truly critical number where we

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would need to have something quantified, then we could go to other sources to get a more firm number.

Q. Okay. And what would those other sources be?

A. We would define what the latest elevations in the area that might have been surveyed for Lake -- in the case for Waukegan, say in Lake Michigan. You know, I'd have to take a look at what -- what is out there on what they can obtain offhand and then track -- track down a number and if it truly becomes critical, you can have it surveyed.

Q. Okay. And then finally at Will County, did you provide any surface water elevation data for waterbodies near Will County?

A. I believe on the Will County map, around some of them, we may have included a number, but I'm not completely sure.

Q. Okay. That's fine. I'd actually be happy to turn to that if you want. I believe my notes state that is Exhibit 281-Q and I'll wait for you to have it in front of you. And if you have it in front of you, you can turn to 62473.

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A. Okay.

Q. Do you see a surface water elevation given in that map?

A. No, I do not.

Q. Okay. This, to be clear, is the groundwater contour map without which Ms. Gale was questioning you, correct?

A. Yes, it is.

Q. Actually, while we're on this map talking about Will County, no point in needlessly switching between exhibits, I believe you mentioned right at the end of your direct testimony that you could conduct the phase one and phase two on an island near the Will County site, is that correct?

A. Correct.

Q. Can you just point out for me where that is on this map?

A. Sure. I believe what you see in the far northwest corner of the map you see a little triangle of land sticking out.

Q. Is that the triangle of land that runs to the edge of the map?

A. Correct, it runs off the map to the

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north, northwest.

Q. Okay. So that's the island that you're talking about here?

A. Yes.

Q. And that's on the -- that's separated from the Will County site by a body of surface water, right?

A. Yes, it is.

Q. So, in your mind, would they be hydrogeologically connected?

A. Well, hydrogeologically connected to the Des Plaines River.

Q. They would both be connected to the Des Plaines River is what you're saying?

MS. GALE: Objection. Vague.

HEARING OFFICER HALLORAN: Yeah, can you rephrase? It might help. Thanks.

BY MR. WANNIER:

Q. Do you believe that groundwater from the island you conducted your study on could flow to the monitoring wells at the Will County site?

A. No, I do not.

Q. Okay. Okay. You can put that exhibit away. Thank you. I believe at several of

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the sites you mentioned the establishment of GMZ's and ELUC's and I know that you assisted in the creation of them and specifically as I recall, and you can correct me if I'm wrong, you testified that IEPA had not contacted you with any concerns about the GMZ's or ELUC's at any of the sites, is that correct?

A. After they had been established, correct.

Q. Yes, after they had been established. Just as a point of clarification, would IEPA have contacted you directly with any of those concerns?

A. That, I do not know. Probably not. I don't know.

Q. And if we can turn back to Joliet, we don't need to go to the exhibit yet. I just have a question of the inspections of that northeast ash impoundment area that we've discussed or that you talked about I should say earlier today.

In 2016, I believe you testified that there was one area that you went back to after your initial inspection to make sure it

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would still look the same for the review, can you just explain that a little bit better for me what happened there?

A. Sure. During the fall inspection, it was right by where a fence pole is in the ground, a fence pole being the fence that isolates the active part of the plant there from -- from the area to the northeast and right around the base of that fence pole it looked like there might be some erosion developing, but it really wasn't anything. I didn't see anything significant there, but I said I probably should check it after the snow melts in the spring and went back there and it looked the same.

Q. Sorry.

A. There was no change. So --

Q. So there was minor erosion, did you say?

A. Yeah, there just appeared to be some minor erosion.

Q. Okay.

A. When I do the inspections, I'm -- generally the rule of thumb, if there's a rill developing greater than four or six inches, than

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that rill needs to be addressed and this was certainly nowhere close to that.

Q. Okay. And you did an inspection in fall of 2017 as well?

A. Yes, I did.

Q. Did you inspect -- is that the area -- when you said you went back, was that the timeframe that you went --

A. No, I went back in spring of 2017 and then I did my annual inspection in the fall of 2017.

Q. Okay. Did you find -- see any difference in that area in the 2017 fall --

A. In that area, no.

Q. -- inspection? Okay. Thank you. Now, that ash landfill area in that northeast area of the site, is that capped?

A. I'm not aware of any information on that.

Q. Have you seen any evidence of a cap at that -- in that area?

A. I'm not aware of any and there is a soil cover and that's all I know.

Q. And is soil impermeable to the rain?

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A. It depends on the soil.

Q. Generally, as water falls from the sky, does it go into the soil in your experience?

A. Again, if it's a clay soil, it's not very permeable. If it's not a clay soil, it would have a higher permeability. So it truly depends on the soil cover.

Q. That's fair. Thank you. Do you know what type of soil is in the northeast landfill area?

A. No, I don't.

Q. Okay. And the repairs that you've discussed, you've discussed several repairs to this area over several years. When you mentioned --

MS. GALE: Objection. Mischaracterizes his testimony.

MR. WANNIER: I can rephrase.

HEARING OFFICER HALLORAN: Thanks, Mr. Wannier.

BY MR. WANNIER:

Q. You have discussed repairs that have been made to this northeast landfill area, correct?

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A. Correct.

Q. Okay. And are those repairs generally made to the riprap soil and vegetation?

A. Those repairs are -- well, there is no riprap. So --

Q. I apologize. I misspoke. Thank you.

A. Those repairs are made -- if I see a rill develop that starts exceeding, you know, my -- what I'm looking for, we usually bring in a clay soil fill material and topsoil.

Q. Okay. Have you ever taken any borings in the northeast landfill area?

A. No, I have not.

Q. Have you conducted any leach tests for the ash buried in that area?

A. No, I have not.

Q. Have you ever tried to estimate the volume of ash that is buried in that area?

A. I don't know if ash is buried in that area, but, no, I have not.

Q. And if we can discuss briefly the southwest ash landfill on the Joliet site, are you familiar with that?

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A. Yes, from the discussions. Yes.

Q. Okay. And, to your knowledge, is that southwest ash landfill area capped?

MS. GALE: Objection. Outside the scope.

HEARING OFFICER HALLORAN: I'll give him latitude. You may proceed. You can answer if you're able.

BY THE WITNESS:

A. I don't know.

BY MR. WANNIER:

Q. Are you aware of any evidence that it is?

A. I don't know. Not that I'm aware of.

Q. And have you ever taken or have you or anyone else, to your knowledge, taken borings from the southwest ash landfill?

A. In the southwest portion of the site --

Q. Yes.

A. -- at Joliet there, I have not taken any borings.

Q. And you're not aware of anyone else

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having done so?

A. Not that I'm aware of.

Q. Okay. And have you ever conducted leach tests in that area?

A. No, I have not.

Q. Are you aware of anyone else having done so?

A. I haven't seen any data, no.

Q. And, finally, have you ever tried to estimate the volume of ash in that area?

HEARING OFFICER HALLORAN: Can you keep your voice up, Mr. Wannier?

MR. WANNIER: I'm sorry. I'm normally a loud talker. I don't know why I get quiet, but I will speak up.

BY THE WITNESS:

A. That area was defined I believe in one of those ENSR reports. I don't know if there is ash in that area or not.

BY MR. WANNIER:

Q. Okay. And are you aware of anyone else attempting to quantify the amount of ash in that area?

MS. GALE: Asked and answered.

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Objection. Asked and answered.

MR. WANNIER: Your Honor, I asked if he had knowledge. I'm asking --

HEARING OFFICER HALLORAN: Overruled. You can answer if you're able.

BY THE WITNESS:

A. Not that I'm aware of.

BY MR. WANNIER:

Q. Just one final question about your inspections of the northeast area.

Are your inspections anything other than visual?

A. I walked the area and it is a visual -- very much a visual physical inspection.

Q. It's a very visual inspection. I think I understand that.

Do you do anything other than the visual inspection that you've testified to?

A. I am -- I'm not sure what other than that would be necessary for the inspection that is required to meet the permit.

Q. Okay. Thank you. If we can turn quickly to the -- you testified about the ASTM testing standard and I think you said that

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analyses done -- and I may have misheard you. So I'm going to apologize if I did. I believe you said analysis done after 2012 were consistent with the ASTM '87 standard as well as the '85 standard, is that correct?

A. It was -- I believe the use standard was issued in 2012.

Q. Okay.

A. The reference in the state statute is still the old reference, but certainly the analyses that are done in the analytical laboratory were consistent with the new standard.

Q. Okay. And just out of curiosity, have you determined whether analyses done before 2012 were consistent with the '87 standard? I know it was -- predates that.

A. It was the 2012 standard, not the '87 standard.

Q. I'm sorry. The 2012 standard is what I meant.

A. Yes. When I discussed with the lab, they said their analyses are within that window. Basically, the -- my understanding is that the window of temperature in which the analysis are

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done was -- was reduced a little bit in the new standard and the lab had indicated that their analysis run within that window. So my understanding is yes.

Q. Thank you. Now, you were asked about the background groundwater quality data that Dr. Kunkel cited, do you recall that?

A. Yes.

Q. Yes. And you suggested I believe that the statewide median might not be the best representation of background, is that correct?

A. For -- for our purposes, yes.

Q. And I guess furthermore just to confirm you said instead you would compare to the Illinois Class 1 groundwater quality standards?

A. That is what Illinois EPA has been using as our measuring stick.

Q. So do Illinois groundwater quality standards reflect background?

A. The groundwater quality standards my understanding are water quality standards developed for -- based on health risk purposes for consumption of groundwater.

Q. Okay. But they don't reflect

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background concentrations, do they?

A. They might. They night not. It's a different question.

Q. So, okay. I understand that the standard might happen to be the same as the background standard, but as a general rule they wouldn't --

A. Background is not a standard.

Q. I'm sorry.

A. The Class 1 drinking water is -- is an established standard. Again, that may or may not be reflective of background in a particular area.

Q. Okay. You also said that after a groundwater GMZ is established you would continue to monitor data and that when the data fell below the standard, the Class 1 groundwater standard, that the GMZ might be lifted, is that right?

A. That is correct. The GMZ is an institutional control tool as part of the overall remedy and at the end of the day you get to a point where I believe you have the state requires two or three, maybe four quarters of data in a row where if all of your values are below the Class 1

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standard the GMZ can be lifted.

Q. Okay. So does that mean that over time, water quality in a Groundwater Management Zone should be improving?

A. It may be improving over time, correct.

Q. Is that part of the purpose of the Groundwater Management Zone?

A. The purpose of the Groundwater Management Zone is to provide some relief from the Class 1 standard as the remediation is working its way through the system basically, yes.

Q. Okay. And you were also asked whether -- actually sticking to the Joliet site, you were asked about whether contamination from the northeast ash area might be moving towards monitoring wells located at the Joliet 29 site, do you remember that?

MS. GALE: Objection. Mischaracterizes the testimony.

HEARING OFFICER HALLORAN: Could you read the question back, Mr. Brickey.

(Whereupon, the record was read as requested.)

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HEARING OFFICER HALLORAN: Yeah, overruled. You may answer if you're able.

BY THE WITNESS:

A. I remember the question, yes.

BY MR. WANNIER:

Q. Do you remember what your response was?

A. That, I do not believe so.

Q. Have you seen any groundwater elevation data from the area of the northeast Ashland fill?

A. No, I have not.

Q. Okay. And have you seen any groundwater quality data from that area?

A. No, I have not and neither -- because I believe there was an indication that there was groundwater movement towards that area and that interpretation was based without any data as well.

Q. Understood.

MR. WANNIER: Your Honor, if I can just have a couple of minutes, I think we're nearing the end.

HEARING OFFICER HALLORAN: Yeah,

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we've been at this for an hour and 20 minutes. Do you want to take a 15-minute break?

MR. WANNIER: That would be perfect.

HEARING OFFICER HALLORAN: Thank you.

(Whereupon, a break was taken after which the following proceedings were had.)

HEARING OFFICER HALLORAN: We're back on the record. It is approximately seven minutes to 3:00. Mr. Gnat is still on the stand and Mr. Wannier is still on cross.

BY MR. WANNIER:

Q. Okay. So just one more question about the northeast landfill area at Joliet. I think you testified that you do not think the erosion that was found -- has in the past been found in that area was caused by the river, is that right?

A. Correct.

Q. What do you think caused the erosion in that area?

A. That is erosion caused from surface water runoff from the cover area to the -- get my

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directions straight here -- to the south. It's not caused by -- by the river coming up or any -- there is never -- I have never seen any indication of flooding or any sedimentation or siltation or anything like that that you would see that would be the result of the river coming up and causing some type of effects. This is strictly surface water runoff causing the rills.

Q. In your opinion?

A. It is strictly surface water runoff causing the rills.

Q. And we discussed the Class 1 groundwater standards a little bit before, do you believe those standards are derived from any ambient groundwater data?

A. My understanding on the Class 1 drinking water standards is very much a health risk based standard. Now, everything that goes into generating that standard I can't say that I know that -- what everything that goes into generating that standard, but those are health risk consumption based is my understanding.

Q. Okay. And if you can turn to exhibit -- let's start with Complainants' Exhibit

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264, which I laid out in front of you and it's actually on the page that I'm going to ask about which is Bates Midwest Gen 14528.

A. Yes.

Q. Do you -- do you recognize this map?

A. Yes, this is a 1961 aerial photograph of the Waukegan station area that KPRG developed dated January 14, 2013.

Q. Okay. Do you see the -- it's hard to know how to describe the shape, but do you see the black roughly round area or line around what -- an area marked as the present ash pond boundary?

A. Yes, I do.

Q. Do you know what that larger black line is intended to represent on this map?

A. No, I don't. I don't know who drew that on this map.

Q. Okay. Did someone at KPRG draw that on this map?

A. I don't know.

Q. Could that be the former extent of the ash impoundment area as of 1961?

A. I don't know.

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Q. Okay. That's fine. Let's turn to Exhibit 813, Respondent's Exhibit 813, which is open before you in the binder.

A. Okay.

Q. And this is, of course, the -- or to confirm, this is the groundwater contour map at Waukegan that you discussed with Ms. Gale earlier today, correct?

A. Yes, it is.

Q. Okay. Now, I know that you said you weren't able to find monitoring well 13, do you remember where roughly it was intended to go?

A. Yes, I do.

Q. Can you point me to that on the map?

A. It would be to the east, southeast of well MW-11 there in the -- you can kind of see the rail yard area there. It was I believe within some of those -- there's kind of a long green area there between two railroad tracks. I believe it was somewhere in there.

Q. Okay. And you said that -- why was monitoring well 16 added?

A. Monitoring well 16 was added as part of compliance with the CCR regs -- regulations

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when they came out. We decided that for CCR compliance purposes adding a well where we have MW-16 is what we needed to do.

Q. Okay. And what was the original intent of monitoring well 13, if you recall? What was the purpose of that well?

MS. GALE: Objection. Foundation.

HEARING OFFICER HALLORAN: Can you elaborate a little more?

MR. WANNIER: Sure.

BY MR. WANNIER:

Q. Were you familiar with the Waukegan site when monitoring well 13 was first installed?

A. I think I can clarify this. Monitoring well's 11 on here that we have MW-11, 14, 10, 12 and 15 are all wells that were installed that we refer to in our reports in the data as ELUC wells.

So ELUC 10, ELUC 12, 13. So well 13 was installed as part of the ELUC wells by the consultants that was working for the responsible party for the Tannery site to the west. So that was one of the original ELUC wells if you want to call them those.

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Q. Yeah.
A. Not anything that KPRG installed.
Q. Right. And you testified to that earlier. So I guess my next question is, are you familiar with the process by which the Tannery site consultant sited those wells?
A. No, I'm not.
Q. Okay. That's fine. Thank you.
MR. WANNIER: No further questions.
HEARING OFFICER HALLORAN: Thank you, Mr. Wannier. Ms. Gale?
MS. GALE: Very briefly.

R E D I R E C T E X A M I N A T I O N

BY MS. GALE

Q. Mr. Gnat, I'm going to help you pull out Complainants' Exhibit 278-Q.
Can you please turn to Figure 2, which is at MWG 13-15_6675.
A. Yes.
Q. And this is a contour map from June 2013?
A. Yes, it is.
Q. And at what station?
A. Will County station.

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Q. And looking at -- well, it's not labeled. What is the waterbody to the west of the ash ponds?

A. That is the Des Plaines River.

Q. And what is the number contained in the Des Plaines River?

A. Plus or minus 579. That's the approximate elevation and that's why when I was asked I said I remember sometimes we had that on the map for Will County, sometimes we didn't. The particular example that I was asked to look at before did not include the number. This one does.

Q. Thank you. You can put that away. Mr. Gnat, you were asked about at Joliet 29 the southwest area and I believe you said you were aware of it from the discussions, do you mean the discussions that you've heard here during this hearing?

A. That is correct, yes.

Q. And before this hearing, had you ever heard of the southwest area being full of ash?

A. No, I have not.

Q. Have you ever been over there?

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A. I might have walked over it, but not knowing.

Q. Not knowing?

A. Right.

Q. Mr. Gnat, can a soil cover be a cap?

A. Yes, it can.

MS. GALE: Nothing further.

HEARING OFFICER HALLORAN: Thank you, Ms. Gale. Any re-cross, Mr. Wannier?

MR. WANNIER: Yeah, just very, very briefly. First of all, thank you to opposing counsel for finding that.

R E C R O S S E X A M I N A T I O N

BY MR. WANNIER

Q. If you can turn back to 278-Q page -- Midwest -- Bates 6675. Midwest Gen 6675.

Just to confirm the 579 figure, did that come to your knowledge from the US Geological Survey?

A. I believe that was off of a USGS map, correct.

Q. There is, again, this plus or minus. Are you able to quantify the uncertainty on this figure?

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A. No, I cannot.

Q. And have you made any independent efforts to determine the surface water elevation here?

A. In these particular instances, we didn't feel we had to really quantify that number to be able to have an understanding of what -- of the groundwater flow beneath the ponds here.

Q. Okay. So just to confirm. You didn't do your own analysis of that surface water elevation?

A. We didn't feel it was needed, no.

MR. WANNIER: Thank you. No further questions.

HEARING OFFICER HALLORAN: Thank you, Mr. Wannier. Ms. Gale, anything?

MS. GALE: No.

HEARING OFFICER HALLORAN: Thank you. Mr. Gnat, thank you and it's been a blast as it has been with Mr. Veenbaas, et al.

THE WITNESS: Thank you very much.

HEARING OFFICER HALLORAN: We can go off the record for a minute.

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(Whereupon, a break was taken after which the following proceedings were had.)

HEARING OFFICER HALLORAN: All right. We're back on the record. We have Midwest Gen's next witness. Ms. Nijman?

MS. NIJMAN: Yes, our next witness we are calling is John Seymour.

HEARING OFFICER HALLORAN: Mr. Seymour, good afternoon. If you can raise your right hand, Mr. Brickey will swear you in.

WHEREUPON:

JOHN SEYMOUR

called as a witness herein, having been first duly sworn, deposeth and saith as follows:

D I R E C T E X A M I N A T I O N

BY MS. NIJMAN

Q. Would you state your name again for the record, sir.

A. John Seymour.

Q. And where are you employed?

A. Geosyntec Consultants in Chicago.

Q. What is your role there?

A. I'm a senior principal. I practice

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in geotechnical engineering and remediation practices.

Q. Remediation?

A. Practices.

Q. Practices. Have you been retained by Midwest Generation for this matter?

A. Yes, I have.

Q. And for what purpose were you retained?

A. To provide my opinion on the conditions at four power plant sites and an opinion on the opposing expert's expert testimony and reports.

Q. If you -- you have a binder in front of you.

A. No, I don't.

Q. You have a million binders in front of you.

A. Thank you.

Q. If you turn to exhibit -- what has been marked as Exhibit 900.

A. Yes.

Q. What is that document?

A. That's my resume.

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(Document marked as Respondent's Exhibit No. 900 for identification.)

BY MS. NIJMAN:

Q. And is that the resume that was previously attached to your expert report in this case?

A. It appears to be, yes.

Q. Is your employment history and your education on that resume still correct?

A. It is the same.

Q. You have a Master of Science in Geotechnical Engineering from University of Michigan?

A. Yes.

Q. And you have a Bachelor of Science in Civil Engineering from Michigan Technical University?

A. Yes.

Q. I'd like to flip quickly to get a description on the next document, what has been marked as Exhibit 901, would you generally just describe what this document is?

A. Yes, this is a Power Point

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presentation printout of the -- pretty much the testimony that I'm going to be providing today that I prepared.

Q. Now, the second -- let's bring it up. The second page of your Power Point -- and I'm also bringing it up on your screen in front of you.

A. Yes.

Q. Now, it says here you have about 14 years of experience with CCR's, what are CCR's just so we're all clear?

A. Coal Combustion Residuals. It's the US EPA term for things you've been calling coal ash and similar.

Q. And we've heard several times already the coal ash we're talking about here is bottom ash?

A. Yes.

Q. Now, you say on this slide two that you have experience at dozens of ponds, CCR ponds and landfills. If you turn to the next slide, slide three.

A. Okay.

Q. Does this provide, slide three, some

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of your recent CCR experience?

A. Yes, this is some recent stuff and update to provide a little more experience relative to this matter.

Q. I'm just noting for the record CCR surface impoundment closure plan in Illinois, you handled a CCR surface impoundment closure design in Illinois, groundwater monitoring systems at -- CCR assessment in Ohio and Kentucky, you've worked on CCR sites in Ohio, West Virginia and Michigan, did I read that correctly?

A. Yes, you did.

Q. Are you familiar with the term beneficial uses of coal ash?

A. Yes, I am.

Q. What does that mean?

A. Well, as the ash comes out of the furnace and stack, it gets collected and reused in various ways and about 40 percent of it gets reused in the commercial marketplace.

Q. Generally, is bottom ash safe to be used as CCB?

A. Yes, generally it is.

Q. What types of uses?

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A. It's used in structural fill, it's used in pavements, it's used in cinderblock and concrete and my favorite use is shingles.

Q. And are you familiar with ASTM standards?

A. Yes, the American Society of Testing Materials.

Q. Have you ever been involved in reviewing or revising an ASTM standard guide related to coal ash?

A. Yes, I was.

Q. When was that?

A. 2011 and 2012.

Q. What did you do?

A. Well, I was a part of a committee that was put together to update the -- the standard guide for the reuse of CCP's as structural fill.

Q. Now, you're using a different term, what is CCP?

A. Well, CCP is Coal Combustion Product I'll call it. The ash industry likes to use that term because they market the material and they like to think of it as a product because it does

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get sold to people and reused.

Q. Is that the same for our purposes as CCB?

A. Yes.

Q. If you would turn to Tab 902, Exhibit MWG 902, in this case.

(Document marked as Respondent's Exhibit No. 902 for identification.)

BY THE WITNESS:

A. Yes.

BY MS. NIJMAN:

Q. Is this the ASTM standard you're talking about?

A. Yes.

Q. This is the one you worked on?

A. Yes.

Q. And if you would turn to Bates 50260 in this document.

A. Okay.

Q. In Section 5, the second sentence of Section 5 starting from in addition, would you read that sentence?

A. "In addition to state and local --

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or local guidance, screening procedures or analysis, techniques, should be employed as appropriate to determine what, if any, potential environmental risks need to be considered when using CCP's for engineered structural fills."

Q. What is that saying in lay people's speak?

A. As an engineer who uses and reuses the material, you want to make sure that you follow I'll call it environmental responsible methods to reuse the material. So you follow local standards and guides which would also include, of course, the federal.

Q. Picking up on that point, the beginning of the sentence says "In addition to state or local guidance," how does this standard relate to state or local guidance?

A. State and local guidance may not include some of the things in here. So it's really to do more work where necessary if state and local guidance doesn't address some of the things in this guidance.

Q. What state or local guidance would apply in Illinois?

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A. Well, Illinois has a statute for CCB's and we've discussed it earlier statute 415 I think it's 5/3.135, which is the statute that covers reuse of CCB's.

Q. Now, the sentence also discusses if you find a potential environmental risk. What are you supposed to do under this standard guide?

A. Well, the guide provides a process, step-wise process, that if you find unacceptable environmental risk, that there is further valuation that should be done prior to reuse. So that at the endpoint you can reuse it so it doesn't have the unacceptable environmental risk.

Q. So is there a design element to what you're doing here?

A. Yes, I consider most of this the designer's responsibility.

Q. If you turn to page 50263.

A. Yes.

Q. Section 5.4.2 if you would read the caption on that section.

A. Leaching Characteristics of CCP's - Test Method 3 -- D3987.

Q. Now, we've heard a lot in this case

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so far about D3987, is that the test that was used in -- at the Midwest Generation stations?

A. Yes.

Q. And is that the test being recommended in this ASTM standard?

A. Yes. Primarily, yes.

Q. Now, you were present during Mr. Gnat's testimony just now?

A. Yes, I was.

Q. Do you recall his discussion of using the D3987 test at the Midwest Gen stations?

A. Yes, I do.

Q. Do you -- would you describe whether or not you agree with his use of that particular test?

A. Yes, I do.

Q. And why is that?

A. Well, first of all, fundamentally, it's required by the statute and he applied what I called good scientific principals in characterizing the materials, testing them and reaching a conclusion as to their reuse.

Q. Now, you were also present during Dr. Kunkel's testimony for the complainants,

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right?

A. Yes, I was.

Q. And Mr. Kunkel stated that he thought this D3987 test was not the right test, what is your opinion?

A. I think that's incorrect. It's required by statute and it provides a fair representation of the material.

Q. We've also heard a lot about the 2015 federal rules for the disposal of Coal Combustion Residuals or the CCR rules, are you familiar with the CCR rules?

A. Yes, I am.

Q. And how?

A. Well, beginning probably in 2009, 2010 really when the proposal rules came out, all the scientists and engineers were looking to see what could be required. So I've been following it through the proposed stage, through the public comment phase and through the finalization of the rule and then from the implementation of the rule many of my clients had to comply with the rule and they needed engineering to help them comply with the rule.

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Q. I'd like you to look at what was marked as -- in Dr. Kunkel's binder at tab 406?

A. Okay.

Q. What is that?

A. That is the Federal Register printout of the -- we call it the CCR rule, the Coal Combustion Residual rule including the preamble.

Q. If you turn to -- there's not Bates numbers. So if you look at the Federal Register page 21342.

A. 21342?

Q. Yes.

A. Okay.

Q. And if you look on the far right column.

A. Yes.

Q. Starting -- the second sentence starting similarly, would you read that please out loud?

A. "Similarly, the requirements of this rule do not apply to inactive CCR landfills, which are CCR landfills that do not accept waste after the effective date of the regulations."

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Q. And next sentence.

A. "The agency is not aware of any damage cases associated with inactive CCR landfills and, as noted, the risks of release from such units are significantly lower than CCR surface impoundments or active CCR landfills."

Q. Do you agree with that statement?

A. Yes, I do.

Q. And why are the risks as noted significantly lower than the CCR surface impoundments or active CCR landfills, in your opinion?

A. Primarily it has to do with water. Ponds have a lot of water and we call it a driving head or pressure and in an active CCR landfill they have moisture from the environment, but they don't have a head. It's basically pour water, that means water in the spaces of the soil is not a driving head water.

Q. So if I understand you correctly, it's sort of the weight or the pressure of the water that causes the head, is that right?

A. Yes, a head is a pressure which is developed by the height of water and the weight of

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water. It doesn't exist on inactive land.

Q. Would it exist -- where else would such a head exist other than a pond?

A. Well, groundwater has a head, for example. If it goes from high pressure to low pressure, that's a head and Rich described that earlier, Rich Gnat, and so the head in a pond again it's the water in the pond driving it on the bottom of the pond that wants to force out the water into the environment and that exists in a pond, but that doesn't exist for this type of landfill, this inactive I'll call it fills.

Q. What about a berm that might have ash in it, does that have a head on it?

A. Not likely. I'm pretty sure that the water that's there would be the -- small amount of water that would infiltrate, but recognizing that if it's in a berm there is a slope on one side so the water runs off quickly and it doesn't have an opportunity to percolate into the ground or into the structural fill.

Q. Based on this statement by US EPA in the federal CCR rules, can you describe whether the rules apply or address the old landfill areas

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generally? Do they apply to old landfill ash areas?

A. No, so long as they have not accepted waste after the effective date of the regulation.

Q. Now, again, you were here during Dr. Kunkel's testimony.

Do you recall him saying that he believed US EPA's analysis of low-risk from inactive landfills only applied to designed or engineered landfills, do you recall that?

A. Yes, I did and I was a little surprised. It's clear in the rule that the inactive landfills, whether they're engineered or not, are not included.

Q. Dr. Kunkel also stated he believed that some of the ash at Midwest Gen sites is mixed with soils and that caused him concern, what is your opinion as to potential risk of ash mixed with soils outside the ponds?

A. Well, by comparison to something in the pond, which is all ash outside, it's a mixture. So it has less ash and, therefore, less risk.

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Q. And does that also relate to this question of the head?

A. Yes. Again, it doesn't have a head that a pond would have. So it also reduces the, call it, potential risk.

Q. Is that consistent -- your opinion consistent with what US EPA found in the CCR rules of 2015?

A. Yes, it is.

Q. Did your opinions in this case include whether the Midwest Generation ponds at the four stations complied with the CCR rules?

A. No, it did not.

Q. Why not?

A. The case arose prior to the rule becoming finalized and I have been focusing on this case specifically which did not include compliance with the CCR rule.

Q. And does that also relate to the age of the ponds?

A. Correct, the ponds existed before the rule. So they -- some of them came under the regulation, under the rule, but, again, I've been focusing on the -- this matter regarding the CCA's

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and what exists, which is more than the ponds.

Q. Before the CCR rules in 2015, do you know whether or not ash ponds in Illinois were lined?

A. There is a statement that has been presented by Illinois EPA which is consistent with my experience that most of the ponds in Illinois are not lined, the CCR ponds are not lined. The calculation is around 40 percent of ponds are lined and if you think of the number of lined ponds that Midwest Gen has, which is maybe eight or ten, that is a significant portion of the lined ponds in Illinois.

Q. When CCR rules were codified in 2015, do you believe that they confirmed an industry standard or created new standards?

A. Can you repeat the question? I'm sorry.

Q. When the rules were codified in 2015, did they create a new standard?

A. Correct, it's a new going-forward so to speak that the ponds -- again, it addressed the existing surface impoundments and new surface impoundments, but it is the rules for the ponds

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that are regulated under the CCR rule.

Q. I also want you in the federal CCR rules if you would turn to Bates page 21404.

A. Yes.

Q. And, again, on the third column to your right, this is a section of the CCR rule I discussed with Dr. Kunkel starting with -- in the middle of the first paragraph starting with the word aluminum.

A. Yes.

Q. I think further down.

A. This one?

Q. Further down in the middle of the first paragraph.

A. I got it.

Q. If you would read that sentence, please.

A. "Aluminum, copper, iron, manganese and sulfide have been removed because they lack maximum contaminant levels (MCL's) and were not known to be constituents of concern based on either the risk assessment conducted for this rule or the damage cases (see units X and XI of this document)."

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Q. Now, Dr. Kunkel stated at some point that he felt this provision wasn't applicable to -- let me ask you this.

Based on this discussion, is manganese covered by the CCR rule?

A. It is not.

Q. And why not?

A. As it says, it did not have the damage cases and it did not drive the risks, therefore, they did not feel it was necessary to include in the rule.

Q. And Dr. Kunkel --

A. And it did not have a maximum contaminant level.

Q. I believe Dr. Kunkel suggested that this section five, because it's part of section five assessment monitoring program, that this would not be an applicable statement, do you agree with that?

A. No, I don't agree at all. This rule covers what we call detection monitoring first and if there is a problem you go to assessment monitoring. The parameters are slightly different, but assessment monitoring is more

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comprehensive and more specific and that if there is a problem with an element or an analyte, it would be included here.

Q. And, in fact, if you refer to page 21500 of the CCR rules --

A. Okay.

Q. -- do you see the chart there, appendix three and appendix four?

A. Yes.

Q. Appendix three is constituents for detection monitoring, is that right?

A. Yes.

Q. Appendix four is constituents for assessment monitoring, correct?

A. Yes.

Q. And do you see manganese on either of those lists?

A. It's not there.

Q. Thank you. Okay. We can put Dr. Kunkel's binder aside. If you would turn in your binder to Tab 903, Midwest Gen Exhibit 903.

(Document marked as Respondent's Exhibit No. 903 for identification.)

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BY THE WITNESS:

A. Okay.

BY MS. NIJMAN:

Q. And I'd also like you to look quickly at Exhibit 904.

A. Yes.

(Document marked as Respondent's Exhibit No. 904 for identification.)

BY MS. NIJMAN:

Q. And just generally describe to me what those documents are?

A. The first document is my expert report from November 2015 and it's got -- a supplement to my report is Tab 904 and that was updating a calculation that I had made in the -- in the report in Section 552.

Q. So Tab 904 just so I'm clear is just the updated calculations, the math, revised math calculations from your Exhibit 903, correct?

A. Correct.

Q. And then if you look at Tab 905, what is Tab 905?

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(Document marked as Respondent's Exhibit No. 905 for identification.)

BY THE WITNESS:

A. This is a list of what I would call errata from my report. Things, for example, where additional information was added or corrected, a citation might be corrected, for example. So it was clarification to correct some errata in my report.

BY MS. NIJMAN:

Q. And, in fact, you attach a table, Table 5-1.

A. Yes.

Q. So was Table 5-1 originally in your report?

A. Yes.

Q. And what is changed on this Table 5-1?

A. If you look in the left column where it says Powerton, it says May 2004 BA01.

Q. Yes.

A. That is analysis I had not seen before and I wanted to include it to improve the

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strength of the database.

Q. So you located an additional sample?

A. Yes, one that was not previously included. It was always in the database. I just hadn't seen it before.

Q. Did any of these revisions change your opinions?

A. No.

Q. If you would look at Tab 906 in your binder.

(Document marked as Respondent's Exhibit No. 906 for identification.)

BY THE WITNESS:

A. Okay.

BY MS. NIJMAN:

Q. Would you describe what this is?

A. This is what is called temporal trend testing result notes by J. Seymour from 29 February 2016.

Q. Now, the thing that jumps out is that it's marked draft, why is that?

A. Well, I completed this just prior to my deposition based on a comment that Mr. Kunkel

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had done some trends and I really felt I needed to look at it a little more clearly so I had a better understanding of groundwater conditions.

Q. And so you compared these for your deposition?

A. Yes, I prepared them to try to be prepared and then they were produced and entered into the record. I stamped them draft because at the time I didn't know if it was going to go final or not, but that's how it got entered into the record.

Q. Now, since your report at exhibit -- or Tab 903, what additional review have you done to update your opinions?

A. Well, because this has gone on for a little longer than we thought, the groundwater data results from the close of 2014, which is the previous end of the dataset, was extended through the second quarter of 2017. So all the data from those nine or ten quarters was added to my database for all my calculations.

Q. And did you adding the data since 2015 change or confirm any of your opinions?

A. It confirmed my opinions.

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Q. I'd like to turn now to some of your opinions in this case. If you'd look at Tab 901. You've already told us that this is a Power Point you created to assist with your testimony today.

Is that Power Point based on your report as updated with the 2017 data?

A. Yes, the slides that are in this report represent the updated data.

Q. And if you turn to slide four, and I know it's very small, but if you look on the very far left in the bottom blue line there are page numbers on this document.

A. I have it.

Q. And it's also on the screen in front of you.

Now, we'll go into detail on each site individually, but generally how did you approach your assessment of this case?

A. Well, the first thing I did recognizing there is four different plants with similar complaints I looked for what I call common factors because if I can identify common factors it makes the analysis more efficient. So in reviewing the records, I looked to see what was

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common amongst the four departments.

Q. The next point is -- the next is assessing site conditions, generally what did you do there?

A. Well, you look at the geology, you look at the groundwater and you look at how the ponds were constructed and operating basically.

Q. And you got bullets here of the site history looking at groundwater elevations, groundwater conditions and as you have said you updated with 2017 data?

A. Yes.

Q. The third bullet on this page is compare the bottom ash to groundwater conditions for each facility, generally what did you do there?

A. Well, we had the bottom ash analyses from the leachate and we had groundwater analysis and if you want to identify where the groundwater impacts are coming from, you want to see where -- what is -- what is the potential source which is the ponds was one potential source.

Q. Okay. And then lastly you say on this page is your overview that there is a bullet

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called risk analysis, what did you do there?

A. Well, in the remediation practice when you look at a site one thing you look for are exposure pathways because you want to understand if there is something that is in the environment what -- how will it travel to a receptor or a person or animal. So we did a risk analysis, if you will, of what I felt was not addressed at that time and that is the exposure to surface water. So I looked at that pathway.

Q. You mentioned it's part of the remediation and I think you may use that term a little differently than the rest of us.

From my perspective, does that also include the investigation stage of the site?

A. Yes, thanks for the clarification. The process is when you have an impact you conduct a remedial investigation first.

Q. Thank you. So looking at the common factors let's just go through some of the common factors and that is outlined on slide six. So the first common factor you've listed is old sites, what -- what -- why was that important to you?

A. Whenever we look at impacted

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properties, the history of the property is really, really important to understand and the timeline and these sites go -- a couple start in the 1920s and youngest, if you will, is 1965, which is really, you know -- I'll call it sort of the end of the -- now we call it environmentally conscious era which started around the 1970s.

Q. And how does that relate to the complexity of these sites?

A. Well, given the fact also that they're industrial sites, that there may have been processes or activities that occurred that there is nobody that can attest to what it was. So there is a bit of a mystery when you look at old sites.

Q. The next point you have there is poz-o-pac or other liners 1978, would you explain what you were talking about there?

A. Sure. The fact that the ponds in 1977, '78 were lined at all as you can tell by the fact of the number of unlined ponds in Illinois, it was in my mind a very good thing as far as to minimize any impacts to the environment. So it was unusual and I think, you know, proactive, if

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you will, for the time.

Q. Now, we heard the poz-o-pac. What is your familiarity generally with poz-o-pac?

A. Well, as an engineer that has used fly ash before, I've heard of it. I have not had the opportunity to use it in a project, but I've looked at it using it in other projects. So I understand what it is and by my involvement in this project, I've had a chance to see some poz-o-pac and read about it.

Q. And in your 2015 report at Exhibit 903, we can reference it if you like, but at footnote 75 you actually noted the density of poz-o-pac and you said the density was 136.9, does that sound right?

A. Yes, I'm very familiar with that.

Q. And I should make it clear 136.9 pounds per cubic foot. Why was the density of poz-o-pac something that you mentioned in your report?

A. Well, it tells me that it is very dense. It's like concrete.

Q. And back in October, we heard it was a long time ago already, Mr. Gnat stated that KPRG

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performed a permeability analysis of the poz-o-pac at the Will County station?

A. I remember.

Q. And how did that inform your opinions in this case?

A. I think it's very important because not only that, but other testimony that I've heard on the condition of the poz-o-pac was that it was in very good condition. It experienced very little weathering. So that is very positive again from the perspective of keeping the pond contents out of the environment.

Q. Now, in your report, you also note several times that poz-o-pac exists beneath the new HDPE liners that were installed at many of the stations, do you remember that?

A. Yes, I do.

Q. Why was that relevant to you?

A. It's relevant in that it provides an additional barrier to flow and additional support as a foundation member for the overall life of the liner. So it's still a positive thing.

Q. Looking back at your common factors slide, the next common factor you list is Midwest

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Gen actions 1999 to 2013 and if you turn to the next slide, what are you looking at? The first bullet, what are you discussing here?

A. The first bullet is pond relining projects and basically when I was reviewing the information, which was quite challenging because it comes in pieces in these massive documents, I was able to filter through and realize that Midwest Gen had gone through a process to evaluate their ponds beginning with Maria Race's evaluation, hired a consultant to look at them and then they, of course, implement the program over the years and relined ponds that needed to be relined or were required to be relined.

Q. And why was that important to you?

A. Well, I looked at all the documents, like you said, in this bullet list because you want to understand the competency of the unit to be sound and whether the standard practice was followed -- in fact, as I looked through it, it did have very sound subgrades below the pond, which is important. The liner installation was 60 mil HDPE which is a robust pond lining. It's about one of the best you can get. And what was a

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surprise to me is that they used leak detection for their -- as a final quality assurance to remove leaks from the pond.

So all those things said, the construction and the design that I reviewed, met the standard of practice and I think went a little further by adding leak detection surveys which is not as common in the lining business, but it is getting more and more common.

Q. You already talked about the fact of having a poz-o-pac liner was unusual, was having HDPE liners starting in 2003 onward as Maria Race testified, was that unusual?

A. Well, a little bit. I mean, you don't have to use HDPE. They're other lining systems that can be used. But an advantage of HDPE is it is ultraviolet resistant because the plastic liners degrade in ultraviolet and to have HDPE with high density is important because it's more resistant than most -- almost any other liner so it's a very robust, long-lasting liner.

Q. Was the program -- you talked a little bit just now about the program Maria Race started, what did you think of that program?

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A. It was very responsible and proactive. I had worked with lots of clients that sort of have a general understanding of what they have, but they went through a process to categorize it and catalog it and prioritize it so they could budget the relinings over the years and so I found that to be very responsible and proactive.

Q. Was there any requirement for them to do that starting in 2003?

A. No, there was not.

Q. Now, in reviewing the lining program, the relining program, what kind of documents did you look at?

A. Well, it starts with the NRT technical memorandum, which there is at least three of I know. I think Maria said technical memo number three was the final and it went through the data gathering which Midwest Gen obtained a lot of data and fed it to NRT and in the spreadsheet they had they had some facts and then they had to make some assumptions and then they had to make some -- present some information for decisions.

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Q. What documents did you look at to assess the actual liners themselves?

A. Well, when you build a liner, the common practice is to document what you build because as Maria testified, and it's true in Illinois and every other state, if you have an NPDES permit and you want to change what's in the permit you have to get an authorization from the agency. So they got that -- that approval and then they went forward and constructed it and collected quality control and quality assurance documents to prove what they built met the design that had been submitted to the Illinois EPA and --

Q. What -- sorry. What kind of documents are included in that package? First of all, what do you call that package? Is that the construction documents?

A. Yes, construction documents. Some people call it a completion report or certification report.

Q. And what kind of documents are in there?

A. Well, the most common things you include are a narrative of what they did, daily

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reports which would include photographs, testing results, for example, a project has specifications and they will say to test the soil or other materials. So they have test results to prove it met the specifications. Liners especially have a lot of common specifications that require leak testing as they're installed and those are the kinds of -- certifications by the contractors, installers and at the end a licensed professional engineer in Illinois will sign that document saying -- who normally ran the inspection program that it met the plans and specs.

Q. Is it important to review those documents?

A. Yeah, it is. It was very helpful. Again, it tells me that they followed the standard practice and, you know, in Illinois and many other states have a established liner installation capabilities and requirements and so that -- for landfills, for example. So it's something if you do liner design, it's a thing you almost automatically do.

Q. And would it be something you would automatically ask for if you're familiar with

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landfill design, with pond design?

A. Normally, yes. It all depends on the timing. If you are -- especially, if you're doing it under an agency permit program, you should have it, you should ask for it, it should be included.

Q. In looking what has been previously marked as Exhibit MWG 510 that is in front of you --

A. Yeah.

Q. -- what is that document?

A. It's a letter to -- from NRT, Natural Resource Technology, to Mr. Jeff Boudry Midwest Generation, reference construction documentation transmittal south ash pond two liner replacement Midwest Generation, LLC, Will County generating station.

Q. Is this an example of the construction documents you're talking about?

A. Yes.

Q. And I think we referred to it as construction documents because the re line is construction documentation, correct?

A. Yes.

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Q. And then if you turn to -- turn to page 34362.

A. 362. Okay. I've got it.

Q. What is that document?

A. Attachment C1 geomembrane certification.

Q. And if you turn the page, what is it telling you?

A. This is the manufacturer of the geomembrane, GSC, it's roll data, it gives the numbers of the -- like an identifying number for each roll of material that was sent to the site for the project.

Q. And when we use the term geomembrane, we're talking about the HDPE liner, correct?

A. Yes.

Q. When we use the term geotextile, that's actually a cushion, that's different, isn't it?

A. In this project, that's correct.

Q. Okay. And so this certification, Attachment C1, Bates page 34362 is telling you -- what is it telling you about the HDPE?

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A. Again, it provides the test results and then you can take the test results and compare it to what is required in the specification and that's being done and compared and accepted.

Q. And if you turn to page 34370 --

A. Yes.

Q. -- what is this document?

A. This is the geotextile certification. SKAPS Industries is the company that manufactured it.

Q. S-K-A-P-S?

A. Yes, we just say SKAPS.

Q. And what is this telling you?

A. This is -- the geotextiles which you have on this project are the cushions and, again, it provides the results of testing to indicate that it meets the specifications.

Q. And then if you turn to 34378.

A. Yes.

Q. What is -- there are several pages of resumes, quite a few pages of resumes of individuals going all the way through to Bates 34388, why is it relevant to have resumes of the installer crew?

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A. Well, the installer crew experience is important. Over the years it was identified very early on that they're contractors or installers that don't have the experience and can make mistakes and cause problems. So in the specifications, you normally require a minimum level of experience, normally the number of square feet of liner installed. So you can tell this person has the skills necessary to install a liner correctly.

Q. And then if you look at 34389.

A. Yes.

Q. What is this document?

A. This is very common. It's called subgrade acceptance. That typically what happens is the installer, as you can see this is an installer here, his name is Thong Ingels, from I think CAW -- CAAW, the initials of the company. It's -- the installer is different from the contractor. The contractor will build the subgrade and they don't -- nobody wants a dispute between the subcontractor and installer and the contractor on the upgrade.

You want to make sure the

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subgrade is acceptable so the person will lay the product on it. When I say acceptable, the spec will include what defines acceptable. Normally, no rocks, no protrusions, it's flat. So there is normally -- there is a specification on this project, too, for the subgrade.

Q. If you would read the middle paragraph, "I, Thong, T-H-O-N-G, Ingels, I-N-G-E-L-S."

A. "I, Thong Ingels, a duly authorized representative of CAAW have visually inspected the subgrade surface described above and found the surface to be acceptable for installation of the geomembrane. I do by -- I do hereby accept the soil subgrade area as described below and shall be responsible for its integrity for suitability, installation and future containment performance in accordance with these specifications from this date to completion and acceptance of the installation. This certification is based on observations of the surface of the subgrade only."

Q. And what does that mean to you?

A. It means that the surface was acceptable to install a geomembrane.

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Q. And if you look at 34392.
A. Yes.
Q. It carries over to 34393. What is this document?
A. The geosynthetic material installation certificate.
Q. What is that telling you?
A. This is from Matt Albert from CAAW Systems. It's a letter to Midwest Generation and it states that the geomembrane and Geosyntec at south ash pond two were installed in accordance with the project specifications and manufacturer recommendations.
Q. Why is that important?
A. Well, this is the buyoff on the actual installer telling the owner I've done what is required.
Q. Then you mentioned earlier leak testing. If you turn to 34422.
A. Yes.
Q. What is this document?
A. This is the contractor -- the subcontractor Leak Location Services, Inc. and they did a leak testing at south ash pond number

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two and it's a letter to Aron Yakima from Brieser Construction. That is the general contractor responsible for the liner installation and this is a Leak Location Services that was conducted on the geomembrane.

Q. And is the leak location survey taken after the warning layer is placed on top of the HDPE?

A. Yes.

Q. Why is that?

A. Well, when you install a geomembrane, there is multiple levels of QCQA. The first is as you're installing it you test the seams. You do an inspection of the material and then you buyoff on that and all the seams are leak tested and then when you put the material on top of it, the sand in this case, a cushion, you want to test it after that point in time in case any equipment could have damaged the liner during installation of that cushion layer.

Q. So if there were trucks on the cushion layer, the leak detection survey would locate them?

A. Would locate leaks --

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Q. Leaks.

A. -- whether they were caused by the trucks or whether it was missed during the installation.

Q. Now, referring back to this whole Exhibit 510, MWG 510, did you review similar documents for most of the ponds at the Midwest Gen station?

A. Yes, for most of them. Nearly all.

Q. What did you conclude based on your review?

A. In my review, I concluded that they followed the standard of practice, that I know the engineering company and that they, again, followed the standard of practice and I think they did a job good installing the liners.

Q. Now, we heard Dr. Kunkel say he had not seen the construction documents for the Midwest Gen ponds, is it possible in your opinion to make a complete opinion about the value or the integrity of a liner without seeing the post-construction documents?

A. No, you really should not do that. You should not make an opinion without having

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facts in evidence such as this or other types of documents similar to this.

Q. We've heard a lot about again the 60 mil HDPE that was used in the relined pond.

What is your opinion whether 60 mil liners were effective liners to prevent potential impact to groundwater?

A. I think they're very effective. To kind of demonstrate how effective they are, US EPA under RCRA, Resource Conversation and Recovery Act, used HDPE -- 60 mil HDPE under hazardous waste regulations for containment -- as part of a containment system because they are so resistant to chemicals and very low permeability.

Q. So the very same liners that are in the Midwest Generation ponds that Maria Race organized the installation, those are the same liners you would use at a hazardous waste landfill?

A. Absolutely. I've designed them and constructed them myself. I didn't construct them myself, but as the engineer contractor constructed them accordingly.

Q. Dr. Kunkel stated -- made a broad

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statement that liners always leak, do you agree with that statement?

A. No, I think it's an extreme statement. I mean, we have seen over the years a lot of papers and he cited Schroeder, for example, from 1994 that talks about leaks in liners and that's all very good discussion. I think having known the founders of my company, Geosyntec, Rudy Bonaparte and Dr. Giroud --

Q. Can you spell those?

A. Dr. Rudy Bonaparte like Napoleon.

Q. B-O-N-A-P-A-R-T-E.

A. And Dr. Giroud, G-I-R-O-U-D. People that are like the founders they want to have good lining systems. They are pioneers in the business and I grew up with them. And they -- they fostered a large academic exercise to show owners and regulators what can happen and what can be avoided and so it's always trying to get a better product and so over the years they have developed methods to develop better products and so some of the opinions that you draw from papers in the past are valuable to understand what not to do and what to do.

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Q. So, for instance, in the 1994 article cited by Dr. Kunkel, what has changed since then?

A. One of the things is that leak location surveys were very new and they weren't hardly ever used and that's one thing that was used here at Midwest Gen and so that gives you the opportunity to address a lot of the comments that you see in the articles like that loading on the liners and to avoid certain things to avoid puncture and it gives you an opportunity that once it's installed and it's at a certain point you can do like a final test and so that's one thing that is very important because even though you may say you have a hole per acre, for example, when you do the leak location survey it can be misinterpreted when you say "Well, they found one hole per acre" and so that's what you use going forward to say "Well, the liner is leaking," but the point is lost that they found it and they fixed it.

So my opinion is there are papers and studies that say they have done location surveys and there are no leaks. So at that point in time, I say that's the standard.

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There are no leaks. If you do that, it passes the test, there is no leaks. So I think now it is easier to -- I'll say lower the numbers for the averages of leaks if you follow good QA and have Leak Location Services or a leak detection survey.

Q. And, as you stated, that was done in the Midwest Gen relining program?

A. Yes.

Q. Mr. Kunkel -- Dr. Kunkel also mentioned some concerns he had with sharp subgrade underneath the liners, what is your opinion as to the -- that concern?

A. Well, it's -- one of the things that Dr. Kunkel has done it's been very general statements, but when you drill down and look at the details and you look at the facts you have subgrade acceptance. So, by definition, it's not going to have sharp objects on the subgrade --

Q. In other words --

A. -- or stones.

Q. I'm sorry. In other words, like the documents we just went to in Midwest Gen 510, somebody has certified the subgrade?

A. Yes, so his assumption is that there

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will be sharp objects like that poz-o-pac was not true.

Q. You also mentioned a few minutes ago cushions, cushion layers. Are cushion layers acceptable practice?

A. Yes, they are. They're used -- in certain circumstances, it can be to help protect the geomembrane either subgrade or on top of the geomembrane to protect the geomembrane when you apply materials over that cushion.

Q. Now, Dr. Kunkel also stated that the ponds might have leaked after relining, do you agree with his comment?

A. Again, it's a general comment based on his observations in other locations and he doesn't have any information from these specific properties to back that up. So I don't think the facts are there to support his conclusion.

Q. What is your response to Dr. Kunkel stating that trucks operating on the liners like during dredging might have caused tears?

A. Well, we've seen and heard testimony that they install -- excuse me. They dredge the cells carefully. The words have been used like

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methodically that they don't turn sharply, they use rubber tired vehicles and so in my opinion -- and they have procedures and processes where they meet with contractors to make sure everybody understands it.

You even heard people say they want to really stay away from the edges. They're really conscious of things like that. So I think when you have a consistent program across all of these sites, it reduces the risk of having construction related -- excuse me -- a dredging related incident.

Q. And in addition to the testimony you've heard throughout this hearing, did you do anything independently to assess the process used for dredging?

A. Yes, we called -- I think it might have even been before the deposition, but we called the plant, the people like Chris Lux and people that were responsible for the dredging and we call Lafarge because they worked at two or three of their plants, we talked to the people who were doing the work to verify that they are following processes that are good practices and

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not increasing the chances for tears in the liners.

Q. We talked a few minutes ago about design of ponds, are the Midwest Generation coal ash ponds designed for the removal of ash?

A. Yes, they are. As we've seen, they have the cushions on the geomembrane, they have adequate, proper subgrade below the geomembranes, they have the cushion layer, they have the crushed limestone layer, six inches and on the edges they have the posts which warn the operators when you get close to the edge so they don't -- as you can appreciate, the sides come up at a slope. So it's hard to tell exactly where it is. So they're marked at the toe of that slope, the bottom of the slope, so they know where to stop cutting.

Q. And I believe Mr. Kelly spoke yesterday about one exception to the ponds being designed for dredging, do you recall what that was?

A. Yes, the Powerton secondary ash basin was not designed to be cleaned out and it's evident in the design because on top of the geomembrane they did not install the cushion or

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the sand cushion or the crushed stone and they don't have a ramp.

Q. So without a ramp, you can't get in?

A. You're not going in and out if you don't have a ramp. So it's not designed to be cleaned out. As Mark Kelly indicated, they -- they -- when they went to clean it out, it had never been cleaned out before and they found some soft material in the bottom and in my professional experience on erosion that kind of soft material comes from the atmosphere.

We design for soil loss for landfills to have no more than two tons per acre per year soil loss. That comes from the old US soil conservation service. It's because the atmosphere deposits dust at about that rate. So you know that you're going to get dust in the pond. So what they found was not ash, but probably just soil, dust in the ponds.

Q. Now, we heard a lot of testimony that there have been some tears in the liners from time to time.

How is your opinion of the reliability of liners in this case impacted by the

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evidence you've heard?

A. Primarily you look at the -- I'll call it the system they have in place that everybody knows and you've heard many testimony they fix any tear within one to two weeks or as fast as they can, weather dependent. So I think it's been a very responsible program and you've heard the Midwest Gen people indicate that environmental consciousness is right up there with safety.

So I look at the fact that they're finding tears and they are identifying and fixing them. It's very positive. Like I think some of the -- nobody could be accused of, oh, I got to get that the next time we clean up the pond and then fill the pond back up. We don't hear stories like that. So I'm assuming it's a good, responsible system that they have in place.

Q. Did the location of the tears factor into your opinion?

A. Yes, we heard time and time again mainly the tears at the top above the water line and that is for many different types of reasons, but, yeah, normally heavy equipment can do that

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and so the point is that they were identified and they were patched and so that the risk of leaks is eliminated.

Q. How does the frequency of dredging impact your opinions?

A. Well, everything is -- risk is probabilistic science. The fewer times you're doing that activity, the lower the risk of having an incident. So some of these ponds are rarely cleaned out. Some of them have not even been cleaned out since they were relined. So the fewer chances of -- the fewer occurrences of dredging lowers the risk of any -- causing any leaks.

Q. So based on your assessment of the relining projects at the sites, what is your opinion as to Midwest Generation's actions for preventing potential leakage from the ponds?

A. As I said, they have a system and they have done everything they can to reduce the risk for leakage and I think it's been a very responsible system and somewhat proactive. They're aware of it. This is not an afterthought.

Q. Turning back to slide seven, you have a time period then on here of 2013 CCA's and

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we've heard a lot of testimony that in 2013 and '14 Midwest Generation completed actions from its Compliance Commitment Agreements and it includes installing GMZ's and Environmental Land Use Controls. We heard Mr. Gnat talk about GMZ's and land use controls, did you agree with the statements in his testimony?

A. Yes.

Q. Was there anything in his testimony about GMZ's or ELUC's that you disagreed with?

A. I don't recall anything.

Q. Good. Then I don't have to ask you all those questions.

Looking back at your slide six, go back a page for me. You have a note here the fourth bullet down Wyoming coal?

A. Yes.

Q. Why was that something you noted?

A. Again, that's one of those common factors that if they're all burning the same coal and we've heard people like Fred Veenbaas say that the combustion process are the same, you'd expect the same bi-product. So if it's a consistent product, then the CCR will be consistent.

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Q. The next point you mention is onsite data, coal ash constituents MWG coal ash constituents, and then listed is samples of bottom ash from ponds and samples of historic ash areas. What did you do there?

A. Well, we heard Mark Kelly, for example, and Fred Veenbaas state they actually took the samples which they had here on display as a demonstrative, packed it and brought it for -- sent it to the lab for testing and then the -- they ran the NLET or the ASTM D3987 test and they came up with the results and that, again, one of the common factors is that the leachate results were very similar across the sites.

Q. Now, you -- you focus on the word onsite data here, why is onsite data important?

A. Well, when you do an evaluation like this, having the specific data, the onsite data, is the best data. If you don't have the best data or the onsite data, you can look at literature and other studies, but primarily onsite data is what should rule over non-site specific data.

Q. If you turn to slide eight, what is this document?

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A. These are the analysis of bottom ash from MWG ponds and that samples were taken from Powerton, Waukegan and Will County and as you can see there are one, two, three, four, five columns listing the results of the -- the -- in the water which is the leachate comes off of the shake test.

Q. And when you say it comes off of the shake test, that's coming off of the ash from the Midwest Gen ponds?

A. Yes, they take the sample, they bring it to the lab, they mix it in a container, they shake it, they decant the water and they test the water to measure what comes out of the ash that could be of concern.

Q. And for all of these tests that were taken, was the D3987 test used?

A. Yes, it was common for all of them. That's what is required by statute in Illinois.

Q. Is this a summary of the Table 5-1 from your report?

A. It is as it has been updated for the Powerton May 2004 bottom ash sample which was not in my original report but it has been included here.

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Q. Now, I see on your list of generating stations Joliet 29 is not one of the stations, how do you account for the constituents of ash in the ponds at Joliet 29?

A. One of the things we do in engineering and you look at is we correlate data. So, in other words, if you have five samples and the results are very similar and they all come from the same coal, the same burning process, Joliet has the same coal and the same burning process, so you can assume and correlate the data to the Joliet site also.

Q. So based on this chart of onsite data, what were the actual constituents that you focused on for your opinions about the ponds in this case?

A. Well, we looked at what we found and what we found was barium, boron, sulfate and TDS and we did -- if you look at the very bottom, the sulfate and TDS we did not analyze it except for one sample. We felt it was safe that even with -- if it was in that one sample, it could be used across for comparisons.

Q. So you took a conservative approach,

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you found it in one, you applied it to the others?

A. Yes.

Q. And is this the part of the data that you relied on in your report and for your opinions today regarding the constituents of concern you were mostly looking at at the site --

A. Yes.

Q. -- sites?

A. Yes, this is the site specific data that we used.

Q. Okay. Now, you've heard Dr. Kunkel he instead of using the site specific data he relied on EPRI. First of all, what is EPRI?

A. That's the Electric Power Research Institute. It's a company that was set up to do research for the power industry. It's a non-profit organization and I work quite a bit with them.

Q. And why not do what Mr. Kunkel -- Dr. Kunkel did and just use the EPRI published data?

A. Well, that published data is a color guide. It's information for people who may not have site specific data, but we have site specific

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data. So you can compare the two and sort of calibrate or correlate that, yes, what you're looking for is reasonable.

Q. Did you do that also?

A. Yes, we did.

Q. So you used EPRI as a backup, if you will?

A. Yes, and it was similar. It wasn't exactly the same, but it was very similar and they said, yeah, what we're finding is -- would be expected from this Wyoming coal.

Q. Is the EPRI data based on different types of sites and ash?

A. Yes, it is. They looked at both landfill leachate and surface impoundment or pond leachate and they looked at it for different types of coal. It was pretty comprehensive. They had maybe a hundred samples.

Q. So Dr. Kunkel using the EPRI data focused on boron, manganese and sulfate, do you disagree with that?

A. Somewhat, yes. Not a hundred percent, but I disagree.

Q. How so?

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A. Well, again, he ignored the site specific data. We found barium and he didn't include barium and we did not find manganese, but he wants to use it. I think he wants to use it because it's found in the groundwater. So his assumption it's from the ponds, but our data says it's not from the ponds because we did not find it in the ash from the ponds.

Q. Similarly, for barium, you found barium in the ash in the ponds?

A. Yes.

Q. So --

A. I'm sorry.

Q. But not in the groundwater?

A. We did find it in the groundwater. We found the others to some extent as well and that's what we did when we looked at the comparison which we'll get to later I know, but we did find these things, but you look at what you find and also what you don't find and so one of the big differences that, you know, manganese is not in the ash, but it's in the groundwater. So it's not consistent.

Q. Now, you mentioned barium, boron,

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sulfate, why not just look at one constituent, a single constituent?

A. That would be somewhat shallow, if you will. I mean, it's really very easy to arrive at a false positive conclusion because clearly there is boron in the groundwater if you take boron as an example, but when you look at the other things it doesn't match. So you would have made an incorrect conclusion if you use just one of these analytes.

Q. Okay. Looking back at slide eight for a minute. So we talked about the constituents of concern that you were focusing on.

Did this information on this table tell you anything about the levels of constituents that you were seeing in the ash and the ponds at the Midwest Generation stations?

A. Well, the test is structured, again, to identify whether or not the material can be reused as a CCB and what it identified is that it met that standard because what you do is you compare the concentrations in the leachate with the Illinois Class 1 groundwater standards and if you meet those standards, then you can reuse that

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ash in structural fill, for example.

Q. And all of these meet the standard?

A. Yes. One is at the standard, for example, boron at Waukegan was two and the standard is two, but I believe it was decided it could be reused. It did not -- was not above the standard.

Q. And that's the highest level ever found, correct?

A. In the leachate data that we've seen, correct.

Q. Now, given these -- these levels that you're seeing here along with the liners, what does this tell you about the potential to impact groundwater from the ponds?

A. Well, when it's this low, you expect that it should not impact the groundwater below the ponds to any, again, unacceptable levels.

Q. And I think you said Dr. Kunkel did not consider this data?

A. That's correct.

Q. Do you agree with ignoring the pond ash data?

A. I do not agree.

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Q. For the reasons you've already discussed or is there anything else?

A. Again, it's site specific data and you cannot ignore it.

Q. You also mentioned one of the common factors you focused on was the sampling of historic areas and if you turn to the next slide, slide nine, what did you mean there?

A. Well, at three locations, the Joliet plant, Joliet 29, at the Powerton plant, and at the Will County plant they had areas that KPRG went out, Andrews Engineering went out and took samples, composite samples. It's very common under RCRA, R-C-R-A. You have to have a composite sample, meaning multiple samples that are composited and also they took multiple samples in analyzing them to represent the waste mass.

So they took all these data and, for example, KPRG they looked at what they found and they concluded as they -- as I will quote here on the slide for the findings for Joliet 29 they found, quote, high-degree of statistical certainty that the criteria established in 415 ILCS 5/3.135 (formally 415 ILCS 5/3.94)a-5(B) are met and that

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the material may be considered CCB for engineering beneficial reuse.

Q. Now, this chart is a summary -- summary of the findings, did you review the actual sample results?

A. I did.

Q. And when you reviewed the results of the historic ash tests, what did that tell you about the levels of the constituents of concern you were focusing on?

A. They were, again, with the exception here of Powerton, they met the reuse standard and as it states for Powerton they found some excursion of selenium and chromium and, in fact, we did not find selenium or chromium in the groundwater at the sites above the groundwater targets. So I believe it was found -- in this situation, it was found to be reuseable.

Q. You mentioned the Powerton site, what else impacted your opinion at the Powerton -- based on the Powerton -- your review of information at the Powerton site? What informed your opinion about historic ash areas from the Powerton site?

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A. Well, one thing that was very clear when you look at what is called the former ash area it is north and west of the current pond area that was an older area that -- and I think Mark Kelly described it as maybe an overflow area, an emergency overflow area, and so we know that there is several feet of ash there. It's contained in a berm and they have monitoring well's 2, 3 and 4 that are immediately down gradient of that area and all the concentrations in those wells, and the groundwater in those wells, is less than the standard, the Illinois Class 1 groundwater standard.

Q. And, in fact, were those all the sample results I went through with Dr. Kunkel when I was speaking to him?

A. Yes, I remember it clearly.

Q. And did Dr. Kunkel rely on this historic ash data?

A. He did not.

Q. Do you agree with that approach?

A. I think you should look at this data because it's applicable and it's site specific.

Q. The last common factor you mentioned

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before was risks/no risks to potential receptors. If you turn to your next slide.

A. Yes.

Q. What did you do to assess risk as part of your investigation?

A. As I mentioned earlier, when you do an evaluation like this, and I've done many, you look at the exposure root and the receptor and with an ELUC the potable water -- groundwater users is eliminated. It's a common factor for the sites by the ELUC's and then --

Q. Let me interrupt you for a second.

Even prior to the ELUC's, were there any potable water receptors?

A. Good point. There was two surveys that were conducted, one in 2009 and one as part of the Compliance Commitment Agreements, where they did a potable well water survey within 2,500 feet of the plants. They identified that the only nearby users were a few wells that were at different plants and they were very deep and there is really no potential for those wells to be impacted by what we're seeing in the surface.

Q. Your second bullet on this page,

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what does that say?

A. Well, what we did for the surface water we took the groundwater data from the wells and we compared the concentrations in wells as though they were being exposed to the surface water receptors and we looked at the Illinois water quality standards and the Illinois water quality criteria and they're different than Class 1 drinking water standards and sometimes they're lower and we looked at those and we looked at whether or not the groundwater concentration exceeded those criteria as a screen level. Because recognize what's in the well it's going to change as it migrates through hundreds or thousands of feet to surface water. So -- in them being further away from where the groundwater has been impacted.

So we looked at it and we made a conclusion and I'll read a quote from my slide. Quote, an assessment of human and ecological receptors in surface water indicates that there is no risk to the surface water environment at each site based on regulatory risk standards and standards of practice for risk assessment.

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Summary, conclusion, surface water receptors were not going to be exposed to anything unacceptable.

Q. Why did you look at surface water receptors, is that what is nearby?

A. Yeah, it's the every -- not every, but nearly every power plant that I work on is next to surface water because they need water for cooling.

Q. Now, is this risk analysis located in your 2015 expert report?

A. Yes, it's included in Appendix B and it's summarized very briefly in the content of the report.

Q. And since that report was updated, did you also update the risk data?

A. Yes, the data that we used included both maximum levels and average levels and so we add all those quarters to update the average and maximum levels that we used in our comparison to the water quality standards and criteria.

Q. If you turn to Tab 907, what has been marked Midwest Gen 907 in the binder, is that the updated risk data?

A. Yes.

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Q. Did the updated data change the conclusions of risks at all?

A. No, they did not.

Q. So we've walked through each of the common factors for your assessment. If we look at slide 11, which is just a brief statement of our next point, the next point was compare bottom ash to groundwater conditions for each facility and you've mentioned a little bit of what you did there. If you turn to slide 12, looking at the first bullet -- I'm sorry. Are you with me?

A. Now, I am. Thank you.

Q. So what do you mean here when you say you conducted a comparison of the occurrence of groundwater constituents to indicators of leachates in the ponds, from ash stored in the ponds?

A. Well, we took the data.

Q. Which data?

A. The groundwater data all the way through second quarter of 2017 and we looked at our indicators that we found in the ash ponds being barium, boron, sulfate and TSS -- excuse me -- TDS and we compared it to, again, the two

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against each other and we looked at what was consistent, meaning found in both or not found in both, and inconsistent, meaning found in one and not found in the other, and we did a calculation as a percentage. We looked at number of times it was inconsistent, which meant they would not -- it would indicate that the ash in the pond would not be a source in the groundwater.

Q. And is that comparison process that you described a standard methodology for reviewing a site?

A. Having reviewed a number of sites, we all do data comparisons. It's done different ways. This way I simply put it in a percentage of matching or non-matching.

Q. Have you presented this type of information in percentages before?

A. No, I haven't.

Q. So is that -- why did you do it here? Was it a way to present data?

A. Yeah. When you look at data, it seemed like a simple way to present it that people could understand whether it matched or did not match, was it consistent or was it inconsistent.

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Q. But is the comparison process standard for your field?

A. Yes, it is.

Q. In this first bullet we were reading from slide 12, it also mentions EPRI research, what did you do there?

A. Well, as I mentioned, we started with the site specific data and we know that Dr. Kunkel had looked at the EPRI research. So we wanted to do our own comparison using our data, the site specific data in the ponds, to see how it compared to the EPRI data or the literature data.

Q. And did the EPRI data change your conclusions?

A. No, it did not.

Q. In looking at the next bullet, what were your conclusions?

A. The profiles that we looked at of the constituents that we found in groundwater did not match the profiles what was found in the ponds at the sites.

Q. And your final bullet on this point, was your conclusion based on both the comparison data and the other information you analyzed

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regarding the ponds?

A. Yes, and the final conclusion was that groundwater impacts are not the result of ash stored in the ponds at the sites.

Q. Now, we spoke a minute about the historic areas and I guess I want to be clear on what historic areas we're talking about.

You heard Maria Race testify about potential areas of historic ash based on maps from ENSR, E-N-S-R, reports that she was shown, is that part of what you're referring to?

A. Yeah, the facility when I speak of historic areas you can look at it in two levels. One is the ENSR report from 1998 identified some areas that were based on some conversations with people that said these are areas that they believe are there. That's one level of history. The other level of history is what I'll call not quite ancient because it's 50-year history and I'm past that so I don't want to admit to being ancient, but it is that old data, the plants are very old. So you go 50 to 80 years old, there is some other historic data that could be representative of the sites.

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Q. But we're not -- as we discussed historic areas, you're not including those 50 to 80 year-old areas, are you?

A. No, I'm not. Really we're looking at -- you can think of historic areas as the borings where ash was found and the ponds which, of course, have existed for quite a while. So those are the historic areas that we based our evla- -- based my valuation on.

Q. And what about things like the northeast landfill area we heard a lot about today at Joliet, is that included as in your definition of historic area?

A. Yes.

Q. So what is not included, is it fair to say that it's what's known?

A. Yes.

Q. Historic ash that is known to exist?

A. Yes.

Q. Would it include the ash that we know might be in the berms?

A. Yes, it would.

MS. NIJMAN: I can keep going. I'm going to jump into some of the stations now. What

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would you like to do?

HEARING OFFICER HALLORAN: Let's go off the record for a minute.

(Whereupon, a break was taken after which the following proceedings were had.)

BY MS. NIJMAN:

Q. All right. Looking at your overview, again one of the things that you said you had done was you assessed the site conditions for each of the facilities. So I'd like to turn to that point and starting with Joliet 29, what did you do -- again, I don't want to go over a lot of this because much of it we heard over other people, testimony that came before. For instance, we heard from Maria Race that Joliet 29 converted to gas in 2016. It's been operating for 30 years. Just looking at slide 14 what other conditions at Joliet were -- forms the basis of your opinions?

A. Well, one of them is when it was operating most of the ash went offsite so the ponds are only used occasionally. I think the number I recall is maybe five percent of the time and also that when you look at the data

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preclosure -- or preconversion, you know, you have pond one and two, you use one pond at a time, pond three was a finishing pond understanding that is important, too.

Finishing pond means by definition, by the rule, it receives di minimus ash and it's not regulated. I understand how it's operated and also we know they were lined back in '78 and they were relined. So that's all very important to know in doing the evaluation.

Q. What is your opinion as to whether water in the finishing ponds could be a source of constituents to groundwater?

A. I don't -- I don't think that's significant at all. I wouldn't be concerned about it. The water is there, it's in a liner and what is in that water as we know it's -- by design it shouldn't have a level of constituent that we would be concerned about.

Q. Turning to the next slide, slide 15. We've heard some testimony about this slide before depicting the Joliet site ponds and can you identify the ponds on that page?

A. Yes, on the left side of the

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drawing, which is to the west, is ash pond one, adjacent to it to the east is ash pond two, a little further away is ash pond three, also called a finishing pond.

Q. If you turn to your next slide, slide 16.

A. Okay.

Q. What does this reflect?

A. This -- this, again, was a bit of struggle, as you go through the data, for me. There is so many dates and facts to remember. This was a nice summary so that I could see like, for example, on the left you see ash pond one. It says how it was used before 2015, intermittently when -- conveyor was not operating. It says when it was originally lined, it says when it was relined and how often the ash was removed. So it goes through that summary for each pond and it's a nice way to see kind of what is going on over time.

Q. Looking at the column that is marked date constructed liners, they all say poz-o-pac which we know from prior testimony, but they also say bituminous, B-I-T-U-M-I-N-O-U-S, seal coat,

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what does that mean?

A. Well, it's an organic material, black normally, it comes a little bit like glue and you spread it over the surface and it sets and it provides like similar to a rubber type seal over -- over the -- over the poz-o-pac.

Q. We also see on this slide 16 that you have the poz-o-pac 12 inches thick for the ponds at Joliet, why was that relevant to you?

A. Well, again, it has compacted granular fill underneath and that's the subgrade, the foundation and they put the poz-o-pac which is 12-inch thick poz-o-pac. If you think, most pavement in your communities aren't 12 inches thick. So it's a pretty thick, hard layer.

Q. This slide also notes in the fourth column, I guess, the date relined with HDPE. If you look at the next slide, slide 17, what are we seeing here?

A. This is a cross section reproduced from my report and which Decision Quest has made it look beautiful. It is ash pond's one and two relined in 2008 and you can see from the bottom up on the far right you -- the dark brown is the soil

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subgrade. You see poz-o-pac on the right 12 inches thick and above that you have the bottom geotextile cushion, above that is the 60 mil HDPE liner, above that is the top geotextile cushion, on top of that cushion is a sand cushion layer 12 inches thick, on top of that is a crushed limestone warning layer which is six inches thick.

Q. Is this an accurate depiction of the Joliet ash pond's one and two?

A. Yes, based on all the records I could find, I believe it's accurate.

Q. We've discussed a little bit as it's used here, what is the purpose of the geotextile?

A. Again, it's a cushion for the geomembrane to prevent mainly puncture damage.

Q. And what is the purpose of the sand cushion 12 inches thick?

A. Well, when you install a geomembrane, you can appreciate that it can be punctured by equipment and its tools. So you want to have that cushion on top of it as a minimum before you put any heavy equipment on that -- in that area. So the crushed limestone is what I call a very strong binding layer. It interlocks

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and provides a hard-working surface similar to a gravel road, for example. It's a good -- good working surface for the equipment later on when the pond is cleaned out.

Q. Does this go back to your comment, your opinion earlier, about the design of these ponds?

A. Yeah, these ponds are designed to be cleaned out with heavy equipment.

Q. When you say heavy equipment, do you -- what do you refer to?

A. We've heard kinds of equipment that they have been using. They've had dump trucks, they've had rubber tire end loaders and that type of equipment.

Q. And in your understanding, that is acceptable for a pond designed this way?

A. Yes. I believe so, yes.

Q. You also note on this slide 17 groundwater elevation, average groundwater elevation.

A. Yes, we can see for pond one the elevation is 506 feet and for pond two it's 505 feet.

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Q. And then you also have noted on here the pond bottom elevation.

A. Yes, the pond bottom elevation for both ponds is 516 feet.

Q. And why did you want to note that on these drawings you did?

A. Well, Dr. Kunkel made quite a bit of -- put a bunch of ink in his report about the occurrence of hydrostatic uplift and this demonstrates that the groundwater levels are quite a bit lower than the liner system and that hydrostatic uplift will just not happen because the water level doesn't go up high enough to contact and push up the liner.

Q. If you turn to the next page, this page we were just looking at was for pond's one and two. If you turn to the next page, you see ash pond three and you mentioned a minute ago that was the finishing pond, I believe?

A. Yes, it is.

Q. And would you describe -- I think generally the layers of the pond are similar, correct?

A. Yes, they are.

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Q. The cross section is similar to pond's one and two. You also noted the pond bottom elevation and the average groundwater elevation here.

A. Yes, the average water level through the updated data is 505.5 feet and the pond bottom elevation is 517.5 feet.

Q. Now, you've listed here the average groundwater elevation.

Did you also consider the maximum and the minimum groundwater elevation?

A. Separate from this, yes, I did.

Q. And you looked at it all?

A. Yeah, and I had the same conclusion that -- recognizing that when ponds are constructed, they often don't have seven years of data and you may have a data point in time. So you design it to accommodate some reasonable expectation of what a maximum could be and when we looked at the actual data, say, over the seven years, it -- again, while it did come close to the bottom, it just would not cause hydrostatic uplift.

Q. What are other things based on the

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design of the ponds that would prevent hydrostatic uplift?

A. Well, it's one of the things we talked about, the weight of these materials help resist hydrostatic uplift.

Q. What do you mean?

A. The weight of -- the combination of the poz-o-pac, the sand, the stone and the water in the pond because that adds weight in the pond to help counterbalance potential uplift force from groundwater rising.

Q. So even if there was some weird situation where you had a 500-year flood and there was water rising, would you -- first of all, are you aware that has happened so far?

A. I'm sure it has not happened, although we've had some pretty big rain storms down in Joliet, it seems to have been hit hard over the last few years, but I would have expected that the water in the pond -- because it's in the pond. It would be plenty -- in addition to the other liner materials, would have played a resistance to hydrostatic uplift and we also know from Rich Gnat's testimony earlier there is a lock

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system nearby that they control the water levels in the river which, in turn, will control the water levels in the ground.

Q. So is there any likelihood of hydrostatic uplift in your opinion at pond's one, two or three at Joliet?

A. No.

Q. Now, going back for a second to slide 16, the chart of the impoundments you did, the last column scheduled ash removals, why was that relevant?

A. Again, it goes back to the how frequently do you have the risk of damage. So in this situation, they're only cleaned out every couple years and I think what happened, and the way I understand it, about every two years one of them has to be cleaned out. That's why it says every two to four years. So you don't have to clean it out instantly. So it's in that range. One of the ponds is cleaned out every couple years or so and then less frequently means less probable chance of damage to the liner.

Q. And you mentioned when we were speaking about the sites generally that you

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personally did -- Geosyntec did some investigation to assure that the processes used in the ponds were -- were appropriate.

Did you do anything specific for Joliet or who did you speak to for Joliet, if you recall?

A. I believe it was -- I can't remember if it was the plant person. We had a conversation with a number of different people.

Q. Does Harrison Estep sound familiar?

A. Oh, yes. Harrison Estep. Yes, that is the person. Thank you. Sorry. Yeah, we spoke to -- Harrison Estep had reported it. I believe that may have been a document that was produced from phone notes. So that was the person, yes.

Q. And did he, along with the testimony we've heard in this case, confirm that at Joliet 29 the operations inside the pond would serve to prevent damage?

A. Yes, I think all the processes they followed were appropriate and they took very reasonable care to avoid damage.

Q. Now, as part of your --

MS. NIJMAN: I can keep going. It's

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quarter til.

HEARING OFFICER HALLORAN: Yeah, let's start wrapping up.

MS. NIJMAN: I'll just stop here.

HEARING OFFICER HALLORAN: Okay. All right. We're still on record. I think we're going to close up shop and continue it tomorrow at 9:00 a.m., February 2nd, 2018. Groundhog Day. So hopefully nobody sees their shadow tomorrow morning when they walk out, but, anyway, thank you. Have a safe drive home.

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STATE OF ILLINOIS)
) SS.
COUNTY OF COOK)

I, Steven Brickey, Certified Shorthand Reporter, do hereby certify that I reported in shorthand the proceedings had at the trial aforesaid, and that the foregoing is a true, complete and correct transcript of the proceedings of said trial as appears from my stenographic notes so taken and transcribed under my personal direction.

Witness my official signature in and for Cook County, Illinois, on this _____ day of _____, A.D., 2018.

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A
A.D 298:15
a.m 1:16 297:8
ABEL 2:10
ability 157:15
able 14:14 24:16 35:10 42:21,23 64:7 72:23 73:8 76:22 77:22 150:11 186:21 196:8 198:5 203:2 207:11 211:23 212:7 243:8
above-entitled 1:12
absolute 99:10
absolutely 48:20 59:5 103:10 105:2,8 256:20
abstract 174:22 174:24 175:1,9 176:5,7,9,16 176:18,21
abstracts 174:15 174:18 176:15
academic 257:17
accept 159:22 224:23 252:14
acceptable 252:1,2,3,13 252:24 260:5 291:17
acceptance 251:15 252:19 259:17
accepted 12:1 13:1 227:4 250:4
accepts 87:17
access 53:10
accommodate 293:18
account 269:3
accuracy 50:24
accurate 290:8 290:11
accused 264:14
achieve 30:3
acquire 170:2
acre 258:15,17 263:13
acres 152:13,17
Act 256:11
actions 106:22 106:22 243:1 265:16 266:2
active 11:19 107:13 167:4 192:7 225:6,11 225:15
activities 240:12
activity 178:24 265:8
actual 12:19 90:23 129:16 132:4 152:8 169:16,19 246:2 253:16 269:14 276:4 293:20
add 47:5 280:18
added 207:22,23 234:7 236:20
adding 208:2 236:22 244:7
addition 219:22 219:24 220:15 261:13 294:21
additional 118:12 139:21 142:1 146:15 234:7 235:2 236:13 242:20 242:20
address 220:21 226:24 258:8
addressed 116:3 193:1 229:22 239:8
addressing 116:7
adds 294:9
adequate 262:8
adjacent 111:10 288:2
admission 136:4 161:15
admit 88:17 111:3 116:22 118:18 120:14 121:22 148:5 157:22 160:17 163:10 166:6 177:13 284:20
admitted 43:15 46:14 111:6 117:16 118:24 120:19 122:4 136:10 148:8 158:3 161:18 163:15 166:9 177:18
adopted 171:15
advantage 244:16
advisor 6:14
aerial 63:23 162:8 206:6
aforesaid 298:8
afternoon 141:3 180:9,10,13 213:10
afterthought 265:22
age 228:19
agency 66:3,8,11 225:2 246:9 248:4
ago 79:10 241:24 260:3 262:3 292:18
agree 80:14 222:14 225:7 231:18,20 257:1 260:13 266:6 274:22 274:24 277:21
agreed 89:22 106:21 108:12
agreement 38:14 39:9 89:21,24 90:12 97:24 145:4
Agreements 266:3 278:17
agricultural 138:16
Agriculture 138:12
ahead 13:16 42:1 44:9 63:18 133:7 156:17 183:4 184:12
al 212:20
Albert 253:8
Alilla 27:17
Alisa 6:15
alleged 124:14
allow 19:17 108:10 141:2
allowed 65:13
allowing 108:18
allows 11:14 167:4
aloud 75:20
aluminum 230:9 230:18
ambient 30:12 205:15
amended 134:3
American 218:6
amount 17:6 197:22 226:17
analyses 87:18 91:4 92:22 199:1,11,14,22 238:17
analysis 87:12 91:5,23,24 92:1,7 93:14 146:6,13 159:12,17,21 159:21 160:2 168:5,18,22 169:2,3 172:13 173:14,20 174:20 177:6 181:9 186:13 199:3,24 200:3 212:10 220:2 227:9 234:23 237:23 238:18 239:1,7 242:1 268:1 280:9
analyte 232:2
analytes 273:10
analytical 87:11 87:13 89:9 90:19 160:4 173:12 199:11
analyze 91:7 92:10 159:2,11 159:19 269:20
analyzed 91:24 159:3,6 168:11 173:17 283:24
analyzing 147:1 168:6,7 275:17
ancient 284:19 284:20
Andrews 275:12
animal 239:7
annual 94:16 193:10
answer 24:16 28:21 33:4 35:10 45:7 57:15 64:7 72:23 73:8 74:9,9 75:24 76:3,22 77:22 80:15 150:11 185:5 196:7 198:5 203:2
answered 68:17 74:5,8 197:24 198:1
antidotal 77:1,6
anybody 31:21 77:14 172:24
anyway 297:10

apologize 9:16 13:16 33:18 80:1 195:6 199:2
apparent 131:10
apparently 51:11
appear 48:23 118:11
appeared 2:18 3:7 192:19
appears 45:22 49:1 59:16 95:17 105:11 136:24 175:9 215:8 298:10
appendix 232:8 232:8,10,13 280:11
applicable 107:17 231:2 231:18 277:23
applications 112:12
applied 222:19 227:10 270:1
apply 107:24 138:14 167:6 220:24 224:22 226:24 227:1 260:10
applying 173:2 173:3
appreciate 262:13 290:19
approach 237:18 269:24 277:21
appropriate 220:3 296:3,21
approval 246:9
approved 140:12
approximate 98:12 210:8
approximately 152:11,18 204:10
April 97:21
aquifer 103:22 142:2 156:18
aquifers 104:12 105:21
area 10:3,3,6,10 10:13,19 11:4 11:6 17:5,7 29:5 45:17 55:2,2,17,18 56:3,5,7,7 61:19 62:9,10 62:15,17,18 77:1 97:1 98:14 100:15 101:2 107:14 107:16 108:12 112:21 113:2 122:7,17,21,23 123:20,24 124:15,19 125:8,18 129:8 129:21 137:15 138:7,9,15 139:13 140:15 142:1,4,8,10 142:13,22,23 150:6,14,23 155:1,20 156:1 157:2,13 158:21 167:20 184:17 185:17 185:18 188:7 191:19,23 192:8 193:7,13 193:14,16,16 193:21 194:10 194:14,23 195:13,16,19 195:21 196:3 197:4,10,17,19 197:23 198:10 198:13 201:13 202:16 203:10 203:14,17 204:15,18,22 204:24 206:7 206:11,12,23 207:17,18 210:15,21 252:15 277:3,3 277:4,5,6,9 285:11,13 290:23
areas 9:4 12:1 12:10 13:6 51:10 54:20,23 54:24 55:12 69:2 80:11 105:7,8 118:10 119:23 120:3 121:14,18 138:12 187:1 226:24 227:2 267:4 275:7,11 276:23 284:6,7 284:9,13,15,16 285:2,3,5,8
Aron 254:1
arose 228:15
arrive 273:4
arrived 67:23
arrow 156:21
arrows 98:4
arsenic 149:22
article 258:2
articles 258:9
aruss@enviro... 2:12
ash 7:16,19 8:2 8:3,4 9:4 10:3 10:5,7,9,13,17 12:1,5,6,9,11 12:15,16,18,18 12:20 13:1,4,5 13:7,10,11,13 13:13 14:6,8 15:19,21 18:12 18:15 23:8 25:13 28:1,1,5 28:15 29:4 32:13,15 35:14 36:17 40:3,21 42:10,19 45:1 47:4,4,8 49:11 50:19,19,24 51:14,18 54:14 55:15,20 56:5 56:9,9 57:17 57:24 58:3 61:21 62:10,15 63:11,15 64:2 70:2,7 73:12 73:19 74:3,16 80:8,23 84:12 102:5 111:11 124:14 127:14 133:17,19 142:10,18 143:6,7 146:14 154:5,13,24 155:20 157:2 158:20,21,23 162:20 168:9 168:20 170:12 170:16 191:19 193:16 195:16 195:19,20,23 196:3,18 197:10,19,22 202:16 206:12 206:23 210:3 210:22 216:14 216:16,17 217:14,17,21 218:10,22 226:14 227:1 227:17,19,22 227:23 229:3 238:14,17 241:5 248:15 253:11,24 262:5,5,21 263:18 267:2,2 267:4,4 268:1 268:8,13,22 269:4 271:13 272:8,10,22 273:16 274:1 274:23 276:8 276:23 277:2,7 277:19 281:7 281:16,22 282:7 284:3,9 285:6,18,20 286:21 287:7 288:1,2,3,13 288:17 289:22 290:9 292:18 295:10
Ashland 203:11
ashless 15:23
aside 37:7 48:3 232:20
asked 65:9 68:21 69:18 70:22 71:18 74:5,8 180:13 180:15 183:23 184:2 197:24 198:1,2 200:5 202:13,15 210:9,11,14
asking 23:11 198:3
aspect 84:12
assembled 181:1
assess 246:2 261:15 278:4
assessed 286:10
assessing 238:3
assessment 19:2 217:9 230:22 231:17,22,24 232:14 237:18 265:14 279:20 279:24 281:5
assigned 6:4 171:5
assist 91:13 107:6 139:17 151:18 157:6 158:14 166:20 237:4
assistance 107:2
assisted 112:11 139:18 140:6

166:21 167:12 191:2
associated 107:13 108:20 112:8 155:21 179:2 225:3
Associates 83:1 119:14 158:10
assume 11:13 18:2 32:24 269:11
Assumes 75:6 75:10 76:19 77:19
assuming 264:17
assumption 259:24 272:6
assumptions 245:22
assurance 183:2 244:2 246:11
assure 296:2
ASTM 159:4,15 159:24 168:11 169:2,16,20 170:5 171:2,10 171:11,12 173:5 174:11 175:10,24 176:13 198:23 199:4 218:4,9 219:13 222:5 267:11
ASTM's 172:6
atmosphere 263:11,16
attach 234:12
attached 128:13 130:10 215:6
Attachment 249:5,23
attempted 117:13
attempting 197:22
attention 88:7
attest 240:13
attitude 179:8
attorney 6:14
August 1:1 119:15,20 121:9
authoritatively 30:21
authorization 246:8
authorized 252:10
authors 60:12
automatically 247:22,24
available 170:7
Avenue 2:10
average 29:8,9 103:13 184:16 185:22 186:3 280:17,18 291:20 293:3,5 293:8
averages 259:4
avoid 32:2 258:10,10 296:22
avoided 257:19
aware 18:4,6,14 18:16 21:14,15 21:16,17 23:1 23:6 30:14 31:21,24 32:6 37:9 58:9 69:12,12 73:12 74:3 76:8 77:17 102:13 193:18,22 196:12,14,24 197:2,6,21 198:7 210:16 225:2 265:22 294:15

B

B 5:1 159:7,18 280:11
B-I-T-U-M-I-... 288:24
B-O-N-A-P-A... 257:12
BA01 234:21
Bachelor 215:16
back 12:12 14:5 15:22 18:8,17 37:14 39:8 42:2 51:2 54:7 57:10 63:7 65:5 66:21 74:18 82:6,6 87:19 111:21 113:17 116:1 117:9,13 122:18,20 128:22 137:18 139:3 141:5,13 141:13,17 155:23 157:18 161:13 177:20 180:5,12 182:23 183:12 186:20 191:16 191:23 192:13 193:7,9 202:22 204:10 211:15 213:5 241:23 242:23 255:5 260:17 264:16 265:23 266:14 266:15 273:11 287:8 291:5 295:8,12
background 27:15 83:4 100:4,7 101:3 102:14,18 103:4,5,9 105:14,16,24 106:2,4,6 200:6,11,19 201:1,6,8,12
backup 271:6
bailer 87:3
bank 25:4 127:5
barium 149:22 269:18 272:2,3 272:9,10,24 281:23
barrier 242:20
base 32:9 192:9
based 16:8 17:24 77:16 106:16 118:21 120:16 122:2 153:8 168:22 179:6 184:16 200:22 203:18 205:18,22 226:22 230:21 231:4 235:24 237:5 252:20 255:10 260:14 265:14 269:13 271:12 276:21 279:23 283:23 284:9,15 285:8 285:9 290:10 293:24
basement 15:19
basically 50:18 68:3 97:4 108:19 143:17 155:20 182:3 199:23 202:12 225:17 238:7 243:5
basin 42:24 62:17 133:17 133:19 137:5 137:14 142:10 143:6,8 262:22
basis 62:16 86:6 86:7 89:23 102:8 107:3 124:9 173:6 286:19
bass 68:6
Bates 9:8 19:4 39:11 44:14,15 49:6 118:6 206:3 211:16 219:18 224:9 230:3 249:23 250:22
beautiful 289:22
becoming 228:16
bedrock 103:2
began 85:16 95:7 125:20
beginning 184:3 220:15 223:15 243:10
behalf 2:18 3:7
believe 16:17 42:13 52:7 66:20 71:18 85:3,16 86:2 86:13 89:13 94:6 97:7 99:12 105:20 112:5 113:13 117:14 122:11 122:16 124:16 126:23 130:13 131:21,24 135:20 139:4 145:24 147:11 148:21 149:22 152:12 159:10 163:2,4 169:2 170:5 171:2,4 171:12 173:11 173:14 176:5 181:16 183:1 183:19 184:5 186:15 188:17 188:21 189:11 189:19 190:19 190:24 191:22 197:17 199:2,6 200:9 201:22 203:8,16 205:14 207:17 207:19 210:15 211:20 229:15 231:15 262:17 274:5 276:17

284:16 290:11 291:18 292:19 296:7,13
believed 227:9 227:16
beneath 56:13 58:2,6,13 90:15 127:13 129:24 130:1 154:24 157:2 212:8 242:14
beneficial 168:10,24 170:12,14 177:11 217:14 276:2
beneficially 159:6,14
berm 17:11 226:13,18 277:8
berms 285:21
best 75:21 102:6 200:10 243:24 267:19,19
better 9:16,18 106:8 186:22 192:2 236:2 257:19,21
beyond 63:11
bi-product 7:18 20:9 21:10 22:8 67:11 75:4 80:8 160:3 170:14 177:11 266:23
bi-products 78:2
big 49:20 50:13 152:11 272:21 294:17
billion 139:1,2
binder 104:4 158:6 169:13 175:7 207:3 214:14 224:2 232:20,21 235:10 280:22
binders 214:17
binding 290:24
bit 12:12 25:16 27:14 28:15 63:11 78:7,24 79:7 83:21 106:5 129:15 131:10,16 133:9 135:21 143:7 146:19 162:23 192:2 200:1 205:13 240:14 244:14 244:23 270:17 281:9 288:9 289:3 290:12 292:7,11
bituminous 288:24
black 104:14,17 206:11,15 289:3
bladder 86:23
blast 212:19
blow 182:21
blue 98:2 156:15 156:20 237:11
Board 1:1 6:4
bodies 126:17
body 190:6
boiler 7:18,20 64:12 162:21
Bonaparte 257:9,11
book 165:14
boring 131:2 150:1,4,22 151:5,5,10,14 151:23,24 152:23 153:5,8 153:13,14,15 153:21,22 154:1
borings 150:13 150:16,21 151:6,7 154:8 195:13 196:17 196:23 285:6
boron 105:22,23 138:17,21 139:9,12,14 269:18 271:20 272:24 273:6,7 274:4 281:23
bottom 7:19 8:3 8:4 9:15 10:2 12:20 13:5,13 19:8 21:6 23:10,21 24:22 24:23 27:16 32:13 40:6 42:3 44:17 47:8 53:21,24 54:10 59:14,15 59:16 63:22 72:1 79:23 80:3 92:6 118:7 119:17 158:17,23 168:9 180:20 216:17 217:21 226:9 237:11 238:14,17 262:15 263:9 267:3 268:1,22 269:19 281:7 289:23 290:2 292:2,3 293:3 293:6,22
bottoms 23:13
Boudry 248:13
boundary 206:13
box 40:20,21 41:5,7,10 42:9 42:10,22,22,22 45:1,4,21 108:6
boxes 51:20
boy 52:23 105:23
Brad 6:2
BRADLEY 1:13
break 39:4 57:6 63:3 65:1 82:2 113:14 117:5 128:18 141:9 161:9 180:1 204:2,6 213:1 286:4
breaking 140:21
Brickey 3:10 37:14 82:11 202:22 213:11 298:5,20
brief 58:18 281:6
briefly 18:24 90:20 117:3 195:22 209:12 211:11 280:12
Brieser 254:1
bring 33:2 132:6 178:2 195:10 216:4 268:11
bringing 216:6
broad 256:24
brought 95:11 130:19 267:9
brown 289:24
bucket 54:7
budget 245:6
bug 82:21
BUGEL 2:2
build 246:3,4 251:20
building 15:19 15:22
built 246:12
bulk 12:19
bullet 238:13,24 243:3,4,17 266:16 278:24 281:11 283:4 283:16,22
bullets 238:8
bunch 292:8
buried 148:15 195:16,19,20
burning 266:20 269:9,10
business 182:6 244:8 257:15
button 182:22
buyoff 253:15 254:15
bypass 133:17

C

C 2:1 7:9 65:6 72:10 82:17 180:7 209:13 211:13 213:16
C-A-A-W 36:13
C1 249:5,23
CAAW 36:12,12 36:16 251:18 252:11 253:8
calculation 229:9 233:16 282:4
calculations 233:19,20 236:21
calibrate 271:2
California 2:16
call 15:20 19:23 19:24 40:3 90:4,10 99:14 108:3 208:24 218:22 220:10 224:6 225:14 226:12 228:5 231:21 234:5 237:21 240:5,6 246:16,19 261:21 264:3 284:18 290:24
called 7:5 10:3 19:10 20:1 47:19 77:7 82:15 89:20 114:1 127:10 148:23 151:24 172:2 173:22 184:15 213:14 222:20 235:18 239:1 251:14

261:17,19 277:2 288:3
calling 213:8 216:13
calls 24:13 82:9 150:7
cap 8:8,23 9:1,2 123:10 193:20 211:5
capabilities 247:19
capped 8:20 11:6 16:5,9 18:19,20,21 22:16,21 193:17 196:3
capping 8:8,10 8:16
caption 221:21
care 296:22
carefully 260:24
carries 253:3
case 31:20 90:9 108:7,9,17 109:12 113:24 159:8 166:14 171:6 188:8 215:7 219:6 221:24 228:10 228:15,17 237:2,18 242:5 254:17,18 263:24 269:16 296:17
cases 225:3 230:23 231:9
catalog 245:5
categorically 31:19
categories 89:14 89:17
categorize 245:5
caught 143:14
cause 1:12 123:8 251:5 293:22
caused 31:17,18 31:23 81:11 124:7 144:2 204:18,21,23 205:2 227:18 255:2 260:21
causes 225:22
causing 205:6,8 205:11 265:13
caution 24:8
caveats 176:1
CAW 251:18
CCA 26:1 89:20 90:3,18,24 91:3,23 92:5,7 92:11,21 93:1 93:18,23 94:2 97:24 129:6 139:16 145:1,2 146:20 155:13 155:19,21 156:1 157:4,8 164:23 165:1 180:19
CCA's 106:21 145:8 166:19 228:24 265:24
CCB 168:1 169:4 217:22 219:3 273:20 276:1
CCB's 221:2,4
CCP 218:20,21
CCP's 218:17 220:5 221:22
CCR 40:3 71:1,8 90:4,6,8,17 91:1,6,24 92:1 92:5,10,23 93:14,18,23 94:2 129:7 135:7,9 148:16 165:23 180:19 207:24 208:1 216:20 217:1,5 217:7,9,10 223:11,12 224:6,22,23 225:3,5,6,10 225:11,15 226:23 228:7 228:12,18 229:2,8,14 230:1,2,6 231:5 232:5 266:24
CCR's 216:10 216:10
ceased 16:12
cells 260:24
center 1:4,15 2:5 6:6 103:11
centered 104:19
certain 30:1 34:7,9 92:10 106:21 108:9 174:22 175:2 258:10,12 260:7
certainly 99:8 103:23 133:18 136:22 142:13 153:21 154:4 183:6 187:9 193:2 199:10
certainty 81:13 81:15 275:22
certificate 253:6
certification 246:20 249:6 249:22 250:9 252:20
certifications 247:8
certified 259:23 298:5
certify 298:6
cetera 41:6 114:4
chain 15:11 87:10,18
challenging 243:6
chance 45:7 241:9 295:22
chances 262:1 265:12
change 146:5 173:23 192:16 235:6 236:23 246:7 279:14 281:1 283:13
changed 122:21 163:5 173:8 234:18 258:2
changes 146:12 171:7,18
Channahon 111:14
channel 98:9,13 109:24 155:6 184:2 185:4,24
Characteristics 221:22
characterized 38:17
characterizing 222:21
chart 187:11 232:7 269:13 276:3 295:9
charts 181:23
check 41:5 94:13 192:12
checked 40:21 42:11 45:1,10 45:12,12,22 114:19
checklist 44:11 45:21
checks 45:13
chemicals 34:8 256:14
Chicago 1:15 2:7 3:4 83:10 111:17 213:22 298:22
chloride 111:23 112:4,7,8 136:23 137:13
chlorides 112:2 136:19 137:11
choose 160:2
Chris 27:23 30:19 261:19
Christopher 27:23 36:5
chromium 276:14,15
cinderblock 218:2
circle 61:24 62:2 62:5,9 63:10 63:13,14 64:2 70:10
circumstances 260:7
citation 234:8
cited 200:7 257:5 258:2
citizen 6:9
Citizens 1:5 6:6
Civil 215:17
clarification 191:11 234:9 239:16
clarify 28:11 53:11 54:24 71:20 113:23 182:9 208:14
clarifying 160:22
Class 102:1,9 106:12 107:16 107:19,21,24 138:3 167:5 200:15 201:10 201:17,24 202:11 205:12 205:16 273:23 277:12 279:8
classified 170:13 177:10
clay 127:20 129:3,10,19 130:4,11 131:5 131:12 133:1 142:19 143:1,3 143:12,15,18 144:1,3 194:4

194:5 195:11
clean 51:10 263:7 264:15 295:19
cleaned 41:19 262:22 263:6,8 265:10,11 291:4,9 295:14 295:17,20
cleaning 51:6,10 57:18
clear 42:8 54:9 96:6 144:11 189:5 216:11 227:13 233:18 241:17 277:1 284:6
clearly 156:24 176:23 236:2 273:5 277:17
client 179:12
clients 223:22 245:2
close 49:19 71:16 100:16 139:15 151:4 193:2 236:17 262:12 293:21 297:7
closed 68:6 78:3
closely 120:4 137:2
closer 28:12
closure 217:6,7
Club 1:3 2:14 6:5
coal 7:20 49:11 90:6 154:2,3 160:3 170:12 170:13,16,16 177:9,11 216:12,13,16 217:14 218:10 218:21 223:10 224:7 262:4 266:16,20 267:2,2 269:9 269:10 271:11 271:17
coat 288:24
code 169:17
codified 229:14 229:19
cold 29:10 30:2 30:13 51:5
collect 86:16,19 87:3 92:15 96:22 158:20 168:8 179:19
collected 86:5 87:5 185:21 217:18 246:11
collects 86:15 137:14
color 270:22
column 87:2 224:16 230:5 234:20 288:21 289:17 295:10
columns 268:4
combination 294:7
combustion 90:7 160:3 170:13 177:10,11 216:12 218:21 223:11 224:7 266:22
come 39:8 123:13 185:14 211:18 262:13 269:8 293:21
comes 11:11 32:15 173:4 179:14 183:5 217:17 243:7 263:11,14 268:6,7,13 289:3
comfortable 38:18
coming 55:16 95:20 106:9 149:21 205:2,6 238:20 268:8
comment 223:20 235:24 260:13 260:14 291:5
comments 258:8
commercial 217:20
Commitment 89:21,24 97:23 145:4 266:3 278:17
committee 218:15
common 237:21 237:22 238:1 239:19,20,22 242:23,24 244:8,9 246:4 246:23 247:6 251:14 266:19 267:13 268:17 275:5,13 277:24 278:10 281:5
commonly 15:20
communicated 44:5
communities 289:14
community 103:18 104:14 138:16
compacted 289:10
companies 83:19 95:12 130:18
company 83:16 83:16 89:10 91:16 95:18 250:9 251:18 255:14 257:8 270:15
compare 101:22 107:19 152:22 200:14 238:14 250:2 271:1 273:22 281:7
compared 101:24 177:1 236:4 250:4 279:4 281:24 283:12
comparing 91:23 152:15
comparison 106:8,10 107:22 227:21 272:18 280:19 281:14 282:9 283:1,10,23
comparisons 269:23 282:13
compartment 54:8
competency 243:18
complainants 1:6 2:18 6:7 43:9 46:9 94:5 114:23 134:4 222:24
Complainants' 5:5,6,7,8 9:5 27:5 35:20 38:8,8,11 39:9 43:10,14,22 44:2,15 46:10 46:14,16,20 48:4,13 60:21 60:24 61:1,7 104:3,5 109:8 110:5,6,7,9,10 113:5 132:8,21 134:2,5,7,8,9 141:18 145:10 145:11,13 147:20,21 164:4 165:6,7 165:8,10 167:23,24 168:6 169:8 174:16 175:7 175:18 178:6 183:13 205:24 209:16
complaints 237:21
complete 99:8 169:22 175:4 175:12 176:22 176:23 177:2 255:20 298:9
completed 36:19 40:2 78:17 235:23 266:2
completely 101:10 188:19
completion 246:19 252:19
complexity 240:9
compliance 89:21,24 97:23 145:3 179:10 179:14 207:24 208:2 228:18 266:3 278:17
complicated 129:15
complied 173:20 228:12
comply 179:15 223:22,23
component 133:4 155:5
components 131:19
composite 275:13,14
composited 275:16
compounds 179:4
comprehensive 232:1 271:17
computer 47:3 47:21
concentration 279:11
concentrations

138:3,22,24 201:1 273:22 277:10 279:4
concern 70:18 78:22 112:18 167:9 227:18 230:21 259:12 268:14 270:6 273:13 276:9
concerned 287:15,19
concerns 48:8 191:5,13 259:10
conclude 151:10 255:10
concluded 255:12 275:20
conclusion 137:10 222:22 260:18 273:5,9 279:19 280:1 283:23 284:2 293:14
conclusions 120:9 121:11 123:1 124:10 168:19 281:2 283:14,17
concrete 15:18 65:19,20 72:13 72:14,20 73:3 73:5,13,18 74:4,15 218:3 241:22
concrete-like 74:13
concurrently 93:20
condition 118:12 122:12 122:17 242:8,9
conditions 214:11 236:3 238:3,10,14 281:8 286:10 286:18
conduct 22:11 85:19 93:17,19 122:6,14 177:6 177:23,23 183:1,1 189:13 239:17
conducted 86:11 94:23,24 173:20 178:13 190:20 195:15 197:3 230:22 254:4 278:16 281:14
conducting 122:23
conducts 85:10 93:17
confidential 74:20 75:18 76:16 78:8 79:4
confirm 69:6 93:16 97:8 139:4 200:14 207:6 211:17 212:9 236:23 296:17
confirmed 229:15 236:24
confusion 113:24
connected 129:18 190:10 190:11,13
conscious 240:6 261:8
consciousness 264:9
conservation 263:15
conservative 269:24
consider 26:5 97:1,9 172:14 221:16 274:20 293:10
consideration 98:17,21 99:1 103:6 128:3,7
considered 220:4 276:1
considering 105:13
consistent 98:15 127:15 137:12 168:20 199:3 199:12,15 228:6,7 229:6 261:9 266:23 266:24 272:23 282:2,24
constantly 182:11
constituent 111:22 273:1,2 287:18
constituents 111:24 230:21 232:10,13 267:2,3 269:3 269:14 270:5 273:12,16 276:9 281:15 283:19 287:13
construct 256:21
constructed 77:5 238:7 246:10 256:21 256:22 288:22 293:16
construction 57:20 131:2 146:16,17,22 244:5 246:17 246:18 248:14 248:19,22,23 254:2 255:18 261:11
consultant 149:1 149:13 150:5 209:6 243:11
consultants 208:21 213:22
consumption 200:23 205:22
contact 25:14 29:4 41:18 60:4 69:3 70:21 292:14
contacted 69:4 112:17 167:8 191:5,12
contain 174:18 175:18
contained 100:22 135:24 145:21 148:1 153:22 155:11 165:18 166:3 166:16 172:3 210:5 277:7
container 91:11 268:11
containers 87:8 87:10
containment 252:17 256:12 256:13
contains 18:5 56:17
contaminant 230:20 231:14
contaminants 179:3
contamination 124:13 149:18 149:19 179:1 202:15
content 20:7 75:15 76:8 280:12
contents 75:4 151:15 242:11
context 33:21 78:24 79:18 89:23 92:18 103:16
continually 32:16
continue 55:20 68:23 201:15 297:7
continued 6:12
continues 18:15 57:16
continuing 130:2 141:15
continuous 129:19 130:1
contour 97:2,6 97:20 98:2,7 99:9 127:21 129:2,10 142:8 144:20 156:16 156:20 163:24 186:9,13 189:6 207:6 209:20
contouring 128:2
contours 97:4 183:22 187:7
contracted 51:8
contractor 52:9 52:11 71:21 251:20,20,23 253:22 254:2 256:22
contractors 72:2 247:8 251:3 261:4
contradicts 78:9
control 1:1 6:4 108:3,6 125:8 125:18 126:11 126:16,20 139:20 149:7 157:10 166:23 167:3 201:20 246:11 295:1,2
controlled 125:14
controlling 125:8
controls 107:8 266:5,6
conversation 66:14 256:10

296:8
conversations 77:10,13 284:15
converted 286:16
convey 37:23
conveyor 288:15
Cook 105:3 298:3,14
cooling 280:8
copper 230:18
copy 40:2 175:4
corner 10:2 19:8 41:8 43:1 63:22 104:24 189:20
correct 8:2,11 8:14 10:6,10 10:19 11:20,21 15:5,12,12 16:3,20 17:14 17:17 19:5 20:19,22 21:24 22:13 23:5,14 23:23 24:2,5 24:22 25:22 26:2 28:6 29:8 31:4 33:9,23 34:12 35:3 39:11 40:13,22 40:23 43:6 44:11,19,20,22 47:10 48:10 49:2,12 52:15 53:3,22,23 54:14,17,20 55:21 56:18 59:20 61:17 63:23 69:13 80:24 81:5 84:3 85:18 87:23 89:12 91:21 92:3 93:14,15 96:1 96:15 98:11,19 98:23 102:11 102:15 103:21 106:1 113:6,19 115:4 120:8 144:4 147:8,9 156:7 174:1 176:4 181:7,13 181:14 184:6 184:10 185:8 189:7,15,16,24 191:4,7,9 194:24 195:1 199:5 200:11 201:19 202:6 204:20 207:8 210:19 211:21 215:10 228:21 229:21 232:14 233:20,21 234:9 248:23 249:16,21 274:9,11,21 292:23 298:9
corrected 95:14 95:23 234:7,8
correctly 92:21 118:16 153:24 173:3 217:11 225:20 251:10
correlate 269:6 269:11 271:2
corresponds 137:2
counsel 114:20 211:12
counsel's 117:12
counterbalance 294:10
County 11:17,20 13:24 14:4 15:9 16:6,9 17:24 18:11,18 19:3 22:20,23 58:5,9,14 60:5 67:24 74:16 89:6 96:5 105:3,3,3,4,5 163:18 164:6,9 164:10,24 165:4 166:20 167:2,8,13 177:21,24 178:3,5,15 186:10 188:15 188:16,17 189:10,14 190:6,21 209:24 210:10 242:2 248:16 268:3 275:11 298:3,14
couple 16:7 18:24 22:18 26:22 31:11 37:23 50:3 52:1 61:2 69:7 70:22 71:19 72:8 86:24 152:12,17 160:21 203:22 240:3 295:15 295:20
course 54:16 120:1 181:24 182:6 207:5 220:13 243:12 285:7
courses 83:11
Court 1:14
cover 8:10,13 118:10 119:23 193:23 194:7 204:24 211:5
covered 18:9 150:23 151:3 231:5
covers 221:4 231:21
cracks 73:2
create 97:5 157:19 229:20
created 78:18 91:15 102:13 102:17 229:16 237:4
creation 91:13 97:10 191:3
crew 93:22 250:24 251:1
criteria 275:23 279:8,12 280:20
critical 187:24 188:12
cross 180:5 204:12 289:20 293:1
Cross-Examin... 4:4,11
crushed 262:9 263:1 290:6,23
CSR 3:10,10 298:20,23
cubic 52:24 241:18
cumulative 181:24
curiosity 199:13
curious 22:5
current 95:12 277:3
Currently 31:11
cushion 23:14 25:8 249:19 254:17,20,22 260:4,4,10 262:9,24 263:1 290:3,4,5,5,14 290:17,21
cushions 250:15 260:4 262:7
custody 87:11 87:18
cutting 262:16
cyclone 7:18

D

D 4:1 65:6 82:17 171:3 209:13 213:16
D.C 2:11
D3987 221:23 222:1,11 223:4 267:11 268:16
D3987-12 171:12
D3987-85 168:12 170:23
daily 246:24
dam 98:14,16,24 125:1,4 126:12 126:19 184:17
damage 26:13 32:2 40:20 41:1,8 47:9 225:3 230:23 231:9 290:15 295:13,22 296:19,22
damaged 254:19
damaging 70:15
dams 125:5,6,13
dark 289:24
data 88:2,3 89:2 92:1,5,6,15 93:11,14 94:9 94:10,17 95:17 95:19,20 96:7 96:9 100:10 102:3,22 103:9 103:24 104:11 104:15 105:2 107:3 135:14 156:4,6 166:14 166:17 168:21 168:22 173:24 180:16,19,24 181:19,21 182:4,15,18 183:8 185:17 187:16 188:16 197:8 200:6 201:16,16,23 203:10,14,18 205:15 208:18 236:17,19,22 237:6,8 238:11 245:19,20 249:10 267:2

267:16,16,18 267:18,19,19 267:20,21,22 269:6,11,14 270:3,9,12,21 270:22,24 271:1,12,19 272:2,6 274:10 274:20,23 275:3,18 277:19,22 279:3 280:15 280:16,23 281:1,18,19,20 282:13,20,21 283:8,10,11,12 283:12,13,24 284:21,23 286:24 288:10 293:6,17,17,20
database 183:10 235:1,4 236:21
dataset 91:12 103:9,11,14,14 104:1 106:2 236:18
date 42:4,5,7 164:1 224:24 227:4 252:19 288:22 289:17
dated 40:12 44:18 115:18 115:22 116:5 118:2 119:15 121:9 144:20 158:10 206:8
dates 288:11
day 1:15 36:19 182:21 201:21 297:8 298:14
days 52:1
decant 268:12
December 44:18 46:4
decided 176:18 208:1 274:5
Decision 289:21
decisions 245:24
dedicated 86:22
deed 108:14 140:13 157:14
deep 150:14 151:6 153:15 278:21
deeper 153:16 153:17
define 100:3 188:6
defined 167:20 197:17
defines 169:21 252:3
defining 143:11
definitely 37:5
definition 259:17 285:12 287:6
definitions 74:11
degrade 244:18
degree 83:9 127:7,9
degrees 83:5
deicing 136:16
deliver 32:17
demonstrate 256:9
demonstrates 292:10
demonstrative 127:23 128:6 130:3 267:9
denote 25:4 71:24
dense 241:22
density 241:13 241:14,18 244:19
departments 238:1
dependent 29:11 29:14,20,23 264:6
depending 87:8
depends 29:9 84:19 100:5 133:13 194:1,6 248:2
depicted 185:10
depicting 287:22
depiction 290:8
deposed 20:18 31:2,3 79:1
deposeth 7:6 82:16 213:15
deposition 20:14 20:17,22 26:16 28:9,11 31:7 33:6,7,13 34:18 35:4 36:24 38:1,4 49:16 50:5 52:24 66:20 67:15 68:20 69:8 74:19 78:8,12 79:1 79:14 235:24 236:5 261:18
deposits 168:20 263:16
derived 205:14
Des 16:23,23 17:1,2,3 98:9 98:13 110:1 124:8,23 125:1 125:21 126:2 127:16 178:16 178:17 184:24 185:4,23 190:12,14 210:4,6
describe 41:5 45:17 52:14 83:13 97:18 99:14 104:18 136:20 162:14 179:8 206:10 215:23 222:13 226:23 233:11 235:17 292:21
described 49:8 126:14 127:3 155:12 226:6 252:12,15 277:5 282:10
describing 41:1
description 215:21
design 57:17,20 77:4 217:7 221:14 244:5 246:12 247:21 248:1,1 262:4 262:23 263:12 287:17 291:6 293:18 294:1
designated 12:3 107:15 108:8 140:15
designates 107:14
designation 108:1
designed 227:10 256:20 262:5 262:19,22 263:5 291:8,17
designer's 221:17
destroyed 148:15
detail 41:5 45:17 237:16
details 259:16
detected 137:13 138:2
detection 231:21 232:11 244:1,7 254:22 259:5
determination 132:2 153:11 159:5,13 160:6 168:1 170:11 177:9
determine 22:12 96:19 100:7,10 102:4 150:5,23 151:2,15 160:2 168:9 170:19 186:24 212:3 220:3
determined 31:19 90:15 129:14 131:3 149:4 174:1 199:14
determining 170:22 187:7
detrimental 118:12
develop 130:22 195:9 257:21
developed 90:6 101:9 102:22 103:15 144:20 200:22 206:8 225:24 257:20
developing 192:10,24
development 107:6
device 14:14
dewater 32:16 54:17,20 55:9 55:9,12,13,18
dewatering 32:5 32:11
di 287:6
diagram 143:23
diameter 31:13 49:20 50:15
difference 50:21 90:19,21,23 146:24 173:9 173:11 176:14 181:19 193:13
differences 90:22 91:2 272:21
different 37:3 55:13 78:24 79:7 84:9 89:14,17 101:10 128:5 144:23 146:19

155:15 163:5 171:3 174:6 201:3 218:19 231:24 237:20 249:19 251:19 264:23 271:12 271:16 278:21 279:8 282:13 296:9
differently 239:13
difficult 30:3,4
direct 4:10,17 6:17 9:15 19:14,15 25:13 57:17 88:5,6 88:18 141:15 189:12
directed 15:8
direction 51:12 100:1 109:22 131:13,18 133:4 155:9 298:12
directions 142:4 205:1
directly 87:7 88:3 91:10 108:14 129:17 183:9 191:12
disagree 79:9 271:21,23
disagreed 123:1 266:10
discharge 17:14 66:6 126:2,5
discontinuous 129:21 131:5 142:20
discovered 130:16
discovery 51:19 51:23
discrepancy 79:9
discuss 9:3 16:18 18:24 56:10 74:20 195:22
discussed 23:7 27:15,24 36:24 42:15 65:24 66:14 69:7 75:14 89:14 90:19 110:2 115:11 116:9 133:21 136:18 137:7 165:3 174:11 191:20 194:13,13,22 199:21 205:12 207:7 221:2 230:7 275:2 285:1 290:12
discusses 221:5
discussing 28:12 39:18 166:19 243:3
discussion 31:10 68:19 137:4 174:11 222:10 231:4 257:7
discussions 196:1 210:16 210:17
display 160:15 267:8
displayed 118:13
disposal 159:7 159:20 223:10
disposed 159:9
dispute 251:21
dissolved 91:5 93:2
distance 152:17
distances 152:8
distinction 21:18 92:17
District 163:4
disturb 55:15 56:7
divergence 133:5 155:4
divergent 142:3 142:11,14 143:21
DNR 108:13
docketed 6:9
document 38:10 44:1 46:19 47:2,15 59:3 59:22 61:6 103:4 117:17 119:6 121:1 130:5 134:22 158:9 159:22 168:2 169:22 175:3,4,5 214:23 215:1 215:21,23 219:7,19 230:24 232:22 233:7,13 234:1 235:11 237:12 246:4 247:10 248:11 249:4 250:7 251:13 253:4,21 267:24 296:14
documentation 115:16,18 116:6,7 248:15 248:23
documented 127:13
documenting 115:19,23
documents 40:1 40:2 88:10 115:1 116:2 233:12 243:7 243:16 245:14 246:1,12,15,17 246:18,21 247:14 248:19 248:22 255:7 255:18,22 256:2 259:22
doing 51:6 84:20 149:1 150:18 155:18 221:15 248:4 261:23 265:8 287:10
dolomite 103:2
dots 104:14,17
double 133:19
download 88:5 89:9
downloaded 88:2 183:10
downloads 183:2
downward 17:11
dozens 216:20
Dr 102:11,13,19 103:19 105:15 123:22 124:12 125:24 151:9 151:13 174:11 181:17 200:7 222:24 224:2 227:7,16 230:7 231:1,12,15 232:20 255:17 256:24 257:9 257:11,13 258:2 259:9,14 260:11,19 270:11,20 271:19 274:19 277:15,18 283:9 292:7
draft 235:22 236:8
drain 32:14 57:23 58:2,6,9 58:12
drainage 56:10 56:13,17
draining 123:11
draw 206:19 257:22
drawing 61:16 155:22 288:1
drawings 131:2 292:6
drawn 61:24 63:12 64:2 164:1
dredge 260:23
dredging 52:3,4 53:3 71:19,21 260:21 261:11 261:16,20 262:19 265:4 265:12
drew 206:17
dried 22:2
drill 259:15
drinking 101:3 102:1,9 106:12 108:11 138:4 201:10 205:17 279:9
drive 2:6 57:19 231:9 297:11
driving 225:14 225:19 226:8
dropped 50:18
drum 178:23
dry 32:17
Dubin 2:6 4:4,6 7:8,10 11:2 19:18,19 24:20 29:1,17,18 33:14,17,19 34:5,16 35:10 35:18 37:18,19 38:13,21,22 39:14,17,20 43:9,16,19,20 44:4,6 45:8,15 46:9,15,22 48:3,7 53:18 53:19 55:6,7 55:24 56:1 57:3,11,22 58:22 59:1 60:1 61:1,11 62:19,24 63:8 63:17,20 64:14 64:17 65:9 66:19 68:13,15

68:16,20 69:18 72:7,8,11,17 72:18 73:4,11 73:16,17,21 74:2,17 75:13 75:14 76:1,7 77:9 78:5,21 78:22 79:16,20 80:16,21 81:18 81:20
ductwork 51:4,7 51:11
due 136:19 143:24
duly 7:5 82:15 213:14 252:10
dump 52:19,22 53:8,20,24 291:13
dumped 50:24
dumping 51:14 52:21
DuPage 105:3
duplicity 181:20
dust 263:16,17 263:19
duties 26:1
duty 133:20

E

E 2:1,1,2 4:1 5:1 7:9 65:6,6,6 72:10,10 82:17 82:17 180:7 209:13,13,13 211:13,13 213:16,16
E-L-U-C 90:11
e-mail 27:7,16 28:7 36:4,5,11 49:2,8,13 51:3
e-mails 48:23
E-N-S-R 284:10
earlier 74:23 75:15 79:5 81:3 85:5 89:8 94:22 106:14 112:10 115:17 124:24 127:23 128:6 136:18 139:5 141:2 147:7 173:7 183:23 191:21 207:7 209:4 221:2 226:7 253:18 278:6 291:6 294:24
earliest 33:8
early 85:17 251:3
earth 83:7
ease 97:17
easier 9:21 131:10 259:3
easiest 34:17
easily 105:23
east 2:6 14:23 23:8,17 26:14 27:24 31:13 34:21 40:21 42:10,24 45:1 47:8 57:24 61:20 63:10 137:5,13 142:9 142:12,24 143:10 155:1 207:15 288:2
eastern 83:11 143:5,18 156:10,22
easy 114:6 273:4
ecological 279:20
edge 143:11,18 156:10,10 189:23 262:12
edges 261:7 262:10
education 215:10
educational 83:5
effect 30:4
effected 46:6 107:15
effective 224:24 227:4 256:6,8 256:9
effects 118:13 126:21 205:7
efficient 237:23
efforts 212:3
eight 50:14 122:22 182:19 229:11 267:23 273:11
either 15:8 18:6 69:12 87:9 148:14 154:2 185:7 230:22 232:16 260:8
elaborate 208:9
electric 11:20 270:14
element 221:14 232:2
elevation 97:5 98:3,12 99:17 99:18,20 131:12 156:17 184:3,16 185:10,22 186:16,18 187:16,21 188:16 189:2 203:10 210:8 212:3,11 291:20,21,23 292:2,3 293:3 293:4,7,9,11
elevations 97:3 98:1,15 186:14 187:1 188:7 238:9
eliminated 265:3 278:10
ELUC 90:10,12 108:4,8,16 139:19 140:7 140:10,13 147:7,11 148:1 148:14,22,23 149:7,10,11 150:2,6,6 151:11,15 153:9,17 156:23 157:9 157:12 167:13 167:17,18,21 208:18,19,19 208:20,23 278:9
ELUC's 106:14 107:8 191:2,6 266:10 278:11 278:13
eludes 159:16
emergency 277:6
employed 213:21 220:2
employment 215:9
ended 129:15
endpoint 182:3 221:12
energy 83:23
enforcement 6:9
engineer 220:8 241:4 247:10 256:22
engineered 220:5 227:11 227:14
engineering 85:23 94:23,24 95:18 130:20 214:1 215:13 215:17 223:23 255:14 269:6 275:12 276:1
Engineering's 95:4,8
engineers 223:17
ENSR 151:10,14 151:22 153:23 197:18 284:10 284:14
enter 8:17 43:10 46:10
entered 48:18 90:1 106:21 128:1 155:16 236:7,10
entering 139:12 139:12
entire 28:21 34:19,19 51:8 53:14 55:9 172:4
entitled 6:5 104:4
environment 1:5 6:7 225:16 226:10 239:5 240:23 242:12 279:22
environmental 1:3 2:5,9 6:5 48:9 51:4 107:8 108:3 139:20 157:9 166:22 179:9 179:14 220:4 220:10 221:6 221:10,13 264:9 266:4
environmenta... 240:6
EPA 90:2,6 101:22 102:8 102:21 106:11 106:15 112:17 139:8 140:3,12 146:16,21 162:22 167:8 177:8 200:16 216:13 226:22 228:7 229:6 246:13 256:9
EPA's 227:9
EPRI 270:13,13 270:20 271:6 271:12,19 283:5,9,12,13

equal 97:5,5 98:3 156:17
equipment 52:8 52:15 81:11 254:19 264:24 290:20,22 291:3,9,10,12 291:15
equivalent 114:3
era 240:7
erosion 115:17 115:19,23 116:6 118:3,4 118:12 119:24 123:8,12 124:6 192:10,17,20 204:17,21,23 263:10
erosional 121:15
errata 234:6,9
errors 95:14,14 95:15,21,23
especially 100:14 108:17 138:7 247:5 248:3
establish 100:7
established 85:9 107:18 112:14 112:16 139:23 140:2,8 167:7 167:14 191:8 191:11 201:11 201:15 247:18 275:23
establishing 139:17,18 140:7 157:7 166:20,21 167:13
establishment 140:10 157:11 167:1,16 191:1
Estep 296:10,11 296:13
estimate 195:18 197:10
estimated 98:2 184:18
estimating 71:8
et 41:6 114:4 212:20
evaluate 100:19 243:9
evaluation 243:11 267:17 278:7 287:10
event 36:18 99:3 125:21,22 164:1
events 15:11 125:15 126:9
everybody 114:6 261:4 264:4
evidence 10:12 10:17 11:3 22:7 23:2 27:8 35:21 48:18 75:3,7,11,21 76:20 77:20 124:19 193:20 196:12 256:1 264:1
evident 262:23
evla- 285:9
exact 159:16 177:2
exactly 31:23 53:5 80:13 262:14 271:9
Examination 4:5,10,12,17
example 84:21 99:22 100:8 105:19 133:15 133:16 146:4 210:11 226:5 234:6,8 247:2 247:20 248:18 257:5 258:15 267:7 273:7 274:1,4 275:19 288:13 291:2
examples 94:2
excavated 158:23
excavating 32:14
excavator 32:18
exceeded 279:12
exceeding 195:9
Excel 88:2,3 89:10 94:11 134:20 145:22 165:19 183:9
Excellent 127:18
exception 262:18 276:11
exchange 161:3
excursion 276:14
excuse 13:3 93:17 109:13 110:5 119:20 131:6 154:19 156:11 160:12 165:9 168:5,11 260:23 261:11 281:23
exercise 257:17
exhibit 5:5,6,7,8 5:9,10,11,12 5:13,14,15,16 5:17,18,19,20 5:21 9:5 19:1 21:21 27:5,6 35:20 37:7 38:8,8,11,14 38:16 39:9 43:10,10,14,22 44:2,5,15 46:10,14,16,20 48:4,13,17 58:17,18 60:21 60:21,24 61:1 61:2,7 88:11 89:5 92:22,24 94:20 100:22 104:3,6 109:7 109:8 110:4,5 110:6,8,9,10 110:22,24 111:6 113:7 114:2 115:2,15 115:16,21 116:4 117:18 117:22 118:18 118:24 119:3,7 120:14,18,23 121:2,22 122:4 128:13,15 130:3,6 132:21 134:2,4,6,7,8,9 134:20,23 135:4,11 136:1 136:4,10 137:8 137:19 141:18 144:9,18,19 145:10,12,13 145:22,24 147:4,20,21 148:2,5,8,20 151:17 153:6 154:11,23 155:10,15,15 157:19,22 158:3,6 160:17 160:23 161:17 162:4 163:10 163:15,17 164:4 165:6,7 165:9,11,15,20 166:3,9 167:23 167:23,24 168:6 169:8,13 171:23 173:17 174:16 175:18 175:20 176:6 177:4,13,18 178:6 183:13 188:22 190:24 191:17 205:24 205:24 207:2,2 209:16 214:20 214:21 215:2 215:22 219:6,8 232:21,23 233:5,8,20 234:2 235:12 236:12 241:11 248:8 255:6
Exhibit's 88:7 88:16 89:1 91:19,22 113:5 114:21 115:13 116:22 145:8 165:5 166:12 166:12 180:15 181:23
exhibits 58:17 69:19 88:14 91:20 94:14 104:4 110:23 113:4,11,20 128:1 134:1 145:21 155:11 155:17 161:3 165:18 189:11
exist 34:23 226:1,2,3,11 285:18
existed 228:21 285:7
existing 229:23
exists 31:13 77:2 226:10 229:1 242:14
exit 15:6
expect 266:22 274:16
expectation 293:19
expected 271:11 294:19
experience 16:8 30:16 194:3 216:10,20 217:1,3 229:7 251:1,4,7 263:10
experienced 242:9
expert 56:24 60:7,19 150:8 150:9 214:12

215:6 233:13 280:10
expert's 214:12
explain 155:14 156:13 192:2 240:17
explanation 45:21
explanations 47:23
exposed 279:5 280:2
exposure 239:4 239:9 278:8
extended 236:18
extends 149:8
extent 19:14 63:15 126:19 206:22 272:16
extra 143:19
extreme 257:3
eyes 97:17

F

facilitate 87:2
facilities 84:10 84:12 86:22 89:4 286:11
facility 84:20 238:15 281:8 284:12
fact 79:6 169:6 232:4 234:12 240:10,19,21 243:20 244:10 264:11 276:14 277:14
factor 239:22 242:24 264:19 277:24 278:10
factors 151:1 237:22,22 239:20,21 242:23 266:20 267:13 275:6 281:5
facts 75:6,10 76:19 77:19 245:21 256:1 259:16 260:18 288:11
fair 194:8 223:7 285:15
fairly 98:15,15 105:10 125:11 125:12,14
FAITH 2:2
fall 90:18 94:4 110:2 111:10 126:8 133:21 145:6 147:18 151:9 165:3 168:3 192:4 193:4,10,13
falls 194:2
false 273:5
familiar 8:8 13:19 19:21 56:12 59:2 84:13 141:21 161:24 195:24 208:12 209:5 217:13 218:4 223:12 241:16 247:24 296:10
familiarity 125:3 241:3
far 38:18 69:21 76:11 104:23 189:20 222:1 224:15 237:11 240:22 289:24 294:15
farming 138:12
fast 126:16 264:6
favorite 218:3
fbugel@gmail... 2:4
feature 142:23
features 115:20 121:15 124:6
February 1:16 6:11 20:19 31:4 235:20 297:8
fed 245:20
federal 91:6 220:13 223:10 224:5,10 226:23 230:2
feel 33:5 78:6 140:24 212:6 212:12 231:10
feet 28:5,18,19 49:22 50:3,14 50:15,22,22 152:21 153:16 153:18 154:3 251:8 277:7 278:19 279:15 291:23,24 292:4 293:6,7
fell 12:16 201:16
felt 119:23 187:24 231:2 236:1 239:8 269:21
fence 192:5,6,6 192:9
fertilizer 138:8
fewer 265:7,11 265:12
field 10:14,21 11:7 91:3,9 92:8,9,14,19 93:22 147:2 283:2
figure 31:22 61:24 76:14 104:5,10,12 109:7,19 132:9 142:7 151:20 154:22 164:17 164:18,20 185:2,22 209:17 211:17 211:24
file 88:1,2,3
filed 127:23 128:6
fill 40:15 55:21 195:11 203:11 218:1,18 226:21 264:16 274:1 289:11
fills 220:5 226:12
filter 91:3 94:2 243:8
filtered 87:9 91:9 92:8,14 92:18,18 147:2 180:22 181:4,6 181:8,18,21
filtering 92:9
final 198:9 236:9 244:2 245:18 258:13 283:22 284:2
finalization 223:20
finalized 228:16
finally 8:20 13:9 179:6 188:14 197:9
find 113:22 148:15 167:23 178:21 187:21 193:12 207:11 221:6,9 272:3 272:7,15,19,20 272:20 276:15 290:11
finding 136:23 211:12 264:12 271:10
findings 275:21 276:4
fine 12:19 61:5 80:15 115:9 120:11 121:18 132:5 141:1 188:20 207:1 209:8
fines 12:17 18:3 18:5
finished 57:11 62:21 65:9 81:24
finishing 287:3 287:5,12 288:4 292:19
firm 188:2
first 7:5,14 9:4 30:18 36:4 38:23 58:17 72:12 82:15,22 85:3 86:18 91:13 96:21 103:7 107:2 108:22 129:4 129:18 134:8 146:4,11,23 160:10 169:7 171:22 180:14 186:7 208:13 211:11 213:14 222:18 230:8 230:14 231:21 233:13 237:19 239:18,22 243:2,4 246:15 254:13 270:13 281:11 283:4 294:14
firsthand 77:3
fish 68:4,5
five 28:5,18 49:22 50:22 78:20 84:22 231:16,17 268:4 269:7 286:23
fix 29:7 264:5
fixed 32:23 258:20
fixing 264:13
flat 252:4
flip 68:19 165:14 166:1 169:13 215:20
flood 125:8,21 125:22 294:13
flooding 123:20

124:7 125:18 126:21 205:4
floor 32:9
flow 9:1 14:5,14 14:18,18,20,24 86:23 96:19 97:2,11,14 98:5,5 99:17 100:1,2 109:20 109:21 126:2 127:11,13,14 129:12,16,17 130:21,23 132:3,23 133:3 133:5,8,8,9 142:3,11,14 143:4,21 154:23,24 155:3,5,9,22 156:8,15,18,19 156:24 163:17 164:20,21 190:20 212:8 242:20
flow-thru 13:20 14:5,7,13 16:12,16 65:10 65:13
flowing 124:20 131:13,17
flows 15:4,12,18 72:19 100:18
fluctuation 125:17
fluctuations 125:9 126:7
flue 20:9 21:9 22:8 67:5,11 79:11 80:6,7
fluid 72:13,19
fly 13:13 51:14 241:5
focus 267:15
focused 155:19 269:15 271:20 275:6
focusing 228:16 228:24 273:13 276:10
folks 25:18 26:4 91:16
follow 142:8 156:21 220:10 220:11 259:4
follow-up 72:9 115:15,24
followed 243:20 247:16 255:13 255:14 296:21
following 39:5 42:22 57:7 63:4 65:2 82:3 113:15 117:6 128:19 141:10 161:10 180:2 182:19 204:7 213:2 223:18 261:24 286:5
follows 7:6 82:16 213:15
foot 153:15 154:1 241:18
footnote 92:13 92:19 241:13
force 226:9 294:10
foregoing 298:8
form 40:16 107:22
formal 26:5
formally 275:24
former 62:10,14 162:16,19,21 162:24 163:6 178:23 206:22 277:2
forms 286:19
forward 246:10 258:18
fostered 257:17
found 22:4 95:22 129:20 178:24 204:17 204:18 228:7 245:7 252:12 258:17,20 263:8,18 269:17,18 270:1 272:2,5 272:9,16 274:9 275:19,22 276:13,17,18 281:22 282:2,2 282:3,4 283:19 283:20 285:6
foundation 29:15 35:8 56:19 63:16 64:5 72:15 73:6,14 208:7 242:21 289:12
founders 257:8 257:14
four 11:19,24 13:9,10,11,11 37:9 50:15 52:24 79:10 89:4,19 101:14 102:14 118:11 153:15,16,18 154:1 192:24 201:23 214:11 228:12 232:8 232:13 237:9 237:20 238:1 268:4 295:18
fourth 86:2,5,9 93:8,9 94:16 110:8,9,17 134:7,17 145:12,18 165:10 266:16 289:16
Franzetti 3:1,2 114:19
Fred 266:21 267:7
FREDERICK 4:2 7:4
free 33:5
freeze 14:16
freezing 14:8,9 14:12
frequency 265:4
frequently 295:13,21
Friday 36:17,19 49:4
front 13:15 35:22 38:7 40:1 43:21 46:16 48:13 52:17 53:9 54:6 66:11 94:7 97:16 128:24 183:16 188:23,24 206:1 214:14 214:17 216:6 237:14 248:8
full 18:2 94:20 149:23 160:10 210:21
fun 81:23
function 142:18
fundamentally 222:18
furnace 217:18
further 6:20 64:14 72:5 81:18,21 131:19 155:2 162:24 179:17 209:9 211:7 212:13 221:10 230:11,13 244:7 279:16 288:3
furthermore 200:13
future 252:17

G

G-I-R-O-U-D 257:13
G-N-A-T 82:21
Gale 3:2 4:5,10 4:12 6:18,19 6:23 7:1 19:13 24:13 28:20 29:15 33:12 34:4,13 35:8 37:11 38:13 39:1,12,16 43:11,12,14 44:4 45:6 46:11,12 53:15 55:3,22 56:19 56:21,22 58:21 59:21 63:16 64:4,19,20 65:5,7 68:18 72:5,7,15,21 73:6,14,20,23 74:5,22 75:6,9 75:10 76:19 77:19 78:12 79:8,19 80:12 81:20,21 82:7 82:8,18 88:13 88:15,23 97:13 97:15 100:20 101:1 108:24 109:2 111:2,8 113:9,19 114:5 114:11,12,18 115:7,10 116:21 117:20 118:17 119:1 119:11 120:13 120:20,21 121:6,21 122:5 127:20 128:12 128:23 130:14 132:6,13,17,18 135:1 136:3,11 140:20 141:15 141:16,20 144:7,14,16 146:10 148:4,9 150:17 157:21 158:4 160:16 160:24 161:1 161:19 163:9 163:16,19

166:5,10 177:12,19 178:2,4,8,10 179:16 184:7 189:6 190:15 194:16 196:4 197:24 202:19 207:7 208:7 209:11,12,14 211:7,9 212:16 212:17
Gale's 75:16
gas 20:9 21:9 22:8 67:5,11 80:6,7 162:24 163:1 286:17
gathering 245:19
gauge 185:18
Gen 38:15 110:24 111:3 132:10 141:19 147:4 148:2,20 149:3,5,8,21 154:11,22 158:16 160:17 162:3,9,13 163:10 165:15 165:19 166:3,6 166:12 169:13 171:23 175:19 177:4,13 178:8 179:7 206:3 211:16 222:11 227:17 229:11 232:21 243:1,9 245:19 255:7 255:19 258:7 259:7,22 264:8 268:9 280:22
Gen's 213:6
general 162:21 185:15 201:6 245:3 254:2 259:14 260:14
generally 7:17 7:18,19 8:3 26:10 27:1 32:3 52:12 56:4 62:14 83:13,18 84:8 84:18 85:1 88:8,24 89:16 94:4,9 96:18 99:13 104:18 106:13 111:20 112:2 122:10 156:19 192:23 194:2 195:3 215:22 217:21 217:23 227:1 233:11 237:17 238:3,15 241:3 292:22 295:24
generated 103:21 107:3 135:15 156:3
generating 11:20 205:19 205:21 248:17 269:2
Generation 1:8 6:8 82:8 84:2 85:4 87:20 88:7,15 90:1 90:13,16 91:20 91:22 96:14 101:22 106:16 106:20 107:1 110:22 112:11 114:21 115:13 115:22 116:5 116:22 118:2 118:18 119:3 119:15 120:14 120:23 121:9 121:22 122:24 123:3 130:3 134:19 135:4 135:11 136:1,3 136:4 137:8,19 144:9,18 145:22 148:5 157:19,22 158:11 179:11 182:7 214:6 222:2 228:11 248:14,16 253:9 256:16 262:4 266:2 273:17
Generation's 117:22 179:8 265:16
Geological 211:19
geology 83:4 238:5
geomembrane 249:5,10,15 252:14,24 253:10 254:5 254:12 260:8,9 260:9 262:7,24 290:15,19
geomembranes 262:8
geosciences 83:9
Geosyntec 213:22 253:10 257:8 296:1
geosynthetic 253:5
geotechnical 214:1 215:13
geotextile 24:1 249:18 250:8 290:3,4,13
geotextiles 250:14
getting 53:12 143:14 244:9
Giroud 257:9,13
give 35:24 38:24 44:7 46:23 48:16,19 88:8 105:19 196:6
given 126:11,22 184:24 189:3 240:10 274:12
gives 91:4 172:7 249:10 258:7 258:11
giving 143:15,18
glue 289:3
GMZ 107:18 112:11,14,16 112:18 139:23 140:2,4 167:7 167:10 201:15 201:18,19 202:1
GMZ's 106:14 191:1,6 266:4 266:5,10
Gnat 4:8 82:9,10 82:14,19,21,24 88:6 96:16 97:18 100:3 102:10 104:2 111:9 112:20 117:21 119:2 120:22 122:6 128:24 130:15 132:19 136:12 137:18 141:14 141:21 144:17 145:6 148:10 148:22 150:4 151:8 154:10 155:10 157:4 158:5 161:3,20 163:20 164:6 164:23 166:11 167:22 169:1 169:12 174:10 175:6 177:20 179:6 180:6 204:11 209:15 210:14 211:5 212:19 226:7 241:24 266:5
Gnat's 222:8 294:24
go 9:1 14:22 15:16 22:6 26:10 28:14 30:16 39:1 42:1 44:9 51:2 53:14 56:6 57:3 61:23 62:20 63:18 64:22 66:13,21 81:24 96:6,22 107:23 113:13 117:2 122:18 128:16 131:19 133:6 150:14 150:18 151:20 161:7 166:13 183:4 184:12 186:5,20 187:23 188:2 191:17 194:3 207:12 212:22 231:22 236:9 237:16 239:20 240:3 266:15 284:22 286:2 286:13 288:10 291:5 292:13
goes 15:17 53:5 137:21 142:24 155:5 205:18 205:20 226:5 288:18 295:12
going 13:16 14:1 14:21 20:13,16 20:16 25:4 26:21 39:10,12 39:17 46:1 68:21 71:6 72:1 74:21 80:16 100:6,17 108:21 125:17 127:19 132:2 138:24 141:17 142:3,12 143:4 144:6 155:9 172:10 180:11 180:11 199:2 206:2 209:15 216:2 236:9 250:22 258:18 259:18 263:4

263:17 279:13 280:2 285:23 285:24 288:19 295:8 296:24 297:7
going-forward 229:21
good 6:1 71:6 103:22 118:11 122:12,17 132:1 140:21 141:8 180:9,10 213:10 222:20 240:22 242:9 255:16 257:7 257:14 259:4 261:24 264:17 266:12 278:15 291:2,2
gosh 9:15 16:23
graded 123:10
gradient 99:12 99:13,15,15,16 99:19,21,24 100:2,13,15 109:10,12,15 109:17 133:11 133:12,14,16 133:17,18 139:5,7,21 154:11,13,17 154:19,21 164:11,12,14 277:9
graduate 83:9
Granted 28:23
granular 289:11
grass 11:7,10,13
grassy 10:14
gravel 102:24 103:1,22 104:11 105:21 129:24 131:9 131:15 142:20 143:17,20 291:2
gravelly 132:20 133:1
great 112:10 169:12 179:12 179:21
greater 192:24
green 207:18
GREG 2:14
greg.wannier... 2:17
Greiss-Pfleger 162:19
grew 257:16
ground 11:14 50:19 51:1,14 143:14 192:6 226:21 295:3
Groundhog 297:8
groundwater 83:17 84:11 85:10,13,20 86:16,17,20 89:3,3 90:15 95:3,8 96:7,19 96:21 97:2,6 97:14,20,21 98:5 99:3,9,17 100:4 101:21 106:8,17 107:7 107:9,11,14,16 108:1 109:20 110:3,15,17,22 112:3,4 124:19 124:20 126:7,8 126:13,14,23 127:1,6,11,12 127:13 128:2 129:2,12,16 130:16,22 131:17 132:3 132:23 133:3 133:22 134:14 134:16,21 135:2,14,23 139:19 141:17 142:11 143:4 144:8,19 145:17 146:18 154:23,24 155:3,5,8,22 156:11,14,16 156:17,19 163:17,24 164:20,21 165:4,17 166:14,22 167:1,5,19 179:1 180:16 183:22 187:7 189:6 190:19 200:6,15,18,20 200:23 201:15 201:17 202:3,8 202:9 203:9,14 203:17 205:13 205:15 207:6 212:8 217:8 226:4 236:3,16 238:6,9,10,14 238:18,19 256:7 272:5,14 272:15,22 273:6,23 274:15,17 276:16,16 277:11,12 278:9 279:3,11 279:16 281:8 281:15,20 282:8 283:19 284:3 287:13 291:20,20 292:10 293:3,9 293:11 294:11
group 114:2
groupings 113:10
grow 11:13,14 35:6
growing 34:12 35:2
grows 35:14
growth 35:13
GSC 249:10
guess 17:23 33:21 39:10 43:5 45:10 49:16,17 57:1 64:9 71:13 76:17 77:16 91:12 128:3 141:1 158:22 180:18 182:9 187:14 200:13 209:4 284:6 289:17
guesswork 153:2
guidance 172:9 220:1,16,17,18 220:21,22,23
guide 218:9,17 221:7,8 270:23
guides 220:12

H

H 5:1
half 152:20
Halloran 1:13 6:1,2,21,24 7:7 10:22 11:1 19:16 24:15 28:22 29:16 33:15 34:14 35:9 37:13,17 38:20 39:3,7 39:19 43:11,13 43:17 46:11,13 46:17 48:5 53:16 55:5,23 56:20 57:5,9 57:12 59:23 60:23 61:4 62:22 63:1,6 63:18 64:6,15 64:18,21 65:4 68:14 72:6,16 72:22 73:7,15 73:24 74:7 75:8,12,23 76:2,21 77:21 78:19 80:14 81:19,22 82:5 82:10 88:13,19 111:5 113:12 113:17 114:8 115:5,8 116:24 117:4,8,15 118:19,23 120:17 121:23 122:3 128:8,16 128:21 132:11 132:15 136:6,9 140:23 141:4,7 141:12 146:8 148:7 150:10 157:23 158:2 160:18,24 161:7,12,16 163:11,14 166:8 177:14 177:17 179:18 179:22 180:4 184:11 190:16 194:19 196:6 197:11 198:4 202:21 203:1 203:24 204:4,9 208:8 209:10 211:8 212:15 212:18,22 213:4,9 286:2 297:2,5
hand 20:13,16 20:17 82:11 95:19 213:11
handed 155:10
handing 144:9
handle 75:18,22 79:5 80:7
handled 217:7
handwritten 62:2,3
happen 201:5 257:18 292:12
happened 77:4,4 148:12 171:10 192:3 294:15

294:16 295:15
happening 57:19 127:9
happens 127:8 251:15
happy 114:3 188:21
hard 30:11 33:4 37:4 41:2 102:4 130:21 152:20 153:1 206:9 262:14 289:15 294:18
hard-working 291:1
Harrison 296:10 296:11,13
hashmarks 61:19
Hayes 36:11,16 51:8
hazardous 170:19,22 256:11,18
HDPE 24:21 242:15 243:23 244:12,15,17 244:19 249:15 249:24 254:8 256:4,11,11 289:17 290:3
head 31:9 97:5 99:18,18 225:15,17,19 225:22,23 226:3,4,6,7,14 228:2,3
health 200:22 205:17,21
hear 34:18 61:5 74:8 126:1 136:15 264:16
heard 37:24 78:15 210:17 210:21 216:15 221:24 223:9 241:2,5,23 242:7 255:17 256:3 260:22 261:6,14 263:20 264:1,4 264:8,21 266:1 266:5,21 267:6 270:11 284:8 285:11 286:14 286:16 287:21 291:12 296:17
hearing 1:12,13 6:1,3,12,21,24 7:7 10:22 11:1 19:16 24:15 28:22 29:16 33:15 34:14 35:9 37:13,17 38:3,20 39:3,7 39:19 43:11,13 43:17 46:11,13 46:17 48:5 53:16 55:5,23 56:20 57:5,9 57:12 59:23 60:23 61:4 62:22 63:1,6 63:18 64:6,15 64:18,21 65:4 68:14 72:6,16 72:22 73:7,15 73:24 74:7 75:8,12,23 76:2,21 77:21 78:19,20 80:14 81:19,22 82:5 82:10 88:13,19 100:20 111:2,5 113:9,12,17 114:8,18 115:5 115:8 116:21 116:24 117:4,8 117:15 118:17 118:19,23 120:13,17 121:21,23 122:3 127:22 128:8,16,21 132:7,11,15 136:6,9 140:20 140:23 141:4,7 141:12 144:8 146:8 148:4,7 150:10 157:21 157:23 158:2 160:16,18,24 161:7,12,16 163:9,11,14 166:5,8 177:12 177:14,17 179:18,22 180:4 184:11 190:16 194:19 196:6 197:11 198:4 202:21 203:1,24 204:4 204:9 208:8 209:10 210:18 210:20 211:8 212:15,18,22 213:4,9 261:14 286:2 297:2,5
heavily 105:6 137:16
heavy 52:14,16 264:24 290:22 291:9,10
height 225:24
held 102:7 120:5
helicopters 10:15
help 113:22 125:17 137:10 190:17 209:15 223:23 260:7 294:4,10
helpful 247:15
high 17:10 30:1 30:10 50:1,15 139:1 226:5 244:19 292:13
high-degree 275:22
higher 30:7 99:17,18,20 131:12 143:15 194:6
highest 99:23 103:10 274:8
highlight 175:3
highlighting 155:20
Highway 111:15
hired 243:11
historic 77:1 149:17,19 267:4 275:7 276:8,23 277:19 284:6,7 284:9,13,23 285:2,5,8,13 285:18
historical 62:16
historically 21:16
history 215:9 238:9 240:1 284:17,18,19
hit 138:24 182:22 294:18
hits 11:13
hitting 70:14
holding 118:16 120:11
hole 258:15,17
holes 26:1 31:12 32:23 34:12 69:7
home 297:11
homogamous 168:21
Honor 113:23 117:2 160:20 198:2 203:21
Honorable 1:13
hopefully 297:9
horizontal 32:4 32:7
hot 51:5
hour 1:16 204:1
house 43:1
huge 50:21 125:20
human 167:21 279:20
hundred 71:12 71:14 152:12 152:17,21 271:18,22
hundreds 279:14
hydraulically 129:17
hydrocarbons 179:5
hydrogeologic... 190:10,11
hydrogeology 83:4,11
hydrostatic 292:9,12 293:22 294:1,5 294:23 295:5

I

I-N-G-E-L-S 252:9
ideally 107:23
identical 52:6
identification 5:3 38:12 44:3 46:21 61:8 88:12 115:3 117:19 119:8 121:3 130:7 134:24 215:3 219:9 232:24 233:9 234:3 235:13
identified 90:5 95:13 112:24 112:24 116:8 174:15 251:2 265:1 273:20 278:19 284:14
identifies 108:7 162:8
identify 39:13 104:14 119:22

237:22 238:19 273:19 287:23
identifying 249:11 264:12
IEPA 108:13 139:22 160:6 191:5,12
ignore 275:4
ignored 272:1
ignoring 274:22
ILCS 169:11 275:23,24
Illinois 1:1,15 2:3,7 3:4 6:3 83:8,10 90:1 101:22 102:8 102:20 104:11 104:13 106:11 106:15 112:17 138:10 139:8 140:3,12 146:16,21 160:5 162:22 167:8 168:13 169:4 170:11 177:8 200:15 200:16,18 217:6,8 220:24 221:1 229:3,6 229:7,13 240:21 246:6 246:13 247:10 247:17 268:18 273:23 277:12 279:6,7 298:1 298:14,22
immediate 150:14 162:14
immediately 149:2 277:9
impact 83:17 239:17 256:7 265:5 274:15 274:17
impacted 102:5 102:6 239:24 263:24 276:20 278:23 279:17
impacting 90:15
impacts 238:20 240:23 284:3
impasse 78:6
impermeable 73:10 193:24
impervious 8:17 11:9,10,15
implement 149:7 243:12
implementation 223:21
important 239:23 240:2 242:6 243:15 243:22 244:19 247:13 251:2 253:14 258:14 267:16 287:4 287:10
impoundment 191:19 206:23 217:6,7 271:15
impoundments 225:6,11 229:23,24 295:9
improve 234:24
improving 202:4 202:5
inactive 224:22 225:3 226:1,12 227:10,14
inch 152:20
inches 31:12 69:9 192:24 262:10 289:8 289:14 290:2,6 290:7,17
incident 27:15 49:8 261:12 265:9
incline 25:4 72:1 72:4
include 41:11 84:2 93:13 96:10 156:3 176:16,18 180:19 182:17 210:12 220:13 220:19 228:11 228:17 231:11 234:24 239:15 246:24 247:1 252:3 272:3 285:20
included 92:11 149:24 175:21 179:3 181:21 188:18 227:15 232:3 235:4 246:15 248:6 268:23 280:11 280:16 285:12 285:15
includes 149:22 156:5 159:20 176:9,10 182:15 266:3
including 84:4 137:15 224:7 285:2
incomplete 47:4 47:14,16
inconsistent 282:3,6,24
incorrect 106:5 223:6 273:9
increase 126:5
increased 127:4
increases 126:17
increasing 262:1
independent 212:2
independently 261:15
indicate 250:16 264:8 282:7
indicated 121:17 124:6 137:16 140:3 160:14 180:20 184:5,6 200:2 263:6
indicates 279:21
indication 123:19 203:16 205:3
indicators 281:15,22
individual 93:4 94:15
individually 237:17
individuals 250:22
industrial 101:2 178:22 240:11
industrialized 105:7
industries 83:19 250:9
industry 83:23 83:24 84:1 100:15 218:22 229:16 270:16
infiltrate 226:17
infiltrates 143:13
inform 242:4
information 60:10 88:17 89:9 96:1 130:20 150:21 155:23,24 174:19 185:15 185:16 193:18 234:7 243:6 245:23 260:16 270:23 273:14 276:22 282:17 283:24
informed 26:11 276:22
Ingels 251:17 252:8,10
inherent 95:21
initial 131:23,24 148:14 191:24
initially 155:18
initials 251:18
initiated 86:21
ink 292:8
inlet 14:22
Inorganic 104:10
inside 296:18
inspect 193:6
inspected 112:21 120:4 252:11
inspection 40:3 40:16 44:10 47:4,5,14,20 48:1 70:23 113:1 115:20 115:24 116:8 118:3 119:13 119:21 121:10 121:16 122:7 122:15 191:24 192:4 193:3,10 193:15 198:14 198:15,18,20 247:11 254:14
inspections 25:17,19,21 71:1,1,9,10 114:16 115:12 122:23 123:23 191:18 192:22 198:10,11
install 251:9 252:24 254:11 260:23 262:24 290:18
installation 57:21 101:15 135:15 157:15 167:19 243:22 247:18 252:13 252:17,20 253:6 254:3,20 255:4 256:17
installed 24:1,21 25:2,3,9 53:3 58:13 76:18 77:18 80:7

90:12 93:6,7,9 101:18 125:7 135:9,21 139:7 139:21 148:13 148:24 149:9 149:11 208:13 208:17,20 209:2 242:15 247:7 251:8 253:11 258:12
installer 250:24 251:1,16,17,19 251:22 253:16
installers 247:9 251:4
installing 56:13 140:14 254:13 255:16 266:4
instance 89:17 258:1 286:15
instances 81:4 212:5
instantly 295:19
Institute 270:15
institutional 107:12 108:6 149:7 167:3 201:20
intake 98:9,13 109:24 155:6 184:2 185:3
integrity 2:9 252:16 255:21
intended 206:16 207:12
intent 208:5
intents 64:10
interchangeably 7:15,22 8:2
interesting 64:12
interlocks 290:24
intermittently 288:14
Internet 170:6 176:10
interpret 142:17
interpretation 153:16 203:18
interpretations 150:15 172:15 173:2
interrupt 278:12
introduced 27:8 35:21 69:19 70:23 94:5 117:13
inventories 87:16
investigate 173:19
investigated 142:15
investigation 22:12 31:22 90:14 149:2,3 239:15,18 278:5 296:1
involved 57:20 59:19 70:21 106:22,24 218:8
involvement 60:2 241:8
iron 230:18
island 178:17,19 189:14 190:2 190:20
isolated 131:5,7 142:22
isolates 192:6
issue 34:6 41:18 51:15 84:7 161:6 182:14
issued 95:11 106:15 110:20 130:18 146:16 171:12,13 199:7
issues 83:17 140:3 183:8
itemized 37:3
items 47:12,12 47:13 116:2,7

J

J 3:10 235:19
James 6:14
January 6:13 162:12 206:8
jargon 77:8
Jason 6:14
Jeff 248:13
JENNIFER 3:1
jn@nijmanfra... 3:5
job 48:8 51:8 57:15 255:16
John 4:15 213:8 213:13,20
Johns 162:16
Johnson 163:7,7
Joliet 84:21,21 89:5,18 96:5 97:13 105:4 108:23,24 109:3,20 110:4 111:12,13 112:3,12,22 122:7,24 123:18 124:13 124:20 127:1 127:14,18 136:19 183:22 191:16 195:23 196:22 202:14 202:17 204:15 210:14 269:2,4 269:10,12 275:9,10,21 285:12 286:12 286:16,19 287:22 289:9 290:9 294:18 295:6 296:5,5 296:17
July 158:10
jump 7:12 17:16 18:8 21:1,20 33:20 34:17 41:16,20 42:1 52:3 285:24
jumping 19:3 40:6 44:13 50:4 74:18
jumps 235:21
June 47:5 164:2 209:20

K

keep 10:23 34:4 39:12 49:24 197:12 285:23 296:24
keeping 242:11
Kelly 136:13 137:16 262:17 263:6 267:6 277:5
Kentucky 217:9
kept 98:15
key 175:16
kg@nijmanfr... 3:6
kind 19:9 22:5 34:8,18 49:24 54:23 55:12 79:6 83:18 142:9 172:7 182:20 184:15 207:16,18 245:13 246:14 246:21 256:9 263:10 288:19
kinds 247:8 291:12
knew 77:1,2
know 6:16,22 10:11,20 11:15 13:23 16:11,24 17:21,22 26:20 26:23 28:11 31:19 33:22 36:13,15 37:20 39:22 46:5,24 47:15,17,22 50:23,24 52:2 52:16 53:1 57:2 60:14 62:5 63:14 64:9,10 67:12 67:19 68:1,5 69:21 72:3 73:16 74:11 76:12 77:6,17 78:1 79:5,13 80:18 81:7,13 93:21 98:6 99:7 100:5 102:17 105:5 107:2 113:10 126:18 133:13 133:15 136:22 140:21 152:19 152:20,21 169:6 170:24 173:1,8 180:18 182:16,19 184:22 185:17 186:2 188:9 191:2,14,15 193:23 194:9 195:9,20 196:10,14 197:14,18 199:16 205:20 206:10,15,17 206:21,24 207:10 229:3 236:9 237:10 240:5,24 245:17 247:17 255:13 262:16 263:17 272:18 272:21 277:6 283:8 285:21 287:1,8,10,17 288:23 294:23
knowing 99:10 100:14 187:9 211:2,3
knowledge 17:23 18:18,21 18:23 20:4,5

22:15,17 52:5 69:15 73:22 76:24 77:3 78:16 124:18 125:19,23 138:5 146:12 149:18 152:10 160:1 171:9 185:20 186:18 196:2,17 198:3 211:18
knowledgeable 179:13
known 80:4 163:7 230:21 257:8 285:16 285:18
knows 264:4
KPRG 83:1,14 84:9 85:9 86:15,16 87:6 87:19,24 93:17 94:12 95:1 115:18,21 116:5,17 118:1 119:14 121:8 124:10 130:18 144:21 150:1 157:19 158:9 159:10 160:2 162:7 164:1 168:2,7 170:2 177:23 178:21 206:7,19 209:2 241:24 275:11 275:19
KPRG's 107:1
KRISTEN 3:2
Kunkel 102:11 102:13,19 103:19 104:4 105:15 125:24 151:9,13 174:11 175:6 200:7 223:3 227:16 230:7 231:1,12,15 235:24 255:17 256:24 258:2 259:9,9,14 260:11,19 270:11,19,20 271:19 274:19 277:15,18 283:9 292:7
Kunkel's 123:22 124:12 181:17 222:24 224:2 227:7 232:20

L

lab 91:10 173:15 173:22,23,24 183:2,5,7,8 199:21 200:2 267:10 268:11
labeled 210:2
laboratory 87:8 87:11,14,14,16 88:5 199:12
lack 230:19
Lafarge 261:21
laid 206:1
Lake 155:7 187:16 188:8,9
land 10:15 107:8 108:3,8 139:20 157:9,14 166:23 189:21 189:22 226:1 266:4,6
landfill 159:9,20 159:22 193:16 194:10,23 195:13,23 196:3,18 204:15 225:15 226:12,24 227:1 248:1 256:19 271:15 285:11
landfills 216:21 224:22,23 225:4,6,11 227:10,11,14 247:20 263:13
large 51:3 52:22 125:15,21 126:1,7,12 257:17
larger 126:16 129:24 206:15
LaSalle 3:3
lasted 78:3
lastly 238:23
late 85:4
latest 188:6
latitude 19:17 196:7
law 1:4 2:5 6:5 71:4
lay 220:6 252:1
layer 23:14,22 24:4,6,8,12,12 25:8,11 154:4 254:7,20,22 262:9,10 289:15 290:5,7 290:24
layers 24:2 260:4,4 292:22
ldubin@elpc.... 2:8
leach 159:4 160:1,11,14 168:12 195:15 197:4
leachability 160:15
leachate 159:15 159:24 238:18 267:13 268:6 271:15,16 273:22 274:10
leachates 281:16
Leaching 221:22
leads 53:21
leak 21:24 22:12 244:1,7 247:6 253:18,23,24 254:4,6,15,22 257:1 258:4,16 259:5,5
leakage 265:17 265:20
leaked 17:4,9 260:12
leaking 100:11 101:19 258:19
leaks 244:3 254:24 255:1 257:6 258:23 259:1,2,4 265:2,13
left 10:2 14:4 16:9,15 17:24 18:11,18 19:8 61:15,23 234:20 237:11 287:24 288:13
length 30:15 53:14
let's 28:14 42:16 45:13 64:22 75:23 81:24 93:8 99:21 104:22 128:16 138:17 161:7 205:24 207:1 216:4 239:20 286:2 297:3
letter 66:5 115:21 116:4 118:1 119:14 121:8,10,12,19 248:12 253:9 254:1
level 17:10 97:4 98:1 99:10,11 102:6 125:9,14 126:20 127:4 130:10 139:13 155:24 156:4,6 184:16 185:12 231:14 251:7 274:8 279:12 284:17,18 287:18 292:13 293:5
levels 22:5 86:19 96:22,23 97:3 99:3,20,23,24 100:2 126:17 127:1 129:22 130:23 131:6 131:14,15 143:3,15 230:20 254:12 273:15 274:12 274:18 276:9 280:17,17,19 284:13 292:10 295:1,3
License 3:10
licensed 60:5,6 60:17 247:9
life 242:21
lifted 201:18 202:1
likelihood 295:4
likes 218:22
limestone 24:7,7 24:11 262:10 290:7,23
limitation 176:17
limitations 172:6,11,12,15 173:1 175:19 176:11 177:5
LINDSAY 2:6
line 21:1,2 23:18 26:2 27:2 29:3 31:11 34:20 35:1 44:24 45:16 47:7 59:14,15,16 66:23,23,24 67:15,15 68:11 69:5,23 70:1,6 70:7 79:2,3 81:2,16 206:11 206:16 237:11 248:22 264:22
lined 11:4 15:24

22:24 72:13 73:13 74:4 229:4,8,8,10 229:10,12 240:20 287:8 288:16
liner 23:3,6 24:21 25:14,20 26:2 28:1 29:20 30:22 31:6 32:2 35:7 35:13 36:17 37:9,21 46:3 47:9,9 48:1 58:3,13 65:22 242:22 243:22 244:11,20,21 246:3 247:18 247:21 248:15 249:15 251:8,9 254:3,19 255:21 258:19 287:16 290:4 292:11,14 294:22 295:22
liners 29:7 40:20 56:14 57:21 240:17 242:15 244:12,18 246:2 247:5 255:16 256:6,6 256:15,18 257:1,6 258:10 259:11 260:20 262:2 263:21 263:24 274:13 288:22
lines 28:13 33:20 50:8 68:21,22,23,24 75:1 79:14 98:2,2,3,4,5,7 156:15,15,16 156:16,18,18 156:21
lining 23:1 73:19 243:23 244:8,15 245:12 257:15
list 91:1 112:5 159:18 172:6 234:5 242:24 243:17 269:1
listed 60:14 90:24 110:24 135:3 145:21 148:10 187:1 239:22 267:3 293:8
listing 37:3 268:5
lists 232:17
literature 267:20 283:12
little 25:16 27:14 28:15 63:11 78:7,24 79:7 83:21 106:5 129:15 131:10,10,16 133:9 135:21 139:3 143:7 146:19 162:23 189:20 192:2 200:1 205:13 208:9 217:3 227:12 236:2 236:16 239:13 242:10 244:6 244:14,23 281:9 288:3 289:3 290:12
Liu 6:15
LLC 1:8 6:8 248:16
LLP 3:1
load 54:7
loaded 56:6
loader 52:17 53:9 54:6
loaders 291:14
loading 258:9
local 219:24 220:1,12,16,17 220:18,21,23
locate 254:23,24
located 10:6,8 34:22 58:6 64:3 80:23 81:8 104:19 132:20 150:22 164:4 202:17 235:2 280:9
location 41:6 105:2 138:3,24 152:23 253:23 254:4,6 258:5 258:16,23 259:5 264:19
locations 151:23 152:6 260:15 275:9
lock 98:14,16,24 124:24 125:4 126:11,19 184:16 294:24
locks 125:5,6,13
logged 154:5
logs 131:2 150:1 150:4,22 151:10,14 152:23 153:6,9 153:13,14,15 153:21,22 154:1
long 28:5,18,19 30:14 51:22 78:2 182:17 207:18 227:3 241:24
long-lasting 244:21
longer 29:12 67:17 107:16 236:16
longest 30:15
look 9:5,7,14,19 10:1 13:15,17 19:7 27:7 33:14 36:3 44:16,24 48:12 59:4,8,13 61:13,22 63:21 74:12 79:2 104:22 116:18 120:2 130:19 137:19 138:17 142:2 146:3 171:21 178:14 183:6 184:1 186:21 188:10 192:1 210:11 224:1,10,15 233:4,22 234:20 235:9 236:2 237:2,10 238:5,6,6 239:3,3,24 240:14 243:11 245:14 246:1 251:11 253:1 259:15,16 264:2,11 267:20 269:6 269:19 272:19 273:1,7 277:2 277:22 278:8 280:3 281:5 282:21 284:13 286:24 289:18 289:22
looked 67:11 120:7 122:19 131:7,14 133:2 147:18 181:18 186:23 187:3 192:9,14 237:21,24 239:10 241:7 243:16,20 269:17 271:14 271:16 272:17 275:19 279:6 279:10,10,18 281:21 282:1,5 283:9,18 293:13,20
looking 20:23 34:1 35:19 40:18 42:9 44:17 45:4 49:7 63:9 96:18 100:22 109:19 131:1 137:24 150:24 151:2,21 154:10,22 156:8 162:13 164:19 170:23 175:17 176:24 177:4 178:13 195:10 210:1 223:17 238:9 239:19 242:23 243:2 248:7 266:14 270:6 271:3 273:11 281:10 283:16 285:4 286:8,18 288:21 292:16
looks 42:24 45:2 67:12 74:14 105:1
loops 142:9
loss 263:12,14
lost 258:20
lot 51:7 55:19 153:2 221:24 223:9 225:14 245:20 247:6 256:3 257:5 258:8 263:20 266:1 285:11 286:13
lots 245:2
loud 74:21 197:14 224:20
low 86:23 226:5 256:14 274:16
low-risk 227:9
lower 99:18,18 100:1 131:16 225:5,10 259:3 265:8 279:10 292:11

lowers 265:13
lowest 103:10
lunch 82:6 140:22 141:8 141:14
Lux 27:23 30:19 36:5 261:19

M

M 3:2 7:9 65:6 72:10 82:17 180:7 209:13 211:13 213:16
main 81:12 91:2 111:23 146:24
maintain 22:6
making 30:19
managed 12:16
Management 107:7,9,11 108:1 139:19 166:22 167:1 202:3,8,10
manganese 230:18 231:5 232:16 271:20 272:3,21
manner 38:17 101:10
manual 88:4 183:11
manufactured 163:1 250:10
manufacturer 64:12 249:9 253:12
Manville 162:17
map 21:3,5 62:14 79:23 80:2 96:24 97:6,14,20,22 98:5 99:9 104:13 109:1,6 109:7 127:21 129:2,10 130:9 132:24 133:2 144:8,10,20 151:22 152:9 152:14,15,18 154:10 155:22 156:2,3,5,15 157:19 162:7 163:17,24 164:4 165:2 178:2,3,5,13 183:22 185:11 186:16,21,24 187:19 188:17 189:3,6,9,18 189:20,23,24 206:5,16,18,20 207:6,14 209:20 210:10 211:21
maps 97:3 127:22 130:23 132:8 155:16 185:16 186:9 284:10
March 33:8 34:2 36:5
Maria 243:10 244:12,23 245:17 246:5 256:16 284:8 286:16
Marine 163:7
mark 39:10 45:4 136:12 263:6 267:6 277:4
marked 5:3 38:10 44:1 46:19 61:6 88:10 115:1 117:17 119:6 121:1 130:5 134:22 144:12 206:12 214:21 215:1,22 219:7 224:2 232:22 233:7 234:1 235:11,22 248:8 262:15 280:22 288:21
market 218:23
marketplace 217:20
marking 143:18
mass 275:17
massive 243:7
Master 215:12
match 273:8 282:24 283:20
matched 282:23
matching 282:15
material 21:17 35:12 67:10,13 73:18 159:5 168:23 195:11 218:23 220:9 220:11 223:8 249:12 253:5 254:14,16 263:9,10 273:19 276:1 289:2
materials 136:16 170:15 171:4 218:7 222:21 247:4 260:10 294:4 294:22
math 233:19,19
Matt 253:8
matter 6:4 20:14 20:19 31:3,4 60:7,19 84:5 84:14 101:13 101:15 102:15 214:6 217:4 228:24
maximum 186:3 230:20 231:13 280:17,19 293:11,19
MCL's 230:20
mean 11:12 13:22 15:1 17:9 29:13,22 32:7 47:17 54:10 67:7 74:12 86:7 87:22 93:3 95:16 97:4 99:14 105:17 118:14 127:8 133:6 137:12 138:9 139:10 140:11 152:5 157:12 167:2 167:17 169:19 169:23 171:1 172:12,17,20 174:5 176:21 202:2 210:16 217:16 244:14 252:22 257:4 273:4 275:8 281:13 289:1 294:6
meaning 275:15 282:2,3
means 8:10,21 52:16 55:12 103:12 129:20 152:6 225:18 252:23 287:5 295:21
meant 62:6 63:14 64:2 199:20 282:6
measure 99:2 107:22 185:9 185:11,13 268:13
measurement 102:6
measurements 127:12
measuring 200:17
Mechanical 51:8
mechanism 81:10
median 102:20 102:22 103:3,5 103:7,8,11,15 103:16,20 105:16,20,24 106:2,5 200:10
meet 54:5 174:7 174:7 198:21 261:4 273:24 274:2
meeting 27:23 48:9
meets 168:23 250:17
melt 122:20 123:15
melts 192:13
member 242:21
memo 59:20 60:10,12,15 245:18
memorandum 245:16
mention 28:6 39:15 53:13 77:11 267:1
mentioned 9:17 17:17 23:11,22 25:17 28:9 29:6,19 31:3 32:11,22 50:6 52:4 53:12 54:22 55:11 65:17 72:12 80:22 90:17 94:22 105:13 106:14,15 108:2 124:24 147:7 173:7 189:12 191:1 194:15 239:11 241:19 253:18 259:10 260:3 272:24 275:5 276:19 277:24 278:6 281:9 283:7 292:18 295:23
mentions 27:22 283:5

message 51:12
met 174:2 244:5 246:12 247:5 247:12 273:21 275:24 276:12
metal 91:5
metals 91:4,8 93:2 147:1 149:5,20 160:15 179:4
method 90:20 150:5 168:12 169:17,21 170:10,21 171:5,18 173:23 176:7,8 221:23
methodically 261:1
methodology 282:10
methods 220:11 257:21
mg/L 105:22,22 139:1,9
MGP 163:1,1
Michigan 83:11 155:7 187:16 188:9 215:14 215:17 217:10
middle 33:8 34:1 156:21 230:8,13 252:7
Midwest 1:8 6:8 6:18 38:15 82:8 84:2 85:4 87:20 88:7,15 90:1,13,16 91:19,22 96:13 101:22 106:16 106:20 107:1 110:21,24 111:3 112:11 114:20 115:13 115:22 116:5 116:22 117:10 117:21 118:2 118:18 119:3 119:14 120:14 120:23 121:9 121:22 122:24 123:3 130:2 132:10 134:19 135:3,11 136:1 136:3,4 137:7 137:19 138:10 141:19 144:9 144:17 145:21 147:4 148:2,5 148:20 149:2,5 149:8,21 154:11,22 155:15 157:18 157:22 158:10 158:16 160:17 162:3,9,13 163:10 165:15 165:19 166:3,6 166:12 169:13 171:23 175:19 177:4,13 178:8 179:7,8,11 182:7 206:3 211:16,16 213:5 214:6 222:2,11 227:17 228:11 229:11 232:21 242:24 243:9 245:19 248:14 248:16 253:9 255:7,19 256:16 258:7 259:7,22 262:4 264:8 265:16 266:2 268:9 273:17 280:22
migrate 24:12
migrates 279:14
migration 149:4
mil 243:23 256:4 256:6,11 290:3
million 139:2,14 214:17
mind 9:4 19:1,3 20:12,24 27:6 28:10 35:19 39:21 40:4,6 40:18,24 41:7 42:9 44:13,16 44:17 45:4 50:4 59:8,13 62:13,19 63:9 63:21 74:18,24 190:9 240:22
minimize 125:16 126:21 240:23
minimum 71:4 251:6 290:21 293:11
minimus 287:6
minor 192:17,20
minus 98:12 184:3 210:7 211:22
minute 82:1 161:8 212:23 273:12 284:5 286:3 292:18
minutes 78:20 203:22 204:1 204:11 260:3 262:3
Mischaracteri... 37:12 59:22 184:8 194:17 202:20
misheard 199:1
misinterpreted 258:16
missed 255:3
misspoke 195:6
misstates 33:12 78:11,12,13
misstating 23:12
mistakes 251:5
misunderstood 172:23
mix 127:6 268:11
mixed 227:17,19
mixture 227:23
Mm-hmm 20:23 21:12,19 29:21 59:12 115:7 164:19 184:4
mode 12:19
modification 171:13
modifications 146:15
modified 171:11 173:13 174:3,8
Mohawk 2:3
moisture 32:13 32:15 225:16
moment 27:9,11 35:24 38:24 44:7 46:23 48:16,19 64:19 64:20 88:9 179:16,19
Monday 36:5
monitor 100:12 201:16
monitored 99:23 145:3
monitoring 84:11 86:20 89:4,20,21 90:8,11 93:9 94:6,11 95:3,9 96:23 97:22 100:9 101:11 101:17,18,21 102:3 106:17 109:5,10,13,16 109:17 110:3 110:15,17,23 112:5 124:21 130:9,12,12,24 131:3 133:11 133:12,14,22 134:14,17,21 135:2,16 137:20 139:5,6 139:7,21 143:2 143:9 144:24 145:4,7,17 146:4,11,18,23 147:16,19,24 148:10,12,13 149:9,11 151:7 152:1 154:5,7 154:12,18,19 155:19,21,24 156:2 164:8 165:17 166:2 181:10 190:21 202:17 207:11 207:22,23 208:5,13,15 217:8 231:17 231:21,23,24 232:11,14 277:8
Monroe 298:21
months 86:8 137:3,17
morning 6:2 180:13 297:10
motion 1:12
Motor 163:7
mounding 141:22 142:1,6 143:22 144:2
move 43:9 46:9 55:17 80:22 108:21 111:3 116:22 118:18 120:14 121:22 127:19 148:5 157:22 160:17 163:10 166:6 177:13
movement 14:15 203:17
moves 136:3 157:2 182:20
moving 88:17 96:16 144:5 202:16
multiple 254:12 275:15,16
municipal 101:3

101:9,12 102:24 103:1 104:15
municipalities 83:22
MW-01 109:18
MW-08 109:13
MW-10 109:13
MW-11 109:14 133:17 207:16 208:15
MW-16 133:14 138:18 148:18 148:19 208:3
MW-17 135:8
MW-18 133:15 135:8,20
MW-19 135:8 135:20,21
MW-9 133:15
MWG 9:8,10 100:23 118:6 119:4 120:23 132:21 151:21 158:16 160:8 164:5 167:24 168:15 209:18 219:6 248:8 255:6 267:2 268:2
mystery 240:14

N

N 2:1 4:1 7:9,9 65:6,6 72:10 72:10 82:17,17 113:11 114:1 180:7,7 209:13 209:13 211:13 211:13 213:16 213:16
name 6:2 40:9 40:10 48:23 49:1 59:16 82:20,22 163:5 163:6 213:18 251:17
named 11:22,23 165:18
Napoleon 257:11
narrative 246:24
natural 68:8,10 248:13
navigational 125:6
near 70:9,11 80:23 81:1,8 153:23 186:19 187:1,17 188:16 189:14
nearby 278:20 280:4 295:1
nearing 203:23
nearly 255:9 280:6
necessarily 105:17
necessary 30:8 198:20 220:20 231:10 251:9
neck 137:1
need 13:16 51:18 54:13 64:19 100:7,12 120:12 121:18 153:21 172:14 188:1 191:17 220:4 280:7
needed 30:5 32:6,12,12 36:20 119:23 121:15 122:18 208:3 212:12 223:23 236:1 243:13
needlessly 189:10
needs 100:16 173:14 193:1
neglected 100:21
neighbor 162:14
neighboring 177:24 178:12
neighbors 162:1
neither 203:15
network 1:4 6:6 89:22 100:9,10 129:6
neutral 159:4,15 159:24 160:1 160:11,14 168:12
never 16:23 17:18 22:2 34:24 35:17 205:3,3 263:8
new 90:6 121:14 135:6,9 148:16 165:23 173:10 173:13,21 174:3 182:18 199:12 200:1 229:16,20,21 229:23 242:15 258:5
nice 68:6 288:12 288:19
night 6:20 201:2
Nijman 3:1,1 4:17 78:11 178:7 213:6,7 213:17 215:4 219:12 233:3 233:10 234:11 235:16 285:23 286:7 296:24 297:4
nine 50:9 236:20 275:8
nitrates 137:24 138:2,5
NLET 267:11
NLT 159:16
No.'s 5:10 88:11 115:2
non-detect 138:22
non-matching 282:15
non-profit 270:17
non-site 267:22
noncompliance 66:5
nonhazardous 159:23
normally 96:20 197:14 247:11 248:2 251:6,7 252:3,5 264:24 289:3
north 12:4,8 13:24 14:4,19 15:8,10,13,15 16:3,5,9,12,19 18:9,12 111:11 127:15 131:20 133:8 142:12 155:6 158:22 162:16,24 163:1,3 190:1 277:3
northeast 41:8 42:24 104:23 112:21 113:1 122:7,23 123:20,24 124:14,19 133:9 191:19 192:8 193:16 194:9,23 195:13 198:10 202:16 203:10 204:15 285:11
northeasterly 131:19
Northeastern 83:8
northerly 131:18 133:4
northside 17:4 178:15
northwest 155:6 189:20 190:1
northwesterly 131:18
note 6:13 9:7 92:8,19 93:22 242:13 266:15 291:19 292:5
noted 115:20 122:3 225:4,9 241:13 266:18 292:1 293:2
notes 188:22 235:19 289:16 296:15 298:11
notice 66:11 102:8 107:4 172:7
notices 95:11 106:16 107:4 130:17
notify 66:3 121:14
noting 217:5
November 46:7 135:19,22 139:3 233:14
NPDES 60:17 65:14 246:7
NRT 245:15,20 248:12
number 40:19 41:4 44:14,15 84:9 95:13 110:2 112:5 126:22 128:13 128:15 133:22 136:23 159:16 165:4 169:10 171:4 186:22 187:4,7,18,24 188:3,12,19 210:5,12 212:6 229:10 240:21 245:18 249:11 251:7 253:24 282:5,12 286:23 296:9
numbered 118:6
numbering

171:3
numbers 98:10 113:7 170:24 183:11 224:10 237:12 249:11 259:3
NW 2:10

O

O 7:9,9 65:6 72:10,10 82:17 180:7,7 209:13 211:13,13 213:16
Oakland 2:16
object 19:13 79:8
objected 161:2
objection 24:13 29:15 33:12 34:13 35:8 37:11 43:12 45:6 46:12 53:15 55:3,22 56:19 59:21 63:16 64:4 68:13 72:15,21 73:6,14,20 75:6 76:19 77:19 78:11 80:12 111:4,7 114:23 117:9 117:11 118:21 120:15 122:1 136:8 146:7 148:6 150:7 158:1 161:14 184:7 190:15 194:16 196:4 198:1 202:19 208:7
objections 163:13 166:7 177:16
objects 259:18 260:1
observation 118:7 153:9
observations 131:23 132:1,4 252:21 260:15
observed 71:21 111:20 112:2
observer 57:16
obtain 150:20 188:11
obtained 245:20
Obviously 37:24
occasionally 286:22
occur 27:1 70:12 71:2 142:21
occurred 37:21 76:11 146:13 240:12
occurrence 281:14 292:9
occurrences 265:12
occurring 37:10 38:5 136:20 142:16 143:22
October 40:12 42:15 46:6 85:6 89:13 112:20 115:11 116:1,10 117:13 241:23
oddly 19:10
offhand 113:8 188:11
office 91:16
Officer 1:14 6:1 6:3,21,24 7:7 10:22 11:1 19:16 24:15 28:22 29:16 33:15 34:14 35:9 37:13,17 38:20 39:3,7 39:19 43:11,13 43:17 46:11,13 46:17 48:5 53:16 55:5,23 56:20 57:5,9 57:12 59:23 60:23 61:4 62:22 63:1,6 63:18 64:6,15 64:18,21 65:4 68:14 72:6,16 72:22 73:7,15 73:24 74:7 75:8,12,23 76:2,21 77:21 78:19 80:14 81:19,22 82:5 82:10 88:13,19 100:20 111:2,5 113:9,12,17 114:8,18 115:5 115:8 116:21 116:24 117:4,8 117:15 118:17 118:19,23 120:13,17 121:21,23 122:3 127:22 128:8,16,21 132:7,11,15 136:6,9 140:20 140:23 141:4,7 141:12 144:8 146:8 148:4,7 150:10 157:21 157:23 158:2 160:16,18,24 161:7,12,16 163:9,11,14 166:5,8 177:12 177:14,17 179:18,22 180:4 184:11 190:16 194:19 196:6 197:11 198:4 202:21 203:1,24 204:4 204:9 208:8 209:10 211:8 212:15,18,22 213:4,9 286:2 297:2,5
official 298:13
offsite 286:21
oftentimes 128:2
oh 9:15 52:23 264:14 296:11
Ohio 217:9,10
okay 6:21 9:22 9:24 17:3,20 19:6 27:13 39:19 41:24 44:9 46:8 58:16 62:22 68:2,16 75:2 75:24 79:15,17 79:21 84:1 88:19,22 89:13 90:17 91:12 93:23 96:4 101:20 104:17 108:21 110:21 112:10,20 114:11 117:15 117:23 121:5 123:6 129:4,9 135:6,12 137:23 138:19 144:15 145:6 146:11 157:3 158:7 162:5 164:23 165:16 166:24 168:14 168:16 169:14 172:21 177:17 180:9 181:3,6 181:15,22 183:12 184:1 184:23 185:6 185:20 186:2,5 186:17,23 187:6,11,14,20 188:4,14,20 189:1,5 190:2 190:23,23 192:21 193:3 193:12,15 194:12 195:2 195:12 196:2 197:3,21 198:22 199:8 199:13 200:24 201:4,14 202:2 202:13 203:13 204:14 205:23 206:9,19 207:1 207:4,10,21 208:4 209:8 212:9 216:23 219:20 224:3 224:14 232:6 232:19 233:2 235:15 238:23 249:3,22 270:11 273:11 288:7 297:5
old 10:20 100:14 120:7,10 179:2 199:10 226:24 227:1 239:22 240:14 263:14 284:21,21,22
older 176:12 177:2 277:4
once 84:24 86:8 87:5,13 107:18 107:23 108:12 140:12 157:18 258:11
one-third 53:12 53:13 54:10
ones 33:1 36:24 98:23 99:24 116:9 121:13 130:11 135:3 145:2 155:12 165:1
online 176:19
onsite 64:3 267:1,16,16,18 267:20,21 269:13
onward 244:12
open 8:14,21 104:2 132:22

207:3
operated 287:8
operating 71:11 238:7 260:20 286:17,21 288:15
operation 80:6
operations 296:18
operator 40:10 47:19 60:5,17 60:18
operators 25:19 262:11
opinion 150:8 205:9 214:10 214:12 223:5 225:12 227:19 228:6 255:19 255:20,24 256:5 258:21 259:11 261:2 263:23 264:20 265:16 276:20 276:23 287:11 291:6 295:5
opinions 228:10 235:7 236:14 236:23,24 237:2 242:5 257:22 265:5 269:15 270:5 286:19
opossum 132:9
opportunity 140:22 226:20 241:6 258:8,11
opposed 133:1
opposing 117:12 211:11 214:12
order 26:8 103:9
organic 179:4 289:2
organization 270:17
organized 38:15 256:17
original 161:2 208:4,23 268:23
originally 176:24 234:15 288:16
out-of-service 42:19
outfall 155:8
outfitted 86:22
outlet 15:17,24 65:17,18
outliers 168:21
outlined 239:21
outside 19:14,14 156:1 196:4 227:20,22
overall 110:16 133:14 201:20 242:21
overflow 16:22 17:3 65:24 277:5,6
overflowed 16:19
overlap 90:3 91:1
overruled 72:23 73:8 76:4,22 150:11 184:12 198:5 203:2
overview 238:24 286:9
owner 253:16
owners 83:15 257:17

P

P 2:1,1
package 94:20 183:5,7 246:15 246:16
packages 107:7
packed 267:9
packet 40:5 42:2
packets 96:10
pad 12:15,21 14:20,21 15:1 15:1,3,7,7,13
page 4:3,9,16 9:8,16,19,20 20:23,24 28:10 31:8,9 33:20 34:19 36:4 40:5,7,19 41:20 42:4 44:14 45:14,24 47:13 49:6 50:7 59:9 61:13 63:10 66:21,22,24 68:20 74:19,22 79:2,4 104:5 116:18 118:5,7 135:10 137:20 137:21,21,22 158:12,16,17 160:7 166:1 168:15,15 169:7 171:22 206:2 211:16 216:5 221:18 224:11 230:3 232:4 237:11 238:13,24 249:2,7,23 250:5 266:15 278:24 287:23 292:15,16,17
pages 66:19,21 75:21 79:2 250:20,21
paper 152:15,16
papers 257:5,22 258:22
paragraph 120:3 160:10 169:8 230:8,14 252:8
parallel 98:3
parameter 160:11
parameters 90:23 92:10 102:23 149:24 159:4,8,19 231:23
parcel 108:8
part 22:4 25:17 25:24 26:23 32:4,8 38:2 48:8 60:6,6 65:15 81:1 85:17 90:5,12 91:1 92:11 96:17 97:23 98:14 99:6 102:20 103:22 104:21 105:10 107:12 112:4 127:22 132:8 139:1,13,16 142:23 149:3,6 149:9 157:1,7 157:16 159:19 167:4 170:4 178:6,17 182:11 192:7 201:20 202:7 207:23 208:20 218:15 231:16 239:11 256:12 270:3 278:5,16 284:11 296:23
participant 57:17
particular 99:21 100:8 110:3 113:4 133:2 138:13 142:23 155:12 173:17 201:12 210:11 212:5 222:14
particularly 126:8
particulate 12:19
parties 39:8
parts 103:23 124:1 139:2,2
party 208:22
passes 259:1
passing 20:12
patched 265:2
path 65:15 156:19,24
pathway 239:10
pathways 239:4
Patrick 85:23 94:23,24 95:4 95:8 130:20 131:21
pattern 142:14
pavement 289:14
pavements 218:2
pay 170:5
PCB 1:5 6:9 159:21
PCB's 179:5
PDF 88:1
Pekin 138:13,15
pending 36:17
people 7:23 36:8 68:4 77:2,11 78:15 219:1 246:19 257:13 261:6,19,20,22 264:8 266:21 270:23 282:22 284:16 286:15 296:9
people's 220:6
percent 217:19 229:9 271:23 286:23
percentage 282:5,14
percentages 282:17
percolate 226:20
perfect 58:22 204:3
perform 34:7 89:4
performance 252:17

performed 47:5 115:23 118:15 173:15 242:1
performs 87:17
period 265:24
periradicular 156:20
peristaltic 87:4
permeability 194:6 242:1 256:14
permeable 73:5 194:5
permeate 72:13
permission 114:22
permit 60:17 65:14,16 146:16,17,22 198:21 246:7,8 248:4
permits 159:20
perpendicular 98:6,7
person 96:6 152:22 172:9 239:7 251:9 252:1 296:8,12 296:15
personal 298:11
personally 50:10 296:1
perspective 239:14 242:11
phase 19:2 151:10,14 177:23,23 178:11,12,24 189:13,14 223:20
phenomena 127:8
phone 296:15 298:22
photo 63:23
photograph 162:8 206:7
photographs 247:1
physical 198:14
Picking 220:14
pictures 10:7
pieces 243:7
pile 151:18 158:11
piles 49:10,11,13 49:14 50:11,13
pilot 79:11 80:6
pink 98:4
pioneers 257:15
piping 14:21
pitch 143:24
pitches 143:1
place 32:3,4 38:7 46:15 56:15 96:6 125:6 166:13 264:3,18
placed 8:11,13 40:1 95:19 140:13 254:7
placement 99:7 100:14,15 108:10
places 52:8 74:16
placing 32:2 43:21
Plaines 16:23,23 17:1,2,3 98:9 98:13 110:1 124:8,23 125:1 125:21 126:2 127:16 178:16 178:18 184:24 185:4,23 190:12,14 210:4,6
plan 9:8,12,18 10:2 19:4 151:22 152:1,3 152:23 217:6
plans 247:12
plant 17:5,7,12 19:8 22:4 27:20 47:19 104:23 155:7 163:1,2 185:19 192:7 214:11 261:19 275:10 275:10,11 280:6 296:8
plants 84:4,7 237:20 261:22 278:19,21 284:21
plastic 29:24 244:18
played 294:22
please 7:2 10:23 13:14 19:3 27:4 28:20 37:14 39:2 40:6,18,24 41:21 44:13 48:12 50:9 61:12 66:22 76:3 82:11 97:14,19 119:2 120:22 137:18 151:17,20 156:13 158:5 160:7 162:3,14 165:14 169:12 171:21 179:17 209:17 224:19 230:17
plenty 294:21
plot 97:4
plotted 96:24
plow 70:13
plugging 49:24
plus 98:11 184:2 210:7 211:22
point 46:2 54:6 55:13,14 77:6 79:6 102:7 140:21 152:8 153:2 189:10 189:17 191:11 201:22 207:14 215:24 216:5 220:14 231:1 237:3,5 238:2 240:16 254:18 258:12,19,24 265:1 267:1 278:15 281:7,7 283:22 286:12 293:17
pointed 66:19 66:20 74:22
pointing 96:13 104:4
points 180:24
pole 72:3 192:5 192:6,9
poles 71:24
policy 1:4 2:5 6:5 30:23 51:13,20,21
Pollution 1:1 6:3
polyaromatic 179:4
pond 8:8,10,11 8:14,16,17,18 8:20,23,24 13:19,24 14:4 14:18,23,23,24 16:2,19 17:4,5 17:10,11 18:1 18:2 19:10,10 19:20,20 21:6 21:6 22:5 24:22,24 25:2 25:4 26:14,24 27:2 28:1,1,5 28:15 29:3 31:13 32:5,8 32:10,14,15 34:21 36:17 40:20,21 41:5 41:9,19 42:10 42:19 45:1 47:4,4,8,9 53:10,21 54:1 54:4,11 55:2,2 55:9,16 56:14 57:24 58:3,6 58:13 63:11,15 65:10 66:1 70:8,17 72:2 74:3 75:5 102:5 155:1,20 157:2 158:21 158:22,24 162:20 206:12 226:3,7,8,9,11 227:22 228:4 242:11 243:4 243:21,23 244:3 248:1,15 253:11,24 256:4 263:18 264:15,16 271:15 274:22 277:3 282:7 287:2,2,2,3,5 288:1,2,3,4,13 288:18 291:4 291:17,22,23 292:2,3,18,19 292:22 293:2,6 294:9,9,20,21 296:18
pond's 289:22 290:9 292:16 293:2 295:5
ponds 11:17 12:1,3,4,6,9,14 12:18,22 13:1 13:3,4,9,12 19:1,9,21,23 19:24 20:2,4,6 21:8,15,16,17 21:22,24 22:2 22:3,9,13,16 22:21,24 23:5 23:7,8,10,13 23:17,18,21 25:9 32:19 41:18 56:11 57:17 60:6 61:21,24 66:13 67:5 70:10

71:7 73:12,19 74:4,16,20 76:9,17 77:5,7 77:7,11,14,17 78:16 80:7 84:12 100:11 101:19 111:11 127:14 146:14 154:13 210:3 212:8 216:20 216:20 225:14 227:20 228:11 228:20,21 229:1,3,7,8,9 229:11,13,22 229:24 238:7 238:22 240:19 240:21 243:10 243:13 255:7 255:19 256:16 260:12 262:4,5 262:18 263:19 265:9,17 267:4 268:2,9 269:4 269:15 272:6,7 272:8,10 273:17 274:15 274:18 281:16 281:17,22 283:11,20 284:1,4 285:6 286:22 287:12 287:22,23 289:9 291:7,8 292:4 293:15 294:1 295:20 296:2
pool 184:16
pooled 17:6
pooling 17:7
pools 125:12
poorly 104:21
populated 105:6
portion 156:22 159:18 185:23 196:19 229:12
portions 160:22 161:5 174:22 175:2
position 83:2
positive 242:10 242:22 264:13 273:5
possibility 70:13 70:14 140:14
possible 24:11 27:24 31:1 35:12 37:2 38:6 45:12 47:19,20 59:6 64:9,11 68:9 125:16 156:9 160:21 255:19
possibly 28:8 31:18 38:6 52:23
Post 9:6
post-construct... 255:22
postgraduate 83:10
posts 25:3 262:11
potable 108:11 108:18 140:14 157:16 167:20 278:9,14,18
potential 140:19 157:17 172:11 172:24 220:3 221:6 227:19 228:5 238:21 238:22 256:7 265:17 274:14 278:1,22 284:9 294:10
Potentially 8:6
pounds 241:18
pour 225:17
poured 91:9
power 84:1,4 214:11 215:24 216:5 237:3,5 270:14,16 280:6
Powerton 89:5 96:5 105:9 127:19,21 129:3,5,13,14 132:20 133:10 133:23 134:20 135:7,24 136:16,21 137:11 139:16 139:17,24 140:4,7 141:17 142:6 186:10 186:12,19 187:2,8 234:21 262:21 268:3 268:22 275:10 276:12,13,19 276:20,21,22 276:24
poz-o-pac 74:12 74:15 240:17 241:2,3,10,14 241:19 242:1,8 242:14 244:11 260:1 288:22 289:6,8,12,13 290:1 294:8
practice 13:19 56:13 213:24 239:2 243:19 244:6 246:4 247:17 255:13 255:15 260:5 279:24
practices 52:5 214:2,4,5 261:24
Prairie 1:4 6:6
preamble 224:8
precipitation 36:18 125:15 143:13
precipitator 51:5
preclosure 287:1
preconversion 287:1
predates 199:16
preparation 158:14
prepare 181:22
prepared 33:23 87:8 94:12 116:15 124:10 158:9 162:7,11 168:2 181:12 182:10 216:3 236:6,7
preparing 112:11
presence 97:10
present 128:4 206:12 222:7 222:23 245:23 282:20,22
presentation 216:1
presented 115:16 116:1 229:6 282:16
preservation 91:4
preservative 91:10
pressure 225:15 225:21,23 226:5,6
pretty 49:18 91:2 137:16 216:1 226:15 271:17 289:15 294:17
prevent 14:7,11 256:6 290:15 294:1 296:19
preventing 265:17
prevents 14:9
previous 46:6 120:3 121:17 176:2 181:17 182:18 236:18
previously 144:12 155:12 155:16 215:6 235:3 248:7
primarily 83:20 83:22 84:10 104:21 222:6 225:13 264:2 267:21
principal 83:3 213:24
principals 222:20
print 182:22
printout 47:3 216:1 224:6
prior 51:23 91:3 118:8 221:11 228:15 235:23 278:13 288:23
prioritize 245:5
private 83:20,22
proactive 179:13 240:24 245:2,8 265:21
probabilistic 265:7
probable 295:21
probably 27:3 33:1 34:1 49:22 50:14 58:15 68:12 191:14 192:12 223:15 263:19
problem 36:13 43:19 231:22 232:2
problems 251:5
procedure 171:14 173:12 175:24
procedures 220:1 261:3
proceed 6:18 19:17 114:10 196:7
proceedings

1:11 39:6 57:8 63:5 65:3 82:4 113:16 117:7 128:20 141:11 161:11 180:3 204:8 213:3 286:6 298:7,9
process 12:17 22:4 29:11,24 30:9 52:13 76:10,12 77:2 78:1 157:5 209:5 221:8,9 239:17 243:9 245:4 261:15 266:22 269:9 269:11 282:9 283:1
processes 240:12 261:3 261:24 296:2 296:20
produced 38:16 236:7 296:14
product 21:15 32:17 218:21 218:24 252:2 257:20 266:24
products 257:21
professional 247:9 263:9
profiles 283:18 283:20
program 79:11 87:9 90:9 92:12 93:21 94:17 97:24 99:6 231:17 243:12 244:22 244:23,24 245:13,13 247:11 248:4 259:7 261:9 264:7
programs 92:16
project 2:9 60:3 241:6,9 247:2 249:13,21 250:15 252:6 253:12
projects 84:10 84:20 241:7 243:5 265:15
pronounce 16:24 36:12
proper 45:14 262:8
properly 116:2
properties 162:9 240:1 260:17
property 83:24 90:13 108:14 139:12 149:3,5 149:8,21 156:10,11 157:16 162:21 163:4 177:24 178:12,15,18 178:21,23 179:2,3 240:1
proposal 223:16
proposed 223:19
protect 260:7,9
protocol 26:6 32:6 159:7,18 160:4
protocols 32:1
protrusions 252:4
prove 246:12 247:4
provide 14:5 100:10 186:13 187:15 188:15 202:10 214:10 216:24 217:3
provided 87:19 183:8 187:12
provides 15:20 221:8 223:7 242:19 250:1 250:16 289:5 291:1
providing 116:6 216:2
provision 231:2
provisional 129:7
proximity 151:4
public 223:19
publication 102:21,21 169:20
publicly 170:7
published 270:20,22
pull 94:1 151:17 187:18 209:15
pulled 170:6 174:23 176:9 176:15
pulling 19:1
pulls 175:2
pulverized 7:20
pump 15:21 31:17,18 32:2 43:1 54:13 55:17,19 86:23 87:2,4
pumped 56:2,5
pumps 15:21 32:3,4 54:17 54:19 55:8
puncture 258:11 290:15
punctured 290:20
purpose 100:6,8 100:9 101:16 108:15,17 126:15,19 140:16,18 202:7,9 208:6 214:8 290:13 290:16
purposes 101:5 101:18 107:23 125:6 181:20 182:16 200:12 200:22 208:2 219:2
pursuant 91:24
push 127:5 292:14
put 9:6 38:18 42:17 51:19 87:7 91:17 105:12 144:7 154:9 157:3 163:16 186:22 187:19 190:23 210:13 218:16 232:19 254:16 282:14 289:12 290:22 292:8
puts 103:16
putting 8:24 156:2
pylons 71:24

Q

QA 91:16 259:4
QCQA 254:12
qualifiers 183:6
qualify 57:15
qualifying 173:5 173:5
quality 100:18 102:22 104:11 167:5 183:2 200:6,15,18,20 200:21 202:3 203:14 244:2 246:11,11 279:7,8 280:20
quantified 188:1
quantify 184:22 185:6 197:22 211:23 212:6
quarter 86:3,4,5 86:9,10 93:8 93:10,10 94:16 110:6,7,8,9,11 110:17,18 127:14,15 134:3,3,5,6,7,9 134:10,17,18 135:19,22 145:9,10,11,12 145:13,18,19 146:5,12,23 165:5,7,8,10 165:11 182:4 182:13,15,18 236:19 281:21 297:1
quarterly 86:6,7 89:23 182:14 182:14,17
quarters 86:13 93:11 94:15,18 112:6 127:11 182:19 201:23 236:20 280:18
Quest 289:21
question 7:14 8:7 18:9 21:2 21:14 30:21 33:4 34:20 37:14 45:7 58:18 76:6 79:18 127:7 172:23 180:14 180:18,21 185:5 187:15 191:18 198:9 201:3 202:22 203:4 204:14 209:4 228:2 229:17
questioning 23:19 189:7
questions 6:20 11:16 58:16 61:3 64:14 65:9 71:19 72:9 81:18 160:22 179:17 180:12,16 183:23 209:9 212:14 266:13
quick 126:20
quickly 16:18 30:24 51:19 94:13 198:23

233:5
quiet 197:15
quite 95:22 120:11 138:21 149:23 243:6 250:21 270:17 284:18 285:7 292:7,10
quote 275:20,22 279:19,20

R

R 2:1 7:9 65:6,6 72:10,10 82:17 180:7 209:13 209:13 211:13 211:13 213:16
R-C-R-A 275:14
Race 244:12,23 256:16 284:8 286:16
Race's 243:10
rail 207:17
railroad 207:19
rain 193:24 294:17
rainwater 8:17 11:10,10 123:15
raise 82:11 213:10
ramp 53:2,6,14 53:21 263:2,3 263:5
ran 247:11 267:11
range 53:1 103:14 105:13 105:17 138:21 174:2 184:20 185:1 295:19
ranging 106:3
rarely 265:9
rate 263:16
RCRA 256:10 275:14
re-approval 175:11
re-cross 211:9
reach 25:22 53:24
reaching 222:22
read 28:21 33:5 34:19 37:14,15 42:23 66:22 68:22 74:21 75:16 79:14,16 202:22,23 217:11 219:23 221:20 224:19 230:16 241:10 252:7 279:19
reading 34:4 41:7 74:24 75:20 283:4
ready 27:8,13 36:1,2 39:22 39:23 46:24 47:1 48:21
realize 243:8
really 26:7 29:10 30:13,20 45:24 46:2 52:1 57:1 59:7 68:6 103:12 132:3 152:7 181:19 192:10 212:6 220:20 223:16 236:1 240:1,2,5 255:23 261:7,8 273:4 278:22 285:4
reappear 56:3
reapproved 170:24 171:7 171:16 173:10
reason 68:11 81:12 127:24 153:12 181:16
reasonable 271:3 293:18 296:22
reasons 125:7 264:23 275:1
rebuttal 75:16
recall 65:10 66:1 66:14 85:11 94:7 106:17 110:11 111:9 112:22 113:2 122:12 123:22 124:12 126:2,4 126:6 130:15 131:22 133:23 134:11,13 137:4 145:14 147:22 151:8 151:13 165:12 174:10,14 175:23,23 183:21 186:10 191:3 200:7 208:5 222:10 227:8,11 262:19 266:11 286:23 296:6
recalling 41:2
receive 13:10
received 12:5,6 12:9,10,14,15 13:4,7 95:18
receives 287:6
receptor 108:19 108:20 140:19 157:17 167:21 239:6 278:8
receptors 278:1 278:14 279:6 279:21 280:1,4
recharge 142:2 143:19
recharging 143:16
recognize 138:1 163:20 168:2 206:5 279:13
recognizing 226:18 237:20 293:15
recollection 21:13 31:14 36:22 50:17 66:7,10 67:3 68:24 80:11 85:17,24 86:10 111:19 112:1 153:20 161:1 161:21 177:22 178:20 186:6
recollections 89:16
recommend 153:3
recommendati... 123:4 253:13
recommended 222:5
record 6:12,14 9:23 28:21 37:15 39:1,8 39:13 44:14 45:2 48:17 49:6 50:23 57:4,10 62:20 63:2,7 64:22 65:5 68:22 71:11 81:24 82:6 113:13,18 113:24 117:3,9 119:4 127:21 128:17,22 141:8 161:8,13 164:3 179:23 180:5 202:23 204:10 212:23 213:5,19 217:5 236:8,11 286:3 297:6
records 237:24 290:10
Recovery 256:10
Recross-Exam... 4:6,13
rectangle 40:7
recycle 14:6 15:21
recycling 15:19 178:24
redacted 160:22 161:5
Redirect 4:5,12
redressed 120:12 121:18
redressing 119:24 120:6
reduce 265:19
reduced 200:1
reduces 228:4 261:10
refer 208:17 232:4 291:11
reference 199:9 199:10 241:12 248:14
referred 20:3 37:1 38:1 79:4 176:6 248:21
referring 13:23 23:17 162:18 255:5 284:11
refers 21:6
reflect 100:21 200:19,24 288:8
reflected 92:1 92:22 94:11 109:6 110:23 147:3
reflective 201:12
refresh 21:13 31:14 36:22 50:16 67:2 80:10 89:15 186:6
regard 101:13 167:9
regarding 39:9 85:13 101:15 112:17 124:23 126:1 133:22 136:16 158:18 228:24 270:5 284:1

regards 167:9
Register 224:5 224:10
registered 108:14
regs 207:24
regular 182:6
regulated 99:9 99:22 230:1 287:7
regulation 227:5 228:23
regulations 48:9 179:15 207:24 224:24 256:12
regulators 257:18
regulatory 279:23
rehabilitation 75:17
reissued 171:17
rejected 123:3
relate 145:7 220:17 228:1 228:19 240:8
related 84:7 103:5 111:20 112:2 114:16 155:13 174:19 218:10 261:11 261:12
relates 110:4 179:9
relation 126:24
relative 77:14 97:3 99:9 104:22 150:24 152:7 171:14 217:4
relatively 99:7
relay 51:12
release 225:4
relevant 96:7 166:14 186:18 242:18,19 250:23 289:9 295:11
reliability 263:24
relied 103:19 151:14 174:14 270:4,13
relief 202:10
relies 177:5
relined 56:11 243:13,14,14 256:4 265:11 287:9 288:17 289:17,23
relining 57:18 243:4 245:13 259:7 260:12 265:15
relinings 245:6
relocate 51:5
rely 277:18
relying 117:11 151:9
remedial 239:18
remediation 107:12,13 108:6 149:6 202:11 214:1,3 239:2,12
remedy 167:4 201:21
remember 26:13 27:3 31:6 32:22,24 38:2 38:5 41:1,10 41:13,15 46:3 47:24 49:7,14 49:20 50:1 51:22 59:7 60:13 66:17 81:4 85:7 113:7 114:1,13 124:1 132:3 136:17 143:2 149:14,23 153:24 186:9 186:12 187:4 202:18 203:4,6 207:12 210:9 242:3,16 277:17 288:11 296:7
remind 35:16 70:4 111:16 166:24
reminder 153:22
removal 54:14 54:16 107:24 262:5
removals 295:10
remove 108:19 140:18 244:3
removed 10:9,13 10:17 22:8 51:19 75:5 114:2 230:19 288:17
removing 157:17 167:21
render 8:24
repair 29:19 30:4 34:8 36:19 115:17 115:19 116:6 118:4,10 119:24 120:4 120:10 121:15 123:4
repaired 30:1 69:20 120:12
repairing 30:24 34:1 37:4
repairs 26:9,10 26:12 30:10,19 33:4 34:7 36:17,18,23 38:3 115:23 118:8,15 120:4 120:7 121:16 122:13 123:7 194:12,13,22 195:2,4,8
repeat 229:17
repeatedly 78:14
rephrase 53:17 55:5,24 59:23 146:9 190:17 194:18
replacement 248:16
replacing 144:12
report 1:11 25:18,20,21,21 26:1 94:16 110:6,7,8,10 110:11 115:18 115:20 116:8 119:19,22 134:3,5,6,8,9 134:10 145:9 145:10,11,12 145:14 165:6,7 165:8,10,11 182:14,14,17 215:6 233:14 233:15,17 234:6,10,16 236:12 237:6,8 241:11,20 242:13 246:19 246:20 268:20 268:23 270:4 280:10,13,14 284:14 289:21 292:8
reported 3:9 26:4 30:22 142:5 296:13 298:6
Reporter 298:6
reporting 84:11
reports 87:19,21 87:22,24 94:15 94:19 110:3,15 110:19 113:1 114:15 116:16 116:19 123:23 124:9 133:22 134:15 145:7 165:4,12 197:18 208:17 214:13 247:1 284:10
represent 114:3 185:22 206:16 237:8 275:17
representation 61:16 117:12 118:22 120:16 122:2 200:11 223:8
representative 252:11 284:23
represented 104:22 186:3
reproduced 289:20
request 139:8
requested 37:16 107:1,5 139:22 158:19,20 168:8 202:24
require 120:5 247:6 251:6
required 87:18 123:7 169:3 198:21 222:19 223:7,18 243:14 250:3 253:17 268:18
requirement 91:7 245:9
requirements 146:18,20,22 168:23 174:2,8 174:9 224:21 247:19
requires 30:1,10 201:22
requiring 71:9
rerouting 51:4
research 270:14 270:16 283:5,9
reside 14:22
resided 12:20
Residual 90:7

224:7
Residuals 216:12 223:11
resist 294:5
resistance 294:23
resistant 244:17 244:20 256:13
Resource 248:13 256:10
respect 56:11
respond 51:15
respondent 1:9 3:7 6:8
Respondent's 5:9,10,11,12 5:13,14,15,16 5:17,18,19,20 5:21 58:18 88:11 111:6 115:2 117:17 118:24 119:6 120:18 121:1 122:4 130:5 134:22 136:10 148:8 158:3 161:17 163:15 166:9 177:18 178:7 207:2 215:1 219:7 232:22 233:7 234:1 235:11
response 34:20 51:15 66:7 106:20 139:16 166:18 203:6 260:19
responsibilities 25:18
responsibility 221:17
responsible 26:9 26:12 30:19 33:3 208:22 220:10 245:1,7 252:16 254:3 261:20 264:7 264:18 265:21
rest 239:13
restate 62:12 76:6,15
rested 6:19
restricted 167:18
restriction 108:10,16 140:17 157:14
restrictions 108:9
restricts 140:13 157:15
result 51:6 124:14 125:10 138:17 205:6 235:19 284:3
results 87:22 92:24 93:2,4 94:6,11 95:4,9 101:20,23,24 106:8,17 107:19 110:15 110:23 125:11 134:14,21 135:3,23 137:24 145:17 145:20 147:3 147:19,24 148:19 160:11 160:13,14 165:18 166:2 168:14,17 174:6,7 183:2 236:17 247:2,4 250:1,2,16 267:12,13 268:5 269:8 276:5,7 277:15
resume 214:24 215:5,10
resumes 250:21 250:21,23
retained 22:2 214:5,9
retains 32:13
retention 12:15 15:2,3 62:18
retired 14:3 16:3 17:17,22
return 43:1
reuse 15:22 168:11,24 170:12,14 177:11 218:17 220:11 221:4 221:11,12 222:22 273:24 276:2,12
reuseable 276:18
reused 159:6,8 159:14 217:18 217:20 219:1 273:20 274:6
reuses 220:8
reversal 127:10 127:13
review 35:24 38:24 44:7 46:23 48:16 95:8,12 150:22 153:8 192:1 236:13 247:13 255:6,11,12 276:4,21
reviewed 41:21 153:5,14 244:5 276:7 282:12
reviewing 39:21 107:2 218:9 237:24 243:5 245:12 282:10
revised 176:8 233:19
revising 218:9
revision 173:21
revisions 235:6
revisit 114:9
Rich 82:9 226:6 226:7 294:24
Richard 4:8 82:14,23
right 9:6 10:14 15:14 21:19 29:3 33:17 35:21 39:23 51:2,21 54:5 55:15 58:20,21 61:14 67:1,2 69:14 79:16 82:11 96:16 100:18 114:9 142:24 143:17 144:5,13 156:5 159:17 183:3 185:18 189:12 190:7 192:5,8 201:18 204:19 209:3 211:4 213:5,11 223:1 223:4 224:15 225:22 230:6 232:11 241:15 264:9 286:8 289:24 290:1 297:6
right-hand 63:22 104:12
rill 192:23 193:1 195:9
rilling 119:24 121:14
rills 205:8,11
rip 41:3
riprap 56:18 195:3,5
rips 27:24 28:1,4 28:4,14,18
rise 126:8,20 127:4
rising 294:11,14
risk 108:19,20 200:22 205:18 205:22 221:6 221:10,13 227:19,24 228:5 230:22 239:1,7 261:10 265:2,6,8,13 265:20 278:4 279:22,23,24 280:9,15,23 295:13
risks 173:1 220:4 225:4,9 231:9 278:1 281:2
risks/no 278:1
river 16:23 17:3 17:8 98:4,9,13 104:20 110:1 123:11,16,20 124:8,23 125:1 125:13,21 126:12,17 127:5,16 178:16,18 184:24 185:4 185:23 190:12 190:14 204:18 205:2,6 210:4 210:6 295:2
Rivers 1:4 6:6
road 2:3 70:9,11 70:15 80:24 81:8 111:14,18 112:9 137:2 291:2
roads 111:17
roadways 137:15
robust 243:23 244:21
rocks 252:4
role 213:23
roll 116:14,15 249:10,12
room 1:14 6:15
root 278:8
roots 11:14
roughly 32:24 98:6 206:11 207:12
round 86:19 96:21 97:21 206:11

rounds 86:11 126:22 127:2 127:12
Route 136:20
row 201:23
rubber 52:18 261:2 289:5 291:14
Rudy 257:8,11
Ruining 1:5 6:7
rule 90:6,7 192:23 201:6 223:21,21,22 223:24 224:6,7 224:22 227:13 228:15,18,22 228:23 230:1,6 230:22 231:5 231:11,20 267:22 287:6
rules 71:8 135:9 223:10,11,12 223:16 226:23 226:24 228:7 228:12 229:2 229:14,19,24 230:3 232:5
run 200:3
running 70:15 123:10
runoff 118:4 123:9 137:13 137:14 204:24 205:8,10
runs 189:23,24 226:19
rush 36:1
RUSS 2:10

S

S 2:1 5:1 7:9,9 72:10,10 180:7 180:7 211:13 211:13
S-K-A-P-S 250:11
safe 217:21 269:21 297:11
safety 27:23 264:10
saith 7:6 82:16 213:15
sake 49:23 50:24
salt 111:18,18 111:21,22,24 112:9 136:19 137:2
salted 137:17
sample 87:17 180:22,23 181:2,5,6,9,9 181:11,21 235:2 268:10 268:22 269:21 269:22 275:15 276:5 277:15
sampled 89:23 92:5,23 97:23 112:6 147:7,16
samples 86:5,16 86:17 87:5,7 87:15,22 91:3 91:8 92:14 93:20 94:1 96:21 105:1,8 105:11 112:3 147:2 158:20 159:1,2,3,7,11 168:9 173:16 267:3,4,8 268:2 269:7 271:18 275:13 275:13,15,16
sampling 85:10 85:14,20 86:1 86:11,14,20,23 86:24 87:9 91:3 93:18,21 93:23,24 94:17 94:23,24 95:4 96:11 97:21 99:3 101:6 125:20 126:9 126:23 127:11 158:11 159:11 172:13 174:19 182:1,1,13 275:6
samplings 93:19
sand 24:5,9,12 102:23,24 103:21 104:11 105:21 132:6 132:20 133:1 141:18 142:19 143:16,19 254:17 263:1 290:5,16 294:8
sands 154:2,2
sandy 129:24 131:9,15
Sanitary 163:4
Saturday 36:20
saw 12:18 25:19 25:20 35:17 50:10 131:16 145:7 181:17 181:19
saying 45:24 73:2 78:23 81:12 190:14 220:6 227:8 247:11
says 28:2,13 35:4 40:19 41:4,7 45:5,16 47:8 63:23 91:7 216:9 220:15 231:8 234:21,21 272:6 288:14 288:15,16 295:17
scale 152:3,4,19 152:24
scheduled 295:10
Schroeder 257:5
science 215:12 215:16 265:7
sciences 83:8
scientific 222:20
scientists 223:17
scope 19:15 175:15 196:5
screen 97:14,16 97:19 100:21 128:24 141:16 144:10 163:16 163:21 216:6 237:14 279:12
screened 101:10 102:24 103:2 129:23 130:11 131:4,8 153:10 153:12
screening 220:1
scribble 45:24
scribbled 45:3 45:18
scrubber 67:5 67:11 80:6,8
sea 97:4
seal 288:24 289:5
seams 254:14,15
seasonal 136:24
second 36:4 40:5 44:14 47:7 86:10 93:10 110:5,11,18 116:18 118:5 120:2 130:19 134:2,3,5,6,10 134:18 135:19 135:22 145:9 145:11,13,19 165:5,6,8,9,11 169:8 182:3 216:4,5 219:21 224:18 236:19 278:12,24 281:21 295:8
secondary 262:21
seconds 57:4 62:20
section 78:8 171:21,22 172:4,5 173:4 175:15,15,15 175:19 176:12 176:17 219:21 219:22 221:20 221:21 230:6 231:16,16 233:17 289:20 293:1
sections 171:18
sector 83:21,23 83:23
sedimentation 205:4
see 9:11 10:2 19:8,11 21:5 28:2 36:6,22 37:2 42:3,5,11 42:12 45:17,20 47:7,11 50:21 56:8 57:18 59:11,15 61:24 62:1,4 63:10 63:13 64:12 67:10,13 75:17 75:23 92:7 97:19 98:8 105:16 119:20 122:10 127:10 129:1 133:3 135:13 138:20 142:13 143:10 143:20 144:10 144:17 173:16 178:17 182:16 184:24 189:2 189:19,20 192:11 193:12 195:8 205:5 206:9,10 207:16 223:17 230:23 232:7 232:16 237:24 238:20 241:9 251:16 258:9 268:4 269:1

283:11 288:12 288:13,19 289:7,23 290:1 291:22 292:17
seeing 112:8 114:13 139:9 142:5,8 255:21 273:16 274:13 278:23 289:19
seen 10:7,12,16 11:3 22:7,19 23:2 30:16 34:24 62:10 75:3 112:6 123:19 126:24 193:20 197:8 203:9,13 205:3 234:23 235:5 255:18 257:4 260:22 262:6 274:11
seep 55:1
sees 297:9
selenium 276:14 276:15
send 182:10
senior 213:24
sense 10:21 24:18 71:6
sent 27:17 36:5 36:9 249:12 267:10
sentence 120:3 219:21,23 220:15 221:5 224:18 225:1 230:16
Separate 293:12
separated 190:6
September 49:4 115:18,22 116:5 118:2
series 90:2 94:5 94:10 96:22 102:23 104:13
serve 296:18
service 9:2 14:5 29:4 70:18 263:15
Services 253:23 254:4 259:5
set 37:7 48:3 94:1,2 103:1 129:22 270:15
sets 125:13 289:4
settling 19:24
seven 51:4 84:22 204:10 265:23 293:16,20
Seventy-nine 31:11
sewage 17:5,7 17:12
Seymour 4:15 213:8,10,13,20 235:19
sf@nijmanfra... 3:5
shadow 297:9
shake 176:1 268:6,8,12
shallow 273:3
shape 206:10
shaped 19:10
share 182:5
sharp 259:10,18 260:1
sharply 261:1
sheet 152:14,16
sheets 70:23 71:10 88:3 180:20
shift 146:21
shingles 218:3
shop 297:7
Shore 162:24 163:3
short 36:19
shorthand 298:5 298:7
show 142:3 154:1 181:11 257:17
showed 168:21
showing 132:19
shown 114:15 284:11
shows 139:11 142:11 144:19 151:23
side 14:23,24 15:6 25:9 104:12 142:24 142:24 143:5 154:21 226:19 287:24
sides 24:23 25:2 25:14 27:2 35:15 71:22 72:3 262:13
Sierra 1:3 2:14 6:5
sign 247:10
signature 116:19,20 119:16 298:13
signed 116:19 121:19 158:12
significance 171:22 172:2 176:17
significant 160:15 176:10 192:11 229:12 287:15
significantly 225:5,10
signify 62:6 63:15 64:2
signs 184:3
silt 129:3 131:17
siltation 205:4
silty 127:20 129:10,18 130:4,11 131:5 131:11 133:1 142:18,19 143:1,3,11,14 143:18,24 144:3 154:2
similar 98:20 114:19 121:13 124:17 146:19 216:14 237:21 255:6 256:2 267:14 269:8 271:8,9 289:5 291:1 292:22 293:1
similarly 187:14 224:19,21 272:9
simple 282:22
simply 69:15 282:14
single 273:2
sir 10:22 21:4,22 43:16 213:19
site 9:8,12,18 10:2 19:2,4 90:14,16 124:15 130:1 149:2,13 151:22 152:1,3 152:23 156:23 157:1 162:17 162:17,18 163:2,7,8 189:14 190:6 190:21 193:17 195:23 196:20 202:14,17 208:13,22 209:6 237:17 238:3,8 239:3 239:15 249:12 269:12 270:6,9 270:12,24,24 272:1 275:3 276:19,22,24 277:23 279:23 282:11 283:8 283:11 286:10 287:22
sited 209:6
sites 104:23 106:7 161:6 162:22 191:1,6 214:11 217:10 227:17 239:22 240:3,9,11,15 261:10 265:15 267:14 270:8 271:13 276:16 278:11 282:12 283:21 284:4 284:24 295:24
sits 142:19
situation 26:11 76:13 276:18 294:13 295:14
six 49:10,11,18 49:22 50:14,22 84:22 192:24 239:21 262:10 266:14 290:7
size 41:6,11,13 43:2
SKAPS 250:9 250:12
skills 251:9
skip 13:16
sky 8:14,21 194:3
slag 7:15,17,17 12:20 14:21 18:3 62:18
slag/fly 10:3 62:10,15
slam@enviro... 2:13
slide 216:19,21 216:22,24 237:9 239:21 242:24 243:2 265:23 266:14 267:23 273:11 275:7,8,21 278:2 279:19 281:6,10 283:5 286:18 287:20 287:20,21 288:5,6 289:7 289:16,18,18

291:19 295:9
slides 237:7
slight 90:23 171:13
slightly 154:21 231:23
slope 226:19 262:13,15,16
slurry 20:4
small 17:6 31:12 69:7 142:22 175:14 226:16 237:10
snow 70:13 122:20 123:15 192:13
SO2 20:1 66:13 74:20 77:7
Society 218:6
soft 263:9,10
soil 11:12 83:16 151:24 158:11 179:1 193:23 193:24 194:1,3 194:4,5,7,9 195:3,11 211:5 225:18 247:3 252:15 263:12 263:14,15,19 289:24
soils 227:18,20
sold 219:1
somebody 26:9 259:23
somewhat 102:4 265:21 271:22 273:3
soon 30:24
sorry 6:23 10:16 12:22 27:10 43:18 56:21,22 58:22 75:9 76:14 80:1 108:13 111:13 116:12,14 128:10 133:6 142:18 146:1 154:7 157:18 172:22 176:6 178:8 181:4 183:4,15 184:12,13 192:15 197:13 199:19 201:9 229:18 246:14 259:21 272:13 281:11 296:12
sort 19:9 23:18 26:5 78:6 103:17 151:1 180:11 182:10 225:21 240:5 245:3 271:1
sound 241:15 243:19,21 296:10
source 238:21 238:22 282:8 287:12
sources 185:21 188:2,5
south 3:3 12:4,8 13:4,4,12,12 15:8 17:16,17 18:17,18 127:16 162:24 163:3,6 205:1 248:15 253:11 253:24
southeast 155:1 207:15
southerly 109:21
southern 104:21
southside 143:7
southwest 195:23 196:3 196:18,19 210:15,21
spaces 225:18
SPD 79:23 80:1 80:2,4
speak 11:8 30:20 37:4 46:7 51:24 52:1 133:20 186:1 197:15 220:7 229:22 284:12 296:5
speaking 88:24 89:16 94:4,10 277:16 295:24
spec 252:2
specializes 83:16
specific 41:6 94:15 116:7 146:17 151:5 185:18 186:15 232:1 260:16 267:18,22 270:9,12,24,24 272:2 275:3 277:23 283:8 283:11 296:4
specifically 37:5 183:15,18 191:3 228:17
specification 250:3 252:5
specifications 247:2,5,6 250:17 251:6 252:18 253:12
specified 92:12 92:13 160:5 168:13 169:17 170:11 173:13 177:8
specs 247:12
speculate 26:21 47:18
speculation 24:14 70:16
spell 82:20 257:10
spent 20:4
split 113:10
spoke 60:9 81:3 262:17 284:5 296:12
spread 50:19 111:17 289:4
spreading 112:9
spreadsheet 89:10 145:23 165:19 183:9 245:21
spreadsheets 94:12 95:5 96:2 134:20 182:22
spring 122:18 122:20,21 192:13 193:9
square 251:7
SS 298:2
stable 125:11,12
stack 217:18
stacked 49:11
stage 223:19 239:15
staged 158:22
stamp 39:11
stamped 236:8
stand 6:17 141:14 204:11
standard 102:9 106:12 107:16 107:20,21,24 138:4 149:22 159:15,16 160:1 169:16 170:1,3,5 171:10,11,12 171:14 172:10 172:16 173:8 174:3,3,8,8,12 174:19 175:10 175:13 177:6,7 198:24 199:4,4 199:6,12,15,17 199:18,19 200:2 201:5,6 201:8,11,17,17 202:1,11 205:18,19,21 218:9,17 219:13 220:16 221:7 222:5 229:16,20 243:19 244:6 247:16 255:13 255:15 258:24 273:21 274:2,3 274:5,7 276:12 277:12,13 282:10 283:2
standards 102:1 167:5 171:3 172:6 176:13 200:15,19,20 200:21 205:13 205:14,17 218:5 220:12 229:16 273:23 273:24 279:7,9 279:23,24 280:20
standpoint 81:10
start 32:14 33:21 50:9 85:2 86:1 141:2 180:11 205:24 240:3 297:3
started 71:9 85:4 131:1 146:23 240:7 244:24 283:7
starting 34:20 66:23 79:18 138:22 219:22 224:18,19 230:7,8 244:12 245:10 286:12
starts 31:10 72:4 137:20,21 167:24 195:9 245:15
state 43:2 82:19 103:23,24 104:13,21 105:7,10 160:5 177:8 188:22

199:9 201:22 213:18 219:24 220:16,17,18 220:20,23 246:6 267:7 298:1
stated 30:9 34:10 60:16 71:23 105:15 118:9 137:11 151:13 223:3 227:16 231:1 241:24 256:24 259:6 260:11
statement 34:18 124:16 225:7 226:22 229:5 231:18 257:1,2 257:4 281:6
statements 259:15 266:7
states 36:11 40:9 46:2 160:13 247:18 253:10 276:13
statewide 103:19 200:10
stating 21:9 260:20
station 9:9 66:3 77:8 78:15 84:21 89:6,6,7 89:18 104:24 105:4,5,9 108:22,22 123:19 127:14 129:3,5,14 146:13,14 152:11,15 161:22 162:1 162:10,15 177:21 178:15 185:18 206:7 209:23,24 242:2 248:17 255:8
stations 84:14 84:23 85:2,10 85:14 86:12 87:1 89:15,19 96:4 98:22 101:14 102:14 102:15 222:2 222:11 228:12 242:16 269:2,3 273:17 285:24
statistical 168:22 275:22
status 95:13
statute 169:4,9 169:11 199:9 221:1,2,3 222:19 223:7 268:18
statutes 160:5 168:13
stay 71:21 72:2 261:7
stenographic 298:10
step 96:21 155:23
step-wise 221:9
Steven 3:10 298:5,20
stick 200:17
sticking 189:21 202:14
stocked 68:4
stone 263:1 294:8
stones 259:20
stop 47:20 262:16 297:4
stopped 67:20
storage 10:3 62:10,15
store 20:7,9
stored 75:4,15 76:9 77:11 281:16 284:4
stories 264:17
storms 294:17
straight 205:1
stream 127:6
Street 2:15 3:3 298:21
strength 235:1
stretch 125:12
strictly 205:7,10
Strike 111:21 153:3
strong 290:24
structural 218:1 218:18 220:5 226:21 274:1
structure 15:18
structured 273:18
struggle 288:10
studies 258:22 267:21
study 100:6 101:16 104:16 129:20 142:23 190:20
stuff 127:9 217:2
subcontracted 51:9
subcontractor 51:13 251:22 253:23
subcontracts 52:12
subgrade 251:15 251:21 252:1,6 252:12,15,21 259:10,17,18 259:23 260:8 262:8 289:11 290:1
subgrades 243:21
subject 60:7,18 84:5,14 101:14 102:15
submit 75:20
submittal 107:6
submitted 65:16 246:13
subset 90:10 94:19 131:3
substance 74:13 74:14
subsurface 150:6 151:11
suction 15:21
sufficient 150:14
sufficiently 150:23 151:2
suggested 200:9 231:15
suggesting 112:7
suitability 252:16
suite 2:7,11,15 3:3 149:23 298:21
sulfate 269:18 269:20 271:20 273:1 281:23
sulfide 230:19
summarize 94:18
summarized 92:6 280:12
summary 89:2 118:3 119:13 121:10 158:11 268:19 276:3,4 280:1 288:12 288:18
Superfund 162:17 163:2,8
supplement 233:15
supply 103:18 104:15
support 35:13 135:9 168:1 242:20 260:18
suppose 45:11
supposed 7:24 26:8 221:7
sure 8:23 10:24 11:18 12:13 14:17 16:13 18:9,10 21:4 23:11 24:3 25:10,12 27:12 30:6 31:10 32:17 35:22 36:14,16 38:16 39:3,14 45:8 45:14 46:1,1 50:18 53:18 54:9 55:6 57:5 58:1,4,11 59:15 62:4,13 63:17 64:21 70:17 71:5 75:18,19 76:8 76:11 77:24,24 79:19 80:15,16 89:19 99:16 104:10,19 105:20 107:21 115:15 117:4 122:19 127:2 138:16 141:6 156:14 161:5 188:19 189:19 191:24 192:4 198:19 208:10 220:9 226:15 240:19 251:24 261:4 294:16
surface 97:1,10 98:18,21 99:2 99:7,11 123:9 123:10,11,13 126:18 185:10 185:11 186:13 186:19 187:1,9 187:15,17,21 188:15 189:2 190:7 204:23 205:7,10 212:3 212:10 217:6,7 225:6,10 229:23,23 239:9 252:12 252:13,21,23

271:15 278:23 279:2,5,15,21 279:22 280:1,3 280:7 289:4 291:1,3
surge 133:19 142:10 143:6,7
surprise 244:1
surprised 227:13
surrounding 97:1 162:9
survey 187:23 211:19 254:6 254:22 258:16 259:5 278:18
surveyed 188:8 188:13
surveys 187:22 244:7 258:5,23 278:15
SUSAN 3:2
suspicion 21:23 22:1
sustained 28:23 33:15 34:15 53:17 63:19 74:1
sways 126:13
swear 7:1 82:12 213:11
switching 189:11
sworn 7:6 20:21 82:16 213:15
synopsis 175:14
system 14:6 18:3 56:13,17 57:24 58:2,6,9,12 60:7 77:15 98:14,16,24 125:1,4,5 126:12,16 130:21 132:3 171:3 184:17 202:12 256:13 264:3,18 265:18,21 292:11 295:1
systems 56:11 57:1,21 86:23 101:12 126:19 217:8 244:16 253:9 257:15

T

T 3:1 5:1 7:9 65:6,6 72:10 82:17,17 180:7 209:13,13 211:13 213:16 213:16
T-H-O-N-G 252:8
tab 219:5 224:2 232:21 233:15 233:18,22,23 235:9 236:13 237:2 280:21
table 27:6 59:11 59:14,17 92:12 92:13,19 93:12 94:7 113:21 167:22 182:2 182:20 234:12 234:13,15,19 268:19 273:15
tables 89:2 91:14,15,17 92:2,4,6 94:17 95:19 96:10 110:19 166:17 180:16,24 181:12 182:16
take 9:7,19 10:1 13:14,17 19:7 20:13 29:12 31:22 33:14 36:3 39:16 48:12 56:15 61:12 98:20,24 103:8,10 106:21 111:21 128:3,7 130:19 140:22 146:3 186:21 188:9 204:2 250:2 268:10 273:6
taken 39:4 57:6 63:3 65:1 82:2 113:14 117:5 128:18 141:9 161:9 180:1 195:12 196:16 196:17,22 204:6 213:1 254:7 268:2,16 286:4 298:11
takes 29:7 156:22 157:1
talk 106:13 108:22 266:5
talked 126:4 146:20 169:1 169:18 173:22 176:11,12 186:8 191:20 244:10,22 261:22 262:3 273:12 294:4
talker 197:14
talking 21:4 39:11 60:13 69:6 91:18 98:18 124:7 157:4 168:3 175:10 177:20 189:10 190:3 216:16 219:14 240:18 248:19 249:15 284:7
talks 257:6
Tannery 64:13 148:1 149:1,13 162:18,19 208:22 209:5
targets 276:17
TCL 159:20
TCLP 159:21
TDS 269:18,20 281:24
tear 30:16 35:7 37:9,21 41:3 41:11,14 42:14 42:15 43:3 46:3,6 48:1 70:12,18 81:10 264:5
tears 25:20 26:1 26:18,20,24 27:1 29:20 30:22 31:7 36:23 37:24 38:1,3,5 69:18 80:23 260:21 262:1 263:21 264:12,19,22
technical 6:15 83:3 215:17 245:16,17
techniques 220:2
Technology 248:13
tell 11:15 16:7 28:15 81:15 104:8 115:13 152:7,20 169:9 187:4 240:20 251:8 262:14 273:15 274:14 276:8
telling 249:8,23 249:24 250:13 253:7,16
tells 241:21 247:16
temperature 29:11,14,20,23 30:1,5,11 34:7 34:9 173:13 174:2 199:24
temperatures 30:2,3,8,12,12
temporal 112:7 136:24 235:18
ten 229:12 236:20
tend 55:16
term 7:15,15,19 8:1,8 141:22 216:13 217:13 218:19,23 239:12 249:14 249:18
termed 169:4
terminology 7:13
test 159:15 160:12,14 170:9,10 172:8 173:1,6,13 176:1,7,8 221:23 222:1,4 222:11,15 223:4,4 247:3 247:4 250:1,2 254:13,18 258:13 259:2 267:11 268:6,8 268:12,16 273:18
tested 180:22 254:16
testified 78:9,14 79:10 80:20 102:11 126:1,6 136:13 191:4 191:22 198:18 198:23 204:16 209:3 244:13 246:5
testify 284:8
testifying 80:13 150:8 165:12
testimony 23:12 33:13 37:12 71:24 106:18 110:12 111:10 112:22 113:2 123:22 124:2 124:12 126:1,3 133:23 134:11 136:15 145:14 147:22 151:9

174:12,16 175:24 181:17 184:8 189:13 194:17 202:20 214:12 216:2 222:8,24 227:7 237:4 242:7 260:22 261:13 263:20 264:4 266:1,7,9 286:15 287:21 288:23 294:24 296:16
testing 168:12 198:24 218:6 222:21 235:19 247:1,7 250:16 253:19,24 267:10
tests 195:15 197:4 268:15 276:8
thank 6:24 7:7 7:11 19:17,18 38:20 39:24 43:13 46:13,17 48:5 51:17 53:17 55:24 57:12 62:23,24 64:15,17,18 72:6 79:17 81:19,22 88:20 105:12 109:1 111:5 114:9 115:9 117:16 117:16 118:23 120:17,20 128:22 132:15 139:15 144:5 146:1 147:15 148:7 154:6,9 154:14 158:2 161:16,20 163:14 166:8 166:18 177:18 179:18 182:5 182:24 183:12 183:14 190:24 193:15 194:8 195:6 198:22 200:5 204:4 209:8,10 210:13 211:8 211:11 212:13 212:15,18,19 212:21 214:19 232:19 239:19 281:12 296:12 297:10
thanks 11:1 82:1 190:17 194:19 239:16
thick 289:8,13 289:15,15 290:2,6,7,17
thing 21:5 46:2 86:18 235:21 237:19 239:3 240:22 242:22 247:21 258:6 258:13 277:1
things 9:2 35:17 37:3 57:19 127:3 216:13 220:19,22 234:6 244:4 246:23 258:4 258:10 259:13 261:8 269:5 272:19 273:8 285:10 286:9 293:24 294:3
think 21:18 25:7 26:22 29:11 37:22 41:3 45:11,23 49:18 55:23 58:7 66:16 67:14 73:16 75:14 78:13 79:11,12 80:5,19 81:23 92:20 106:4,15 111:14 124:24 127:3 147:6 154:3 163:5 165:22 180:14 198:16,24 203:22 204:16 204:16,21 208:14 218:24 221:3 223:6 229:10 230:11 239:12 240:24 242:6 244:6,24 245:17 248:21 251:18 255:15 256:8 257:3,7 259:2 260:17 261:8,17 264:6 264:13 265:20 272:4 274:19 277:4,22 285:5 286:22 287:14 289:13 292:21 295:15 296:20 297:6
thinking 81:9
third 54:3 110:7 120:3 145:9 230:5 238:13
Thompson 1:14
Thong 251:17 252:8,10
thought 17:2 33:7 64:11 223:4 236:16
thoughts 179:20
thousands 71:16 279:15
three 11:24 12:23 13:2,3,4 13:5,7,12 31:12 37:8 43:6 44:22 52:24 69:8 71:3 86:8 105:6,23 201:23 216:22 216:24 232:8 232:10 245:17 245:18 261:22 268:4 275:9 287:3 288:3 292:18 295:6
thumb 192:23
time 15:9 16:19 17:24 18:1 22:6 26:19 27:21 28:12 29:9 30:15 31:7 33:1,2,6 37:6 41:2 46:4 46:4 48:1 49:23 51:3 55:19 58:5,8 64:17 95:17 118:13 130:21 181:10 202:3,5 236:9 239:9 241:1,24 254:18 258:24 263:22,22 264:15,21,21 265:24 286:23 287:2 288:20 293:17
timeframe 85:5 110:14,16 134:13,16 135:17,18 145:16 193:8
timeline 240:2
times 8:5 29:12 71:4 84:22,23 93:18 105:24 169:1 216:15 242:14 265:7 282:5
timing 248:3
tire 291:14
tired 261:2
tires 52:18 81:11
title 63:22 104:9
titled 104:10
today 6:11 69:19 78:13 106:7 183:23 191:21 207:8 216:2 237:4 270:5 285:11
Todd 27:24
toe 262:15
told 34:23,24 35:1,16 112:21 237:3
tomorrow 297:7 297:9
tons 263:13
tool 107:12,14 108:5,6 201:20
tools 290:20
top 8:11,14 9:6 49:1 70:8,9,12 170:23 254:7 254:16 260:8 262:23 264:22 290:4,5,6,21
topographic 185:16 186:21
topographical 186:24
topsoil 195:11
total 91:7 147:1 164:8
totally 42:8
track 188:11,11
tracks 207:19
trademark 74:14
trailer 54:8
transactions 83:24
transcribed 95:19 298:11
transcript 78:8 298:9
transcription 88:4 95:13,15 95:21 183:11
transmittal 248:15
transported 87:10
trapped 56:4,8
travel 239:6

treat 114:20
treatment 17:7 17:12 179:9
trench 14:22
trend 235:19
trends 236:1
trial 298:7,10
triangle 189:21 189:22
tried 195:18 197:9
trouble 131:22
trough 15:4,6,13 15:17,24 65:17 65:18
troughs 72:12
truck 32:18 54:7 54:8 70:14
trucks 52:17,19 52:21,22 53:7 53:8,14,20,20 53:24 56:6 254:21 255:3 260:20 291:13
true 8:15 112:12 246:5 260:2 298:8
truly 187:24 188:12 194:6
try 32:4 54:5 71:5 125:16,17 126:16,20 150:22 186:6 187:21 236:6
trying 37:22 76:14 100:19 130:22 179:14 257:19
TSS 281:23
tucking 143:6
turn 25:16 27:4 51:9 60:20 117:21 119:2 120:22 135:10 137:18 153:21 158:5,16 160:7 162:3 169:7 175:7 183:12 183:18 188:21 188:24 191:16 198:22 205:23 207:1 209:17 211:15 214:20 216:21 219:5 219:18 221:18 224:9 230:3 232:20 237:1,9 243:1 249:1,1 249:7 250:5,18 253:19 261:1 267:23 275:7 278:2 280:21 281:10 286:11 288:5 292:15 292:17 295:2
turning 20:24 28:10 40:4 110:21 118:5 134:19 168:14 265:23 287:20
two 11:23 12:4,7 12:9,9,11,17 13:4,12 14:3 18:3 19:2,9,10 19:20 21:6 22:13 28:1,14 28:18,19 29:7 45:13 47:22 58:16 90:22,24 92:16 105:1 125:13 129:16 129:16 130:16 151:10,14 154:3 162:21 165:22 174:15 176:15 177:24 178:12,24 180:23 189:14 201:23 207:19 216:19 248:15 253:11 254:1 261:21 263:13 264:5 268:4 271:1 274:4,5 278:15 281:24 284:13 287:2 288:2 289:22 290:9 291:23 292:17 293:2 295:6,16,18
type 52:7,21 86:24 94:16 142:14 194:9 205:7 226:11 282:16 289:5 291:14
types 128:5 217:24 256:1 264:23 271:13 271:16
typically 138:6 251:15

U

Uh-huh 40:8 43:7
ultraviolet 244:17,18
un- 181:11
unacceptable 221:9,13 274:18 280:2
unaware 20:11
uncertainty 184:6,21 185:1 185:7 211:23
unclear 45:22
underdrain 56:24 57:21
undergone 118:10
undergraduate 83:7
underground 21:24
underlying 131:15 143:16 143:19
underneath 35:13 42:10 259:11 289:11
understand 8:23 23:20 30:18 56:15 92:21 100:17 103:8 103:12,13 131:11 172:10 172:24 185:21 198:16 201:4 225:20 239:4 240:2 241:8 243:18 257:23 282:23 287:7 295:16
understanding 8:12 23:15,24 24:10 28:17 31:16 42:7,14 61:20 62:8 64:1 102:19 103:4 114:22 124:3,5 130:21 131:22 175:1 183:7 199:23 200:4,21 205:16,22 212:7 236:3 245:3 287:3 291:16
understands 261:5
understood 92:20 203:20
undertake 31:22
underwent 146:15
undetermined 45:11,23
unfiltered 87:9 94:3 180:23 181:2,9,11,19
unit 6:15 11:23 11:23,24,24 12:2,5,7,9,11 12:23 13:1,3,5 13:7,9,10,11 13:11 18:3,3 51:4 100:1,16 100:19 129:3 129:19,19,23 129:24 130:4 130:11 131:5,7 131:9,12,15 132:7,20 133:1 133:2,13 141:18 142:19 142:20 143:1,3 143:10,12,15 143:17 144:1,3 243:18
units 11:20,22 14:3 99:10,22 129:16,17 130:16 225:5 230:23
University 83:8 83:9,12 215:13 215:18
unlined 10:19 240:21
unpermitted 17:13 66:5
unrepaired 30:17
unusual 240:24 244:11,13
update 217:3 218:16 236:14 280:15,18
updated 182:2 182:11 233:19 237:6,8 238:11 268:21 280:14 280:23 281:1 293:6
updating 233:16
upgrade 251:23
uplift 292:9,12 293:23 294:2,5 294:10,23 295:5
upper 81:1
upwards 25:5 72:1
use 8:3 16:12

17:21 21:3,16 22:3 34:8 52:7 55:8 60:8,19 67:17 70:19 80:9 99:22 101:3 107:8 108:3,9,10,15 137:2 138:8 139:20 157:9 157:14 166:23 170:17 171:22 172:2,10,15 176:10,17 177:9 178:22 179:2 199:6 218:3,22 222:14 239:12 241:6 244:15 249:14,18 256:18 258:18 261:2 266:4,6 270:20 272:4,4 273:9 287:2
useful 172:17,19 172:20,23
usefulness 172:13
useless 8:24
users 278:10,20
uses 172:8 217:14,24 220:8
USGS 186:20,24 187:22,23 211:20
usually 56:4 107:13 137:1 195:10

V

vague 34:13 53:15 55:3,4 55:22 73:16,20 74:6 146:7 190:15
valleys 104:20
valuable 257:23
valuating 100:17
valuation 221:11 285:9
value 102:20 103:3,6,8,11 184:18,24 185:2 255:20
values 105:13,16 106:2 107:23 201:24
variation 112:7 137:1
various 54:19,22 54:24,24 55:12 89:3 92:16 94:5 102:23 104:20 113:1 128:1 142:3 145:7 149:5,20 151:23 154:1 179:1,4 185:17 217:19
Veenbaas 4:2 6:17 7:1,4,12 65:8 69:11 76:3 81:23 212:20 266:21 267:7
vegetation 34:11 35:2,6,14 195:3
vehicles 261:2
vendor 33:2
Veolia 51:9
verbiage 177:1,3
verify 33:6 94:14 261:23
Vermont 2:10
version 171:8 175:13 176:2 176:13,16,21 176:22,24 177:2
versions 182:11
versus 6:8 90:18 91:23 92:18 151:7
vertically 8:18 11:11
vicinity 153:13
view 156:20
violation 66:10 95:10 106:16 107:5 130:17
violations 102:8 107:4
Virginia 217:10
visible 40:19 47:8,9
visited 84:16 161:21
visiting 85:2 152:10
visual 29:2 198:12,14,14 198:15,18
visually 35:17 252:11
voice 10:23 197:12
volatile 179:3
volume 95:20 195:19 197:10
vs 1:7

W

Wacker 2:6
wait 116:11 188:22
waiting 41:19
walk 297:10
walked 198:13 211:1 281:4
Wannier 2:14 4:11,13 111:4 113:23 114:7 115:4 117:1,2 117:9,11 118:20,21 120:15,18 121:24 122:1 128:9,10,14 136:7,8 140:24 141:1,6 144:11 144:15 146:7 148:6 150:7 157:24 158:1 160:19,20 161:4,14,17 163:12,13 166:7 177:15 177:16 179:19 179:21 180:5,8 184:9,19 190:18 194:18 194:20,21 196:11 197:12 197:13,20 198:2,8 203:5 203:21 204:3 204:12,13 208:10,11 209:9,11 211:9 211:10,14 212:13,16
want 6:13 7:12 8:22 14:11,14 18:8 21:3 27:14 35:15 36:14 39:13,16 53:11,13 66:13 66:21 68:19 79:22 88:6 97:8 106:13 108:22 114:5 140:22 161:4 179:19 186:6 188:21 204:2 208:24 220:9 230:2 238:19 238:20 239:4 243:18 246:7 251:24 254:17 257:14 261:7 284:6,20 286:13 290:20 292:5
wanted 9:3 13:18 36:21 38:16 75:17 149:6 166:13 234:24 283:10
wants 79:14 96:6 226:9 251:21 272:4,4
warn 262:11
warning 23:22 24:4,6 25:11 254:7 290:7
Washington 2:11
wasn't 17:22 148:13 176:20 176:22 192:10 231:2 271:8
waste 159:23 170:20,22 177:10 224:23 227:4 256:12 256:18 275:17
wastewater 60:5 60:17
water 6:10 9:1 11:13 14:9,12 14:14,18,20 15:7,22,23 22:2 26:2 27:2 29:3 35:1 41:9 41:17 42:20 54:13,23 55:1 55:16,20,20 56:2,3,8 68:23 68:24 69:3,5,5 69:23,24 70:6 70:20,21 81:16 86:19 87:1 96:22,23 97:3 97:10,24 98:18 98:21 99:2,10 99:19,23,24 100:1,18 101:3 101:9,11,12 102:1,9,22 103:18 104:11 104:15 106:12 108:11,11,18 123:9,10,11,13

123:16,20 125:8,12,14 126:17,20 127:4,5 129:22 130:10,23 131:6,12,14,15 138:4 140:14 143:2,12,13,15 155:24 156:4,6 156:9 157:1,16 167:19,20 185:10,11 186:13 187:1 187:16,21 188:15 189:2 190:7 194:2 200:21 201:10 202:3 204:24 205:8,10,17 212:3,10 225:13,14,17 225:18,19,22 225:24 226:1,8 226:10,16,17 226:19 239:9 264:22 268:5 268:12,13 278:9,14,18 279:3,6,7,7,9 279:15,21,22 280:1,3,7,7,20 287:12,16,17 292:13 293:5 294:8,14,20 295:1,3
waterbodies 97:1 126:18 188:16
waterbody 99:8 99:11 187:10 210:2
waters 186:19 187:17
Waukegan 9:9 23:8,14,17,22 27:20 30:16 31:7 32:20 48:9 52:5 57:24 61:16,21 62:11 70:24 89:6,18 90:9 96:5 104:24 144:6,7,22 145:8,22 146:13,14 147:6 148:17 152:11,16 154:12 157:7,7 161:21 162:1 162:10,15 186:9 187:15 187:17 188:8 206:7 207:7 208:12 268:3 274:4
way 7:23 13:13 18:6 42:17 52:11 54:4,10 61:22 66:23 69:13 70:16 75:21 81:12 122:19 127:17 129:11 142:17 152:7 202:12 250:22 281:20 282:14,20,22 288:19 291:17 295:16
Wayne 27:17
ways 217:19 282:14
we'll 33:21 37:7 49:23 50:9 52:3 79:16 96:22 164:19 175:7 186:6 237:16 272:18
we're 13:16,24 21:21 28:12 39:7,10,17 43:21 46:1 49:7 57:9,11 63:6 65:4 80:16 82:5,6 93:21 101:6,6 108:21 112:8 117:8 124:7 127:19 128:21 132:11,13 140:21 141:1 141:12 142:8 161:12 179:22 180:4 189:9 203:22 204:9 213:5 216:11 216:16 249:15 271:10 278:23 284:7 285:1,4 297:6,6
we've 102:7 112:6 148:10 157:4 162:18 166:19 169:1 175:10 191:19 204:1 216:15 221:2,24 223:9 256:3 260:22 262:6 266:1,21 274:10 281:4 287:21 290:12 291:12 294:17 296:17
weather 29:10 30:2 264:6
weathering 242:10
Webster 2:15
week 71:4 127:23 128:6
weeks 29:7 264:5
weight 225:21 225:24 294:4,7 294:9
weird 294:12
well's 130:12 135:8 145:4 147:11,16 148:1,11 154:15,20 156:23,24 164:12,16,16 165:2,24 166:2 208:15 277:8
well-known 127:8
well-represent... 105:10
wells 86:20,21 86:24 89:15,17 89:20,21 90:2 90:3,4,5,10,10 90:11,18,18,20 92:10,16 93:7 96:11,12,23 97:22 98:1 99:16,19,19,20 101:9,11,15,17 101:21 102:4 102:24 103:1 103:18,22 104:15 108:11 108:18,23 109:3,5,11,13 109:16,17 124:13,21 128:4,5,7 129:4,7,7,23 130:4,9,24 131:3,4,6,8 133:11,12,14 133:16,19 135:7,16,24 136:23 143:2,5 143:9 144:22 144:23,24 145:1,2 147:7 147:11,19 148:1,22,23,24 149:9,12 150:2 150:6 151:11 151:15 153:10 153:14,17,23 154:5,7,12,18 154:20 155:13 155:21,22 156:1,6 164:7 164:9,11,12,15 164:24 165:1 165:23 190:21 202:17 208:16 208:18,20,23 209:6 277:10 277:11 278:20 278:22 279:3,4
went 12:17 13:12 15:9 16:22 17:3,5,6 17:10,11 76:12 122:20 173:23 173:24 191:23 192:13 193:7,8 193:9 244:6 245:4,18 246:10 259:22 263:7 275:12 275:12 277:15 286:21
weren't 67:23 176:1 207:11 258:5
west 14:24 23:8 23:18 28:1,5 28:15 58:3 61:21 62:17,17 63:11 90:13 133:9 142:13 143:4 149:2 155:2 162:18 162:20 164:22 178:16 208:23 210:2 217:10 277:3 288:1 298:21
westerly 131:13
western 143:5 156:9
wet 14:6 15:20
white 24:7
wide 70:15
Wilmette 2:3
window 173:13 199:22,24 200:3
winter 111:16

137:3,3,17
Wisconsin 159:7 159:18
withdraw 48:4
withdrawing 132:12,13
withdrawn 56:22 144:13
witness 4:2,8,15 7:5 10:24 24:17 35:11 45:9 56:23 57:14 61:9 64:8 73:1,9 74:10 76:5,23 77:23 78:14 80:17 82:15 88:21 119:9 121:4 130:8 150:12 184:13 184:14 196:9 197:16 198:6 203:3 212:21 213:6,7,14 219:10 233:1 234:4 235:14 298:13
woods 137:2
word 17:21 177:3,3 230:9 267:15
words 98:8 175:16 259:19 259:21 260:24 269:7
work 27:19 34:9 47:22 51:9 52:12 77:14 82:24 83:19,20 83:21 85:3,15 85:16 149:1 178:24 179:12 182:12 220:20 261:23 270:17 280:6
worked 77:2 78:1 217:9 219:16 245:2 261:21
working 47:21 51:11 179:7 202:11 208:21 291:3
world 73:10
wouldn't 93:13 186:2 187:3 201:7 287:15
wrapping 297:3
write 66:4
writing 27:22 60:10
written 171:6
wrong 15:12 132:8 184:10 191:4
Wyoming 266:16 271:11

X

x 4:1 5:1 7:9 45:3 65:6 72:10 82:17 152:14,16 180:7 209:13 211:13 213:16 230:23
XI 230:23

Y

Yakima 254:1
yard 137:5,13 207:17
yards 52:24
yeah 9:11 20:12 20:15 34:11 45:11 48:20 53:16 58:21 59:5 71:15 94:13 114:7 115:9 132:13 135:21 171:2 190:16 192:19 203:1,24 209:1 211:10 247:15 248:10 264:24 271:10 280:5 282:21 284:12 291:8 293:14 296:12 297:2
year 29:10,12 78:3 84:19,22 84:23,24 115:24 116:1,9 118:4 120:1 171:5 263:14
year-old 285:3
years 16:7 18:7 22:18 37:9,24 43:6 44:22 79:10 118:11 121:17 122:22 123:6,7 179:7 194:14 216:10 243:13 245:6 251:2 257:4,20 284:22 286:17 293:16,21 294:19 295:15 295:16,18,20
yellow 156:18 156:21
yesterday 6:12 23:8 25:17 29:6 37:8,23 52:4 53:12 262:18
youngest 240:4

Z

Zone 107:10,11 108:1 139:19 166:22 167:2 202:4,8,10
Zones 107:7

0

0.12 105:21
0.13 138:23
0.36 105:22
0.7 106:3
01 41:22
02 109:18
03 109:18
04 109:18
05 109:18
06 109:18
07 109:18
084-004675 3:10 298:23
09 109:18

1

1 102:1,9 106:12 107:16,19,21 107:24 138:3 145:4 148:11 154:20 164:12 165:2 167:5 175:15 200:15 201:10,17,24 202:11 205:12 205:16 273:23 277:12 279:9
1.0 139:1,9
1:10 141:5
1:15 141:13
10 3:3 147:12 154:15 156:23 156:24 165:2 208:16,19
1000 2:10
1004 2:3
103 27:5
105 35:20
106 48:13 50:8
11 31:11 33:20 109:5 147:12 152:14,16 154:15 164:16 165:24 166:2 208:15 281:6
11/1/15 42:6
1100 2:11
115 5:10
117 5:11
119 5:12
12 21:1 28:13 33:21 50:8 66:24 130:13 147:14,15 148:11 154:15 164:8,16,17 165:24 166:2 208:16,19 281:10 283:5 289:8,14 290:1 290:5,17
12-inch 289:13
121 5:13
12812 158:12
12th 49:4
13 9:17 50:8 75:1 148:12,13 207:11 208:5 208:13,19,20
13-15 1:5 6:9 9:10
13-15_12811 158:17
13-15_12812 160:8
13-15_19475 118:6
13-15_19483 119:5
13-15_44147 120:24
13-15_45817 151:21
13-15_49565 168:1
13-15_49568 168:15
13-15_62326 100:23
13-15_62473 164:5
13-15_62538 132:10
13-15_62540 132:21 141:19
13-15_6675 209:18
130 5:14
1300 2:15

134 5:15
136.9 241:14,17
14 9:20 21:1 34:20 68:21 130:13 147:12 148:11 154:15 156:23,24 206:8 208:16 216:9 266:2 286:18
14527 61:13
14528 63:10 206:3
15 130:13 147:12 154:16 208:16 287:20
15-minute 204:2
16 28:13 38:2 40:19 41:5 42:10 44:24 47:6 137:20 139:5,6 144:24 148:11 154:21 207:22,23 288:6 289:7 295:9
1600 2:7
16th 115:22
17 41:4,7 42:22 45:4,16 135:18 289:18 291:19
18 66:23 68:21 79:18
18-D 19:2
180 4:11
18th 47:6
19 68:22 129:7
19-D 9:5 13:15 13:17 151:18 153:6
1920s 240:3
1960's 10:8
1961 63:15,23 206:6,23
1965 240:4
1970s 240:7
1974 162:8
1977 240:20
1978 240:17
1985 171:17
1994 257:6 258:1
1998 284:14
1999 67:16 243:1
1N 65:10 66:1
1st 1:15 6:11

2

2 175:15,15 209:17 277:8
2,500 278:18
20 66:22,23 68:22 79:2 204:1
20005 2:11
2002 85:4
2003 85:5 244:12 245:10
2004 158:10 170:24 171:7 171:16 173:10 176:15,21 234:21 268:22
2007 298:21
2008 289:23
2009 115:12,19 115:20 223:15 278:16
2010 86:3,5,9 93:8,10 110:18 115:12,22 125:20 134:17 145:19 223:16
2011 110:6 115:12 116:6 171:17 218:13
2012 85:17 95:7 118:2 134:3 145:9 165:5 171:10,17 173:8,20,21 175:24 176:9 176:18 199:3,7 199:15,17,19 218:13
2013 26:14 110:7 119:13 119:15,21 121:13 134:5 145:10 162:12 165:7 206:8 209:21 243:1 265:24 266:1
2014 49:4 121:9 121:10 175:11 236:17
2015 20:19 31:4 36:6 40:13 44:18 46:4 110:8 122:7,11 134:6 135:19 139:3 145:11 165:8 223:10 228:8 229:2,15 229:20 233:14 236:23 241:11 280:10 288:14
2016 110:10 122:14,17 134:8 135:22 145:12 165:10 191:22 235:20 286:17
2017 1:1 38:2 86:10 93:10 97:21 110:11 110:18 132:24 134:9,10,18 135:19,22 144:20 145:14 145:19 146:5 146:12,23 164:1,2 165:11 182:4 193:4,9 193:11,13 236:19 237:6 238:11 281:21
2018 1:16 6:11 6:13 297:8 298:15
202 2:12
209 4:12
20th 20:19 31:4
21 66:24 74:19 75:1 79:2 166:1,1
2101 2:15
211 4:13
213 4:17
21342 224:11,12
21404 230:3
215 5:16
21500 232:5
216-I 147:20
219 5:17
21st 119:15
22 79:2
220-I 147:20
229-K 147:21
22nd 116:5 158:10
23 75:1
232 5:18
233 5:19
234 5:20
235 5:21
235.5-K 147:21
23620 59:9
23rd 44:18 46:4
24.5-E 134:2
243-M 110:6
244-M 110:8
245-M 110:9
246-M 100:23 109:8 110:10 183:13
248 113:5 114:3
248-N 113:20 114:4
249 113:5
249-N 113:20
25-E 110:5
250 113:5
250-N 113:20
251 113:6
251-5255 3:4
251-N 113:21
256-O 134:4
257-O 134:6
258-O 134:7
259-O 134:8
26 20:24 66:21 183:21
260-O 132:9,21 134:10 141:18
263-4453 2:12
264 5:8 60:22 61:2,7 206:1
267-P 145:9
268-P 145:10
269-P 145:12
26th 115:18 118:2
27 66:21 86:13 93:11 126:23 127:2,11,12
270-P 145:13
278-Q 165:6 209:16 211:15
279-Q 165:7
280-Q 165:9
281-Q 163:17 164:4 165:11 188:22
282-9119 2:4
284 167:23,24 168:7 169:8 173:17
28th 40:12 42:15 121:9
29 47:13 84:21 89:5 96:5 97:13 108:23 108:24 109:3 109:20 110:4 111:12,13 112:3,12,22 122:8,24 123:19 124:13 124:20 127:1 127:19 136:19 183:22 202:17 210:14 235:19 269:2,4 275:10

275:21 286:12 286:16 296:18
29-E 145:8
2nd 297:8
2S 58:13

3

3 221:23 277:8
3:00 204:11
30 47:12,12,13 57:4 62:20,20 286:17
30-E 165:5
31 1:1 47:13 137:21,21
312 2:4,8 3:4 298:22
31st 6:13
32 137:21,22
33 135:10
34362 249:2,23
34370 250:5
34378 250:18
34388 250:23
34389 251:11
34392 253:1
34393 253:3
34422 253:19
35 2:6 135:11
3600 3:3
362 249:3
38 5:5
3987 169:2 171:4
3987-12 173:10
3987-85 173:9
3S 58:6

4

4 79:3 104:5,10 145:5 154:20 171:21 175:19 176:12 277:8
40 217:19 229:9
405 104:3,6
406 224:2
409 174:16 175:7,18
410 174:16 176:7
415 2:16 169:11 221:2 275:23 275:24
419-9292 298:22
44 5:6
4458 49:7
447 142:9
45813 9:8,11
45814 9:23
46 5:7

5

5 67:15 80:1,2,4 145:5 151:20 154:15 219:21 219:22
5-1 234:13,15,19 268:19
5.4.2 221:20
5/3.135 169:11 221:3 275:23
5/3.94)a-5(B) 275:24
50 284:22 285:2
50-year 284:19
500-year 294:13
50260 219:18
50263 221:18
504 184:18
505 98:12 291:23
505.5 293:6
506 291:23
510 248:8 255:6 255:6 259:22
516 292:4
517.5 293:7
55-gallon 178:23
552 233:17
5739 19:4
579 210:7 211:17
5th 144:20

6

6 111:15,15 130:13 145:5 154:15 164:13
60 40:5 243:22 256:3,5,11 290:3
60091 2:3
605 58:18,20
60601 2:7
60603 3:4 298:22
60892 39:11,15
60899 39:18
60900 39:18 40:5
60901 39:18 41:23
60902 39:18 41:23 42:2
60942 44:15
60943 44:16,17
61 5:8
620 43:14
62326 183:19,20
62473 188:24
62539 132:10
62540 132:17
65 4:5
667 178:6,9
6675 211:16,16
6th 36:6

7

7 4:4 21:2,2 104:5 145:5 154:20 164:16
70s 76:11 77:3 79:11 80:5
711 137:8
72 4:6
720 5:5 38:9,11 39:9 43:10,16 43:18
721 5:6 43:22 44:2,15 46:10 46:14
722 5:7 46:16,20 48:4
75 241:13
78 240:20 287:9
79 31:9 34:19 68:20
795-3712 2:8

8

8 67:15 79:23 130:12 147:16 148:1 152:14 152:16 154:15 298:21
80 33:20 284:22 285:3
800 114:21 115:5,14,15 116:13,16,22 117:10
800-802 5:10 115:3
801 114:21 115:5,14,21 116:16,23 117:10
802 114:21 115:6,14 116:4 116:13,16,23 117:10
803 5:11 116:10 117:18,22 118:18,24
804 5:12 119:3,7 120:14,18
805 5:13 120:23 121:2,22 122:4
806 158:6 160:17 161:17
807 162:4,13 163:10,15
808 169:13 171:23 175:20 177:5,13,18
809 88:8,16 89:1 89:5 91:19,23 96:14 110:22 110:24 111:3,6 166:12 180:15 181:23
809-812 5:9 88:12
810 5:15 88:8,16 89:5 91:19 96:14 134:20 134:23 135:4 135:11 136:1,5 136:10 137:19 166:13
811 88:8,16 89:6 91:19 96:14 145:24 146:1 147:4 148:2,5 148:8,20 166:13
812 88:8,16 89:1 89:6 91:19,23 96:14 145:22 165:15,20 166:3,6,9,13 180:15 181:23
813 5:14 9:13 130:3,6 132:14 144:9,13,18 154:11,23 155:15 157:19 157:22 158:3 207:2,2
82 4:10
85 171:5,7,8,15 173:18 175:11 199:4
87 28:10 199:4 199:15,18
88 5:9

9

9 33:21 136:20 147:16 148:1 154:15
9-040 1:14
9:00 1:16 297:8
900 5:16 214:21 215:2

901 215:22
237:2
902 5:17 219:5,6
219:8
903 5:18 232:21
232:21,23
233:20 236:13
241:12
904 5:19 233:5,8
233:15,18
905 5:20 233:22
233:23 234:2
906 5:21 235:9
235:12
907 280:21,22
94612 2:16
977-5637 2:16

Exhibit 30

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THE ILLINOIS POLLUTION CONTROL BOARD

SIERRA CLUB, ENVIRONMENTAL LAW & POLICY CENTER & POLICY CENTER, PRAIRIE RIVERS NETWORK AND CITIZENS AGAINST RUINING THE ENVIRONMENT,	)	
Complainants,	)	
vs	)	No. PCB 13-15
MIDWEST GENERATION, LLC,	)	
Respondent.	)	

TRANSCRIPT FROM THE PROCEEDINGS

taken before HEARING OFFICER BRADLEY HALLORAN by LORI ANN ASAUSKAS, CSR, RPR, a notary public within and for the County of Cook and State of Illinois, at the James Thompson Center, Room 9-040, Chicago, Illinois, on the 2nd day of February, 2018, A.D., at 9:00 o'clock a.m.

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I N D E X

PAGES

Opening Comments by Hearing Officer... 5 - 7
Direct Examination of Mr. Seymour..... 7 - 129
Cross-Examination of Mr. Seymour..... 129 - 205
Public Comment by Ms. Shanley-Roberts..206 - 211
Public Comment by Ms. Flores.....211 - 215
Cross-Examination of Mr. Seymour.....216 - 312
Redirect Examination of Mr. Seymour....312 - 326
Recross-Examination of Mr. Seymour.....326 - 330
Briefing Schedule.....330 - 332
Court Reporters Certificate.....333 - 333

E X H I B I T S

	Marked	Admitted
Respondent's Exhibit No. 900		129
Respondent's Exhibit No. 901		129
Respondent's Exhibit No. 902		129
Respondent's Exhibit No. 903		129
Respondent's Exhibit No. 904		129
Respondent's Exhibit No. 905		129
Respondent's Exhibit No. 906		129
Respondent's Exhibit No. 907		129
Respondent's Exhibit No. 908		129
Respondent's Exhibit No. 909		129

HEARING OFFICER HALLORAN: Hi. Good morning, everyone. My name is Brad Halloran. I'm also a hearing officer with the Illinois Pollution Control Board. I'm assigned to this matter entitled Sierra Club, Environmental Law and Policy Center, and Citizens Against Ruining the Environment, complainants versus Midwest Generation, LLC, Respondent. It's docketed as No. PCB 13-15. It's an enforcement, water.

Today is February 2, 2018, Groundhog Day. This is continued on record from February 1, 2018. That was yesterday.

At present, we have Mr. Seymour on the stand under direct by Ms. Nijman from Midwest. I think we should introduce everyone again starting with Mr. Wannier.

MR. WANNIER: Yes. My name is Greg Wannier, attorney for Sierra Club, representing complainant.

MS. BUGEL: Faith Bugel also representing complainant, Sierra Club.

MR. RUSS: Abel Russ, representing complainant, Prairie Rivers Network.

MS. NIJMAN: Jennifer Nijman and Kristen Gale for Respondent, Midwest Generation.

HEARING OFFICER HALLORAN: Thank you.

And I do want to note for the record I do have an Anad Rao from the technical unit here and also attorney advisor Jason James.

With that said, Mr. Seymour, you can raise your right hand and Lori will swear you in.

THE COURT REPORTER: Do you swear the testimony you are about to give will be the truth, the whole truth, and nothing but the truth, so help you God?

THE WITNESS: I do.

(Witness sworn.)

HEARING OFFICER HALLORAN: Thank you.

Please proceed.

WHEREUPON:

J O H N S E Y M O U R, P.E.,

called as a witness herein, having been first duly sworn, deposeth and saith as follows:

D I R E C T E X A M I N A T I O N

by Ms. Nijman

Q. Mr. Seymour, yesterday when we left off with our discussion, we were in the middle, I believe, of talking about the Joliet site.

Do you recall that?

A. Yes.

Q. Okay. And I believe you had said yesterday that you had looked at, as part of your overview of all the sites, but specifically now as to Joliet, you had looked at groundwater elevations and groundwater flow.

Do I have that correctly?

A. Yes.

Q. If you would, turn to Slide 19.

A. Okay.

Q. Now, we heard Mr. Gnat describe the location of these monitoring sells.

Did you agree with his description of the wells and the locations

they were placed?

A. Yes, I do.

Q. And this map on Page 19 accurately reflects the location of those monitoring wells?

A. Yes, I believe so.

Q. And Mr. Gnat also talked about these upgradient versus downgradient.

Did you agree with his assessment of Monitoring Wells 11, 10, 9 and 8 as upgradient -- excuse me -- 11, 10 and 8 as upgradient?

A. Yes.

Q. Did you independently establish groundwater flow for all of the sites?

A. Yes, I did.

Q. And did you also review Mr. Gnat's assessment of groundwater flow?

A. Yes, I did.

Q. Do you agree with his process for developing groundwater flow as he described it?

A. Yes.

Q. Now, you heard Dr. Kunkel say that

he was concerned that there could be higher unseen levels of groundwater in between sampling events at Joliet.

What is your opinion on that point?

A. Well, I think it's somewhat theoretical. We've got 26 or 27 quarters, over seven years of data, and that -- I believe that the data -- the groundwater data that we have is -- is very thorough and excellent and we haven't seen that large of a swing that he im- -- implied. So I don't see that in the -- in the facts.

Q. And what, if any, is the impact of the Des Plaines River on groundwater flow at the site?

A. Well, there's a direct connection because the groundwater flow is into the surface water and the -- where -- the level of the surface water is the discharge point so groundwater will flow to the lowest point.

So when you have a surface water body and you have groundwater levels, you intuitively will think the water will

flow to the surface water.

Q. And you say "intuitively."

Is that a known principal? Is that an accepted principal?

A. Well, no. It's just I've done this so often. You -- you sort of know it, but it's physics. It's groundwater hydraulics.

Q. Now, Dr. Kunkel seemed to suggest that there could be flooding of the Des Plaines River that could rise and fall impacting the wells.

Do you agree with that assessment?

A. The -- the surface water can rise and fall and it will affect the groundwater and it's been measured over the -- that impact has been measured over the years.

Q. Would you explain that it affects -- what do you mean that it affects the groundwater?

A. When the surface water comes up, the groundwater will come up. I know that in some of the reports that Dr. Kunkel -- he explained the gradient reversal and Rich

did that yesterday.

The gradient reversal is more immediate to the edge of the river. It does not go back into the site that much because again, this is a pressure response. So the water doesn't flow from the river to the wells.

The water pressure rises and the gradient, meaning the direction flow, really kind of mimics that rising and falling and it only reverses a short-term near the river.

And as the testimony of Mr. Gnat yesterday, and I agree with Mr. Gnat, we haven't seen gradient reversals in all those 27 quarters. I have sites that it happens and you do see it, but not here.

Q. Dr. Kunkel originally stated in his report, although he didn't testify specifically about it, so I don't know whether that opinion stands, but let's talk about it.

He originally stated in his report that there is mounding from a pond at Joliet 29.

Do you agree with that opinion?

A. I disagree. Dr. Kunkel referred to mounding around Monitor Well 9. And as I stated in my report, and confirmed with further data, that he selected the highest water level of 9, and then compared it to approximately upgrading into Monitor Well 8.

And if monitor -- the water level of Monitor Well 9 is higher than Monitor Well 8, his conclusion was that would be mounding and it was sustained. I think some would have to agree, but what we find is that for the vast majority of the data, Monitor Well 9 is lower -- the water level is lower than in Monitor Well 8 and mounding does not occur.

So there may be some short-term effects, but remember, it's hard to tell. This is a very flat site. The groundwater elevation across the site might -- it's -- a couple thousand feet might vary about a half a foot to a foot. So that's really flat.

What that does is any measurement that you make becomes critical because you can measure to about an eighth of an inch or a quarter of an inch or a water level indicator. It's not that exact. And so if you're talking about a half an inch difference between wells, it's obviously within -- a measurement error. So I don't agree that mounding is occurring.

Q. Thank you.

If you would turn to page -- Slide 20, we heard Mr. Gnat talk about the groundwater flow direction and I'm showing you a depiction -- the depiction that he reviewed yesterday about depiction of groundwater flow at Joliet.

Do you agree with the flow direction towards the river as indicated on this slide?

A. Yes. He's indicated in the red lines flowing toward the river. And as he said, the flow lines are perpendicular to the equipotential lines or the elevation lines that are the -- the blue lines.

Q. Now, earlier you stated that you conducted a comparison of ash data from the ponds with groundwater data.

Do you recall that?

A. Yes.

Q. And I think you also told me that that was a common standard or common type of comparison that you do in your field?

A. Yes. Every site where you have some impact to the groundwater, you're going to compare it to some source of data and that's what we're doing here. It's the same thing.

Q. And did you have the opportunity to make that comparison for Joliet?

A. Well, at -- at Joliet, we had -- I used the data from other sites. We have -- for the ash data, and so that -- we had had very consistent readings from all the different bottom ash -- well and Waukegan and Powerton to say that we were looking for barium, boron sulfate and TDS.

Q. And I think you said yesterday, because all of the stations were burning

the same coal in the same way, that's why you combined those?

A. Yes, exactly.

Q. If you turn to that next page, Page 21 of the slides, what is this table?

A. This is a data -- a presentation of the comparison of the constituents on the left that were found in groundwater and the next column is the constituent that we look at in leachate from ash that had been stored in the -- in the ponds.

And you can see where it says barium, boron and sulfate here, is what we're -- what we're focusing this table on. Then across, you see each monitoring well. So we -- we've looked at, you know, a year's worth -- the most recent year's worth of data to evaluate what was found in each -- each well, each constituent, and where you see the dark shading, that's where that -- the result was inconsistent meaning what was found in the groundwater was inconsistent with what was found in the ash leachate.

That goes to what was -- if it

was inconsistent, it was because something in the groundwater was not in leachate or something that is in leachate is not in groundwater.

And so we summed to the number of times that the data were inconsistent and then calculated a percentage. And at the bottom, you see that the percentage's range sort of focused mainly around 40 to 60 percent inconsistent. When it's inconsistent, the conclusion what we made is that what's in the groundwater is not -- the data is not consistent with what's found in the ash.

Q. And turning to the next page, there is an additional updated Table 5-4. I should say on the prior page, Page 21, updated Table 5-5, is that Table 5-5 from your expert report?

A. The expert report relied on previous data. This includes all of the updated -- the updated data obtained through the second quarter of 2017.

Q. And same for Page 22, the updated Table 5-4, is that updated with the additional 2017 data?

A. Yes. This is the same presentation with the updated groundwater data.

Q. And why did you --

MR. RUSS: Can I ask for a clarification? I'm sorry.

It says from '16 --

HEARING OFFICER HALLORAN: Let's hold on. Ask me and then go ahead, Mr. Russ. Objection?

MR. RUSS: Objection. Misstates the exhibit.

It looks like this data is from 2016 to 2014. So it's not the 2014 updated through 2017?

MS. NIJMAN: I can ask the witness --

HEARING OFFICER HALLORAN: You can clarify that. All right. Thank you.

BY MS. NIJMAN:

Q. Mr. Seymour, would you explain what data -- which years of data are included in this exhibit?

A. Yes. It begins -- it covers four quarters of data beginning in the third

quarter of 2016 through the most recent data that has been admitted to this hearing, the second quarter of 2017. So that is the updated data. It does not include the previous data.

Q. And is that the same for the next slide, Slide 22?

A. Yes, it is.

Q. So your prior charts in your report deal with the pre-2016 or up to your report, the date of 2015, correct?

A. What we agreed to do is that we would have a full calendar year representing all the seasons in 2014. So that data ended December of 2014.

Q. Thank you.

Now, this Table 5-4 on Page 22, what did you do here? Why -- you site to EPRI.

What does that mean?

A. That's the Electric Power Research Institute. It's an independent corporation that does research for the power industry and they had conducted research at many different facilities as to what could be found in leachate

from CCRs. So we took their data, which is -- and again compared their data to what was found in groundwater and so you had a dozen or so constituents in groundwater and compared it to the dozen or so constituents identified by EPRI.

Q. And did you do that, as you said yesterday, as a sort of a backup to the site data?

A. Yeah. As I mentioned yesterday, if we start with the site-specific date, that's the best data. And when we go to the lit- -- this is basically a literature study and research. You go to that as a backup or a corroboration to make sure we -- we're on target with our conclusions.

Q. And did it corroborate generally?

A. Yes, it did. We followed the same process and that -- at the bottom, you see the percentages. They're still maybe the 50 to 60 percent consistent. So actually, it's a little more -- I'd say, on average, it's a little more inconsistent with the EPRI data than with the site data.

Q. And when you --

A. But essentially, it's the same conclusion.

Q. When you say it's inconsistent, do you mean there are constituents in either the ash or groundwater that don't match the other ash, the ash that's in the EPRI report?

What are you saying?

A. Yeah. The groundwater constituents found at the site are inconsistent with the ash data constituents. As I said, that inconsistency is either when you find something in one and not the other or you don't find something in one, but you find it in the other. That's what we define inconsistent as.

Q. If you would, turn to the next slide, Page 23, of the binder in front of you.

A. Yes.

Q. That's been marked as Exhibit 901 in the hearing here. Turning to what we've been calling the historic ash filled areas at Joliet,

does this -- we've heard a lot of descriptions about the areas. Does this map on Page 23 accurately depict the known former ash filled areas that are at Joliet?

A. Yes.

Q. And is there any groundwater monitoring -- are there any groundwater monitoring wells in the areas of these historic ash?

A. No.

Q. Now, the map says on the left side -- there's a green circle that says "Former Ash Placement Areas Sample 2005."

A. I see it.

Q. Is that part of the ash sampling that you reviewed in this case?

A. Yes.

Q. And again, what was that ash sampling?

What was the purpose of that sampling?

A. The series of borings were obtained and sampled and analyzed to evaluate whether it could be beneficially reused.

Q. And what were the findings?

A. The findings of that initially was that they found, I think, one out of about 15 borings had some elevated levels. So they came in and they removed that. So the -- having removed, I'll call it the higher concentration area, KPRG did a calculation -- a statistical calculation that basically concluded -- and I've looked at the date also. They concluded that it met Illinois statute for the chemical constituents for groundwater reuse and it could be beneficially reused.

Q. What is your opinion as to whether the historic ash from these areas of Joliet are impacting groundwater?

Is there any evidence?

A. I -- I do not see it. I don't -- I don't think it's impacting ground- -- it's not impacting the groundwater.

Q. Now, do you recall what Dr. Kunkel said about a possible southwesterly flow from the northeast area called alleged former ash placement area and that he believed there

could be some southwest flow of groundwater towards the monitoring wells impacting those wells?

Do you agree with that?

A. I think that's an exaggeration that he's presented. In the hydraulics of groundwater -- which is, of course, I've had as a practice for many decades -- the groundwater will flow to the river, but there is a slight, I'll call it, angle. And so there's a very slight southwest angle, but it's -- I'll call it a factor.

You know, like a vertical and horizontal component. And that component down river is very small. When you look at the contours that I would expect, the water will not flow from that site to impact the monitoring wells that we have seen around the ponds at Joliet.

Q. And when you say --

A. And the nearest well is Monitor Well 1.

THE COURT REPORTER: I'm sorry. Repeat that.

THE WITNESS: The nearest well

is Monitor Well 1.

BY MS. NIJMAN:

Q. When you say "that area," are you're talking about it wouldn't flow from what we've been calling the northeast area marked on this map as alleged former ash placement area?

A. Correct.

Q. This slide also identifies the area of the Groundwater Management Zone.

Can you describe where that is on this site?

A. The Groundwater Management Zone is marked in the green hatching that basically surrounds the ponds and it goes from the upgradient area all the way down to the intake canal, which is the Des Plaines River.

Q. And are all of the monitoring wells within that Groundwater Management Zone?

A. Yes, they are.

Q. Are ground management zones a standard practice in Illinois in site investigations?

A. They are -- they are common. They are not necessary as a standard practice, but

they are common and it's well -- well used in Illinois.

Q. Is it statutory or regulatory?

A. Yes. It is codified in both the 740 regulations and in the 620 regulations. One is for what we call TACO, Tiered Approach for Corrective Objectives, and then the 620 is the groundwater rules in Illinois.

Q. Now, earlier when you were describing your various reports and notes in this case, you stated that you had some notes of a temporal trend analysis.

Do you remember that?

A. Yes.

Q. And I think we've referred to them at what's been marked as Exhibit 906 in your binder.

What is a temporal trend analysis?

A. Temporal is meaning over time. And so what we looked at over time, the groundwater data, how it fluctuated from the chemistry perspective, in other words, from the early sampling throughout time until the most recent

sampling, how did the individual constituents vary in the individual wells.

Q. Looking at Slide 24, titled "Updated Groundwater Constituent Temporal Trend Testing Results Joliet 29," do you see that?

A. Yes.

Q. What is this slide showing?

A. This is a summary slide where -- for the analysis. We used a linear regression analysis, which is a mathematical that is used in an Excel spreadsheet with the appropriate QAQC. We identified the monitoring well, for example, at the top left as MW-01. It says trend direction decreasing and it gives a slope, which is the concentration per year, the change per year.

And in this case, it's a negative slope. And conclusion was that that line that was simulated by the data is a decreasing slope, meaning a decreasing concentration.

Q. And is this data updated to the -- again, the second quarter of 2017 data?

A. Yes. And this data includes all

the data from beginning of the sampling through the second quarter of 2017.

Q. Now, when Dr. Kunkel was testifying, he showed us charts of boron and sulfate at each well.

Do you know how he did his trend review?

A. Well, he sat through his testimony last fall. He went site-by-site with a graph of the data for each of the components -- constituents looked at over time and he basically concluded by eyeball this is increasing or decreasing or not changing.

Q. And how is your method different than eyeballing?

A. Well, this method is a mathematical method and it's an objective method. There's no subjective influence. When you base it on eyeballing, it's subject. There is maybe an inherent bias. So this takes out that bias and is a more objective method.

Q. Now, Dr. Kunkel criticized your notes here as not being Mann-Kendall or not normalizing the data.

What is your response to that?

A. Well, I -- I find it rather ironic because he is criticizing a mathematical method in favor of a subjective eyeballing method and he's compared it that I didn't use another mathematical method when he didn't use any mathematical method.

And I'm familiar with Mann-Kendall. It's another tool, another way to compare it. It doesn't make it any better or worse. It's actually used for maybe a little different application.

What we're looking at here is the long-term trend as to what's going on and it's -- it's just to get an idea at the site in general as to what's going on.

Q. And if you turn to the next slide, does this present your conclusions as to the updated trend analysis at Joliet?

A. Yes. This is the Joliet trend. If we look at the top chart, it's a summary for each of the four constituents we looked at and you can see, for example, I'll just go through

one line, the increasing trend, barium is increasing at two wells, boron is increasing at two wells, manganese is increasing at one well and sulfate is increasing in two wells.

So at the bottom, when you look at the overall conclusion, it appears that the concentrations are slightly decreasing because mainly, that the indicators that are decreasing are three wells to six wells. The ones that are increasing are only one to two. The ones that are no conclusion made are three to six.

So in general, that middle group that it's decreasing and so they're getting slightly better based on this overall trend.

Q. And when you did the trend analysis, you didn't compare it to a standard, per se? You just looked at whether it's going up or down?

Do I understand that correctly?

A. Yes, you do.

Q. If you would, turn to what's been marked as Exhibit 908, Tab 908 in your binder.

A. Yes.

Q. So you may recognize this document from Dr. Kunkel's testimony.

Can you explain what it is?

A. On the left are the charts that he -- base charts that he used that was submitted prehearing. On the right, it's a representation of boron concentrations. Overall, I believe this is Monitor Well 1.

In the middle of this note is testimony, what he stated, in that he stated in this data are decreasing and at the bottom, you can also see he's got the red line that represents the back -- his representation of back run for boron.

Q. And on this chart in the orange color, this is -- it stays standard boron level two, so that's the class one standard --

A. Yes.

Q. -- being shown?

A. Yes.

Q. Now, we heard Mr. Gnat talk about this a little bit -- Dr. Kunkel, you said, relied -- compared the data at Joliet and

the other sites to background here, correct?

A. That's what he said.

Q. And what is your opinion of using -- well, Mr. Gnat explained that that background was based on community water levels or community water supplies throughout the state of Illinois.

Do you recall Mr. Gnat saying that?

A. I do.

Q. Did you -- do you agree that that's how these backgrounds are Dr. Kunkel created?

A. The data that he used to present this median value are from the community water -- water wells, yes.

Q. And what is your opinion of using the community water levels as a background?

A. Well, a couple things. They're not site-specific, number one. That's the first thing you look at because I think as we learned yesterday, there aren't that many well -- community wells near the site.

So first, you look at site-specific wells. That's my first objection. That's not site-specific.

If you want the second part, I will give you the second part. That is, what he's done, for example, for boron, he uses a median value of .12 as background. He represents it as the data used by IEPA and that's just not true.

He also -- if you look at the group document that he has, which is one of the exhibits that is presented or attachments to his reports, he gives a diagram that shows the median value, as Rich mentioned yesterday, the number -- the value, which half of the numbers are greater than the median, half of the numbers are values that are less than.

It doesn't represent what the Illinois EPA expects, which is a statistical representation. And on the diagram, they put 75th percentile level of confidence and a 90th percentile level of confidence. What that is that is statistical calculation. It takes all the data and says if the value we measure are less than a level of confidence saying, like, for example, a 90 percent confidence level, if it's that number you're 90 percent sure that it

is within that background range.

And conversely, if it's above that number, you're sure that it is above background. But if it's within that range, it's within the background range. It's not above background. But that's comparing it to the community wells.

To really, what Illinois EPA says is that it has to be a statistical evaluation and he did not do that. He just picked the median, which is -- which is meaning that no matter what you meant, almost no matter what you measure, even if it's not impacting groundwater, half the values can be above and half the values can below. So it's not going to be an accurate representation of background.

Q. And just so we have the record clear, in Mr. -- Dr. Kunkel exhibits that are in front of you in the binder, would you turn to what's been marked there as, I believe, Exhibit 405 --

A. Okay. Yes.

Q. If you turn to the document, Page 27, it's got a Bates number on it.

A. It does. Yes, Bates 019094.

Q. And on that page, under the heading "Determining Background Values," the second sentence says, "Background refers to the concentration of chemical constituents migrating through the groundwater towards the regulated unit upgradient whether they are of natural or anthropogenic origin. Background also refers to the existing concentration of chemical constituents migrating in groundwater away from a regulated unit (downgradient)."

Did I read that correctly?

A. Yes.

Q. So what is that saying?

What does that mean to lay speak?

A. This means that for the purpose of this rule, which is a rule for Illinois for CCR units --

Q. The proposed rule, do you mean?

A. Excuse me, yes, the proposed rule.

It's -- they say what's in the groundwater, if it's not caused by the

unit, it's considered part background. So anthropogenic means by man, caused by man. So there can be other constituents in the groundwater that can be represented -- that can be present that aren't -- what we would often call background from broader perspective of unimpacted water.

So the rule in Illinois -- the proposed rule in Illinois considers this, how you determine background, and I think it's very much in line with this whole process we've followed here for the past eight years, since 2010.

As Mr. Gnat pointed out yesterday, for the purpose of this study, the background is what's in the upgradient wells if it's not from the source.

Q. Now, we talked just a second ago about the upgradient wells of Joliet and I think we said eight, ten and 11; is that right?

A. Monitor Well 8, Monitor Well 10 and Monitor Well 11, yes.

Q. And did you review the boring logs

for those wells?

A. Yes.

Q. Do you know whether those three upgradient wells are installed in ash fill?

A. Those monitor wells are not installed in any kind of ash fill nor any other monitoring well nor are the historical borings conducted in 1998.

Q. Now, Dr. Kunkel concluded that they were installed in ash fill.

Do you know why he made that conclusion?

A. I believe, in all fairness, the documents that have been produced in this process that had Joliet 9 borings logs included with Joliet 29 power plant and that some of those logs had ash in them, but clearly the Patrick reports, which documented the installation of monitoring wells did not have ash.

So I think he was confused in what he found historically versus what was actually found at the site because the incorrect boring logs were attached to the

original report.

I had identified that very early. I told my staff engineer to look harder and we were able to find the correct boring logs.

Q. And, in fact, Ms. Race, talked about those correct borings logs?

A. I believe so.

Q. And just turn quickly to Maria Race, Exhibit 604, are these the correct borings logs, just for identification?

A. Yeah. At this top, it says "Location Joliet 29 for Boring Log 1." I'm sure if we go through here, they will -- they will all say at the top Joliet 29 Power Station. So these are the correct ones from ENSR.

Q. Mr. Gnat also talked about -- you can put that aside. Thank you.

You also talked about the potential for an upgradient off-site source of chloride at Joliet 29.

Do you agree with his testimony?

A. Yes, I do.

Q. And what is the basis for the understanding that there is a source of chloride?

A. Well, Channahon Road is right there. It's a heavy traffic road that parallels the river and it's salted. It's well known it's salted. The salt runoff water goes down into the ditch that parallels the site and parallels those upgradient monitoring wells and then ditches even closer to a groundwater level. And so it migrates to groundwater and then migrates towards the river, which is under the ponds and through the monitor wells and the chlorides are being detected in the monitoring wells.

Q. Mr. Gnat also spoke yesterday about nitrogen or nitrates and its connection to fertilizer.

What is your opinion about including nitrate as indicative of coal ash?

A. I think it's unnecessary here. Obviously, we end up -- it's not appropriate. In addition, we have -- I haven't found it. So I don't think that's appropriate.

Q. Now, looking back at Tab 90- -- excuse me -- what's been marked as Midwest Gen Exhibit 908 of the binder. Take a look at Monitoring MW-11 for boron.

A. Yes.

Q. Now, I think you just said MW-11 was an upgradient well, correct?

A. Yes, it is upgradient.

Q. All right.

A. Excuse me. It is upgradient, but do you want me to look at boron, did you say?

Q. Boron, which is on Page 11 of this document.

A. I'm sorry. Okay. All right.

Q. So based on your review of this upgradient well, what did you see?

I'm sorry. Are you there, Page 11?

A. I'm there now. Pardon me?

Q. On Page 11?

A. Yes.

Q. Okay. Based on your review of boron at MW-11 upgradient well at Joliet, what did you see?

A. Well, the graph presents the boron concentrations over time and the graph shows that at two points back in late 2010, early 2011, and I believe that was prior to the CCA, the compliance commitment agreements, that the boron exceeded the standard twice and then subsequently, after the CCA, exhibits the -- of course the standard is not a standard, but it did -- it looks like it hit the boron standard once. So for all for all those 27 monitoring points, there's very little boron.

Q. And, in fact, are there any other wells at Joliet that had boron above the Class 1 standard?

A. Well, as a matter of fact, the last number of quarters, there isn't anything above the standards of anything.

Q. And let's look at sulfate and just -- Page 19 of this Exhibit 908.

A. What site, please?

Q. Page 19 of Exhibit 908.

A. Yes.

Q. So this is -- it says, "Joliet 29

Monitoring Well 8 Sulfate Concentration."

Do you see that?

A. Yes.

Q. What conclusions do you -- explain what you are seeing here as to levels of sulfate concentration.

A. Well, this is Monitor Well 8 and it's the same graph of sulfate concentrations over time in that we see that in the 2014 timeframe, maybe early 2015, the sulfate concentrate -- concentration exceeded the -- what's greater than sulfate standard. Again, it's within the GMZ zone. So it's not a violation. It is by comparison levels. It exceeded it twice and when you look at the data, which, Jim --

Q. He isn't here.

A. Okay. We've got -- only twice of all those times it exceeded the standard and even Dr. Kunkel said that it's -- he said it was at background -- his background, which means it's fairly low. Now, it lasts, like, eight to ten quarters. It's been very low and much less than the Illinois standard.

Q. And Monitoring Well 8 is also upgradient, am I right?

A. Yes.

Q. Now, you said earlier that -- well, you had an opportunity to review all of the data for Joliet, the groundwater data?

A. Yes.

Q. And what are your overall conclusions regarding the sample results at Joliet?

A. Overall, and over the last year or two, couple years, the data are less than groundwater standard.

Q. And prior to that?

A. Occasionally, it was exceeded and oddly, upgradient is inconsistent with what you'd expect if the ponds were a source, for example.

Q. You said earlier that you conducted a risk analysis for Joliet 29, right?

A. Yes.

Q. Okay. And what did you find as to potential risk for Joliet 29?

A. Overall, we found no unacceptable risk to surface water. And to remind what

that entails, we took all the groundwater data as if it was surface water. We took the maximums and we took the averages and we compared those values to the Illinois Water Quality Standards, which is for surface water, or Illinois Water Quality Criteria, and there's -- you know, there's no risk at all if it's less than the standard.

If it's greater than the standard, then it means that we looked at it further and we made a further evaluation point-by-point to conclude whether there was any unacceptable risk and we concluded in normal risk assessment standard and practice, there's no unacceptable risk to surface water.

Q. And I think we've heard several times that are also no potable water receptors at Joliet, correct?

A. Yes. There's no potable water wells at all and they haven't an ELUC at Joliet so there's no allowed -- no allowances to that well. They're not -- the won't -- they're not allowed to put them in.

Q. Now, we see that there have been --

you just identified a few coal cash constituents in the past that have been detected in the monitoring wells.

You would agree?

A. Yes.

Q. Okay. Even though, as you said, Joliet went below Class 1, but -- and I think what the trend was.

What was the trend -- overall trend of constituents of Joliet?

A. Over time, they have been again slightly decreasing. As I mentioned, if you look at the data, it's below -- I believe every data is below the Illinois standard currently.

Q. Uh-huh. So you testified that the source is not the ponds, is that right?

A. Yes.

Q. And in your opinion, the source is not the historic land filled areas?

A. Yes.

Q. At least what we know of including the berms; is that right?

A. Yes. What I -- I want to make it clear that when I refer to the historic areas, you know, we've got some areas called, you know, alleged former and landfill areas.

We also -- in some sites, not this one, but if you have in the boring or in the fill that we've identified in the boring, it would be a historic area.

As I mentioned, we don't find it in the fill here. We just have these few areas that are outside of the ponds that, based on the data I've reviewed, I've concluded they are not the source.

Q. Thank you.

So then if there are these few constituents, how did they get there? Can you determine that?

A. That's a -- that's a -- that's a complicated question and I've obviously -- you know, people can struggle over it, but it's really important, as I stated yesterday, you know, these plants -- this plant is very old. I think it's -- it might be 1955 or 1965. It's certainly more than 50 years

old. And as it was demonstrated yesterday, in Joliet, there's a lot of confusion as to what happened in the past. For example --

Q. In the past being prior to 1999, for instance?

A. Precisely. Even farther back. I mean, you know, there's only so much memory and there's only so many records. So I believe that there have been some historic uses of the property that aren't documented. It's a power plant and so there's ash-related constituents at the site. It's just that we haven't identified a specific source.

Q. Now, in Illinois, as a professional engineer with experience in doing investigations of properties, what do you do when you can't determine the source?

A. Well, in Illinois, it's, I think, a very progressive state in that this practice of investigating is mature and it's knowledgeable and it recognizes that chasing the minutia is oftentimes a waste of time.

If you step back and look at the problem, what Illinois allows is that

you manage the risk by establishing a GMZ or establishing an ELUC. The way I like to phrase it, I've done this at other sites where you've got a box and you've got some impacts and so you control that area. You make sure nothing gets out of the box.

So you confine use of the site. You eliminate risk. That's the most practical way to manage the risk.

Q. And based on your review of the data and the risk at Joliet, what is your opinion as to Midwest Generation's actions to protect groundwater impact?

A. Well, I think by the end of my testimony, you'll hear this a number of times and you'll think that they were very responsible and proactive by putting together the pond evaluation, the program that they had.

They looked at maintaining ponds, relining ponds and even eliminating ponds that they didn't feel they needed to use anymore and then they went through the process. I thought it was a very -- a very

good program.

Q. And you said we'll probably hear that a lot.

Is that your opinion for all of the sites?

A. Yes.

Q. Turning back to Exhibit 901, and I'm looking at Slide 26, this -- as you did with Joliet, did you look at the site history and surroundings of the Powerton Plant?

A. Of course.

Q. And looking at the Slide 26, we heard from Maria Race about some of the history and the pond relinings.

What on this slide did you focus upon?

A. Excuse me. What slide are you on?

Q. Twenty-six, Powerton site history.

A. Okay. You're on Powerton. Okay. Great. I wanted to be sure.

Q. Sorry.

A. Repeat the question, please.

Q. Generally, what of the site history and the surroundings was important to you?

A. Well, when you have a -- want to have a source identification, one of the things I learned was that there could be an off-site source.

So we looked at that and we looked at historical records to see if there was something we could find there so we could focus our study.

Q. And as with Joliet, you have on the slide here pond ash samples. You looked at pond ash samples?

A. Yeah. We had some data from the limestone basin and we looked at that data, which was ash, bottom ash, and we compared -- I think we had two samples actually and we compared all the data to the -- the groundwater constituents.

So the leaching data, as I mentioned before and the tables we saw for Joliet. We followed the same process to compare what's in the ash and what's in the groundwater.

Q. And we also note on this slide that this -- the Powerton site has been operating

since the 1920s.

How does that relate to your opinion of the historic nature of the facilities?

A. It's even, you know, older than Joliet and it's -- again, the practices that were followed up until the late '60s, 1960s, when environmental consciousness was raised and we started changing how we managed these wastes, it was very different.

And so a lot of things could have happened back then that haven't been documented that we can't see at the sites.

Q. The other couple of points on here are that there are historic areas and samples of a historic area at Powerton, that there are administrative controls and no potable water risks, no risk receptors.

Was that similar to your analysis at Joliet?

A. Yes. And let me clarify what -- I might have misspoke earlier.

We have bottom ash samples

from the ponds when we reached those comparisons. The limestone basin is the data that we had from outside of the ponds. This ash -- it was ash. It was not in the pond.

We used that data to look to see if the -- I'll call it historic fill areas like berms and ash that we've seen in borings, whether that -- those materials could be a part of the source.

Q. And turning to Slide 27, this has been previously identified by witnesses as the map of the basins at the Powerton site.

Would you agree?

A. Yes.

Q. And the next slide, Slide 28 --

A. Yes.

Q. -- would you describe what this is?

Is this similar to what you did at Joliet?

A. This is a very nice summary, which I had at my deposition actually, but it's a very nice -- very nice summary because there's a lot of different ponds and this one has the

ash surge basin.

It's a summary of the conditions of the ponds over history. So at Powerton, we have ash surge basin, the ash bypass basin, the metal cleaning basin and the secondary ash basin.

Of those ponds, the ash surge basin, the ash bypass basin and the ash metal cleaning basin are the currently regulated ponds. The secondary ash basin, as we call it, is a finishing pond.

So the other -- the other columns indicate when the liners were constructed over time and then it was when -- the next column is when they were relined with high density polyethylene and I also call that the geomembrane. In the right column, it talks about how frequently the ponds have been cleaned up.

Q. And on the date constructed/liners column, the third column here, it's -- all four of the ponds were 1978 construction; is that correct?

A. Yes. Yes, they were.

Q. And the next column over, date relined with HDPE, relined -- the ponds were relined either in 2010 or 2013, is that what you say here?

A. Yes.

Q. And then in the last column, what are you showing under scheduled ash removal?

A. Well, for example, the ash surge basin, which is the primary ash management pond, it's cleaned out every six to eight years or as-needed. It's based on how much coal they burned.

It's also pointed out that since it was relined in 2013, which was approximately five years ago, it has not been -- it has not been -- ash has not been removed.

Q. And the secondary ash basis, you just mentioned was a finishing pond.

Does that get emptied?

A. No, it hadn't. It didn't need it. And I think Mark Kelly had indicated why it was just the last point before discharge and it had de minimis ash.

As I explained yesterday,

you could have dust in the air accumulate in the water. I think when they un-watered the original lined facility, they had some slop in the bottom. It was probably just dust from the air that had accumulated over the previous 30 years.

Q. If you would, turn to the next slide, Slide 29.

A. Yes.

Q. And that's the Powerton metal cleaning basin cross section?

A. Yes.

Q. Do you recognize this as an accurate comparison to the drawings that you reviewed?

A. Yes. After looking at all the drawings and construction reports and historical documents, this is what's out there.

Q. And just briefly, because they're all pretty similar, what was the liner system when the ponds were -- three ponds, metal cleaning, ash surge and ash bypass when we were relined?

A. Well the conditions were this that they had Poz-o-Pac from the previous liner

on the bottom. And on the sides, they had Hypalon, which they removed the Hypalon, but they did not remove the Poz-o-Pac, as Mark Kelly testified.

Then above the Poz-o-Pac, you've got a bottom geotextile cushion. On top of the cushion is a HDB liner. On top of the liner is another cushion. Above the geotextile cushion is a 12-inch thick sand cushion. Above the 12-inch thick sand cushion is a crushed limestone warning layer that's six inches thick.

Q. And again, as to all the ponds at all the stations, why were the liner systems relevant for your analysis?

A. Well, number one, fundamentally, they were put in in 1978. As I pointed out yesterday, people were not lining ponds like that that much back then. So it's good that they were there.

So when they were relined, what I looked for was that they were relined under an appropriate quality control, quality assurance program and that they followed the

specs and design and I found that they did.

Q. Now, you also, like you did at Joliet, considered a comparison between elevation of the bottom of the pond as compared to the elevation of groundwater for each of these ponds; is that right?

A. Absolutely. I mean, this is -- in my history, you know, we originally started to look at bottom uplift or uplift pressures for soil layers because if you put too much pressure under a soil layer, it can crack because soil is not good in tension. As you rise it, it cracks.

Here, we have geomembrane and Poz-o-Pac, neither one of which are likely to crack, but we looked at the water levels anyway and you can see here the bottom of the pond is elevation 457.5. The average groundwater elevation is 445, which is about 12 feet difference. And so my assessment of this up- -- hydrostatic uplift just will not happen.

Q. Now, turning to the ash surge basin on Slide 30, the bottom elevation is compared

to the groundwater elevation is a little closer. Does that cause you any concern?

A. No. I've looked at this again. There is no pressure underneath it. And as it got closer, then we started to look at some of the maximum water levels that we found and again, it does not exceed the pressures that would cause any concern for hydrostatic uplift.

And for the record, the liners at the ash surge basin the layering, it's the same as for the metal cleaning basin.

Q. And you talked yet about the weight of the water and the warning layers in the sand. Does that apply also for these ponds?

A. It does. Normally, when there's water in the pond, that all weight to the bottom, which keeps -- it's an additional resisting force. But even without that water, this pond and the other pond would not have

hydrostatic uplift.

But I think what is important is that one-and-a-half-foot layer of gravel and sand at the bottom of the pond, I think Dr. Kunkel said that there -- he brushed them off as almost insignificant, I think he said. That's very wrong.

I mean, that's a foot and a half. That sometimes is -- is very important. It could be your safety factor for resisting uplift. Not here. I'm just saying it is important to count that weight in the assessment for hydrostatic uplift.

Q. If you would, flip to Slide 32, the secondary basin.

A. Yes.

Q. Now, what's different about this pond?

A. Well, this is kind of interesting when I was reading the records. It's like you lived a life of the construction guy who has some unexpected condition come up and he's got to tell somebody they have to spend more money.

What happened here is when

they went to reline -- remove the Hypalon liner and they found that the groundwater levels were higher, and as you can see here, it's very clear. On the left, the average groundwater level is elevation 441.5. And at the pond, they had to build it, you know, at 440.

And to compound that, when we talk about, you know, what the unexpected condition at a very high Illinois River water level, as Mark Kelly said, I don't know what level at flood it was, but it was very high. And not to disagree with Mark, but he described the river water as coming into the excavation. Really, that's -- that's groundwater.

Again, it's not river water flowing that far. It raises the pressure. It raises the groundwater. So the groundwater is coming into the bottom. So they -- they couldn't build it. And so they got with the engineers, which is what they're supposed to do, and they re- -- they designed an under-drain system, which you can see here as that very rocky-looking layer. It' a nice graphic.

And they built an under-drain layer so they can drain the water -- the groundwater to get the bottom dry so they could build the pond liner and then they filled the pond after which the bottom uplift was not an issue or ground filtration was not an issue.

And they only need to operate this system if they were ever to remove the water in the pond and they wanted to reline it. As we heard yesterday, it's not designed to be cleaned out. It doesn't receive enough material to clean out. And so hydrostatic uplift is a nonissue at this pond.

Q. You mentioned the design. Does that -- is that consistent with your opinions from yesterday afternoon about designing for the purpose -- designing a pond for the purpose of which it's going to be used?

A. Yes. You know, call me a problem solver. I'm an engineer, a geotechnical engineer, which we have to deal with subsurfaces, which is more difficult, but

yes. You have to design the unit for its intended purpose and this is not intended to be cleaned out.

As I commented earlier, you know, the other ponds had the same type of layering. This is a very different layering. Number one, it has the drainage system at the bottom and it's got a cushion in underneath the geomembrane and then the geomembrane, but there's is nothing on top of the geomembrane because nothing is intended to drive on top of there or work on top of there. It's just water.

Q. So do you recall Dr. Kunkel saying that he believed there was an industry standard for a distance between groundwater and a pond bottom before the CCR rules of 2015?

A. Yes, I do recall.

Q. And what did he believe there was as an "industry standard"?

A. I think he used the industry standard of five feet.

Q. And do you agree that that was an industry standard for Illinois?

A. Not at all.

Q. Does that go back to the same design issue?

A. In Illinois -- well, first of all, in engineering, the engineer designs a pond for its purpose. I've designed landfills with liners like this and in all reality, my colleagues have designed landfills and I'm familiar with those designs.

Where it's -- it's just like this; you have to be able to design it, to construct it so that uplift is not an issue and the engineers are allowed to do that. They are allowed to solve that problem.

Then when it becomes -- becomes operating after a certain point in time, they don't need to run that groundwater through a watering system. They can turn it off because what happens is that essentially, the -- it's an inwardgradient. It goes from the groundwater toward the inside of a landfill, for example.

Now, here you have a pond, but the point is is that this is designed for its purpose.

Q. Now --

A. There is no standard because again, in Illinois there is no standard for lined systems and in many states, there's no standard regulatory-wise. It's really an engineering practice to solve the problem.

Q. Now, Dr. Kunkel also testified about potential issues with liner stability if groundwater reaches the liner.

Do you agree were that?

A. I don't. I don't at all.

Q. What do you -- what is your opinion as to the foundation of a pond?

A. Well, the foundation here, it's -- most of these ponds have a competent soil subgrade. It's not soft subgrade. It's a competent subgrade. And where you have water, as Dr. Knuckle said, come up to the bottom of the foundation and then go down, he was concerned about the rising and falling causing settlement and collapse.

When I read that, I couldn't believe it because I've designed foundations where water level goes up and down all the

time and it's been designed for it. It's all -- I'm mot going to get complicated with the affective stratus and total stratus, but it doesn't happen that way especially in these types of materials.

If you get any settlement at all within a granular, it's a very microscopic intergranular.

THE COURT REPORTER: Within a what? I'm sorry. Within a granular?

THE WITNESS: Intergranular.

THE COURT REPORTER: Thank you.

THE WITNESS: I'll speak slowly. I'm getting very excited. I'm sorry.

THE COURT REPORTER: It's not that you're not speaking slowly. You're not finishing your complete word. You need to be articular and complete your words, please, so I can get the entire record for you. Thank you very much.

BY THE WITNESS:

A. Just briefly, there's intergranular stress and shifting that is very small. It's almost not measurable. So to imply that the

bottom would collapse, I just couldn't believe it.

BY MS. NIJMAN:

Q. Now, at the Powerton ponds, do you believe there's any risk of issues with liner stability due to this water on the liner issue that Dr. Kunkel raised?

A. I'm not concerned at all.

Q. Now, you said earlier yesterday that you reviewed the construction documentation for the ponds and I just want to make clear that you reviewed the construction documentation packages for the ash surge basin, secondary ash basin, metal cleaning basin and the bypass basin.

Are those the exhibit documents you reviewed?

A. Yes.

Q. Did you identify any issues with the construction of the liners at Powerton?

A. No.

Q. At Powerton, how did you learn about the ash removal process?

A. Well, we heard from Mark Kelly. I

spoke to him previously. We spoke to him previously to prepare my report. They described the processes quite methodical and careful including use of equipment and staying away from the liner and I felt that their dredging, as they call it, or cleanup process, removal process, was very methodical and all that type of process that they followed reduces the possibility for an accident or incident on the liner.

Q. Based on your review of the Powerton data and the construction, the documentation, what is your opinion as to whether the ponds are leaking constituents to the groundwater at Powerton?

A. I don't think they're leaking.

Q. Turning to Slide 33, again we heard from Mr. Gnat the description and location of the monitoring wells at Powerton.

Does that map identify all of the monitoring wells?

A. Yes.

Q. And you see MW-16 at the bottom of this map.

Is that an upgradient well?

A. Yes.

Q. Now, turning to the next slide, Slide 34, Mr. Gnat also said there are two distinct groundwater units.

Did you agree with his description of the units on Slides 34 and 35?

A. Yes.

Q. And again, just to confirm, did you agree with his description of the groundwater flow in each of these units based on Slides 34 and 35?

A. Yes.

Q. On the Slide 35 --

A. Yes.

Q. -- Mr. Gnat gave a bit of a description. It says, "The groundwater contramap for gravelly sand unit." It's dated 5/2017. And he gave a bit of a description as to the middle contour lane on this map that's got a big hump in it.

Do you see that?

A. Yes.

Q. And do you -- did you agree with

his assessment of what was going on there?

A. Yes, I did. The way it was explained is the upper zone, shown on Slide 34, it's called a shallow silted clay unit. It's a lower permeability unit. And so the water in that unit is higher than in the gravelly sand, which is a lower unit.

And so what he explained is that that gravelly -- excuse me -- the silty sand unit is not everywhere. It pinches out. It ends along the edges of the pond, on the west edge of the pond -- excuse me -- east edge of the pond.

So what happens is the water in the upper level is actually kind of going over the edge and spilling into the local area next to -- in the gravelly sand unit causing a slightly higher level and it gives the appearance of a mound. In essence, it is, but it's from groundwater seeping from the upper unit to the lower unit.

HEARING OFFICER HALLORAN: And, Mr. Seymour, I think that's a perfect speed. Thank you. I understood.

THE WITNESS: I'll take any compliment I can get, Mr. Hearing Officer.

BY MS. NIJMAN:

Q. Okay. If you would, turn to the next slide. There are two slides that again are -- and I think we can move a little more quickly now that you've explained what these are.

The next two slides are your updated tables 5-5 and 5-4 from your report; is that accurate?

A. Yes.

Q. And did you do the same analysis of comparing the groundwater data to the leachate data as you did with Joliet?

A. Yes, I did.

Q. Just generally, what are your conclusions here at Powerton?

A. At Powerton, again you see a lot of the data speed over a little wider range, but in general, around 50 percent or so to 60 percent are inconsistent.

So that means again that the -- what we found in groundwater compared

to the site-specific ash leachate doesn't match meaning that the ponds aren't the source.

Q. When you say "the ponds aren't the source," this is one of the pieces of evidence you used for that conclusion?

A. Yes. As I mentioned, we also looked at the construction of the ponds and the operation of the ponds as well.

Q. Thank you.

Turning to Slide 38, this was discussed in previous testimony as identifying a former ash basin and the limestone -- former limestone runoff basin at Powerton.

Do you see that?

A. Yes.

Q. Are there any groundwater monitoring wells around the former ash basin at Powerton?

A. Yes. There's approx- -- I think there are five wells beginning with Monitor Well 1 on the far right, sort of, a little bit upgradient/sidegradient of the pond.

Going counterclockwise, you have Monitor Wells 2, 3, 4 and 5, 5 as being

on the western margin of the former ash basin.

Q. And have you reviewed the groundwater data for those monitoring wells around the ash?

A. Yes, I have.

Q. And what is your opinion based on that review as to whether ash in this former ash basin is impacting groundwater?

A. Well, the data are less than the groundwater standard downgradient.

My conclusion is that this -- the ash that's there is not a source to groundwater impacts.

Q. And how does that information then form the rest of your opinions about historic ash areas at all the stations?

A. Well, that's not the only data that we have. Obviously, we have a number of data from the leaching from the historic fill areas and that it supports the opinion that I have in that the ash is not the cause of what we're seeing in the wells.

Q. Now, we also discussed earlier yesterday that you had sample results from

the area marked here as the limestone runoff basin; is that right?

A. Yes.

Q. And what did those, briefly, sample results -- CCB sample results show?

A. We found similar results to the other sites with a little bit of exceptions. We had some chromium and some selenium and -- but they were -- they were detected. They were not -- I don't think they're maybe slightly above the Illinois Ground Waste Standard.

When you averaged them out for their waste mass, the -- statistically, it was less than the Illinois Groundwater Standard. But otherwise, it was the same as the other materials we've seen.

Q. And even though it was called the limestone runoff basin, what is your understanding as to the type of ash that was in there during the sampling?

A. It wasn't what kind of ash. It was --

Q. Well, what is the bottom ash from the --

A. It was bottom ash. I think it might have had a few materials mixed in, but it was mainly bottom ash.

Q. Turning to Slide 39 --

A. Yes.

Q. -- this slide represents -- we've heard from prior testimony about the Groundwater Management Zone, would you agree?

A. Yes.

Q. And are all the monitoring wells at Powerton within that Groundwater Management Zone?

A. Yes, they are.

Q. Now, in your report of 2015, you discuss assessing a spacial trend at Powerton.

Do you recall that?

A. Yes.

Q. What is a spacial trend?

A. Well it's a trend where -- my -- my definition really is we're looking for the locus location of a plume or source. And so we look over an area, the space in the horizontal area, where you might look at an area that is at the location of the source, it

would be at a higher concentration, and going farther away from that source, you have a lower concentration. So you want to see that distance or space, you look for that change in the data.

Q. And so it could tell you if there's a source or plume?

A. Yes.

Q. What would you -- well, I think you answered this.

What would you expect to see spacially if there was a source area, a known source area?

A. You would hope -- you would expect to see that the data would be consistent over time as well. So it's time and space so that if you have a high -- a source, an ongoing source in a particular location, it would be -- every time you looked at it, it would be similar, that would be high relative to the others.

If it's a changing or a discontinuous source, it -- it would not quite look like that, but we're looking at

it from a -- something that's present and that it would be higher and this location from quarter-to-quarter consistently.

Q. If you turn to the next slide, I think the page number got cut off, it's Slide 41.

A. Yes.

Q. Does this represent the spacial analysis in simple terms that you did?

A. Yeah. It's -- it's -- obviously, the squiggly lines get to be complicated, but the high concentrations are higher on the graph and I highlighted the different wells that had the high concentrations, for example, for boron.

Q. You mean -- I'm sorry.

When you said peak concentrations, is that -- what are these arrows referring to?

A. Yeah. Well, there's two kinds of lines on the graphs, the squiggly kinds, which are the trafficking of the concentrations over time of each individual well and the blue arrows point out generally where the

peak concentrations are, which as I said -- so it would be the center of a source.

So, for example, you see Monitor Well 13 -- Monitor Wells 9 and 13, 12, 10, 19, they all have peaks that are higher and it's not -- it's not consistent.

Q. So you are not seeing a consistent source area?

A. Correct. And we looked at manganese and again, we have three or four wells that are peaks and sulf- -- over time and sulfate, there's several -- same thing, several wells that -- we don't see the consistency of the data. So it's hard to say that there is a specific source.

Q. Well, as you did with Joliet, you also conducted a temporal or a time trend analysis at Powerton?

A. Yes, I did.

Q. If you turn to the next slide, Slide 42.

A. Yes.

Q. Is this the updated data for temporal trend at Powerton?

A. Yes. And again, it goes -- uses the data from 2010 through 2017.

Q. And similar to Joliet, you used the statistical linear regression analysis?

A. Yes, we did.

Q. Turning to Slide 43, what were your conclusions of the trend testing at Powerton?

A. Well, again you look at the table summarizing the results of how we found increasing, decreasing or where we could make no conclusion because the line wasn't -- was statistically inconclusive. Overall, the groundwater concentrations are neither increasing nor decreasing. They're about the same.

Q. Now, you heard Mr. Gnat discuss Monitoring Well 16 yesterday as an upgradient and we just mentioned that it's an upgradient well.

A. Yes.

Q. Did that well, to your recollection, monitoring well, show any impact from an off-site source?

A. You can have nitrate and maybe boron

like one point.

Q. Does that suggest there's something upgradient -- further upgradient off-site?

A. Yeah. If it's high enough concentrations that look out of the ordinary, and they do, we'd expect that it's coming from upgradient. So it's like -- a little bit like Illinois EPA expectant for CCR sites that there can be constituents in the groundwater upgradient to the unit that would be considered part -- part background.

Q. And you also heard Mr. Gnat and Mr. Kelly talk about the deicing that occurs on all the roads at Powerton.

Would that impact chloride results across the property?

A. Yes, it would. It would recognize that when the salt melts from runoff, it's going to go to various areas. They have strong water pond, for example, and it's going to have like a -- percolate into the ground and impact groundwater quality for chloride.

Q. And again, for Powerton at

Exhibit 907, you conducted a risk analysis for the site?

A. Yes, we did.

Q. And did you generally -- I think you said this already. You generally found the same conclusion?

A. Precisely. Even with the updated data, it was the same conclusion, no unacceptable risk to surface water.

Q. And we heard -- I think even Dr. Kunkel, no potable water receptors at Powerton?

A. That's correct.

Q. Based on your review of the data and the risk analysis at Powerton, what is your opinion of Midwest Generation's actions regarding protection of the environment?

A. Well, I hold them in high regard. I think a responsible -- they conducted a responsible program all around with planning for maintenance and relining and their operations and the dredging and the removals, complying with the requests of the Illinois

EPA throughout the CCA process. So I think they acted very responsibly and in some cases proactively.

Q. Now, we just saw from a couple of your slides that there are constituents of coal ash found in the groundwater above Class 1 at Powerton, correct?

A. Yes.

Q. And you said ponds are not a source and you don't believe the historic areas are not a source. How -- same questions for Joliet. How did the constituents get there?

A. Remember the -- I think one of the first slides was a very old power plant and again, it's similar to -- to Joliet in that the things that happen historically that, you know, we don't do anymore that probably happened to cause impacts of the groundwater, it's kind of like a smudge that's remaining and it's being properly managed by the Illinois program. So it's those things you can't specifically identify, but something is there obviously.

Q. Is it -- we are moving on to Waukegan. Looking at Slide 44, again Waukegan site history and surroundings, we heard Maria Race talk about it. We heard Mr. Gnat talk about it.

Just briefly, describe what's on this slide.

A. Well, again we talk about how old the power plant is. This is a 1923 vintage power plant. I followed the same process for all the projects. I looked at the records. We found sample results, the historic areas, off-site impacts, the whole list here, administrative controls, ELUCs, which is E-L-U-C-s, Environmental Land Use Controls, potable water use.

So we looked at the -- followed the same process to evaluate Waukegan. This is obviously more complicated with the off-site impacts.

Q. We'll get into that in a second. Turning to Slide 45, the map of the ponds at Waukegan, would you agree that that's an accurate depiction of the pounds?

A. Yes.

Q. And the next slide is Slide 46, a description of the Waukegan impoundments.

Would you briefly describe that?

A. Sure. It's the same type of table that we presented before that summarized the history of the units. They have the east ash pond, the west ash pond and it shows the original construction, the 1997 -- excuse me -- 1977, when they were relined in the 2000s and the scheduled ash removal, which changed over the years depending upon how much coal they burned.

Q. And on the column of scheduled ash removal, we heard from Mr. Veenbaas that just the inlet side is -- ash is removed generally mostly from the inlet side.

Did you understand that to be the case?

A. Oh, perfectly. It's totally understandable. It's a -- it's -- a bottom ash pond is a little coarser and it settles up fairly quickly in the water column and

so where the -- where the sluice comes in, you're going to have most of the ash fall out and as it travels around that U, the water becomes clarified prior to discharge.

Q. And these ponds were lined in, I think this says, 1977 with a Hypalon liner?

A. Yes.

Q. I don't know if anyone has described that.

What is Hypalon?

A. Hypalon is an older style liner that was used. It's -- it's a -- maybe the best way to describe it is if -- obviously polyethylene is like this -- a little bit like this notebook and the -- the Hypalon is a little more rubbery. So it's a little -- it's less dense, but still a very common water barrier and it's still used.

Q. Looking at the date relined with HDPE and the layers at the two ponds, are they similar?

A. Yeah, they are. They are the same.

Q. Looking at the next slide, Slide 47, the cross section of the Waukegan east and

west ash ponds, do you see that?

A. Yes.

Q. Would you just briefly describe the lining system?

A. Well, recognize the Waukegan site is along Lake Michigan and is pretty much built on the beach and at the base, you have a sand -- a natural subgrade prepared for the overlying layers. They have a designed 12-inch thick sand cushion layer. Excuse me. On the prepared subgrade, they have the HDPE liner 60 mil thick, M-I-L. And above that, the sand cushion layer and above the sand cushion, they have the limestone warning layer, which is six inches thick.

Q. And as with the other ponds we've looked at for the other sites, you note groundwater elevation and pond bottom elevations here.

Would you describe your analysis?

A. Sure. The pond bottom is at elevation 585.5 and the groundwater toward the lake, which is to the east, that which

would be the east pond, is around elevation 582. Moving farther away from the lake, the groundwater comes up and the average is 583. That means that the water levels are several feet below the bottom of the pond and hydrostatic uplift is not a concern.

Q. Did you consider the maximum groundwater elevations for Waukegan?

A. Yes, we did. Some discussion has been provided over the -- surface water levels control the groundwater. It's the same with Lake Michigan. It doesn't stay constant over the 20 or 30 years. It's probably changed about a foot and a half up and down. I did consider that and I looked at historical data and the pond bottom has always been -- excuse me -- the groundwater levels, I would expect to always be below the pond bottom. Of course, when it's full, it don't matter. It's not an issue at all for hydrostatic uplift. There's a huge head on top of the liner.

Q. Well, I was just going to ask you

that.

What is your opinion as to uplift even assuming that the groundwater might reach the pond bottom -- the liner on the pond bottom?

A. Well, obviously there's water in the pond, but there's -- if it reaches the bottom of the pond essentially, it's the geomembrane and it's got water height on top of it to resist the pressure, but I don't -- I don't think that should be an issue.

Obviously, the pond's design life and the history of the lake, I -- I don't even think the lake is going to come up that high to ever make it a problem.

Q. Now, we talked to -- we already heard from Mr. Veenbaas and Mr. Lux about the ash removal process.

Did you also speak to anyone to confirm the ash removal process at Waukegan?

A. Well, they use LaFarge. So we spoke to a Mr. Nowicki. So we had several -- and he was at two or three -- three of the plants,

I believe. With his description -- with Mr. Lux's description and Mr. Veenbaas's description, all were very similar. They all followed what I call a methodical, careful program and, yes, they had the incidence where they thought a pump caused a hole in the liner and they fixed it.

In my opinion, when -- when you do see these holes, they are always above the water level. They are always identified and they are always patched. Now, if -- so I look at that as a good thing in that they have a process that they follow to fix it and they don't ignore it. That's obviously a positive to Midwest Gen.

Q. Now, I'm flipping back. You don't have to, but I just wanted to flip back to Slide 8 for a second where -- and that was the slide from yesterday where you talked about the analyses of bottom ash from the Midwest Gen ponds and -- well, you could --

A. I know what's on that slide.

Q. Yes. Okay.

So does that -- where was

bottom ash sampled at Waukegan?

A. It was sampled from the pond. We heard Fred Veenbaas testify that he took the sample himself.

Q. Well, that was the -- I'm sorry. I'm confusing you.

A. Excuse me.

Q. That was the little sample in the jar that we brought here.

If you turn to Slide 8, I'm referring to the --

A. Yeah, I --

Q. -- CCV sampling.

A. Sure. Yeah, I see.

Q. So which ponds was CCV sampling done at Waukegan?

A. Well, it just says Bottom Ash 1 and Bottom Ash 1. I'm not -- I don't recall which pond specifically or from, but it was from the bottom ash ponds at Waukegan.

Q. And what does that data show you?

A. It says that, you know, we find barium, we find boron, we find sulfate at the very bottom and a lot of -- there's a

lot of non-detects and non-analyzed, a couple of those. We find them consistently in TDS. So that's what we find consistently and I think importantly what we don't find is manganese.

Q. Okay. And looking at those levels, are they at or below the Class 1 standards for Illinois?

A. They are.

Q. And given the levels on that slide, what, if any, of those constituents would you expect to see in the groundwater?

A. Barium, boron, sulfate and TDS is what we would expect to find.

Q. Did you?

A. We did. And what's important, though, what we didn't find. We found it in most -- in many cases, but again, there's a lot of things that we found in the groundwater that -- that are not in the ash. So it's not consistent with the ash sample.

Q. And again, that's describing your comparison of the constituents of the actual ash with what's in the groundwater.

A. Yes.

Q. Based on your review of the Waukegan information, what is your opinion as to whether the ponds at Waukegan are leaking constituents to groundwater?

A. I don't think the ponds are leaking.

Q. And do you know if Illinois EPA agrees with your opinion as to the Waukegan ponds?

A. I believe there was a comment over the course of the testimony this week citing that Len Dunaway concluded that the ponds were not -- he did not think the ponds were a likely source and that comes from that transcript from the hearing, I believe, that Fred Veenbaas attended maybe.

Q. Yes.

Looking at Slide 48, the map of Waukegan with the groundwater wells, again we've heard that described by Mr. Gnat, do you agree this is an accurate depiction of the monitoring well locations?

A. Yes.

Q. And the downgradient wells, what would those be?

A. On the right closest to the lake Monitoring Wells 1, 2, 3, 4 and 16, which is a recent addition downgradient as well.

Q. And looking at Page 49 of Exhibit 901, that shows the groundwater contour map that Mr. Gnat discussed yesterday.

A. Yes.

Q. Do you agree generally with the contour lines here?

A. I agree generally. I think I made the observation that on the far north end toward the power plant, I think I would have curved the contours a little farther, a little flatter, a little farther away from the lake, but for the barrier of concern, it's pretty accurate.

Q. For your opinions, did you review the groundwater monitoring data at Waukegan?

A. Yes.

Q. And you just identified the downgradient wells.

Did you compare upgradient versus upgradient at Waukegan from the pond?

A. I did.

Q. And generally, what did you find?

A. I found that upgradient of the ponds was higher concentrations than downgradient.

Q. What does that tell you?

A. Well, it's sort of the opposite. I mean, it tells you it's not the pond, number one. It's kind of like the -- it tells me that the source is to the west of the ponds.

Q. We've already briefly touched upon the analysis that you conducted -- the comparison of the indicators on the next two slides.

A. Yes.

Q. Turning to -- just generally your conclusions on that comparison, what did you find?

A. Well, if you look at the bottom line again, you know, 40, 50, 60 percent, kind of focus here on the mid-50 percentages, if -- the data don't match. So if I were to make a conclusion as to a source, which is a very important conclusion, I would want to

have the groundwater data match, the ash data, much more closely.

Q. If you turn to Slide 52, and again I apologize, some of the page numbers got cut off in the photocopying, this is the Waukegan map of the established environmental land use control boundaries.

Do you see that?

A. Yes.

Q. Could you describe in the entirety where the -- well, let me ask it this way.

Does this map accurately reflect the environmental land use controls across the property at Waukegan?

A. Yes.

Q. And as you did with Powerton, did you assess the spacial trends at Waukegan?

A. Yes.

Q. And again, that's to assess a source or a plume, is that a fair description?

A. Yes.

Q. Turning to the next slide, Slide 53, what are you showing here?

A. We have a similar graph where those

blue arrows indicate the peaks for the monitoring wells. As I commented earlier, you expect the sources to be the same or similar over time and you see them somewhat fluctuating like, for example, with the manganese.

Even with Monitor Wells 4, 5, 6, 7, 12, 15 and Monitor Well 14, they all are peaks at one point in time. Then for sulfate, again, we have, you know, Monitor Wells 5, 7 and 16 have peaks over time. So it just tells me again that the data aren't consistent to say that the well is at a location of a source.

Q. Let me ask you about barium.

Looking at the left top time concentration chart, is the line at 2.0 the Class 1 standard?

A. It is.

Q. And barium is very low. It's way down below it, the bottom of this time concentration chart.

How does that compare to what you saw in the ash -- from the ash ponds?

A. Well, we did find low levels of barium and -- and -- and so this is somewhat reflective of what we found in the ash. It would be consistent, but it's at much, much lower levels. So I don't doubt that there could be some anthropogenic or natural source.

Q. Well, what about manganese, how does that compare?

A. Well, that's the thing in my whole analysis. When -- there's certainly manganese at all of these sites. And we have -- I have yet to see an ash sample from the site that has manganese.

Q. So there is manganese in the groundwater, but not in any of the ash?

A. Correct.

Q. Is there any explanation for that based on how manganese moves or is transported through the environment?

A. Well, no. I don't think so. I know Dr. Kunkel discussed using it initially in his report and removing it from his trend analysis talking about some less stability in the environment.

But the environments that we're seeing here and what we're measuring, I would not expect the -- that to be an issue. But there's manganese present in the environment and it moves with the groundwater similar to a sulfate. If it's a little bit less stable, I would bet it's not even measurable in these results.

Q. And turning to the next slide, Slides 54 and 55, are these the updated results of your temporal trend testing for Waukegan?

A. Yes, they are.

Q. And just looking straight at Slide 55, what did you conclude?

A. Again, they are neither increasing nor decreasing for the same reasons. You have about the same number of wells and parameters increasing as decreasing. So you can't make a -- it's not going up or down.

Q. Now, we heard Mr. Gnat talk about a tannery property and a General Boiler property. Do you remember that testimony?

A. Yes.

Q. I'd like to show you what has been previously marked at Exhibit 624 in this case.

HEARING OFFICER HALLORAN: Is that Respondent's 624?

MS. NIJMAN: Sorry. No. This is -- yes, Midwest Gen Respondent 624.

HEARING OFFICER HALLORAN: Thank you.

BY MS. NIJMAN:

Q. And that actually might not be the right one. It's 623. I apologize, Respondent's Exhibit 623, yes, 623.

Have you reviewed this document?

A. Yes.

Q. And if you would, turn to Bates page Midwest Gen 51281. Oh, yes. It was produced several times so there's different pages. Let me just help you with the page number.

In Exhibit 623, it's Bates MWG 472.

A. Yes, I have it.

Q. And if you would, read the first line -- well, first of all, what is this page?

A. This looks like kind of a newspaper of sorts. It's labeled task force on Waukegan neighbors. It looks like it's from a website.

Q. And what are they discussing in the first paragraph?

A. Well, it's a lakefront redevelopment report. It's Waukegan. It's on the lake and it says, "To north along the lakefront is the site of the former General Boiler company a 19-acre parcel on Dahringer Road between the Midwest Generation Power Plant and the North Shore Sanitary District facility."

Q. And then if you turn to the top of the second paragraph, would you read that?

A. "In 1998 and 1999, further environmental analyses were performed on portions of this property and it was confirmed that the northern section contained arsenic above remediation benchmarks

in a fly ash fill area."

Q. So there was fly ash fill area on the General Boiler property?

A. That's what was pointed out in the late 1990s.

Q. Now, would you read the next sentence, please?

A. "Because the 'remedial objectives and/or remedial action for the fly ash area (had) yet to be developed' the cleanup possibilities for this area could not be determined."

Q. So what is your understanding reading this of what's being quoted?

A. It's from a report of some kind.

Q. And we don't have the underlying report?

A. I don't believe so. We have a number of reports on this study, but I don't -- I don't think we have one that's quoting that. It might have been a -- it's -- we don't have it, to my knowledge.

Q. Now, Dr. Kunkel dismissed this discussion as anecdotal.

Do you agree that we should dismiss the discussion of a fly ash area on a neighboring source?

A. Well, it would be consistent. I think that, you know, it is, you know, a citizen web page, if you will, but I believe there is something here. So I would say that we know there are studies that have been conducted.

So I would say it couldn't be simply discounted, but it doesn't -- it's not the same as having a consultant's report in front of you.

Q. I'm sorry. Just so we're clear, it should not be discounted? Should not be discounted?

A. Correct. You should consider this.

Q. Okay. If you turn to Slide 56 and it was unfortunately cut off, the page number, Slide 56, what's represented here?

A. Well, this is an aerial view looking west of the Waukegan station and the surrounding properties. The wells have been developed that were shown. For example, for the tannery site,

they have the red box.

Q. I'm sorry. Let me back up for just one second. I want to understand what properties we're looking at.

The area outlined in blue, what property is that?

A. That's the General Boiler property.

Q. And the area outlined in red, what property is that?

A. That's the tannery property.

Q. And this map is showing the wells on all of those properties?

A. Yes.

Q. Including the Waukegan?

A. Yes.

Q. And in the notes on the right side of the page, what are you showing there?

A. Well, it indicates what the units are. They're all the same, but the data come from different periods of time and, for example, the Griess-Pfleger site through 1997 and other General Boiler in 1998, the ELUC wells, which are around the edges of the General Boiler and Griess-Pfleger from

2017 and the on-site groundwater wells are current from 2017.

Q. Now, are those -- is the General Boiler site upgradient from the Waukegan property?

A. Yes.

Q. And is the tannery site upgradient from the Waukegan property?

A. Yes.

Q. Now, we saw earlier the groundwater flow map.

In your opinion, in the groundwater flow, could components of groundwater from the General Boiler property reach the Midwest Generation property?

A. Yes.

Q. And similar question; do the components of the groundwater from the tannery property reach the Midwest Gen Waukegan site?

A. Yes.

Q. What did you conclude as to off-site sources based on this map at Page 56 and the next map at Page 57?

A. Well, of course, we're interested in if there's something that's found on the -- on the Midwest Gen properties. So we looked at barium and manganese, which is found and indicated on these maps.

It's very clear that there are significant upgradient sources of each, of barium and manganese, upgradient and even upgradient of the tannery property there's impact. So this whole area has been impacted by these facilities -- these old abandoned facilities.

Q. And to be clear on Slide 56, we're talking about barium and on Slide 57, we're looking at manganese results?

A. Yes.

Q. And do you have a similar conclusion for both the barium and the manganese?

A. Yes. You can see there are concentrations that are quite significant. MW-6, for example, on Figure 2 for manganese is 3.5 parts per million compared to those levels on site of -- you know, the highest on site is around .6. Downgradient to the

pond, it's, you know, .1, .07, .002. So downgradient to the pond is even less. So it's clear that the ponds are not the source and that the source is coming from upgradient.

Q. And what about other potential constituents?

Why only look at manganese and barium?

A. Well, the framework that the off-site studies were conducted is different than what we're conducting. Commonly, when you analyze the soils and groundwater, there's a standard suite of parameters that you look at when it's done for a -- I'll call it a remedial investigation. You've got a problem you're trying to understand what's going on.

So they test for what we commonly call the RCRA 9 metal. That doesn't include boron, for example, sulfate, they're not -- they're not hazardous waste metals. And so these -- these are -- they look for hazardous waste metal. So, you know, it would have been nice to have boron data, but that was not the focus of their study.

Q. They were looking at hazardous materials?

A. Correct.

Q. Looking at the -- next, we are moving to -- well, I'm sorry, one more question on Waukegan.

As with Powerton and Joliet, you -- did you do a -- conduct a risk analysis at Waukegan?

A. We did the same as Joliet for Powerton and for Waukegan and we found the same conclusion. Under the normal risk assessment practices, we found no unacceptable risk.

Q. And that updated data appears at Tab 907 of your binder, Exhibit 907?

A. Yes.

Q. Again, just so we are all clear, I think everyone has testified no potable water receptors at Waukegan?

A. Correct.

Q. Based on your review of the data and the risk at Waukegan, what is your opinion as to Midwest Generation's actions regarding

protection of groundwater?

A. I think they have been -- had a responsible program with considerate, caring professional that managed the -- managed the sites and I think they were proactive again with their -- with looking at the conditions of the ponds back in the early 2000s, mid-2000s, and they spent the money to upgrade it and fix it. I think they were responsible owners of these facilities.

Q. Moving to Will County.

HEARING OFFICER HALLORAN: It's 10:45. We've been at this an hour 45 minutes. I'd like to take a break. Is that okay?

MS. NIJMAN: Absolutely.

HEARING OFFICER HALLORAN: Thank you. We'll be back at 11:00.

(Whereupon, after a short break was had, the following proceedings were held accordingly.)

HEARING OFFICER HALLORAN: It looks like everyone is ready. We are back

on the record. It's approximately 11:00 o'clock. Mr. Seymour is still on the stand and Ms. Nijman is directing. You may proceeding. Thank you.

MS. NIJMAN: Thank you.

BY MS. NIJMAN:

Q. So we were just turning to the Will County site before the break and turning to Slide 58 of your Exhibit 901, this slide presents the Will County site history and surroundings.

Would you briefly describe this?

A. Yes. This is again the summary of the similar process that I used for the other plants where, you know, it's a plant that's a 1955 plant. So, you know, over 50 years back, this was operating -- actually 62 years.

And so I reviewed the situation there and I looked at the various ponds. I looked at the ash sample results that for comparison to groundwater. I looked at the historic areas and the samples analysis that we had for more recently 2015.

Then, of course, I had reviewed CCAs and the administrative controls, which include the establishment of a GMZ and an ELUC, E-L-U-C, and also looked at the risks from groundwater from potable well use and surface water.

Q. And turning to the next slide, the site map, we've heard the ponds identified and described by Mr. Gnat, among others, does this map provide an accurate representation of your understanding of the various impoundments, active and inactive?

A. Yes. The two highlighted blue ponds, Pond 2-S and Pond 3-S also called Pond 2-South and 3-South, those are the currently -- the more active pounds and I believe one of them may be going inactive soon, but to the north, we have Pond 1-South and Pond 1-North and those are not active.

Q. And just as to 1-North and 1-South, we have stipulations as to those ponds: Stipulation 48, there are two inactive ponds at the Will County station: Ponds 1-North (1-N) and 1-South (1-S); Stipulation

49, Ponds 1-N and 1-S at the Will County Electric Generating Station have Poz-o-Pac liners; Stipulation 50, Ponds 1-N and 1-S were removed from service in 2010 and neither received any ash or process water.

Now, turning to the next slide, similar to the other stations, did you review the history of the impoundments for Will County?

A. I did. And it has the same format as the other tables for -- for Will County. We looked at columns to the right are -- one describes the ash ponds present, the date they were constructed with the liners, original, and then the date when they were relined with high density polyethylene and then the last column is scheduled ash removed.

Q. And generally, looking at the date constructed, the liners, what was the date all of these original liners were constructed on the ponds?

A. These all had Poz-o-Pac liners back in 1977.

Q. And how thick was the Poz-o-Pac at

Will County?

A. Well, the -- in general, they're 36 inches thick. They put them in in six-inch layers. So they're quite, quite thick.

Q. Now, looking at the next column, dates relined, how would -- as to Ponds 2-South and 3-South right now, how would you generally describe the relining systems?

Are they similar or different?

A. Well, they both have -- they're very similar. So they're similar. They both have HDPE. They both have geotextile cushions. They both have a sand cushion layer. So they are very, very similar.

Q. Okay. And turning to the next page, Slide 61, entitled "Will County South Ponds 2 and 3," does this represent the cross section for those ponds?

A. Yes, it does.

Q. And would you describe from bottom to top what the liner is for those ponds as relined?

A. Sure. The dark brown is the native soils are subgrade. Above that and underneath

the bottom of the ponds, we have -- it's Poz-o-Pac 24 plus inches toward the edge of the bottom of the pond. And then we've got -- above that, we have the bottom geotextile cushion. Above that, is the HDPE liner. Above the liner is the top geotextile cushion.

Then in Pond 2-S, we have what's called a geocell along the bottom edge and up the side slopes. And on both Ponds 2-S and 3-S, they both have the sand cushion of 12 inches. On top of that, they have the crushed limestone warning layer that is six inches thick.

Q. Noting towards the middle of the cross section, we've got Poz-o-Pac at the bottom and then it's slightly different right above it.

What is that area?

A. Well, in the -- away from the edge of the pond, that is natural fill. When it was originally installed, they had the foot of total Poz-o-Pac in the bottom and then they had a foot of fill and above that, they

put a foot of Poz-o-Pac.

In the relining, they took out the top foot of Poz-o-Pac and so in some areas, there was a natural -- there's a fill at the bottom of the pond at that point compared to the sides of the pond -- the Poz-o-Pac on the sides.

Q. So if I understand correctly, the Poz-o-Pac on the sides was 36 inches and in the middle of the ponds had a film material in the middle of the Poz-o-Pac?

A. Correct.

Q. Other than the liner systems, you also note the elevations of groundwater in the pond bottom elevation at Will County.

Would you discuss that analysis?

A. Sure. The pond bottom elevation is 528.5 feet for both ponds. The groundwater varies between the different ponds. For the average for Pond 3-South is elevation 581, which is about a foot and a half less than the pond bottom. In round Pond 2-S, we have an elevation of 582.5, which is the same as

the pond bottom.

Q. And do those higher elevations cause you concern for hydrostatic uplift?

A. Well, it would be of concern when the ponds were empty and being cleaned out. And so what I looked at is I looked at that elevation, which does not cause hydrostatic uplift because the water pressure -- the pressure of water having the weight of about half of soil and concrete -- like, one foot of soil is equal two feet of water.

And so you have to have more feet of water pressure than soil to counterbalance or to push the liner up. So in this situation, that weight of that 18 inches is very important of that cushion and the stone on top of the geomembrane because as that water level would rise around Pond 2-S, is could cause hydrostatic uplift.

So I looked at that and basically that foot and a half of sand and stone at the bottom resists the maximum water level that we recorded, which is about 1.3 or a foot and a quarter higher and so it

still adds a margin of net down pressure even at the highest maximum groundwater levels in the area and, of course, that would only be of concern when the pond is empty.

So the bottom line is you should watch it. You should be careful when you do unline the pond. You probably check the water levels and make sure it's not too high, but even then, it's just something to be looked at, but I'm -- I'm not that concerned about having hydrostatic uplift occur.

HEARING OFFICER HALLORAN: Again, Mr. Seymour, perfect speed. Thank you for me anyway. Thank you.

BY MS. NIJMAN:

Q. In fact, did you do some mathematical calculations of downward forces at this pond because of the concern you're just discussing?

A. We did. I did.

Q. And did those calculations result in the conclusion you just stated?

A. That calculation was done a couple few years ago and since that time, I've updated it because I have now considered the maximum

water levels. Obviously, it was raised in the course of this matter.

And I also -- and again, in this testimony, I wanted to present the worst case as though there was no Poz-o-Pac just in case it was -- because I had actually used 30-inch Poz-o-Pac in my calculation. That was a -- it should have been 24.

So I looked at it as if there was no Poz-o-Pac, just a geomembrane liner at the bottom at the maximum water level. There was no hydrostatic uplift because it's resisted by the sand and gravel sitting on top of the geomembrane.

Q. At Will County, how did you learn about the ash removal process? I mean, we've heard some testimony here.

Did you do anything else?

A. Yes. Will County ash was removed by LaFarge. We spoke to Mr. Nowicki and then, of course, Fred Veenbaas was here and we heard his testimony and we talked to him and Chris Lux. So we talked to the operators, if you will, of these facilities and the contractor

that does the removal.

Again, it was the methodical approach. They had contingency plans if they did have an accident meaning a nick in the liner that could cause a hole. So I felt it was a responsible program.

Q. In your experience, where would these nicks in the liner from equipment occur, the top of the liners or where would they occur?

A. Well, they would occur where the geomembrane was exposed. In other words, where it was not below the water. It would be next to impossible to damage it when it's full of water because there is no equipment in the pond. So it's always going to happen around the edges where the liner is exposed or when its being cleaned out, it could occur again above where the water is at that time, but it could be from equipment hitting the -- hitting the geomembrane where there's exposed geomembrane.

Q. And did you learn of any circumstances where there is exposed geomembrane during the

clean-outs?

A. Yes. There was -- there was a good-sized tear that was found when there was no water in the pond at some point in time during the clean-out.

My understanding is it was repaired prior to filling the pond and so that would not have caused the leak.

Q. So that was the one circumstance at a pond that was not in use?

A. That was pond 3-S back around the 2009 timeframe, I believe.

Q. What is your opinion based on your review of Will County data and the construction information as to whether the Will County ponds are leaking constituents to groundwater?

A. I don't think they are leaking.

Q. Looking at Slide 62, that's the Will County map with the monitoring wells identified. We heard Mr. Gnat discuss those.

Is this an accurate depiction of the monitoring wells at Will County?

A. Yes.

Q. And I think he stated Monitoring Wells

1, 2, 3, 5 and 9 are upgradient; is that correct?

A. I don't think that's what --

Q. Oh, I'm sorry. Go ahead. Why don't you tell me.

A. I -- I would have said that Monitoring Wells 1, 2, 3, 4, 5 and 6 would be upgradient.

Q. Thank you.

And looking at the next slide, Slide 63, we heard Mr. Gnat discuss the groundwater flow direction. This is the groundwater contour map dated 5 of 2017 at Will County.

Did you agree or do you agree with Mr. Gnat's description of the groundwater flow as depicted here?

A. Yes, I do.

Q. And again for Will County, if you look at the next two slides, 64 and 65, you did a comparison of the ash data from ponds -- constituents from ash data and ponds with constituents in the groundwater.

What were your conclusions?

A. Well, we followed the same process

and my main conclusion was that at the bottom line, 50 to 60 percent of the data, the constituents in the groundwater do not match the constituents in the ash.

Q. In the ponds?

A. Excuse me. Yes, the ash in the ponds.

Q. And --

A. This first table is using the site-specific date at Table 5-5.

Q. And as we've said earlier, the second table at 5-4 is the comparison with the constituents of ash from the EPRI published data, correct?

A. Correct. And we found a little more consistency oddly, but it was still about 50 percent of the data are inconsistent meaning the data between the groundwater and the ash in the ponds don't match.

Q. Turning to the next slide, Slide 66.

A. Okay.

Q. We heard from Maria Race some discussion about this area at the bottom, alleged slag bottom ash placement area?

A. On the bottom southern property

line, yes.

Q. Yes. Is that the area that -- I'm sorry. I'm referencing the wrong section.

In green, at the top near pond 1-N, CCR placement area sample 2015, that's what I wanted to ask you about.

A. I see that.

Q. And do you recall Mr. Gnat talking about the sampling done in that area?

A. I do.

Q. And are those part of the historic ash samples that you relied upon for your opinions in this case?

A. I did. They are.

Q. And generally what did you find based on that sampling?

A. Again, we found similar parameters across the different sites where we had some barium and boron. Additionally, we had a little iron in this one and we did not have the sulfate, but the barium and boron were consistent with the other samples from the other sites.

Q. Turning to the next line for

Will County, Slide 67, does that represent the Groundwater Management Zone accurately, in your opinion?

A. Yes.

Q. And that's been discussed in testimony by Mr. Gnat and where are all the groundwater monitoring wells included within that Groundwater Management Zone?

A. Yes.

Q. Now, did you also review the groundwater concentrations for Will County to conduct a spacial analysis?

A. I did.

Q. And did you use the same procedure for Will County as you did with the other sites?

A. We did. And as you can see, we used the same four analytes.

Q. Okay. Turning to Slide 69, is that what you're referring to?

A. I'm sorry. Yes.

Q. And what did you find?

A. Again, we had not very many -- nothing exciting with barium, which is

probably a good thing. But boron, we had again several well, Monitor Wells 7.4 and 5 and what's interesting is, you know, Wells 4 and 5 for boron, they're upgrading wells.

And manganese, we found it at Wells 4 and 8 and 3 recognizing that Wells 4 and 3 are upgradient, which would indicate it's not coming from the ponds. Well 8 is downgradient.

And it's similar for sulfate where they found the peaks. Again, where you're looking for a source, it's upgradient of the pond because these are upgradient wells.

Q. And what did this tell you about what -- did the peaks tell you from different wells?

A. It told me that the ponds aren't -- the source is not the ponds, that there's some upgradient, I'll call it, as I said before, some historical use of the property that is causing the impacts.

Q. And as you did with the other sites,

did you do a temporal trend analysis for Will County?

A. I did.

Q. Looking at the next slide, Slide 70, is that -- does Slide 70 reflect the updated groundwater constituent temporal trend testing results for Will County?

A. It does recognizing these are the first ten wells that were installed. The more recent wells were installed by Midwest Gen to respond to the CCR rule and there wasn't the amount of data to analyze. We did not analyze the new wells.

But these data again go from 2010 to 2017. We did the same linear regression analysis to see what slope the line is. We looked at what was increasing, what was decreasing or where we would make no conclusion.

Q. On the next slide is Slide 71.

What did you find at Will County?

A. Again, in summary, in the middle, in the big bullets, it appears that the

groundwater concentrations are neither increasing nor decreasing for same reason.

If you look at the numbers, about the same number of wells or parameters are increasing as decreasing. So it's neither increasing or decreasing.

Q. Is a fair way to describe that it's not getting worse?

A. Correct.

Q. In lay speak?

A. Yes.

Q. Now, for Will County, you also, like you did or all the other sites, you did a risk analysis and that would be at -- what's marked as Exhibit 907 in your binder?

A. Yes.

Q. What did you find for Will County?

A. The same as the other three sites under an accepted risk assessment practices that we found.

Q. And as with the other sites, were there any potable wells in the area that are at issue?

A. There are no potable water use at

this site like the other sites. In addition, there's the ELUCs that don't allow the installation of potable water wells.

Q. And that would apply to all the sites --

A. Yes.

Q. -- where the ELUCs are?

A. Correct.

Q. Based on your review of the data and your risk assessment at Will County, what is your opinion of Midwest Generation's actions regarding protection of groundwater?

A. My opinion of Will County would be the same as the other plants. Again, it was a responsible program. It was -- I worked for a number of power utilities and to have an organized evaluation program normally is good and it's normally other clients, it's ad hoc and plant-base driven.

So here, it was nice to have a corporate program to look forward a little farther that what plants often do and I found it to be a very responsible owner of these facilities.

Q. So I'm going to ask you the same question we have for the other facilities.

You're saying it's not the ponds. You're saying it's not the historic areas at Will County. So how did the constituents of coal ash that are in the groundwater get into the groundwater?

A. You know, the first bullet in my analysis all along has been that these are old facilities and, you know, we've looked at the ponds. I called them historic areas, which are defined by borings mainly. So there's other historic use and upgradient influences that are causing these impacts.

And there's no specific source that could be identified and that in my opinion, the way to manage these -- these impacts are the way that it's been agreed to by the Illinois EPA and Midwest Gen. It's to monitor, put a GMZ, put an ELUC, control the risk, and you're going to have no risk at all.

Q. So is it important to locate these potential little sources -- residual sources

that might be out there?

MR. RUSS: Object to little.

HEARING OFFICER HALLORAN: Rephrase.

BY MS. NIJMAN:

Q. Is it important to locate each individual potential source -- historic source that might be there?

A. I've worked at much more complicated, much more contaminated sites with lots of things going on and you can waste a lot of effort going after every possible area.

And in situations like that -- again, I think I mentioned earlier that Illinois has a more practical approach that cuts to the solution quickly. I -- as I mentioned before, you put the problem within a box and you control at that box. You control the risk. In that case, it's not necessary to know all of these other historic use sources.

Q. Is it unusual at these old historic sites you are talking about to have unknown sources when a site is 50, 80 years old?

A. Not at all. It's more likely than not, put it that way. Much more likely than

not.

Q. Have all of your opinions in your report as updated and your opinions today and yesterday, are they true and correct to a reasonable degree of scientific certainty?

A. Yes. That's my opinion.

MS. NIJMAN: Mr. Hearing Officer, I'd move to admit Exhibits -- Midwest Gen's Exhibits 900 through 908.

HEARING OFFICER HALLORAN: Okay.

MR. RUSS: I'm sorry. May I have just a moment?

HEARING OFFICER HALLORAN: Any objection, Mr. Russ?

MR. RUSS: Yes. Can I have a moment to confer, please?

HEARING OFFICER HALLORAN: Sure.

MR. RUSS: No objection.

HEARING OFFICER HALLORAN: All right. Thank you, Mr. Russ.

Respondent Exhibits 900, 901, 902, 903, 904, 905, 906, 907, and 908 are admitted.

(Respondent Exhibit Nos. 900 through 908 were admitted into evidence.)

MS. NIJMAN: Our direct is complete.

HEARING OFFICER HALLORAN: Thanks. Let's go off the record:

(Whereupon, a discussion was had off the record.)

(Whereupon, after a short break was had, the following proceedings were held accordingly.)

HEARING OFFICER HALLORAN: All right. We are back on the record. It's approximately 11:40. Mr. Russ is starting his cross-examination of Mr. Seymour.

You may begin, sir. Thank you.

MR. RUSS: Thanks.

C R O S S - E X A M I N A T I O N

by Mr. Russ

Q. Hello, Mr. Seymour.

A. Hi.

Q. The first thing I want to look at is

your CV, which I believe is in your binder at the end of Exhibit 900.

A. Okay.

Q. Or it is Exhibit 900. I'm sorry.

Do you have any degrees in hydrology?

A. No.

Q. Do you have any degrees in geology?

A. My degree is in geotechnical engineering, which is a combination of civil engineering and geology.

Q. Okay. Can you please identify any projects on your CV where you were responsible for evaluating groundwater quality data to determine the source of contamination?

A. Yes.

HEARING OFFICER HALLORAN: Mr. Russ, could you keep your voice up?

MR. RUSS: Yep.

HEARING OFFICER HALLORAN: Thank you.

BY MR. RUSS:

Q. Do you want me to ask it again?

Can you please identify any

projects on your CV where you were responsible for evaluating groundwater quality data to determine the source of contamination?

A. Yes. There's a project in Monroe, Michigan. It's called DTE Energy. It may not be fully explained in here.

Q. Is it on Page 48961?

A. 48961, Monroe Power Plant, yes. It's an ash pond and there was seepage at the toe of the slope and that we looked at the chemistry, including Tritium, to look at whether or not the source was the pond.

Q. Who is "we," for the record?

A. Me and my colleagues.

Q. Oh, okay. Thank you.

Any other?

A. Well, we looked at, for example, the Berlin & Farro Superfund site, which is not an ash fund. Let me look. It should be here. Yes, on Bates 58963 (sic.), Berlin & Farro Liquid Incineration Site, that was a remedial investigation. There, we were looking for remaining sources.

If you look at the same page

further up, National Industrial Environmental Services, that was a hazardous waste treatment facility where we looked at groundwater and we looked at a couple of organic evaporation ponds. We looked at a hazardous waste landfill and we looked at some acid treatment ponds.

At the McGraw-Edison facility on Bates 48962, that was again a Superfund site and we were looking for the sources and conducting a study to arrive at a remedy.

For the Motor Wheel Disposal Site, that was a Superfund site where we looked at sources for cost allocation understanding what came from where.

For the -- a number of sites, manufactured gas plant sites, a utility -- a manufacturer on the same page, Page 48962, where they have a lot of MGP sites where we looked at various possible sources.

Q. Which one is that? I'm sorry.

A. It's at the top left. It says, "Utility Company, Multiple Sites, Wisconsin."

Q. Thank you.

Sorry to interrupt you, but

the first one is an FGD site.

Were the rest of these ash coal ash related or not?

A. They were not.

Q. And when you --

A. And they had the similar, you know, groundwater evaluations, but it's -- they weren't coal ash constituents.

Q. Okay. And was that all while you were working for Geosyntec?

A. No. That was a lot of prior -- some of it was with Geosyntec and some was with my previous company.

Q. And when -- when you were working with your company, whether it was with Geosyntec or the previous company on these projects, were you personally responsible for evaluating the groundwater data or was that sometimes someone else within the company?

A. It's a combination, but more often than not, I was responsible. You can appreciate when you first start, my first site in 1982 with Environmental Contamination, I was the guy doing all of the work.

Q. Right. That's how it goes. Okay. Thank you.

A. Excuse me, Mr. Russ. You said FGD site.

Q. That's what it looked like.

A. No. With the Monroe project, it was fly ash.

Q. Oh, I'm sorry. It looks here like it says flue gas desulphurization gypsum.

THE COURT REPORTER: I'm sorry. could you say that again louder?

MR. RUSS: Yeah. Flue gas desulphurization gypsum.

BY MR. RUSS:

Q. Am I reading that wrong?

A. Well, let me find it again because at each project, I've done so many things it may not be listed here, Mr. Russ.

Q. This is the Monroe Power Plant on 48961. This is the first one we talked about.

A. Yeah. That was the first study. It's built in 19- -- I think 2009 and then I worked on that project for eight more years and so within that span -- period of time is

when I did the study.

Q. Okay. And so the confusion over whether that was fly ash or flue gas desulphurization material, which --

A. It was fly ash. The study was to look for a flue ash -- excuse me -- FGD, flue gas desulphurization facility that could be located within that ash pond or at another location.

Q. Okay. Thank you. That clarified that.

And just to get this crystal clear on the record, you said you were responsible for getting it done, the groundwater analysis, does that mean you were doing it yourself?

A. I did everything. I was sampling the groundwater, tabulating the data and analyzed the data -- evaluated the data, yes.

Q. Okay. But you didn't necessarily do that for each of these --

A. Put it this way; if you know what you're doing, you can tell people what data you need to see and you know how to do it --

Q. Okay.

A. -- after doing it -- after doing it for so many years.

Q. Okay. Thank you.

Now, moving your report, you don't have to open it yet, but in your report, you discussed groundwater impacts at these sites, right?

A. Yes.

Q. And by impacts, you were referring to elevated concentrations of certain constituents in the groundwater?

A. Yes. That's a fair statement.

Q. And these constituents included chemicals that you would describe as inorganics; is that right?

A. They were inorganic and elemental or as compounds.

Q. For the Powerton site, you noted that the inorganics that are in the groundwater are characteristic of coal ash.

Do you remember that?

A. They probably were something like that in general.

Q. Do you still hold that opinion that the inorganics in the groundwater at Powerton are characteristic of coal ash?

A. I would say that they are characteristic, but not consistent with what we previously heard regarding what's in the ponds and what we've identified.

HEARING OFFICER HALLORAN: Let's go off the record for a minute.

(Whereupon, a discussion was had off the record.)

BY MR. RUSS:

Q. Can we look at your deposition? I have a few copies of it here.

Go to Page 46 of your deposition.

A. Excuse me. Page 46 on the bottom or the actual deposition?

Q. Page 46 on the deposition. I think the pages on the bottom will have a parenthesis range of four pages for each page?

A. Okay. Yes.

Q. So deposition Page 46, Ms. Cassel has indicated on the top of the page -- she's asking

questions about the Powerton site, right?

A. Yes. I see that.

Q. And she asked you a series of questions, but the answer you gave on Lines 17 and 18, could you recite that, please, out loud?

A. Yeah, I will. I was just --

Q. Oh, okay. Sure.

A. -- reading all around it --

Q. Yes.

A. -- to make sure I understood it.

Q. Yes.

A. Leading up to it, it asks if there's a specific source. And I say, "Answer: No specific source.

And then Ms. Cassel said, "Question: Any general sources?"

"Answer: The inorganics that are in the groundwater are characteristic of coal ash materials."

Q. Okay. And then --

MS. NIJMAN: Can you keep reading?

BY THE WITNESS:

A. "Answer: My point is that the ash

that we sampled and analyzed and where we evaluated it, it doesn't appear to be contributing enough to cause what we're seeing. And so I'm concluding by process of elimination there's something else."

BY MR. RUSS:

Q. Thank you. I appreciate the rest of that answer too.

Now, some of the inorganics we are talking about here are boron and sulfate; is that right?

A. Some of them are, yes, boron and -- inorganic compounds -- sulfate.

Q. And so when you use the phrase "groundwater impact, that included in some cases elevated concentrations of boron and sulfate?

A. In the groundwater data, it had, in some cases, elevated boron and sulfate.

Q. Now, one the opinions that you gave in this case is that the recent groundwater impacts are not a result of the ash currently stored in the ponds at the sites; is that right?

A. Consistently, what we've seen in the

analysis -- by the matching analysis, we've concluded that the data of the groundwater is inconsistent with the ponds being the source.

Q. Is your opinion, that the recent groundwater impacts instead are more likely than not a result of historical uses at the site and the surrounding industrial companies and conditions?

MS. NIJMAN: I'm going to object as to overbroad.

HEARING OFFICER HALLORAN: Sustained. Rephrase, please.

BY MR. RUSS:

Q. I was actually reading from your report.

Could you turn to your report on Page 43?

HEARING OFFICER HALLORAN: Is that Exhibit 901, sir?

MR. RUSS: 901 is the presentation.

MS. NIJMAN: Is it 903?

MR. RUSS: It's 903.

BY THE WITNESS:

A. I found it.

BY MR. RUSS:

Q. Thank you. It's on Page 43 of Exhibit 903.

A. Page 43.

Q. And I'll catch up with you here. I think it's the last sentence there. It says, "Thus, it is my opinion that the recent groundwater impacts are not a result of the ash currently stored in ponds at the sites, but instead are more likely than not a result of historical uses at the sites and the surrounding industrial companies and conditions."

HEARING OFFICER HALLORAN: Okay. We've got to speak up and slow down. We have a court reporter trying to take in all you have. It's my obligation to get a clear record, a legible record.

MR. RUSS: Did you catch what I said?

THE COURT REPORTER: It's a struggle. I mean, you're talking too low and you're really reading fast so I'll have to get the document to make

sure I have it correctly.

MR. RUSS: Okay. All right.

I'll slow it down.

BY MR. RUSS.

Q. So what it says here is, "Thus, it is my opinion that the recent groundwater impacts are not a result of the ash currently stored in ponds at the sites, but instead are more likely than not a result of historical uses at the sites and the surrounding industrial companies and conditions."

MS. NIJMAN: Same objection to over- -- based on the previous 25 pages.

HEARING OFFICER HALLORAN: I'm not sure what the question was, Mr. Russ.

MR. RUSS: I was asking if that was still his opinion.

HEARING OFFICER HALLORAN: Yes, that's fine. You can, you know, flesh it out on redirect if need be, Ms. Nijman.

Can you answer that?

BY THE WITNESS:

A. Yes. It is still my opinion.

MR. RUSS: Thank you.

HEARING OFFICER HALLORAN: Thank you.

BY MR. RUSS:

Q. Are you familiar with the coal ash rule? I'm assuming you are because we've been looking at it already today, the EPA coal arm rule or CCR rule, as it's been referred to.

A. I'm familiar with it, as established yesterday.

Q. And are you aware of the liner requirements in the coal ash rule?

A. I am very knowledgeable of that.

Q. And is it true that the coal ash rule requires at least two feet of compacted soil with a hydraulic conductivity of not more than one time ten to the negative seven centimeters per second or the equivalent of the subgrade for ash in ponds?

A. I'd have to look at the rule. I would say that the permeability for two-foot thick is a requirement for the soil or barrier layer for a new facilities.

Q. Uh-huh. And when they say "compacted soil," what does that mean to you?

A. It's a common -- in my business, when you have compacted soil, it's normally a low permeability soil to achieve the hydraulic conductivity characteristics.

Q. And is there anything other than clay that can achieve that permeability?

A. Yes.

Q. Okay.

A. Many things, as we have seen here in these cases.

Q. Can we go back to your deposition then, which is Page 207 -- in this case, 207 and 208?

And could you just please read on Page 208, Lines 8 through 10.

MS. NIJMAN: Hold on a second. I'm not there yet.

BY THE WITNESS:

A. Page 208.

BY MR. RUSS:

Q. Uh-huh.

A. You said Lines 8 through 10?

Q. Yes.

A. Okay. I can see it. You want me to read it out loud?

Q. Yes. Just Lines 8 through 10.

MS. NIJMAN: Well, are we reading the whole question and answer? I don't think you can just read a portion of the answer.

HEARING OFFICER HALLORAN: I agree.

BY MR. RUSS:

Q. Well, okay. Let's go back to -- I guess we'd have to start with Line 16 on Page 207 to get the whole exchange on that one.

A. I'm fine with that.

Q. Okay.

A. Line 16 begins "Question: Okay. So -- I'm sorry -- you said your understanding is the ponds, the Midwest Generation ponds that we're discussing, do not have liners with the permeability that I mentioned?"

"Answer: Correct."

"Question: What is the basis for

your statement?"

"Answer: That -- the records that we've researched and what has been indicated to us and the -- what I have documented if my report on the figures we just went through. There's been no report of a compacted clay liner of low permeability as you've requested."

"Question: Okay. I said 'compacted soil' just to be clear.

Do you know about compacted soil with that particular hydraulic conductivity under the liners at the ash ponds?"

"Answer: I apologize. The only soil that is that low of permeability is clay. It's the same. I'm sorry."

Q. Okay. So you just said that there -- I believe you said there were other kinds of compacted soil that would have the same permeability?

A. Mr. Russ, I -- I -- I agree I said that and I think -- when I think of the rule, I think of the requirements for liners including the alternate. So, in fact, clay soil is what

you use to achieve that permeability and there are alternates to receive that permeability. So I was thinking the permeability versus the compacted soil. That's my understanding.

Q. Okay. Okay.

A. That's the clay and the equivalence for what they call the alternate in the rule.

Q. Okay. So just to be clear, are you aware of any other compacted soils that would have that permeability other than clay?

A. I -- not to my knowledge.

Q. Okay. Okay. Thank you.

And then I think we started getting into this with this part of the transcript, but as far as you know, none of the ponds at these four sites have a subgrade that fits that description, do they?

A. The description of a compacted clay bottom liner in the rule is for the new facilities and it's not necessarily a requirement for the existing facilities. So these bonds are existing. So it's not there, but it's also not a requirement.

Q. Understood. But just for the record,

do any of these ponds at the four sites have a two-foot compacted clay liner with that permeability?

A. They do not, to my knowledge.

Q. Thank you.

Are you familiar with -- and I know you are -- Poz-o-Pac?

A. Yes. I am familiar with Poz-o-Pac.

Q. And Poz-o-Pac is a cementitious material made with fly ash; is that correct?

A. That's one of the ingredients. It's also of lime or cement aggregate like a sand.

Q. And some of the ponds of these four sites are lined with Poz-o-Pac, correct?

A. Yes, they are. Many of them.

Q. And Poz-o-Pac liners can crack, right?

A. The conditions that they would crack would have to, of course, be between the loading and weathering of those like freeze/thaw so they can crack.

Q. Okay. And if a Poz-o-Pac liner is cracked and is put under liquid load, the liquid will push through the cracks;

is that correct?

MS. NIJMAN: I'm sorry. Objection. Is this a hypothetical?

HEARING OFFICER HALLORAN: I'm sorry?

MS. NIJMAN: Objection, vague. Is this a hypothetical?

MR. RUSS: I don't think it's a hypothetical. I guess if a Poz-o-Pac liner is cracked, will water pass through it.

BY THE WITNESS:

A. Well, if you phrase it in the question of if, I would consider that like a hypothetical. But, of course, if you have crack in a material, the water can flow through if you put the water head on top of it.

BY MR. RUSS:

Q. Right. Well, okay. I can stop there.

Is it your opinion that a landfill -- well, first of all, does the term "mobile waste" mean anything to you

in your professional experience?

A. Did you say mobile waste?

Q. Mobile.

A. Not really.

Q. Okay. Let's go back to your deposition again so we can get clarification on this. Go to Page 222 of your deposition.

A. Okay.

Q. If you start on Line 9 and read through Line 2 on Page 223, please.

A. Okay. I've read it.

Q. Did you use the term "mobile waste"?

A. Yes. It was a mis- -- probably a misstatement. What you're thinking was the mobility of the constituents. The waste isn't really moving. It's the constituents in the waste, for clarification.

Q. And --

A. Again, this is -- as we have been discussing, this is non-site-specific, this is general?

Q. This is general. This is not specific to any site. I'm just wondering if you still have this opinion that if a landfill is -- I'll

read it. "If you had a landfill that was closed that had highly mobile waste and that the waste were placed below the groundwater table and they were allowed to migrate off-site, then I would say that would not be a safe practice."

Is that still your opinion?

MS. NIJMAN: I'm sorry. If you could continue reading; "BY MS. CASSEL: Okay." "Answer: -- as a hypothetical."

MR. RUSS: I'm going to object. I think that was --

HEARING OFFICER HALLORAN: You can keep reading. I have sustained.

BY MR. RUSS:

Q. So then Ms. Cassel said, "Question: Okay."

You said, "Answer: -- as a hypothetical."

"Question: Understood."

I think that was the end of the answer.

A. That's fine. What's the question, sir?

Q. My question?

Do you still have this opinion?

A. I think that in situations like that, then, it's highly mobile waste that has the characteristics of -- that could cause other effects. If it's allowed to leave containment area, it would be exposed to receptors, if you will, then it would be not safe if you were truly causing a health risk in excess of what's allowable by state and federal law.

Q. And I want to ask you a couple of questions about two terms that you used.

One is "highly mobile waste." I know you -- now, you're saying constituents. But what you do mean by "highly mobile"?

MS. NIJMAN: Objection, misstates testimony.

HEARING OFFICER HALLORAN: Overruled. He can answer if he's able.

BY THE WITNESS:

A. Sure. Again, when I look at the constituents, some constituents are absorbed. Both organic and inorganic could be absorbed or precipitated as it moves through the

environment. And so less -- less of it moves or moves more slowly. Others are more freely moved like with water, they consider those to be mobile. Some organic wastes are like that and some inorganic chemicals are like that and some inorganic constituents are like that.

BY MR. RUSS:

Q. And then I also was wondering about the significance of the waste being placed below the groundwater table.

How does that contribute to it being an unsafe practice?

A. Well, I -- again, I didn't say that it would be unsafe. It would be under certain circumstances, but what it really does is the groundwater, if it's migrating under -- through that material, then it would carry off those materials to -- again, assuming it's to a source, a receptor, that would make it unsafe.

Q. Okay. Thank you.

Would this opinion also apply to coal ash leaving coal ash in the landfill below the groundwater table if it migrated

off-site, it would be an unsafe practice, in general terms?

MS. NIJMAN: Objection, overbroad.

HEARING OFFICER HALLORAN: I'm sorry, Ms. Nijman?

MS. NIJMAN: Overboard, objection.

HEARING OFFICER HALLORAN: He can answer if he is able.

BY THE WITNESS:

A. If he had the conditions, as I mentioned, where you have coal ash below the groundwater table, put it in a situation where it can migrate laterally to an exposure point where it could be subject to ingestion in a concentration that exceeds an acceptable risk limit, then I would consider that as unsafe.

BY MR. RUSS:

Q. Okay.

A. Or at least in excess of regulatory allowances because even with the regulatory allowances, I think calling it unsafe may be a little bit too simple. It's really because we live with these cleanup levels of acceptable

risk.

Because you have a risk, they can say you have to manage that risk. That doesn't mean it's necessarily unsafe.

Q. Are there also situations where a constituent might be unsafe at a level lower than the current regulatory standard?

A. That's a very complicated question, Mr. Russ, because there's a lot of chemistry out there and that's a very big question. So maybe you have to hone me in because there are -- it's almost more of a question applicable for a professional risk assessor because there are a lot of chemistry that I'm not aware of.

Q. That was my old job.

So let's take a chemical like manganese, for example. We were reading in the coal ash rule that there's no MCL for manganese. So it hasn't been found to cause a lot of damage cases, I think, is the term they used.

Could manganese be unsafe even though there's no MCL by which to evaluate its safety?

A. My understanding of manganese is that it's got very limited health impacts also and so that again you have to ask a toxicologist that question. What I know is I follow the regulations and, yes, I know a little bit about how you set MCLs and so on, but that's really a toxicology question. I don't -- I don't see that applicable here.

Q. Well, okay. In general, let's not talk about manganese specifically, but is it possible that there could be a health risk at a level below which the regulatory standard has been set?

MS. NIJMAN: Asked and answered, overbroad.

MR. RUSS: He can probably answer the question.

THE WITNESS: I think I answered --

HEARING OFFICER HALLORAN: I'm sorry.

THE WITNESS: I said I think I answered it.

HEARING OFFICER HALLORAN: I agree. Sustained.

Let's go off the record.

(Whereupon, a discussion was had off the record.)

BY MR. RUSS:

Q. Now, concerning the Joliet site, you looked at the various potential sources of groundwater impact at Joliet 29, didn't you?

A. I've examined the data, yes.

Q. And you looked at off-site sources as possibly causing groundwater impacts of Joliet 29?

A. Just in general. Again, Joliet doesn't really have the impacts that the other sites have. So yes, you can see that there's chloride in the wells based on Mr. Gnat's testimony and things I've heard and understood from before, yeah, they looked at the chloride source, but not much else really.

Q. Okay. So you have not identified any off-site sources that could be contributing to impacts other than chloride, have you?

MS. NIJMAN: Asked and answered.

BY THE WITNESS:

A. That's kind of what I said --

THE COURT REPORTER: Wait, wait.

HEARING OFFICER HALLORAN: Speak up.

MS. NIJMAN: Sorry. Asked and answered.

HEARING OFFICER HALLORAN: He may answer if he's able.

BY THE WITNESS:

A. I think I did answer by saying we looked at chloride and that's all.

BY MR. RUSS:

Q. Is it your opinion that the groundwater impacts at Joliet may be related to coal ash from historic uses?

A. What I've said is I don't understand the specific source, but it appears to be historic uses and that the site again is one of the sites that has the lowest impacts and it is currently below the Illinois standards.

Q. Okay. Can we turn to your deposition at Page 37?

A. Yes, Mr. Russ.

Q. Can you read the question and the answer -- let me see. I'm sorry. This is a long back and forth, but starting with the question on Line 6. Ms. Cassel -- I'll just get you to the answer here, but Ms. Cassel asked, "Question: Are there any particular, specific non-coal ash ponds or ash fill sources that you opine are impacting the groundwater?"

"Answer: I have not opined that on Joliet."

"Question: So is it your opinion that the historical uses of the sites and the coal ash ponds are impacting the groundwater at Joliet?"

"THE WITNESS: Pardon me. Repeat the question."

"MS. CASSEL: Could you read the question, please?"

The question was read back. There is an objection.

You said, "I can understand part of it. I can answer part of it.

The power plant is over 50

years old and there are many historic uses at the site that may have caused the impacts that we're seeing, and they have caused the impacts that we're seeing, and they may be related to coal ash from historic uses."

Is that right?

A. Yes. That's what it says.

Q. Okay. And do you still have that opinion?

A. Yes. I think that's consistent with my opinion. As I mentioned, at Joliet, there's some impacts and we don't have specific sources and the site is under proper management right now to avoid risk.

Q. Thank you.

And it's your opinion that for at least some of the ash outside of the ponds, you can rule that out as a source?

A. Well, what I have said is that in Joliet, there is no identified ash outside of the pond.

Q. And specifically, the material that you can rule out is the material for which you have leach test data; is that right?

A. Correct.

Q. So by process of elimination, if --

A. Excuse me, Mr. Russ. There is the northeast area and the south area and I'm thinking of the borings. So that I mentioned the borings as I've identified historic materials.

Q. But the material that you had leach test data for, where was that from at the Joliet site?

A. We had the Joliet data from the area sampled by KPRG kind of southwest of the ash ponds. Then for the data in the ponds, we used other pond data for characteristics.

Q. And do you have leach test data from the landfill for the northeast side of the site?

A. There is the -- they call it the alleged landfill northeast of the site, which is reportedly there. To my knowledge, there's been no sampling and analysis and there's been no need to have that done.

Q. So on Page 41 of your deposition --

A. Yes.

Q. -- starting at Page 40, Line 23, "Question: So your conclusion that there are historic uses that may be impacting the plant is solely based on general knowledge of what is done at a coal plant?"

"Answer: And looking at it by process of elimination, what we've seen out there so far doesn't appear to be an active source. So it must be from some other historic use."

What did you mean by "what we have seen out there so far"?

A. Well, merely the observations that you have, the documentation that again, where the -- what area was sampled and that we know that there was ash in the ponds, for example. So it's really those kind of observations that we are making the conclusions.

Of course, there are, you know, boring logs that don't have ash, for example. You put all of those things together, you come to a conclusion.

Q. Thank you.

Specifically, when you say

"what we've seen there," what were you referring to "there" in terms of specific sources?

A. I said there are no specific sources to the groundwater impacts that we've been able to find, but from some of the historic areas where -- as I mentioned, the area that's been sampled by KPRG, there's a northeast area that's adjacent to the site and there's the borings that don't show ash and then there's the ash in the pond. That's what I mean by what I see among the documentation.

Q. Okay. Were the leach tests that -- from the Joliet 29 site that you saw representative of the ash that may or may not be buried in the alleged ash landfill to the northeast?

A. Well, the records show a lot of, you know, use of the western Wyoming coal, if you will, in that when we look at that and say, well, there's coal and coal ash does have similar characteristics also, you can then say, well, it could be.

But again, we've not specifically targeted that as a source because

there's no need to. It's not regulated. The US EPA has stated we've looked at these kinds of facilities and if it doesn't have the hydraulic head or the -- I'll call it the drivers to cause them to regulate.

Illinois is, I think, in the same position -- they're in a position right now to change things.

Q. So just to get back to my questions, were the leach test data that you had representative of that area?

A. I assume that it is because it's -- if it is coal ash, if it is there, I would say it would be reasonably representative provided it is again a similar power plant and so on.

Q. You assume that it is?

A. I'm thinking that it is, yes.

Q. Okay. And what was the material that was sampled foe the leach test at Joliet 29?

A. It was the material again that KPRG sampled in the borings southwest of -- at least outside the pond, southwest of the pond.

Q. All right. Do you know what it consisted of?

A. It was primarily ash. It probably had some soil. I know they found some soil in some areas and I think they excluded that from their analysis.

Q. Do you know whether it was bottom ash or fly ash?

A. I don't recall what it said. So I don't remember.

Q. Okay. I think that's enough of Joliet.

At Powerton, your opinion that at Powerton, the inorganics that are in the groundwater are characteristic of coal ash?

A. Again, did I conclude that in my report? You were so helpful to point that out to me before.

Q. You concluded that in your deposition.

Do you want to look at that again to refresh your recollection?

A. Could you show me, please?

Q. Page 46.

So on Page 46 of your

deposition, starting at Line 6, the question for Ms. Cassel was, "Question: Can you tell me at Powerton what specific sources outside the Powerton Plant you allege are sources of groundwater contamination at that plant?"

"Answer: We have not -- I have not opined on any specific source."

"Question: Do you have any opinion, as we sit here today, of any other sources outside of the Powerton Plant?"

"Answer: No specific sources."

"Question: No specific source. Any general sources?"

"Answer: The inorganics that are in the groundwater are characteristic of coal ash materials."

A. Yes, Mr. Russ. I think we read this earlier. I apologize, but I answered this before.

Q. That's right. I was asking in a general way.

MS. NIJMAN: I'm also going to object with a continuation where he then says "And I'm thinking something old and

historic, but not something current." We need to read the completed answers.

HEARING OFFICER HALLORAN: I agree, Mr. Russ.

MR. RUSS: Okay. Would you like me to reread it?

HEARING OFFICER HALLORAN: Not the whole thing. You can finish where you left off.

BY MR. RUSS:

Q. So the rest of that answer was, "My point is that the ash that we sampled and analyzed and where we evaluated it, it doesn't appear to be contributing enough to cause what we're seeing. And so I'm concluding by process of elimination there's something else."

I'm actually glad --

MS. NIJMAN: Question, please continue.

MR. RUSS: Well, I can, but I don't know if that has anything to do with what I was just asking.

HEARING OFFICER HALLORAN: Continue, please.

BY MR. RUSS:

Q. "Question: Okay. So you aren't --"

"Answer: But what I'm --"

"Question: I'm sorry."

"Answer: And I'm thinking something old and historic, but not something current."

MR. RUSS: Is that an okay place to stop?

MS. NIJMAN: Yes. Thank you.

BY MR. RUSS:

Q. So back on Page 46 there, you mentioned the ash that you sampled and analyzed doesn't appear to be contributing; is that right?

A. I believe that's what we said, but again I don't want to limit it to a specific sample because remember, samples are taken to represent a median or medium.

MS. NIJMAN: I'm also going to object to it mischaracterizes what's written here, but it's in the record.

HEARING OFFICER HALLORAN: So noted.

BY MR. RUSS:

Q. Then you concluded by process of elimination that there's something else, meaning something that you didn't sample or analyze; is that right?

A. It's meant that when you look at all the data, not just sample analysis, but there's observations of borings, there are things that haven't been tested that we've correlated by engineering analyses to say -- to then use the process of elimination that there's something else that has not been characterized.

But remember, a simple sample is not intended to be the only thing. It's to represent that median.

Q. So you said engineering correlation?

A. Correct.

Q. What does that mean?

A. In engineering, technical engineering specifically, we conduct soil borings and analyses and you are only sampling a certain frequency, a certain amount of material.

So what you do is you correlate

the data. You might test this soil sampling in this boring, but not a soil sample here, but it's the same material. So you correlate the properties across that median.

Q. So the material at Powerton that you tested for the leach tests, where did that come from?

MS. NIJMAN: Objection to "you."

BY MR. RUSS:

Q. I'm sorry. That Midwest Generation had tested.

A. That we had the limestone rock basin was one set of samples. I'm pretty sure we had it also in -- from the bottom ash from the ponds.

Q. Right. As far as the ash outside of the ponds, it was just the limestone basin that was sampled?

A. Yes, that's correct, as I remember.

Q. Right. And you correlated that data to what other data on-site?

A. Well, the fact that you have ash in borings and you have ash in the ponds and

you have ash in the runoff of the basin, you correlate that to the materials outside of the pond that has not been tested.

Q. So is it safe to say that you assumed that the material in the limestone basin was representative of the ash that was found elsewhere on the site?

A. Well, you can look at it from two perspectives. It's a limestone basin, but you also have the other data from the bottom ash samples representing the bottom ash. So it's a characterization of that material that's been correlated to other areas of the site, correct.

Q. Okay. Okay. I'm going to move to Will County.

There are no off-site sources contributing to the groundwater impacts at Will County; is that right?

A. I think we have to be careful how we define site. Recognize at Will County, there is a substation property that's not part of the ownership of Midwest Gen. So you could almost think of that property also.

We have not analyzed that, but I'm saying there are -- in general, I would say you are correct, we have not analyzed off-site sources. It's a water lot area.

Q. In fact, it's an island, isn't it?

A. A peninsula.

Q. Peninsula.

And why is that significant in terms of potential impacts from off-site sources?

A. They are limited areas to be off-site is really why.

Q. Would the water -- surface water on either side of the peninsula serve as a barrier from the migration of off-site sources of contamination?

A. We call it -- in hydrogeology, it's a boundary condition. So the answer would be we're not going to have something come across the water, so to speak.

Q. Okay. Thank you.

Is it your opinion that at Will County, the groundwater impacts are from historic on-site uses of coal ash?

A. I think -- is that also in my deposition report? It probably is.

Q. Let's go there.

A. Can I have the wording correct or accurate?

Q. Page 54. So here --

MS. NIJMAN: Of the deposition or report?

MR. RUSS: I'm sorry. Deposition, Page 54.

BY MR. RUSS:

Q. I'm going to start on Line 24 and I'll keep my eyes up and somebody can tell me when it's okay to stop.

"Question: Can you tell me what historic uses in Will County you allege are the source of the groundwater contamination at that site?"

"Answer: It would be the same as Powerton. I don't have specific historical uses or conditions that would have caused it, but again, I'm dealing with what I know and what I know versus what I don't know."

MR. RUSS: Is that an okay place

to stop?

MS. NIJMAN: Uh-huh.

BY MR. RUSS:

Q. Okay. So when you say it's the same as Powerton, what did you mean by that?

A. Well, again, it's the process. You kind of go through the process. When I say what I know and what I don't know, I mean, that I would not be a real good expert if I didn't look.

And so I've looked at tons of dates on all of these sites. So there's prior reports and current testing. So I've looked at a lot of things. And again, my conclusion has been that there are other historic uses that have not been identified specifically.

HEARING OFFICER HALLORAN: I'm sorry, Mr. Seymour.

THE WITNESS: I'm sorry.

THE COURT REPORTER: I've looked at tons of dates on all of these sites. So there's prior reports and current testing. So I've looked at a lot of

things. And again, my conclusion has been that there are other -- and then you trailed off. If you could pick up from there, that would be fabulous.

BY THE WITNESS:

A. There are other -- other uses that are not specific that have not been identified that are contributing to the impacts of the groundwater.

BY MR. RUSS:

Q. Okay. And is it your opinion that the inorganics at Will County in the groundwater are characteristic of coal ash?

A. The inorganics in the groundwater are also found in coal ash, but again, we have been very careful to -- when you say "characterize," you know, I'm looking at characteristics of this ash versus what's in this groundwater.

Q. Right.

A. And I've -- I'm trying to make it clear that I don't think it's a match, but there are characteristics in general of coal ash.

Q. Okay. Thank you.

And I was just -- I was asking that question because you said it's the same as at Powerton and at Powerton, you had said that constituents in groundwater was characteristic of coal ash.

HEARING OFFICER HALLORAN: Would you keep your voice up, Mr. Russ, please?

MR. RUSS: Yes.

BY MR. RUSS:

Q. So is that a fair comparison between Powerton and Will County?

A. I believe so, yes.

Q. Okay. Thank you.

You used leach tests from -- coal ash outside of the ponds at Will County. You had some leach test data; is that right?

A. Yes.

Q. That Midwest Generation or Midwest Generation's consultants had generated; is that right?

A. Yes. I said that's a KPRG report.

Q. All right. And do you know where that sample came from geographically?

A. Well, it was a series of samples,

really. It was to characterize the area so that I think there was about 50 or 20 borings. They took the samples and analyzed each boring. So they had a lot of tests.

Q. Do you know where the borings were located?

A. It's in the -- I don't know if it's been produced, but it's in the file somewhere.

Q. It's on your desk. I believe it's Exhibit 284?

A. Here?

Q. It's on this pile here on the left.

A. Okay.

Q. I think the map you were talking about is on Page 49569?

A. Yes.

Q. It's a close-up of an area. So I'm not sure if you will be able to identify the area?

A. I know the area.

Q. You do know?

Can you tell me where it is?

A. Well, it's at Will and it's to the east of the north end of, I believe, Pond

1-North. If I had a larger map I could be more specific.

Q. Yes. Let's look at Exhibit 30-E, which is also in that same stack on Page 42352.

A. Thank you. I've got it.

Q. Sir, can you identify on that drawing where this area is located?

A. It's south of Monitoring Well 1 and east of Pond 1-North.

Q. Okay. And do you have a sense of how large that area is looking at it here?

A. It could be determined, but it looks like that's several hundred feet -- by a couple hundred feet.

Q. Do you remember Mr. Veenbaas's testimony about an area where bottom ash was stored near the ponds?

A. I don't specifically recall.

Q. Okay. That's fine. I'll move on. Have you seen leach test data for any other coal ash outside of the ponds at Will County?

A. I don't think so. I have not.

Q. Again, how do you know that the

leach test for the area that was sampled in that exhibit is representative of the coal ash elsewhere on the site?

A. Well, again, it goes back to the source of the coal and the process of the burning and we have seen the consistency at all of the plants in that they have used, you know, coal, that boilers haven't changed and so I'm assuming that, yeah, in correlating the data, that this is representative of ash and when you look at this data, it's very similar to what we found in the ash ponds.

Q. So you are assuming that that ash is similar to the other ash on the site?

A. Again, I --

MS. NIJMAN: Objection, misstates.

HEARING OFFICER HALLORAN: I'm sorry, Ms. Nijman?

MS. NIJMAN: Objection, misstates testimony.

HEARING OFFICER HALLORAN: He can answer if he is able.

BY THE WITNESS:

A. You say assume. I say it correlated

the data, which is the end result. It' similar, the same.

BY MR. RUSS:

Q. Okay. What kinds of materials -- have you seen various -- have you seen -- let me see. How do I want to phrase this?

Have you seen the boring logs at Will County?

A. I have.

Q. Have you seen ash material in those boring logs?

A. Yes.

Q. Have you seen the ash material in those boring logs described in the same way or different ways?

MS. NIJMAN: Objection, vague overboard.

BY THE WITNESS:

A. I think if you --

THE COURT REPORTER: Wait. You have to let the hearing officer rule, please, after there's an objection.

HEARING OFFICER HALLORAN: Is there a way you can rephrase?

MR. RUSS: Yes, I can, actually.

BY MR. RUSS:

Q. Let's just turn to your deposition again on Page 226.

A. Okay.

Q. I'm going to start on Line 11.

"Question: Can you tell me again what the basis was for the statement that a lot of the ash at these sites is bottom ash and not fly ash?"

"Answer: That's my understanding, that fly ash is reusable and that they use bottom ash as fill. Now, I'm not saying it's only bottom ash. It's lots of different things if you look at the boring logs."

MR. RUSS: Is that an okay place to stop?

MS. NIJMAN: Yes.

BY THE WITNESS:

A. Okay.

BY MR. RUSS:

Q. So when you said many things in the -- lots of different things, what was that in reference to?

A. Well, they described it in the boring logs because different people might describe it differently. Some people know that it's specifically bottom ash. You've heard it called cinders, I think, sometimes is common. I think even Fred Veenbaas has said something very similar. It's a similar terminology.

So that's what I meant. so that's called -- they might call it cinders and I think sometimes it could be slag, but as Ms. Race said, that's a little -- a little bit different, but so these are coal ash materials. Mostly what we see is bottom ash.

And as I said, again, I'm -- I've heard that they don't put bottom ash out there. They -- excuse me. They don't put fly ash out there.

Q. They don't put fly ash out there?

A. To my knowledge, they -- they send the fly ash off-site. They don't leave it on-site. Its sent off-site.

Q. And have they been -- have they been

doing that -- when did that start as far as you are aware?

A. I think that that is kind of a very difficult question to answer, Mr. Russ. I apologize.

Q. You may not know.

A. It goes back. I mean, you deal with the data that you get from 1998 in the ^^ENSE reports. Probably sometime before that based on the process they were following at that time. So quite a while.

But specifically, you know, I'm not the plant operator or the owner. So I don't think I know precisely.

Q. So can you say with certainty that the material that was found in those boring logs was purely bottom ash?

A. Well, there's soil in it and there's other things in it, too. It's fill normally. So it's not characterized as bottom ash normally. It's just a part of a matrix.

Q. Can you say with certainty that the only kind of ash in those boring logs

is bottom ash?

A. I think you have to define certainty. I mean, is that like 100 percent? Because I heard -- I heard something called likely a differently the other day by Mr. Kunkel. I think I would say that it's a reasonable assumption that it's more likely a bottom ash material than a fly ash and they don't make, like, other CCRs at this site to my knowledge.

Q. Right. Okay.

Waukegan. Is it your opinion that some of the contamination at Waukegan is coming from on-site historic uses of coal ash?

A. Is that the same kind of statement in my deposition or report, Mr. Russ? I think we're going over the same questions; is that correct?

Q. Yes.

A. I think it's a fair understanding if put in the proper context.

Q. Okay. Then I won't -- we don't have the worry with your deposition then.

Actually, I think maybe we

should. So if we turn to Page 58 of your deposition --

MS. NIJMAN: I'm sorry. Objection. He answered the question. Is this --

MR. RUSS: I'm going to ask another question, but I just want to set it up.

MS. NIJMAN: Thank you.

BY MR. RUSS:

Q. Okay. Now --

A. For clarification, I think when you said other historic uses, there's also the upgradient issues at Waukegan.

Q. That's what I want to get into now, yes.

So is your opinion at Waukegan that some of the boron sag on-site is coming from upgradient off-site sources?

A. Yes.

Q. Is it your opinion that some of the boron is not coming from upgradient off-site sources?

A. Well, again we've looked at it from

a very big perspective and then a small perspective.

From the big perspective, we see the impacts of the similar constituents of coal ash and the evidence of coal ash west of the Midwest Gen property that is migrating onto the site. That's why we have an ELUC, for example. And then --

Q. Sorry to interrupt you.

Did you say there are off-site data or boron data?

A. There's barium and manganese -- you know, there's barium, for example. There's boring logs and anecdotal that there's influence from coal ash constituents.

Q. Have you seen any off-site boron groundwater data?

A. I don't recall. I think again I specifically may not have done boron.

Q. How about sulfate? Have you seen any off-site sulfate data?

A. Not that I recall.

Q. Okay. So but you believe that some of the boron that we have seen on-site was

coming from off-site --

A. Yeah.

Q. -- based on historic uses off-site?

A. That and the groundwater gradients and the fact that this boron is -- yes, and it's coming from off-site.

Q. Page 58 -- to the question of whether some of it is coming from on-site, on Page 58 -- so I'm going to start with the question on Line 5 on Page 59 actually.

Ms. Cassel asks, "Question: So, to be clear, for your prior answer, you were saying that some of the boron you're alleging is coming from this off-site property, this tannery, but not all of the boron that's found in the monitoring wells at issue here is coming from that tannery?

Is that accurate?

"Answer: That's accurate considering there are other characteristics of coal ash that aren't characteristic of a tannery."

MS. NIJMAN: I'll object to the entire prior page discussing the

precursor to all of that last point.

MR. RUSS: I'm happy to read all of that in too.

HEARING OFFICER HALLORAN: We can read the whole thing in.

MR. RUSS: Yes. Where would you like me to start, Page 57. It looks likes it would have to be page 57?

HEARING OFFICER HALLORAN: Lori, I will give you the deposition.

MR. RUSS: I'm sorry. Ms. Nijman, I'm asking you where would you like me to start reading?

MS. NIJMAN: Page 57, Line 8.

MR. RUSS: Okay.

BY MR. RUSS:

Q. "Question: Do you remember -- regardless of the documents, your bases for stating that those particular constituents have migrated onto the Waukegan property?"

"MS. NIJMAN: Object to the form of the question, basis is listed."

"MS. CASSEL: Jennifer, I would object to the spoken objections.

If he understands the question, he can answer. You've gotten your objection on the record. I would appreciate if you could let him answer."

"THE WITNESS: Could you please ask it again. It's --"

"MS. CASSEL: Could you repeat that question, please?"

The last question was read by the reporter.

"MS. NIJMAN: Asked and answered. In the record."

"THE WITNESS: Okay. Well, basically people like focus on boron, as an example, of an im- -- something that's coming onto the property. And that's boron on the upgradient side in a number of wells west of the existing facility that have boron and the groundwater contours, in general, move west to east toward the property. So I'm saying that the boron -- some of the boron, not all of it could be coming from the off-site property."

"MS. CASSEL: Where does the remainder of the boron come from, in your opinion?"

"MS. NIJMAN: Objection, vague."

"THE WITNESS: As I've stated in the report, I believe there is some historical uses at these as these properties that have caused some old releases. And based on the data that we have obtained to date, when we look at the sampling, that where it's leaching greater than the groundwater quality criteria.

And so I don't have an answer what, specifically, the historic sources are. I'm saying I know what I don't know in that I don't -- I know that it's not coming from what we've measured, but it must be coming from somewhere else on-site that I've not specifically identified."

"Question: So, to be clear, for your prior answer, you were saying that some of the boron you're alleging is coming from this off-site property,

this tannery, but not all of the boron that's found in the monitoring wells at issue here is coming from that tannery.

Is that accurate?"

"Answer: That's accurate, considering there are other characteristics of coal ash that aren't characteristic of a tannery."

MR. RUSS: I'll stop there if that's okay.

MS. NIJMAN: That's fine.

BY MR. RUSS:

Q. And so rather than reading the rest of this in, can you explain what you meant when you said there are characteristics of coal ash that aren't characteristic of a tannery?

A. Well, when you look at the groundwater, you know, you think that some other trace metals or, you know, what would be kind of an idea of -- that there are just things in a tannery is going to be fairly limited.

You know, chrome and are also in coal ash. So again, I'd have to look at

the list, if you will. Again, it's something I have not analyzed other than in general and I know it's listed at the tannery that came from at that area, what we found, and there are differences.

Q. Do you still have the opinion that some of the boron in the monitor wells at Waukegan was coming from an on-site source?

A. Yes, I believe so. I think that's clearly stated in my deposition.

Q. Okay. Thank you.

The reason I keep asking it that way is because I think we've all looked at a lot more information since the deposition and I just want to make sure.

At Waukegan, did you have any leach test data from ash outside of the ash pond?

A. No.

Q. Are you familiar with the area that we have been talking about, the former slag flash area immediately west of the ash ponds at Waukegan?

A. Are you talking about what some

have called kind of a grassy area from the west of the ponds to the west of the property line?

Q. To the boilers.

A. I know of the area, yes.

Q. Do you have any knowledge of what is in there?

A. No. I think I have shown that nobody knows what's in there.

Q. And so you don't have any data to characterize the leachability of any material that might be stored there; is that right?

A. There's nothing -- there's no borings or samples from that area. So we are looking at what's upgradient and what's downgradient.

Q. Okay. And I think I'm hoping to do that in a little bit. Maybe I can skip to that. Yes, sure. We can get at that.

So before I do that, though, without looking at a diagram, are you roughly familiar with where the monitoring wells at Waukegan are located?

A. Yes, I am. I would like to have a

map in front of me just so I don't --

Q. Sure.

A. -- make a mistake.

Q. Okay. So I believe -- I'm not sure which exhibit, but we have a few of those groundwater monitoring reports there.

A. It might be here. I'll look here.

Q. Which exhibit is that, for the record?

A. I'm looking at 268-P Annual Quarterly Groundwater Monitoring Results for the Waukegan Generating Station. It might be in here. Oh, here we go.

Q. Okay. Just let me know when you have that map in front of you.

A. Well, recognizing this map doesn't include a lot of the non-monitored -- non-quarterly monitored wells.

Q. Right. Maybe we can look at the map that has all of the wells.

A. Can you help me with that?

Q. Do you have Dr. Kunkel's binder on your desk?

A. Is this it?

Q. No.

A. Is this it?

Q. Yes.

A. Go it.

Q. Just for purposes of having a map in front of you, this is Exhibit No. 411, Complainants' Exhibit No. 411, site maps of Waukegan. Wells MW-8 and MW-9 are located in that former fly ash slag storage area; is that right?

MS. NIJMAN: I'm sorry.

MR. RUSS: I'm sorry.

MS. NIJMAN: What page or what map are you looking at?

MR. RUSS: Yes. These aren't numbered. This is --

BY THE WITNESS:

A. The demonstrative?

BY MR. RUSS:

Q. Yes.

A. After 410?

Q. Approximately 20 pages.

A. Twenty pages?

Q. There are two maps of Waukegan on those pages.

So are MW-8 and MW-9 in the former fly ash flag storage area?

A. That could be debatable because it looks likes they are on the edges.

Q. Okay. What you said earlier, you look at upgradient and downgradient. The concentrations of boron in Wells 1 through 4, I'm talking about the ponds now, are lower than they are in upgradient wells. I believe you said that earlier today; is that right?

A. Yes.

Q. How did that happen to be the case if they're lower downgradient than they are upgradient?

A. Well, there are upgradient sources. Again, I mentioned earlier, when you kind of look -- when you go farther away -- if there's no additive, the concentrations will decrease.

Q. If there's --

A. Farther away from where it originated.

Q. Is it always the case that there will be some attenuation as you move away from the source?

A. Well, the attenuation in this case

will pretty much be an addition of infiltration or groundwater that's mixing in decreasing concentrations.

Q. Right. Is that always the case? Will there always be some attenuation when you move from a source to a downgradient well?

HEARING OFFICER HALLORAN: Keep your voice up, please? I have cars, traffic, everything behind me.

MR. RUSS: Okay.

HEARING OFFICER HALLORAN: Thank you.

BY MR. RUSS:

Q. I'll ask the question again.

A. Thank you.

Q. Is that always the case that there will be some attenuation in groundwater concentrations as you move from a source to a downgradient well?

MS. NIJMAN: Objection, vague, hypothetical.

BY THE WITNESS:

A. I think the word always is too

encompassing.

HEARING OFFICER HALLORAN: Overruled. You can answer.

Go ahead, Mr. Seymour. I'm sorry for interrupting.

BY THE WITNESS:

A. I think I interrupted. I apologize. This is not my profession as far as testifying.

The word always, to me, is a bit broad and because groundwater hydrogeology is very complicated and if you think you know everything, for example, this is the high concentration moving downgradient and it's lower, I've seen the opposite happen and you don't know why.

It's normally because you don't have a monitoring well everywhere where it might be the highest or the lowest. So it's not -- you don't always see that in real life.

BY MR. RUSS:

Q. But you did see it in this case with this site?

A. From the west of the ash ponds to

the east of the ash ponds, it decreases, yes.

Q. Do you expect that it would have decreased from those ELUC wells we were talking about, Wells 10 through 14, moving towards the lake?

A. Well, again it -- this is the compilations of our studies. It can and it will and in general, if you can measure it in all the locations. So you could make that accurate assessment because it isn't always the case because you don't have the data to show it because again, you only have so much data to look at and if it doesn't, it wouldn't surprise me. If it does, it would be expected.

Q. Okay. So staying with Wells 1 through 4 for a minute, do you remember roughly what the concentrations of boron was in those wells?

A. They were down around the -- I think they were less than the -- well, I can look at it.

Q. Yeah. That would be great. I don't

know what exhibit that is.

A. I know it's very low. It my world, it seemed very low by comparison, but we have some graphs here at this January 22, 2015, groundwater monitoring report.

Q. Okay.

A. And just in general, I can tell you what was going on at that time.

The boron levels for Monitor Wells 1 through 4 -- excuse me -- 2, 3 and 4 were down around the Illinois groundwater standard. That standard would apply in the GMZ zone, of course.

Q. I'm sorry. Is there a GMZ at Waukegan?

A. Excuse me. There is -- there is not. You're right.

Q. Thank you.

A. There's ELUC. And in Monitor Well 1, it's above the standard, but the levels -- remember the standard is two milligrams per liter.

Q. So it's around two?

A. The standard is two.

Q. Yeah.

A. And three of the wells are below that standard and one is above Monitor Well 1.

Q. Hypothetically, if the concentrations in those wells doubled over the course of a year and the upgradient concentrations of boron didn't change at all, what would that tell you about the ash ponds?

A. I think that's a very general question, Mr. Russ.

I think, in general, if you examine a site, it could mean one of a couple things. One is that something has moved through that you had not previously depicted, in other words, I would call it a slug. So it could have been a higher concentration upgradient and its passed below the ponds here and then you finally detected it.

So it could be coming from upgradient as a slug. I think that that is one of the situations and as you had said, if it is from a leaking pond, if that was the case, you could see that, but I'm saying there is more than one scenario where there could have happened.

Q. All right. And for the record, that has not happened here. That's just a hypothetical, but in that case, if the ponds were leaking and that was happening, the downgradient concentration of boron would be lower and the upgradient concentration. It would have doubled from -- is that right, given your understanding of the upgradient concentrations?

A. You know, I -- I -- this is very hypothetical. I really would have to -- you know, it's never that simple. You have to look at, say, the whole -- the whole problem, if you will, and you just can't look at it from Point A to Point B with one compound.

You would have to look at the other data as well because again, these groundwater -- it does not behave as you should -- as you think it should.

Q. Sure. The reason I'm asking about these is because you've used the gradient and the upgradient and the downgradient route to form a lot of your other opinions. So

I'm trying to flesh out how that works for you.

A. I understand. And when I formed my other opinions, I had the ability to look at all the data and make a conclusion.

Q. Sure.

A. And what you're presenting me with is this hypothetical information.

Q. Yeah. I guess the point I'm -- okay. Let me just ask this one more way and then maybe take a break for lunch.

Are you roughly familiar with the concentration of boron in MW-5?

A. In general, we know that is of higher concentration than downgradient.

Q. In looking at the exhibit you just had in front of you, roughly what was it?

A. Well, in 2015, Monitoring Well 5 looked to be between 30 and 40 --

Q. Okay.

A. -- in general, milligrams per liter.

Q. So that's roughly 15 to 20 times higher than in the downgradient well; is that right?

A. It is much higher, yes, in that regard. Again, this is as of actually the end of 2014, I believe. So it doesn't represent all the data, but it's in that range.

Q. Using the data, how do you know that the ponds aren't leaking?

A. Well, if you think that the area upgradient of the pond was higher, it's lower downgradient. You're going to -- again, looking at all the data that we've looked at including the construction and the operations and all those kinds of things, I would conclude that it would not be the source.

Q. How did --

A. The pond would not be the source.

Q. Right. How would groundwater data form that opinion?

A. As I said, you know, we've had a chance to look at all the data and that upgradient is higher and you would not expect upgradient of the pond to get higher. You would expect downgradient to be higher.

Q. If the ponds were leaking --

A. If they were leaking --

Q. -- the downgradient would be higher?

A. You would think so, but we don't -- and again, when we look at that, again, in reverse relationship from what you need to prove it was a leaking pond plus all the other data.

Q. Right. Okay. Thank you.

MR. RUSS: That's actually all I have on that particular point.

Do you want to take a break for lunch?

HEARING OFFICER HALLORAN: Yes. Let's take a break for lunch. See you back here at, geez, 1:50. Thank you.

(Whereupon, after a short break was had, the following proceedings were held accordingly.)

HEARING OFFICER HALLORAN: All right. Good afternoon. We are back on the record. We just took a lunch. It's approximately 1:55.

Before we continue with Mr. Russ's cross of Mr. Seymour, we have two members of the public who would like to give a five-minute public comment each.

You can just step up to the podium, if you will. State your name for the record and you may proceed.

MS. SHANLEY-ROBERTS: My name is Eileen Shanley-Roberts.

I am a resident of Waukegan, Illinois. I have lived there since 2007 and I would like to thank you for taking the time to hear my comments.

I'm the rector of Christ Episcopal Church. I'm the mother of Emily and Abigail and the aunt of Casey. I live, work and am raising a family in downtown Waukegan about a mile from Waukegan Harbor.

Our beautiful lake is one of my favorite parts of our community. As a resident and parent, I'm deeply concerned about the effects of pollution on our community.

I am a boater. I have a sailboat in the harbor. My parents, who are

in their 80s, kept their boat in the harbor for a number of years. All three of my girls, who range in age from 21 to 13, began sailing through Waukegan Junior Sail Program.

Being on the water and the independence and confidence that comes from learning to drive a dingy offers some tremendous advantages for young women.

Emily began sailing when she was 12. The other two started when they each turned six. Part of Waukegan sailing involves taking boats out on that big lake and going to the beach. Kids love to explore the shoreline. One of their favorite areas is near the power plant where the warm water discharges into the lake, which apparently has altered the ecology there and drawing more fish and birds to the site.

Knowing that the corporation has dumped significant amounts of ash on its sites in insufficiently protected areas, including the shores of Waukegan where my family enjoys Lake Michigan, is so troubling.

Coal ash contains a myriad

of dangerous pollutants and I'm concerned that a corporation is allowed to dump its ash even temporarily on a site along Lake Michigan and then flush its wastewater from the wash ponds directly into the water where our community swims, sails and fishes.

The coal ash is located in an area that naturally attracts human and other animals. Most people are not aware of the existence of the ash let alone what toxins coal ash contains. Fish and birds are certainly unaware of the risks.

Although the ponds are lined, there continues to be evidence of pollutants that are commonly found in coal ash leaching into the groundwater across the Waukegan site. The health effects of exposure to these chemicals often do not appear until decades after the exposure.

The Waukegan Municipal Swimming Beach is just south of the coal plant where families swim, paddle board and many fish as an important part of their diet. What are they ingesting? Are the present benefits of

gaining skill and confidence in a lifelong sport, enjoying the magic of one of our great lakes, and putting food on the tables worth the long term health risks?

I still keep my boat in Waukegan Harbor. I still enjoy our beautiful lake that I can see from my windows and I visit the beach in the summer.

My younger kids no longer sail through Waukegan Junior Sail. They sail in Lake Forest where I can see the smoke from the plant from safer distance and know that girls are not being exposed to toxins leaching into the lake.

I live in Waukegan. My kids could ride their bikes to the harbor. I choose not to have them participate in a program minutes away from home and instead drive them to another community. The residents of Waukegan who are aware of the ash located in Waukegan choose to avoid our local lakefront because of its toxic legacy and go to other communities for outdoor recreation. We shouldn't need to do this.

Also, as a city, Waukegan has been saddled with the cost of cleanup from heavy industry. We've been stymied in our economic redevelopment efforts in part because of the fear of exposure to industrial toxins. Energy's failure to address the current coal ash scattered around the site and begin remediation of the abandoned coal ash disposal areas continues the pattern of industrial exploiting of impoverished communities endangering the health of its residents and walking away from the problem.

The economic future of our hometown depends on our ability to transform our lakefront from the legacy of industrial pollution to a shoreline that attracts sustainable businesses, recreation and tourism.

Creating sacrifice with high levels of coal ash pollution along our shoreline would make it hard for our community to eventually transition towards the future we need. The federal government is showing no

willingness to protect the people of my community from corporate greed.

It is up to the state of Illinois to hold NRG and other polluters accountable for their actions and require that they change the way they handle toxic waste. Negative impact on the economic and physical health of communities and people is far more important than the profitability of a major corporation.

Please increase your oversight of these plants. Require the safest handling of ash possible and make sure cleanup costs do not fall on us as taxpayers. Thank you.

HEARING OFFICER HALLORAN: Thank you, Ms. Roberts. The Board will read this. Thank you.

MS. ROBERTS: Thank you.

MS. FLORES: I'm Celeste Flores.

Good afternoon, your Honor. Thank you for this opportunity to be speaking today. I was born and raised in Lake County. I care deeply about the protection of our

earth and the community from environmental harm.

I'm the Lake County outreach director with Faith In Place. Our office is just a mile from the Waukegan Harbor. I empower people of all faiths across Lake County to be leaders in taking care of the earth. I do this by providing resources to educate, connect and advocate for healthier communities.

I fell in with love nature at a young age. Growing up, I enjoyed biking and walking in a Lake County forest preserve. Many residents, I had no idea there was a coal fire power plant or a coal ash storage spawn on-site. I learned this after I learned about the threats of coal pollution as I was doing my undergrad in Kentucky.

When I returned home, I learned about the coal impacts and how it continues to impact my family's hometown of Waukegan. Waukegan has been a devastated legacy of pollution on what is now a working class Latino community on the shorelines of Lake Michigan with limited resources to

access to health and care.

As a community leader, I'm fearful for the affects of the coal and ash pollution in our communities and I know we deserve better. There have been and continue to be dedicated groups of community members and faithful leaders that clean the Waukegan beach and lakefront on a weekly basis.

As community members, we are working to keep trash and other waste from our lake. A corporation should do the same. No corporation should be able to dump ash on or near our shores of Lake Michigan and walk away without cleaning up its mess.

Waukegan residents have a right to swim, play and enjoy in Lake Michigan without worrying about exposure to pollution from NRG's coal ash dumping grounds next to the shore. We know that even with liners, coal ash contaminates, can leach into groundwater and adequate protection is not coming from the federal government.

Waukegan residents need to be able to rely on the Pollution Control

Board to hold corporations accountable when corporation pollution has been dumping without adequate protection.

As a community, we are ready to no longer be dumping grounds for energy. The time has come to set a new precedent for Waukegan where corporations are held accountable to clean up their pollution and leave sites and healthier options for the future we use. We cannot move forward when corporations like NRG are able to continue polluting our groundwater and walkway without cleanup.

I'm asking that you think about the future of Waukegan. The future of Waukegan is with our students, bright individuals that are proud to be from Waukegan and have become so involved and they've educated, connected and advocated for the environment and for their community. They don't want the future to be burdened by industrial pollution or coal ash.

Me, Dillon, who is here with me, and all of the students in the community,

are going to inherit the legacy that NRG leaves us. I ask the Board to help make sure that this legacy is one of health and the tax dollars don't pay for it.

Thank you for your time. Thank you.

HEARING OFFICER HALLORAN: Thank you and thank you both. I promise the Board will read your comments.

MR. WANNIER: Your Honor, I just personally want to thank you for making the time for this.

As we discussed, because the case is probably going to be finishing sooner, there were a couple of other potential commenters from other sites that are at issue that weren't going to be able to make it here personally, I just wanted to request that maybe we could submit written comments into the record?

HEARING OFFICER HALLORAN: Oh, yes, yes. As I stated earlier, I'll set a briefing period for written

comments.

MR. WANNIER: Thank you very much.

HEARING OFFICER HALLORAN: Thank you.

All right. Let's go off the record for a second.

(Whereupon, a discussion was had off the record.)

HEARING OFFICER HALLORAN: We're back on the record.

Mr. Russ, you can continue with the cross of Mr. Seymour.

BY MR. RUSS:

Q. I would like to hand you something that you cited in your report, I believe.

Does this look familiar to you?

A. Yes, I think so.

MR. RUSS: Okay. I was hoping we could project it on the screen, Mr. Hearing Officer. Would that be okay? So I could point to it with a laser pointer?

HEARING OFFICER HALLORAN: Sure.

MS. NIJMAN: I -- it's not our exhibit. I mean, I don't -- I don't know --

HEARING OFFICER HALLORAN: Yes. If they don't agree -- I thought you had your own, but it doesn't sound like they're going to agree. So we'll just have to do it the old fashion way.

MR. RUSS: Okay.

BY MR. RUSS:

Q. Okay. Before the break, I believe you said -- I'll stand up so my voice carries better -- what you want to see is higher concentrations downgradient than upgradient when we were talking about the ash pond.

Do you remember that?

A. Well, I -- I characterized it amongst other things, right.

Q. And in order to determine whether the ash ponds were a source of contamination?

A. Yes.

Q. Now, do you see the wells designated MW-5 and MW-7?

A. Yes.

Q. Those -- looking at their boring concentrations, those two wells have the highest boring concentrations on-site; is that right?

A. Well, as of this time, they -- they -- on this display that you have, they appear to be the highest.

Q. Right. And if you wouldn't mind also opening up -- it's right in front of you already -- Dr. Kunkel's demonstrative Exhibit No. 411. I believe it's just a couple of pages after those maps. That's it right there on the left -- on the right.

A. This?

Q. He has a median concentration of boring and sulfate.

Do you see that?

A. This is from his report, do you say?

Q. It's the demonstrative exhibit that we used in October.

A. I see it. I see it.

Q. We may have used them this month too.

Is that consistent in terms of MW-5 and MW-7 having the highest concentrations of boron?

A. Five and seven?

Q. Yes.

A. On this list, they are the highest concentrations on this page.

Q. Yeah. And those two wells are immediately downgradient of the area we've been talking about at the former fly ash slag storage area; is that right?

A. Yes.

Q. What wells are immediately upgradient of that area?

A. There's several, Monitor Wells 6, 8 and 9, for example.

Q. Six, 8 and 9, what are the boron concentrations in 6, 8 and 9?

A. Six is 2.9, 8 is 24 and 9 is 6.3.

Q. Those concentrations are lower than they are in MW-5 and MW-7; is that right?

A. Correct.

Q. So is it fair to say that something -- as the groundwater moved from those upgradient

wells to the downgradient wells was adding boron to the groundwater?

A. Well, we -- we spoke a little bit about this less specifically before the lunch and my -- my belief, yes, you can see that they are higher and that there could be some contributions except that, you know, between Monitor Wells 6, 8 and 9, you don't really know if you are actually measuring the higher concentration.

In fact, at 8, it's 24. The difference between 24 and 40, for example, and a quarter can be substantial or it could be not substantial. So if there's another well -- or at the time, you may see higher concentrations at that upgradient site.

Q. There are a number of other upgradient wells there, further upgradient.

Are there any wells of higher concentrations than MW-5 and MW-7 on-site?

A. Well, upgradient in this sense, if I had the groundwater flow contour, I think you'd find upgradient is kind of the

General Boiler property and there's -- the ELUC wells are not on that property. They are on the property boundary.

Q. Would you turn to -- well, let me just pause for a second.

Are they upgradient of the fly ash slag storage area?

A. Are what?

Q. The ELUC wells.

A. Not all of them.

Q. Okay. Are there any -- are there any wells on-site with higher concentrations than MW-5 and MW-7?

A. On this display, there are -- they -- those are the two highest.

Q. So let's turn to sulfate in --

A. Sorry.

Q. What are -- MW-5 and MW-7 also has the highest sulfate concentrations on-site.

MS. NIJMAN: Object to time period, vagueness.

MR. RUSS: On Page 45512, if you're looking for it.

BY THE WITNESS:

A. This page?

BY MR. RUSS:

Q. No. I'm sorry. I was asking about the dating on Page 45512 and then I'll ask you about Dr. Kunkel's report.

A. I apologize. I couldn't even read the Bates number.

Q. Yeah. It says it on the bottom here.

A. And the question is about sulfate?

Q. Yeah.

A. The sulfate at MW-7 and MW-5 are the highest that I can see here and then we have others that are similar. They are -- you know, they are similar, but not quite as high.

Q. When you say "similar," what's the concentration of sulfate in MW-5?

A. MW-5 is 640.

Q. What's the concentration of sulfate in MW-7?

A. 690.

Q. How about MW-8?

A. 370. I think that's where I was going with it. It's lower at 8, but at any

point in time you may see fluctuations.

Q. At this point in time, the sulfate concentrations in MW-7 were twice as high as they were in MW-8, roughly; is that right?

A. A little less than that.

Q. And in Dr. Kunkel's report, the median values being an average over long periods of time, if you concede that median is a kind of average?

A. It's not.

Q. Well, that's -- let's just say it's a median.

A. Okay. It is a median.

Q. It's a median calculated from a time series.

What's the sulfate concentration?

A. Mr. Russ, I'm not sure that this is a median. It says median, but I guess it's over the time period available when this report was written, I presume.

Q. Yeah. This is --

A. Just reflect that a median is not an average, but go ahead.

Q. Well, okay. That's a magic point, but okay.

A. No, it's a mathematical point.

Q. Let's take a look -- a median is not a mean. I'll give you that much, but what is the median concentration of sulfate in MW-7?

A. In this map?

Q. Dr. Kunkel's report.

A. MW-7's sulfate is 690. It's the same as this well.

Q. How about MW-8?

A. 370, which is the same as this well.

Q. So again, over a long period of time, the median concentration at MW-7 is roughly twice as high as it was in MW-8; is that right?

A. A little less than that, yes. But I still take issue with this table because I don't know how he -- if he really calculated median or the mean.

Q. Well, if you'd like to turn the page -- he has individual data for Well MW-7. I'm sorry. Well, if you don't mind me flipping through, I can't remember whether he listed

this before or after his data charts. It might be it's here.

A. I don't need to look at this.

Q. I think you might because what I want to show you --

A. Is it the time share --

HEARING OFFICER HALLORAN: You really have a talk one at a time and back not towards the court reporter nor myself.

MR. RUSS: I'm sorry.

BY THE WITNESS:

A. I've got to look at the time series because I know there's some issues with these data as for inaccuracies. And so I don't know how much I can reply on these data.

BY MR. RUSS:

Q. Well, let's assume for the record -- you know, these -- you don't have to treat these as accurate, but according to the data that Dr. Kunkel presented, you can see the values he used to calculate the mean, the median, the maximum and minimum in that table; is that right?

A. I can't see the values that he used

to make the calculation. I see the end point of the calculation.

Q. I believe the values that he used are above on the page that you're looking at.

A. These are -- this is the result. This is not the background data he used to calculate the result.

Q. If you look --

A. No.

Q. -- the page I was just trying to turn you to, if you -- if you turn past the charts --

A. But again --

THE COURT REPORTER: Wait, wait, wait. You have to let him finish the question.

MR. RUSS: Hearing Officer, are you also looking at Exhibit 411?

HEARING OFFICER HALLORAN: No. I'm looking at your map. I have yet to go to 411.

Would you like me to go to 411? I didn't know there was a question yet.

MR. RUSS: Not necessarily. I just was trying to figure what we're looking at so we're all on the same page.

BY MR. RUSS:

Q. If you turn to Exhibit 411 passed his time series plots for Waukegan, you will find tables of data.

A. I understand there are tables there.

Q. I would like for you to look at them.

A. I -- why would you want me to look at them. Again, I've just said --

Q. Sir, please look at them.

A. The data are inaccurate.

Q. I understand.

Do you see a table of data for MW-7?

A. I see Tables 7 and 8, yes.

Q. And you see a time series of data?

A. I do.

Q. And as far as the data that Dr. Kunkel had, what was the mean value for MW-7 he calculated?

A. He calculated for MW-7 a mean of --

which, boron or sulfate?

Q. Sulfate.

A. He calculated a median of -- for 7 of 690.

Q. I'm asking about the mean on the page you were just looking at.

A. It doesn't say which is the mean. I'm sorry.

Q. You're right. I'm sorry. If you flip to the first well in that series, you'll see where he -- how he's organized the data. There, you can see at that -- I believe the -- I don't have a copy of it in front of me, but I believe the second value in his summary statistics is a mean.

A. He shows the mean, yes, as a second value below the sulfate concentration for 8. I see it. I see it, yes.

Q. Okay. So what is the mean sulfate value for MW-7?

A. It's 280 milligrams per liter. Excuse me. It's 380 milligrams per liter.

Q. For MW-7?

A. I'm sorry. That's MW-8. MW-7 is 666.

Q. And MW-8?

A. It is 380.

Q. So the mean sulfate concentration for MW-7 is higher than the mean concentration of MW-8 over time?

A. Over time, it is.

Q. Are there any other wells upgradient of the former fly ash slag storage area?

A. Well, 8 is. Six and 8, as I mentioned, are upgradient.

Q. Upgradient of the fly ash slag storage area have higher concentrations of sulfate then MW-5 and MW-7?

A. I don't -- I'd have to look at all the data. I don't recall.

Q. So the concentrations of both boron and sulfate increased moving from upgradient to downgradient across the former fly ash slag storage area; is that accurate?

A. It is for this data series that's shown.

Q. Does that not suggest that the land between upgradient and downgradient wells is contributing boron and sulfate to the

downgradient wells?

A. As I mentioned, along the upgradient side -- well, first of all, along the upgradient side, you have the two wells. You don't know if you've captured the center of the mass, if you will, the higher concentration. So what you're saying is accurate, but it doesn't necessarily mean you're adding boron to that -- from that parcel.

Q. Is it possible that that parcel is contributing boron and sulfate to the groundwater?

A. Well, you said possible and that's pretty -- is that more likely than not? I don't know. I don't think -- I don't think so. I mean, all I can say is I don't really have enough to say more likely than not. I'd say what I see is that it's higher at this point in time and recognize that the Illinois standard for sulfate is 400 and this is 690.

Q. Did the Illinois standard for sulfate have any bearing on whether the concentration increase from upgradient to downgradient?

A. No. I'm putting it into perspective

for the reader.

Q. So I want to move on to your matching analysis.

I would like you to turn to -- I think we might have to flip back and forth between your first report and your supplemental report, which I think are both in your binder.

The supplemental report, if I remember correctly, is exhibit -- I can't remember the exact numbers right now. Exhibit 904, I think, is your supplemental report?

A. What are you asking me again? I'm sorry. What? 904?

Q. Yes. I'm just going to be asking you a couple questions about your supplemental report and your original report.

Your supplemental report is Exhibit 904; is that right?

A. Yes.

Q. And your original report is Exhibit 903; is that right?

A. It's within there, yes.

Q. Sorry. I just want to make sure I have this right.

Now, the supplemental report replaced Tables 5-4 and 5-5 in your first report; is that right?

A. It looks like, yes, that's what we've done.

Q. Okay. And the updated tables that you've been talking about this morning with Ms. Nijman are an updated version of the same table; is that right?

A. Yes. With the new data with the different time series, I believe.

Q. Were the methods you used to generate the new tables the same as --

A. Excuse me. This is the -- the data in the supplement is 2014. This is a corrected data table.

Q. Right.

A. So it's not the data tables we had been presented, the updated 2017.

Q. Exactly. Thank you for clarifying.

So the data in your supplemental report from 2014, the data in the demonstrative exhibits are 2016 to 2017?

A. Correct.

Q. Were the methods you used to generate what is shown here as Table 5-4 the same methods that you used to generate the new Table 5-4?

A. The method in the Exhibit 904 is the same method that we used for the demonstratives.

Q. Okay. Thank you.

Now, the Tables 5-4 and 5-5, the reason why I was mentioning your original report here, they refer back to Tables 5-1 and 5-2 for the leachate data; is that right?

A. For the comparison data, yes.

Q. Okay. In your original report?

A. Yes.

Q. Okay. So we might have to go back and forth between the two.

Now, if you had a leachate value and a groundwater value that were identical, that would be a match in your match analysis, correct?

A. Well, even if it wasn't necessarily identical, if they are the same constituent, we -- we'd call that a match.

Q. Yeah. But if -- if you had a boron concentration of three in leachate milligrams

per liter, a boron concentration of three milligrams per liter in groundwater, that would be a match, right?

A. Yeah. I think that would be unusual. It doesn't happen quite that simply, but it would be a match.

Q. Okay. Thank you.

Now, on these tables for each well, you derived a percentage that you described as a percentage of observed constituents that are not consistent with indicators with leachate from ash currently stored in impoundment; is that right?

A. Yes.

Q. Did you intend for this matching analysis to support conclusions about ash outside of the impoundment?

A. Only to the sense that we can understand what is in it, that could be.

Q. Okay.

A. It's a good baseline to start.

Q. Would it be fair to describe the observations in the numerator of these percentages as a mismatch?

A. For this, because it's inconsistent, we're showing that -- I guess, as I said early today, it goes in a numerator if it is inconsistent, a mismatch.

Q. So a mismatch is a fair characterization?

A. I think that's okay.

Q. And to simplify a little, mismatches in your approach count against the possibility that groundwater has been contaminated by coal ash; is that right?

A. Yes, in the increase in the likelihood that it's not from the ash in the pond.

Q. Okay. In your deposition, you were asked about benzene.

Do you remember this?

A. I don't recall.

Q. And we will turn to Page 79 of your deposition to refresh your memory.

A. Page 79, did you say?

Q. Yes.

A. I see it.

Q. Without going through and reading the transcript into the record, if you could

just look at that to refresh your memory, I'll just ask you a question about it.

Would the presence of benzene in the groundwater effect --

A. Do you want me to read this?

Q. Just to refresh your memory.

A. I haven't finished yet.

Q. Oh, okay. I'm sorry. I'm sorry.

A. Okay I've read it.

Q. Okay. Is benzene a constituent of coal ash?

A. No. I think the discussion here, though, doesn't define it.

Q. That's okay. I'm just asking -- I'm just giving you that to refresh your memory and I'm just asking you now.

So benzene is not a constituent of coal ash. Would finding benzene in groundwater affect your conclusions about the presence or absence of coal ash?

A. As long as -- I mean, to me, it's almost data that you would not consider in your analysis.

Q. Okay. Thank you.

So a non-indicator, something that's not in coal ash, does not say anything about the presence or absence of coal ash; is that fair to say?

A. Say that again, please.

Q. A non-indicator, something that's not -- a constituent that's not an indicator of coal ash, the presence or absence of that chemical in groundwater shouldn't have any bearing on your conclusion about the presence or absence of coal ash; is that right?

A. That's kind of complicated. I'm sorry, Mr. Russ. One more time. I'll try to concentrate very carefully.

Q. What you said about benzene, I believe, is it shouldn't have any -- it shouldn't be in the analysis?

A. It would not be in the analysis.

Q. And why is that?

A. It's not an indicator of coal ash.

Q. Okay. Right. And that's what I'm asking.

So something that's not an indicator of coal ash shouldn't have any

bearing on your determination of whether or not there's coal ash in groundwater?

A. I would think -- yes, I think that would be correct.

Q. Okay. Can you turn to Table 5-4 in your supplement? You had it arranged by site. So there's a Table 5-4 in Waukegan. That site had the fewest wells so I think it will be the easiest to look at.

A. I see it.

Q. Some of these are highlighted in blue, right?

A. Yes.

Q. What does that signify?

A. It was not matching.

Q. And some of the cells are white and some of the cells are green. Can you just explain what the different colors mean?

A. The whites where they match and the green where they don't match. The data are inconsistent in the green.

Q. So what's the difference between green and blue?

A. It was flagged, as you can see, in

the ash. It was not found in the EPRI data. I believe that's why it's flagged.

Q. Okay. Okay. And --

A. It also may not have been analyzed in the EPRI data. I'd have to look.

Q. Okay. Let me -- I believe you have a legend for this table someplace. Do you remember where that was?

A. I think it's at the end.

Q. Yep. Can you -- can you read for me what the -- what you wrote that the blue cells mean?

A. Blue shading indicates the constituents had not -- that is not an indicator of leachate from ash stored in the impoundments was detected during at least one quarterly groundwater monitoring event in 2014.

Q. Right. Okay. Thank you.

And then turning back to the Waukegan table, all of the blue cells are in a row for iron; is that right?

A. Yes.

Q. And for purposes of this table, iron is not a coal ash indicator, is it?

A. It isn't.

Q. Iron can be naturally occurring; is that right?

A. It can be. And actually although it was not found in this analyses, it can come also from coal ash.

HEARING OFFICER HALLORAN: You have to speak up.

BY THE WITNESS:

A. Although iron was shaded blue here, we do also note that -- and it was not found in this EPRI data, we also find it in coal ash. It is present.

BY MR. RUSS:

Q. Okay. Now, for iron, you have an X for MW-2. You have an X for iron.

Does that mean you coded as a mismatch?

A. Yes, I believe so.

Q. Even though you just said it was in coal ash?

A. I -- I agree.

Q. Is that an error in your report?

A. I'd have to think about it.

Q. Okay. For purposes of this table, you counted the presence of non-indicator as evidence against the possibility of contamination; isn't that right?

A. Yes.

Q. And I believe you just said you shouldn't do that?

A. You're right.

Q. Okay. Thank you.

Table 5-5 for Waukegan again, there are a lot of blue cells; is that right?

A. Yes, I did see.

Q. Those are all instances in which you coded the presence of non-indicator as a mismatch and counted it against the possibility of contamination, is that right?

A. Yes. To be honest, I'm a little confused. This says that green and blue shading demonstrate observed constituents that are not consistent with indicators of leachate from ash stored in impoundments and that's what I'm relying on.

Q. Rights. So these are non-indicators

of ash for purposes of this table that you found in groundwater?

A. It says not consistent with indicators of leachate for ash stored in the impoundments.

Q. Right. If you look in the column labeled "Constituent is an indicator of leachate," there are only three where the answer is yes on Table 5-5; isn't that right?

A. That's from the ash in the ponds.

Q. Everything that's not marked yes, I assume the is answer is no and it's not an indicator?

A. I'm sorry. Say that again, please.

Q. This column purports to show indicators of coal ash -- leachate from coal ash stored in the ponds; is that right?

A. Yes.

Q. And some are marked yes and some that are blank?

A. Yes.

Q. Is it safe to call the blank row as non-indicators?

A. It was not found in the ash.

Q. There's not --

A. It was not an indicator in this situation. But in general, it could -- you know, we find it in other places.

Q. So all of these blue cells, though, are non-indicators that were found in groundwater and you counted that against the possibility of contamination; isn't that right?

A. Well, because it wasn't found in the leachate, but it was found in the groundwater, so it did not match. It's not consistent.

Q. Right. But I believe you said earlier if you find a non-indicator in groundwater, you shouldn't contribute that to your analysis; is that right?

A. I understand, yes.

Q. So there's a series of errors in this table?

A. Mr. Russ, I -- I -- I would agree that it looks that way. I -- as I said, I am a little bit confused. I have to kind of go back to the whole discussion in the report. It may take a while.

Q. Okay. All right. Well, that's -- we'll move on for now.

Just one more question about Table 5-5 actually. Are there any mismatches in Table 5-5 other than those blue cells?

A. They're all -- I think they're blue, yes. There's lots of blue that are labeled as mismatched. Let me see. One, two, three, yes.

Q. So if we were to take the non-indicators out of this table, you would have a 100 percent match; is that right?

A. Again, I would have to go back and refresh my memory on how it was established.

Q. Okay. Let me just walk through a few of these. You have three indicators so it won't take too long.

You have barium, right? Barium was found in leachate. How many of the wells was barium found in?

A. All of them?

Q. All of them.

How many boron? Boron was found in leachate. How many wells was boron

fond in?

A. Let me -- I'm sorry. I might not be on the right table. Waukegan. Okay.

Q. How many of those wells was boron found in?

A. All of them.

Q. How about sulfate?

A. It was found on all of them.

HEARING OFFICER HALLORAN: Could you keep your voice up, Mr. Seymour? Thank you.

THE WITNESS: Sorry.

BY MR. RUSS:

Q. So the three indicators that you have in this table were found in all of the wells at the Waukegan site?

A. Yes.

Q. So if we take the non-indicators out, that would be a 100 percent match, wouldn't it?

A. Yes. In fact, they did -- in the analysis, the new percent is correct. But again, I have to go back and refresh my memory.

Q. Okay. Thank you.

Now, is there arsenic in coal ash?

A. It has been found in coal ash.

Q. Is arsenic in coal ash leachate?

A. I believe so. In general, it has been found.

Q. How much arsenic was there in the leachate that was used for Table 5-5? You might have to refer back to Table 5-1 of your original report.

A. For which site?

Q. For the -- the leachate.

A. Which --

Q. Well, I believe --

THE COURT REPORTER: Wait. You've got to wait. One at a time.

BY THE WITNESS:

A. For --

BY MR. RUSS:

Q. The leachate data has --

A. -- Waukegan?

Q. The --

A. -- which table?

Q. The?

HEARING OFFICER HALLORAN: Come on, gentlemen, please. You have to help me and the court reporter. Speak one at a time.

MR. RUSS: I'm just trying to answer his question.

HEARING OFFICER HALLORAN: One at a time.

BY MR. RUSS:

Q. You -- you have one set of leachate data that you used for all the sites in Table 5-5; is that right?

A. Yes.

Q. And that's found in -- the data are found in Table 5-1 of your original report?

A. 5-1 is one set of data, I believe, and 5-2 is second set of data. I would have to look.

Q. And I'm -- I'm just reading off Table 5-5 where you said Table 5-1.

A. Okay. Yes.

Q. Okay. So in Table 5-1, what is the arsenic value for the leachate that you

used?

MS. NIJMAN: Do you have a page number?

MR. RUSS: The tables aren't -- I don't think the tables have page numbers. Oh, they do. I'm sorry. Table 5-1 is on Page -- well, it says Page 1 of 1 at the bottom. So I don't know how helpful that is.

THE WITNESS: There's no Bates number but it's Table 5-1 in my report.

BY MR. RUSS:

Q. How much arsenic is in the leachate?

A. There wasn't any site-related leachate.

Q. Now, you say there wasn't any, but what is the number that you show in Table 5-1?

A. Less than .006 milligrams per liter.

Q. I'm sorry. I'm asking about arsenic.

A. I -- I apologize. Arsenic is less than 0.050.

Q. Okay. So that's what you call non-detect, right?

A. Yes.

Q. And that might mean that there's no arsenic. It might also mean that there's 0.049 milligrams per liter of arsenic, right?

A. Yeah. The test is geared to run at or below the drinking water standard in Illinois. So if it's less than that number, it could be present, but you would never know.

Q. Right. It could be present at up to 49 micrograms per liter?

A. You'd never know if it was, like, one or zero.

Q. Right. But is that true to say that it could be as high as 49 micrograms per liter?

A. Yes, it could be.

Q. Can you tell me what concentrations were observed in groundwater in 2014?

To look at -- to do this, I think you're going to have to look at Exhibit 268-P, which should be there in front of you.

At Waukegan, at MW-5, what are arsenic concentrations in that well in this period of time?

A. They are low right around .01 to

.009, .0013 milligrams per liter.

Q. Okay. So is it safe to say that the groundwater had concentrations of arsenic between roughly two and ten micrograms per liter?

A. Micrograms per liter or milligrams per liter?

Q. Two and ten micrograms.

A. Yes, micrograms per liter.

Q. Thank you.

So the leachate had something less than 50 micrograms per liter, the groundwater had something between two and ten micrograms per liter, the leachate could have the same amount of arsenic as the groundwater; isn't that right?

A. The leachate from the test?

Q. Yes.

A. The leachate, as you indicated, could have a concentration of less than the -- than the -- what was detected, which again is a test from the leachate just to give us some kind of an idea what's there, right.

HEARING OFFICER HALLORAN: We're

getting soft again, gentlemen. If you could, raise your voices. Thank you.

MR. RUSS: Sorry. Maybe I should stay standing.

BY MR. RUSS:

Q. So the leachate could have between two and ten micrograms or arsenic per liter?

A. It could have concentrates that are lower.

Q. Yes. And the leachate in the groundwater, using these tests and these data, could have the exact same concentration of arsenic; isn't that correct?

A. It's possible.

Q. Uh-huh. And that would be a match?

A. If they were present and we were confident that the leach data were accurate, yes.

Q. And you don't really know whether these data are a mismatch or not because of the relative difference in the detection limits, right?

A. Well, we are looking at this data to see if it matches.

Q. Uh-huh.

A. And sometimes it will match and won't match and then we fall back to the analysis that it's not in the ash in accordance with the test procedure, which is at the groundwater protective standards or slightly less.

Q. So the question I'm asking is since the leachate in the groundwater could have the same concentration of arsenic given these numbers, you can't really say for sure it's that it's a mismatch; is that right?

A. Well, if you don't have the data, you can't say it is a match either.

Q. Right. You can't say that it's a match and you can't say that it's a mismatch. I would call it unknown; is that fair?

A. Okay.

Q. Yet you coded it as a mismatch, I believe and --

A. Yes, I understand that. And as mentioned, I think I'm confused. I have to go back and look at it.

Q. So is that potentially an error in

your table?

A. It's possible it's an error, yes. I have to look at it. I am confused.

Q. And to generalize, I'd like to consider a hypothetical situation. You have a sample of water with eight micrograms of arsenic per liter and you subject it to the leach test, you subject it to the groundwater test, same sample of water, that would be a match?

A. If you analyzed it and found the same constituents, you mean?

Q. If you took the -- yeah. If you took one sample of water that you knew had eight micrograms per liter of arsenic and subjected it to both tests, you would get the same result and you would find the match, theoretically, right?

A. I'm sorry. Are you saying take the same water and test it to -- I'm sorry. Please repeat it.

Q. Say you took a gallon of water --

A. Yes.

Q. -- with eight micrograms of arsenic

per liter, you took some of it and you tested it with a leach test that was used for Table 5-1 and you took some of it and you tested it with a groundwater test that was used by Midwest Generation in 2014, that should be a match with the same sample of water, right?

A. Well, the leach test adds the ash material to it and then shakes it. So if there's arsenic, you'd be adding to it. But there's absolutely no arsenic, then you would have a similar concentration.

Q. Okay. And the leach test would not be able to detect that amount of arsenic; is that right?

A. Not necessarily, but I would have to look at that detection levels that were run at the time.

Q. I think we just looked at the leach test in Table 5-1 and it looked like it was --

A. I think you said eight?

Q. I said eight micrograms.

A. Yes. Then it would be above what the -- it would be detected in the groundwater test and I would have to look --

Q. And not --

A. Because you're converting from milligrams to micrograms. It's slightly confusing.

Q. Okay. I'm sorry.

So let's just -- I'll stick with micrograms. So eight micrograms in the sample you're testing, with the leach test table, would you be able to detect that?

A. I would have to look at the detection limits.

Q. Yep. Sure. Go ahead and look. The leach test is in Table 5-1 of your report.

A. It's 50 micrograms -- net micrograms, which is greater than eight.

Q. So that leach test would not be able to detect the arsenic; is that right?

A. That's correct.

Q. The groundwater test would be able to detect the arsenic; is that correct?

A. Yes.

Q. So the exact same sample of water, you would end up coding that as a mismatch using your method; is that right?

A. Yes, and it wouldn't.

Q. Is that an error in your method?

MS. NIJMAN: Objection, same error. You are giving the impression that there was -- well, I'm speaking. Objection, misstates the testimony.

HEARING OFFICER HALLORAN: Well, overruled. He can answer if he is able.

BY THE WITNESS:

A. I said what I said. It may be.

BY MR. RUSS:

Q. Okay. To generalize beyond arsenic, this kind of -- this kind of phenomenon, when you detect a constituent in groundwater, but not a leach test, even if groundwater and the leachate has the same concentration, it's possible whatever the groundwater test is, it's more sensitive than the leach test; isn't that right?

A. That's -- yes, it could be.

Q. Do you know how many of the results in your Table 5-5 might be affected by that circumstance?

A. I would have to add them, but you

know that there would be quite a few.

Q. Okay. Thanks.

A. Presuming, in fact, I'm -- I'm a little confused. If it's correct, there would be errors in the table.

Q. Okay. Now, in your deposition, you said that boron is a good indicator of coal ash contamination; is that right?

A. In the deposition, I have probably said that it was, but it's one of many. And again, to be able to prove it's from an ash, you have to have more than one constituent to make that case.

HEARING OFFICER HALLORAN: Keep your voice up, please, Mr. Seymour. You are trailing off again at the end. Thank you.

BY MR. RUSS:

Q. And one of the reasons that boron, in particular, is a good indicator of coal ash, is -- that it's often found in areas contaminated by coal ash; is that right?

A. Studies show that it's in the leachate and it's found in the groundwater also in some sites.

Q. And another reason that boron is a good indicator is because it's mobile in the environment; is that right?

A. It moves with the water.

Q. Okay. Would you call it a conservative constituent in that way?

A. If you think it's -- conservative is a relative thing. I would say that if it's mobile, then it's there and with others that would support it. Then it would be -- it may be conservative.

Q. Okay. Are there any other indicators of coal ash with similar characteristics?

A. I know that sulfate is one. That is generally accepted. It's fairly mobile.

Q. Okay. So is it safe to say boron and sulfate are better coal ash indicators than other constituents of coal ash?

A. Not necessarily. Because again, it's all what you find. They may be there, but there may be other things also.

Q. Okay. I want to go back to the matching analysis. I'm sorry. My outline

is a little bit disjointed. These questions are going to sound similar, but it's a different set of tables and different issues so bear with me.

If you look at Table 5-4 of your supplemental report, in the Waukegan -- we'll stick with Waukegan to keep it simple, I want to talk about antimony.

Based on this table --

A. I'm sorry. Let me find Waukegan.

Q. Oh, sure. I'm sorry. It's the smallest of the four.

A. I found it.

Q. For purposes of this table, were you treating antimony as an indicator of coal ash leachate?

A. Yes.

Q. How much antimony was there in the leachate that EPRI tested? You might have to look at Table 5-2 of your original report.

A. Antimony?

Q. Yes.

A. For an ^^antonina, we found a range in EPRI the data --

Q. Uh-huh.

A. -- of .2 to .6 micrograms per liter.

Q. Okay. So for shorthand, we can say less than one microgram?

A. Okay.

Q. Is that fair?

Not nothing, but less than one microgram?

A. Yes.

Q. Was the groundwater test used by Midwest Generation in 2014 sensitive enough to detect that amount of antimony?

A. I don't recall. I would have to look.

Q. You can look at 268-P. That should show you.

HEARING OFFICER HALLORAN: 268-P, as in Patrick?

MR. RUSS: P, as in Patrick.

BY THE WITNESS:

A. The results for antimony looks to be less than three micrograms per unit, I believe. I'd have to check the units. It's less than three micrograms per unit.

BY MR. RUSS:

Q. Okay. That's -- the detection limit was three?

A. Yes.

Q. So was that test sensitive enough to detect the concentrations you saw in every leachate?

A. That doesn't look to be.

Q. Okay. Now, Table 5-4 shows empty green cells for antimony across the board.

Does that mean no antimony was detected in Waukegan in 2014?

A. Well, we are looking at -- I apologize. It's hard to flip back and forth.

Q. No, I know. I'm sorry about that.

A. We are saying that there was no antimony detected at those levels and that it is an indicator in coal ash.

Q. Okay. So since it was reported to be less than three micrograms per liter, it's possible that it had one or two micrograms per liter; is that right?

A. But what you're doing is you're -- you're taking the -- again the leachate and

comparing it to groundwater. The leachate test is to see if it's there, not at what connotation.

So if it's found in the leachate, it's -- it's there. Whatever concentration that the lab is using, if it's not there, it would be inconsistent if it's in the leachate and not in the ground?

Q. The concentration that you saw in the leachate, which was, I believe, between 0.2 and 0.6 micrograms per liter --

A. Yes.

Q. -- if that exact same concentration was in the groundwater, that should be a match according to your earlier definition of a match?

A. Well, it actually is. You can see the level and the EPRI data has a lower detection level.

Q. Right.

A. So it is finding a more conservative characterization of the data than what we've used in that it includes more things than what we've found. And so if you look at the

groundwater data, the groundwater data is at a detection level that's different. But again, it's the standard detection level for the water in these wells.

Q. Right.

A. It's an accepted test by the state of Illinois.

Q. I understand.

The question I'm asking is it's possible that the groundwater had the same concentration of antimony as leachate; is that right?

A. It's irrelevant.

Q. I don't believe it --

A. It's only relevant that it's there in the leachate, not at what concentration.

Q. Could you answer the question, please?

A. Repeat the question.

Q. Is it possible that the groundwater had the same amount antimony as the leachate?

A. Again, it could be, but it's really irrelevant.

Q. Okay. If it did have the same concentration as the leachate, that should

be a match, right?

A. If the -- say if the concentration and where.

Q. The groundwater in the leachate were the same?

A. Well, and the concentration in the groundwater is at a different detection.

Q. I'm not asking --

A. You have to --

Q. I'm simply asking if the two concentrations were the same, that should be a match, right?

A. If you found antimony in groundwater and you found antimony in leachate, it would be a match.

Q. I'm asking if the same concentration of antimony exists in both the leachate and the groundwater, that should be a match?

A. If they are above the detection limit and you detect them, that would be a match.

Q. The exact same concentration would be not a match only as a function of the defection limit, is that what you're saying?

A. No. I am a saying that if you find

it in the coal ash and you find it in the groundwater, that would be a match.

Q. I guess what I'm asking you is isn't it possible that you wouldn't find it in the groundwater because the groundwater test was not as sensitive a test as the leachate test?

MS. NIJMAN: I'm just going to object as to asked and answered.

HEARING OFFICER HALLORAN: I don't think so. Overruled.

BY THE WITNESS:

A. So the -- please, again. Repeat the question, Mr. Russ.

BY MR. RUSS:

Q. Let me go about this a different way. Let's do the same kind of scenario.

You have a gallon of water with antimony. It has 0.6 micrograms per liter. According to the EPRI leach test, you would detect it.

A. I would -- 0.6 micrograms per liter and in the leach test used by EPRI, I think, yes, the -- the level was less than one.

Q. Yeah. It was a range of 0.2 to 0.6. You can check, but that's -- so at 0.6, you would find it in the leach test, right?

A. Yes.

Q. Would you find it in the groundwater test?

A. Six micrograms?

Q. 0.6.

A. The groundwater detection level is established at, I believe, we said...

Q. Three.

A. Three?

Q. Yes.

A. And so that -- but again, the groundwater detection level is a state method.

Q. I understand that.

A. And that you can't measure below that.

Q. I understand. I'm simply asking whether that groundwater test would defect that amount of antimony?

A. The groundwater test is at a higher detection level.

Q. Would it detect that amount of

antimony?

A. .6?

Q. Yes.

A. It would not.

Q. So if the exact same sample of water detected in the leachate, not in the groundwater, should be a match, your result -- your method counts it as a mismatch; is that right?

A. Well, again, I think you're missing what I'm trying to say as far as the groundwater test is as low as the state standard test. You won't know if it's there.

Q. That's right.

A. Okay.

Q. Thank you.

A. So you can see that -- you can find it in the lower detection level in the leachate tests. So if you feel comfortable -- more comfortable it's there, but in the state test, it's at a higher level. So yeah, again, it's at the level the state accepts. So you don't report or test it that low.

Q. So you don't know whether the antimony

level in the groundwater is the same as it is in the leachate, but it could be; is that right?

A. Overall, in a laboratory analysis, there's always something that could be there, but you will never know.

Q. Is it possible that the groundwater in the leachate has the same concentration of antimony?

A. It's possible.

Q. And it's, therefore, possible that they match?

A. If there -- again, I keep going back to as you know, this is an interesting discussion on detection levels. If it's above the state detection level, and it's -- and obviously we found it in the EPRI leachate, it would be a match.

Q. So I just want to make it clear for the record. What you're saying, I think, is that it could have the exact same concentration. Your approach would count that as mismatch and count it against the possibility of contamination; is that right?

A. Again, it's a theoretical argument

because you won't know in the groundwater sample if it's there.

Q. Is it --

A. If it's -- if it is there and we could measure it, then it would be there and it would be a match, but again, you can't test it below the detection level.

Q. I'm simply asking if it's possible it could be a match.

MS. NIJMAN: Asked and answered now.

HEARING OFFICER HALLORAN: Yes. You know, I think Mr. Seymour has answered it or at least qualified his answer. So you can move on now.

BY MR. RUSS:

Q. Okay. So let me just ask a slightly different question now. Well, let me think about this for a second.

Let me ask it this way. The leachate has less than one microgram per liter of antimony, correct?

A. The leachate detection level, we're saying, for now is one.

Q. I don't --

A. It's less than that actually.

Q. The leachate has less that is one microgram per liter, right?

MR. HALLORAN: You have to keep your voice up, Mr. Russ.

MR. RUSS: Okay.

HEARING OFFICER HALLORAN: Thank you.

BY THE WITNESS:

A. Again, I think so. I would have to look.

BY MR. RUSS:

Q. Yes. And in order for that to be detected in the groundwater, it would have to be at least three times higher than the leachate sample; is that right?

A. Again, I'm -- it's -- it's -- the leachate is like a separate test in a way. It's -- so it's hard to equate. If you're talking about laboratory analysis, if it's three times less, it would have to be three times.

Say that again. It would have

to be three times less?

Q. The leachate has less than one microgram per liter of antimony. In order for the groundwater test to detect that amount of antimony -- I'm sorry -- in order for -- you'd have to have three times the amount of antimony you have in leachate for the groundwater test to defect it; is that right?

A. Correct, but you can't assume that the leachate test is the groundwater. It's not the same. It's again indicating that it's there or not.

Q. So the only --

A. You really can't -- I don't think, Mr. Russ, you can use that as a comparison.

Q. Why is that?

A. Well, you're saying that in the leachate, which is .2 or .6, you're saying .1 -- 1, and the groundwater is 3, so you -- if you're saying the an- -- the concentration of leachate in the lab sample would have to be three times larger to detect in groundwater, it's like making a non- -- it's a non-comparison

to me.

Q. I'm sorry. I might have misspoken. The groundwater would have to have three times more antimony than the leachate in order for it to be detected by the groundwater test; is that right?

A. The groundwater -- I'm very sorry. It's difficult to track.

The groundwater concentration would have to be three times larger than --

Q. Than what we saw in leachate for it to be detected by the groundwater test that Midwest Generation was using in 2014?

A. Again, I think they are independent. The leachate test is to see if it's there. It's to see if it's there. Once we say it's there, then the concentration is irrelevant in the laboratory leachate. It's just that it is there.

Q. I don't think you're answering the question.

A. Yeah. Maybe I'm not understanding. I'll try harder.

Q. The leachate concentration is less

than one microgram per liter, correct?

A. Yes.

Q. The groundwater would have to have at least three times that before it was detected by the groundwater test that Midwest Generation was using in 2014 --

A. Yes.

Q. -- is that right?

A. Yes.

Q. Okay. Thank you.

For the groundwater to have three times more antimony than the leachate, given what we've seen earlier that there's some attenuation and it's unlikely to increase from the source to a downgradient receptor well, it's impossible for that leachate to ever be detected in a downgradient groundwater well using those tests; is that right?

MS. NIJMAN: Object to overbreadth and ever.

HEARING OFFICER HALLORAN: I'm sorry, Ms. Nijman?

MS. NIJMAN: Object to overbreadth and the word ever.

HEARING OFFICER HALLORAN: Can you rephrase, please?

BY MR. RUSS:

Q. If a source of coal ash like the one you sampled or the one that was sampled for the purposes of Table 5-2 in your report has less than one microgram per liter of antimony, would a downgradient well ever have enough antimony to be detected by the groundwater test that Midwest Generation was using in 2014 from that source?

A. You know, it -- it boils down to fundamentals. Okay. I -- I think there's maybe a misunderstanding of the fundamentals detect -- how we used the data.

In my view, when we take the data from the groundwater, which state the method of detection level, right? It's low. It's less than the groundwater standard. I'm talking about the method of detection level in the laboratory. And even though the laboratory test that was used by the EPRI data to test the leachate, the detection levels aren't an important part.

It's just whether it is there. And so it doesn't matter from Point A to B in the groundwater. It's just whether or not it is present. It's not -- concentration is not the point. If you don't -- and if you have groundwater less than the EPRI -- less than the method test, you're not going to -- you shouldn't -- you shouldn't detect it anywhere else. I mean, you know, downgradient if, in fact, it increases downgradient, as we talked about theoretically.

Q. Thank you. And that's exactly what I was trying to elicit.

So you shouldn't see it at a concentration that's greater than it is in the leachate in a downgradient well?

A. Again, it has nothing to do with the concentration of leachate. If it migrates and it is diluted as it moves, then it would be less than the detection level that we use in groundwater. It's still higher than this theoretical concentration that you're talking about.

Q. So you wouldn't expect to see it in

a downgradient well and yet when you found it in leachate and not in a downgradient well, which is what you're saying you would expect, you counted that as a mismatch; is that right?

A. It doesn't matter upgradient or downgradient, if it's there, it's not the concentration if it's detected if the detection level is the same in both of these wells.

Q. But the detection level is not the same, I think you've testified to?

A. The concentration in the groundwater -- excuse me.

The detection levels in the groundwater, I thought, are the same in the laboratory. I mean, we looked at one in the lab, right? I believe it was one result -- one detection level we looked at for the groundwater.

Q. You can look at the summary tables for the groundwater data in that report and you will see that it's consistently reported at less than 0.003 milligrams per liter?

A. Just three, right, three micrograms.

Q. And you wouldn't detect the leachate

with that groundwater test is what we've established.

A. But it -- you cannot equate what's in the leachate as being put in the groundwater. Okay? It's just what is detected in the leachate that's important, not the absolute concentration.

Q. So are you suggesting then that the groundwater might have much more of a constituent than the leachate?

MS. NIJMAN: Objection, mischaracterizes his testimony.

HEARING OFFICER HALLORAN: I'm sorry?

MS. NIJMAN: Objection, mischaracterizes his testimony.

HEARING OFFICER HALLORAN: He can answer if he is able.

BY THE WITNESS:

A. Whether -- if it -- if it's three times higher than what's -- what we detect in the lab, it's irrelevant. It's either detected in the groundwater at those detection levels or not. If it's less than that, it's

considered as a non-detect. So even though it could be three times, it's irrelevant.

BY MR. RUSS:

Q. Okay. I'm going to move on for now. This matching analysis in Tables 5-4 and 5-5, have you ever used this before.

A. I do groundwater comparisons that match before and it's a common tool and we use it in these comparisons at all my sites.

Q. Have you ever used this particular quantitative method?

A. Again, this is a method that looks at the numbers and accumulates a percentage and presents a percentage. I have not used that presentation before.

Q. Okay. Can you name anyone else who has done it this way before?

MS. NIJMAN: I'm sorry. Vague.

HEARING OFFICER HALLORAN: Can you rephrase, please?

MR. RUSS: Okay. Sure. Yeah.

BY MR. RUSS:

Q. Are you aware of anyone else using

this particular quantitative method before?

MS. NIJMAN: Vague.

HEARING OFFICER HALLORAN: He can answer if he is able.

BY THE WITNESS:

A. I mean, it implies a very broad understanding of what all the industry does. So I think it's a little bit -- I would answer no, but I think it's -- there's a lot of ideas out there and I don't know if I could know.

BY MR. RUSS:

Q. And are you aware of this particular quantitative method where you compare a source characteristic to groundwater data, calculate a percentage of matching that has ever been published in a journal or academic publication?

A. I don't know.

MS. NIJMAN: I'm going to object to the form of the question as mischaracterizing. He said a percentage only.

HEARING OFFICER HALLORAN: Okay. Mr. Russ?

MR. RUSS: I can reask the question.

BY MR. RUSS:

Q. Are you aware of anyone -- are you -- has this particular quantitative method ever been published in any journal or academic publication?

A. It's a similar question that you asked before, if I knew of anybody who had done it. There's lots of publications. I've not read all the publications. So I don't know if I -- even if I say I don't know, that doesn't mean it hasn't been used.

Q. Are you aware of any?

A. As I said, I don't know. But it's a little unfair because there's lots of journals and I've not read all the journals.

Q. I'm just asking if you're aware of any publications --

HEARING OFFICER HALLORAN: I think he said no.

MR. RUSS: I'll move on.

BY MR. RUSS:

Q. Okay. Let's talk about your temporal

trend testing results, which I believe is Exhibit 906.

A. Yes.

Q. Are these the same methods that you used to derive to your trend results that were in the demonstrative exhibits we were looking at earlier today?

A. The method is the same, but the database is different.

Q. All right. Without getting -- well, actually how did you calculate the significance of trend line?

A. The significance in the trend line is in the slope and internally there is a calculation of whether it is statistically valid, if you will. And that's why if it's above a certain slope, and I can't remember the percentage, but if it's above a certain slope, then you can say it's increasing or decreasing. But if it's less than that, you can't tell. I don't recall the sensitivity, if you will.

Q. Where did you discover that method of testing the significance of the trend line?

A. Well, it's the -- the calculation is done within Excel and really, you know, I had -- I had input into Excel and ran the calculation. I don't recall how the significance was tested.

Q. Did Excel calculate the significance for you?

A. I don't recall.

Q. Did you derive this method of determining the statistical significance of a trend test yourself?

A. It's a test that I had one of my engineers input for me and he reviewed it, but I don't -- that's why I don't recall sensitivity of the test.

Q. Okay.

A. I do know -- as I said, we concluded that if it's above certain slope, it was -- you know, again we concluded it was more statistically valid as either increasing or decreasing if it's less than a certain slope. If it was within a certain sensitivity and you couldn't tell, you couldn't tell.

Q. Okay. If you -- I'm sorry to do

this. I'm not sure exactly how to find what I'm looking for now, but the trend test results you had for Powerton in your demonstrative this morning was hard for me to read the page numbers. So I don't really know where they are. I could try to make out the page number to get there. It looks like it might be 42 or 43. I'm sorry.

A. The summary, I think, is on Page 43.

Q. Yeah. That's the one I'm interested in.

So on the summary table for boron, how many wells showed s decrease in trend?

A. For boron, six wells showed decrease.

Q. Out of how many total wells?

A. I believe there's 16.

Q. So most wells do not show a decline in boron over time; is that fair?

A. Well, you're looking at increasing, decreasing and no conclusion.

Q. Right.

A. And so the question is how many are...

Q. Most of the wells are not decreasing;

is that right?

A. For boron --

MS. NIJMAN: Objection as to vague. The chart says what it says.

BY THE WITNESS:

A. There are six wells out of 16 and --

THE COURT REPORTER: Wait, sir. You have to let the hearing officer make his determination.

HEARING OFFICER HALLORAN: Could you rephrase, Mr. Russ, to make it a little clearer? Thanks.

MR. RUSS: Sure.

BY MR RUSS:

Q. For boron, you have increasing, decreasing and no conclusion, right?

A. Yes.

Q. There are six wells that are decreasing, right?

A. Yes.

Q. There are 16 wells total?

A. Yes.

Q. So there are ten wells that are not decreasing; is that right?

A. They are not decreasing or there is no conclusion.

Q. They're not --

A. You are correct. Six wells are not -- ten wells are not decreasing.

Q. So most of the wells are not decreasing; is that right?

A. More than half.

Q. And for sulfate, how many wells are decreasing?

A. It says no wells, so no wells.

Q. Okay. None of the wells at Powerton show decreasing in sulfate trend; is that right?

A. I'm sorry?

Q. None of the wells at Powerton show a decreasing sulfate concentration?

A. Or there is no conclusion, yes.

Q. In general, for Powerton, Waukegan and Will County, most wells do not show a decrease; is that right?

A. That's very broad. Show a decrease in what?

Q. So let's -- I'll do it one-by-one.

So for Powerton, you have a

bullet below the table we're looking at here. It says that overall, it appears the groundwater concentrations are neither increasing nor decreasing; is that right?

A. Yes.

Q. A similar statement appears for Waukegan and Will County, to the best of your recollection?

A. Yes.

Q. You were asked whether you could describe these trends as "not getting worse." Do you remember that?

A. Yes.

Q. Would it also be fair to say that the data are not getting better?

A. Well, when you look at all of the data, there's a lot of nonconclusion data. And so that over time, if may prove one way or the other whether it's increasing or decreasing.

I'm sorry. Using this data set in its total, not -- again, getting lines that you have, you could say there are wells here that are not decreasing and there are

some that are not -- there's no conclusion -- conclusions and there's some that are increasing.

So in the overall data, I mean, you can't take one line item independently to say, oh, look, all those wells are not --

Q. Right.

A. -- down. You have to look at all of the data.

Q. I understand. So I'm just wondering because it -- you just said for Powerton, Waukegan and Will County, your conclusion was that groundwater concentrations were neither increasing nor decreasing.

Earlier today, you were asked to generalize whether it was fair to say that the data are not getting worse and you said yes.

A. That's an interesting observation. Thank you. It's also not getting -- it's not getting either -- it's not increasing or decreasing or worse or better.

Q. Okay. Thank you.

Now, in Exhibit 902, which

I think we're in -- oh, I'm sorry. 902 is the ASTM test. Let's look at Exhibit 902, Section 5.

A. 902.

Q. It's Bates Page 5026 -- sorry -- 50260.

A. 50260?

Q. Yes. This section -- did you say that you helped to write this?

A. It was written before I helped to revise it.

Q. Okay. Thanks.

This section recommends using certain screening procedures or analysis techniques when using ash for beneficial use; is that right?

A. Allow me to look at it for a little bit. I haven't read it in a while.

Q. Sure. Feel free.

HEARING OFFICER HALLORAN: Let's take a break. We'll be back in 15. Thank you.

(Whereupon, after a short break was had, the following proceedings were held

accordingly.)

HEARING OFFICER HALLORAN: We are back on the record at approximately 3:30. We have Mr. Seymour still on the stand. We have Mr. Abel Russ crossing him.

I might add our chairperson was in the room earlier, I think she's coming back, Katie Papadimitriu, and she asked if everybody could speak up because they are really having a hard time hearing.

MR. RUSS: Okay.

HEARING OFFICER HALLORAN: I apologized about the acoustics. Anyway just keep that in mind. Thank you.

BY MR. RUSS:

Q. Mr. Seymour, we were looking at Exhibit 903 -- 902 -- I'm sorry -- and Bates 50260.

Section 5 here recommends screening procedures or analysis techniques for using CCP as beneficial fill; is that right?

A. Yeah. It's got -- I'll call it process, a step-wide process to evaluate

materials, yes.

Q. Is the environmental flow chart on the next page part of that process?

A. Yes, it is.

Q. Okay. Regarding the ash found outside of the ash ponds at Joliet, have you seen any evidence that the ash was placed using these screening procedures?

A. This procedure became much after these were replaced. They may have had some idea, but I don't really know.

Q. Okay. And I guess that goes for all the sites. These procedures are more recent than the placement of ash at the sites?

A. Yes. This was originally approved previously. I don't recall the original date. It was more than ten years ago. So I don't recall the original date. So it's been around, but probably not as long as this ash fill was placed.

Q. So it's clear for the record, have you seen any documentation of the decision-making process replacing the ash

at the four sites -- this -- this historic ash areas we're talking about?

MS. NIJMAN: Objection, to the vague as to --

HEARING OFFICER HALLORAN: Yes. Can we rephrase. I'm sorry.

BY MR. RUSS:

Q. I'll go site-by-site.

At Joliet, have you seen any documentation documenting the decision-making process for placing the ash in any of the historic ash areas of Joliet?

A. I have not seen --

MS. NIJMAN: Objection, vague, historic ash areas. Which? Which ones are we talking about?

MR. RUSS: I could ask about any of them. I could say have you seen documentation for any? I'll do it that way.

MS. NIJMAN: Yes, but -- I'm sorry. May I ask?

HEARING OFFICER HALLORAN: Go ahead.

MS. NIJMAN: My concern is that Mr. Seymour has also testified as to -- and Dr. Kunkel has testified as to wells with data, wells with ash, area berms with ash. Are you talking about those or are you talking about the northeast area or what are you talking about?

MR. RUSS: I could just say outside of the ponds for the whole site. That might make it easier.

MS. NIJMAN: That would be a very broad question.

HEARING OFFICER HALLORAN: That still will be a broad question. Can you kind of zero it in? I understand what Ms. Nijman is getting at.

MR. RUSS: Okay. Well, I'll go location-by-location.

HEARING OFFICER HALLORAN: Okay.

BY MR. RUSS:

Q. At Joliet, have you seen any documentation documenting the decision-making process for placing ash in northeast ash landfill?

A. In that alleged former ash landfill, I have not seen documentation.

Q. How about the southwest ash landfill?

A. Well, that's the fill area that was sampled by KPRG. I don't recall how that was -- how they decided to place it there.

Q. And are you not aware of any other discreet fill areas at Joliet, are you?

A. It's not been identified.

Q. Right. At Powerton, have you seen any documentation related to the decision-making process behind placing fill in the area of the ponds outside of the ponds, if you know what I mean?

A. I have not seen any documentation.

Q. In Waukegan, have you seen any documentation at all relating to that former slag fly ash disposal area?

A. Well, they called it a former, as you may recall, but other than the ENSR document that says it was a former slag fill area or something like that, I don't recall seeing any documentation.

Q. Just for the record, I was asking

about the southwest area, Joliet 29, and you mentioned that area had been sampled by KPRG.

Just so we're all clear on the record, do you remember where the area that KPRG sampled at Joliet was?

A. Yes.

Q. Where was that?

A. I could find the map maybe. It's southwest of the pond area, if I remember that right.

Q. Okay. And --

MS. NIJMAN: You can look at your --

BY MR. RUSS:

Q. You might want to look at the map.

MS. NIJMAN: In your Exhibit 901, the map is there, Page 23.

BY THE WITNESS:

A. I've got it. It's the area, yes, southwest of the pond area for Joliet. It says former ash placement area sampled in 2005.

BY MR. RUSS:

Q. Okay. And are you aware of any other ash placement areas further southwest of that Joliet site?

A. On this map, it says we're in the very southwest corner of the site. It says alleged former ash placement area.

Q. Have you seen any documentation at all related to that area?

A. I have not.

Q. And at Will County, have you seen any documentation related to the decision-making process for placing ash outside of the ponds at Will County?

MS. NIJMAN: Could you maybe reference the maps or point to what you are talking about?

BY MR. RUSS:

Q. Are you aware of ash in the boring logs at Will County?

A. Yes, I've seen the boring logs and there's ash in some of the borings.

Q. Have you seen any documentation of the decision-making process behind placing ash

there?

A. I don't recall seeing it.

Q. Okay. Thank you. That's it for that line of questioning.

So you said that the risk of contamination from inactive landfills is less than from active impoundments because the inactive landfills don't have a driving head of surface water; is that right?

A. That's one of the elements that has been looked at.

Q. I think you also said that groundwater can create a head?

A. Excuse me. Groundwater -- it's a different direction, if you will. It flows horizontally from a higher head or higher elevation to a lower elevation. So that head moves the water laterally. That's the head and if that doesn't exist, it wouldn't -- if there's no ash, it wouldn't put any head on it.

Q. Right. So if you have any substance -- it could be ash or any substance -- beneath the water table, is it subjected to

a hydraulic head?

A. It would be a horizontal difference of pressure, yes.

Q. Okay. Thank you.

Exhibit 510, I believe, this was in Maria Race's exhibit or is that Rebecca Maddox? Not Race? Maddox or Gnat?

MS. NIJMAN: Maddox.

BY MR. RUSS:

Q. Go to Exhibit 510.

A. I have it.

Q. Okay. Looking at Page 34311 --

MS. NIJMAN: Just one second.

BY MR. RUSS:

Q. I know this is just a title page, but 34311, begins with Attachment B-1; is that right?

A. Yes. It says borrow source samples.

Q. Do you know where these borrow source samples -- what the borrow source was?

A. I don't recall. Let me look to see if there is anything in here. This is the construction documentation transmittal for south ash pond two liner replacement from NRT

to Midwest Generation, July 18, 2014.

Q. Uh-huh.

A. And I don't recall. It may be in here, Mr. Russ, but I -- I don't recall where they might have got these borrow source samples from.

Q. I don't either. Sorry. We're on the same page.

Moving on, you said you've installed HDPE liners for hazardous waste landfills; is that right?

A. Yes.

Q. In those situations, do you install the HDPE on bare soil?

A. The regulations for hazardous and solid waste are similar in that they -- they have a 60 HDPE cited in the regulation as a liner. The flexible membrane liner is common in RCRA. We've just been calling it a geomembrane. It's HDPE. It's the same thing. They put that on a -- what's required as a two-foot thick compacted clay soil barrier layer liner with a maximum xxx of no more than one times ten to the minus seven centimeters per

second.

HEARING OFFICER HALLORAN: Okay. If we could speak up, like I suggested before, we have a chairperson. She would like to be able to hear. You keep sliding down. Thank you.

MR. RUSS: I'll stand so I can project a little bit better.

BY MR. RUSS:

Q. So when you've installed an HDPE liners for hazardous waste landfill, you've installed them on that compacted soil two-foot liner that you've just described?

A. I've used that on hazardous and solid and I've also put it as a cover for solid waste at Superfund sites where the bottom two-foot layer was not required.

Q. You put the HDPE or the clay as the cover?

A. Thank you. It's the HDPE that was placed without the two-foot clay.

Q. Oh, I see. As a cover?

A. As a cover.

Q. Have you ever installed a hazardous

waste landfill below the water table?

A. The one that I did -- two that I did did not go below the water table.

Q. Do you recall how high above the water table they were?

A. I don't recall. It was awhile ago.

Q. We talked about you did a risk analysis in your report, right?

A. We did to assess the water surrounding the site.

Q. And you mentioned receptors?

A. Yes.

Q. Can you say what a receptor is?

A. Well, the water quality criteria and the water quality standards relate to the animals and benthic organisms so on that live in the water and also form an exposure to people as in bathing, for example.

Q. Okay.

A. Recreational use.

Q. Okay. Does the presence or absence of receptors affect the degree to which a potential source of contamination leaches into the groundwater?

A. The groundwater infiltration is separate from the receptor. What we did, as I mentioned, we looked at what was in the groundwater as though it was in the surface water.

Q. Right. Thank you.

Now, on Slide 25 of your demonstrative, so Exhibit 902, 901, right, Slide 25?

A. Yes.

Q. The heading of this chart says, "Updated Temporal Trend Testing Groundwater Concentrations for Site-Specific Indicators of Ash in Ponds," right?

A. Yes.

Q. One of the constituents you have in this table is manganese, right?

A. Yes, I believe it is.

Q. All right. Do you believe the manganese is an indicator of --

A. Well, Mr. Russ, you pointed out something helpful. I think it would have been fairer to say what was found in groundwater, but we didn't mean to imply that it was an

indicator. So that is -- that's not correct.

Q. Okay. So the manganese trend test results are not relevant to your conclusion; is that right?

A. No. It is relevant because, as we talked about earlier, there is manganese there. We haven't identified specifically where it's from, but we're still assessing it because it's still there and we want to assess it.

Q. Okay.

A. And so this data looks at all the groundwater data and not whether there's a source or not.

Q. Right. Your opinion is that the manganese that you've seen from these sites is not coming from the coal ash; is that right?

MS. NIJMAN: Objection, misstates, mischaracterizes.

HEARING OFFICER HALLORAN: He can answer if he is able.

BY THE WITNESS:

A. Manganese is one of the indicators

that we have found in the ash. So again, it's like one of the -- we look at the other indicators and then we also -- as we said, we looked at the EPRI data to corroborate.

BY MR RUSS:

Q. And you just said you didn't find it in ash?

A. It was not detected in the test that we ran.

Q. Right. So did the trends in manganese then have any bearing on the degree to which coal ash continues to leach into the groundwater at these sites?

A. As I said, there's presence of some ash constituents in the groundwater and if you're looking for -- if it's getting better or worse, so to speak, that's valid to look at. That's like any water, it's conservative looking at those water quality criteria.

Q. Okay.

A. Or water quality trends. Excuse me.

Q. Just so it's clear on the record, for Powerton, the comparable table to what we were just looking at in Joliet would be on

Page -- oh, boy.

MS. NIJMAN: Page 43.

MR. RUSS: Forty-three. Thank you very much.

BY MR. RUSS:

Q. Okay. How many of the wells at Powerton show a decreasing trend in manganese?

A. Five wells show a decreasing trend in manganese.

Q. How many are either increasing or -- neither increasing or decreasing?

A. For manganese?

Q. Uh-huh.

A. Eight.

Q. How many are increasing?

A. Three.

Q. So of these total wells, 11 are not decreasing, is that fair to say?

A. Again, that's a mathematically fair statement with the caveat that no conclusion is no conclusion. Statistically, you can't tell. So maybe.

Q. Fair enough.

And Waukegan is Slide 55.

A. Okay.

Q. Three wells are decreasing in manganese; is that right?

A. Yes. Three wells are decreasing.

Q. Five wells are neither increasing nor decreasing?

A. Yes, with the same comment I had before, you don't know if it's decreasing or increasing.

Q. Right. One well is increasing?

A. Yes.

Q. So six of the wells are not decreasing, according to your statistical methods; is that right?

A. Again, mathematically, that is correct, but with five wells, there is no conclusion.

Q. Okay.

A. They all may be very close to decreasing. You just don't know.

Q. Right. Then I just want to do the same for Will County just to get it complete.

That's Slide 71, I believe.

A. Okay.

Q. Here, at least seven of the ten

wells for manganese show either increased or no conclusion; is that right?

A. That's correct. Four wells are increasing and three wells are decreasing and three wells have no conclusion.

Q. Okay. Thank you.

Slide 47 in your -- in the same exhibit, it's very close to the end here. Right. Okay. I believe you said on the record that the average groundwater level was several feet below the pond bottom; is that right?

A. I believe so, yes.

Q. And how many feet exactly is it between the average groundwater elevation and the pond bottom here?

A. For the east pond, which is the one closest to the lake, and the groundwater, which is a little lower, it is three and a half feet below.

Q. Okay. And the other?

A. For the west ash pond, the elevation of the water -- groundwater is 583 feet and it is two and a half feet below the bottom of the pond.

Q. Okay. And for the record, we are looking at a picture that might not be clear on the record, but the pond bottom elevation that you're referring to is the top of the liner, correct?

A. Yes.

Q. Can you estimate the elevation of the HDPE layer at the bottom of the liner?

A. It would be elevated -- it's an 18-inch thick layer below 585.5. That would make it 584.0 feet.

Q. So for -- that would be one or two feet above the average groundwater elevation depending on the pond?

A. Relative to the geomembrane of the pond to the groundwater elevation.

Q. Okay. Thank you.

Regarding the General Boiler site at Waukegan, you were looking at an exhibit -- an attachment to an exhibit that I think you described as a citizen website.

Do you remember that?

A. I believe so, yes. I remember that.

Q. That discussed potential ash fill

area at the General Boiler site?

A. Yes.

Q. And I think you said it's not the same as having a consultants report?

A. Yes.

Q. Can you explain why?

A. Well, it's the internet. It's a website. So it has the -- often general information, but to me, it looked as though they quoted something from a report. As we know, there were active studies in the '90s looking at that area.

Q. What would a consultant's report have provided you that would have been an improvement over what you were looking at?

A. Probably some field information that would classify it as flash.

Q. The extent of it, I would assume?

A. Often, yes, but not necessarily. They might have just seen an outline, for example, and made a characterization from an observation.

Q. Okay. So then I take it you have not seen any consultant reports for the

General Boiler site?

A. I have seen the reports done by a combination of companies back in the '90s and carrying forward, and with ongoing monitoring of those areas.

Q. Did any of those reports mention the national landfill?

A. They didn't call it out as a -- I'm not sure if that citizen report called it an ash landfill or ash area.

Q. Yes. I don't remember.

A. We did see evidence of slab and cinders and a lot of old fill and those old borings and we know that they're an old facility, over 100 years old, and burning coal was very common. We also know, you know General Boiler, same thing. If you need heat, often coal was used. So we did see evidence of, I'll call it, some fill that was mixed with other fill.

Q. Okay. Let's turn to Slide 61 in the demonstrative exhibit. This is a Will County diagram.

A. Yes.

Q. What is the el vacation of the bottom of this liner if you can estimate that?

A. The --

Q. I'm sorry. The bottom of the Poz-o-Pac layer. The bottom of the Poz-o-Pac layer would be three and a half feet below the bottom of the pond, is that what you're asking?

A. I think so, yes. One, two, three and a half, yes.

Q. And so what elevation would that be?

A. 579.0.

Q. Okay. And that's at least a foot lower than the average groundwater elevations for these ponds; is that right?

A. 579, yes, it is.

Q. Okay. This diagram doesn't show it, but I just want to make sure.

Is there a drainage layer in these ponds?

A. Not to my knowledge.

Q. And this diagram says that it represents south ponds two and three. This

is not a representation of ponds 1-North and 1-South, correct?

A. We did put it at that way. I know that they are Poz-o-Pac lined, but I didn't put it on a diagram because they're inactive ponds. We did focus on that.

Q. Okay. Two more questions.

You mentioned some updated calculations about hydrostatic uplift at Will County.

Do you remember that?

A. Yes.

Q. Are those calculations in the record anywhere?

A. No.

Q. Okay.

A. I could review them for you if you want me to state them for the record.

Q. No. That's okay. I think what you said earlier was good enough.

MR. RUSS: May I have a moment to confer with counsel?

HEARING OFFICER HALLORAN: Sure.

(Brief pause.)

MR. RUSS: That's all I have.

HEARING OFFICER HALLORAN: We are back on the record.

Mr. Russ, that's all you have?

MR. RUSS: That's all I have.

HEARING OFFICER HALLORAN: All right. You lied. You said 30 minutes. It's been 23 minutes.

Ms. Nijman, do you need a minute?

MS. NIJMAN: I can get started. I might take a minute at the end.

HEARING OFFICER HALLORAN: Okay.

R E D I R E C T E X A M I N A T I O N

by Ms. Nijman

Q. Mr. Seymour, you suffered through a long discussion about your comparison tables and Mr. Russ had you comparing detection levels with the groundwater with the levels -- detection levels of the leachate tests.

Do you recall that very long testimony?

A. Yes, I do.

Q. What is a quantification limit?

A. It's essentially the laboratory equipment has a mechanical test level. It can test down to a certain limit.

Q. How is a detect limit different than quantification limit?

A. Method detection limit is higher than the quantification limit and what happens in the groundwater analysis is when the laboratory runs it at a method, and if they happen to see it at a concentration less than a method detection limit, and it's above the quantification limit, they can find it, but they don't have as accurate of an understanding of that chemical. So they flag it. They mark it as an estimated number.

Because above the method detection limit, it's required to have certain accuracy. Below, it's less accurate.

Q. And how many lower is the quantification limit than the detect limit?

A. It can be around ten times lower.

So, for example, if you have a detection limit of three, the quantification limit would be .3 or lower. It depends on the specific method.

Q. And are we talking about micrograms per liter?

A. Excuse me. Yes. That's micrograms per liter. Mr. Russ sort of switched units on me. We're used to milligrams per liter, but he was discussing it in micrograms per liter.

Q. So the quantification limit is actually the capability of the equipment to detect lower --

A. Yes.

Q. -- levels of constituents?

A. Yes. Sorry for interrupting.

Q. Oh, that's all right.

What is a J value or J flag?

A. That's what I was mentioning as if it's an estimated number, they will flag it with a J. We heard Mr. Gnat talk about that the other day. He would look at the data when it comes in and he would look for qualifies and

J is one of the qualifiers that he would look for.

Q. So the groundwater data that Mr. Russ was asking you about could actually detect at a level that was the quantification limit, a much lower level, correct?

A. Yes.

Q. So if we were to see constituents in the groundwater, we would still see them, just with a J flag, correct?

A. Correct.

Q. And we didn't see them on any of the groundwater tables, did we?

A. That's correct. The data reported is less than basically the method of detection levels. We just commonly call them the detection limit.

Q. So if a value is below the detection limit and there's no J flag, what does that mean?

A. It means that it's present, but you don't have a good understanding of the accuracy of the number. It's an estimated number.

Q. And what if there's no J flag?

A. That means it's even less than the quantification limit. So if there's no J flag, it's less than the quantification limit.

Q. All the data -- the groundwater data Mr. Russ was asking you about below the detection limit that has no J flag would actually be the quantification limit?

A. Yes, it would be. As we normally do in the practice, you report it at the method detect limit because that's the standard way of reporting, but as you said, if it would have been found in Mr. Gnat's data, it would have been flagged as a J and you would see. It would not say less than a number. It would just have the number with a J after it.

Q. Starting out earlier this afternoon when Mr. Russ was talking about your curriculum vitae, you have -- I think you said in your resume, your CV, 40 plus years of experience?

A. Yes.

Q. And do you list every project you've ever worked on in your CV?

A. No.

Q. That would be a long CV, wouldn't it?

A. Yes. And even what I put in my CV was very abbreviated. As you could see, one of the projects I talked about was a very large project and I just put a very short description in the CV.

Q. We had some discussion about Joliet. Generally, what is your view of the groundwater impacts at Joliet?

A. Well --

MR. RUSS: Objection.

HEARING OFFICER HALLORAN: He may answer if he is able.

BY THE WITNESS:

A. I would like to clarify it because my earlier answer was a little bit -- maybe too basic.

HEARING OFFICER HALLORAN: You can answer it, sir.

THE WITNESS: Thank you.

BY THE WITNESS:

A. One of the wells does have some levels over the Illinois groundwater standards, but all the other wells pretty much -- they're pretty much below the groundwater standards.

It's a pretty -- it's a less impacted site of all the four.

BY MS. NIJMAN:

Q. Now, you also talked with Mr. Russ about the Powerton site and you were talking about correlating data -- the ash data. Let me ask you about the Powerton old former ash area. There is a landfill area that's been identified in the record on Powerton called the old former ash area.

Do you remember that?

A. Yes.

Q. And are you aware of groundwater around that entire old landfill area?

A. Yes. There's a groundwater water monitoring network around the whole area. It starts one Monitor Well 1 on the east side and I think as Rich Gnat characterized the shape of that area, it's like an ice cream cone. To the north is the large side of the ice cream itself is the cone. So on the right side of the cone is Monitor Well 1 progressing counterclockwise with Monitor Wells 2, 3, 4 and 5.

Q. And I think you stated all of the results of those groundwater monitoring wells are below the Class 1 standards?

A. Yes, yes.

Q. Do you know for certainty what ash is in that area?

A. It's just been characterized as an old former ash area and I don't have any knowledge of what kind of ash is there or how old it is.

Q. And yet we see nothing in the groundwater above Class 1 standards?

A. Correct.

Q. How did that form your opinion as to old ash areas generally?

A. Well, it tells me that, you know, we don't have a lot of information on the chemistry of that area, but we know what's getting away from that area is under the groundwater quality standard.

That's just another data point that I used when you look at the other areas of the site that may have ash in the fill as to what the potential is for that

ash in the field to impact groundwater.

Q. And when you generally spoke about historic -- the word historic, can you just clarify?

Were you referring, as you said, I believe, several times in your deposition to the longstanding 50 to 70 to 80-year uses of these properties?

A. Yes. As I mentioned earlier, the historic areas are the ones that we've identified in borings and in observations that are very old and then can be very old and then there's a set of classification that I use as historic uses that have not been specifically identified.

That is because of the age of all the facilities. There are things that we -- that we're unaware that could have happened, but obviously, as I said, there are impacts to groundwater.

Q. I would like to refer you back to the document that Mr. Russ was showing you in Kunkel Exhibit 411 and it was the Waukegan chart for MW-7 and MW-8, the data used for

hearing charts and tables.

A. I'm sorry.

Q. I'm halfway through, I guess.

A. This is for Waukegan. This was for Monitor Wells 7 and 8.

Q. Yes. For Monitor Well 8, I noticed that the data ends at year 2015.

Do you see that?

A. Yes.

Q. Do you have any idea why Dr. Kunkel left out two years data from his tabulation of median?

A. I really don't know. And as I mentioned when I was pointed to this data, I said I cannot speak to the accuracy of this dated because it was pointed out to Mr. Kunkel that there are errors in these data.

MR. RUSS: Objection. That's not what the record shows. Dr. Kunkel was shown errors in a separate part of the --

HEARING OFFICER HALLORAN: I don't know. The Board will take note.

Overruled at this point.

BY THE WITNESS:

A. To answer the question, I don't know why the data are missing.

BY MS. NIJMAN:

Q. You talked about with Mr. Russ the comparison data that you did comparing groundwater constituents, constituents that you find in the groundwater, and comparing them with constituents you find in the leachate from the ash test.

Do you remember that discussion?

A. Yes, I certainly do.

Q. And is comparing constituents of groundwater to a potential source area, is that axiomatic in your world?

Is that what everybody does?

A. Yes. We do comparisons of the data.

Q. In fact, Dr. Kunkel compared the data?

A. In effect, he compared the EPRI data to groundwater data.

Q. And when you said you weren't aware of journals that published it, were you talking

about how you presented it as a matrix percentages?

A. The way I -- yes. I -- I just presented it in percentages and my knowledge, of course, would be that there are plenty of ways to present data. I have not seen a percentage as I have shown in my report.

Q. Just a few minutes ago, Mr. Russ went through each of the facilities and the -- whether you had seen documentation about the CCP ASTM standard.

Just to confirm, all the areas that he identified, Joliet northeast ash area, the southwest area, the former slag area at Waukegan, to your knowledge, when was that ash placed?

A. Well, it was certainly before 1998, when ENSR documented it in those reports. I don't know how much farther back than that, but it was definitely way before at that.

Q. Mr. Russ also asked you about HDPE liners for hazardous waste landfills. Coal ash is not hazardous waste, is it?

A. It is not.

Q. In fact, as you testified, it's often beneficially reused?

A. Yes, it is.

Q. There was also some discussion about the fact that you included manganese in some of your charts for risk analysis.

Now, Dr. Kunkel viewed manganese as an indicator in his report, correct?

A. Yes, he did.

Q. Was that one of the bases for you looking at it?

A. Well, it's there. Again, it is there. So we looked at it for our trends and we looked at it for the potential for surface water indicators because, as I said, there are other historic uses that it could be coming from. So we considered it in our analyses.

Q. Now, at Will County, you looked at the bottom of the Poz-o-Pac elevation with Mr. Russ. To your knowledge -- based on your review of the information in this case, what was the reason for installing 36 inches of

Poz-o-Pac at the Will County ponds -- all four of the Will County ponds back when the ponds were installed?

A. I don't recall the purpose of 36 inches.

Q. Would it be to help protect against that groundwater elevation?

A. Well, you know, when they built the ponds, they knew the groundwater was fairly close. So you could make an engineering assumption that they had some idea that they had to deal with it and they put the extra weight to help counterbalance the force of water -- force of groundwater.

Q. Would that be part of the design of the pond that you and I were speaking about earlier?

MR. RUSS: Can I object to the leading nature of the questions?

HEARING OFFICER HALLORAN: Yes. You're* starting to lead again, Ms. Nijman. Thank you.

BY MS. NIJMAN:

Q. How does that relate to the discussion

we were having about designing a pond for the circumstances the pond is in?

A. It's directly applicable in that, as I mentioned, as engineers, you know, there are things that aren't in the regulations that you have to consider anyway. Hydrostatic uplift is one of them. And so if you have bedrock very near the ground surface, as they did, and a very limited ability to excavate down, they wanted to get the maximum excavation so I can very well see a thicker Poz-o-Pac to resist those groundwater forces.

MS. NIJMAN: Thank you. That's all I have.

HEARING OFFICER HALLORAN: Thank you, Ms. Nijman.

Mr. Russ?

MR. RUSS: Just one or two questions.

R E C R O S S - E X A M I N A T I O N

by Mr. Russ

Q. If you look at Exhibit 268-P, please, Mr. Seymour? It's right there on top of the stack.

A. Okay.

Q. Ms. Nijman was asking you about J values, I believe.

A. Yes.

Q. Could you find an example of a J value in this report?

A. There is a fair amount of data. I went through the first result and I didn't see any. I did not find any.

Q. There's no J values in the report at all?

And for the record, this is the Waukegan fourth quarter 2014 groundwater monitoring report, is that right?

A. Yes, January 22, 2015, yes.

Q. There are no J values here.

Can you look for the method detection level for antimony?

A. I don't see antimony on this chart.

Q. Let me help you. Look at Page 10 of the original source document. There's not a Bates page, but --

A. Oh, I see it, yes.

Q. What is the method detection limit

for antimony?

A. It would be .003.

Q. And the reporting limit is also 0.003 here?

A. Yes.

Q. Can you explain again what a J value is?

A. It's an estimated number between the method detection limit and the ability of the machine for detecting it.

Q. The method detection limit and the reporting limit are the same here, right?

A. I see that.

Q. So what would -- how would you find the J value in this case?

A. I would assume if they found it, they would have shown it on this table, but it's not obviously.

Q. Okay. No J values for antimony in 2014 in Waukegan?

A. Correct.

Q. How about in 2017, if you look at 269-P, I don't think you have that there, but I can find you a copy.

Exhibit 269-P, are there any J values or antimony in this report?

A. I don't see any.

Q. Are there any J values for anything in this report?

A. There aren't.

Q. And what would the -- what would the -- the J value represents the difference between the method detection limit and what?

A. The quantitation limit.

Q. Can you -- the quantitation limit shown in this report?

A. I don't see it in the chart and just the few pages we looked at.

Q. Right. So it doesn't appear that these reports actually provide quantitation limits or J values; is that right?

A. They don't provide --

MS. NIJMAN: Objection to the overbreadth. We're looking at one document of how many reports do we have?

HEARING OFFICER HALLORAN: Rephrase, Mr. Russ.

BY MR. RUSS:

Q. Well. I'm just asking about this one document. It didn't have any quantitation limits or J values; is that right?

A. I didn't see any.

Q. And so is that because they don't exist or is that something this report just doesn't produce?

A. I don't know. I can't tell.

MR. RUSS: Okay. One moment, please.

HEARING OFFICER HALLORAN: Go off the record.

(Whereupon, a discussion was had off the record.)

MR. RUSS: Nothing further.

HEARING OFFICER HALLORAN: Okay. Thank you, Mr. Russ.

Ms. Nijman, any re-redirect?

R E - R E D I R E C T E X A M I N A T I O N

by Ms. Nijman

Q. There's a quantification level and detection level for equipment; is that correct?

A. Yes.

Q. Just because it's not in this report doesn't mean it didn't exist?

A. That's correct.

MS. NIJMAN: That's all I have.

HEARING OFFICER HALLORAN: Thank you.

Thank you, Mr. Seymour. You may step down. I appreciate it.

Ms. Nijman, anything further? Do you rest your case-in-chief?

MS. NIJMAN: We rest our case-in-chief. Thank you.

HEARING OFFICER HALLORAN: Ms. Bugel, any rebuttal?

MS. BUGEL: We do not have any rebuttal?

HEARING OFFICER HALLORAN: All right. Thank you. I think at this point we will go off go the record for a moment.

(Whereupon, a discussion was had off the record.)

HEARING OFFICER HALLORAN: We're back on the record.

We were just talking about

dates and I have asked the parties and they have agreed, they are going to file their respective master list of exhibits and how they were taken by February 13th. The complainants are to file their written objection to respondent's Exhibit 662 by February 5th. Midwest response is due by February 9th. We are going to discuss the briefing schedule during a conference call on February 7th at 2:00 p.m. I have already -- I put down public comment is due on February 28, 2018.

All right. I think that's it. I thank you for abiding by all my admonishments and it's been a great week. Thank you so much everyone.

(Whereupon, no further proceedings were had in the above-entitled cause.)

STATE OF ILLINOIS)
) SS.
COUNTY OF C O O K)

I, LORI ANN ASAUSKAS, CSR, RPR, do hereby state that I am a court reporter doing business in the City of Chicago, County of Cook, and State of Illinois; that I reported by means of machine shorthand the proceedings held in the foregoing cause, and that the foregoing is a true and correct transcript of my shorthand notes so taken as aforesaid.

Lori Ann Asauskas, CSR, RPR.
Notary Public, Cook County, Illinois

A
A.D 1:17
a.m 1:17
abandoned 103:11 210:8
abbreviated 317:2
Abel 2:18 5:23 289:5
abiding 332:13
Abigail 206:16
ability 203:4 210:15 326:9 328:9
able 37:4 62:11 152:19 154:9 158:9 163:5 177:18 179:22 213:12,24 214:11 215:18 254:13 255:9,16,19 256:8 257:11 277:18 279:4 299:5 302:22 317:12
above-entitled 332:18
absence 236:20 237:3,8,11 300:21
absolute 277:6
absolutely 56:7 106:16 254:10
absorbed 152:22 152:23
academic 279:17 280:6
acceptable 154:16 154:24
accepted 10:4 124:19 258:16 263:6
accepts 267:22
access 213:1
accident 66:10 116:4
accountable 211:5 214:1,8
accumulate 54:1
accumulated 54:5
accumulates 278:14
accuracy 313:21 315:22 321:15
accurate 33:16 54:13 69:11 81:24 90:20 91:16 108:10 117:21 173:5 187:18,19 191:4,5 199:11 225:19 229:19 230:7 251:17 313:15,21
accurately 8:3 21:3 93:12 121:2
achieve 144:5,8 147:1
acid 132:6
acoustics 289:13
acted 80:2
action 99:9
actions 47:12 79:17 105:24 125:12 211:5
active 108:12,16,19 162:8 296:7 308:11
actual 89:23 137:18
ad 125:19
add 256:24 289:6
adding 220:1 230:8 254:9
addition 38:23 91:3 125:1 197:1
additional 16:15,23 57:22
Additionally 120:19
additive 196:18
address 210:6
adds 114:1 254:7
adequate 213:21 214:3
adjacent 163:8
administrative 50:18 81:14 108:2
admit 128:8
admitted 4:15 18:2 128:23 129:2
admonishments 332:14
advantages 207:8
advisor 6:7
advocate 212:8
advocated 214:19
aerial 100:21
affect 10:15 236:19 300:22
affective 64:3
aforesaid 333:13
afternoon 60:18 205:22 211:21 316:16
age 207:3 212:11 320:16
aggregate 148:12
ago 35:18 53:15 114:23 290:18 300:6 323:8
agree 7:23 8:9,20 10:12 11:14 12:1 12:13 13:9,17 23:4 31:10 37:22 44:4 51:14 61:23 63:10 67:6,10,24 73:8 81:23 90:20 91:8,10 100:1 118:14,14 145:10 146:21 156:24 167:3 217:5,7 240:22 243:20
agreed 18:12 126:19 332:2
agreements 40:5
agrees 90:7
ahead 17:8 118:4 198:4 223:24 255:12 291:24
air 54:1,5
allege 166:4 173:16
alleged 22:23 24:6 45:4 119:23 161:19 163:15 293:1 295:7
alleging 187:13 190:23
allocation 132:13
allow 125:2 288:16
allowable 152:9
allowances 43:21 154:21,22
allowed 43:21,23 62:13,14 151:4 152:5 208:2
allows 46:24
altered 207:16
alternate 146:24 147:7
alternates 147:2
amount 123:12 169:23 250:15 254:13 260:12 263:20 266:21,24 271:5,7 327:7
amounts 207:20
an- 271:21
Anad 6:6
analyses 87:20 98:21 169:10,22 240:5 324:19
analysis 25:12,19 26:9,10 28:20 29:17 42:19 50:21 55:15 69:13 75:9 76:18 77:4 79:1 79:15 84:21 92:12 95:10,23 105:8 107:23 112:17 121:12 123:1,16 124:14 126:9 135:15 140:1,1 161:21 165:6 169:7 231:3 233:19 234:16 236:23 237:17,18 243:16 245:22 252:4 258:24 268:3 270:21 278:5 288:13 289:20 300:8 313:10 324:6
analytes 121:18
analyze 104:11 123:12,13 169:5
analyzed 21:23 135:19 139:1 167:13 168:13 172:1,3 177:3 192:2 239:4 253:11
and/or 99:9
anecdotal 99:24 186:14
angle 23:10,12
animals 208:9 300:16
Ann 1:13 333:6,17
Annual 194:9
answer 138:4,14,18 138:24 139:8 142:22 145:6,8,23 146:2,14 151:9,17 151:21 152:19 154:9 156:16 158:9,11 159:2,5 159:10,23 162:6 166:6,11,14 167:11 168:3,5 172:18 173:19 179:22 181:11 183:4 187:12,19 189:2,4 190:14,22 191:5 198:3 242:8 242:11 247:7 256:8 263:17 269:14 277:18 279:4,9 302:22 317:12,15,18

322:3
answered 74:10 156:14,18,22 157:24 158:7 166:18 185:4 189:11 265:9 269:10,13
answering 272:20
answers 167:2
anthropogenic 34:8 35:2 95:6
antimony 259:8,15 259:18,21 260:12 260:20 261:10,11 261:17 263:11,20 264:13,14,17 265:19 266:21 267:1,24 268:8 269:22 271:3,5,7 272:4 273:12 274:8,9 327:18,19 328:1,19 329:2
antonina 259:23
anybody 280:9
anymore 47:23 80:18
anyway 56:17 114:14 289:13 326:6
apologize 93:4 97:12 146:14 166:18 183:5 198:7 222:7 248:20 261:13
apologized 289:13
apparently 207:16
appear 139:2 162:8 167:14 168:13 208:18 218:8 329:15
appearance 68:19
Appeared 2:24 3:7
appears 29:6 105:15 123:24 158:18 286:2,6
applicable 155:12 156:8 326:3
application 28:13
apply 57:18 125:4 153:22 200:12
appreciate 133:21 139:7 189:3 331:8
approach 25:6 116:3 127:14 235:9 268:21
appropriate 26:11 38:22,24 55:23
approved 290:16
approx- 70:19
approximately 12:8 53:15 107:1 129:15 195:21 205:24 289:3
area 22:7,23,24 24:3,5,6,8,15 45:8 47:5 50:17 68:17 72:1 73:22,23,24 74:12,13 76:8 99:1,2,9,11 100:2 101:5,8 103:10 111:19 114:3 119:22,23 120:2,5 120:9 124:22 127:11 152:6 161:4,4,11 162:15 163:6,8 164:11 172:4 177:1,17,19 177:20 178:7,11 178:16 179:1 192:4,20,22 193:1 193:5,14 195:8 196:2 204:8 208:8 219:9,11,14 221:7 229:8,12,19 292:4 292:7 293:4,12,18 293:21 294:1,2,5 294:10,20,21,22 295:7,9 308:1,12 309:10 318:8,8,10 318:14,16,19 319:6,8,18,19 322:16 323:13,14 323:14
areas 20:24 21:2,4 21:8,13 22:15 44:21 45:3,3,4,11 50:16 51:8 71:16 71:19 78:19 80:10 81:12 107:23 112:4 126:5,11 163:6 165:5 171:13 172:11 207:14,21 210:9 257:20 291:2,12 291:15 293:8 295:3 309:5 319:15,23 320:10 323:12
argument 268:24
arm 143:8
arranged 238:6
arrive 132:10
arrows 75:19,24 94:1
arsenic 98:24 246:2 246:5,8 247:24 248:14,19,20 249:2,3,22 250:3 250:15 251:7,13 252:10 253:7,15 253:24 254:9,10 254:13 255:17,20 256:12
articular 64:18
aruss@environm... 2:17
as-needed 53:11
Asauskas 1:13 333:6,17
ash 14:2,18,20 15:10,23 16:13 20:6,7,7,12,24 21:4,9,13,15,18 22:15,23 24:6 36:4,6,10,17,20 38:20 49:10,11,14 49:14,21 50:24 51:4,4,8 52:1,4,5 52:6,7,8,9,10 53:7 53:8,9,16,17,23 54:21,21 56:23 57:12 65:13,14,23 70:1,12,18 71:1,4 71:7,8,12,16,21 72:19,21,23 73:1 73:3 80:6 82:9,9 82:12,15,17,23 83:2 84:1 86:19 86:21 87:20 88:1 88:17,18,20 89:20 89:21,24 93:1 94:24,24 95:3,12 95:15 99:1,2,9 100:2 107:21 109:5,13,17 115:16,19 118:20 118:21 119:4,6,12 119:18,23 120:12 126:6 131:9,19 133:3,3,8 134:7 135:3,5,6,8 136:21 137:3 138:20,24 139:22 141:9 142:7 143:6 143:13,15,20 146:13 148:10 153:23,23 154:12 155:18 158:15 159:7,7,14 160:5 160:17,20 161:12 162:16,20 163:9 163:10,14,15,21 164:13 165:3,8,8 165:15 166:16 167:12 168:12 170:15,17,23,24 171:1,6,11,11 172:24 175:13,15 175:18,23 176:5 176:15 178:16,21 179:3,10,12,13,14 180:10,13 181:9,9 181:10,12,13,14 182:4,14,15,17,19 182:20,22 183:18 183:21,24 184:1,8 184:8,14 186:5,5 186:15 187:21 191:7,16,24 192:17,18,22 195:8 196:2 198:24 199:1 201:7 207:20,24 208:3,7,10,11,15 209:20 210:7,9,21 211:13 212:14 213:3,13,18,20 214:22 217:16,21 219:10 221:7 229:8,11,18 234:12,16 235:11 235:13 236:11,18 236:20 237:2,3,8 237:11,20,24 238:2 239:1,15,24 240:6,13,21 241:22 242:1,4,9 242:15,16,23 246:3,4,5 252:4 254:7 257:8,11,20 257:21 258:13,18 258:19 259:15 261:18 265:1 274:4 288:14 290:5,6,7,14,20 290:24 291:2,11 291:12,15 292:4,5 292:23,23 293:1,3 293:18 294:22 295:3,7,13,19,22 295:24 296:20,23 297:24 301:14 302:17 303:1,7,12 303:15 306:21 307:24 309:10,10

318:6,7,10 319:5 319:8,9,15,23 320:1 322:11 323:13,15,23
ash-related 46:11
aside 37:18
asked 138:3 156:14 157:24 158:6 159:6 189:11 235:15 265:9 269:10 280:9 286:10 287:16 289:9 323:21 332:1
asking 137:24 142:17 166:20 167:22 176:2 188:12 192:12 202:21 214:14 222:4 228:5 231:12,14 236:14 236:16 237:22 248:19 252:8 263:9 264:8,10,16 265:3 266:19 269:8 280:18 293:24 310:9 315:4 316:5 327:2 330:2
asks 138:13 187:11
assess 93:17,19 300:9 302:10
assessing 73:15 302:8
assessment 8:10,18 10:13 43:14 56:21 58:12 68:1 105:13 124:19 125:10 199:11
assessor 155:13
assigned 5:5
assume 164:12,17 179:24 225:17 242:11 271:10 308:18 328:16
assumed 171:4
assuming 86:3 143:6 153:19 179:9,13
assumption 184:7 325:11
assurance 55:24
ASTM 288:2 323:11
attached 36:24
attachment 297:16 307:20
attachments 32:9
attended 90:15
attenuation 196:22 196:24 197:6,18 273:14
attorney 5:19 6:7
attracts 208:8 210:17
aunt 206:16
available 223:20
Avenue 2:15
average 19:22 56:19 59:4 85:3 112:21 223:7,9,24 306:10,14 307:13 310:15
averaged 72:12
averages 43:3
avoid 160:14 209:21
aware 143:12 147:9 155:14 183:2 208:9 209:20 278:24 279:13 280:4,14,18 293:7 295:2,19 318:13 322:23
awhile 300:6
axiomatic 322:17

B

B 4:14 202:15 275:2
B-1 297:16
back 11:4 30:14,15 39:1 40:3 46:6,23 48:7 50:12 55:19 62:2 87:16,17 101:2 106:7,18,24 107:18 109:22 117:11 129:14 144:13 145:12 150:5 159:3,20 164:9 168:11 179:4 183:7 205:16,22 216:11 225:8 231:5 233:9 233:14 239:19 243:23 244:13 245:23 246:10 252:3,23 258:23 261:14 268:13 288:20 289:3,8 309:3 312:3 320:21 323:19 325:2 331:23
background 31:1,4 31:16 32:4 33:1,4 33:5,6,17 34:3,4,9 35:1,6,10,16 41:21,21 78:11 226:6
backgrounds 31:11
backup 19:8,14
bare 298:14
barium 14:21 15:13 29:1 88:23 89:13 94:15,20 95:2 103:4,8,14 103:18 104:8 120:19,21 121:24 186:12,13 244:18 244:18,20
barrier 83:18 91:15 143:23 172:14 298:22
base 27:18 30:6 84:7
based 29:15 31:5 39:15,22 45:11 47:10 53:11 66:11 67:11 71:6 79:14 90:2 95:18 102:23 105:22 117:13 120:15 125:9 142:13 157:16 162:4 183:10 187:3 190:9 259:9 324:22
baseline 234:21
bases 188:18 324:11
basic 317:16
basically 19:13 22:9 24:13 27:12 113:21 189:14 315:15
basin 49:13 51:2 52:1,4,5,5,6,8,8,9 52:10 53:9 54:11 56:23 57:12,14 58:15 65:13,14,14 65:15 70:12,13,18 71:1,8 72:2,18 170:13,18 171:1,5 171:9
basins 51:13
basis 38:1 53:17 145:24 181:8 188:22 213:8
Bates 33:24 34:1 97:17,22 131:20 132:8 222:8 248:11 288:5 289:17 327:22
bathing 300:18
beach 84:7 207:13 208:21 209:8 213:8
bear 259:4
bearing 230:22 237:10 238:1 303:11
beautiful 206:19 209:6
bedrock 326:8
began 207:3,9
beginning 17:24 27:1 70:20
begins 17:23 145:18 297:16
behalf 2:24 3:7
behave 202:19
belief 220:5
believe 7:9,12 8:6 9:9 30:8 33:21 36:13 37:8 40:4 44:14 46:8 61:19 63:23 65:1,5 80:10 87:1 90:9 90:14 99:18 100:6 108:16 117:12 130:1 146:18 168:15 176:12 177:9,24 186:23 190:6 192:9 194:4 196:9 204:3 216:16 217:12 218:12 226:3 228:12,14 232:11 237:16 239:2,6 240:19 241:6 243:13 246:6,15 247:17 252:20 260:21 262:10 263:14 266:10 276:16 281:1 283:17 297:5 301:18,19 305:22 306:9,12 307:23 320:6 327:3
believed 22:24 61:15
benchmarks 98:24
beneath 296:24
beneficial 288:14 289:21
beneficially 21:24

22:13 324:2
benefits 208:24
benthic 300:16
benzene 235:15 236:3,10,17,18 237:15
Berlin 131:18,20
berms 44:24 51:8 292:4
best 19:12 83:13 286:7
bet 96:7
better 28:11 29:15 213:5 217:14 258:18 286:15 287:22 299:8 303:16
beyond 256:12
bias 27:20,20
big 67:21 123:24 155:10 186:1,3 207:12
bikes 209:16
biking 212:11
binder 20:19 25:17 29:24 33:20 39:3 105:16 124:15 130:1 194:21 231:7
birds 207:17 208:11
bit 30:23 67:16,19 70:22 72:7 78:8 83:14 96:6 154:23 156:6 182:13 193:18 198:10 220:3 243:22 259:1 279:8 288:17 299:8 317:15
blank 242:19,21
blue 13:24 75:24 94:1 101:5 108:13 238:12,23 239:11 239:13,20 240:10 241:11,19 243:4 244:5,7,7
board 1:1 2:2 5:4 208:22 211:17 214:1 215:2,9 261:10 321:24
boat 207:1 209:5
boater 206:23
boats 207:12
body 9:23
Boiler 96:21 98:13 99:3 101:7,22,24 102:4,14 221:1 307:18 308:1 309:1,17
boilers 179:8 193:4
boils 274:12
bonds 147:22
boring 35:24 36:24 37:5,13 45:6,7 162:20 170:2 177:3 180:7,11,14 181:15 182:2 183:17,24 186:14 218:2,4,17 295:19 295:21
borings 21:22 22:4 36:8,15 37:7,10 51:9 126:12 161:5 161:6 163:9 164:23 169:8,21 170:24 177:2,5 193:14 295:22 309:14 320:11
born 211:23
boron 14:21 15:13 27:4 29:2 30:8,15 30:17 32:3 39:4 39:11,12,22 40:1 40:6,10,12,14 75:15 77:24 88:23 89:13 104:19,23 120:19,21 122:1,4 139:10,12,16,19 185:18,22 186:11 186:16,19,24 187:5,13,15 189:14,17,19,22 189:22 190:2,23 191:1 192:7 196:7 199:19 200:9 201:5 202:5 203:13 219:3,17 220:2 228:1 229:16,24 230:8 230:11 233:23 234:1 244:23,23 244:24 245:4 257:7,18 258:1,17 283:13,15,19 284:2,15
borrow 297:18,19 297:20 298:5
bottom 14:20 16:8 19:19 29:5 30:12 49:14 50:24 54:4 55:1,6 56:4,9,18 56:24 57:22 58:4 59:19 60:3,5 61:8 61:17 63:19 65:1 66:23 72:23 73:1 73:3 82:22 84:18 84:22 85:5,17,20 86:4,5,8 87:20 88:1,17,18,20,24 92:19 94:21 110:20 111:1,3,4 111:9,17,23 112:5 112:15,18,23 113:1,22 114:5 115:11 119:1,22 119:23,24 137:17 137:20 147:19 165:7 170:15 171:10,11 178:16 181:9,13,14 182:4 182:15,17 183:18 183:21 184:1,7 222:9 248:8 299:17 306:11,15 306:23 307:3,8 310:2,5,6,8 324:21
boundaries 93:7
boundary 172:18 221:3
box 47:4,6 101:1 127:16,17
boy 304:1
Brad 5:2
BRADLEY 1:12 2:4
break 106:14,20 107:8 129:10 203:11 205:13,15 205:18 217:12 288:20,23
Brief 311:24
briefing 4:10 215:24 332:8
briefly 54:18 64:22 72:4 81:6 82:4 84:3 92:11 107:12
bright 214:16
broad 198:10 279:6 285:21 292:12,14
broader 35:6
brought 88:9
brown 110:23
brushed 58:6
Bugel 2:6,9 5:21,21 331:13,15
build 59:6,20 60:4
built 60:1 84:7 134:22 325:8
bullet 126:8 286:1
bullets 123:24
burdened 214:21
buried 163:15
burned 53:12 82:14
burning 14:24 179:6 309:15
business 144:3 333:8
businesses 210:18
bypass 52:5,8 54:21 65:14

C

C 2:1 3:1 7:5 129:20 312:15 326:20 330:20 333:3
calculate 225:21 226:7 279:15 281:11 282:6
calculated 16:7 223:14 224:19 227:23,24 228:3
calculation 22:8,8 32:20 114:22 115:7 226:1,2 281:15 282:1,4
calculations 114:17 114:20 311:9,13
calendar 18:13
California 2:21
call 22:6 23:10,12 25:6 35:6 51:7 52:11,17 60:21 66:6 87:4 104:14 104:18 122:21 147:7 161:18 164:4 172:17 182:10 201:14 233:22 242:21 248:22 252:17 258:5 289:23 309:8,19 315:16 332:9
called 7:3 22:23 45:3 68:4 72:17 108:14 111:9 126:11 131:5 182:5,10 184:4 193:1 293:19 309:9 318:9
calling 20:24 24:5 154:22 298:19
canal 24:16

capability 314:13
captured 230:5
care 211:24 212:6 213:1
careful 66:4 87:4 114:6 171:20 175:16
carefully 237:14
caring 106:3
carries 217:13
carry 153:18
carrying 309:4
cars 197:9
case 21:16 25:10 26:17 82:20 97:3 115:5,6 120:13 127:18 139:21 144:14 196:12,21 196:24 197:4,17 198:22 199:12 201:22 202:3 215:14 257:13 324:23 328:15
case-in-chief 331:10,12
cases 80:2 89:18 139:16,19 144:12 155:20
Casey 206:16
cash 44:1
Cassel 137:23 138:16 151:8,15 159:4,5,18 166:2 187:11 188:23 189:7 190:1
catch 141:5,19
cause 57:2,9 71:21 80:19 113:3,7,19 116:5 139:3 152:5 155:19 164:5 167:14 332:18 333:11
caused 34:24 35:2 87:6 117:8 160:2 160:3 173:21 190:8
causing 63:21 68:18 122:23 126:14 152:8 157:11
caveat 304:20
CCA 40:5,7 80:1
CCAs 108:2
CCB 72:5
CCP 289:21 323:11
CCR 34:20 61:17 78:8 120:5 123:11 143:8
CCRs 19:1 184:9
CCV 88:13,15
Celeste 211:20
cells 238:16,17 239:11,20 241:11 243:4 244:5 261:10
cement 148:12
cementitious 148:9
center 1:3,3,15 2:10,15 5:6 76:2 230:5
centimeters 143:19 298:24
certain 62:16 136:11 153:15 169:22,23 281:17 281:18 282:18,21 282:22 288:13 313:5,20
certainly 45:24 95:10 208:12 322:14 323:17
certainty 128:5 183:16,23 184:2 319:5
Certificate 4:11
chairperson 289:6 299:4
chance 204:21
change 26:15 74:5 164:8 201:6 211:6
changed 82:13 85:15 179:8
changing 27:13 50:9 74:22
Channahon 38:4
characteristic 136:21 137:3,5 138:19 165:15 166:15 175:13 176:5 187:21 191:7,16 279:15
characteristics 144:6 152:4 161:14 163:21 175:17,22 187:20 191:6,15 258:14
characterization 171:12 235:6 262:22 308:21
characterize 175:16 177:1 193:11
characterized 169:13 183:21 217:18 318:18 319:7
chart 28:22 30:16 94:17,22 284:4 290:2 301:11 320:24 327:19 329:13
charts 18:9 27:4 30:5,6 225:1 226:12 321:1 324:6
chasing 46:21
check 114:7 260:22 266:2
chemical 22:11 34:5,10 155:16 237:9 313:16
chemicals 136:15 153:5 208:18
chemistry 25:22 131:10 155:9,14 319:18
Chicago 1:16 2:3 2:12 3:4 333:8
chloride 37:21 38:3 78:15,23 157:16 157:19,23 158:12
chlorides 38:14
choose 209:16,21
Chris 115:22
Christ 206:14
chrome 191:23
chromium 72:8
Church 206:15
cinders 182:5,11 309:13
circle 21:12
circumstance 117:9 256:23
circumstances 116:23 153:16 326:2
cited 216:16 298:17
citing 90:10
citizen 100:6 307:21 309:9
Citizens 1:4 5:7
city 210:1 333:8
civil 130:10
clarification 17:5 150:6,17 185:12
clarified 83:4 135:10
clarify 17:18 50:22 317:14 320:4
clarifying 232:20
class 30:18 40:15 44:7 80:7 89:7 94:18 212:23 319:3,12
classification 320:13
classify 308:17
clay 68:4 144:8 146:7,15,24 147:6 147:10,19 148:2 298:22 299:18,21
clean 60:13 213:7 214:8
clean-out 117:5
clean-outs 117:1
cleaned 52:19 53:10 60:12 61:3 113:5 116:18
cleaning 52:5,9 54:10,21 57:13 65:14 213:14
cleanup 66:7 99:10 154:24 210:2 211:14 214:13
clear 33:18 45:2 59:4 65:11 100:14 103:6,13 104:3 105:18 135:13 141:18 146:10 147:8 175:21 187:12 190:21 268:18 290:22 294:4 303:22 307:2
clearer 284:12
clearly 36:18 192:10
clients 125:18
close 305:18 306:8 325:10
close-up 177:17
closed 151:1
closely 93:2
closer 38:10 57:1,6
closest 91:1 306:17
Club 1:2 2:20 5:5 5:19,22
coal 15:1 38:20 44:1 53:12 80:6 82:14 126:6 133:3 133:8 136:21 137:3 138:19 143:5,8,13,15 153:23,23 154:12 155:18 158:15

159:14 160:5 162:5 163:18,20 163:20 164:13 165:15 166:15 172:24 175:13,15 175:22 176:5,15 178:21 179:2,5,8 182:14 184:14 186:5,5,15 187:21 191:7,16,24 207:24 208:7,11 208:15,21 210:7,9 210:21 212:14,14 212:16,19 213:3 213:18,20 214:22 235:10 236:11,18 236:20 237:2,3,8 237:11,20,24 238:2 239:24 240:6,12,21 242:15,15 246:3,4 246:5 257:7,19,21 258:13,18,19 259:15 261:18 265:1 274:4 302:17 303:12 309:16,18 323:22
coarser 82:23
coded 240:17 241:14 252:19
codified 25:4
coding 255:23
collapse 63:21 65:1
colleagues 62:8 131:14
color 30:16
colors 238:18
column 15:9 52:15 52:18,21,21 53:1 53:6 82:15,24 109:17 110:5 242:5,14
columns 52:13 109:12
combination 130:10 133:20 309:3
combined 15:2
come 10:22 58:21 63:18 86:15 101:20 162:21 170:7 172:19 190:2 214:6 240:6 247:2
comes 10:21 83:1 85:3 90:13 207:6 314:24
comfortable 267:19 267:20
coming 59:14,19 78:6 104:4 122:9 184:14 185:18,22 187:1,6,8,14,16 189:16,23 190:17 190:18,24 191:3 192:8 201:18 213:22 289:8 302:17 324:18
comment 4:5,6 90:9 206:4 305:7 332:11
commented 61:4 94:2
commenters 215:16
comments 4:2 206:13 215:9,21 216:1
commitment 40:5
common 14:7,7 24:23 25:1 83:17 144:3 182:6 278:9 298:18 309:16
commonly 104:11 104:18 208:15 315:16
communities 209:23 210:11 211:8 212:9 213:4
community 31:5,5 31:13,16,21 33:7 206:20,22 208:6 209:19 210:22 211:2 212:1,23 213:2,6,9 214:4 214:20,24
compacted 143:16 144:1,4 146:7,9 146:11,19 147:4,9 147:18 148:2 298:22 299:12
companies 140:7 141:12 142:11 309:3
company 98:13 132:22 133:13,15 133:16,19
comparable 303:23
compare 14:11 28:11 29:18 49:21 91:22 94:23 95:8 279:14
compared 12:7 19:2,5 28:6 30:24 43:4 49:14,16 56:5,24 69:24 103:22 112:6 322:20,21
comparing 33:7 69:14 262:1 312:19 322:7,9,15
comparison 14:2,8 14:15 15:7 41:14 54:14 56:3 89:23 92:13,17 107:22 118:20 119:11 176:10 200:3 233:11 271:16 312:18 322:7
comparisons 51:2 278:8,10 322:19
competent 63:15 63:17
compilations 199:8
complainant 5:20 5:22,24
complainants 1:5 2:24 5:8 332:5
Complainants' 195:6
complete 64:17,18 129:4 305:21
completed 167:2
compliance 40:5
complicated 45:19 64:2 75:11 81:19 127:8 155:8 198:11 237:12
compliment 69:2
complying 79:24
component 23:14 23:14
components 27:10 102:13,18
compound 59:8 202:16
compounds 136:18 139:13
concede 223:8
concentrate 41:11 237:14
concentrates 251:8
concentration 22:7 26:15,21 34:5,10 41:1,6,11 74:1,3 94:17,22 154:16 198:13 201:15 202:5,6 203:13,15 218:16 220:10 222:17,19 223:17 224:6,15 228:17 229:3,4 230:6,22 233:24 234:1 250:20 251:12 252:10 254:11 256:16 262:6,9,13 263:11,16,24 264:2,6,16,21 268:7,21 271:21 272:9,17,24 275:4 275:15,18,22 276:7,11 277:7 285:16 313:12
concentrations 29:7 30:8 40:2 41:8 75:12,14,18 75:22 76:1 77:13 78:5 92:3 103:20 121:11 124:1 136:11 139:16 196:7,18 197:3,19 199:19 201:3,5 202:9 217:15 218:3,4 219:3,7 219:18,20 220:16 220:20 221:12,19 223:3 229:12,16 249:16,22 250:3 261:6 264:11 286:3 287:13 301:13
concern 57:3,9 85:7 91:15 113:3 113:4 114:4,18 292:1
concerned 9:1 63:20 65:8 114:10 206:21 208:1
concerning 157:5
conclude 43:12 96:14 102:22 165:16 204:14
concluded 22:9,10 27:12 36:9 43:13 45:12 90:11 140:2 165:19 169:2 282:17,19
concluding 139:4 167:15
conclusion 12:11 16:11 20:3 26:18 29:6,11 36:12 70:5 71:11 77:11 79:6,8 92:23,24 103:17 105:12

114:21 119:1 123:19 162:2,22 174:15 175:1 203:5 237:10 283:21 284:16 285:2,17 287:1,12 302:3 304:20,21 305:16 306:2,5
conclusions 19:16 28:19 41:4 42:8 69:18 77:7 92:17 118:23 162:18 234:16 236:19 287:2
concrete 113:10
condition 58:21 59:10 172:18
conditions 52:3 54:23 106:6 140:8 141:13 142:11 148:18 154:11 173:21
conduct 105:8 121:12 169:21
conducted 14:2 18:23 36:8 42:18 76:17 79:1,20 92:12 100:9 104:10
conducting 104:11 132:10
conductivity 143:17 144:6 146:12
cone 318:20,21,22
confer 128:16 311:22
conference 332:9
confidence 32:18 32:19,22,23 207:6 209:1
confident 251:17
confine 47:7
confirm 67:9 86:21 323:12
confirmed 12:5 98:23
confused 36:21 241:19 243:22 252:22 253:3 257:4
confusing 88:6 255:4
confusion 46:2 135:2
connect 212:8
connected 214:19
connection 9:17 38:17
connotation 262:3
consciousness 50:8
conservative 258:6 258:7,11 262:21 303:18
consider 85:8,16 100:17 149:14 153:3 154:17 236:22 253:5 326:6
considerate 106:3
considered 35:1 56:3 78:11 114:24 278:1 324:18
considering 187:20 191:6
considers 35:9
consisted 165:2
consistency 76:13 119:15 179:6
consistent 14:19 16:12 19:21 60:17 74:15 76:6,7 89:21 94:13 95:4 100:4 120:22 137:5 160:10 219:1 234:11 241:21 242:3 243:12
consistently 75:3 89:2,3 139:24 276:21
constant 85:14
constituent 15:9,19 26:4 123:6 155:6 233:21 236:10,18 237:7 242:6 256:14 257:12 258:6 277:10
constituents 15:7 19:4,5 20:5,10,12 22:12 26:1 27:11 28:23 34:5,10 35:3 44:1,10 45:16 46:11 49:17 66:14 78:9 80:5 80:12 89:11,23 90:4 104:6 117:16 118:21,22 119:3,4 119:12 126:6 133:8 136:12,14 150:15,16 152:14 152:22,22 153:6 176:4 186:4,15 188:19 234:11 239:13 241:20 253:12 258:19 301:16 303:15 314:16 315:8 322:8,8,10,15
construct 62:12
constructed 52:14 109:14,19,20
constructed/liners 52:20
construction 52:22 54:16 58:20 65:10 65:12,20 66:12 70:7 82:10 117:14 204:12 297:23
consultant 308:24
consultant's 100:12 308:13
consultants 176:19 308:4
contained 98:24
containment 152:6
contains 207:24 208:11
contaminated 127:9 235:10 257:21
contaminates 213:20
contamination 130:15 131:3 133:23 166:5 172:16 173:17 184:13 217:21 241:4,16 243:7 257:8 268:23 296:6 300:23
context 184:21
contingency 116:3
continuation 166:23
continue 151:8 167:19,23 206:1 213:5 214:12 216:12
continued 3:1 5:12
continues 208:14 210:9 212:20 303:12
contour 67:20 91:5 91:9 118:12 220:23
contours 23:16 91:13 189:20
contractor 115:24
contramap 67:18
contribute 153:12 243:15
contributing 139:3 157:22 167:14 168:13 171:18 175:8 229:24 230:11
contributions 220:7
control 1:1 2:2 5:4 47:5 55:23 85:12 93:7 126:21 127:16,17 213:24
controls 50:18 81:14,15 93:13 108:2
conversely 33:2
converting 255:2
Cook 1:14 333:8,18
copies 137:14
copy 228:13 328:24
corner 295:6
corporate 125:21 211:2
corporation 18:21 207:19 208:2 211:10 213:11,12 214:2
corporations 214:1 214:7,11
correct 18:11 24:7 31:1 37:4,7,10,16 39:7 43:18 52:23 76:9 79:13 80:7 95:16 100:17 105:3,21 112:12 118:2 119:13,14 124:9 125:8 128:4 145:23 148:10,14 149:1 161:1 169:18 170:20 171:14 172:3 173:4 184:18 219:22 232:24 233:19 238:4 245:22 251:13 255:18,20 257:4 269:22 271:10 273:1 285:4 302:1 305:15 306:3 307:5 311:2 315:6 315:10,11,14 319:13 324:9 328:21 330:23 331:3 333:12

corrected 232:15
Corrective 25:7
correctly 7:17 29:21 34:13 112:8 142:1 231:9
correlate 169:24 170:3 171:2
correlated 169:10 170:21 171:13 179:24
correlating 179:9 318:6
correlation 169:17
corroborate 19:17 303:4
corroboration 19:15
cost 132:13 210:2
costs 211:14
counsel 311:22
count 58:12 235:9 268:21,22
counted 241:2,15 243:6 276:4
counterbalance 113:14 325:13
counterclockwise 70:23 318:23
counts 267:8
County 1:14 106:11 107:8,10 108:23 109:1,9,11 110:1,16 112:15 115:15,19 117:14 117:15,19,22 118:13,18 121:1 121:11,15 123:2,7 123:22 124:12,17 125:10,13 126:5 171:16,19,21 172:23 173:16 175:12 176:11,15 178:22 180:8 211:23 212:2,5,12 285:19 286:7 287:12 295:11,14 295:20 305:21 309:23 311:10 324:20 325:1,2 333:3,8,18
couple 12:22 31:17 42:11 50:15 80:4 89:2 114:22 132:4 152:11 178:13 201:11 215:15 218:13 231:15
course 23:7 40:8 48:11 85:20 90:10 103:1 108:1 114:3 115:2,21 148:19 149:15 162:19 200:13 201:4 323:5
court 4:11 6:12 23:22 64:9,12,15 134:10 141:16,21 158:3 174:21 180:20 225:9 226:14 246:16 247:4 284:7 333:7
cover 299:15,19,22 299:23
covers 17:23
crack 56:12,16 148:16,19,21 149:16
cracked 148:23 149:10
cracks 56:13 148:24
cream 318:19,21
create 296:13
created 31:11
Creating 210:20
criteria 43:6 190:12 300:14 303:19
critical 13:2
criticized 27:22
criticizing 28:4
cross 54:11 83:24 110:17 111:16 206:2 216:13
cross-examination 4:4,7 129:16
crossing 289:5
crushed 55:11 111:13
crystal 135:12
CSR 1:13 333:6,17
current 102:2 155:7 167:1 168:6 174:13,23 210:7
currently 44:15 52:9 108:15 139:22 141:9 142:7 158:21 234:12
curriculum 316:17
curved 91:13
cushion 55:6,7,8,9 55:10,10 61:8 84:10,13,14 110:13 111:5,7,11 113:16
cushions 110:12
cut 75:5 93:4 100:19
cuts 127:14
CV 130:1,13 131:1 316:19,22,24 317:1,5

D

D 4:1 7:5 312:15 330:20
D.C 2:16
Dahringer 98:14
damage 116:14 155:20
dangerous 208:1
dark 15:20 110:23
data 9:8,9,10 12:6 12:14 14:2,3,11 14:17,18 15:6,17 16:6,12,19,20,24 17:2,12,21,21,24 18:1,4,5,14 19:1,2 19:9,12,24,24 20:12 25:22 26:19 26:22,23,24 27:1 27:10,24 30:12,24 31:12 32:5,21 41:16 42:6,6,11 43:1 44:13,14 45:12 47:11 49:12 49:13,16,18 51:3 51:6 66:12 69:14 69:15,20 71:3,9 71:17,18 74:5,15 76:14,23 77:2 79:8,14 85:17 88:21 91:18 92:22 93:1,1 94:13 101:19 104:23 105:15,22 117:14 118:20,21 119:2 119:13,16,17 123:12,14 125:9 130:14 131:2 133:18 135:18,19 135:19,23 139:18 140:2 157:9 160:24 161:9,11 161:13,14,15 164:10 169:7 170:1,21,22 171:10 176:16 178:21 179:10,11 180:1 183:8 186:11,11,17,21 190:9 192:17 193:10 199:13,14 202:18 203:5 204:4,6,11,18,21 205:8 224:22 225:1,14,15,19 226:6 227:8,14,16 227:19,21 228:11 229:15,20 232:10 232:14,16,18,21 232:22 233:10,11 236:22 238:20 239:1,5 240:12 246:21 247:12,15 247:17,18 251:12 251:17,20,23 252:13 259:24 262:18,22 263:1,1 274:15,17,23 276:20 279:15 286:15,17,17,21 287:4,9,17 292:4 302:12,13 303:4 314:23 315:3,14 316:4,5,12 318:6 318:6 319:21 320:24 321:7,11 321:14,18 322:4,7 322:19,20,21,22 323:6 327:7
database 281:9
date 18:11 19:11 22:10 52:20 53:1 83:19 109:13,15 109:18,19 119:9 190:10 290:17,19
dated 67:19 118:12 321:16
dates 110:6 174:12 174:22 332:1
dating 222:5
day 1:16 5:12 184:5 314:23
de 53:23
deal 18:10 60:23 183:7 325:12
dealing 173:22
debatable 196:3
decades 23:8 208:18
December 18:14
decided 293:6
decision-making 290:24 291:11

292:22 293:11 295:12,24
decline 283:18
decrease 196:18 283:13,15 285:20 285:21
decreased 199:4
decreases 199:1
decreasing 26:14 26:20,20 27:13 29:7,9,14 30:12 44:12 77:10,14 96:16,18 123:18 124:2,5,6 197:2 281:20 282:21 283:21,24 284:16 284:19,24 285:1,5 285:7,10,13,16 286:4,20,24 287:14,22 304:7,8 304:11,18 305:2,4 305:6,8,12,19 306:4
dedicated 213:6
deeply 206:21 211:24
defect 266:20 271:8
defection 264:23
define 20:16 171:21 184:2 236:13
defined 126:12
definitely 323:20
definition 73:20 262:15
degree 128:5 130:9 300:22 303:11
degrees 130:5,8
deicing 78:13
demonstrate 241:20
demonstrated 46:1
demonstrative 195:17 218:11,21 232:23 281:6 283:4 301:8 309:22
demonstratives 233:5
dense 83:17
density 52:16 109:16
depending 82:13 307:14
depends 210:15 314:3
depict 21:3
depicted 118:16 201:13
depiction 13:14,14 13:15 81:24 90:20 117:21
deposeth 7:4
deposition 51:22 137:13,16,18,19 137:23 144:13 150:6,7 158:22 161:23 165:19 166:1 173:2,7,9 181:3 184:16,23 185:2 188:10 192:10,14 235:14 235:19 257:6,9 320:7
derive 281:5 282:9
derived 234:9
Des 9:15 10:9 24:16
describe 7:21 24:10 51:18 81:6 82:4 83:13 84:3,20 93:10 107:12 110:8,20 124:7 136:15 182:3 234:22 286:11
described 8:21 59:13 66:3 83:8 90:19 108:9 180:14 182:1 234:10 299:13 307:21
describes 109:13
describing 25:9 89:22
description 7:24 66:18 67:7,10,17 67:20 82:3 87:1,2 87:3 93:20 118:15 147:17,18 317:4
descriptions 21:1
deserve 213:5
design 56:1 60:16 61:1 62:2,11 86:13 325:15
designated 217:23
designed 59:22 60:12 62:6,8,23 63:23 64:1 84:9
designing 60:18,19 326:1
designs 62:5,9
desk 177:9 194:22
desulphurization 134:9,13 135:4,7
detect 254:13 255:9 255:17,20 256:14 260:12 261:6 264:20 265:21 266:24 271:4,23 274:15 275:8 276:24 277:21 313:6,23 314:14 315:4 316:10
detected 38:14 44:2 72:9 201:17 239:15 250:21 254:23 261:12,17 267:6 270:15 272:5,12 273:4,17 274:9 276:7 277:5 277:23 303:8
detecting 328:10
detection 251:21 254:16 255:10 261:2 262:19 263:2,3 264:7,19 266:9,15,23 267:18 268:14,15 269:7,23 274:18 274:20,23 275:20 276:7,9,13,17 277:23 312:20,21 313:8,13,20 314:1 315:15,17,18 316:6 327:18,24 328:9,11 329:9 330:23
determination 238:1 284:9
determine 35:10 45:17 46:17 130:15 131:3 217:20
determined 99:12 178:12
determining 34:3 282:10
devastated 212:21
developed 100:23
developed' 99:10
developing 8:21
diagram 32:10,17 193:21 309:23 310:18,23 311:5
diet 208:23
difference 13:7 56:20 220:12 238:22 251:21 297:2 329:8
differences 192:5
different 14:19 18:23 27:14 28:13 50:10 51:24 58:17 61:6 75:13 97:19 101:20 104:10 110:9 111:17 112:20 120:18 122:17 180:15 181:14,23 182:2 182:13 232:11 238:18 259:3,3 263:2 264:7 265:16 269:18 281:9 296:15 313:6
differently 182:3 184:5
difficult 60:24 183:4 272:8
Dillon 214:23
diluted 275:19
dingy 207:7
direct 4:3 5:15 9:17 129:4
directing 107:3
direction 11:9 13:13,18 26:14 118:11 296:15
directly 208:5 326:3
director 212:3
disagree 12:3 59:13
discharge 9:20 53:22 83:4
discharges 207:15
discontinuous 74:23
discounted 100:11 100:15,16
discover 281:23
discreet 293:8
discuss 73:15 77:16 112:16 117:20 118:10 332:8
discussed 70:11 71:23 91:6 95:21 121:5 136:7 215:13 307:24
discussing 98:8 114:18 145:21 150:20 187:24 314:10
discussion 7:8 85:10 99:24 100:2 119:22 129:7 137:10 157:2 216:8 236:12

243:23 268:14 312:18 317:6 322:13 324:4 325:24 330:14 331:20
disjointed 259:1
dismiss 100:2
dismissed 99:23
display 218:7 221:14
disposal 132:11 210:9 293:18
distance 61:16 74:4 209:12
distinct 67:5
District 98:16
ditch 38:8
ditches 38:10
docketed 5:9
document 30:2 32:8 33:23 39:13 97:15 141:24 293:20 320:22 327:21 329:20 330:3
documentation 65:10,12 66:13 162:14 163:11 290:23 291:10,19 292:22 293:2,11 293:15,17,23 295:8,12,23 297:23 323:10
documented 36:19 46:10 50:13 146:5 323:18
documenting 291:10 292:22
documents 36:14 54:17 65:16 188:18
doing 14:12 46:15 133:23 135:15,23 136:2,2 183:1 212:17 261:23 333:7
dollars 215:3
doubled 201:4 202:7
doubt 95:5
downgradient 8:8 34:12 71:10 90:23 91:3,21 92:4 103:24 104:2 122:10 193:16 196:6,13 197:7,20 198:13 202:5,23 203:15,23 204:10 204:24 205:3 217:15 219:9 220:1 229:18,23 230:1,23 273:15 273:17 274:8 275:9,10,16 276:1 276:2,6
downtown 206:17
downward 114:17
dozen 19:4,5
Dr 8:24 10:8,23 11:18 12:3 22:21 27:3,22 30:3,23 31:11 33:19 36:9 41:20 58:5 61:14 63:7,18 65:7 79:11 95:21 99:23 194:21 218:11 222:6 223:6 224:9 225:20 227:22 292:3 321:10,20 322:20 324:7
drain 60:2
drainage 61:7 310:20
drawing 178:6 207:17
drawings 54:14,16
dredging 66:6 79:23
drinking 249:5
drive 2:11 61:11 207:7 209:18
driven 125:19
drivers 164:5
driving 296:8
dry 60:3
DTE 131:5
DUBIN 2:13
due 65:6 332:7,11
duly 7:4
dump 208:2 213:12
dumped 207:20
dumping 213:18 214:2,5
Dunaway 90:11
dust 54:1,5

E

E 2:1,1,6,9 3:1,1 4:1,14 7:2,5,5 129:20 312:15,15 312:15 326:20,20 330:20,20,20,20
E-L-U-C 108:4
E-L-U-C-s 81:15
earlier 14:1 25:9 42:4,18 50:23 61:4 65:9 71:23 94:2 102:10 119:10 127:13 166:18 196:5,10 196:16 215:23 243:14 262:15 273:13 281:7 287:15 289:7 302:6 311:20 316:16 317:15 320:9 325:17
early 25:23 37:3 40:3 41:10 106:7 235:2
earth 212:1,6
easier 292:10
easiest 238:9
east 2:11 68:12 82:8 83:24 84:24 85:1 177:24 178:9 189:20 199:1 306:16 318:17
ecology 207:16
economic 210:4,14 211:7
edge 11:3 68:12,13 68:16 111:2,9,20
edges 68:11 101:23 116:17 196:4
educate 212:7
educated 214:19
effect 236:4 322:21
effects 12:19 152:5 206:22 208:17
effort 127:10
efforts 210:4
eight 35:12,20 41:23 53:10 134:23 253:6,15 253:24 254:20,21 255:7,15 304:14
eighth 13:3
Eileen 206:9
either 20:6,13 53:3 172:14 252:14 277:22 282:20 287:21 298:7 304:10 306:1
el 310:1
Electric 18:20 109:2
elemental 136:17
elements 296:10
elevated 22:4 136:11 139:16,19 307:9
elevation 12:21 13:23 56:4,5,18 56:19,24 57:1 59:5 84:18,23 85:1 112:15,18,21 112:24 113:7 296:17,17 306:14 306:21 307:3,7,13 307:16 310:12 324:21 325:7
elevations 7:16 84:18 85:9 112:14 113:2 310:15
elicit 275:13
eliminate 47:8
eliminating 47:21
elimination 139:5 161:2 162:7 167:16 169:3,11
ELUC 43:20 47:2 101:23 108:4 126:21 186:8 199:4 200:18 221:2,9
ELUCs 81:14 125:2,7
Emily 206:15 207:9
empower 212:4
emptied 53:19
empty 113:5 114:4 261:9
encompassing 198:1
endangering 210:11
ended 18:14
ends 68:11 321:7
energy 131:5 214:5
Energy's 210:6
enforcement 5:10
engineer 37:3 46:15 60:22,23 62:5
engineering 62:5 63:6 130:10,11 169:10,17,20,20 325:10
engineers 59:21 62:13 282:13 326:4
enjoy 209:6 213:16
enjoyed 212:11
enjoying 209:2

enjoys 207:23
ENSE 183:9
ENSR 37:16 293:20 323:18
entails 43:1
entire 64:19 187:24 318:14
entirety 93:10
entitled 5:5 110:16
environment 1:4 5:7 79:18 95:19 95:24 96:4 153:1 214:20 258:3
environmental 1:2 2:10,15 5:6 50:8 81:15 93:6,13 98:21 132:1 133:23 212:1 290:2
environments 96:1
EPA 32:16 33:9 78:8 80:1 90:7 126:19 143:7 164:2
Episcopal 206:15
EPRI 18:18 19:6 19:24 20:8 119:12 239:1,5 240:12 259:19,24 262:18 265:20,23 268:16 274:22 275:6 303:4 322:21
equal 113:11
equate 270:20 277:3
equipment 66:4 116:8,15,20 313:4 314:13 330:23
equipotential 13:23
equivalence 147:6
equivalent 143:19
error 13:8 240:23 252:24 253:2 256:2,4
errors 243:18 257:5 321:17,21
especially 64:4
essence 68:19
essentially 20:2 62:19 86:8 313:3
establish 8:14
established 93:6 143:10 244:14 266:10 277:2
establishing 47:1,2
establishment 108:3
estimate 307:7 310:2
estimated 313:17 314:21 315:23 328:8
evaluate 15:18 21:23 81:18 155:23 289:24
evaluated 135:19 139:2 167:13
evaluating 130:14 131:2 133:17
evaluation 33:10 43:11 47:18 125:17
evaluations 133:7
evaporation 132:4
event 239:17
events 9:3
eventually 210:23
everybody 289:9 322:18
evidence 22:17 70:4 129:3 186:5 208:14 241:3 290:7 309:12,19
exact 13:5 231:10 251:12 255:22 262:13 264:21 267:5 268:20
exactly 15:3 232:20 275:12 283:1 306:13
exaggeration 23:5
Examination 4:3,8
examine 201:11
examined 157:9
example 26:13 28:24 32:3,23 42:17 46:3 53:8 62:21 75:14 76:3 78:20 94:5 100:24 101:21 103:21 104:19 131:17 155:17 162:16,20 186:8,13 189:15 198:12 219:16 220:12 300:18 308:21 314:1 327:5
excavate 326:9
excavation 59:14 326:10
exceed 57:8
exceeded 40:6 41:11,15,19 42:14
exceeds 154:16
Excel 26:11 282:2,3 282:6
excellent 9:11
exceptions 72:7
excess 152:9 154:20
exchange 145:14
excited 64:14
exciting 121:24
excluded 165:5
excuse 8:11 34:22 39:1,10 48:17 68:9,12 82:10 84:10 85:18 88:7 119:6 134:3 135:6 137:17 161:3 182:18 200:10,15 228:21 232:14 276:12 296:14 303:21 314:7
exhibit 4:16,16,17 4:17,18,18,19,19 4:20,20 17:11,22 20:22 25:16 29:24 33:21 37:10 39:3 40:20,22 48:7 65:16 79:1 91:4 97:2,13,22 105:16 107:9 124:15 129:1 130:2,4 140:19 141:2 177:10 178:3 179:2 194:5,8 195:5,6 200:1 203:16 217:3 218:12,21 226:18 227:6 231:9,10,18 231:20 233:4 249:19 281:2 287:24 288:2 289:17 294:17 297:5,6,10 301:8 306:8 307:20,20 309:22 320:23 326:22 329:1 332:6
exhibits 32:9 33:19 40:8 128:8,9,21 232:23 281:6 332:3
exist 296:19 330:7 331:2
existence 208:10
existing 34:9 147:21,22 189:18
exists 264:17
expect 23:16 42:16 74:11,14 78:6 85:19 89:12,14 94:3 96:3 199:3 204:22,24 275:24 276:3
expectant 78:8
expected 199:16
expects 32:16
experience 46:15 116:7 150:1 316:19
expert 16:17,18 174:9
explain 10:18 17:20 30:4 41:4 191:14 238:18 308:6 328:6
explained 10:24 31:4 53:24 68:2,8 69:7 131:6
explanation 95:17
exploiting 210:10
explore 207:13
exposed 116:12,17 116:21,24 152:6 209:13
exposure 154:14 208:17,19 210:5 213:17 300:17
extent 308:18
extra 325:12
eyeball 27:12
eyeballing 27:15,19 28:5
eyes 173:13

F

fabulous 175:4
facilities 18:24 50:4 103:11,12 106:10 115:24 125:24 126:2,10 143:24 147:20,21 164:3 320:17 323:9
facility 54:3 98:16 132:3,7 135:7 189:18 309:15
fact 37:6 40:13,16 114:16 146:24 170:23 172:5 187:5 220:11 245:21 257:3 275:10 322:20 324:1,5
factor 23:12 58:10

facts 9:13
failure 210:6
fair 93:20 124:7 136:13 176:10 184:20 219:23 234:22 235:5 237:4 252:17 260:6 283:19 286:14 287:16 304:18,19,23 327:7
fairer 301:23
fairly 41:22 82:24 191:22 258:16 325:9
fairness 36:13
Faith 2:6,9 5:21 212:3
faithful 213:7
faiths 212:5
fall 10:10,15 27:9 83:2 211:14 252:3
falling 11:11 63:20
familiar 28:9 62:9 143:5,10 148:6,8 192:20 193:22 203:12 216:17
families 208:22
family 206:17 207:23
family's 212:20
far 59:17 70:21 91:11 147:15 162:8,12 170:17 183:1 198:8 211:9 227:21 267:11
Farro 131:18,21
farther 46:6 74:2 85:2 91:13,14 125:22 196:17,20 323:19
fashion 217:8
fast 141:23
favor 28:5
favorite 206:20 207:14
fbugel@gmail.com 2:8
fear 210:5
fearful 213:3
February 1:17 5:11 5:13 332:4,6,7,9 332:11
federal 152:10 210:24 213:22
feel 47:22 267:19 288:18
feet 12:22 56:20 61:22 85:5 112:19 113:11,13 143:16 178:13,14 306:11 306:13,18,22,23 307:11,13 310:7
fell 212:10
felt 66:5 116:5
fertilizer 38:18
fewest 238:8
FGD 133:1 134:3 135:6
field 14:8 308:16 320:1
figure 103:21 227:2
figures 146:5
file 177:8 332:2,5
fill 36:4,6,10 45:7 45:10 51:7 71:19 99:1,2 111:21,24 112:4 159:7 181:13 183:20 289:21 290:20 293:4,8,12,21 307:24 309:13,19 309:20 319:24
filled 20:24 21:4 44:21 60:5
filling 117:7
film 112:10
filtration 60:6
finally 201:17
find 12:13 20:13,15 20:15 28:3 37:4 42:21 45:9 49:7 88:22,23,23 89:2 89:3,4,14,17 92:1 92:18 95:1 120:15 121:22 123:21 124:17 134:16 163:5 220:24 227:8 240:12 243:3,14 253:17 258:21 259:10 264:24 265:1,4 266:3,5 267:17 283:1 294:9 303:6 313:15 322:9,10 327:5,9 328:15,24
finding 236:18 262:21
findings 22:1,2
fine 142:20 145:16 151:22 178:19 191:11
finish 167:8 226:15
finished 236:7
finishing 52:11 53:18 64:17 215:15
fire 212:14
first 7:3 31:19,22 31:23 62:4 80:15 98:1,2,9 119:8 123:9 126:8 129:24 133:1,22 133:22 134:20,21 149:23 228:10 230:3 231:6 232:2 327:8
fish 207:17 208:11 208:22
fishes 208:6
fits 147:17
five 53:15 61:22 70:20 219:4 304:8 305:5,16
five-minute 206:4
fix 87:13 106:8
fixed 87:7
flag 196:2 313:17 314:19,21 315:10 315:19,24 316:2,6
flagged 238:24 239:2 316:13
flash 192:22 308:17
flat 12:20,24
flatter 91:14
flesh 142:20 203:1
flexible 298:18
flip 58:14 87:17 228:10 231:5 261:14
flipping 87:16 224:23
flood 59:12
flooding 10:9
Flores 4:6 211:20 211:20
flow 7:16 8:15,18 8:21 9:16,18,21 10:1 11:6,10 13:13,16,17,22 22:22 23:1,9,17 24:4 67:11 102:11 102:13 118:11,16 149:17 220:23 290:2
flowing 13:21 59:17
flows 296:15
fluctuated 25:22
fluctuating 94:5
fluctuations 223:1
flue 134:9,12 135:3 135:6,6
flush 208:4
fly 99:1,2,9 100:2 134:7 135:3,5 148:10 165:8 181:10,12 182:19 182:20,22 184:8 195:8 196:2 219:10 221:7 229:8,11,18 293:18
focus 48:16 49:8 92:21 104:24 189:14 311:6
focused 16:9
focusing 15:14
foe 164:20
follow 87:13 156:5
followed 19:18 35:12 49:20 50:7 55:24 66:9 81:10 81:18 87:4 118:24
following 106:20 129:10 183:11 205:18 288:23
follows 7:4
fond 245:1
food 209:3
foot 12:23,23 58:8 85:15 111:23,24 112:1,3,22 113:10 113:21,24 310:14
force 57:23 98:5 325:13,14
forces 114:17 326:12
foregoing 333:11 333:11
forest 209:11 212:12
form 71:15 188:22 202:24 204:19 279:20 300:17 319:14
format 109:10
formed 203:3
former 21:3,13 22:23 24:6 45:4 70:12,13,18 71:1 71:7 98:13 192:21 195:8 196:2 219:10 229:8,18 293:1,17,19,21

294:22 295:7 318:7,10 319:8 323:14
forth 159:3 231:5 233:15 261:14
Forty-three 304:3
forward 125:21 214:10 309:4
found 15:8,18,21 15:23 16:13 18:24 19:3 20:11 22:3 36:22,23 38:23 42:23 56:1 57:7 59:2 69:24 72:6 77:9 79:5 80:6 81:12 89:17,19 92:2 95:3 103:2,4 105:11,13 117:3 119:14 120:17 122:6,12 124:20 125:22 140:24 155:19 165:4 171:6 175:15 179:12 183:17 187:15 191:2 192:4 208:15 239:1 240:5,11 242:2,23 243:5,9 243:10 244:19,20 244:24 245:4,8,15 246:4,7 247:15,16 253:11 257:20,23 259:13,23 262:4 262:24 264:13,14 268:16 276:1 290:5 301:23 303:1 316:12 328:16
foundation 63:13 63:14,19
foundations 63:23
four 17:23 28:23 52:22 76:10 121:18 137:21 147:16 148:1,13 259:12 291:1 306:3 318:2 325:1
fourth 327:13
framework 104:9
FRANZETTI 3:2
Fred 88:3 90:14 115:21 182:6
free 288:18
freely 153:2
freeze/thaw 148:21
frequency 169:23
frequently 52:18
front 20:19 33:19 100:13 194:1,14 195:5 203:17 218:10 228:13 249:20
full 18:13 85:21 116:15
fully 131:6
function 264:22
fund 131:19
fundamentally 55:16
fundamentals 274:13,14
further 12:6 43:11 43:11 78:3 98:20 132:1 220:18 295:3 330:16 331:10 332:16
future 210:14,23 214:10,15,15,21

G

gaining 209:1
Gale 3:6 6:2
gallon 253:22 265:18
gas 132:16 134:9 134:12 135:3,7
geared 249:4
geez 205:16
Gen 39:2 87:15,21 97:7,18 102:19 103:3 123:11 126:20 171:23 186:6
Gen's 128:8
general 28:17 29:13 69:21 96:21 98:13 99:3 101:7 101:22,24 102:3 102:14 110:2 136:24 138:17 150:21,22 154:2 156:9 157:13 162:4 166:13,21 172:2 175:22 189:20 192:2 199:9 200:7 201:8 201:10 203:14,21 221:1 243:2 246:6 285:18 307:18 308:1,8 309:1,17
generalize 253:4 256:12 287:16
generally 19:17 48:23 69:17 75:24 79:4,5 82:18 91:8 91:10 92:1,16 109:18 110:7 120:15 258:16 317:7 319:15 320:2
generate 232:12 233:1,3
generated 176:19
Generating 109:2 194:11
Generation 1:7 5:8 6:2 98:15 102:15 145:20 170:11 176:18 254:5 260:11 272:13 273:5 274:10 298:1
Generation's 47:12 79:16 105:24 125:11 176:19
gentlemen 247:3 251:1
geocell 111:9
geographically 176:23
geology 130:8,11
geomembrane 52:17 56:14 61:9 61:9,10 86:9 113:17 115:10,14 116:12,21,22,24 298:20 307:15
Geosyntec 133:10 133:12,15
geotechnical 60:22 130:9
geotextile 55:6,9 110:12 111:5,6
getting 29:15 64:14 124:8 135:14 147:14 251:1 281:10 286:11,15 286:22 287:17,20 287:21 292:16 303:16 319:19
girls 207:3 209:13
give 6:13 32:2 188:10 206:4 224:5 250:22
given 89:10 202:8 252:10 273:13
gives 26:14 32:10 68:18
giving 236:15 256:4
glad 167:17
GMZ 41:13 47:1 108:3 126:20 200:13,14
Gnat 7:21 8:7 11:14,15 13:12 30:22 31:4,7 35:14 37:17 38:16 66:18 67:4,16 77:16 78:12 81:5 90:19 91:6 96:20 108:9 117:20 118:10 120:8 121:6 297:7 314:22 318:18
Gnat's 8:17 118:15 157:17 316:12
go 11:4 17:8 19:12 19:14 28:24 37:13 62:2 63:19 78:19 118:4 123:14 129:6 137:9,15 144:13 145:12 150:5,7 157:1 173:3 174:7 194:12 195:3 196:17 198:4 209:22 216:6 223:24 226:21,23 233:14 243:23 244:13 245:23 252:23 255:12 258:23 265:16 291:8,23 292:17 297:10 300:3 330:12 331:19,19
God 6:15
goes 15:24 24:14 38:7 62:20 63:24 77:1 134:1 179:4 183:7 235:3 290:12
going 14:11 28:15 28:17 29:19 33:16 60:20 64:2 68:1 68:15 70:23 74:2 78:19,21 83:2 85:24 86:15 96:19 104:16 108:17 116:16 126:1,21 127:10,10 140:9 151:10 166:22 168:19 171:15 172:19 173:12 181:6 184:17 185:6 187:9

191:22 200:8 204:10 207:12 215:1,14,18 217:7 222:24 231:14 235:23 249:19 259:2 265:8 268:12 275:7 278:4 279:19 332:2,8
good 5:2 48:1 55:19 56:12 87:12 122:1 125:18 174:9 205:22 211:21 234:21 257:7,19 258:2 311:20 315:22
good-sized 117:3
gotten 189:2
government 210:24 213:22
gradient 10:24 11:2 11:9,15 202:22
gradients 187:4
granular 64:7,10
graph 27:9 40:1,2 41:8 75:13 93:24
graphic 59:24
graphs 75:21 200:4
grassy 193:1
gravel 58:4 115:13
gravelly 67:18 68:6 68:9,17
great 48:20 199:24 209:2 332:14
greater 32:13 41:12 43:9 190:11 255:15 275:15
greed 211:2
green 21:12 24:13 120:4 238:17,20 238:21,23 241:19 261:10
Greg 2:23 5:18
greg.wannier@si... 2:22
Griess-Pfleger 101:21,24
ground 24:20 60:6 72:11 78:22 262:8 326:8
ground- 22:19
Groundhog 5:12
grounds 213:18 214:5
groundwater 7:15 7:16 8:15,18,21 9:2,9,15,18,21,23 10:7,15,20,22 12:21 13:13,16 14:3,10 15:8,22 16:2,4,12 17:2 19:3,4 20:6,10 21:6,7 22:12,16 22:20 23:1,7,9 24:9,12,18 25:8 25:21 26:4 33:14 34:6,11,24 35:4 38:10,11 42:6,12 43:1 47:13 49:16 49:22 56:5,19 57:1 59:2,5,15,18 59:18 60:3 61:16 62:17,20 63:9 66:15 67:5,10,17 68:20 69:14,24 70:17 71:2,8,10 71:13 72:14 73:7 73:11 77:13 78:10 78:22 80:6,19 84:18,23 85:3,9 85:12,19 86:3 89:12,19,24 90:5 90:18 91:5,18 93:1 95:15 96:5 102:1,10,13,14,18 104:12 106:1 107:22 108:5 112:14,19 114:2 117:16 118:11,12 118:15,22 119:3 119:17 121:2,7,8 121:11 123:6 124:1 125:12 126:7,7 130:14 131:2 132:3 133:7 133:18 135:14,18 136:7,12,20 137:2 138:19 139:15,18 139:21 140:2,5 141:8 142:6 151:3 153:11,17,24 154:13 157:7,11 158:14 159:9,14 163:4 165:15 166:5,15 171:18 172:23 173:17 175:9,12,14,18 176:4 186:17 187:4 189:19 190:12 191:18 194:6,10 197:2,18 198:10 200:5,11 202:19 204:18 208:16 213:21 214:12 219:24 220:2,23 230:12 233:17 234:2 235:10 236:4,19 237:9 238:2 239:16 242:2 243:6,11,15 249:17 250:3,13 250:15 251:11 252:6,9 253:8 254:4,23 255:19 256:14,15,17 257:23 260:10 262:1,14 263:1,1 263:10,19 264:4,7 264:13,18 265:2,5 265:5 266:5,9,15 266:20,22 267:7 267:11 268:1,6 269:1 270:15 271:4,8,11,20,23 272:3,6,7,9,12 273:3,5,11,17 274:10,17,19 275:3,6,21 276:11 276:14,18,20 277:1,4,9,23 278:8 279:15 286:2 287:13 296:12,14 300:24 301:1,4,12,23 302:13 303:12,15 306:10,14,17,22 307:13,16 310:15 312:20 313:10 315:3,9,13 316:4 317:7,22,24 318:13,15 319:2 319:12,20 320:1 320:20 322:8,9,16 322:22 325:7,9,14 326:12 327:13
group 29:14 32:8
groups 213:6
Growing 212:11
guess 145:13 149:9 203:9 223:19 235:2 265:3 290:12 321:3
guy 58:20 133:23
gypsum 134:9,13

H

H 4:14 7:2
half 12:23 13:6 32:12,13 33:14,15 58:9 85:15 112:22 113:10,21 285:8 306:18,23 310:7 310:11
halfway 321:3
Halloran 1:12 2:4 5:1,3 6:3,18 17:7 17:17 68:22 97:4 97:8 106:12,17,23 114:12 127:3 128:10,13,17,19 129:5,13 130:17 130:20 137:8 140:11,18 141:14 142:15,19 143:2 145:9 149:4 151:12 152:18 154:4,8 156:19,23 158:4,8 167:3,7 167:23 168:22 174:18 176:6 179:17,21 180:23 188:4,9 197:8,12 198:2 205:14,21 211:16 215:7,22 216:4,10 217:1,4 225:7 226:19 240:7 245:9 247:2 247:8 250:24 256:7 257:14 260:16 265:10 269:12 270:5,8 273:21 274:1 277:13,17 278:20 279:3,23 280:20 284:10 288:19 289:2,12 291:5,23 292:13,19 299:2 302:21 311:23 312:2,7,14 317:11 317:17 321:23 325:20 326:15 329:22 330:12,17 331:5,13,17,22
hand 6:10 216:15
handle 211:6
handling 211:13
happen 56:22 64:4 80:17 116:16 196:12 198:14 234:5 313:12
happened 46:3 50:12 58:24 80:19 201:24 202:2 320:19

happening 202:4
happens 11:17 62:19 68:14 313:10
happy 188:2
harbor 206:18,24 207:1 209:6,16 212:4
hard 12:20 76:14 210:22 261:14 270:20 283:4 289:10
harder 37:4 272:23
harm 212:1
hatching 24:13
hazardous 104:20 104:22 105:1 132:2,5 298:10,15 299:11,14,24 323:22,23
HDB 55:7
HDPE 53:2 83:20 84:11 110:12 111:5 298:10,14 298:17,20 299:10 299:18,20 307:8 323:21
head 85:23 149:17 164:4 296:9,13,16 296:18,19,20 297:1
heading 34:2 301:11
health 152:8 156:2 156:11 208:17 209:4 210:12 211:8 213:1 215:3
healthier 212:8 214:9
hear 47:15 48:2 206:13 299:5
heard 7:21 8:24 13:12 21:1 30:22 43:16 48:13 60:11 65:24 66:17 73:7 77:16 78:12 79:10 81:4,4 82:16 86:18 88:3 90:19 96:20 108:8 115:17,21 117:20 118:10 119:21 137:6 157:17 182:5,17 184:4,4 314:22
hearing 1:12 2:4 4:2 5:1,3 6:3,18 17:7,17 18:2 20:23 68:22 69:2 90:14 97:4,8 106:12,17,23 114:12 127:3 128:7,10,13,17,19 129:5,13 130:17 130:20 137:8 140:11,18 141:14 142:15,19 143:2 145:9 149:4 151:12 152:18 154:4,8 156:19,23 158:4,8 167:3,7 167:23 168:22 174:18 176:6 179:17,21 180:21 180:23 188:4,9 197:8,12 198:2 205:14,21 211:16 215:7,22 216:4,10 216:22 217:1,4 225:7 226:17,19 240:7 245:9 247:2 247:8 250:24 256:7 257:14 260:16 265:10 269:12 270:8 273:21 274:1 277:13,17 278:20 279:3,23 280:20 284:8,10 288:19 289:2,10,12 291:5 291:23 292:13,19 299:2 302:21 311:23 312:2,7,14 317:11,17 321:1 321:23 325:20 326:15 329:22 330:12,17 331:5 331:13,17,22
heat 309:18
heavy 38:5 210:3
height 86:9
held 106:21 129:11 205:19 214:7 288:24 333:10
Hello 129:22
help 6:15 97:20 194:20 215:2 247:3 325:6,13 327:20
helped 288:8,9
helpful 165:17 248:9 301:22
Hi 5:1 129:23
high 52:16 59:10 59:12 74:17,20 75:12,14 78:4 79:19 86:16 109:16 114:9 198:12 210:21 222:15 223:3 224:16 249:14 300:4
higher 9:1 12:10 22:7 59:3 68:6,18 74:1 75:2,12 76:6 92:3 113:2,24 201:15 203:14,23 204:1,9,22,23,24 205:3 217:14 220:6,10,15,20 221:12 229:4,12 230:6,18 266:22 267:21 270:16 275:21 277:21 296:16,16 313:8
highest 12:6 103:23 114:2 198:18 218:4,8 219:2,6 221:15,19 222:13
highlighted 75:13 108:13 238:11
highly 151:2 152:3 152:13,15
historic 20:24 21:9 22:15 44:21 45:2 45:8 46:9 50:3,16 50:17 51:7 71:15 71:19 80:10 81:12 107:23 120:11 126:4,11,13 127:6 127:19,20 158:16 158:19 160:1,5 161:6 162:3,9 163:5 167:1 168:6 172:24 173:16 174:16 184:14 185:13 187:3 190:14 291:1,12 291:15 320:3,3,10 320:14 324:17
historical 36:8 49:6 54:16 85:17 122:22 140:6 141:11 142:9 159:13 173:20 190:7
historically 36:22 80:17
history 48:9,13,18 48:23 52:3 56:8 81:3 82:8 86:14 107:11 109:8
hit 40:10
hitting 116:20,21
hoc 125:19
hold 17:8 79:19 137:1 144:18 211:4 214:1
hole 87:6 116:5
holes 87:9
home 209:18 212:18
hometown 210:15 212:20
hone 155:11
honest 241:18
Honor 211:21 215:10
hope 74:14
hoping 193:17 216:20
horizontal 23:14 73:23 297:2
horizontally 296:16
hour 106:13
huge 85:23
human 208:8
hump 67:21
hundred 178:13,14
hydraulic 143:17 144:6 146:12 164:4 297:1
hydraulics 10:7 23:6
hydrogeology 172:17 198:10
hydrology 130:6
hydrostatic 56:21 57:9 58:1,13 60:14 85:6,22 113:3,7,19 114:11 115:12 311:9 326:6
Hypalon 55:2,2 59:1 83:6,10,11 83:15
hypothetical 149:3 149:7,9,15 151:9 151:18 197:22 202:3,11 203:8 253:5
Hypothetically 201:3

I

ice 318:19,21
idea 28:16 191:20 212:13 250:23 290:11 321:10 325:11
ideas 279:10
identical 233:18,21
identification 37:11 49:2
identified 19:6 26:12 37:2 44:1 45:7 46:13 51:12 87:10 91:20 108:8 117:19 126:16 137:7 157:21 160:20 161:6 174:16 175:7 190:20 293:9 302:7 318:9 320:11,15 323:13
identifies 24:8
identify 65:19 66:20 80:23 130:12,24 177:18 178:6
identifying 70:12
IEPA 32:5
ignore 87:14
Illinois 1:1,15,16 2:2,3,7,12 3:4 5:4 22:11 24:21 25:2 25:8 31:6 32:16 33:8 34:19 35:8,9 41:24 43:4,6 44:14 46:14,18,24 59:10 61:24 62:4 63:3 72:11,14 78:8 79:24 80:22 89:8 90:7 126:19 127:13 158:21 164:6 200:11 206:11 211:4 230:19,21 249:6 263:7 317:22 333:1,9,18
im- 9:12 189:15
immediate 11:3
immediately 192:22 219:9,13
impact 9:14 10:16 14:10 23:17 47:13 77:22 78:15,22 103:10 139:15 157:7 211:7 212:20 320:1
impacted 103:10 318:1
impacting 10:10 22:16,19,20 23:2 33:14 71:8 159:8 159:14 162:3
impacts 47:5 71:13 80:19 81:13,20 122:23 126:14,18 136:7,10 139:22 140:5 141:8 142:7 156:2 157:11,14 157:23 158:15,20 160:2,3,12 163:4 171:18 172:9,23 175:8 186:4 212:19 317:8 320:20
implied 9:12
implies 279:6
imply 64:24 301:24
important 45:21 48:24 58:3,9,12 89:16 92:24 113:16 126:23 127:5 208:23 211:9 274:24 277:6
importantly 89:4
impossible 116:14 273:16
impoundment 234:13,17
impoundments 82:3 108:12 109:8 239:15 241:22 242:4 296:7
impoverished 210:11
impression 256:4
improvement 308:15
inaccuracies 225:14
inaccurate 227:14
inactive 108:12,17 108:22 296:6,8 311:5
inch 13:4,4,6
inches 55:12 84:15 110:3 111:2,12,14 112:9 113:16 324:24 325:5
incidence 87:5
incident 66:10
Incineration 131:21
include 18:4 104:19 108:3 194:16
included 17:21 36:16 121:7 136:14 139:15 324:5
includes 16:19 26:24 262:23
including 38:20 44:23 66:4 101:14 131:11 146:23 204:12 207:22
inconclusive 77:12
inconsistency 20:13
inconsistent 15:21 15:22 16:1,6,10 16:10 19:23 20:4 20:11,17 42:15 69:22 119:16 140:3 235:1,4 238:21 262:7
incorrect 36:24
increase 211:11 230:23 235:12 273:14
increased 229:17 306:1
increases 275:10
increasing 27:13 29:1,2,2,3,4,10 77:10,14 96:15,18 123:17 124:2,5,6 281:19 282:20 283:20 284:15 286:3,19 287:3,14 287:21 304:10,11 304:15 305:5,9,10 306:4
independence 207:6
independent 18:21 272:14
independently 8:14 287:5
indicate 52:13 94:1 122:9
indicated 13:18,20 53:21 103:5 137:24 146:4 250:19
indicates 101:18 239:13
indicating 271:12
indicative 38:20
indicator 13:5 237:7,20,24 239:14,24 242:6 242:12 243:1 257:7,19 258:2 259:15 261:18 301:20 302:1 324:8
indicators 29:8 92:13 234:12 241:21 242:3,15 244:16 245:14 258:13,18 301:13 302:24 303:3 324:16
individual 26:1,2 75:23 127:6 224:22
individuals 214:17
industrial 132:1 140:7 141:12 142:10 210:5,10 210:16 214:22
industry 18:22 61:15,20,21,24 210:3 279:7
infiltration 197:1 301:1
influence 27:18 186:14
influences 126:14
information 71:14 90:3 117:15 192:14 203:8 308:9,16 319:17 324:23
ingesting 208:24
ingestion 154:15
ingredients 148:11
inherent 27:20
inherit 215:1
initially 22:2 95:21
inlet 82:17,18
inorganic 136:17 139:13 152:23 153:5,6
inorganics 136:15 136:20 137:2 138:18 139:9 165:14 166:14 175:12,14
input 282:3,13
inside 62:21
insignificant 58:6
install 298:13
installation 36:19 125:3
installed 36:4,6,10

111:22 123:9,10 298:10 299:10,12 299:24 325:3
installing 324:24
instance 46:5
instances 241:13
Institute 18:21
insufficiently 207:21
intake 24:16
INTEGRITY 2:15
intend 234:15
intended 61:2,2,11 169:15
interested 103:1 283:10
interesting 58:18 122:3 268:13 287:19
intergranular 64:8 64:11,22
internally 281:14
internet 308:7
interrupt 132:24 186:9
interrupted 198:7
interrupting 198:5 314:17
introduce 5:16
intuitively 9:24 10:2
investigating 46:20
investigation 104:15 131:22
investigations 24:22 46:15
involved 214:18
involves 207:11
inwardgradient 62:20
iron 120:20 239:21 239:24 240:2,10 240:15,16
ironic 28:3
irrelevant 263:13 263:22 272:17 277:22 278:2
island 172:5
issue 60:6,7 62:3,12 65:7 85:22 86:12 96:3 124:23 187:16 191:3 215:17 224:18
issues 63:8 65:5,19 185:14 225:13 259:3
It' 59:24 180:1
item 287:5

J

J 7:2 314:19,19,22 315:1,10,19,24 316:2,6,13,15 327:2,5,10,16 328:6,15,19 329:2 329:4,8,17 330:4
James 1:15 6:8
January 200:4 327:15
jar 88:9
Jason 6:8
Jennifer 3:6 6:1 188:23
Jim 41:16
jn@nimanfranze... 3:5
job 155:15
Joliet 7:9,15 9:3 11:24 13:16 14:15 14:16 20:24 21:4 22:15 23:19 26:5 28:20,21 30:24 35:19 36:15,16 37:13,15,21 39:23 40:14,24 42:6,9 42:19,22 43:18,20 44:7,10 46:2 47:11 48:9 49:9 49:20 50:6,21 51:20 56:3 69:15 76:16 77:3 80:11 80:16 105:7,10 157:5,7,12,13 158:15 159:11,15 160:11,20 161:10 161:11 163:13 164:20 165:12 290:6 291:9,12 292:21 293:8 294:1,6,21 295:4 303:24 317:6,8 323:13
journal 279:17 280:6
journals 280:17,17 322:24
July 298:1
Junior 207:4 209:10

K

K 333:3
Katie 289:8
keep 130:18 138:22 151:13 173:13 176:7 192:12 197:8 209:5 213:10 245:10 257:14 259:7 268:12 270:5 289:14 299:5
keeps 57:22
Kelly 53:21 55:4 59:11 65:24 78:13
Kentucky 212:17
kept 207:1
kg@nimanfranz... 3:5
kids 207:13 209:9 209:15
kind 11:10 36:6 58:18 68:15 72:21 80:20 92:8,21 98:4 99:15 158:2 161:12 162:17 174:7 183:3,24 184:15 191:20 193:1 196:16 220:24 223:9 237:12 243:22 250:23 256:13,13 265:17 292:15 319:9
kinds 75:20,21 146:18 164:2 180:4 204:13
knew 253:14 280:9 325:9
know 10:6,22 11:20 15:16 23:13 27:6 36:3,11 43:7 44:23 45:3,4,20 45:22 46:7 50:5 56:8 59:6,9,11 60:21 61:5 80:18 83:8 87:22 88:22 90:7 92:20 94:10 95:21 100:5,5,8 103:23 104:1,22 107:16,17 122:3 126:8,10 127:18 133:6 135:22,24 142:20 146:11 147:15 148:7 152:14 156:4,5 162:15,19 163:18 165:1,4,7 167:21 173:22,23,23 174:8,8 175:17 176:22 177:5,7,20 177:21 178:24 179:8 182:3 183:6 183:13,15 186:13 190:15,16,16 191:19,20,23 192:3 193:5 194:13 198:11,15 200:1,2 202:10,12 203:14 204:6,20 209:12 213:4,19 217:3 220:7,9 222:15 224:19 225:13,14,18 226:23 230:4,15 243:3 248:9 249:8 249:11 251:19 256:21 257:1 258:15 261:15 267:13,24 268:5 268:13 269:1,13 274:12 275:9 279:10,11,18 280:12,13,15 282:2,17,19 283:6 290:11 293:13 297:15,19 305:8 305:19 308:11 309:14,16,17 311:3 319:5,16,18 321:13,24 322:3 323:19 325:8 326:4 330:9
Knowing 207:19
knowledge 99:22 147:11 148:4 161:20 162:4 182:21 184:10 193:6 310:22 319:9 323:4,15 324:22
knowledgeable 46:21 143:14
known 10:3 21:3 38:6 74:13
knows 193:9
Knuckle 63:18
KPRG 22:7 161:12 163:7 164:23 176:21 293:5 294:3,6
Kristen 3:6 6:2
Kunkel 8:24 10:8 10:23 11:18 12:3 22:21 27:3,22 30:23 31:11 33:19

36:9 41:20 58:5 61:14 63:7 65:7 79:11 95:21 99:23 184:5 225:20 227:22 292:3 320:23 321:10,17 321:20 322:20 324:7
Kunkel's 30:3 194:21 218:11 222:6 223:6 224:9

L

lab 262:6 271:22 276:16 277:22
labeled 98:5 242:6 244:8
laboratory 268:3 270:21 272:18 274:21,22 276:15 313:3,11
LaFarge 86:22 115:20
lake 84:6,24 85:2 85:13 86:14,15 91:1,14 98:11 199:6 206:19 207:12,16,23 208:3 209:7,11,14 211:23 212:2,5,12 212:24 213:11,13 213:16 306:17
lakefront 98:10,12 209:21 210:16 213:8
lakes 209:3
LAM 2:19
land 44:21 81:15 93:6,13 229:22
landfill 45:4 62:21 132:5 149:23 150:24 151:1 153:23 161:16,19 163:15 292:24 293:1,3 299:11 300:1 309:7,10 318:8,14
landfills 62:6,8 296:6,8 298:11 323:22
lane 67:20
large 9:12 178:11 317:3 318:20
larger 178:1 271:23 272:10
LaSalle 3:3
laser 216:23
lasts 41:22
late 40:3 50:7 99:5
laterally 154:14 296:18
Latino 212:23
law 1:3 2:6,10 5:6 152:10
lay 34:16 124:10
layer 55:11 56:11 58:3 59:24 60:2 84:10,13,15 110:13 111:13 143:24 298:22 299:17 307:8,10 310:6,7,20
layering 57:12 61:6 61:6
layers 56:10 57:16 83:20 84:9 110:4
ldubin@elpc.org 2:13
leach 160:24 161:8 161:15 163:12 164:10,20 170:6 176:14,16 178:20 179:1 192:17 213:20 251:17 253:8 254:2,7,12 254:18 255:8,13 255:16 256:15,18 265:20,23 266:3 303:12
leachability 193:11
leachate 15:10,23 16:2,3 18:24 69:15 70:1 233:10 233:16,24 234:12 239:14 241:22 242:4,7,15 243:10 244:19,24 246:5,9 246:13,21 247:11 247:24 248:14,15 250:11,14,17,19 250:22 251:6,10 252:9 256:16 257:23 259:16,19 261:7,24 262:1,5 262:8,10 263:11 263:16,20,24 264:4,14,17 265:7 267:6,18 268:2,7 268:16 269:21,23 270:3,17,19 271:2 271:7,11,19,22 272:5,11,15,18,24 273:12,16 274:23 275:16,18 276:2 276:24 277:4,6,10 312:21 322:10
leaches 300:23
leaching 49:18 71:19 190:11 208:15 209:13
lead 325:21
leader 213:2
leaders 212:6 213:7
leading 138:13 325:19
leak 117:8
leaking 66:14,16 90:4,6 117:16,17 201:21 202:4 204:7 205:1,2,7
learn 65:22 115:15 116:23
learned 31:20 49:3 212:15,15,19
learning 207:7
leave 152:6 182:22 214:9
leaves 215:1
leaving 153:23
left 7:7 15:8 21:11 26:13 30:5 59:4 94:16 132:21 167:9 177:12 218:14 321:11
legacy 209:22 210:16 212:22 215:1,3
legend 239:7
legible 141:18
Len 90:11
let's 11:21 17:7 40:19 129:6 137:8 145:12 150:5 155:16 156:9 157:1 173:3 178:3 181:3 205:15 216:6 221:16 223:11 224:4 225:17 255:6 265:17 280:24 285:23 288:2,19 309:21
level 9:19 12:7,10 12:15 13:5 30:17 32:18,19,22,23 38:10 59:5,11,12 63:24 68:15,18 87:10 113:18,23 115:11 155:6 156:12 262:18,19 263:2,3 265:24 266:9,15,23 267:18,21,22 268:1,15 269:7,23 274:18,21 275:20 276:8,9,17 306:10 313:4 315:5,6 327:18 330:22,23
levels 9:2,23 22:4 31:5,16 41:5,14 56:17 57:7 59:3 85:4,12,19 89:6 89:10 95:1,5 103:23 114:2,8 115:1 154:24 200:9,19 210:21 254:16 261:17 268:14 274:24 276:13 277:24 312:20,21,21 314:16 315:16 317:22
lied 312:8
life 58:20 86:14 198:20
lifelong 209:1
likelihood 235:12
likes 188:8 196:4
lime 148:12
limestone 49:13 51:2 55:11 70:13 70:13 72:1,18 84:14 111:13 170:13,18 171:5,9
limit 154:17 168:16 261:2 264:19,23 313:2,5,6,7,8,9,13 313:14,20,23,23 314:2,2,12 315:5 315:17,19 316:2,3 316:6,7,10 327:24 328:3,9,11,12 329:9,10,11
limited 156:2 172:11 191:22 212:24 326:9
limits 251:22 255:11 329:17 330:4
LINDSAY 2:13
line 26:19 29:1 30:13 35:11 77:11 92:20 94:17 98:2 114:5 119:2 120:1 120:24 123:17

145:13,18 150:9 150:10 159:4 162:1 166:1 173:12 181:6 187:10 188:14 193:3 281:12,13 281:24 287:5 296:4
linear 26:9 77:4 123:15
lined 54:3 63:4 83:5 148:14 208:13 311:4
liner 54:19,24 55:7 55:8,14 59:2 60:4 63:8,9 65:6,6 66:5 66:10 83:6,11 84:12 85:23 86:4 87:6 110:21 111:6 111:6 112:13 113:14 115:10 116:5,8,17 143:12 146:7 147:19 148:2,22 149:10 297:24 298:18,18 298:23 299:13 307:5,8 310:2
liners 52:13 57:12 62:7 65:20 109:3 109:14,19,20,22 116:9 145:21 146:13,23 148:16 213:19 298:10 299:11 323:22
lines 13:21,22,23 13:24,24 75:11,21 91:9 138:4 144:17 144:24 145:4 286:22
lining 55:18 84:4
liquid 131:21 148:23,24
list 81:13 192:1 219:6 316:21 332:3
listed 134:18 188:22 192:3 224:24
lit- 19:12
liter 200:21 203:21 228:21,22 234:1,2 248:18 249:3,10 249:14 250:1,5,6 250:7,9,12,14 251:7 253:7,15 254:1 260:2 261:20,22 262:11 265:20,22 269:21 270:4 271:3 273:1 274:7 276:22 314:6,8,9,11
literature 19:13
little 19:22,23 28:13 30:23 40:12 57:1 69:6,20 70:21 72:7 78:7 82:23 83:14,16,16 88:8 91:13,13,14 96:6 119:14 120:20 125:21 126:24 127:2 154:23 156:6 182:12,13 193:18 220:3 223:5 224:17 235:8 241:18 243:22 257:4 259:1 279:8 280:16 284:11 288:17 299:8 306:18 317:15
live 154:24 206:16 209:15 300:16
lived 58:20 206:11
LLC 1:7 5:8
LLP 3:2
load 148:23
loading 148:20
local 68:16 209:21
locate 126:23 127:5
located 135:8 177:6 178:7 193:23 195:7 208:7 209:20
location 7:22 8:4 37:12 66:18 73:21 73:24 74:18 75:2 94:14 135:9
location-by-locat... 292:18
locations 7:24 90:21 199:10
locus 73:21
Log 37:13
logs 35:24 36:15,17 36:24 37:5,7,10 162:20 180:7,11 180:14 181:15 182:2 183:18,24 186:14 295:20,21
long 159:3 209:4 223:7 224:14 236:21 244:17 290:20 312:18,23 316:24
long-term 28:15
longer 209:9 214:5
longstanding 320:7
look 15:10 23:15 28:22 29:6 31:19 31:22 32:7 37:3 39:3,11 40:19 41:15 44:13 46:23 48:9 51:6 56:9 57:6 73:22,23 74:4,24 77:8 78:5 87:12 92:19 104:7 104:13,21 118:19 124:3 125:21 129:24 131:11,19 131:24 135:6 137:13 143:21 152:21 163:19 165:20 169:6 171:8 174:10 178:3 179:11 181:15 190:10 191:18,24 194:7 194:18 196:6,17 199:14,23 202:13 202:15,17 203:4 204:21 205:5 216:17 224:4 225:3,12 226:8 227:10,11,13 229:14 236:1 238:9 239:5 242:5 247:19 249:18,19 252:23 253:3 254:16,24 255:10 255:12 259:5,20 260:13,14 261:8 262:24 270:12 276:19 286:16 287:6,8 288:2,16 294:13,16 297:21 303:2,17 314:23 314:24 315:1 319:22 326:22 327:17,20 328:22
looked 7:13,15 15:16 22:9 25:21 27:11 28:23 29:19 43:10 47:20 49:5 49:6,10,13 55:22 56:16 57:4 70:7 74:19 76:9 81:11 81:17 84:17 85:17 103:3 107:20,21 107:22 108:4 109:12 113:6,6,20 114:10 115:9 123:17 126:10 131:10,17 132:3,4 132:5,6,13,19 134:5 157:6,10,19 158:12 164:2 174:11,14,21,24 185:24 192:13 203:19 204:12 254:18,19 276:15 276:17 296:11 301:3 303:4 308:9 324:14,15,20 329:14
looking 14:21 26:3 28:14 39:1 48:8 48:12 54:15 73:20 74:24 81:2 83:19 83:23 89:6 90:17 91:4 94:16 96:13 100:21 101:4 103:15 105:1,4 106:6 109:18 110:5 117:18 118:9 122:13 123:4 131:23 132:9 143:7 162:6 175:17 178:11 193:15,21 194:9 195:13 203:16 204:11 218:2 221:23 226:4,18 226:20 227:3 228:6 251:23 261:13 281:7 283:2,20 286:1 289:16 297:12 303:16,19,24 307:2,19 308:12 308:15 324:12 329:20
looks 17:12 40:9 98:4,6 106:24 134:8 178:12 188:7 196:4 232:4 243:21 260:20 278:13 283:7 302:12
Lori 1:13 6:10 188:9 333:6,17
lot 21:1 46:2 48:3 50:11 51:24 69:19 88:24 89:1,19 127:10 132:18 133:11 155:9,14

155:20 163:17 172:4 174:14,24 177:4 181:9 192:14 194:16 202:24 241:11 279:10 286:17 309:13 319:17
lots 127:9 181:14 181:23 244:7 280:10,16
loud 138:6 145:3
louder 134:11
love 207:13 212:10
low 41:22,23 94:20 95:1 141:23 144:5 146:7,15 200:2,3 249:24 267:12,23 274:19
lower 12:15,15 68:5,7,21 74:3 95:5 155:6 196:8 196:13 198:14 202:6 204:10 219:20 222:24 251:9 262:18 267:18 296:17 306:18 310:15 313:22,24 314:3 314:14 315:6
lowest 9:21 158:20 198:18
lunch 203:11 205:13,15,23 220:4
Lux 86:18 115:23
Lux's 87:2

M

M 7:2,5 129:20 312:15 326:20 330:20
M-I-L 84:12
machine 328:10 333:10
Maddox 297:7,7,8
magic 209:2 224:1
main 119:1
maintaining 47:20
maintenance 79:22
major 211:10
majority 12:14
making 162:18 215:12 271:24
man 35:2,2
manage 47:1,9 126:17 155:3
managed 50:9 80:21 106:4,4
management 24:9 24:12,18,20 53:9 73:8,11 121:2,8 160:13
manganese 29:3 76:9 89:5 94:6 95:7,10,13,14,18 96:4 103:4,8,15 103:18,21 104:7 122:6 155:17,19 155:22 156:1,10 186:12 301:17,20 302:2,6,16,24 303:10 304:7,9,12 305:3 306:1 324:5 324:8
Mann-Kendall 27:23 28:10
manufactured 132:16
manufacturer 132:17
map 8:3 21:2,11 24:6 51:13 66:20 66:24 67:21 81:22 90:17 91:5 93:6 93:12 101:11 102:11,23,24 108:8,10 117:19 118:12 177:14 178:1 194:1,14,15 194:18 195:4,13 224:8 226:20 294:9,16,18 295:5
maps 103:5 195:6 195:23 218:13 295:16
margin 71:1 114:1
Maria 37:9 48:13 81:4 119:21 297:6
mark 53:21 55:3 59:11,13 65:24 313:17
marked 4:15 20:22 24:5,13 25:16 29:24 33:21 39:2 72:1 97:2 124:14 242:10,18
mass 72:13 230:5
master 332:3
match 20:7 70:2 92:22 93:1 119:3 119:18 175:21 233:18,18,22 234:3,6 238:19,20 243:11 244:12 245:19 251:15 252:2,3,14,16 253:10,17 254:6 262:14,16 264:1 264:12,15,18,20 264:22 265:2 267:7 268:11,17 269:6,9 278:9
matches 251:24
matching 140:1 231:2 234:15 238:15 258:24 278:5 279:16
material 60:13 112:10 135:4 148:10 149:16 153:18 160:22,23 161:8 164:19,22 169:23 170:3,5 171:5,12 180:10 180:13 183:17 184:8 193:11 254:8
materials 51:9 64:5 72:16 73:2 105:2 138:20 153:19 161:7 166:16 171:2 180:4 182:14 290:1
mathematical 26:10 27:16 28:4 28:7,8 114:16 224:3
mathematically 304:19 305:15
matrix 183:22 323:1
matter 5:5 33:12,13 40:16 85:21 115:2 275:2 276:5
mature 46:20
maximum 57:7 85:8 113:22 114:2 114:24 115:11 225:22 298:23 326:10
maximums 43:3
McGraw-Edison 132:7
MCL 155:18,23
MCLs 156:6
mean 10:19 18:19 20:5 34:16,21 46:7 56:7 58:8 75:16 92:7 115:16 135:15 141:22 144:2 149:24 152:15 155:4 162:11 163:10 169:19 174:5,8 183:7 184:3 201:11 217:3 224:5,20 225:21 227:22,24 228:5,7 228:15,16,19 229:3,4 230:8,16 236:21 238:18 239:12 240:17 249:1,2 253:12 261:11 275:9 276:15 279:6 280:13 287:5 293:14 301:24 315:20 331:2
meaning 11:9 15:21 25:20 26:20 33:12 70:2 116:4 119:17 169:4
means 34:18 35:2 41:22 43:10 69:23 85:4 315:21 316:1 333:9
meant 33:12 169:6 182:9 191:14
measurable 64:24 96:7
measure 13:3 32:21 33:13 199:9 266:17 269:5
measured 10:16,17 190:18
measurement 13:2 13:8
measuring 96:2 220:9
mechanical 313:4
median 31:13 32:4 32:11,13 33:11 168:18 169:16 170:4 218:16 223:7,8,12,13,14 223:19,19,23 224:4,6,15,20 225:22 228:3 321:12
medium 168:18
melts 78:18
members 206:3 213:6,9
membrane 298:18
memory 46:7

235:19 236:1,6,15 244:14 245:24
mention 309:6
mentioned 19:10 32:11 44:12 45:9 49:19 53:18 60:16 70:6 77:18 127:13 127:15 145:22 154:12 160:11 161:5 163:6 168:12 196:16 229:9 230:2 252:22 294:2 300:11 301:3 311:8 320:9 321:14 326:4
mentioning 233:8 314:20
merely 162:13
mess 213:14
met 22:11
metal 52:5,9 54:10 54:20 57:13 65:14 104:18,22
metals 104:20 191:19
method 27:14,16 27:17,17,21 28:5 28:6,7,8 233:4,5 255:24 256:2 266:15 267:8 274:18,20 275:7 278:12,13 279:1 279:14 280:5 281:8,23 282:9 313:8,11,13,19 314:4 315:15 316:9 327:17,24 328:9,11 329:9
methodical 66:3,8 87:4 116:2
methods 232:12 233:1,2 281:4 305:13
MGP 132:18
Michigan 84:6 85:13 131:5 207:23 208:4 212:24 213:13,16
microgram 260:4,8 269:21 270:4 271:3 273:1 274:7
micrograms 249:10 249:14 250:4,6,8 250:9,12,14 251:7 253:6,15,24 254:21 255:3,7,7 255:14,14 260:2 260:21,23 261:20 261:21 262:11 265:19,22 266:7 276:23 314:5,7,10
microscopic 64:8
mid-2000s 106:7
mid-50 92:21
middle 7:8 29:13 30:10 67:20 111:15 112:10,11 123:23
Midwest 1:7 5:8,16 6:2 39:2 47:12 79:16 87:15,20 97:7,18 98:15 102:15,19 103:3 105:24 123:10 125:11 126:19 128:8 145:20 170:11 171:23 176:18,18 186:6 254:5 260:11 272:13 273:5 274:10 298:1 332:7
migrate 151:4 154:14
migrated 153:24 188:20
migrates 38:11,12 275:18
migrating 34:6,11 153:17 186:7
migration 172:15
mil 84:12
mile 206:18 212:4
milligrams 200:20 203:21 228:21,22 233:24 234:2 248:18 249:3 250:1,6 255:3 276:22 314:9
million 103:22
mimics 11:10
mind 218:9 224:23 289:14
minimis 53:23
minimum 225:22
minus 298:24
minute 137:9 199:18 312:11,13
minutes 106:14 209:18 312:8,9 323:8
minutia 46:22
mis- 150:13
mischaracterizes 168:20 277:12,16 302:20
mischaracterizing 279:21
mismatch 234:24 235:4,5 240:18 241:15 251:20 252:12,16,19 255:23 267:8 268:22 276:4
mismatched 244:8
mismatches 235:8 244:4
missing 267:10 322:4
misspoke 50:23
misspoken 272:2
misstatement 150:14
misstates 17:10 152:16 179:16,19 256:6 302:20
mistake 194:3
misunderstanding 274:14
mixed 73:2 309:20
mixing 197:2
mobile 149:24 150:2,3,12 151:2 152:3,13,15 153:4 258:2,9,16
mobility 150:15
Mohawk 2:7
moment 128:12,16 311:21 330:10 331:19
money 58:23 106:8
monitor 12:4,8,9 12:10,10,14,16 23:21 24:1 30:9 35:22,22,23 36:5 38:13 41:7 70:20 70:24 76:4,4 94:7 94:8,11 122:2 126:20 192:7 200:9,18 201:2 219:15 220:8 318:17,22,23 321:5,6
monitored 194:17
monitoring 7:22 8:4,10 15:15 21:7 21:8 23:2,18 24:17 26:12 36:7 36:19 38:9,14 39:4 40:11 41:1 42:1 44:3 66:19 66:21 70:17 71:3 73:10 77:17,22 90:21 91:2,18 94:2 117:19,22,24 118:6 121:7 178:8 187:16 191:2 193:22 194:6,10 198:17 200:5 203:18 239:17 309:5 318:16 319:2 327:14
Monroe 131:4,8 134:6,19
month 218:24
morning 5:2 232:7 283:4
mot 64:2
mother 206:15
Motor 132:11
mound 68:19
mounding 11:23 12:4,12,16 13:9
move 69:6 128:8 171:15 178:19 189:20 196:22 197:6,19 214:10 231:2 244:2 269:15 278:4 280:22
moved 153:3 201:12 219:24
moves 95:18 96:5 152:24 153:1,2 258:4 275:19 296:18
moving 81:1 85:2 105:5 106:11 136:5 150:16 198:13 199:5 229:17 298:9
Multiple 132:22
Municipal 208:20
MW-01 26:13
MW-11 39:4,6,23
MW-16 66:23
MW-2 240:16
MW-5 203:13 217:24 219:2,21 220:20 221:13,18 222:12,17,18 229:13 249:21
MW-6 103:21
MW-7 217:24

219:2,21 220:20 221:13,18 222:12 222:20 223:3 224:7,15,22 227:17,23,24 228:20,23,24 229:4,13 320:24
MW-7's 224:10
MW-8 195:7 196:1 222:22 223:4 224:12,16 228:24 229:1,5 320:24
MW-9 195:7 196:1
MWG 97:23
myriad 207:24

N

N 2:1 3:1 4:1 7:2,5 7:5 129:20,20 312:15,15 326:20 326:20 330:20,20
name 5:2,18 206:6 206:8 278:17
national 132:1 309:7
native 110:23
natural 34:8 84:8 95:6 111:21 112:4
naturally 208:8 240:2
nature 50:3 212:10 325:19
near 11:12 31:21 120:4 178:17 207:14 213:13 326:8
nearest 23:21,24
necessarily 135:20 147:20 155:4 227:1 230:8 233:20 254:15 258:20 308:19
necessary 24:24 127:18
need 53:20 60:8 62:17 64:18 135:24 142:21 161:22 164:1 167:2 205:6 209:24 210:24 213:23 225:3 309:18 312:10
needed 47:22
negative 26:18 143:18 211:7
neighboring 100:3
neighbors 98:6
neither 56:15 77:13 96:15 109:5 124:1 124:5 286:3 287:13 304:11 305:5
net 114:1 255:14
network 1:4 5:24 318:16
never 202:12 249:7 249:11 268:5
new 123:13 143:24 147:20 214:6 232:10,13 233:3 245:22
newspaper 98:5
nice 51:21,23,23 59:24 104:23 125:20
nick 116:4
nicks 116:8
NIJMAM 3:6
Nijman 3:2 5:15 6:1,1 7:6 17:15,19 24:2 65:3 69:3 97:6,10 106:16 107:3,5,6 114:15 127:4 128:7 129:4 138:22 140:9,21 142:12,21 144:18 145:5 149:2,6 151:7 152:16 154:3,5,6 156:14 157:24 158:6 166:22 167:18 168:9,19 170:8 173:7 174:2 179:16,18,19 180:16 181:18 185:3,9 187:23 188:11,14,21 189:11 190:4 191:11 195:10,12 197:21 217:2 221:20 232:8 248:2 256:3 265:8 269:10 273:19,22 273:23 277:11,15 278:19 279:2,19 284:3 291:3,14,21 292:1,11,16 294:13,17 295:15 297:8,13 302:19 304:2 312:10,12 312:16 318:3 322:5 325:21,23 326:13,16 327:2 329:19 330:19,21 331:4,9,11
nitrate 38:20 77:24
nitrates 38:17
nitrogen 38:17
non- 271:24
non-analyzed 89:1
non-coal 159:7
non-comparison 271:24
non-detect 248:23 278:1
non-detects 89:1
non-indicator 237:1,6 241:2,14 243:14
non-indicators 241:24 242:22 243:5 244:11 245:18
non-monitored 194:16
non-quarterly 194:17
non-site-specific 150:20
nonconclusion 286:17
nonissue 60:14
normal 43:14 105:12
normalizing 27:24
normally 57:20 125:17,18 144:4 183:20,22 198:16 316:8
north 91:11 98:12 98:15 108:17 177:24 318:20
northeast 22:23 24:5 161:4,16,19 163:7,16 292:6,23 323:13
northern 98:23
Nos 129:1
notary 1:13 333:18
note 6:5 30:10 49:23 84:17 112:14 240:11 321:24
notebook 83:15
noted 136:19 168:23
notes 25:10,11 27:23 101:16 333:13
noticed 321:6
Noting 111:15
Nowicki 86:23 115:20
NRG 211:4 214:11 215:1
NRG's 213:18
NRT 297:24
number 16:6 31:18 32:12,24 33:3,24 40:17 47:15 55:16 61:7 71:18 75:5 92:8 96:17 97:21 99:19 100:19 124:4 125:16 132:15 189:17 207:2 220:17 222:8 248:3,11,17 249:6 283:7 313:18 314:21 315:23,23 316:14 316:15 328:8
numbered 195:15
numbers 32:13,14 93:4 124:3 231:10 248:6 252:11 278:14 283:5
numerator 234:23 235:3
NW 2:15

O

O 7:2,2,5 129:20,20 312:15 326:20,20 330:20 333:3,3
o'clock 1:17 107:2
Oakland 2:21
object 127:2 151:10 166:23 168:20 187:23 188:21,24 221:20 265:9 273:19,23 279:20 325:18
objection 17:9,10 31:23 128:14,18 140:10 142:12 149:3,6 152:16 154:3,7 159:21 170:8 179:16,19 180:16,22 185:4 189:2 190:4 197:21 256:3,6 277:11,15 284:3 291:3,14 302:19 317:10 321:19 329:19 332:5

objections 188:24
objective 27:17,21
objectives 25:7 99:8
obligation 141:17
observation 91:11 287:19 308:22
observations 162:13,17 169:8 234:23 320:11
observed 234:10 241:20 249:17
obtained 16:20 21:22 190:9
obviously 13:7 38:22 45:19 71:18 75:10 80:24 81:19 83:13 86:6,13 87:14 115:1 268:16 320:19 328:18
Occasionally 42:14
occur 12:17 114:11 116:9,10,11,18
occurring 13:9 240:2
occurs 78:13
October 218:22
oddly 42:15 119:15
off-site 37:20 49:3 77:23 78:3 81:13 81:20 102:22 104:9 151:4 154:1 157:10,22 171:17 172:4,9,11,15 182:22,23 185:19 185:22 186:10,16 186:21 187:1,3,6 187:14 189:23 190:24
offers 207:7
office 2:6 212:3
officer 1:12 2:4 4:2 5:1,3 6:3,18 17:7 17:17 68:22 69:2 97:4,8 106:12,17 106:23 114:12 127:3 128:7,10,13 128:17,19 129:5 129:13 130:17,20 137:8 140:11,18 141:14 142:15,19 143:2 145:9 149:4 151:12 152:18 154:4,8 156:19,23 158:4,8 167:3,7 167:23 168:22 174:18 176:6 179:17,21 180:21 180:23 188:4,9 197:8,12 198:2 205:14,21 211:16 215:7,22 216:4,10 216:22 217:1,4 225:7 226:17,19 240:7 245:9 247:2 247:8 250:24 256:7 257:14 260:16 265:10 269:12 270:8 273:21 274:1 277:13,17 278:20 279:3,23 280:20 284:8,10 288:19 289:2,12 291:5,23 292:13,19 299:2 302:21 311:23 312:2,7,14 317:11 317:17 321:23 325:20 326:15 329:22 330:12,17 331:5,13,17,22
oftentimes 46:22
oh 82:21 97:18 118:4 131:15 134:8 138:8 194:11 215:22 236:8 248:6 259:11 287:6 288:1 299:22 304:1 314:18 327:23
okay 7:12,20 33:22 39:14,22 41:18 42:21 44:6 48:19 48:19 69:4 87:23 89:6 100:18 106:15 110:15 119:20 121:19 128:10 130:3,12 131:15 133:9 134:1 135:2,10,20 136:1,4 137:22 138:8,21 141:14 142:2 144:10 145:2,12,17,18 146:9,17 147:5,5 147:8,12,12 148:22 149:20 150:5,8,11 151:9 151:16 153:21 154:19 156:9 157:21 158:22 160:8 163:12 164:19 165:11 167:5 168:2,7 171:15,15 172:21 173:14,24 174:4 175:11,24 176:13 177:13 178:10,19 180:4 181:5,16,20 184:11,22 185:11 186:23 188:15 189:13 191:10 192:11 193:17 194:4,13 196:5 197:11 199:17 200:6 203:9,20 205:9 216:20,22 217:10,12 221:11 223:13 224:1,2 228:19 232:6 233:6,12,14 234:7 234:20 235:7,14 236:8,9,10,14,24 237:21 238:5 239:3,3,6,18 240:15 241:1,9 244:1,15 245:3 246:1 247:22,23 248:22 250:2 252:18 254:12 255:5 256:12 257:2,6 258:5,12 258:17,23 260:3,5 261:2,9,19 263:23 267:15 269:17 270:7 273:10 274:13 277:5 278:4,17,22 279:23 280:24 282:16,24 285:12 287:23 288:11 289:11 290:5,12 292:17,19 294:12 295:2 296:3 297:4 297:12 299:2 300:19,21 302:2 302:11 303:20 304:6 305:1,17,23 306:6,9,20 307:1 307:17 308:23 309:21 310:14,18 311:7,16,19 312:14 327:1 328:19 330:10,17
old 45:23 46:1 80:15 81:8 103:11 126:10 127:20,22 155:15 160:1 166:24 168:6 190:8 217:8 309:13,13,14,15 318:7,10,14 319:8 319:10,15 320:12 320:12
older 50:5 83:11
on-site 102:1 170:22 172:24 182:23 184:14 185:18 186:24 187:8 190:19 192:8 212:15 218:4 220:21 221:12,19
once 40:10 272:16
one-and-a-half-f... 58:3
one-by-one 285:23
ones 29:10,11 37:16 291:15 320:10
ongoing 74:17 309:4
open 136:6
opening 4:2 218:10
operate 60:9
operating 49:24 62:16 107:18
operation 70:8
operations 79:23 204:13
operator 183:14
operators 115:23
opine 159:8
opined 159:10 166:7
opinion 9:4 11:21 12:2 22:14 31:3 31:15 38:19 44:20 47:12 48:4 50:3 63:12 66:13 71:6 71:20 79:16 86:2 87:8 90:3,8 102:12 105:23 117:13 121:3 125:11,13 126:17 128:6 137:1 140:4 141:7 142:6,18,24 149:22 150:24 151:6 152:1 153:22 158:14 159:12 160:9,11 160:16 165:13 166:8 172:22

175:11 184:12 185:17,21 190:3 192:6 204:19 302:15 319:14
opinions 60:17 71:15 91:17 120:13 128:2,3 139:20 202:24 203:4
opportunity 14:14 42:5 211:22
opposite 92:6 198:14
options 214:9
orange 30:16
order 217:20 270:14 271:3,5 272:5
ordinary 78:5
organic 132:4 152:23 153:4
organisms 300:16
organized 125:17 228:11
origin 34:8
original 37:1 54:3 82:10 109:14,20 231:16,20 233:8 233:12 246:11 247:16 259:20 290:17,19 327:21
originally 11:18,22 56:8 111:22 290:16
originated 196:20
outdoor 209:23
outline 258:24 308:20
outlined 101:5,8
outreach 212:2
outside 45:11 51:3 160:17,20 164:24 166:3,10 170:17 171:2 176:15 178:21 192:17 234:17 290:6 292:9 293:13 295:13
over- 142:13
overall 29:6,15 30:8 42:8,10,23 44:10 77:12 268:3 286:2 287:4
overboard 154:6 180:17
overbreadth 273:19,23 329:20
overbroad 140:10 154:3 156:15
overlying 84:9
overruled 152:18 198:2 256:8 265:11 322:1
oversight 211:12
overview 7:14
owner 125:23 183:14
owners 106:9
ownership 171:23

P

P 2:1,1 3:1,1 260:18
P.E 7:2
p.m 332:10
packages 65:13
paddle 208:22
page 8:3 13:11 15:4 15:5 16:14,16,16 16:22 18:17 20:19 21:3 33:23 34:2 39:12,18,20 40:20 40:22 75:5 91:4 93:4 97:18,20 98:3 100:6,19 101:17 102:23,24 110:15 131:7,24 132:17,17 137:15 137:17,19,21,23 137:24 140:17 141:2,4 144:14,17 144:21 145:14 150:7,10 158:23 161:23 162:1 165:23,24 168:11 173:6,10 177:15 178:4 181:4 185:1 187:7,8,10,24 188:7,8,14 195:12 219:7 221:22 222:2,5 224:21 226:4,10 227:4 228:6 235:18,20 248:3,5,7,8 283:5 283:7,9 288:5 290:3 294:18 297:12,15 298:8 304:1,2 327:20,22
pages 4:1 97:20 137:20,21 142:14 195:21,22,24 218:13 329:14
Papadimitriu 289:8
paragraph 98:9,18
parallels 38:5,8,8
parameters 96:17 104:13 120:17 124:4
parcel 98:14 230:9 230:10
Pardon 39:19 159:16
parent 206:21
parenthesis 137:20
parents 206:24
part 7:13 21:15 32:1,2 35:1 51:10 78:11,11 120:11 147:14 159:23,23 171:23 183:22 207:11 208:23 210:4 274:24 290:3 321:21 325:15
participate 209:17
particular 74:18 146:12 159:6 188:19 205:11 257:19 278:11 279:1,13 280:5
parties 332:1
parts 103:22 206:20
pass 149:10
passed 201:16 227:6
patched 87:11
Patrick 36:18 260:17,18
pattern 210:10
pause 221:5 311:24
pay 215:4
PCB 1:6 5:9
peak 75:17 76:1
peaks 76:5,11 94:1 94:9,11 122:12,17
peninsula 172:6,7 172:14
people 45:20 55:18 135:23 182:2,3 189:14 208:9 211:1,8 212:5 300:18
percent 16:9 19:21 32:23,24 69:21,22 92:20 119:2,16 184:3 244:12 245:19,22
percentage 16:7 234:9,10 278:14 278:15 279:16,22 281:18 323:7
percentage's 16:8
percentages 19:20 92:21 234:24 323:2,4
percentile 32:18,19
percolate 78:21
perfect 68:23 114:13
perfectly 82:21
performed 98:21
period 134:24 215:24 221:21 223:20 224:14 249:23
periods 101:20 223:8
permeability 68:5 143:22 144:5,8 145:22 146:7,15 146:20 147:1,2,3 147:10 148:3
perpendicular 13:22
personally 133:17 215:11,19
perspective 25:23 35:7 186:1,2,3 230:24
perspectives 171:9
phenomenon 256:13
photocopying 93:5
phrase 47:3 139:14 149:13 180:6
physical 211:8
physics 10:7
pick 175:3
picked 33:11
picture 307:2
pieces 70:4
pile 177:12
pinches 68:10
place 168:7 173:24 181:17 212:3 293:6
placed 8:1 151:3 153:10 290:8,21 299:21 323:16
placement 21:13 22:24 24:6 119:23 120:5 290:14 294:22 295:3,7

places 243:3
placing 291:11 292:23 293:12 295:13,24
Plaines 9:15 10:9 24:16
planning 79:21
plans 116:3
plant 36:16 45:22 46:11 48:10 80:15 81:9,10 91:12 98:15 107:16,17 131:8 132:16 134:19 159:24 162:3,5 164:15 166:4,5,10 183:14 207:15 208:21 209:12 212:14
plant-base 125:19
plants 45:22 86:24 107:16 125:14,22 179:7 211:12
play 213:16
please 6:20 40:21 48:22 64:19 99:7 128:16 130:12,24 138:5 140:12 144:16 150:10 159:19 165:22 167:18,24 176:7 180:22 189:5,8 197:9 211:11 227:13 237:5 242:13 247:3 253:21 257:15 263:17 265:13 274:2 278:21 326:22 330:11
plenty 323:5
plots 227:7
plume 73:21 74:7 93:20
plus 111:2 205:7 316:19
podium 206:6
point 9:5,20,21 53:22 62:16,23 75:24 78:1 94:9 112:5 117:4 138:24 154:14 165:17 167:12 188:1 202:15,15 203:9 205:11 216:23 223:1,2 224:1,3 226:1 230:18 275:2,5 295:16 319:22 322:1 331:18
point-by-point 43:12
pointed 35:14 53:13 55:17 99:4 301:21 321:14,16
pointer 216:24
points 40:3,11 50:15
Policy 1:3,3 2:10 5:6
pollutants 208:1,14
polluters 211:4
polluting 214:12
pollution 1:1 2:2 5:4 206:22 210:17 210:21 212:16,22 213:4,17,24 214:2 214:8,22
polyethylene 52:16 83:14 109:16
pond 11:23 47:18 48:14 49:10,11 51:5 52:11 53:10 53:18 56:4,18 57:21,24,24 58:4 58:17 59:6 60:4,5 60:10,15,19 61:16 62:5,22 63:13 68:11,12,13 70:22 78:20 82:9,9,23 84:18,22 85:1,6 85:17,20 86:4,5,7 86:8 88:2,19 91:23 92:7 104:1 104:2 108:14,14 108:14,18,18 111:3,8,21 112:5 112:6,15,18,21,23 112:23 113:1,18 114:4,7,17 116:16 117:4,7,10,11 120:5 122:14 131:9,12 135:8 160:21 161:14 163:10 164:24,24 171:3 177:24 178:9 192:18 201:21 204:9,17 204:23 205:7 217:16 235:13 294:10,21 297:24 306:11,15,16,21 306:24 307:3,14 307:16 310:8 325:16 326:1,2
pond's 86:13
ponds 14:3 15:11 23:19 24:14 38:13 42:16 44:17 45:11 47:21,21,22 51:1 51:3,24 52:3,7,10 52:19,22 53:2 54:20,20 55:13,18 56:6 57:19 61:5 63:15 65:4,11 66:14 70:2,3,7,8 80:9 81:23 83:5 83:20 84:1,16 87:21 88:15,20 90:4,6,8,11,12 92:3,10 94:24 104:3 106:7 107:21 108:8,13 108:21,22,23 109:1,3,13,21 110:6,16,18,21 111:1,10 112:10 112:19,20 113:5 117:15 118:20,21 119:5,6,18 122:9 122:19,20 126:4 126:11 132:5,6 137:7 139:23 140:3 141:9 142:8 143:20 145:20,20 146:13 147:16 148:1,13 159:7,14 160:18 161:13,13 162:16 170:16,18 170:24 176:15 178:17,22 179:12 192:22 193:2 196:8 198:24 199:1 201:7,16 202:3 204:7 205:1 208:5,13 217:21 242:9,16 290:6 292:9 293:13,13 295:13 301:14 310:16,21,24 311:1,6 325:1,2,2 325:9
portion 145:8
portions 98:22
position 164:7,7
positive 87:14
possibilities 99:11
possibility 66:9 235:9 241:3,16 243:7 268:23
possible 22:22 127:11 132:19 156:11 211:13 230:10,13 251:14 253:2 256:17 261:21 263:10,19 265:4 268:6,9,10 269:8
possibly 157:11
potable 43:17,19 50:18 79:11 81:16 105:19 108:5 124:22,24 125:3
potential 37:20 42:22 63:8 104:5 126:24 127:6 157:6 172:9 215:16 300:23 307:24 319:24 322:16 324:15
potentially 252:24
pounds 81:24 108:16
power 18:20,22 36:16 37:15 46:10 80:15 81:9,10 91:12 98:15 125:16 131:8 134:19 159:24 164:15 207:14 212:14
Powerton 14:20 48:10,18,19 49:24 50:17 51:13 52:4 54:10 65:4,20,22 66:12,15,19 69:18 69:19 70:14,18 73:11,15 76:18,24 77:7 78:14,24 79:12,15 80:7 93:16 105:7,11 136:19 137:2 138:1 165:13,14 166:3,4,10 170:5 173:20 174:5 176:3,3,11 283:3 285:12,15,18,24 287:11 293:10 303:23 304:7 318:5,7,9
Poz-o-Pac 54:24 55:3,5 56:15 109:2,22,24 111:2 111:16,23 112:1,3 112:7,9,11 115:5 115:7,10 148:7,8 148:9,14,16,22

149:9 310:6,6 311:4 324:21 325:1 326:11
practical 47:9 127:14
practice 23:8 24:21 24:24 43:14 46:19 63:6 151:5 153:13 154:1 316:9
practices 50:6 105:13 124:19
Prairie 1:3 5:24
pre-2016 18:10
precedent 214:6
precipitated 152:24
precisely 46:6 79:7 183:15
precursor 188:1
prehearing 30:7
prepare 66:2
prepared 84:8,11
presence 236:3,20 237:3,8,10 241:2 241:14 300:21 303:14
present 5:14 28:19 31:12 35:5 75:1 96:4 109:13 115:4 208:24 240:13 249:7,9 251:16 275:4 315:21 323:6
presentation 15:6 17:1 140:20 278:16
presented 23:6 32:9 82:7 225:20 232:19 323:1,4
presenting 203:7
presents 40:1 107:10 278:15
preserve 212:12
pressure 11:5,8 56:11 57:5 59:17 86:10 113:8,9,13 114:1 297:3
pressures 56:10 57:8
presume 223:21
Presuming 257:3
pretty 54:19 84:6 91:15 170:14 197:1 230:14 317:23,24 318:1
previous 16:18 18:4 54:6,24 70:11 133:13,16 142:13
previously 51:12 66:1,2 97:2 137:6 201:13 290:17
primarily 165:3
primary 53:9
principal 10:3,4
prior 16:16 18:9 40:4 42:13 46:4 73:7 83:4 117:7 133:11 174:13,23 187:12,24 190:22
proactive 47:17 106:5
proactively 80:3
probably 48:2 54:4 80:18 85:15 114:7 122:1 136:23 150:13 156:16 165:3 173:2 183:9 215:14 257:9 290:20 308:16
problem 46:24 60:21 62:14 63:6 86:16 104:15 127:16 202:14 210:13
procedure 121:14 252:5 290:9
procedures 288:13 289:20 290:8,13
proceed 6:20 206:7
proceeding 107:4
proceedings 1:11 106:21 129:11 205:19 288:24 332:17 333:10
process 8:20 19:19 35:11 36:15 47:24 49:20 65:23 66:7 66:7,8 80:1 81:10 81:18 86:19,21 87:13 107:15 109:5 115:16 118:24 139:4 161:2 162:7 167:15 169:2,11 174:6,7 179:5 183:10 289:24,24 290:3,24 291:11 292:23 293:12 295:13,24
processes 66:3
produce 330:8
produced 36:14 97:19 177:8
profession 198:8
professional 46:14 106:4 150:1 155:13
profitability 211:9
program 47:18 48:1 55:24 79:21 80:22 87:5 106:3 116:6 125:15,17 125:21 207:4 209:17
progressing 318:22
progressive 46:19
project 131:4 134:6 134:17,23 216:21 299:8 316:21 317:3
projects 81:11 130:13 131:1 133:16 317:3
promise 215:8
proper 160:13 184:21
properly 80:21
properties 46:16 100:23 101:4,12 103:3 170:4 190:7 320:8
property 46:10 78:16 93:14 96:21 96:21 98:22 99:3 101:6,7,9,10 102:5,8,14,15,19 103:9 119:24 122:22 171:22,24 186:6 187:14 188:20 189:16,21 189:24 190:24 193:2 221:1,2,3
proposed 34:21,22 35:9
protect 47:13 211:1 325:6
protected 207:21
protection 79:17 106:1 125:12 211:24 213:21 214:3
protective 252:6
proud 214:17
prove 205:7 257:11 286:18
provide 108:10 329:16,18
provided 85:11 164:15 308:14
providing 212:7
public 1:13 4:5,6 206:3,4 332:10 333:18
publication 279:17 280:7
publications 280:10,11,19
published 119:13 279:17 280:6 322:24
pump 87:6
purely 183:18
purports 242:14
purpose 21:20 34:18 35:15 60:19 60:20 61:2 62:6 62:24 325:4
purposes 195:4 239:23 241:1 242:1 259:14 274:6
push 113:14 148:24
put 32:17 37:18 43:23 55:17 56:11 110:3 112:1 126:20,20 127:16 127:24 135:22 148:23 149:17 154:13 162:21 182:17,19,20 184:21 277:4 296:20 298:21 299:15,18 311:3,5 317:1,4 325:12 332:10
putting 47:17 209:3 230:24

Q

QAQC 26:12
qualified 269:14
qualifiers 315:1
qualifies 314:24
quality 43:5,6 55:23,23 78:22 130:14 131:2 190:12 300:14,15 303:19,21 319:20
quantification 313:2,7,9,14,23 314:2,12 315:5 316:2,3,7 330:22
quantitation 329:10,11,16

330:3
quantitative 278:12 279:1,14 280:5
quarter 13:4 16:20 18:1,3 26:23 27:2 113:24 220:13 327:13
quarter-to-quarter 75:3
quarterly 194:9 239:16
quarters 9:7 11:16 17:24 40:17 41:23
question 45:19 48:22 102:17 105:5 126:2 138:17 142:16 145:6,18,24 146:9 149:14 151:15,19 151:22,24 155:8 155:10,12 156:4,7 156:17 159:1,4,6 159:12,17,19,20 162:2 166:1,2,8 166:12 167:18 168:2,4 173:15 176:2 181:7 183:4 185:4,7 187:7,9 187:11 188:17,22 189:1,8,9 190:21 197:15 201:8 222:10 226:16,24 236:2 244:3 247:7 252:8 263:9,17,18 265:14 269:18 272:21 279:20 280:2,8 283:23 292:12,14 322:3
questioning 296:4
questions 80:11 138:1,4 152:12 164:9 184:17 231:15 259:1 311:7 325:19 326:19
quickly 37:9 69:7 82:24 127:15
quite 66:3 74:24 103:20 110:4,4 183:11 222:15 234:5 257:1
quoted 99:14 308:10
quoting 99:21

R

R 2:1 3:1 7:2,5 129:20 312:15,15 326:20,20 330:20 330:20,20
Race 37:6,9 48:13 81:4 119:21 182:12 297:7
Race's 297:6
raise 6:10 251:2
raised 50:8 65:7 115:1 211:23
raises 59:17,18
raising 206:17
ran 282:3 303:9
Randolph 2:2
range 16:8 33:1,5,5 69:20 137:21 204:5 207:3 259:23 266:1
Rao 6:6
RCRA 104:18 298:19
re- 59:22
re-redirect 330:19
reach 86:4 102:15 102:19
reached 51:1
reaches 63:9 86:7
read 34:13 63:22 98:1,18 99:6 144:17 145:3,7 150:9,11 151:1 159:1,18,20 166:17 167:2 188:2,5 189:9 211:17 215:9 222:7 236:5,9 239:10 280:11,17 283:5 288:17
reader 231:1
reading 58:19 99:14 134:15 138:9,22 140:14 141:23 145:6 151:8,13 155:17 188:13 191:13 235:23 247:20
readings 14:19
ready 106:24 214:4
real 174:9 198:20
reality 62:7
really 11:10 12:24 33:8 45:21 59:15 63:5 73:20 141:23 150:4,16 153:16 154:23 156:7 157:14,20 162:17 172:12 177:1 202:11 220:9 224:19 225:8 230:16 251:19 252:11 263:21 271:15 282:2 283:5 289:10 290:11 321:13
reask 280:1
reason 124:2 192:12 202:21 233:8 258:1 324:24
reasonable 128:5 184:6
reasonably 164:14
reasons 96:16 257:18
Rebecca 297:6
rebuttal 331:14,16
recall 7:10 14:4 22:21 31:7 61:14 61:18 73:16 88:18 120:8 165:9 178:18 186:18,22 229:15 235:17 260:13 281:21 282:4,8,14 290:17 290:19 293:5,20 293:22 296:2 297:21 298:3,4 300:4,6 312:23 325:4
receive 60:13 147:2
received 109:5
receptor 153:20 273:15 300:13 301:2
receptors 43:17 50:19 79:11 105:20 152:7 300:11,22
recite 138:5
recognize 30:2 54:13 78:17 84:5 171:21 230:19
recognizes 46:21
recognizing 122:7 123:8 194:15
recollection 77:21 165:21 286:8
recommends 288:12 289:19
record 5:12 6:6 33:18 57:11 64:20 107:1 129:6,8,14 131:13 135:13 137:9,11 141:18 141:18 147:24 157:1,3 168:21 189:3,12 194:8 202:1 205:23 206:7 215:21 216:7,9,11 225:17 235:24 268:19 289:3 290:22 293:24 294:5 303:22 306:9 307:1,3 311:13,18 312:3 318:9 321:20 327:12 330:13,15 331:19 331:21,23
recorded 113:23
records 46:8 49:6 58:19 81:11 146:2 163:17
recreation 209:23 210:18
Recreational 300:20
Recross-Examin... 4:9
rector 206:14
red 13:20 30:13 101:1,8
redevelopment 98:10 210:4
redirect 4:8 142:21
reduces 66:9
refer 45:2 233:9 246:10 320:21
reference 181:24 295:16
referencing 120:3
referred 12:3 25:15 143:9
referring 75:19 88:11 121:20 136:10 163:1 307:4 320:5
refers 34:4,9
reflect 93:13 123:5 223:23
reflective 95:3
reflects 8:4
refresh 165:21 235:19 236:1,6,15 244:14 245:23
regard 79:19 204:2
regarding 42:9

79:17 105:24 125:12 137:6 290:5 307:18
regardless 188:18
regression 26:9 77:4 123:16
regulate 164:5
regulated 34:7,11 52:10 164:1
regulation 298:17
regulations 25:5,5 156:5 298:15 326:5
regulatory 25:3 154:20,21 155:7 156:12
regulatory-wise 63:5
relate 50:2 300:15 325:24
related 133:3 158:15 160:4 293:11 295:9,12
relating 293:17
relationship 205:6
relative 74:20 251:21 258:8 307:15
releases 190:8
relevant 55:15 263:15 302:3,5
relied 16:18 30:24 120:12
reline 59:1 60:11
relined 52:15 53:1 53:2,2,14 54:22 55:21,22 82:11 83:19 109:15 110:6,22
relining 47:21 79:22 110:8 112:2
relinings 48:14
rely 213:24
relying 241:23
remainder 190:2
remaining 80:20 131:23
remedial 99:8,9 104:14 131:22
remediation 98:24 210:8
remedy 132:10
remember 12:19 25:13 80:14 96:22 136:22 165:10 168:17 169:14 170:20 178:15 188:17 199:18 200:20 217:17 224:24 231:9,10 235:16 239:8 281:17 286:12 294:5,10 307:22 307:23 309:11 311:11 318:11 322:12
remind 42:24
removal 53:7 65:23 66:7 82:12,16 86:19,21 115:16 116:1
removals 79:23
remove 55:3 59:1 60:10
removed 22:5,6 53:16 55:2 82:17 109:4,17 115:19
removing 95:22
repaired 117:7
repeat 23:23 48:22 159:16 189:7 253:21 263:18 265:13
rephrase 127:3 140:12 180:24 274:2 278:21 284:11 291:6 329:22
replaced 232:2 290:10
replacement 297:24
replacing 290:24
reply 225:15
report 11:19,23 12:5 16:17,18 18:9,10 20:8 37:1 66:2 69:10 73:14 95:22 98:11 99:15 99:17 100:12 128:3 136:5,6 140:15,16 146:5,6 165:17 173:2,8 176:21 184:16 190:6 200:5 216:16 218:19 222:6 223:6,21 224:9 231:6,7,8 231:11,16,16,17 231:20 232:1,3,22 233:9,12 240:23 243:24 246:11 247:16 248:12 255:13 259:6,20 267:23 274:6 276:20 300:8 308:4,10,13 309:9 316:9 323:7 324:8 327:6,10,14 329:2 329:5,12 330:7 331:1
reported 261:19 276:21 315:14 333:9
reportedly 161:20
reporter 6:12 23:22 64:9,12,15 134:10 141:16,21 158:3 174:21 180:20 189:10 225:9 226:14 246:16 247:4 284:7 333:7
Reporters 4:11
reporting 316:11 328:3,12
reports 10:23 25:10 32:10 36:18 54:16 99:19 174:13,23 183:9 194:6 308:24 309:2,6 323:18 329:16,21
represent 32:15 75:8 110:17 121:1 168:18 169:16 204:4
representation 30:7,14 32:17 33:16 108:10 311:1
representative 163:14 164:11,14 171:6 179:2,10
represented 35:4 100:20
representing 5:19 5:22,23 18:13 171:11
represents 30:14 32:5 73:6 310:24 329:8
request 215:20
requested 146:8
requests 79:24
require 211:5,12
required 298:21 299:17 313:20
requirement 143:23 147:21,23
requirements 143:13 146:23
requires 143:16
reread 167:6
research 18:20,22 18:23 19:14
researched 146:3
resident 206:10,21
residents 209:19 210:12 212:13 213:15,23
residual 126:24
resist 86:10 326:12
resisted 115:12
resisting 57:23 58:10
resists 113:22
resources 212:7,24
respective 332:3
respond 123:11
Respondent 1:8 3:7 5:9 6:2 97:7 128:21 129:1
respondent's 4:16 4:16,17,17,18,18 4:19,19,20,20 97:5,12 332:6
response 11:6 28:1 332:7
responsible 47:17 79:20,21 106:3,9 116:6 125:15,23 130:13 131:1 133:17,21 135:14
responsibly 80:2
rest 71:15 133:2 139:7 167:11 191:13 331:10,11
result 15:20 114:20 139:22 140:6 141:8,10 142:7,9 180:1 226:5,7 253:17 267:7 276:16 327:8
results 26:5 42:9 71:24 72:5,5,6 77:9 78:16 81:12 96:8,10 103:15 107:21 123:7 194:10 256:21 260:20 281:1,5 283:3 302:3 319:2
resume 316:19
returned 212:18
reusable 181:12
reuse 22:12
reused 21:24 22:13

324:2
reversal 10:24 11:2
reversals 11:15
reverse 205:6
reverses 11:11
review 8:17 27:7 35:24 39:15,22 42:5 47:10 66:11 71:7 79:14 90:2 91:17 105:22 109:8 117:14 121:10 125:9 311:17 324:23
reviewed 13:15 21:16 45:12 54:14 65:10,12,17 71:2 97:14 107:19 108:2 282:13
revise 288:10
Rich 10:24 32:11 318:18
ride 209:16
right 6:10 17:18 30:7 35:21 38:4 39:9,14 42:2,19 44:18,24 52:17 56:6 70:21 72:2 91:1 97:12 101:16 109:12 110:7 111:17 128:20 129:14 134:1 136:8,16 138:1 139:11,23 142:2 148:17 149:20 160:6,14,24 164:8 165:1 166:20 168:14 169:5 170:17,21 171:19 175:19 176:16,20 176:22 184:11 193:12 194:18 195:9 196:10 197:4 200:16 202:1,7 203:24 204:18 205:9,22 213:16 216:6 217:19 218:5,9,10 218:14,14 219:11 219:21 223:4 224:16 225:23 228:9 231:10,18 231:21,24 232:3,9 232:17 233:10 234:3,13 235:11 237:11,21 238:12 239:18,21 240:3 241:4,8,11,17 242:5,8,16 243:8 243:13,16 244:1 244:12,18 245:3 247:13 248:23 249:3,9,13,24 250:16,23 251:22 252:12,15 253:18 254:6,14 255:17 255:24 256:19 257:8,21 258:3 261:22 262:20 263:5,12 264:1,12 266:3 267:9,14 268:2,23 270:4,17 271:9 272:6 273:8 273:18 274:18 276:4,16,23 281:10 283:22 284:1,16,19,24 285:7,13,20 286:4 287:7 288:15 289:22 293:10 294:11 296:9,22 297:17 298:11 300:8 301:6,8,14 301:17,19 302:4 302:15,18 303:10 305:3,10,14,20 306:2,9,11 310:16 312:8 314:18 318:21 326:23 327:14 328:12 329:15,17 330:4 331:18 332:12
Rights 241:24
rise 10:10,14 56:13 113:18
rises 11:8
rising 11:10 63:20
risk 42:19,22,24 43:7,13,14,15 47:1,8,9,11 50:19 65:5 79:1,9,15 105:8,12,14,23 124:13,19 125:10 126:21,22 127:17 152:9 154:16 155:1,2,3,13 156:11 160:14 296:5 300:7 324:6
risks 50:19 108:4 208:12 209:4
river 9:15 10:10 11:3,7,12 13:18 13:21 23:9,15 24:16 38:6,12 59:10,14,16
Rivers 1:3 5:24
road 2:7 38:4,5 98:14
roads 78:14
Roberts 211:17,19
rock 170:13
rocky-looking 59:24
room 1:15 289:7
roughly 193:21 199:19 203:12,17 203:22 223:4 224:15 250:4
round 112:23
route 202:23
row 239:21 242:21
RPR 1:13 333:6,17
rubbery 83:16
Ruining 1:4 5:7
rule 34:19,19,21,22 35:8,9 123:11 143:6,8,8,13,16 143:21 146:22 147:7,19 155:18 160:18,23 180:21
rules 25:8 61:17
run 30:15 62:17 249:4 254:17
runoff 38:7 70:13 72:1,18 78:18 171:1
runs 313:11
Russ 2:18 5:23,23 17:4,9,10 127:2 128:11,14,15,18 128:20 129:15,19 129:21 130:17,19 130:22 134:3,12 134:14,18 137:12 139:6 140:13,20 140:22 141:1,19 142:2,4,16,17 143:1,4 144:22 145:11 146:21 149:8,19 151:10 151:14 153:8 154:18 155:9 156:16 157:4 158:13,24 161:3 166:17 167:4,5,10 167:20 168:1,7,10 169:1 170:10 173:9,11,24 174:3 175:10 176:7,8,9 180:3 181:1,2,16 181:21 183:4 184:16 185:6,10 188:2,6,11,15,16 191:9,12 195:11 195:14,18 197:11 197:14 198:21 201:9 205:10 216:12,14,20 217:10,11 221:22 222:3 223:18 225:10,16 226:17 227:1,5 237:13 240:14 243:20 245:13 246:20 247:6,10 248:4,13 251:3,5 256:11 257:17 260:18 261:1 265:14,15 269:16 270:6,7,13 271:16 274:3 278:3,22,23 279:12,24 280:1,3 280:22,23 284:11 284:13,14 289:5 289:11,15 291:7 291:17 292:8,17 292:20 294:15 295:1,18 297:9,14 298:4 299:7,9 301:21 303:5 304:3,5 311:21 312:1,4,6,19 314:8 315:3 316:5 316:17 317:10 318:4 320:22 321:19 322:6 323:8,21 324:22 325:18 326:17,18 326:21 329:23 330:1,10,16,18
Russ's 206:2

S

s 2:1 3:1 4:14 7:2 129:20,20 283:13 326:20,20
sacrifice 210:20
saddled 210:2
safe 151:5 152:8 171:4 242:21 250:2 258:17
safer 209:12
safest 211:13
safety 58:10 155:24
sag 185:18
sail 207:4 209:10

209:10,10
sailboat 206:24
sailing 207:4,9,11
sails 208:6
saith 7:4
salt 38:7 78:18
salted 38:6,7
sample 21:13 42:9 71:24 72:4,5 81:12 88:4,8 89:21 95:12 107:21 120:5 168:17 169:4,7,14 170:2 176:23 253:6,9,14 254:6 255:8,22 267:5 269:2 270:17 271:22
sampled 21:23 88:1 88:2 139:1 161:12 162:15 163:7 164:20,23 167:12 168:12 170:19 179:1 274:5,5 293:5 294:2,6,22
samples 49:10,11 49:15 50:16,24 107:23 120:12,22 168:17 170:14 171:11 176:24 177:3 193:14 297:18,20 298:5
sampling 9:3 21:15 21:19,21 25:24 26:1 27:1 72:20 88:13,15 120:9,16 135:17 161:21 169:22 170:1 190:10
sand 55:9,10 57:17 58:4 67:18 68:6 68:10,17 84:8,10 84:13,13 110:13 111:11 113:21 115:13 148:12
Sanitary 98:16
sat 27:8
saw 49:19 80:4 94:24 102:10 163:13 261:6 262:9 272:11
saying 20:9 31:7 32:22 34:15 58:11 61:14 126:3,4 152:14 158:11 172:2 181:13 187:13 189:21 190:15,22 201:22 230:7 253:19 261:16 264:23,24 268:19 269:24 271:18,19,21 276:3
says 15:13 17:6 21:11,12 26:13 32:21 33:9 34:4 37:12 40:24 67:17 83:6 88:17,22 98:12 132:21 134:9 141:7 142:5 160:7 166:24 222:9 223:19 241:19 242:3 248:8 284:4,4 285:11 286:2 293:21 294:22 295:5,6 297:18 301:11 310:23
scattered 210:7
scenario 201:23 265:17
schedule 4:10 332:8
scheduled 53:7 82:12,15 109:17
scientific 128:5
screen 216:21
screening 288:13 289:20 290:8
se 29:18
seasons 18:14
second 16:20 18:3 26:23 27:2 32:1,2 34:3 35:18 81:21 87:18 98:18 101:3 119:11 143:19 144:18 216:7 221:5 228:14,16 247:18 269:19 297:13 299:1
secondary 52:6,10 53:17 58:15 65:13
section 54:11 83:24 98:23 110:17 111:16 120:3 288:3,7,12 289:19
see 9:13 11:17 15:12,15,19 16:8 19:19 21:14 22:18 26:5 28:24 30:13 39:16,24 41:2,9 43:24 49:6 50:13 51:7 56:17 59:3 59:23 66:23 67:22 69:19 70:15 74:4 74:12,15 76:3,13 84:1 87:9 88:14 89:12 93:8 94:4 95:12 103:19 120:7 121:17 123:16 135:24 138:2 145:2 156:8 157:15 159:2 163:11 180:6 182:14 186:4 198:19,22 201:22 205:15 209:7,11 217:14,23 218:18 218:23,23 220:5 220:15 222:13 223:1 225:20,24 226:1 227:16,18 227:19 228:11,12 228:18,18 230:18 235:22 238:10,24 241:12 244:8 251:24 262:2,17 267:17 272:15,16 275:14,24 276:21 297:21 299:22 309:12,19 313:12 315:8,9,12 316:13 317:2 319:11 321:8 326:11 327:8,19,23 328:13 329:3,13 330:5
seeing 41:5 71:22 76:7 96:2 139:4 160:3,4 167:15 293:22 296:2
seen 9:11 11:15 23:18 51:8 72:16 139:24 144:11 162:7,12 163:1 178:20 179:6 180:5,5,7,10,13 186:16,20,24 198:14 273:13 290:7,23 291:9,13 291:18 292:21 293:2,10,15,16 295:8,11,21,23 302:16 308:20,24 309:2 323:6,10
seepage 131:9
seeping 68:20
selected 12:6
selenium 72:8
sells 7:22
send 182:21
sense 178:10 220:22 234:18
sensitive 256:18 260:11 261:5 265:6
sensitivity 281:21 282:15,22
sent 182:23
sentence 34:4 99:6 141:6
separate 270:19 301:2 321:21
series 21:22 138:3 176:24 223:15 225:12 227:7,19 228:10 229:20 232:11 243:18
serve 172:14
service 109:4
Services 132:2
set 156:6,13 170:14 185:8 214:6 215:24 247:11,17 247:18 259:3 286:22 320:13
settlement 63:21 64:6
settles 82:23
seven 9:8 143:18 219:4 298:24 305:24
Seymour 4:3,4,7,8 4:9 5:14 6:9 7:7 17:20 68:23 107:2 114:13 129:16,22 174:19 198:4 206:2 216:13 245:10 257:15 269:13 289:4,16 292:2 312:17 326:23 331:7
shaded 240:10
shading 15:20 239:13 241:20
shakes 254:8
shallow 68:4
Shanley-Roberts 4:5 206:8,9
shape 318:19
share 225:6
shifting 64:23
shore 98:16 213:19
shoreline 207:13 210:17,22

shorelines 212:23
shores 207:22 213:13
short 106:19 129:9 205:17 288:22 317:4
short-term 11:11 12:19
shorthand 260:3 333:10,12
show 72:5 77:22 88:21 97:1 163:9 163:17 165:22 199:13 225:5 242:14 248:17 257:22 260:15 283:18 285:13,15 285:19,21 304:7,8 306:1 310:18
showed 27:4 283:13,15
showing 13:13 26:7 53:7 93:23 101:11 101:17 210:24 235:2 320:22
shown 30:20 68:3 100:24 193:8 229:21 233:2 321:21 323:7 328:17 329:12
shows 32:10 40:2 82:9 91:5 228:16 261:9 321:20
sic 131:20
side 21:12 82:17,18 101:16 111:10 161:16 172:14 189:17 230:3,4 318:17,20,22
sides 55:1 112:6,7,9
Sierra 1:2 2:20 5:5 5:19,22
significance 153:10 281:12,13,24 282:5,6,10
significant 103:7 103:20 172:8 207:20
signify 238:14
silted 68:4
silty 68:9
similar 50:20 51:19 54:19 72:6 74:20 77:3 80:16 83:21 87:3 93:24 94:4 96:5 102:17 103:17 107:15 109:7 110:9,11,11 110:14 120:17 122:11 133:6 163:21 164:15 179:12,14 180:1 182:7,7 186:4 222:14,15,16 254:11 258:13 259:2 280:8 286:6 298:16
simple 75:9 154:23 169:14 202:12 259:7
simplify 235:8
simply 100:11 234:5 264:10 266:19 269:8
simulated 26:19
sir 129:17 140:19 151:23 178:6 227:13 284:7 317:18
sit 166:9
site 7:9 9:16 11:4 12:20,21 14:9 18:18 19:8,24 20:11 23:17 24:11 24:21 28:17 31:21 36:23 38:8 40:21 46:12 47:8 48:9 48:18,23 49:24 51:13 79:2 81:3 84:5 95:12 98:13 100:24 101:21 102:4,7,20 103:23 103:24 107:8,10 108:8 125:1 127:22 131:18,21 132:9,12,12 133:1 133:22 134:4 136:19 138:1 140:7 150:23 157:5 158:19 160:2,13 161:10 161:17,19 163:8 163:13 171:7,14 171:21 173:18 179:3,14 184:9 186:7 195:6 198:23 201:11 207:18 208:3,16 210:8 220:16 238:7,8 245:16 246:12 292:10 295:4,6 300:10 307:19 308:1 309:1 318:1,5 319:23
site-by-site 27:9 291:8
site-related 248:15
site-specific 19:11 31:18,23,24 70:1 119:9 301:13
sites 7:14 8:15 11:16 14:17 31:1 45:5 47:3 48:5 50:14 72:7 78:9 84:17 95:11 106:5 120:18,23 121:16 122:24 124:13,18 124:21 125:1,5 127:9,21 132:15 132:16,18,22 136:8 139:23 141:9,11 142:8,10 147:16 148:1,14 157:15 158:20 159:13 174:12,22 181:9 207:21 214:9 215:17 247:12 257:24 278:10 290:13,15 291:1 299:16 302:16 303:13
sitting 115:13
situation 107:20 113:15 154:13 243:2 253:5
situations 127:12 152:2 155:5 201:20 298:13
six 29:9,12 53:10 55:12 84:15 111:13 207:11 219:17,19 229:9 266:7 283:15 284:6,18 285:4 305:12
six-inch 110:3
skill 209:1
skip 193:18
slab 309:12
slag 119:23 182:12 192:21 195:8 219:11 221:7 229:8,11,18 293:18,21 323:14
slam@environm... 2:18
slide 7:19 13:12,19 18:7,7 20:19 24:8 26:3,7,8 28:18 48:8,12,15,17 49:10,23 51:11,16 51:16 54:7,8 56:24 58:14 66:17 67:3,4,14 68:3 69:5 70:10 73:4,6 75:4,6 76:20,21 77:6 81:2,7,22 82:2,2 83:23,23 87:18,19,22 88:10 89:10 90:17 93:3 93:22,22 96:9,13 100:18,20 103:13 103:14 107:9,10 108:7 109:7 110:16 117:18 118:10,10 119:19 119:19 121:1,19 123:4,4,5,20,20 301:7,9 304:24 305:22 306:7 309:21
slides 15:5 67:7,11 69:5,9 80:5,15 92:14 96:10 118:19
sliding 299:5
slight 23:10,11
slightly 29:7,15 44:12 68:18 72:10 111:17 252:7 255:3 269:17
slop 54:4
slope 26:14,18,20 123:16 131:10 281:14,17,19 282:18,21
slopes 111:10
slow 141:15 142:3
slowly 64:13,16 153:2
slug 201:14,19
sluice 83:1
small 23:15 64:23 186:1
smallest 259:12
smoke 209:11
smudge 80:20
soft 63:16 251:1
soil 56:10,11,12 63:15 113:10,11 113:13 143:17,23 144:2,4,5 146:12 146:15,19,24 147:4 165:4,4

169:21 170:1,2 183:19 298:14,22 299:12
soil' 146:10
soils 104:12 110:24 147:9
solely 162:4
solid 298:16 299:15 299:16
solution 127:15
solve 62:14 63:6
solver 60:22
somebody 58:22 173:13
someplace 239:7
somewhat 9:6 94:4 95:2
soon 108:17
sooner 215:15
sorry 17:5 23:22 39:14,17 48:21 64:10,14 75:16 88:5 97:6 100:14 101:2 105:5 118:4 120:3 121:21 128:11 130:4 132:20,24 134:8 134:10 145:19 146:16 149:2,5 151:7 154:5 156:20 158:6 159:2 168:4 170:11 173:9 174:19,20 179:18 185:3 186:9 188:11 195:10,11 198:4 200:14 221:17 222:4 224:23 225:10 228:8,9,24 231:13 231:23 236:8,8 237:13 242:13 245:2,12 248:6,19 251:3 253:19,20 255:5 258:24 259:10,11 261:15 271:5 272:2,7 273:22 277:14 278:19 282:24 283:8 285:14 286:21 288:1,5 289:17 291:6,22 298:7 310:5 314:17 321:2
sort 10:6 16:9 19:8 70:21 92:6 314:8
sorts 98:5
sound 217:6 259:2
source 14:11 35:17 37:20 38:2 42:16 44:17,20 45:13 46:13,17 49:2,4 51:10 70:2,4 71:12 73:21,24 74:2,7,12,13,17 74:18,23 76:2,8 76:15 77:23 80:9 80:11 90:13 92:9 92:23 93:19 94:14 95:6 100:3 104:3 104:4 122:13,20 126:16 127:6,6 130:15 131:3,12 138:14,15 140:3 153:20 157:19 158:18 160:18 162:9 163:24 166:7,12 173:17 179:5 192:8 196:23 197:6,19 204:15,17 217:21 273:15 274:4,11 279:14 297:18,20 297:20 298:5 300:23 302:14 322:16 327:21
sources 94:3 102:23 103:7 126:24,24 127:19 127:22 131:23 132:9,13,19 138:17 157:6,10 157:22 159:8 160:13 163:2,3 166:3,4,9,11,13 171:17 172:4,10 172:15 185:19,23 190:15 196:15
south 3:3 110:16 161:4 178:8 208:21 297:24 310:24
southern 119:24
southwest 23:1,11 161:12 164:23,24 293:3 294:1,10,21 295:3,6 323:14
southwesterly 22:22
space 73:22 74:4,16
spacial 73:15,18 75:8 93:17 121:12
spacially 74:12
span 134:24
spawn 212:15
speak 34:17 64:13 86:20 124:10 141:15 158:4 172:20 240:8 247:4 289:9 299:3 303:17 321:15
speaking 64:16 211:22 256:5 325:16
specific 46:13 76:15 126:15 138:14,15 150:22 158:18 159:7 160:12 163:2,3 166:3,7,11,12 168:16 173:20 175:7 178:2 314:4
specifically 7:14 11:20 80:23 88:19 156:10 160:22 162:24 163:24 169:21 174:17 178:18 182:4 183:13 186:19 190:14,20 220:4 302:7 320:15
specs 56:1
speed 68:23 69:20 114:13
spend 58:22
spent 106:8
spilling 68:16
spoke 38:16 66:1,1 86:22 115:20 220:3 320:2
spoken 188:24
sport 209:2
spreadsheet 26:11
squiggly 75:11,21
SS 333:2
stability 63:8 65:6 95:23
stable 96:6
stack 178:4 326:24
staff 37:3
stand 5:15 107:3 217:13 289:5 299:7
standard 14:7 24:21,24 29:18 30:17,18 40:6,8,9 40:10,15 41:12,19 41:24 42:12 43:8 43:10,14 44:15 61:15,20,21,24 63:2,3,5 71:10 72:11,15 94:18 104:12 155:7 156:12 200:12,12 200:19,20,23 201:2 230:19,21 249:5 263:3 267:12 274:19 316:10 319:20 323:11
standards 40:18 43:5 89:7 158:21 252:6 300:15 317:22,24 319:3 319:12
standing 251:4
stands 11:21
start 19:11 133:22 145:13 150:9 173:12 181:6 183:1 187:9 188:7 188:13 234:21
started 50:9 56:9 57:6 147:13 207:10 312:12
starting 5:17 129:15 159:3 162:1 166:1 316:16 325:21
starts 318:17
state 1:14 31:6 46:19 152:9 206:6 211:3 263:6 266:15 267:12,20 267:22 268:15 274:17 311:18 333:1,7,9
stated 11:18,22 12:5 14:1 25:11 30:11,11 45:21 114:21 117:24 164:2 190:5 192:10 215:23 319:1
statement 136:13 146:1 181:8 184:15 286:6 304:20
states 63:4
stating 188:19
station 37:15 100:22 108:23 109:2 194:11
stations 14:24 55:14 71:16 109:7

statistical 22:8 32:16,20 33:9 77:4 282:10 305:13
statistically 72:13 77:12 281:15 282:20 304:21
statistics 228:15
statute 22:11
statutory 25:3
stay 85:13 251:4
staying 66:5 199:17
stays 30:17
step 46:23 206:5 331:8
step-wide 289:24
stick 255:6 259:7
Stipulation 108:22 108:24 109:3
stipulations 108:21
stone 113:17,22
stop 149:20 168:8 173:14 174:1 181:17 191:9
storage 195:8 196:2 212:14 219:11 221:7 229:8,11,19
stored 15:11 139:23 141:9 142:8 178:17 193:12 234:13 239:15 241:22 242:4,16
straight 96:13
stratus 64:3,3
Street 2:2,20 3:3
stress 64:23
strong 78:20
struggle 45:20 141:22
students 214:16,24
studies 100:8 104:10 199:8 257:22 308:11
study 19:13 35:15 49:8 99:19 104:24 132:10 134:21 135:1,5
style 83:11
stymied 210:3
subgrade 63:16,16 63:17 84:8,11 110:24 143:20 147:16
subject 27:19 154:15 253:7,8
subjected 253:16 296:24
subjective 27:18 28:5
submit 215:20
submitted 30:6
subsequently 40:7
substance 296:23 296:23
substantial 220:13 220:14
substation 171:22
subsurfaces 60:24
suffered 312:17
suggest 10:8 78:2 229:22
suggested 299:3
suggesting 277:8
suite 2:3,11,16,21 3:3 104:13
sulf- 76:11
sulfate 14:22 15:13 27:4 29:4 40:19 41:1,5,8,10,12 76:11 88:23 89:13 94:10 96:6 104:19 120:21 122:11 139:10,13,17,19 186:20,21 218:17 221:16,19 222:10 222:12,17,19 223:2,16 224:6,10 228:1,2,17,19 229:3,12,17,24 230:11,20,21 245:7 258:15,18 285:9,13,16
summarized 82:7
summarizing 77:9
summary 26:8 28:22 51:21,23 52:2 107:14 123:23 228:14 276:19 283:9,12
summed 16:5
summer 209:8
Superfund 131:18 132:8,12 299:16
supplement 232:15 238:6
supplemental 231:6,8,11,15,17 232:1,22 259:6
supplies 31:6
support 234:16 258:10
supports 71:20
supposed 59:21
sure 19:15 32:24 33:3 37:13 47:6 48:20 82:6 84:22 88:14 110:23 112:18 114:8 128:17 138:8,11 142:1,16 152:21 170:14 177:18 192:15 193:19 194:2,4 202:21 203:6 211:14 215:2 217:1 223:18 231:23 252:11 255:12 259:11 278:22 283:1 284:13 288:18 309:9 310:19 311:23
surface 9:19,20,22 10:1,14,21 42:24 43:2,5,15 79:9 85:11 108:6 172:13 296:9 301:4 324:16 326:8
surge 52:1,4,8 53:8 54:21 56:23 57:12 65:13
surprise 199:15
surrounding 100:22 140:7 141:12 142:10 300:9
surroundings 48:10,24 81:3 107:11
surrounds 24:14
sustainable 210:18
sustained 12:12 140:11 151:13 156:24
swear 6:11,12
swim 208:22 213:16
Swimming 208:20
swims 208:6
swing 9:12
switched 314:8
sworn 6:17 7:4
SYLVIA 2:19
system 54:19 59:23 60:9 61:7 62:18 84:4
systems 55:14 63:4 110:8 112:13

T

T 3:6 4:14 7:5,5 129:20 312:15,15 326:20 330:20,20
Tab 29:24 39:1 105:16
table 15:5,14 16:15 16:16,17,23 18:17 77:8 82:6 119:8,9 119:11 151:3 153:11,24 154:13 224:18 225:22 227:16 232:9,16 233:2,3 238:5,7 239:7,20,23 241:1 241:10 242:1,8 243:19 244:4,5,11 245:3,15 246:9,10 246:24 247:12,16 247:21,21,23 248:7,11,17 253:1 254:2,19 255:9,13 256:22 257:5 259:5,9,14,20 261:9 274:6 283:12 286:1 296:24 300:1,3,5 301:17 303:23 328:17
tables 49:19 69:10 109:11 209:3 227:8,9,18 232:2 232:6,13,18 233:7 233:9 234:8 248:4 248:5 259:3 276:19 278:6 312:19 315:13 321:1
tabulating 135:18
tabulation 321:11
TACO 25:6
take 39:3 69:1 106:14 141:16 155:16 203:11 205:12,15 224:4 224:18 243:24 244:10,17 245:18 253:19 274:16 287:5 288:20 308:23 312:13 321:24
taken 1:12 168:17 332:4 333:13
takes 27:20 32:20
talk 11:21 13:12

30:22 59:9 78:13 81:4,5,8 96:20 156:10 225:8 259:8 280:24 314:22
talked 8:7 35:18 37:6,17,19 57:15 86:17 87:19 115:22,23 134:20 275:10 300:7 302:6 317:3 318:4 322:6
talking 7:9 13:6 24:4 95:23 103:14 120:8 127:21 139:10 141:22 177:14 192:21,24 196:8 199:5 217:16 219:10 232:7 270:21 274:20 275:22 291:2,16 292:5,6 292:7 295:17 314:5 316:17 318:5 322:24 331:24
talks 52:18
tannery 96:21 100:24 101:10 102:7,19 103:9 187:15,17,22 191:1,3,8,17,21 192:3
target 19:16
targeted 163:24
task 98:5
tax 215:3
taxpayers 211:15
TDS 14:22 89:3,13
tear 117:3
technical 6:7 169:20
techniques 288:14 289:20
tell 12:20 58:22 74:6 92:5 118:5 122:16,17 135:23 166:2 173:13,15 177:22 181:7 200:7 201:6 249:16 281:21 282:23,23 304:22 330:9
tells 92:7,9 94:12 319:16
temporal 25:11,18 25:20 26:4 76:17 76:23 96:11 123:1 123:6 280:24 301:12
temporarily 208:3
ten 35:20 41:23 123:9 143:18 250:4,8,13 251:7 284:23 285:5 290:18 298:24 305:24 313:24
tension 56:13
term 149:24 150:12 155:20 209:4
terminology 182:8
terms 75:9 152:12 154:2 163:2 172:9 219:2
test 104:17 160:24 161:9,15 164:10 164:20 170:1 176:16 178:20 179:1 192:17 249:4 250:17,22 252:5 253:8,9,20 254:2,4,7,12,19 254:24 255:8,13 255:16,19 256:15 256:17,18 260:10 261:5 262:2 263:6 265:6,6,7,20,23 266:3,6,20,22 267:12,12,20,23 269:7 270:19 271:4,8,11 272:6 272:12,15 273:5 274:10,22,23 275:7 277:1 282:11,12,15 283:2 288:2 302:2 303:8 313:4,5 322:11
tested 169:9 170:6 170:12 171:3 254:1,3 259:19 282:5
testified 44:16 55:4 63:7 105:19 276:10 292:2,3 324:1
testify 11:19 88:3
testifying 27:3 198:8
testimony 6:13 11:13 27:8 30:3 30:11 37:23 47:15 70:11 73:7 90:10 96:23 115:4,17,22 121:6 152:17 157:17 178:16 179:20 256:6 277:12,16 312:24
testing 26:4 77:7 96:11 123:7 174:13,24 255:8 281:1,24 301:12
tests 163:12 170:6 176:14 177:4 251:11 253:16 267:19 273:18 312:22
thank 6:3,18 13:10 17:18 18:16 37:18 45:14 64:12,20 68:24 70:9 97:8 106:17 107:4,5 114:13,14 118:8 128:20 129:17 130:20 131:15 132:23 134:2 135:10 136:4 139:7 141:2 143:1 143:2 147:12 148:5 153:21 160:15 162:23 168:9 172:21 175:24 176:13 178:5 185:9 192:11 197:12,16 200:17 205:9,16 206:12 211:15,16 211:18,19,22 215:5,5,7,8,11 216:2,4 232:20 233:6 234:7 236:24 239:18 241:9 245:10 246:1 250:10 251:2 257:16 267:16 270:8 273:10 275:12 287:20,23 288:20 289:14 296:3 297:4 299:6,20 301:6 304:3 306:6 307:17 317:19 325:22 326:13,15 330:18 331:5,7,12 331:18 332:13,15
Thanks 129:5,19 257:2 284:12 288:11
theoretical 9:7 268:24 275:22
theoretically 253:18 275:11
thick 55:9,10,12 84:10,12,15 109:24 110:3,4 111:14 143:23 298:22 307:10
thicker 326:11
thing 14:13 31:19 76:12 87:12 95:9 122:1 129:24 167:8 169:15 188:5 258:8 298:20 309:17
things 31:17 49:2 50:11 80:17,22 89:19 127:9 134:17 144:11 157:17 162:21 164:8 169:9 174:14 175:1 181:14,22,23 183:20 191:21 201:12 204:13 217:19 258:22 262:23 320:17 326:5
think 5:16 9:6,24 12:12 14:6,23 22:3,19 23:5 25:15 31:19 35:10 35:20 36:21 38:21 38:24 39:6 43:16 44:8 45:23 46:18 47:14,16 49:15 53:21 54:2 58:2,5 58:7 61:21 66:16 68:23 69:6 70:19 72:10 73:1 74:9 75:5 79:4,10,20 80:1,14 83:6 86:11,15 89:4 90:6,12 91:10,12 95:20 99:20 100:5 105:19 106:2,5,9 117:17,24 118:3 127:13 134:22 137:19 141:6 145:7 146:22,22 146:23 147:13 149:8 151:11,20 152:2 154:22 155:20 156:18,21 158:11 160:10 164:6 165:5,11

166:17 171:20,24 173:1 175:21 177:2,14 178:23 180:19 182:5,6,11 183:3,15 184:2,6 184:16,20,24 185:12 186:18 191:19 192:9,13 193:8,17 197:24 198:7,11 199:22 201:8,10,19 202:20 204:8 205:4 214:14 216:19 220:24 222:23 225:4 230:15,15 231:5,7 231:11 234:4 235:7 236:12 238:3,3,8 239:9 240:24 244:6 248:5 249:19 252:22 254:18,20 258:7 265:11,23 267:10 268:19 269:13,18 270:11 271:15 272:14,20 274:13 276:10 279:8,9 280:21 283:9 288:1 289:7 296:12 301:22 307:21 308:3 310:10 311:19 316:18 318:18 319:1 328:23 331:18 332:12

thinking 147:3 150:14 161:5 164:18 166:24 168:5

third 17:24 52:21

Thompson 1:15

thorough 9:10

thought 47:24 87:6 217:5 276:14

thousand 12:22

threats 212:16

three 29:9,11 36:3 54:20 76:10 86:24 86:24 124:18 201:1 207:2 233:24 234:1 242:7 244:9,16 245:14 260:21,23 261:3,20 266:11 266:12 270:16,22 270:22 271:1,6,23 272:4,10 273:4,12 276:23,23 277:20 278:2 304:16 305:2,4 306:4,5 306:18 310:7,10 310:24 314:2

Tiered 25:6

time 25:20,21,24 27:11 40:2 41:9 44:11 46:22 52:14 62:16 64:1 74:16 74:16,19 75:23 76:11,17 94:4,9 94:12,17,21 101:20 114:23 116:19 117:5 134:24 143:18 183:11 200:8 206:12 214:6 215:5,12 218:6 220:15 221:20 223:1,2,8,15,20 224:14 225:6,8,12 227:7,19 229:5,6 230:19 232:11 237:13 246:17 247:5,9 249:23 254:17 283:19 286:18 289:10

timeframe 41:10 117:12

times 16:6 41:19 43:17 47:16 97:19 203:22 270:16,22 270:23 271:1,6,23 272:4,10 273:4,12 277:21 278:2 298:24 313:24 320:6

title 297:15

titled 26:3

today 5:11 128:3 143:7 166:9 196:10 211:23 235:3 281:7 287:15

toe 131:9

told 14:6 37:3 122:19

tons 174:11,22

tool 28:10 278:9

top 26:13 28:22 37:12,15 55:7,7 61:10,11,12 85:23 86:10 94:16 98:17 110:21 111:6,12 112:3 113:17 115:13 116:9 120:4 132:21 137:24 149:18 307:4 326:23

total 64:3 111:23 283:16 284:21 286:22 304:17

totally 82:21

touched 92:11

tourism 210:19

toxic 209:22 211:6

toxicologist 156:4

toxicology 156:7

toxins 208:11 209:13 210:6

trace 191:19

track 272:8

traffic 38:5 197:10

trafficking 75:22

trailed 175:3

trailing 257:16

transcript 1:11

90:13 147:15 235:24 333:12

transform 210:15

transition 210:23

transmittal 297:23

transported 95:18

trash 213:10

travels 83:3

treat 225:18

treating 259:15

treatment 132:2,6

tremendous 207:7

trend 25:12,18 26:4 26:14 27:7 28:15 28:20,21 29:1,16 29:17 44:8,9,10 73:15,18,19 76:17 76:24 77:7 95:22 96:11 123:1,7 281:1,5,12,13,24 282:11 283:2,14 285:13 301:12 302:2 304:7,8

trends 93:17 286:11 303:10,21 324:14

Tritium 131:11

troubling 207:23

true 32:6 128:4 143:15 249:13 333:12

truly 152:8

truth 6:14,14,15

try 237:13 272:23 283:6

trying 104:16 141:16 175:20 203:1 226:10 227:2 247:6 267:11 275:13

turn 7:19 13:11 15:4 20:18 28:18 29:23 33:20,23 37:9 54:7 62:18 69:4 75:4 76:20

88:10 93:3 97:17 98:17 100:18 140:16 158:22 181:3 185:1 221:4 221:16 224:21 226:11,11 227:6 231:4 235:18 238:5 309:21

turned 207:11

turning 16:14 20:23 48:7 51:11 56:23 66:17 67:3 70:10 73:4 77:6 81:22 92:16 93:22 96:9 107:7,9 108:7 109:6 110:15 119:19 120:24 121:19 239:19

Twenty 195:22

Twenty-six 48:18

twice 40:6 41:15,18 223:3 224:16

two 29:2,3,4,10 30:17 40:3 42:11 49:15 67:4 69:5,9 75:20 83:20 86:24 92:14 108:13,22 113:11 118:19 143:16 152:12 171:8 195:23 200:20,22,23 206:3 207:10 218:3 219:8 221:15 230:4 233:15 244:9 250:4,8,13 251:7 261:21 264:10 297:24 300:2 306:23 307:12 310:10,24 311:7 321:11 326:18

two-foot 143:22 148:2 298:22 299:12,17,21

type 14:7 61:5 66:8 72:19 82:6
types 64:5

U

U 7:2 83:3
Uh-huh 44:16 144:1,23 174:2 251:15 252:1 260:1 298:2 304:13
un-watered 54:2
unacceptable 42:23 43:13,15 79:9 105:13
unaware 208:12 320:18
under-drain 59:22 60:1
undergrad 212:17
underlying 99:16
underneath 57:5 61:8 110:24
understand 29:21 82:19 101:3 104:16 112:8 158:17 159:22 203:3 227:9,15 234:19 243:17 252:21 263:8 266:16,19 287:10 292:15
understandable 82:22
understanding 38:2 72:19 99:13 108:11 117:6 132:14 145:19 147:4 156:1 181:11 184:20 202:8 272:22 279:7 313:16 315:22
understands 189:1
understood 68:24 138:11 147:24 151:19 157:18
unexpected 58:21 59:9
unfair 280:16
unfortunately 100:19
unimpacted 35:7
unit 6:7 34:7,12 35:1 61:1 67:18 68:4,5,6,7,10,17 68:21,21 78:10 260:21,23
units 34:20 67:5,7 67:11 82:8 101:18 260:22 314:8
unknown 127:21 252:17
unline 114:7
unnecessary 38:21
unsafe 153:13,15 153:20 154:1,17 154:22 155:4,6,22
unseen 9:2
unusual 127:20 234:4
up- 56:21
updated 16:15,16 16:19,20,22,23 17:2,14 18:4 26:3 26:22 28:20 69:10 76:23 79:8 96:10 105:15 114:23 123:6 128:3 232:6 232:8,19 301:12 311:8
upgrade 106:8
upgradient 8:8,11 8:12 24:15 34:7 35:16,19 36:4 37:20 38:9 39:7,8 39:10,16,23 42:2 42:15 67:1 77:17 77:18 78:3,3,7,10 91:22,23 92:2 102:4,7 103:7,8,9 104:4 118:1,7 122:8,13,14,21 126:13 185:14,19 185:22 189:17 193:15 196:6,9,14 196:15 201:5,16 201:19 202:6,8,23 204:9,22,23 217:15 219:13,24 220:16,18,18,22 220:24 221:6 229:7,10,11,17,23 230:2,3,23 276:5
upgradient/sideg... 70:22
upgrading 12:8 122:4
uplift 56:9,9,21 57:10 58:1,11,13 60:6,14 62:12 85:6,22 86:3 113:3,8,19 114:11 115:12 311:9 326:7
upper 68:3,15,21
use 28:7,8 47:7,23 66:4 81:15,16 86:22 93:6,13 108:5 117:10 121:14 122:22 124:24 126:13 127:19 139:14 147:1 150:12 162:10 163:18 169:11 181:12 214:10 271:16 275:20 278:10 288:14 300:20 320:14
uses 32:4 46:9 77:1 140:6 141:11 142:10 158:16,19 159:13 160:1,5 162:3 172:24 173:16,21 174:16 175:6 184:14 185:13 187:3 190:7 320:8,14 324:17
utilities 125:16
utility 132:16,22

V

vacation 310:1
vague 149:6 180:16 190:4 197:21 278:19 279:2 284:4 291:4,14
vagueness 221:21
valid 281:16 282:20 303:17
value 31:13 32:4,11 32:12,21 227:22 228:14,17,20 233:17,17 247:24 314:19 315:18 327:6 328:7,15 329:8
values 32:14 33:14 33:15 34:3 43:4 223:7 225:21,24 226:3 327:3,10,16 328:19 329:2,4,17 330:4
varies 112:20
various 25:10 78:19 107:20 108:11 132:19 157:6 180:5
vary 12:23 26:2
vast 12:14
Veenbaas 82:16 86:18 88:3 90:14 115:21 182:6
Veenbaas's 87:2 178:15
Vermont 2:15
version 232:8
versus 5:8 8:8 36:22 91:23 147:3 173:23 175:18
vertical 23:13
view 100:21 274:16 317:7
viewed 324:7
vintage 81:9
violation 41:14
visit 209:8
vitae 316:18
voice 130:18 176:7 197:9 217:13 245:10 257:15 270:6
voices 251:2
vs 1:6

W

Wacker 2:11
wait 158:3,3 180:20 226:14,14,15 246:16,17 284:7
walk 213:14 244:15
walking 210:12 212:12
walkway 214:13
Wannier 2:23 5:17 5:18,19 215:10 216:2
want 6:5 32:1 39:11 45:1 49:1 65:11 74:3 92:24 101:3 129:24 130:23 145:2 152:11 165:20 168:16 180:6 185:7,15 192:15 205:12 214:21 215:11 217:14 225:4 227:11 231:2,23 236:5 258:23 259:8 268:18 294:16 302:9 305:20 310:19 311:18

wanted 48:20 60:10 87:17 115:4 120:6 215:19 326:10
warm 207:15
warning 55:11 57:16 84:14 111:13
wash 208:5
Washington 2:16
wasn't 72:21 77:11 123:12 233:20 243:9 248:15,16
waste 46:22 72:11 72:13 104:20,22 127:10 132:2,5 149:24 150:2,12 150:15,17 151:2,2 152:3,13 153:10 211:7 213:10 298:10,16 299:11 299:16 300:1 323:22,23
wastes 50:10 153:4
wastewater 208:4
watch 114:6
water 5:10 9:19,20 9:23,24 10:1,14 10:21 11:6,8 12:7 12:9,15 13:4 23:16 31:5,6,14 31:14,16 35:7 38:7 42:24 43:2,4 43:6,6,15,17,19 50:19 54:2 56:16 57:7,16,21,23 59:10,14,16 60:2 60:10 61:13 63:18 63:24 65:6 68:5 68:14 78:20 79:9 79:11 81:16 82:24 83:3,18 85:4,11 86:6,9 87:10 105:19 108:6 109:5 113:8,9,11 113:13,18,23 114:8 115:1,11 116:13,15,19 117:4 124:24 125:3 149:10,16 149:17 153:3 172:4,13,13,20 207:5,15 208:5 249:5 253:6,9,14 253:20,22 254:6 255:22 258:4 263:3 265:18 267:5 296:9,18,24 300:1,3,4,9,14,15 300:17 301:5 303:18,19,21 306:22 318:15 324:16 325:14
watering 62:18
Waukegan 14:20 81:1,3,18,23 82:3 83:24 84:5 85:9 86:21 88:1,16,20 90:2,4,8,18 91:18 91:23 93:5,14,17 96:11 98:6,11 100:22 101:14 102:4,8,20 105:6 105:9,11,20,23 184:12,13 185:14 185:17 188:20 192:8,16,23 193:23 194:10 195:7,23 200:14 206:10,18,18 207:4,11,22 208:16,20 209:6 209:10,15,20,21 210:1 212:4,21,21 213:7,15,23 214:7 214:15,16,17 227:7 238:7 239:20 241:10 245:3,16 246:22 249:21 259:6,7,10 261:12 285:18 286:7 287:12 293:16 304:24 307:19 320:23 321:4 323:15 327:13 328:20
way 15:1 24:15 28:10 47:2,9 64:4 68:2 83:13 93:11 94:20 124:7 126:17,18 127:24 135:22 166:21 180:14,24 192:13 203:10 211:6 217:9 243:21 258:6 265:16 269:20 270:19 278:18 286:18 291:20 311:3 316:10 323:3,20
ways 180:15 323:6
we'll 48:2 81:21 106:18 217:7 244:2 259:7 288:20
we're 14:12 15:14 15:14 19:15 28:14 71:21 73:20 74:24 96:2,2 100:14 101:4 103:1,13,14 104:11 139:3 145:21 160:3,4 167:15 172:19 184:17 216:10 227:2,3 235:2 250:24 269:23 286:1 288:1 291:2 294:4 295:5 298:7 302:8 314:9 320:18 329:20 331:22
we've 9:7 15:16 20:23 21:1 24:4 25:15 35:12 41:18 43:16 45:3,7 51:8 72:16 73:6 84:16 90:19 92:11 106:13 108:8 111:3,16 115:16 119:10 126:10 137:7 139:24 140:1 141:15 143:6 146:3 162:7 163:1,4,23 164:2 169:9 185:24 190:17 192:13 204:11,20 210:3 219:9 232:4 262:22,24 273:13 277:1 298:19 320:10
weathering 148:20
web 100:6
website 98:7 307:21 308:8
Webster 2:20
week 90:10 332:14
weekly 213:8
weight 57:15,21 58:12 113:9,15 325:13
wells 7:24 8:5,10 10:11 11:7 13:7 21:8 23:2,3,18 24:17 26:2 29:2,3 29:4,9,9 31:14,21 31:23 33:7 35:17 35:19 36:1,4,5,20 38:9,13,15 40:14 43:19 44:3 66:19 66:21 70:18,20,24 71:3,22 73:10 75:13 76:4,10,12 90:18,23 91:2,21 94:2,7,11 96:17 100:23 101:11,23 102:1 117:19,22 117:24 118:7 121:7 122:2,4,5,7 122:8,15,18 123:9 123:10,13 124:4 124:22 125:3 157:16 187:16 189:18 191:2 192:7 193:22 194:17,19 195:7 196:7,9 199:4,5 199:17,20 200:10 201:1,4 217:23 218:3 219:8,13,15 220:1,1,8,18,19 221:2,9,12 229:7 229:23 230:1,4 238:8 244:19,24 245:4,16 263:4 276:8 283:13,15 283:16,18,24 284:6,18,21,23 285:4,5,6,9,11,11 285:12,15,19 286:23 287:6 292:3,4 304:6,8 304:17 305:2,4,5 305:12,16 306:1,3 306:4,5 317:21,23 318:23 319:2 321:5
went 27:9 44:7 47:23 59:1 146:6 323:9 327:8
weren't 133:8 215:18 322:23
west 2:2 68:12 82:9 84:1 92:9 100:22 186:6 189:18,20 192:22 193:2,2 198:24 306:21
western 71:1 163:18
Wheel 132:11
white 238:16
whites 238:19
wider 69:20
willingness 211:1
Wilmette 2:7
windows 209:7

Wisconsin 132:22
witness 6:16,17 7:3 17:16 23:24 64:11 64:13,21 69:1 138:23 140:23 142:23 144:20 149:12 152:20 154:10 156:18,21 158:1,10 159:16 174:20 175:5 179:23 180:18 181:19 189:5,13 190:5 195:16 197:23 198:6 222:1 225:11 240:9 245:12 246:18 248:10 256:9 260:19 265:12 270:10 277:19 279:5 284:5 294:19 302:23 317:13,19 317:20 322:2
witnesses 51:12
women 207:8
wondering 150:23 153:9 287:10
word 64:17 197:24 198:9 273:24 320:3
wording 173:4
words 25:23 64:19 116:12 201:14
work 61:12 133:24 206:17
worked 125:15 127:8 134:23 316:22
working 133:10,14 212:22 213:10
works 203:1
world 200:2 322:17
worry 184:23
worrying 213:17
worse 28:12 124:8 286:11 287:17,22 303:17
worst 115:4
worth 15:17,17 209:3
wouldn't 24:4 199:15 218:9 245:20 256:1 265:4 275:24 276:24 296:19,20 316:24
write 288:8
written 168:21 215:21,24 223:21 288:9 332:5
wrong 58:7 120:3 134:15
wrote 239:11
Wyoming 163:18

X

X 4:1,14 7:5 129:20 240:15,16 312:15 326:20 330:20
xxx 298:23

Y

Y 7:2
yeah 19:10 20:10 37:12 49:12 75:10 75:20 78:4 83:22 88:12,14 134:12 134:21 138:7 157:18 179:9 187:2 199:24 200:24 203:9 219:8 222:9,11 223:22 233:23 234:4 249:4 253:13 266:1 267:21 272:22 278:22 283:10 289:23
year 18:13 26:15 26:16 42:10 201:4 321:7
year's 15:16,17
years 9:8 10:17 17:21 35:12 42:11 45:24 53:11,15 54:6 82:13 85:14 107:17,18 114:23 127:22 134:23 136:3 160:1 207:2 290:18 309:15 316:19 321:11
Yep 130:19 239:10 255:12
yesterday 5:13 7:7 7:13 11:1,14 13:15 14:23 19:8 19:10 31:20 32:11 35:15 38:16 45:21 46:1 53:24 55:18 60:11,18 65:9 71:24 77:17 87:19 91:6 128:4 143:11
young 207:8 212:11
younger 209:9

Z

zero 249:12 292:15
zone 24:9,12,18 41:13 68:3 73:8 73:12 121:2,8 200:13
zones 24:20

0

0.003 276:22 328:4
0.049 249:3
0.050 248:21
0.2 262:11 266:1
0.6 262:11 265:19 265:22 266:1,2,8
0013 250:1
002 104:1
003 328:2
006 248:18
009 250:1
01 249:24
019094 34:1
07 104:1

1

1 5:13 23:21 24:1 30:9 37:13 40:15 44:7 70:21 80:7 88:17,18 89:7 91:2 94:18 104:1 118:1,7 178:8 196:7 199:17 200:10,19 201:2 248:8,8 271:20,20 318:17,22 319:3 319:12
1-N 108:24 109:1,3 120:5
1-North 108:18,20 108:23 178:1,9 311:1
1-S 108:24 109:1,3
1-South 108:18,20 108:24 311:2
1.3 113:24
1:50 205:16
1:55 205:24
10 3:3 8:10,12 35:22 76:5 144:17 144:24 145:4 199:5 327:20
10:45 106:13
100 2:2 184:3 244:12 245:19 309:15
1000 2:15
1004 2:7
11 8:10,11 35:20,23 39:12,18,20 181:6 304:17
11-500 2:3
11:00 106:18 107:1
11:40 129:15
1100 2:16
12 32:4 56:20 76:5 94:8 111:12 207:10
12-inch 55:9,10 84:10
129 4:3,4,16,16,17 4:17,18,18,19,19 4:20,20
13 76:4,4 207:3
13-15 1:6 5:9
1300 2:21
13th 332:4
14 94:8 199:5
15 22:4 94:8 203:22 288:20
16 17:6 77:17 91:2 94:11 145:13,18 283:17 284:6,21
1600 2:11
17 138:5
18 113:15 138:5 298:1
18-inch 307:10
19 7:19 8:3 40:20 40:22 76:5
19- 134:22
19-acre 98:14
1920s 50:1
1923 81:9
1955 45:23 107:17
1960s 50:7
1965 45:24
1977 82:11 83:6 109:23
1978 52:22 55:17
1982 133:22
1990s 99:5
1997 82:10 101:22
1998 36:8 98:20 101:22 183:8 323:17
1999 46:4 98:20

2

2 5:11 70:24 91:2 103:21 110:16

118:1,7 150:10 200:10 260:2 271:19 318:23
2-S 108:14 111:8 111:10 112:23 113:18
2-South 108:14 110:6
2.0 94:18
2.9 219:19
2:00 332:10
20 13:12 85:14 177:2 195:21 203:22
20005 2:16
2000s 82:12 106:7
2005 21:13 294:23
2007 206:11
2009 117:12 134:22
2010 35:13 40:3 53:3 77:2 109:4 123:15
2011 40:4
2013 53:3,14
2014 17:13,13 18:14,15 41:9 204:3 232:15,22 239:17 249:17 254:5 260:11 261:12 272:13 273:6 274:11 298:1 327:13 328:20
2015 18:11 41:10 61:17 73:14 107:24 120:5 200:4 203:18 321:7 327:15
2016 17:13 18:1 232:23
2017 16:21,24 17:14 18:3 26:23 27:2 77:2 102:1,2 118:12 123:15 232:19,23 328:22
2018 1:17 5:11,13 332:11
202 2:17
205 4:4
206 4:5
207 144:14,15 145:14
208 144:15,17,21
21 15:5 16:16 207:3
2101 2:20
211 4:5,6
215 4:6
216 4:7
22 16:22 18:7,17 200:4 327:15
222 150:7
223 150:10
226 181:4
23 20:19 21:3 162:1 294:18 312:9
24 26:3 111:2 115:8 173:12 219:19 220:11,12
25 142:13 301:7,9
251-5255 3:4
26 9:7 48:8,12
263-4453 2:17
268-P 194:9 249:20 260:14,16 326:22
269-P 328:23 329:1
27 9:7 11:16 33:23 40:11 51:11
28 51:16 332:11
280 228:21
282-9119 2:8
284 177:10
29 11:24 26:5 36:16 37:13,15,21 40:24 42:19,22 54:8 157:7,12 163:13 164:21 294:1
2nd 1:16

3

3 70:24 91:2 110:17 118:1,7 122:7,8 200:10 271:20 314:3 318:23
3-S 108:14 111:11 117:11
3-South 108:15 110:7 112:21
3.5 103:22
3:30 289:4
30 54:6 56:24 85:14 203:19 312:8
30-E 178:3
30-inch 115:7
312 2:4,8,12 3:4 4:7 4:8
32 58:14
326 4:8,9
33 66:17
330 4:9,10
332 4:10
333 4:11,11
34 67:4,7,11 68:3
34311 297:12,16
35 2:11 67:7,12,14
36 110:3 112:9 324:24 325:4
3600 3:3
37 158:23
370 222:23 224:13
38 70:10
380 228:22 229:2
39 73:4

4

4 70:24 91:2 94:7 118:7 122:4,7,8 196:7 199:18 200:10,10 318:23
40 16:9 92:20 162:1 203:19 220:12 316:19
400 230:20
405 33:21
41 75:6 161:23
410 195:20
411 195:5,6 218:12 226:18,21,23 227:6 320:23
415 2:22
42 76:21 283:8
42352 178:4
43 77:6 140:17 141:2,4 283:8,9 304:2
44 81:2
440 59:7
441.5 59:5
445 56:19
45 81:22 106:13
45512 221:22 222:5
457.5 56:18
46 82:2 137:15,17 137:19,23 165:23 165:24 168:11
47 83:23 306:7
472 97:23
48 90:17 108:22
48961 131:7,8 134:20
48962 132:8,17
49 91:4 109:1 249:10,14
49569 177:15

5

5 4:2 70:24,24 94:8 94:11 118:1,7,12 122:3,4 187:10 203:18 288:3 289:19 318:24
5-1 233:9 246:10 247:16,17,21,23 248:7,11,17 254:3 254:19 255:13
5-2 233:10 247:18 259:20 274:6
5-4 16:15,23 18:17 69:10 119:11 232:2 233:2,3,7 238:5,7 259:5 261:9 278:6
5-5 16:17,17 69:10 119:9 232:2 233:7 241:10 242:8 244:4,5 246:9 247:13,21 256:22 278:6
5/2017 67:19
50 19:21 45:24 69:21 92:20 107:17 109:3 119:2,16 127:22 159:24 177:2 250:12 255:14 320:7
5026 288:5
50260 288:5,6 289:18
510 297:5,10
51281 97:18
52 93:3
528.5 112:19
53 93:22
54 96:10 173:6,10
55 96:10,13 304:24
56 100:18,20 102:23 103:13
57 102:24 103:14 188:7,8,14
579 310:17
579.0 310:13
58 107:9 185:1 187:7,8
581 112:21
582 85:2
582.5 112:24
583 85:4 306:22
584.0 307:11
585.5 84:23 307:10
58963 131:20
59 187:10
5th 332:6

6

6 94:8 103:24 118:7

159:4 166:1 219:15,18 220:8 260:2 267:2 271:19
6.3 219:19
60 16:9 19:21 69:21 84:12 92:20 119:2 298:17
60091 2:7
604 37:10
60601 2:3,12
60603 3:4
60s 50:7
61 110:16 309:21
62 107:18 117:18
620 25:5,7
623 97:12,13,13,22
624 97:2,5,7
63 118:10
64 118:19
640 222:18
65 118:19
66 119:19
662 332:6
666 228:24
67 121:1
69 121:19
690 222:21 224:10 228:4 230:20

7

7 4:2,3 94:8,11 227:18 228:3 321:5
7.4 122:2
70 123:5,5 320:7
71 123:20 305:22
740 25:5
75th 32:18
79 235:18,20
795-3712 2:12
7th 332:9

8

8 8:11,12 12:8,11 12:16 35:22 41:1 41:7 42:1 87:18 88:10 122:7,10 144:17,24 145:4 188:14 219:15,17 219:18,19 220:8 220:11 222:24 227:18 228:17 229:9,9 321:5,6
80 127:22
80-year 320:8
80s 207:1
814-6983 2:4

9

9 8:10 12:4,7,10,15 36:15 76:4 104:18 118:1 150:9 219:16,17,18,19 220:8
9-040 1:16
9:00 1:17
90 32:23,24
90- 39:1
900 4:16 128:9,21 129:1 130:2,4
901 4:16 20:22 48:7 91:5 107:9 128:22 140:19,20 294:18 301:8
902 4:17 128:22 287:24 288:1,2,4 289:17 301:8
903 4:17 128:22 140:21,22 141:3 231:21 289:17
904 4:18 128:22 231:11,13,18 233:4
905 4:18 128:22
906 4:19 25:16 128:22 281:2
907 4:19 79:1 105:16,16 124:15 128:22
908 4:20 29:24,24 39:3 40:20,22 128:9,23 129:2
909 4:20
90s 308:11 309:3
90th 32:18
94612 2:21
977-5637 2:22
9th 332:7

Exhibit 31

Electronic Filing: Received, Clerk's Office 06/20/2023

ILLINOIS POLLUTION CONTROL BOARD

SIERRA CLUB,	)	
ENVIRONMENTAL LAW AND	)	
POLICY CENTER, PRAIRIE	)	
RIVERS NETWORK, and	)	
CITIZENS AGAINST RUINING	)	
THE ENVIRONMENT,	)	
Complainants,	)	
vs.	)	No. PCB 13-15
MIDWEST GENERATION,	)	
Defendant.	)	

TRANSCRIPT of the PROCEEDINGS taken before HEARING OFFICER BRADLEY HALLORAN at the James R. Thompson Center, 100 West Randolph Street, Room 503, Chicago, Illinois, on the 12th day of June, 2023, A.D., at 9:00 o'clock a.m.

Reported by: Kari Wiedenhaupt, CSR

License No.: 084-004725

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RICHARD GNAT	
By MS. KRISTEN LAUGHRIDGE GALE	12
By MS. FAITH BUGEL	74
By MS. KRISTEN LAUGHRIDGE GALE	142
DOUGLAS DORGAN and MICHAEL MAXWELL	
MS. JENNIFER T. NIJMAN	164

E X H I B I T S

NUMBER	MARKED FOR ID
RESPONDENT'S EXHIBIT	
No. 1514	26
No. 1515	40
No. 1516	41
No. 1517	59
COMPLAINANTS' EXHIBIT	
No. 1518	90
No. 1519	108
No. 1520	129
No. 1521	159

RESPONDENT'S EXHIBIT
No. 1701 166
No. 1702 203
No. 1703 258

ADMITTED INTO EVIDENCE
RESPONDENT'S EXHIBIT
No. 1514 28
No. 1515 49
No. 1516 49
No. 1517 64
COMPLAINANTS' EXHIBIT
No. 1519 119
No. 1520 134
No. 1521 162
RESPONDENT'S EXHIBIT
No. 1703 261

HEARING OFFICER HALLORAN: All right. Good morning, everybody. My name is Bradley Halloran. I am the hearing officer with the Illinois Pollution Control Board. I'm also assigned to this case, PCB 13-15. It's an enforcement case. We are in the liability phase. This case was continued on the record from May 19th, 2023. Today is June 12th, 2023.

And before I go any farther, would the parties like to introduce themselves, please?

MS. BUGEL: Yes. I am Faith Bugel here on behalf of the Sierra Club, and with me is Mr. Abel Russ with Environmental Integrity Project representing Prairie Rivers Network.

HEARING OFFICER HALLORAN: Thank you. Ms. Nijman and Ms. Gale?

MS. GALE: Yes. Kristen Gale here with Jennifer Nijman and Drew Nishioka on behalf of Midwest Generation, LLC.

HEARING OFFICER HALLORAN: Thank you.

Do we have any housekeeping matters before we proceed?

MS. GALE: Yes, a couple. Unless you want to go first?

MS. BUGEL: One housekeeping matter we had was an e-mail that I had sent you on behalf of both Complainants and Respondent seeking an agreed extension to the deadline for filing all electronic exhibits. We were jointly seeking 14 days after the last date of hearing so that we could file electronic exhibits all at once.

HEARING OFFICER HALLORAN: Okay. Yeah, I saw that. I was kind of waiting for a motion, since you did a motion on the extension to do the interlocutory appeals.

But there is no objection. I will allow it. I will look for the e-mail, and I will put that in an order after this hearing.

MS. BUGEL: Very good. Thank you.

HEARING OFFICER HALLORAN: Thank you.

MS. BUGEL: And just one point of inquiry on electronic exhibits, would it be possible for us to file them by providing some sort of flash drive or jump drive instead of through the website? I just -- I am -- last time

that is how we handled it, and I don't know how it will work to upload the volume of exhibits we have, so --

MS. GALE: I mean, if I might suggest, maybe we jointly contact the Clerk, since he handles that and see what he thinks?

HEARING OFFICER HALLORAN: Yeah, if you could.

MS. GALE: Yeah.

HEARING OFFICER HALLORAN: Because he's the guy who does all the work on that, Don Brown.

MS. GALE: Yeah.

MS. BUGEL: Okay.

HEARING OFFICER HALLORAN: I don't see where it would be a problem, but, you know, who knows.

MS. BUGEL: Okay, yeah.

HEARING OFFICER HALLORAN: I don't know. Thank you for bringing that to my attention. I know there is a lot of stuff.

Anything else?

MS. GALE: Two things.

One, Mr. Hearing Officer, our

original order of witnesses was Mr. Gnat, and then Ms. Sharene Shealey and then our experts. Ms. Sharene Shealey woke up this morning very ill, and she is hopeful she will be able to make it, but we need to -- we may have to start with Mr. Gnat, finish him, and then we may have to move on with the -- our groundwater experts, simply because I can tell you, from what she tells me, we don't want her here right now.

HEARING OFFICER HALLORAN: That's unfortunate.

MS. GALE: Yeah.

HEARING OFFICER HALLORAN: Okay. That -- that will be fine.

MS. GALE: Okay.

HEARING OFFICER HALLORAN: That will be fine. And I think you have one more thing, Ms. Gale?

MS. GALE: I do. Thank you, sir.

At the end of the last week, I went through pictures that are in Exhibit 1513 with Mr. Gnat. I -- the Complainants requested, and I agreed, to modify the pictures, because the bates numbers were within the colored part and

move the Bates numbers to the bottom.

I unfortunately also misread my own notes when I read in the Bates numbers from my notes, and so I just want to correct for the record that on -- in the transcript of that day, which is May 19th, on page 209, line 3, I identified the photo as -- incorrectly identified the photo as 108351. The correct Bates number for that photo is 108350. The next photo on the same page, transcript page 209, line 21, I incorrectly identified the photo as 108350. The correct Bates is 108352.

On page 2 -- excuse me. On transcript page 210, line 12, I incorrectly stated the Bates number as 108352. The correct Bates number is 108375. And finally, on transcript page 210, line 20, incorrect Bates number was 108375. The correct number is 108386.

We have provided the pages to Complainants' counsel, Mr. Hearing Officer, and Ms. Hutchins -- it's not Hutchins. Your name is not Hutchins. Horton. Thank you.

And so we are asking that just simply take out the photos that were in Gnat

Binder No. 2, and replace them with the photos that have the Bates numbers legible on the bottom.

HEARING OFFICER HALLORAN:

Ms. Bugel?

MS. BUGEL: No objection.

HEARING OFFICER HALLORAN: Great. The record will so reflect. Thank you so much.

Anything else?

MS. GALE: Nothing from us.

HEARING OFFICER HALLORAN: All right. I think Mr. Gnat is up here. He is in the middle of Ms. Gale's direct. If you could raise your right hand, Mr. Gnat?

THE WITNESS: Good morning.

(Whereupon, the witness was duly sworn.)

HEARING OFFICER HALLORAN: Thank you, Mr. Gnat.

Ms. Gale, you are up.

WHEREUPON:

R I C H A R D G N A T

called as a witness herein, having been first duly sworn, deposeth and saith as follows:

D I R E C T E X A M I N A T I O N (Cont).

by Ms. Gale

Q. Thank you.

Good morning, Mr. Gnat.

A. Good morning.

Q. I just went through discussing the photos we -- that we discussed of the northeast area at Joliet 29.

Do you recall that discussion?

A. Yes, I do.

Q. And that -- you took those photos on one of your inspections of the northeast area, right?

A. Correct.

Q. And when did you start those inspections, about?

A. Somewhere in 2009, or so.

Q. And when you first started the inspections in 2009, did you see ash in those inspections?

A. Yeah. There were some areas that had some bare ground and some rural development that I identified, and within that I saw soil, and I saw some evidence of the ash or cinders within that in the -- with the soil itself.

Q. And then other than what you identified in your report of ash mixed in with the soil itself, have you ever seen ash anywhere else?

A. No, I have not, outside of the areas that we identified over our inspections and then repaired, correct.

Q. And we covered this just a couple weeks ago, but -- well, obviously you have been to Joliet 29 Station, right?

A. Yes, I have.

Q. And can you just describe the surrounding area of Joliet 29 Station, please?

A. Sure. The -- to the -- to the south is the Des Plaines River and the intake channel for the plant. To the east is the Brandon Lock and Dam. To the north is Channahon Road followed by various small commercial, light industrial type activity, and then to the west is a former industrial area, which has now been redeveloped.

Q. And it's redeveloped. Do you know sort of about the redevelopment, where it's at?

A. I believe that's still industrial use. I don't know if it's a trucking terminal or not, but it's certainly still industrial use.

Q. And you mentioned the Brandon Road Lock and Dam. What is that?

A. The lock and dam is -- the dam itself is not a hydroelectric dam or anything. I believe it's a structure that was put in place along with other lock and dams for flood control, and it also allows for barges and boats to move through -- through the Des Plaines River area there.

Q. And so when you do your inspections or you're at Joliet 29 Station, do you see boats and barges on the river?

A. Yes, on a regular basis.

Q. Okay. I want to go back and talk about your testimony in May about the northwest area at Joliet 29, and I believe you stated you did the sampling there to determine whether it was coal combustion byproduct; is that right?

A. Correct.

Q. And why was that sampling done?

A. There was a project being anticipated by the station to construct a wind break or a windshield -- excuse me -- for the coal pile area, and an RPF did come out for that, and my company did bid on that.

Q. Now, I want to turn back to our discussion about the chloride in the groundwater at Joliet 29.

Do you recall that discussion?

A. Yes.

Q. And does -- in May we discussed that Channahon Road is directly -- and you just mentioned that Channahon Road is directly adjacent to the north of Joliet 29 Station, right?

A. Correct.

Q. And what is spread on roads in winter in Illinois on roads like Channahon Road?

A. Road salt.

Q. And, to your knowledge, what is road salt composed of?

A. My understanding, it's primarily a calcium carbonate-type material.

Q. And --

A. Or calcium chloride.

Q. And then we touched upon the permit applications. Did KPR -- and I believe you testified earlier in May that KPRG acted as the clearinghouse for the Joliet 29 operating permit application; is that right?

A. Correct.

Q. And, to your recollection, approximately how big was that operating permit application?

A. Oh, hundreds of pages. I believe we had it in a three-inch or so binder per copy.

Q. And how many hours was it just for KPRG to prepare that application?

A. KPRG hours alone on the operating permit was into upper hundreds of hours easily, and similar for the construction permit application, even though some information is the same for those, but there is also other information that's required in the construction permit. So for that as well, into the hundreds of hours.

Q. And as you were the clearinghouse, and I think you testified to this -- the operating

permit -- excuse me.

The operating application had documents from other consultants, right?

A. Correct.

Q. And so your estimate of hundreds of hours doesn't include their work?

A. That's correct, yes.

MS. BUGEL: I'm going to object to the leading nature of the questions.

HEARING OFFICER HALLORAN: Sustained.

BY MS. GALE:

Q. And you mentioned the construction permit application. How big was that -- the Joliet 29 construction permit application?

A. The same. Hundreds of pages, and I believe the three-inch type binder, if not larger. Yeah, three-inch binder.

Q. And just so we make the record clear, approximately how many hours did it take KPRG to collect the Joliet 29 construction permit application?

A. You know, into the upper hundreds of hours.

Q. All right. I'm going to move on to Powerton, and if you could open to your Gnat Book 3, please.

Ready, Mr. Gnat?

A. Yes.

Q. Okay. Turning to the first tab, this is the maps from Exhibit 1307. Can you describe what those map -- that map is, please?

A. Sure. The first map is a groundwater contour for the silt and clay layer unit for November 21st, and the second one is for the gravely silt -- I'm sorry -- the gravely sand unit for November 2021.

Q. Okay. You said the first map is for the silty clay unit. What is -- what is that?

A. Well, when we go through the boring logs, there is a discontinuous unit that underlies the Ash Surge Basin, the Service Water Basin, Metals Cleaning Basin, that general area.

There is a silty clay layer that underline -- underlies it that is not present a little bit further to the east. It was not present further to the north.

So it's not under, for example,

the Former Ash Basin. So that unit sits above those -- those basins, and basically water, even though it's hydraulically connected to the sand and gravel underneath it, it doesn't allow water to percolate down quite as fast, and so the water levels are a little bit higher in that unit.

Q. And I think you misspoke. You said that unit sits above the basins. The unit sits --

A. Below the basins, correct.

Q. Thank you.

And so for the silty clay unit, which direction is the groundwater?

A. Groundwater is flowing to the west.

Q. And so for the sand unit, which direction is groundwater?

A. Groundwater flows in a northerly direction.

Q. And to clarify, what -- was one unit on top of the other?

A. Correct. And they are hydraulically connected. So there's no -- if you drill through the silty clay layer, it's -- you encounter the water table and the silty clay layer, and when you get down to the base of it and into the sand and

gravel, it's still saturated. There is no break or unsaturated material between them.

Q. And how do you know, or how would -- how -- well, I will say it this way.

How did -- was it discovered that the silt clay unit existed and the sand unit existed?

A. Based on boring log interpretations.

Q. And can you describe what's happening? You say they are hydrologically connected. What does that mean?

A. That, like I said, the -- once you encounter the saturated zone within the silty clay layer, when you get through the base of the silty clay layer into the underlying sands, it's still saturated.

So there's no indication that this is a perched water zone or anything. It's just in an area -- since it's a silty clay area, it's just not letting the water percolate down through quite as fast as if you go to the west where you don't have that layer, rain falls down, and it's more of a sandy unit, and it percolates down much, much quicker.

Q. And KPRG has submitted -- well, how long has KPRG submitted the groundwater reports to the Illinois EPA for the Powerton station?

A. I believe we started doing those in 2012. Yeah, 2012/2013 timeframe.

Q. And are these maps in those reports?

A. Yes, they are.

Q. And has Illinois EPA ever disputed the -- your interpretation here of the two units?

A. No, they have not.

Q. And you said from 2012. So -- and so since 2012, you've reviewed the groundwater levels?

A. Yes, I have.

Q. Okay. And, to your knowledge, do you recall that the Ash Surge Basin was re-lined?

A. Yes, it was.

Q. Do you recall when?

A. I believe somewhere in the 2012 timeframe.

Q. 2013?

A. 2013, correct.

Q. And in your review of the groundwater elevations from 2012 to present, have

you seen the groundwater levels drop?

A. Well, the groundwater levels fluctuate up and down, depending on the season, obviously, and precipitation and so on, but what we did not see is as the ash basin was pumped out and basically dewatered for the construction purposes, we didn't see an effect on water levels around the basin.

So one would -- one would interpret that -- if the basin was leaking and they dewatered it for an extended period of time for re-lining, you would see water levels drop, because you have dewatered the basin. We did not see that. And then conversely, when -- once the liner was placed back in and water placed back into the -- you know, the Ash Surge Basin comes back online for slurry and ash. You know, again, if that basin was compromised for some reason, it's a brand new liner, but you would expect then if, in fact, that was associated with the basin leaking, you could see water levels come up again.

And we didn't. We just saw standard, normal fluctuations in groundwater over that entire construction time.

Q. So if you see standard fluctuations in groundwater, what does that mean to you?

A. That the water levels that we are seeing, those slightly higher water levels within the clay, they are, in fact, the result of that this is a slightly less permeable material. So it's holding up the groundwater. It's not -- not peculating down quite as fast, but certainly not as a result of adding head from water in the basin.

Q. And we discussed this in May related to Joliet 29, but to revisit it for Powerton, in 2010, how was the -- what constituents was the groundwater sampled for?

A. In 2010, that was for the dissolved metals and inorganics that were identified by Illinois EPA under their request to do the voluntary hydrogeologic investigation and groundwater sampling.

Q. And then -- and at Powerton, did you also assist in the requirements for the Powerton compliance commitment agreement?

A. Yes, I did.

Q. What did you do?

A. I assisted in pulling together the information to establish the groundwater management zone that was agreed upon between Midwest Generation and Illinois EPA, as well as, I believe, an ELUC for the property, environmental land use control, ELUC, E-L-U-C.

Q. And, to your knowledge, the groundwater -- is the groundwater management zone still in effect?

A. That's my understanding, yes.

Q. Same question for the ELUC, the E-L-U-C. Is the ELUC still in effect?

A. Yes, that's -- that actually sits right on the deed.

Q. And then in -- again, similar to Joliet 29, in 2015 at Powerton related to sampling of the groundwater, what happened?

A. In 2015, the federal CCR rules came into -- into play, and under that program, the requirement was for total inorganics. So you no longer filter it in the field. It's just a total metals analysis, and the list of parameters, slightly different.

Q. I want to turn to the service water

basin at Powerton.

Recently, did KPRG conduct an investigation of the contents of that pond?

A. Yes.

Q. And what was that investigation?

A. They did -- we did a bathymetric survey for that, as well as some sampling of the sediment within the basin and analyzed it for physical parameters to evaluate whether or not it might, in fact, have some component of ash to it or not.

Q. And what were -- what was the conclusion of the investigation?

A. Based on a bathymetric survey and on the sampling, the nature of the materials of the sediments accumulating -- first off, there wasn't very much accumulating, and the nature of it was not ash-like, so to speak, and my understanding is that the Illinois EPA agreed with that conclusion.

Q. Now, I want to turn to the East Yard Runoff Basin. Are you familiar with that basin?

A. Yes.

Q. What is it?

A. That is a located to the south and

slightly west of the Ash Surge Basin and the Ash Bypass Basin, and my understanding is that is primarily surface runoff, a stormwater runoff retention pond.

Q. And under the CCAs, did you assist in the complying with the CCAs related to the East Yard Runoff Basin?

A. Yes, we did.

Q. What did you do?

A. I believe under the CCA we had to sample it for eight or nine rounds of sampling and analyze it for parameters specified, and we did that and submitted that to the Agency.

Q. And by sampling, what did you sample?

A. The water. The water -- I don't remember if it was the intake or the outfall from the East Yard Basin.

Q. Can you turn to the next exhibit in your book marked for identification as 1514?

A. Yes.

(Whereupon, Respondent's Exhibit No. 1514 was marked for identification.)

BY MS. GALE:

Q. And it start at Bates No. MWG13-15_48711. What is this document?

A. This is the Quarterly Groundwater Monitoring Report for Powerton Generating Station dated April 24th, 2015.

Q. And did KPRG assist in preparing this document?

A. Yes, we did.

Q. Can you turn to Table 3, which is located at 13-15_48742?

A. Okay.

Q. And what is Table 3?

A. Table 3 is a summary of the analytical data for the sampling of the East Yard Runoff Basin, and nine rounds of sampling from February 2013 through February 2015 on a quarterly basis.

Q. And what did the -- excuse me. What do the samples show?

A. The samples to us indicated that the water in the East Yard Runoff Basin is, in fact, stormwater runoff. It is not water that one would encounter in an ash pond.

MS. GALE: Mr. Hearing Officer, we move to admit Midwest Gen's Exhibit 1514.

HEARING OFFICER HALLORAN: Ms. Bugel?

MS. BUGEL: No objection.

HEARING OFFICER HALLORAN: Thank you.

Exhibit 1514 is admitted. No objection.

(Whereupon, Respondent's Exhibit No. 1514 was admitted into evidence.)

BY MS. GALE:

Q. Mr. Gnat, we discussed your work for Midwest Gen pursuant to the federal and state CCR rules in May about Joliet 29.

Do you also do that work for Midwest Gen at the Powerton Station?

A. Yes, we do.

Q. And so, generally speaking, for the -- under the federal CCR program at Powerton, what do you do?

A. We -- we collect the groundwater on a quarterly basis, and those are for, again, as I

mentioned, for total inorganic, total metals as specified in the rule, and so those are not field filtered, whereas when we collect the CCA samples from the same wells at the same time, for those analyses we field filter them prior to placing them into the acid preserved jars.

Q. And under the federal program, you collect that groundwater information. Do you also prepare reports based upon that?

A. Yes, we do.

Q. And under the Illinois CCR program at Powerton, generally speaking, what does KPRG do?

A. The same thing. The state rule is a little different from the federal rule, in that they don't recognize detection monitoring versus assessment monitoring. The Illinois EPA just requires the full -- what would be considered the Appendix III, Appendix IV parameters of the federal rule. They just consider that one -- one list of analyses, and those are required on a quarterly basis, plus turbidity, which is not required under the federal rule.

Q. And what kind of reports do you

prepare under the Illinois CCR rule?

A. We prepare -- under the state CCR rule, within 60 days of your last day of sampling, you have to provide a summary of the data, and so we refer to those as our 60-day reports, and so we provide those, as well as then an annual groundwater monitoring and corrective action report as required under the rule.

Q. And for the Powerton Station, did KPRG prepare any permit applications?

A. Yes, we did.

Q. So what permit -- so what permit applications did you prepare for Powerton Station?

A. We prepared the operating permit for the Ash Bypass Basin and Ash Surge Basin, the initial application for the initial operating permit for the Former Ash Basin, as well as now under the state rule, the Metals Cleaning Basin is also involved, and we prepared the operating permit for that and construction permit for that as well.

Q. So for the operating permit application for the Ash Surge Basin, Bypass Basin, and Former Ash Basin, did you act as a

clearinghouse similar to your description of Joliet 29?

A. That is correct, yes.

MS. BUGEL: Objection, leading questions.

HEARING OFFICER HALLORAN: Sustained. Could you rephrase? Thank you.

BY MS. GALE:

Q. Sure. For the operating permit applications for the Ash Surge Basin, Bypass Basin, and Former Ash Basin, how did -- what was KPRG's role?

A. KPRG's role was kind of like a hub or a clearinghouse where we would -- for the sections that other consultants were involved with, for example, structural integrity and so on, all of that would be -- being submitted through us, and we would be bringing the whole application together, and then there were sections of that application that KPRG generated as well.

So we were somewhat as the clearinghouse for it, and bringing the whole permit together for submittal.

Q. And for the operating permit

application for the Ash Surge Basin, Bypass Basin, and Former Ash Basin, how big was the application?

A. Again, those are -- each of those applications are three-inch binders with hundreds of pages, literally.

Q. And for KPRG alone, how -- approximately how many hours did KPRG spend preparing the operating permit application for the Ash Surge Basin, Bypass Basin, and Former Ash Basin?

A. You know, certainly between the applications there is some same or similar material that goes in on historic background and so on, but then each one has its own specific items. So each permit application is literally into the hundreds or upper hundreds of hours for KPRG work alone.

Q. And then you mentioned the Metal Cleaning Basin operating permit application. Why did you treat that differently?

A. The Metals Cleaning Basin was not part of the federal rule, and so once it was identified that that was going to be brought in

under the state rule requirements, we had to install a couple of additional monitoring wells to bring that up to -- to bring the monitoring system up to the state rule requirements.

And with the installation of those wells, we basically had to start our background groundwater sampling from scratch, because for the other wells, we have already had some sampling under the federal rule. So, you know, when the state rule kicked in, we already had -- for a lot of the wells for the other basins, we had eight rounds of background, and so on. For the Metals Cleaning Basin, we had to start from scratch on that.

Q. And what was -- and was that in addition to your role -- well, let me put it this way.

What was your role in preparing the operating permit application for the Metal Cleaning Basin?

A. Well, it was just -- well, from the get-go was to install the additional monitoring wells and do the eight rounds of background sampling, calculation of all the statistics

associated with that, and then the same role as we played for the other ones where we were somewhat the hub and clearinghouse for all the other information that's being prepared by other specialty consultants to feed into that one permit application and then pulling the whole application together.

Q. And then to prepare the Metal Cleaning Basin operating permit application, approximately how many hours just for KPRG to prepare the application, including installing the new wells and the eight rounds of sampling?

A. Right. Once -- once you start adding that in, certainly into the upper hundreds of hours, if not even tipping a thousand.

Q. Did KPRG assist in preparing a construction permit application at the Powerton Station?

A. Yes, we did.

Q. Which one?

A. The construction permit application for the Ash Bypass Basin and Ash Surge Basin, and the construction application for the Former Ash Basin, as well as then the separate one for the

Metals Cleaning Basin, each one of those three sets is an individual submittal.

Q. And what was KPRG's role in preparing those permit applications?

A. The same, as kind of a hub and central clearinghouse on it.

Q. And for the construction permit applications for the Powerton basins, approximately how big -- pages. How many pages was each application?

A. Hundreds of pages.

Q. And again, approximately how many hours did KPRG spend preparing those applications?

A. Hundreds of hours.

Q. Mr. Gnat, have you visited the Powerton Station?

A. Yes, I have.

Q. And have you observed the Service Water Basin?

A. Yes, I have.

Q. Okay. I want you to turn to the next tab in your book, Exhibit -- Gnat Book G. This is an excerpt of Exhibit 710 that was previously admitted in the first hearing. It's

these sheets, and it starts at MWG13-15_34260.

A. Yes.

Q. Okay. Mr. Gnat -- and I actually want you to turn to Sheet No. C021, which is hard to read, and I actually have the larger size here if you need it, but that's on Bates No. MWG13-15_34265.

A. Yes.

Q. What is depicted in Sheet No. C021?

A. This is -- it looks like the construction drawings by Natural Resources Technologies, which was the consulting firm that did this work and the design work, and this in particular is a set of east/west and north/south cross sections through the -- designed cross sections through the Ash Surge -- I'm sorry -- through the Service Water Basin.

Q. And I'm sorry. Just -- did you say it shows the elevations as well?

A. Yes, it does.

Q. Okay. And the elevations in these cross sections, what did -- what does that mean?

A. The elevations are relative to mean sea level. So those are surveyed by an Illinois

licensed surveyor, and it's all surveyed towards a benchmark that's established on the property that's, I believe, relative to -- it's called NGVD; so National Geodetic Vertical Datum, I believe.

Q. So looking at Sheet No. C021, what is the elevation of the base of the interior of the Service Water Basin?

A. It looks like approximately 440, 441 -- 441 elevation relative to mean sea level.

Q. And at this -- looking at the same sheet, approximately what is the elevation of the top of the Service Water Basin?

A. The top ranges anywhere from about 459 to -- about 459 to 460 feet above mean sea level.

Q. And we are going to put on the screen the Board's 2019 opinion, page 39. On page 39, I believe, last paragraph, the Board states, "In addition, Midwest Gen employees recalled ash ponds and historical ash flooded on several occasions with water rising 30 feet above the bottom of the Secondary Ash Settling Basin and Illinois River flowing in and out of the Former

Ash Basin."

Now, first of all, Mr. Gnat, is -- to your knowledge, what is the Secondary Ash Settling Basin?

A. I believe that's the same as the Service Water Basin.

Q. And so knowing that the base of the Service Water Basin is at 441, how high would the river have to be to be 30 feet above the base of the Service Water Basin?

MS. BUGEL: Hearing Officer, I'm going to object here to this is beyond the scope of our -- our case that we put on.

HEARING OFFICER HALLORAN: You are going to have to speak up, Ms. Bugel.

MS. BUGEL: I'm sorry. I'm going to have to object to this being beyond the scope of Complainants' case. We did not get into flooding.

MS. GALE: This is --

HEARING OFFICER HALLORAN: We did not get into what?

MS. BUGEL: Flooding.

HEARING OFFICER HALLORAN: Ms. Gale?

MS. GALE: Well, this is Midwest

Generation's direct. So I -- I don't understand the objection.

MS. BUGEL: Their case in -- needs to be in response to our case. It can't go beyond the scope of our case.

HEARING OFFICER HALLORAN: I will let it in. You know, the Board can disregard if they so choose, and, you know, I'm not sure where it belongs, but you may proceed, Ms. Gale. Overruled.

BY MS. GALE:

Q. I'm sorry, Mr. Gnat. I didn't hear the answer to your last question.

So, knowing that the base of the Service Water Basin is at 441, how high would the river have to be to be 30 feet above the base of the Service Water Basin?

A. Four hundred seventy-one feet.

Q. Mr. Gnat, are you familiar with river gauges in the Illinois River?

A. Yes, I am.

Q. And what are river gauges?

A. There are gauges in various parts of the US river system that are set up by the US

Geologic Survey, and they are for the purpose of recording what the stage of the river is at a particular time.

Q. I'll read 2022 Stipulation No. 10, "The NOAA National Weather Service river gauge located at the Peoria Lock and Dam is the closest river gauge upstream of the Powerton Station."

(Whereupon, Respondent's Exhibit No. 1515 was marked for identification.)

BY MS. GALE:

Q. Mr. Gnat, I would like you to turn to the next tab in your book --

A. Okay.

Q. -- which has been marked for identification purposes as 15 -- Midwest Gen Exhibit 1515, Bates No. MWG13-15_124544.

Mr. Gnat, what is Exhibit 1515?

A. This is the gauging data from the Illinois River at the Peoria Lock and Dam, which is the nearest upstream gauging station established.

Q. And looking at the bottom of that page, do you see it says historical crests?

A. Yes.

Q. What is the highest crest that was recorded at the Peoria Lock and Dam?

A. That was 456.57 feet on April 24th of 2013.

Q. Okay. And, Mr. Gnat, I would like you to turn to the next tab. It reads stipulation -- excuse me. 2022, Stipulation No. 11, "The NOAA National Weather Service river gauge located at the Kingston Mines is the closest river gauge downstream of the Powerton Station."

And the next exhibit, Midwest Gen Exhibit marked for identification as 1516, labeled as MWG13-15_124541.

Mr. Gnat, what is Midwest Gen Exhibit 1516?

(Whereupon, Respondent's Exhibit No. 1516 was marked for identification.)

MS. BUGEL: Hearing Officer, I am going to object to this line of questions about both 1515 and 1516, as these are printouts from NOAA. Mr. Gnat has not been established as having first-hand knowledge of these printouts. He

cannot authenticate them. He has not authenticated them. He can't establish the -- you know, the foundation for these exhibits.

HEARING OFFICER HALLORAN: Ms. Gale?

MS. GALE: We can go through some questions, sure.

HEARING OFFICER HALLORAN: That's fine. Yes.

BY MS. GALE:

Q. Mr. Gnat, can you flip back to Midwest Gen Exhibit 1515, please?

A. Yes.

Q. And I believe you stated earlier when I asked you if you knew what river gauges were, you said -- well, remind us when you said you knew what river gauges were.

What are they?

A. River gauges are established by the US Geologic Survey at various points on rivers to record and document the elevation of the river at that location, and they call it river stage.

Q. And how do you know what river gauges are?

A. That's a common practice that's

established across the country by the USGS. It's used in flood -- you know, understanding flood control and so on. It's just a very common -- commonplace information and setups across the entire United States.

Q. And as a hydrogeologist, have you consulted the NOAA river gauges?

A. Sure.

Q. For what?

A. For the purposes of evaluating flood stages, and certainly for -- as part of the construction permit application, we had to do some basic groundwater -- numerical groundwater modeling in support of the construction permit applications, and getting an understanding of river -- river stages in the area adjacent or -- you know, adjacent to the plant. This is information that -- that is needed and we -- it was pulled for those purposes, certainly.

Q. And where did you go to find that information?

A. You go online.

Q. Which website?

A. You can go to the NOAA website.

There is -- also you can go right -- access probably the same website. You can do it through the USGS as well.

Q. And looking at Exhibit 1515 -- well, does this look like something you would consult?

A. Yes. This is a typical printout.

Q. Okay. And same thing with Exhibit 1516. What does this look like?

A. The same -- the same printout, except for the next river gauge downstream, and so this is for Kingston Mines, which is the first river gauge downstream of the plant. So when we were doing our modeling, we certainly would look at the river stage at the nearest gauging station upstream of our facility, and at the river gauge at the nearest station downstream of our facility.

Q. And so when you did the modeling, were these the two stations you -- river gauges you looked at?

A. Yes.

Q. All right. Looking at Exhibit 1516, which is the Kingston Mines river gauge, and looking at the bottom, left corner under historic crests, what is the highest the Kingston Mine dam

has ever been at?

A. The historic crest on this printout here is 26.54 feet on April 24th, 2013.

Now, that is the measurement on the gauge itself. So in this particular case, a little bit further up, it provides what the gauge datum is, which is 428 feet. So this -- the way you would interpret this is it would be 26.54 feet higher than 428 feet. So that would be 440 -- 454 feet, plus or minus. Something around that order.

Q. Does 454.5 feet sound about right?

A. Correct.

MS. BUGEL: Objection, leading.

HEARING OFFICER HALLORAN: Sustained. You can rephrase.

BY MS. GALE:

Q. Do you want to try that math again, how many feet?

A. If I had a pencil or a --

HEARING OFFICER HALLORAN: Oh, here.

BY THE WITNESS:

A. Can I write on this exhibit?

BY MS. GALE:

Q. By all means.

A. 454.54 feet.

Q. Thank you.

So based upon the record highs at both the Peoria Lock and Dam and the Kingston Mines, has the Illinois River ever reached 471 feet?

A. No, it has not.

MS. BUGEL: Objection. That was asking about facts that have not been established.

MS. GALE: All right. Mr. Hearing Officer, he said at the beginning that the -- you know, the base -- the base liner was at -- well, I have it written down.

MS. BUGEL: But my objection to the question is use of the word "ever," which is not established by this exhibit. This exhibit only goes back to 2020.

HEARING OFFICER HALLORAN: Do you want to rephrase, Ms. Gale?

BY MS. GALE:

Q. Sure.

Mr. Gnat, under the Exhibit 1515

and 1516, what does historic crests mean to you?

A. These are the highest levels reached at that location over the period of recording, and so if -- I get -- if we would go back to Exhibit 1515, the spread of data here is from 1943 to 2000 -- 2019. And for Exhibit 1516, the spread of data is from 1943 to -- also to 2015. Well, actually, the data goes up to 2022. It provides the recent crests.

Q. Okay. So based upon this document -- and you said, I think, the earliest was 1943, but does historic crests identify -- these are the -- well, the -- when you say historic crests, is that all of the crests, or what does that mean to you?

A. Right. So when I look at this -- and let's say for Exhibit 1516 where it says historic crests, and it provides the first five of them, the way I would interpret that is these were the five highest elevations that the river reached over the period of recording at that station.

Q. Okay. So based upon the record of historic crests over the period of recording at both the Peoria Lock and Dam and the Kingston

Mine, did the river reach 471 feet?

MS. BUGEL: Objection, leading.

HEARING OFFICER HALLORAN: Overruled. He may answer, if he is able.

BY THE WITNESS:

A. No.

BY MS. GALE:

Q. So focusing on the 30 feet above the bottom of the Secondary Ash Basin, is that accurate?

A. No, that's not accurate.

Q. And do you have personal experience with that, on how high the historic crests have been?

A. Well, between myself and all of the crews that were out there, we never saw water that would suggest that the Service Water Basin was under water, which at 475 -- 471 feet of elevation, it would be under water.

MS. GALE: Thank you. Mr. Hearing Officer, Midwest Generation moves for the admission of Exhibits 1515 and 1516.

HEARING OFFICER HALLORAN: Ms. Bugel?

MS. BUGEL: We maintain our objection to the witness' inability to lay the -- confirm the authenticity of these exhibits.

HEARING OFFICER HALLORAN: Okay. I think authenticity is a low bar, and I think he laid a very well foundation. So objection overruled. 1515, 1516, they are admitted.

(Whereupon, Respondent's Exhibit Nos. 1515 and 1516 were admitted into evidence.)

BY MS. GALE:

Q. Mr. Gnat, I would like you to flip back to the maps of the Powerton Station where there were excerpts of Exhibit 1307.

A. Okay.

Q. Can you see the area -- do you see the Illinois River on the top of that map?

A. Yes, I do.

Q. And there are -- I always want to say two long, rectangular channels from the river. Do you see those?

A. Yes.

Q. What are those?

A. I believe those are intake channels

that were dredged in.

Q. And do you see the area between those channels?

A. Yes. Between those two channels, yes.

Q. And to your knowledge, has KPRG ever taken any samples from that area?

A. I have not, but KPRG has, yes.

Q. And what samples -- what did KPRG sample?

A. Midwest Generation requested us to sample the dredge spoils. Those are dredge spoils in that area from the dredging of the -- dredging or maintenance, but those are dredge spoils that are placed in that area.

Q. Okay. And what are dredging -- I think you said -- can you just explain what dredging spoils are?

A. That's when you go in and you excavate and dredge out for these channels to bring in water from the Illinois River. Those would have to be excavated and dredged out, and it's -- and if they start silting in, you maintain them and dredge them out some more, but basically,

the spoils from the excavation of those was placed onto that area in the middle, and we were requested to sample that, and the term used for that is "dredge spoils."

Q. Thank you. All right. Let's just make sure.

Mr. Gnat, I would like you to flip to the one, two, three -- six -- fifth tab in your book, and it's a map, and it's an excerpt of Exhibit 1310.

A. Yes.

Q. What is depicted in this map?

A. This is the groundwater contour map for November 2021 for the Waukegan station.

Q. Have you visited the Waukegan station?

A. Yes, I have.

Q. How would you describe the area the Waukegan station is located in?

A. That's an old and heavily industrial area. To the north, the Mans-Johnsville [sic] Superfund site. To the west was an old tannery, and the general boiler site. Immediately south is the wastewater treatment plant, still operational,

and then south of that are -- there is an old coal gas site. I believe that that might have been a Superfund site. But I know that the old -- the Outboard Marine site just south of here as well was an old Superfund site.

Q. And on this figure -- I think you said it's a map of Waukegan station.

What is depicted in the map of the Waukegan station?

A. This map shows the entire station. In particular for this map, though, we were -- this is a map for the groundwater flow that goes beneath the West Pond and the East Pond, which is kind of in the bottom, central half of the figure.

Q. And what's the groundwater flow?

A. Groundwater flow beneath the ponds is in an east/southeasterly direction.

Q. Okay. And so similar to our discussions about Joliet 29 and the Powerton Station, in 2010 what was the groundwater sampled for?

A. In 2010, that was part of that initial voluntary sampling that was done for the list of parameters that were provided by the

Illinois EPA, and those were for dissolved organics -- inorganics.

Q. And then in 2015 at Waukegan, what kind of groundwater sampling was starting to be conducted?

A. In 2015, the federal CCR rule was coming into play, and we started the federal CCR sampling under that program. That was for total metals. I believe also at that time to -- in response to some of the requirements under the federal rule, there was -- had to be an adjustment of the east berm of the East Pond, and for that, Midwest Generation obtained a construction permit from Illinois EPA.

And under the -- under the requirements of that permit, that also specified total metals, and at that time, Illinois EPA just asked us rather than under -- doing sampling under CCA, that we can stop the dissolved metals and just fulfill the requirements of the construction permit itself for that, and those were total metals, a slightly different list than the federal rule, but from that point forward, we were not doing any type of field filtering for groundwater

samples at Waukegan station.

Q. So looking at the figure, do you see the area east of the East Pond?

A. Yes.

Q. And on your visits to the station, have you viewed that area east of the East Pond?

A. Yes, I have.

Q. And what are you seeing you -- when you have observed that area?

A. Well, from -- going to the east it's a fairly steep slope going down. There has never been any indication of seeps or anything like that of -- visible along that slope, and then that goes into kind of a marshy area down at the base.

Q. And in May I believe you testified about data from the ELUC wells at the Waukegan station. Do you recall that testimony?

A. Yes.

Q. What are the ELUC wells?

A. The environmental land use control wells were for the site investigation that was being done on the tannery to the west of the -- of the plant. That was being done under, I believe, the Illinois EPA site remediation program, the

SRP, and they documented groundwater contamination with inorganics moving to the east and onto our property.

And as part of the risk-based closure that's allowed under the site remediation program, they requested that Midwest Generation would allow for an environmental land use control, or ELUC, to be placed on the property associated with their contamination coming onto Midwest Generation property, and Midwest Generation agreed to it, and Wells -- I believe -- 10, 11, 12 and 14 -- 14 and 15, and actually, there was a well 13, but it's no longer in use, but those are all the wells that were installed by the consultant working for the tannery as part of the ELUC.

Q. And what is the purpose of an ELUC?

A. It's -- the purpose is it's placed right on the deed of the property, and it restricts the -- in this particular case, it restricts the use of groundwater within that area. So no groundwater wells, potable water wells, can be installed on that area of the property.

Q. As part of the compliance commitment agreement for the Waukegan station, what did you

assist in establishing at Waukegan?

A. An expanded environmental land use control.

Q. And what do you mean by expanded?

A. So, the initial ELUC that was placed on the property for the tannery investigation so that that investigation could get closure under the SRP program, the -- that ended basically just past the property line on the property, and the rest of the ELUC basically -- an expanded ELUC was -- was put in place that basically covers from that location all the way to the east beneath the ash ponds and south of the ash ponds all the way to Lake Michigan.

Q. So we have discussed your work for Midwest Gen pursuant to the federal and state CCR rules for Joliet 29 and Powerton Station. For the Waukegan station, generally speaking, what is your work -- do you conduct any work under the federal CCR rules?

A. Yes. We do the sampling under the federal CCR rule, as well as under the state CCR rule.

Q. And for the sampling, what type of

reports do you prepare?

A. Under the federal rule, there are semi-annual and annual reporting requirements, and under the state rule, the same. It's a quarterly required sampling, and we submit what we call the 60-day reports, which are data summaries 60 days after the last day of sampling in the field.

Q. And any other reports for the sampling?

A. And then there is an annual reporting requirement as well.

Q. And then for the Waukegan station, what permit applications did you prepare?

A. The application for -- the initial application for operating permit, as well as the initial application for a construction permit.

Q. And for the Waukegan operating permit application, and is that -- was that -- well, what ponds was the operating permit application for?

A. The East Pond and the West Pond.

Q. And for the operating permit application for the east and west ponds, what was KPRG's role?

A. The same as the hub and clearinghouse. We certainly generated some of the sections ourselves, but then certain other specialty areas that are required within the permit were done by other consulting firms, and we basically acted as a clearinghouse and pulled the entire package together.

Q. And for the Waukegan operating permit application, approximately how big was it?

A. Again, hundreds of pages and a submittal within a -- I believe a three-inch binder.

Q. And to prepare the operating permit application for Waukegan, approximately how many hours did KPRG spend?

A. Hundreds of hours.

Q. And you mentioned the construction permit application. What pond was that construction permit application for?

A. That was for both. Again, for the East Pond and the West Pond.

Q. And what was Midwest Generation's -- excuse me.

What was KPRG's role in

preparing the construction permit application?

A. The same. We developed some of the sections, and other sections were developed by other consulting firms with other expertise, and we basically were a clearinghouse and pulled the whole package together.

Q. And for the Waukegan construct -- excuse me.

For the Waukegan construction permit application for both ponds, approximately how big was the application?

A. Again, hundreds of pages.

Q. And approximately how many hours did KPRG spend preparing the application?

A. Hundreds of hours.

Q. If you can turn to the next document in your binder. This has been marked for identification purposes as Exhibit 1517. It starts on Bates No. MWG13-15_81195.

Mr. Gnat, what is Exhibit 1517?

(Whereupon, Respondent's Exhibit No. 1517 was marked for identification.)

BY THE WITNESS:

A. This is the analytical reporting package from Eurofins, which is the lab that did the analyses for the Waukegan station, and this in particular is for three -- a subset of three samples that were drawn for the LEAF test, L-E-A-F, test, for the three ash samples that were collected from that area west of the West Ash Pond.

Q. So we discussed this in May -- well, the area west of the West Ash Pond, remind us, what did Midwest -- excuse me -- what did KPRG do in that area?

A. We established a fairly large boring. We were asked to do a sampling in that area, detailed sampling, and to basically just guarantee that that one round will take care of everything. So we ended up doing 40 borings over a 10-acre area, or 4 borings per acre, which generally is a little bit -- could be overkill, but we were asked to do it expeditiously. We did a very thorough, detailed sampling of the ash, and based -- and then I believe there were two to three samples per boring analyzed for the ash

parameters as defined in the CCR rule, and based on those results, we chose a subset of three samples that we had the lab run for this LEAF test.

Q. And, Mr. Gnat, what is the LEAF test?

A. It's a leaching test that -- and I believe it stands for leaching environmental framework testing, and it's a leaching test that has been established. In this particular case, they take the sample, and they collect leachate over a wide range of pH. I believe the pH ranges from as low as 2, which is an extremely acidic condition to as high as 13, which is an extremely alkaline condition, and a whole slew in between of different pH levels, including neutral.

Then they also run it at the natural pH, which is the pH of the material when they received it. And so they basically run a liquid of a high pH or a low pH, depending on the run they are doing. They collect the leachate at the bottom, and then they run that for the full list of parameters that are listed in the CCR rule.

Q. And then why -- what is -- why use the LEAF test?

A. The LEAF test has more recently come into popular use and is looked at to get an understanding of how materials might give up or mobilize various constituents under the whole range of pHs, and then knowing, you know, kind of what the general pH range is for the particular site that you are looking at, and so on, you can get an idea of what might truly be mobile in the system associated with that.

Q. And so when you did this investigation of the area of the west -- of the West Pond, why did you choose the grid pan pattern?

A. That's a very robust approach to sampling. So, I mean, you could certainly do lots of different approaches, and normally, if we weren't requested to just do everything and as expeditiously as possible, we'd probably propose doing a phased approach where we would go out and do a set of five borings or so, you know, five or six borings across the site, collect several samples from each boring, and then take a look

statistically, how is the variability in that data.

And if the variability is low, then that set of samples is pretty representative of the ash in that whole mass. If the variability is high, you would have to go back and collect additional samples to get a representative sample. So, I mean, statistically, if you look at something, if it's purely homogenous, you can pull one sample out of 100,000 cubic yards and that sample is representative, because it's pure homogenous.

So, generally an approach is if we are asked if there is no, you know, desire for expeditious purposes or whatever, you know, we would look at doing a phased approach. Let's do a handful of borings across that area, get a good idea horizontally and vertically through that area, take a look statistically, what's the variability, and do we need to collect more samples to be representative, or does the set we have represent that mass fairly well statistically?

MS. GALE: Mr. Hearing Officer,

Midwest Gen moves for the admission of 1517.

HEARING OFFICER HALLORAN:

Ms. Bugel?

MS. BUGEL: No objection.

HEARING OFFICER HALLORAN: Thank you, Ms. Bugel.

Exhibit 1517 is admitted.

(Whereupon, Respondent's Exhibit No. 1517 was admitted into evidence.)

BY MS. GALE:

Q. Mr. Gnat, I would like to move on to the Will County Station. Will you flip to the last tab in your binder?

A. Yes.

Q. And a map, which is an excerpt of Exhibit 1314, what does this map show?

A. This is the groundwater contour map for the Will County Station ash ponds for November 2021.

Q. And have you been to the Will County Station?

A. Yes, I have.

Q. How would you describe the area that

the Will County Station is located?

A. The Will County Station is somewhat -- kind of an isolated piece of property with the Des Plaines River to the west, the Chicago Sanitary Ship Canal to the east. I believe there is a materials quarry to the south, and then on the other side of the river and further north, those areas are some undeveloped, some residential, some commercial.

Q. And looking at the map, what is the direction of the groundwater flow?

A. Groundwater flow beneath the ponds is to the west.

Q. Thank you. So similar to the prior stations, in 2010, what was the groundwater sampled for?

A. You know, the same under that voluntary agreement. The Illinois EPA had a list of parameters that they wanted analyzed on a quarterly basis. They're inorganics, and they were for dissolved metals.

Q. And then in 2015 at Will County related to the groundwater, what happened?

A. That's when a federal rule was

applied and Ponds 2 South and 3 South were considered to be -- to fall under the jurisdiction of the federal rule, and so we installed Wells 11 and 12 to bring the monitoring system that would be in compliance then for the federal rule for -- that combined two ash ponds together, and then we did groundwater monitoring on -- first we established the background under the federal rule and groundwater monitoring using a total metals analysis.

Q. Okay. And then in 2021, what happened related to groundwater?

A. The state rule came into effect, and Ponds 1 North and 1 South were included under the jurisdiction of the state rule, and so in order for us to, again, meet the monitoring requirements under the state rule, we installed Wells 13, 14, and 15, downgradient of Ponds 1 North and 1 South to make sure that we fulfilled the requirements of the state rule as well for groundwater monitoring.

Q. And for the Will County Station, were you -- did you assist in responding to the requirements under the compliance commitment agreement?

A. Yes, we did.

Q. What did KPRG assist in preparing?

A. We assisted in preparing the -- there is an environmental land use control that's on the property, and I also believe that there is a groundwater management zone that has been established on that property as well.

Q. And, to your knowledge, is the groundwater management zone still in effect?

A. Yes, that's my understanding.

Q. And similar question. Is the ELUC still in effect?

A. Yes, it's on the deed.

Q. And looking at the west side of the ponds, have you observed that area before?

A. Yes.

Q. What is over there?

A. Well, again, it drops off fairly steeply from the ash ponds, and, in fact, when we were installing Wells 13, 14, and 15, we actually had to build out some pads a little bit to be able to place these wells, and so there is, you know, somewhat of -- you'd call it an embankment. So that's there, and then there is also a utility

corridor above ground, high power lines, that run just to the west of where we have our wells, within that area, and then you have got the river.

Q. And so when you have looked over there, what have you observed?

A. You know, it's a fairly well-vegetated slope there. Did not see any seeps or evidence of seeps, whatsoever.

Q. So, Mr. Gnat, we have discussed your work for Midwest Gen pursuant to federal CCR rules related to the other three stations. At Will County Station, what is KPRG doing pursuant -- for Midwest Gen pursuant to the federal CCR rule?

A. For the federal rule, we are doing the groundwater monitoring under the federal rule and the associated reporting under the rule.

Q. And for the -- are you also doing work for the -- under -- for Midwest Gen under the Illinois CCR rule?

A. Yes, we are.

Q. What is KPRG -- excuse me.

What is KPRG doing under the Illinois CCR rule?

A. Again, we installed the additional

monitoring wells required for the reporting for the groundwater monitoring. We do the quarterly groundwater monitoring for the impoundments, and we also did the initial permits for application -- initial application for operating permits -- I'm sorry -- for the ponds, as well as the construction permit applications for the ponds.

Q. So, the initial operating permit application that you mentioned, what operating permit application did you prepare -- or excuse me -- have a role in?

A. There is an initial application for an operating permit for Ponds 2 South and 3 South, and then there is a separate one for Ponds 1 North and 1 South.

Q. And for the Ponds 2 South and 3 South operating permit application, what was KPRG's role?

A. The same as on the previous ones, kind of a hub and clearinghouse for information coming in from other consultants. We also wrote some of the sections, and we pulled the entire application package together.

Q. And the operating permit application

for Ponds 2 South and 3 South, approximately how big was it?

A. Again, hundreds of pages, three-inch binder.

Q. And approximately how many hours -- or excuse me.

How many hours just for KPRG did it take to prepare that application?

A. Hundreds of hours.

Q. And then you mentioned that there was a separate operating permit application for Ponds 1N and 1S?

A. Correct.

Q. Why was that separate?

A. We had to install the three additional monitoring wells, and with that, again, kind of similar to what the Metals Cleaning Basin was on the Powerton site, you know, since this wasn't under the federal rule, we did not have the benefit of all of the background federal rule sampling that was done.

And so the establishment of the statistical background, the required minimum of eight rounds of sampling and so on, none of that

was available for the Ponds 1 North and 1 South. So all of that had to be done, and so that was being run as a separate application, a permit application.

Q. And what was KPRG's role in preparing the permit application?

A. The same. You know, we installed all the wells. We did all the initial background sampling, and then acted as the hub and clearinghouse for the -- you know, the information from other specialty consultants coming in and as well as writing some of the sections ourselves and pulling together the entire permit application.

Q. And for the operating permit application for Ponds 1N and 1S, how big was that application?

A. Hundreds of pages.

Q. And to prepare that -- excuse me -- yeah.

To collect that application, including installing the wells and collecting the additional data, approximately how many hours of KPRG's time was spent?

A. Well into the hundreds, if not even

tipping a thousand hours with all the well installations and having to go back and do eight rounds of upfront monitoring and so on.

Q. And you mentioned the construction permit applications for Ponds 1N, 1S, 2S, and 3S, right?

A. Yes.

Q. What is the status of those construction permit applications?

A. Those are in the process of being prepared for final submittal. There was a public meeting held last week in regards to those, and so now there is a timeframe after the public meeting. And so those applications are in the process of being completed and finalized.

Q. And what is KPRG's role in preparing the construction permit applications?

A. The same. Acting as a hub and clearinghouse for data and aspects coming in from other consultants, as well as preparing some of the pages ourselves or sections ourselves, and also attending the public meeting.

Q. And understanding that they are not final yet, approximately how big is the

applications?

A. They will be hundreds of pages, three-inch binder type.

Q. And so far, approximately how many hours has KPRG spent in preparing the construction permit applications for the four ponds?

A. Easily into the upper hundreds of hours.

MS. GALE: Mr. Hearing Officer, can I have five minutes?

HEARING OFFICER HALLORAN: Yes. Off the record for five minutes.

(Whereupon, a discussion was had off the record.)

HEARING OFFICER HALLORAN: We are back on the record.

Ms. Bugel, do you want to take a break before you start your cross or --

MS. BUGEL: Yes.

HEARING OFFICER HALLORAN: Okay. Ten minutes. Off the record. Thank you.

(Whereupon, a short break was taken.)

HEARING OFFICER HALLORAN: All

right. We are back on the record, Kari.

You know, I was -- again, I forgot to announce we have Vanessa Horton, the staff attorney, today from the Board. We also have environmental scientist Essence Brown in the back. Thanks for being here.

You may proceed, Ms. Bugel.

C R O S S E X A M I N A T I O N

by Ms. Bugel

Q. Okay. And, Mr. Gnat, I believe you still -- do you have your binders in front of you with all your exhibits from both May and today?

A. I believe so, yes.

Q. Okay. Can you please turn to Exhibit 1502?

A. Which binder would that be?

Q. I think that's Book 2.

A. Yes.

Q. And this -- just to refresh everybody's recollection, this Exhibit 1502 contains an alternate source demonstration?

A. Yes, it does.

Q. And that's found at Appendix B?

A. Correct.

Q. Can you please turn to Appendix B?
A. Okay.
Q. And looking at Appendix B, to the best of your knowledge, has USEPA ever reviewed this alternate source determination?
A. I do not know.
Q. To the best of your knowledge, has Illinois EPA ever reviewed this alternate source determination?
A. I do not know.
Q. And -- I'm sorry -- I said determination, when I -- it's demonstration.
Has anybody at Illinois EPA ever communicated to you that they reviewed this alternate source demonstration?
A. No.
Q. Do you know if anyone other than KPRG and Midwest Gen have ever reviewed this alternate source demonstration?
A. I do not know.
Q. And this references an alternate transient -- transient source, correct?
A. Correct.
Q. And just for the record, the

alternate source demonstration we are looking at appears at 114021, the Bates No. 114021, correct?

A. Correct.

Q. And you didn't evaluate what the alternate transient source was, correct?

A. That is correct.

Q. And in your testimony when you referenced the alternate transient source, did you reference the possibility that it was road salt?

A. I would have to go through here and read this, but --

Q. And -- I'm sorry -- just to make my question clear for the record, I was not referring to the alternate source demonstration. I was referring to your testimony back in May.

A. Oh, I believe that there -- in previous testimony and discussions and even the previous -- prior to May hearings and so on, I believe that there was discussion of the use of road salt associated with Channahon Road, and my understanding is that from some of the previous testimony and so on, that that was somewhat agreed upon as well by the Illinois Pollution Control Board.

Q. And did you do any leach testing to determine whether the constituents you were seeing in the alternate source demonstration were caused by road salt?

A. I do not believe that for this alternate source demonstration we did any LEAF testing, which we did for other -- other stations.

Q. And your answer referenced LEAF testing. LEAF testing is one -- is a leach test, correct?

A. Correct. It's a specific type, yes.

Q. Did you do any leach testing in general to determine whether the constituents referenced in this alternate source demonstration were caused by road salt?

A. Now, I -- we did not, and I -- one of the things is by 2021 when this demonstration was done, all of the ash has been removed at this point. So I believe the ash was fully removed out of that impoundment from, I believe, in 2019 or so. So there is no ash in which we could even sample at that point.

Q. There is no ash in the ponds, correct?

A. And that -- this is for Pond 2. There is no ash in Pond 2. There is still -- the warning layer is still down in there, but all of the ash has been removed.

Q. And are there still Poz-O-Pac layers in the three ponds at Joliet?

A. I believe so.

Q. And do the berms remain at the three ponds at Joliet?

A. Yes, they do.

Q. And did you do any evaluation to confirm whether the source, the transient source, was offsite?

A. We -- considering it was -- we were seeing it in our upgradient well, as well as our downgradient wells, that tends to indicate a source upgradient to the ponds, and the ponds are immediately upgradient -- or immediately adjacent to the road, but that was -- under the federal rule, there is no specific requirement to identify the specific source.

Q. And I would like to turn to Exhibit 1504.

A. Yes.

Q. And Exhibit 1504 consists of boring logs, correct?

A. Correct.

Q. Are any of these boring logs marked "draft"?

A. Yes. All of them are.

Q. And the -- looking at the very first boring on Bates page 79341 --

A. Yes.

Q. -- this boring stops at 17 feet, correct?

A. Correct.

Q. Okay. Do you know why this stops at 17 feet?

A. I believe that's where refusal was encountered by the Geoprobe, which was the drilling method that was being used. It's generally on top of bedrock.

Q. Does -- is there anything on here that indicates that bedrock was encountered?

A. Not on this specific boring, no.

Q. Is there anything on this specific boring that indicates that refusal was -- refusal was -- I don't know the right word -- encountered

or established?

A. No.

Q. And flipping through this series of borings, can you tell me, is there any indication on any of them that the boring hit bedrock?

A. No, not on these borings.

Q. And is there any indication on any of these that there was refusal when the borings stopped?

A. No. Not specifically on these borings, no.

Q. And can you please turn to Exhibit 1511?

A. Okay.

Q. And you -- when you were discussing Exhibit 1511 in your testimony in May, you testified to not seeing any seeps along the length of the area inspected.

Do you recall that?

A. Yes.

Q. And can you please describe the length of the area that you inspected?

A. Sure. We walk from just -- there is a fence line on the southeast corner of the

property, and we start the inspection several hundred feet to the west of that fence, and then it proceeds down the -- and down the entire length of the intake channel, and then the Des Plaines River all the way up to an area that's just short of the lock and dam.

And there is actually kind of an entrance off of Brandon Road that there is a little parking lot there, and that people also drive further back into that property, and there is a lot of evidence of people there doing campfires and fishing and whatnot. So that's basically the entire length that we do.

Q. And flipping to Exhibit 1512, would you have walked the same area?

A. Yes.

MS. BUGEL: Okay. And we are going to -- Leah is here, and she is going to distribute an exhibit from the liability phase of this hearing.

May Leah approach?

HEARING OFFICER HALLORAN: Yes. Thank you.

BY MS. BUGEL:

Q. So we have placed in front of you an exhibit that was marked in the previous hearing, Complainants' Exhibit 248N, as in Nancy.

And do you need a minute to review that, Mr. Gnat?

A. It depends on the question you will ask.

Q. Okay. Fair enough. Fair enough. And to refresh everybody's recollection, this is a letter that you wrote, correct?

A. Yes, it is.

Q. And your signature appears on Bates page 19444?

A. Yes.

Q. And the -- I call it the Re: line. I don't know what other people call it, but I'm going to refer to the Re: line of the letter, which is, R-E, colon.

The Re: line of this letter refers to the Joliet No. 29 Former Ash Burial Area Runoff Inspection 2009. Do you see that?

A. Yes.

Q. Okay. Where did you get the

terminology formal -- "former ash burial area"?

A. Exactly where -- where that was pulled from, I don't know. It might be what was provided to me as referencing what was in that -- I believe it was the 1999 Phase II work that was done prior to purchase of the property by Midwest Generation.

Q. In writing this letter, you decided to use that terminology in the Re: line, correct?

A. Right. Again, that was terminology that was given to me. I mean, it's not something that I created or whatnot, but it -- terminology at that time, that's what my understanding was, yes.

Q. And can you please refer to the first sentence of this letter? In the first sentence, it refers to -- beginning at the very end of the first line, "the former ash burial area on the northeast side of the Joliet 29 property." Do you see that?

A. Yes, "outside the fenced boundary of the facility," yes.

Q. So this letter refers to the same area covered by Exhibits 1511 and 1512, correct?

A. Correct. And, you know, just to clarify, we actually start the walk to the west of that fence line, as well as then continue on past it, obviously, but we actually start several hundred feet west of that, yes.

Q. Leah is going to approach you with an excerpt of Exhibit 901.

And, Leah, just to confirm, that's page 15 from 901?

MS. BAHRAMIPOUR: Yes.

BY MS. BUGEL:

Q. And, Mr. Gnat, you have referred to the fence line. Can you please tell us where the fence line is?

A. Sure. If you take a look at Ash Pond 3, what's identified here as Ash Pond 3, so you go a little bit to the east of that, you will see kind of a darker, almost triangular-shaped area. And right below that triangular-shaped area and before you see the boundary of the channel, you'll see what looks like a little access road, because that is an access road.

And if you take that access road to the east there right to the corner of what

would be that triangular-shaped area, that's basically where the fence -- there's a gate there, and that's the gate we would go out, and then that fence goes from that point to the north to just short of Channahon Road there.

Q. And, Mr. Gnat, I have given you -- or Leah has given you a marker.

Can you draw very -- just very approximately onto this exhibit where the fence line is?

A. Sure. Got it.

MS. BUGEL: And, Mr. Hearing Officer, we believe it would aid the Board to actually have that marked. So this is a new exhibit. I have not yet presented this proposal to Midwest Generation, but -- what number would we do?

And we have pre-numbered our other exhibits. So we can mark this and copy it at lunchtime and submit it.

So I would move for Complainants' -- can we go off the record for a second?

HEARING OFFICER HALLORAN: Sure.

(Whereupon, a discussion was had off the record.)

MS. GALE: I'm a little confused on the process here. We have not seen what Mr. Gnat has done before we had to answer an opinion on what the motion would be.

HEARING OFFICER HALLORAN: Okay. They don't have a copy of this.

MS. BUGEL: They have a copy of it, but they don't have it with -- Mr. Gnat's marked --

HEARING OFFICER HALLORAN: Okay. Then we will wait until it's marked, and you can make your motion then.

MS. BUGEL: Okay.

HEARING OFFICER HALLORAN: You may proceed.

MS. BUGEL: Very good.

BY MS. BUGEL:

Q. Mr. Gnat, one question about this. The fenced boundary -- I'm sorry. Or the -- what you have -- what we have referred to as the fence line, that is different from the property line, correct?

A. Correct.

Q. Okay. So now referring back to Exhibit 248N. So, I'm looking at the first page, Bates page 19442, the first sentence of the second paragraph. This says, "During the inspection KPRG identified five areas outside the fenced boundary of the Joliet No. 29 facility."

Do you see that reference?

A. Yes.

Q. Okay. And the fence line is the same as the fenced boundary, correct?

A. Correct.

Q. And the fenced boundary is different from the property boundary, correct?

A. Correct.

Q. And the next sentence goes on -- I'm sorry. Let me finish that sentence.

The rest of this sentence goes on to say there was either, quote, "either sheet wash erosion or drilling has exposed the underlying ash slag and may transport the material to the Des Plaines River."

Do you see that?

A. Yes.

Q. And that was true at all five areas, correct?

A. I would have to read the description there for each area.

Q. Do you want to take a minute to do that?

A. Yes, please.

Yes, that is correct.

Q. And then there was an additional area with erosion identified within the fenced boundary of the Joliet No. 29 facility, correct?

A. Yes, Area 6.

Q. And looking at the bottom of this exhibit, there is a single bullet -- I'm sorry -- the bottom of this page, 19442, there is a single bullet on this page.

Do you see that?

A. Yes.

Q. And that bullet refers to Area 1, correct?

A. Yes.

Q. And in that bullet, you give the coordinates for Area 1, correct?

A. Yes. That was using a little

handheld GPS unit, a Garmin-type unit.

Q. And those coordinates are, quote, N41 degrees, space, 30.068 and that is that little -- there is a little apostrophe, and then a slash, W88 degrees, space, 06.419 apostrophe, correct?

A. Yes.

Q. And that apostrophe -- what does that apostrophe stand for?

A. Minutes.

Q. So these coordinates are --

A. Minutes and seconds. 41 degrees, 30.068 minutes.

Q. So these coordinates are expressed in terms of degrees and minutes, correct?

A. Correct.

Q. And it's possible to express coordinates in the form of degrees, minutes, and seconds, isn't it?

A. Correct.

Q. And both -- in your experience, are both degrees and minutes also equally accurate as degrees, minutes, and seconds?

A. You know, that depends. In this

particular case, 30.0 -- 30.068 minutes, you could convert that to minutes and seconds, if you would like.

(Whereupon, Complainants' Exhibit No. 1518 was marked for identification.)

BY MS. BUGEL:

Q. And we can -- we are passing out a new exhibit, and this is a demonstrative that was provided three days ago, and we have marked this Exhibit 1518.

And on this first page, in the search box with the magnifying glass on the upper, left-hand side -- do you see that search box?

A. Yes, I do.

Q. And in the search box, do you see the same coordinates that we just identified in bullet point Area 1 in Exhibit 248N?

A. Yes.

Q. And the -- they are expressed slightly differently with the N at the end instead of at the beginning. Do you see that?

A. Yes, for -- yes, for -- yes.

Q. And then the W is at the end instead

of the beginning?

A. Correct.

Q. And instead of the slash mark, it's just a comma in between?

A. Correct.

Q. And below that do you see -- under the blue graphic with the buildings, do you see the coordinates expressed in degrees, minutes, and seconds?

A. Yeah. I haven't done the number crunch myself, but that would -- if you are converting above to minutes and seconds, you know, assuming the number crunch is right. I don't know. But I haven't done it myself.

Q. And do you see a red pin on this image?

A. Yes, I do.

Q. Do you have any reason to believe that the red pin does not accurately represent where Area 1 is located at Joliet No. 29?

MS. GALE: Objection, foundation.

HEARING OFFICER HALLORAN: Ms. Bugel?

MS. BUGEL: Well, the foundation is

that these are the coordinates that Mr. Gnat himself gave, and he has also walked the property and wrote the letter that identified Area No. 1. He's --

HEARING OFFICER HALLORAN: I agree. Overruled. He may answer, if he is able.

BY THE WITNESS:

A. Yes. I believe that's -- if that's the area I'm thinking of, that's probably pretty close, yes.

BY MS. BUGEL:

Q. Okay. And just to confirm at the bottom of this exhibit, the bottom right-hand corner, it gives a scale, and that scale says 1,000 feet. Do you see that?

A. Yes, I do.

Q. And can you please turn to the second page of this exhibit?

A. Yes.

Q. And in the upper left-hand in the box with the magnifying glass, do you still see the same coordinates that appear in your letter for Area 1?

A. Yes.

Q. And in the lower right-hand corner, do you see the scale of 200 feet?

A. Yes.

Q. And do you see the red pin again?

A. Yes, I do.

Q. And do you have any reason to believe that that red pin does not accurately represent where Area 1 is located at Joliet 29?

A. No. It seems approximately right.

Q. And turning back to Exhibit 248N, can you please turn the page to Bates page 19443?

A. Okay.

Q. And do you see a bullet, the first bullet on this page?

A. Yes.

Q. And that bullet refers to Area No. 2?

A. Yes.

Q. And you give the coordinates for Area No. 2, correct?

A. Yes, I do.

Q. And those coordinates are N41 degrees, 29.950 minutes, slash, W88 degrees, 06.621 minutes, correct?

A. Correct.

Q. And turning to page 3 of Exhibit 1518, in the search box in the upper left-hand corner with the magnifying glass, do you see the same coordinates that you gave in Exhibit 248N?

A. Yes.

Q. And those are the coordinates for Area 2, correct?

A. That is correct, yes.

Q. And do you see the red pin on this image?

A. Yes, I do.

Q. Do you have any reason to believe that that red pin does not accurately represent where Area 2 is located at Joliet 29?

A. No. That appears roughly correct.

Q. And in the lower right-hand corner, you see the scale showing 500 feet, correct?

A. Yes.

Q. Okay. And can you please turn to page 4 of Exhibit 1518?

A. Okay.

HEARING OFFICER HALLORAN: Is that

Area 4, Ms. Bugel?

MS. BUGEL: I'm -- no. We are on page 4.

HEARING OFFICER HALLORAN: Okay.

MS. BUGEL: And in the upper left-hand corner it should still say Area 2.

HEARING OFFICER HALLORAN: Thank you.

BY MS. BUGEL:

Q. And Mr. Gnat, you see it still says Area 2 in the upper left-hand corner?

A. Yes.

Q. And in the box with the magnifying glass, do you see the same coordinates that you gave for Area 2 in Exhibit 248N?

A. Yes, I do.

Q. And do you see the red pin again?

A. Yes.

Q. And do you have any reason to believe that that red pin does not accurately represent where Area 2 is located at Joliet 29?

A. That looks roughly correct.

Q. And turning back to Exhibit 248N, can you please look at the second bullet point on

Bates page 19443?

A. Okay.

Q. And that bullet refers to Area 3, correct?

A. Correct.

Q. And that bullet gives the coordinates for Area 3, correct?

A. Yes, it does.

Q. And those coordinates are N41 degrees, 29.916 minutes, slash, W88 degrees, 06.683 minutes, correct?

A. Correct.

Q. And can you please turn to page 5 of Exhibit 1518?

A. Okay.

Q. And in the search box with the magnifying glass, do you see the same coordinates that you gave in Exhibit 248N for Area 3?

A. Yes.

Q. And you see the red pin on this image?

A. Yes, I do.

Q. And do you have any reason to believe that the red pin does not accurately

represent where Area 3 is located at Joliet 29?

A. No.

Q. And do you see the scale in the lower, right-hand corner?

A. Yes.

Q. And that scale now shows 200 feet -- I'm sorry.

That shows 500 feet?

A. Five hundred feet, correct.

Q. Thank you. And can you please turn to page 6 of Exhibit 1518? And in the search box, do you still see the same coordinates that you gave for Area 3?

A. Yes.

MS. GALE: Objection. That's not what the document says on page 6 underneath Area 3.

BY THE WITNESS:

A. Page 6, Area 3. Yeah, that's -- yeah. That's incorrect, yes.

BY MS. BUGEL:

Q. All right. Okay.

A. Those are Area 2 and --

Q. It's the coordinates for Area 2.

So just to be clear, page 5 is for Area 3, but page 6 is for Area 2.

Okay. And turning back to liability hearing Exhibit 248N, can you please refer back to Bates page 19443?

A. Okay.

Q. And do you see the third bullet on this page?

A. Yes.

Q. And that bullet refers to Area 4, correct?

A. Correct.

Q. And you give the coordinates for Area 4, correct?

A. Yes.

Q. And those coordinates are N41 degrees, 29.894 minutes, slash, W88 degrees, 06.732 minutes, correct?

A. Correct.

Q. And looking in the search box with the magnifying glass in Exhibit 1518, it gives the same coordinates on page 7, correct?

A. Yes.

Q. And those are the coordinates for

Area 4, correct?

A. Yes.

Q. And do you see the red pin on page 7?

A. Yes, I do.

Q. And do you have any reason to believe that the red pin does not accurately represent where Area 4 is located at Joliet No. 29?

A. No. I have -- that looks roughly correct.

Q. And if you look in the lower right-hand corner, does the scale show 1,000 feet?

A. Yes, it does.

Q. And turning the page to page 8, in the search box with the magnifying glass in the left -- upper left-hand corner, do you still see the same coordinates that you gave for Area 4?

A. Yes, I do.

Q. And in the lower right-hand corner, do you see the scale of 200 feet?

A. Yes.

Q. And do you have any reason to believe that the red pin does not accurately

represent where Area 4 is located at Joliet No. 29?

A. Roughly, it appears to be roughly correct, yes.

Q. And turning the page. I'm sorry. Let's start by turning back to Exhibit 248N, Bates page 19443. Do you see the last bullet on this page?

A. Yes.

Q. And that bullet references Area No. 5, correct?

A. Correct.

Q. And it provides the coordinates for Area No. 5, correct?

A. Yes, it does.

Q. And those coordinates are N41 degrees, 29.889 minutes, slash, W88 degrees, 06.947 minutes; is that correct?

A. Yes.

Q. And before the slash, is the operator -- I'm sorry -- is the apostrophe missing?

A. Yes.

Q. But that still represents to you

29.889 minutes, right?

A. Correct.

Q. And looking at page 9 of Exhibit 1518 labeled Area 5, do you see the same coordinates in the search box on the upper left-hand side with the magnifying glass?

A. Yes, I do.

Q. And those are the same coordinates that you gave in Exhibit 428N for Area 5?

A. Yes.

Q. And do you see a red pin on this image?

A. Yes, I do.

Q. And do you have any reason to believe that the red pin does not accurately represent where Area 5 is located at Joliet No. 29?

A. That's roughly correct.

Q. And looking at that red pin, that is not on the banks of the Des Plaines River, correct?

A. That is along the intake channel, correct.

Q. And -- and looking in the lower

right-hand corner, the scale shows 1,000 feet, correct?

A. Yes.

Q. Based on that scale, do you have any approximation of how far that pin is from the Des Plaines River?

A. As the crow flies or along the bank?

Q. As the crow flies.

A. Two hundred feet, three hundred feet.

Q. Okay. Thank you. And can you please turn to page 10? And do you see the scale in the lower right-hand corner?

A. Yes, I do.

Q. That scale now shows 200 feet, correct?

A. Correct.

Q. And do you see the search box in the upper left-hand corner with the magnifying glass?

A. Yes.

Q. And that search box still contains the coordinates for Area No. 5, correct?

A. Yes, it does.

Q. Do you have -- and do you see the

red pin on this?

A. Yes, I do.

Q. Do you have any reason to believe that the red pin does not accurately represent where Area 5 is located at Joliet No. 29?

A. That looks roughly correct.

Q. And can you please turn to exhibit -- well, let me stop there.

Complainants move for Exhibit 1518 to be admitted into the record.

HEARING OFFICER HALLORAN: Ms. Gale?

MS. GALE: We would object to the admission of this document. It's inaccurate at least for one of the areas, and it also -- he estimated, but he wasn't sure why the difference between the search and the result. So it's just foundation on whether the results are accurate.

HEARING OFFICER HALLORAN: I thought this was a demonstrative Exhibit. 1518?

MS. BUGEL: Yes. It's a demonstrative. Then, do we --

HEARING OFFICER HALLORAN: No. You can -- yeah. Is your objection still the same?

MS. GALE: Yes. As an exhibit, yes.

HEARING OFFICER HALLORAN: Okay. Well, I'm going to accept it as -- excuse me -- a demonstrative exhibit. It may assist the Board. It has no probative value. Thank you.

MS. BUGEL: Mr. Gnat -- actually, Hearing Officer, can I make one recommendation, that we just have Mr. Gnat use the marker to correct Area 4?

HEARING OFFICER HALLORAN: Yes. And then I guess you will make a copy when able, hopefully sooner than later, and then you will move it, and then Ms. Gale will have her time to object?

MS. GALE: Yes.

HEARING OFFICER HALLORAN: Okay. Yes, yes, you may.

BY MS. BUGEL:

Q. Mr. Gnat, can you please go back to Area 3 on page 6? And are you on Area 3, page 6?

A. Yes.

Q. And can you please take the marker we provided to you and cross out Area 3 and just replace that with 2?

A. Okay.

Q. Thank you. And -- and you can set that aside for the moment.

And can you please turn back to Exhibit 248N, Bates page 19444?

A. Okay.

Q. And on this page, do you see where it states Area 6?

A. Yes.

Q. And this says Area 6 is located within the fenced boundary of the Joliet No. 29 facility, approximately 500 feet west of Area 5.

Do you see that?

A. Yes.

Q. And Area 6, you do not provide coordinates for Area 6, correct?

A. That is correct.

Q. Okay. And turning -- earlier I gave you page 15 of Exhibit 901. Do you still have that in front of you?

A. The -- this map?

Q. Yes.

A. Yes.

Q. On that, could you just mark approximately where Area 6 is located?

A. I can do it approximately, but I don't have a scale on this map here. So unless it's up at the top, but I don't see a scale. So I'm going to be guessing based on having been there, but, you know, saying here it's 500 feet. It looked less, but I don't have a scale on this map, but --

Q. Well, let me interrupt you then. Would it be easier for you to do that on Exhibit 1518, page 10, that has Area 5 marked, and has the scale of 200 feet in the lower right-hand corner?

A. Yeah. I can -- I can mark it on that.

Q. Okay. So if you could please draw a block dot approximately where Area 5 is, and then indicate -- just write Area 5 -- add a 6 -- and 6 in the upper left-hand corner. Where it says Area 5, we can add a 6 to that.

A. Okay.

Q. And just -- we can set those aside. We are going to move on to Exhibit 15 -- sorry. We are going to look back at 1513 before we distribute the next exhibit.

Exhibit 1513, and this is in binder 2 or book 2, the very last exhibit.

A. Okay.

Q. Mr. Gnat, do you recall referencing dredging of the Des Plaines River when you were testifying as to this exhibit in May?

A. If I recall, when I would see the big chunks of dolomite and so on, that -- you know, that was probably from dredging operations of the channel. That's what my reference was to, yes.

Q. And were you involved in -- personally involved in any dredging of the Des Plaines River?

A. No, I was not.

Q. Were you involved in any construction of any part of the lock and dam system on the Des Plaines River?

A. No, I was not.

Q. Do you have any first-hand knowledge regarding the placement of dredged spoils from dredging at the Des Plaines River?

A. No.

Q. And you are not appearing as an

expert witness in this proceeding, correct?

A. Correct.

Q. So you are here as a fact witness, correct?

A. Yes.

Q. And you are not offering any expert opinions on dredging or dredged spoils, correct?

A. That is correct.

Q. And we can now distribute Exhibit 1519.

(Whereupon, Complainants' Exhibit No. 1519 was marked for identification.)

BY MS. BUGEL:

Q. And, Mr. Gnat, Exhibit 1519 is also a series of photos, correct?

A. Yes.

Q. And these photos -- are these photos familiar to you?

A. They look like pictures I would take, but I don't know when they were taken. There is --

Q. Do these --

A. Do you know what -- you know, which

of my inspections this one was out of?

Q. These photos were part of Exhibit 1513. Do those now look familiar to you, that they are from the same series as Exhibit 1513?

A. I am assuming that's correct. I -- you know, I -- pictures are pictures. They -- assuming they are -- this one says Exhibit 1519. This one says Exhibit 1513. So they certainly look like pictures I have taken. I don't know if it's from the same walk or from a previous -- from the previous years. That's the only thing I can't put together.

Q. Okay. Do you see that the Bates numbers are sequential?

A. On the Exhibit 1513 here that's in my book, there are no Bates numbers available or that are legible or that I can see.

MS. BUGEL: Can we go off the record for a second?

(Whereupon, a discussion was had off the record.)

HEARING OFFICER HALLORAN: Okay. We are back on the record. Sorry, Mr. Gnat.

BY THE WITNESS:

A. All right. Now -- now, I have a set here with the Bates numbers. So, yes, it appears it's from the same -- same sequence.

BY MS. BUGEL:

Q. So -- so do the -- does the area photographed in these pictures, is it familiar to you?

A. Yes.

Q. Okay. And these photos were taken at the northeast area at Joliet, correct?

A. Correct. During that site walk, yes.

Q. And the photos -- you took the photos during a walkover inspection of that northeast area?

A. Yes.

Q. And looking at Bates 108284, there are no cobbles visible in this picture, correct?

A. That is correct. Along this part of the intake, by the intake channel here, I do not remember seeing lots of those cobbles, which you see further on when you are along the Des Plaines River, correct.

Q. And can you please page through 108285 and go through 108292 and tell me if you see any cobbles in this next eight pages?

A. So, on -- I will go along here. No. 285, that picture is taken a little bit further up from the bank, but I just note all along this part of the bank, I don't remember seeing very much in terms of cobble. The 286, no. That's just inside the fence there. 287, no cobbles there. This is all one side of the fence there.

289, that's a picture facing the other way up into the -- so we are not even looking at the -- at the -- at the river here at this point. Same with 290. And then 291 -- and I believe I'm -- I'm pretty sure I know where this is taken. This is right as you are approaching where the intake splits off from the river itself, but I do believe that there is a little bit of cobble at this point along the channel, and it's almost evident in the picture in here. So that's kind of where -- if I remember right, where you start seeing that cobble that I refer to as probably dredging from the channel.

Q. And --

A. And then 292 -- I believe you said through 292?

Q. Yes.

A. Again, this picture is looking away from the channel, so I wouldn't expect to see anything there in terms of cobble.

Q. And turning to the next page, which is 108302, there are no cobbles visible in this picture either, correct?

A. I wouldn't necessarily say from this angle that you would be able to see it, but I'm looking a little bit further up. I'm standing up on top. So I'm not necessarily looking straight down. So I wouldn't necessarily say that absolutely that I see -- would see no -- or none of that type of cobble there. It could just be the view of this picture.

Q. In the picture, in the view, there is no cobble visible, correct?

A. I think that would be correct, yes.

Q. And turning to the next page, 108313, if you could flip for the next six pages through 108318, and tell me whether there are any

cobbles visible in any of these pictures?

A. No. And I wouldn't expect any. These are all pictures looking more towards the interior, because I'm not just looking at the bank, but also the interior. So all of those pictures through the 318, from 313 to 318, are looking away from -- from the embankment. So I wouldn't expect to see any there.

Q. And can you please turn to 108323?

A. Yes.

Q. And if you can look through the next set of six pictures, from 108323 to 108328. There are no cobbles visible in any of these pictures, correct?

A. Again, that entire sequence of pictures is from the internal part then of my site inspection, so not along the bank. So I wouldn't expect to see the cobbles there, at the surface at least.

Q. And just to confirm, in the pictures, you don't see any cobbles, correct?

A. Correct.

Q. And turning to Bates 108329, there are no cobbles visible in this picture, correct?

A. Correct. Again, quite a distance off the bank.

Q. So you are quite a distance from the river, correct?

A. Correct.

Q. How far -- do you have any estimate of how far you are from the river?

A. Kind of hard to tell on the scale here. You can see the river in the background there, so a couple hundred feet.

Q. And if you could page through the next five pages and tell me whether there are any cobbles visible in any of these pictures?

A. Five pages? That is correct. Again, these are interior pictures. So not along the embankment.

Q. And if you could turn to Bates page 108335.

A. Okay.

Q. There are no cobbles visible in this picture, correct?

A. That's correct. Pretty heavily overgrown here, but getting closer to the bank knowing kind of where this picture is taken, there

is cobble there. You just don't see it in this picture. It's a little bit further off the bank.

Q. And you do see the river in this picture, though, correct?

A. Yes.

Q. And you can see the river in the upper right-hand corner?

A. The upper right-hand corner is the sky. The river is kind of right in the middle where you can see through the bushes.

Q. So looking at the upper right-hand corner, it's your testimony that --

A. Oh, no, I take it back. Yep. That's water there. You are correct. So, yep, the river goes along there. I was focused in on -- I'm looking right through the -- through the brush here.

Q. That white spot in the middle looks to be a bright reflection from the river, correct?

A. Yeah, either that or just a sun reflection on the lens or whatnot, but yes.

Q. Okay.

A. And yeah, upper right, you are correct. That is water.

Q. Okay. And turning to the next page, this Bates 108337, there are no cobbles visible in this picture, correct?

A. If this is the particular area I'm thinking of, by the angle of this picture, no, you will not see any. Cobbles will be over to the right.

Q. And there is a -- do you see what looks like a metal pole in this picture?

A. Yes.

Q. And do you know where that's located at the Joliet 29 property?

A. If I -- I'm just looking at this picture, and, you know, it's a pole that was when we were doing the repairs. It was probably anchoring down a hay log. So I can -- yeah, wherever we did our repairs, you will generally find some of these remnants still there.

Q. So this is one of the areas that you believe you repaired?

A. Not I believe. Yes, it is one of the areas I repaired.

Q. Fair enough. And do you know which area?

A. Just generally looking at it on -- I don't want to speculate. I'm -- this is probably the Area 3.

Q. Okay. And can you, please, page through the next eight pages from 108338 to 108345 and tell me whether there are cobbles visible in these photos?

A. 108338?

Q. Yes.

A. There is some cobbles there along the shoreline. They don't necessarily appear to be cobbles in your picture, but they are. 339 is pretty well overgrown, so any cobbles there would certainly not pop out at you in this picture. 108340, same observation, pretty well overgrown. Any cobbles that are there, even if I tell you, yes, trust me that they are there, you can't see them in the picture. And 108341, I believe you can kind of make out some of the cobble there, but, you know, again, it's not very clear or definitive in this picture.

And how far through did you ask the --

Q. All the way through 345.

A. Okay. 108342, no, you cannot see any cobbles in this picture. And if I recognize this area correctly, I wouldn't expect to either. 108343, same. This is an area right by the fence. That's not an area -- it's along the intake channel. So it's not an area where I'd see cobble.

Q. And, Mr. Gnat, the fence in 108343, what fence is that?

A. That is that east fence line. That's that northeast corner.

Q. So that is not the property line, correct?

A. That is correct. 108344, no, you cannot see any cobbles in this. Pretty well overgrown. The repairs we put in are holding pretty well. 108345, same area, just another -- whenever I do these site walks, I usually try and document some of the areas that we did the repairs on, just to be able to document how they are holding up, and these particular pictures are documenting that and showing how well put in the -- or how well the vegetation has taken over at this point, which is what we want.

Q. Okay. And turning to the last set of pictures that go from 108382 through 108393, can you confirm that there are no cobbles visible in any of these pictures?

A. All the way through 108393, these are all, again, pictures of the internal part away from the embankment. So it's at the surface you certainly don't see any pictures -- or don't see any cobbles and haven't seen them in the past, and they are certainly not on the picture.

Q. Thank you. And Complainants move for Exhibit 1519 to be admitted into the record.

HEARING OFFICER HALLORAN: Ms. Gale?

MS. GALE: No objection.

HEARING OFFICER HALLORAN: Thank you. Complainants' Exhibit 1519 is admitted. No objection.

(Whereupon, Complainants' Exhibit No. 1519 was admitted into evidence.)

BY MS. BUGEL:

Q. And bear with me a minute here while I flip over.

And, Mr. Gnat, earlier today you

were discussing the northwest area at Joliet.

Do you recall that?

A. Yes.

Q. And have you ever seen cobbles in the northwest area?

A. Similar to what we -- what I was referring to in terms of my walks?

Q. Yes.

A. No. I mean, there are chunks of dolomite. You have got bedrock pretty close to the surface there, and there are some chunks laying around, but not -- I don't view that the same as my embankment walk.

Q. And when you say you don't view that the same as your embankment area, are you saying you don't see cobbles in the northwest area that are similar to cobbles you have seen in the embankment area?

A. I guess I would view that when I'm walking along a channel like the Des Plaines River or Chicago Sanitary Ship Canal or whatever, and you see big chunks of dolomite and limestone, knowing that these things have been ripped through the bedrock to deepen channels and so on for

navigation, you know, you kind of make that correlation.

Okay. This is from the -- you know, the process, the construction process. You're right there by the lock and dam. Up in the northwest area, I'm well away from that, so I can't make that association. I do know that bedrock is fairly shallow. I do know that fill that people use for roads and whatnot includes -- you know, in the area coming from local quarries can include dolomite of various sizes and so on.

So when I see a larger chunk or something of dolomite laying on an internal piece, I don't have that connection. I'm not walking right along the bank of a navigational waterway that I know has been dredged.

Q. Earlier today you talked about the northwest area being sampled potentially for construction for a wind break for the coal pile.

Do you recall that?

A. Yes.

Q. Was ash from the northwest area ever used for that wind break?

A. That project, the request for

proposal went out, but that project never materialized.

Q. So I think you answered my next question, which is, do you know if the wind break was ever constructed?

A. Not to my understanding.

Q. And you also were talking about Powerton earlier today.

Do you recall that?

A. Yes.

Q. And you were talking about water levels rising, and I believe it was in relation to the Secondary Ash Basin.

Do you recall that?

A. Yes.

Q. And you said you never saw -- you yourself never saw water levels 30 feet above the bottom of the ash basin, correct?

A. Above the Service Water Basin, and I believe I said neither myself, nor any of my sampling crews that would go out there. I'd imagine if an entire impoundment was under water, they would let me know.

Q. How many days per year do you go to

Powerton?

A. I -- there are crews out there doing quarterly sampling, and the sampling around there takes roughly five days. So one week per quarter.

Q. So five days per quarter?

A. Correct.

Q. And four times a year?

A. Correct. And then if we have to do a resampling, you know, we go out there. We also do monthly -- at this point monthly water levels at Powerton as well. So one for another day a month for the months in between the quarters somebody is out there as well, yes.

Q. Okay. So your crews, if my math is correct, spend at -- approximately 37 days per year at Powerton?

A. Probably correct, yes.

Q. And we had an exhibit that was the site map of -- I'm sorry. Not the site map, but a KPRG satellite image of Powerton. I don't have the name for it, but can you find that in front of you still?

A. Which book would that be in, or which --

Q. That would be in book 3.

A. The excerpt from Exhibit 1307?

Q. I believe so. So you have the excerpt of 1307 in front of you?

A. Yes.

Q. And can you please tell me whether there are monitoring wells along the west side of the channels?

A. There is -- there are two channels. There is -- the ash ponds are on -- or the ash basins are on the east side of the eastern most channel shown there. There are no wells to the west of that channel.

Q. And then there is another channel, correct?

A. Correct, there is another channel.

Q. And the second channel is west of the channel next to the ponds?

A. Correct.

Q. And are there monitoring wells along the west side of the western most channel?

A. No.

Q. Are there monitoring wells located in between the two channels?

A. No.

Q. So when you or your crew are out there doing the groundwater monitoring, you are not walking between the channels, correct?

A. That is correct.

Q. And when you and your crew are out there, you are not walking along the west side of the channels when you are doing -- checking the monitoring wells?

A. Correct.

Q. And I want to turn to Waukegan. You discussed Waukegan today, correct?

A. Yes.

Q. Okay. And you discussed the adjustment of the east berm of the East Pond at Waukegan, correct?

A. Yes.

Q. What adjustment needed to be made?

A. I wasn't involved on that. I believe that was part of the inspection. On the stability inspection, I believe that height of the wall had to come down a little bit, but again, I wasn't part of that project. It was a different firm.

Q. Is it your understanding that the height of the wall needed to come down for stability purposes?

A. I don't know for the specific purpose, but that's my understanding. You know, again I was -- our firm did not do that.

Q. But was your firm involved in the construction permit for that adjustment?

A. No.

Q. And I want to refer to Will County now. You testified as to Will County this morning as well, correct?

A. Yes.

Q. And your firm has been involved in work for Midwest Gen under the federal CCR rule, correct?

A. Yes.

Q. And the federal CCR rule came into force in 2015; is that correct?

A. Yes.

Q. And the Illinois EPA CCR rule came into force later than the federal CCR rule, correct?

A. I believe, 2021.

Q. And there were closure plans for the Will County ponds under the federal rule, correct?

A. Yes. I believe that 2 South, 3 South were under the federal rule.

Q. And you referenced a -- you referenced a meeting last week for the Will County ponds, correct?

A. Yes.

Q. And that meeting was for the purposes of the Illinois CCR rule, correct?

A. That, as well as under the federal rule, for corrective action, assessment of corrective measures for Ponds 2 South, 3 South, yes.

Q. And that -- one of the purposes of that meeting was to present an alternatives analysis, correct?

A. Yes.

Q. And that -- at that meeting, was it communicated that the selected alternative for closure of 2 South and 3 South was cap in place; is that correct?

A. Yeah. I believe the preferred alternative that was identified for the public

meeting was to cap in place, yes.

Q. Do you know what the preferred alternative was under the federal rule prior to the Illinois EPA rule going into effect?

MS. GALE: Objection. Mischaracterizes the documents. There -- there is no preferred alternative under the federal rule.

HEARING OFFICER HALLORAN: Ms. Bugel?

MS. BUGEL: I'll rephrase.

HEARING OFFICER HALLORAN: Thank you.

BY MS. BUGEL:

Q. Do you know if there was an alternative for closure of Ponds 2 South and 3 South selected for Will County under the federal rule?

A. I believe that you have to identify what you are thinking that the -- the closure might be at that point. What it was back in 2015 and what was developed, I -- honestly, I don't remember. That was more of the engineering side of the house.

Q. Okay. Okay. Moving on.

We are placing in front of you an exhibit that has been marked as Exhibit 1520.

A. Yes.

(Whereupon, Complainants' Exhibit No. 1520 was marked for identification.)

BY MS. BUGEL:

Q. And, Mr. Gnat, are you familiar with this document?

A. Yes, I am.

Q. And did your firm work on this document?

A. Yes. We worked on it. You know, again, there are probably some aspects of this, that were brought in from other firms as well, but certainly worked on it and pulled this together, yes.

Q. And it has KPRG -- a KPRG header on the first page?

A. Yes, it does.

Q. And you, yourself, were involved in the preparation of this document?

A. Portions of it, yes. I'm just trying to see. There is so many different

documents that are generated as part of these submittals that I want to -- so, yes, I would have been involved in the geology and hydrogeology aspect of it, and any -- if the -- I don't know if this document includes any of the support modeling? Yes, it does. And I was also involved in the direction and interpretation of some of the modeling efforts in support of the alternatives analysis.

Q. And this -- this is the document that was being discussed at the meeting that you referenced last week, correct?

A. That is correct, yes.

Q. And you attended that meeting?

A. Yes, I did.

Q. And you answered questions at that meeting?

A. Yes, I did.

Q. And do you know if this document has an appendix that covers cost figures for the closure alternatives?

MS. GALE: Mr. Hearing Officer, we are going to object to the questions about this document. This document is -- you know, there was

an objection earlier about the lateness of documents. This document is very recent, and, you know, we -- the Complainants have routinely objected to, you know, surprise and lateness. And so we would also have an objection to surprise and lateness of documents here.

HEARING OFFICER HALLORAN: I think one of them was the recent FOIA request.

But, anyway, Ms. Bugel.

MS. BUGEL: On direct Mr. Gnat brought up the meeting -- the hearing -- sorry -- the meeting of last week; discussed it, raised this very document by referencing that meeting and discussing the goings on, and --

HEARING OFFICER HALLORAN: Yeah. I agree. I think -- you know, I think the door was opened.

And so overruled. You may continue.

BY MS. BUGEL:

Q. So one question. Is there a table of cost figures for cost estimates for the closure alternatives in this document?

A. I don't think that was included in

this document. Oh, no, it is, absolutely. Table 2. It appears to be Table 2.

Q. And Table 2 contains the closure alternatives analysis cost estimates comparison; is that correct?

A. That is correct, yes.

Q. And do you recall any questions about cost estimates being asked at that meeting last week?

A. Yes.

Q. Okay. All right. Complainants move for Exhibit 1520 to be admitted into the record.

HEARING OFFICER HALLORAN: Ms. Gale?

MS. GALE: Objection to relevance. I mean, she talked about one table. Same objections that we have had routinely. This is a pretty large document, very technical. They have talked about one table. This also, again, is a surprise to us, which that has been upheld before, and, you know, we just don't see how it's relevant.

Yes, he testified that he sat in a meeting last week pursuant to the Illinois CCR rule to discuss compliance with that rule, but

that doesn't make this document relevant to these proceedings, which are related to the compliance with the groundwater rules under 620.

HEARING OFFICER HALLORAN: Ms. Bugel?

MS. BUGEL: This -- we have established that the document pertains to the meeting, and closure alternatives were being discussed at the meeting, and closure alternatives are discussed in the document very generally. In addition, closure alternatives are very relevant to the remedy at issue in this proceeding.

HEARING OFFICER HALLORAN: I will allow one more response, Ms. Gale.

MS. GALE: Well, closure -- again, this is -- closure alternatives are important for this Illinois CCR rule analysis. This is a document acquired by -- under Part 845. This proceeding is not an analysis of compliance with Part 845. This proceeding is related to compliance with 620 and any remedy that may -- the Board may consider.

Now, but again, that doesn't establish that this document is relevant to the

Board on deciding what its -- what its decisionmaking should be.

MS. BUGEL: May I respond?

HEARING OFFICER HALLORAN: Last time. Thank you.

MS. BUGEL: Okay. The -- this goes to the heart of this proceeding, is how to address the violations. This goes through closure alternatives for the ponds, which is one option at the Board's disposal for remedy. So this is -- they are hand in hand. Even if they are under different legal -- legal framework, they -- it's -- all the same options can be considered for both closure and for remedy in this proceeding.

HEARING OFFICER HALLORAN: Yeah. I think it's relevant, and it possibly could assist the Board. Midwest's objections are noted for the record, but I will admit it over objection.

Complainants' Exhibit 1520 is admitted.

(Whereupon, Complainants' Exhibit No. 1520 was admitted into evidence.)

MS. BUGEL: And, Hearing Officer,

may I have five minutes to confer with co-counsel? We are virtually wrapping up. I just want to make sure I have covered everything.

HEARING OFFICER HALLORAN: Okay. We are off the record.

(Whereupon, a short break was taken.)

HEARING OFFICER HALLORAN: All right. We are back on the record. Thank you.

Ms. Bugel.

BY MS. BUGEL:

Q. Yes. We are referring back to the excerpt of Exhibit 601 from May. And Leah has pulled this out of the boxes for the witness, for Mr. Gnat.

And, Mr. Gnat, just could you please grab Exhibit 1518, which is hopefully still in front of you? And referring to the excerpt of Exhibit 601, you discussed this area of land that is not necessarily owned by Midwest Generation in your testimony in May.

Do you recall that?

A. Yes.

Q. And you on the record described the

area. Do you recall that?

A. Yes.

Q. And Exhibit 601, does this show the property line, and this -- does this show the property line as the Joliet No. 229 station?

A. My understanding is this is the property line that was surveyed and associated with the project there for the Army Corp of Engineers, and that is the property line that -- there is that strip of land there that is actually, I believe DNR property or Army Corp of Engineers property, but not Midwest Generation property, correct.

Q. Okay. And Exhibit 601, the expert shows that little strip of land that is not Midwest Gen property?

A. Yes.

Q. Okay. And referring back to Exhibit 1518, can you just look at Area 5, please?

A. Area 5?

Q. Yeah, pages 9 and 10.

A. Okay.

Q. And is Area 5 -- let me strike that and rephrase that.

Is -- Area 5, does it fall within the strip of property that is not owned by Midwest Generation?

A. No.

Q. And flipping back just one page to Area 4, does area -- I will wait for you to get there.

Does Area 4 fall within the strip of land that is not owned by Midwest Generation?

A. No.

MS. BUGEL: Okay. I have no further questions.

HEARING OFFICER HALLORAN: Thank you, Ms. Bugel. Off the record for a minute.

(Whereupon, a lunch break was taken.)

HEARING OFFICER HALLORAN: All right. Back on the record. We're back from lunch. It's approximately 1:10. Thank you for being so prompt.

Ms. Bugel, housekeeping before Ms. Gale's re-direct?

MS. BUGEL: Yes. So it's as to

public comment tomorrow. We have learned that there may be three more people coming.

HEARING OFFICER HALLORAN: Three more out of -- in addition to what?

MS. BUGEL: Initially, we had said two. So we are looking at about four people coming at 1:00, and I just did want to advise that one of the people coming at 1:00 is the Mayor of Waukegan.

HEARING OFFICER HALLORAN: Okay.

MS. BUGEL: So I just want that to be transparent. In addition, we have had a request for Representative Avelar out in Will County. She would like to come offer comment, but she cannot come at 1:00. She is requesting to come in the morning tomorrow. I do not have a time.

MS. NIJMAN: You know, Mr. Hearing Officer, again, I'm struggling with this, but this happened in the last -- in 2019 as well, and it happened during our week. If they have public comment, it should have been handled during the week that they were presenting their case. Now, it interrupts our case flow. It interrupts now

several times, apparently. Now, it's not two for three minutes. Now, it's longer. This is becoming -- this shouldn't have been done in our week, and we may well go over then.

HEARING OFFICER HALLORAN: Yeah, we may. I mean, it's the Board's policy to have public comment, but I agree with you, Ms. Nijman, that this could have been done during the Complainants' case, and we were told via e-mail about the two or three, and now we may have three more, so I count five.

MS. BUGEL: Five.

HEARING OFFICER HALLORAN: And it's three minutes a piece?

MS. BUGEL: Five at three minutes a piece. I will note that we -- we ended before. You know, and there was never an argument --

HEARING OFFICER HALLORAN: Yeah.

MS. BUGEL: -- about a 50/50 split. We didn't even use a full week. We were on to Midwest Gen's witnesses by lunch time.

MS. NIJMAN: Which is why they should have been done --

MS. GALE: You should have done them

then.

HEARING OFFICER HALLORAN: Okay. Yeah, we're still on the record. So let's not talk over each other.

I am going to allow it, but, you know -- and I believe the rules -- I haven't looked at them in a while -- is it's as time allows. And if need be, we will just have to shorten our lunch for a day or two. I mean, I don't know, but --

MS. NIJMAN: Is there a way to do this all at once --

HEARING OFFICER HALLORAN: Well, as part of the --

MS. NIJMAN: -- rather that splitting up our cases?

HEARING OFFICER HALLORAN: Well, you mean as far as bringing the other witnesses in? But she doesn't know when the state rep is coming in.

MS. NIJMAN: And so we have to stop in the middle of a witness because the state rep is coming?

HEARING OFFICER HALLORAN: Maybe so,

Ms. Nijman. That's the way the ball roles.

MS. BUGEL: I have no control over the state rep's schedule.

HEARING OFFICER HALLORAN: I -- neither do I. I agree. The timeliness is not the most ideal. But we will have them on. They can give their three minutes, and we will see what happens. We won't -- we won't mess with your -- whether you are doing a direct or not. We will have the state rep wait for a little bit until you are done, so you don't have to stop in the middle of your direct or re-direct or whatnot.

Ms. Bugel, if she is doing a cross or Mr. Abel, they can stop. But is that agreed?

MS. BUGEL: Agreed. And I will advise the state rep that she may have to wait if we are in the middle of --

HEARING OFFICER HALLORAN: If -- yeah, we were in the middle of something.

MS. BUGEL: Yeah.

HEARING OFFICER HALLORAN: You know, it won't be too long, but we will try to get her in.

MS. BUGEL: Okay.

HEARING OFFICER HALLORAN: Or we will get her in.

MS. NIJMAN: Are we doing any kind of time limitations? We were told three minutes.

HEARING OFFICER HALLORAN: I think it's three minutes.

MS. BUGEL: I will advise them that they need to each keep it to three minutes.

MS. NIJMAN: Thank you.

HEARING OFFICER HALLORAN: Thank you. All right. That was that housekeeping matter.

Ms. Gale, I think you are on re-direct, and Mr. Gnat, you are still under oath.

R E - D I R E C T E X A M I N A T I O N

by Ms. Gale

Q. Mr. Gnat, I would like you to get out Gnat Book No. 2, please.

A. Okay.

Q. And can you flip to Exhibit 1504?

A. Okay.

Q. And you were asked questions about the end of borings for each of these borings logs.

Do you recall those questions?

A. Yes, I do.

Q. And -- well, I will ask this.

Why -- and at the end of borings for each of these logs, why did the boring end?

A. You know, it's not put on these logs and in a way, shame on us, but knowing this particular effort, this was done with a Geoprobe drilling rig, which is a technology that pounds the sampler down, and this was because of refusal hitting large -- larger cobbles or whatnot that the technology just couldn't get past.

Q. So -- and I'm sorry. So you said -- you used the term "Geoprobe." What is a Geoprobe?

A. A Geoprobe is a drilling tool that rather than spinning like an auger does or a rotary-type approach, this is strictly hammering down and hammering a core barrel down literally with a hydraulic hammer.

Q. And where -- and so I see on the boring log, the first one there at the bottom it says, "Use of rig, Geoprobe." Is that what you mean?

A. Yes.

Q. And can you turn to Boring Log SB3?

A. Yes.

Q. And do you see it says towards about 15 feet, "increased cobbles"?

A. Yes, around 10 feet down, yes.

Q. And then Boring Log SB4?

A. Yes.

Q. Around there, around six feet, it says, "increased cobbles"?

A. Correct.

Q. And when you see cobbles, what does that indicate to you?

A. That the material is picking up a larger -- you know, so you have got different sizes. And sizes are sand, gravel -- cobble is the next size up, and above cobbles is a -- is a boulder. So cobbles tend to be, you know, four or five inches, maybe larger, eight, ten inches type, and you start getting bigger, they will starting going into what would be called boulders then.

Q. And would the boulders -- well, could a Geoprobe get through a boulder?

A. Well, certainly -- well, cobbles -- depending on the cobble and the angle in which the

Geoprobe hits it. If it's large enough, and the Geoprobe is hitting the cobble, you know, just along the side, it will probably break it off or should be able to angle past it, but if you take -- get a large cobble and you hit it head on, you may, in fact, just hit refusal. You won't be able to get past that.

Q. And you mentioned earlier the Geoprobe is different than -- I think you used the term "auger." What is an auger?

A. Right, a hollow stem auger. It's a different drilling method where you're actually spinning down an auger, and when an auger encounters a cobble-size fraction, it can quite often just go along the side and spin it up the side of the auger and bring it to the surface, but, you know, in terms of limitations for drilling methods, if you get into a big cobble -- into a big actual boulder field, hollow stem arguers aren't the best to go through those either, because those are just too big, and it can't bring it up. It's going to sit on top of that boulder and just turn and not be able to get past it.

Q. And so -- but all right.

Well, I am going to actually give to you an excerpt of Complainants' Exhibit 12C. And 12C, for the record, was introduced and admitted in the first hearing, and the -- what we have here is an excerpt of the Hydrogeologic Assessment Report prepared by Patrick Engineering in February of 2011.

Can you turn to the -- so to the first -- sorry. I guess the second page?

A. Yes.

Q. And you see it's for Monitoring Well 9?

A. Yes.

Q. And if you want to turn in your Exhibit 2 -- excuse me -- binder 2 to Exhibit 1503?

A. Yes.

Q. And 1503 is a map, right?

A. Yes, it is.

Q. So what monitoring well is on 1503?

A. MW-09.

Q. And so looking at the boring -- and so in exhibit -- Complainants Exhibit 12C, is this

boring log Monitoring Well 9, the monitoring log -- excuse me -- the monitoring well in 1503?

A. Yes, it is.

Q. Okay. So I want you to look at -- so this goes all the way down to 35 feet, right?

A. Yes.

Q. What's the difference?

A. Well, this -- this boring was done with the hollow stem auger right there on the drilling method. It says there a 4.25 inch ID hollow stem auger, has, that signifies a 4.25-inch inner diameter hollow stem auger.

So this is that drilling method that can certainly handle cobbles left that are -- where if it encounters a cobble layer, it can bring those cobbles up, as opposed to getting stalled out on them.

Q. Okay. And, yeah, could you look at -- in the Patrick Engineering boring log Monitoring Well 9 at 11 feet?

A. Yes.

Q. What do you -- what is -- what is shown at 11 feet?

A. Limestone fragments with wet ground

silty fine to course sand, dry.

Q. And what do the limestone fragments -- fragments mean to you?

A. Knowing what the bedrock in the area is, it's a limestone dolomite-type bedrock, and so a lot of the soils and so on in this area, and even the materials being used as fill being brought in from offsite will include this type of limestone fragment. It's provided for the weathered bedrock in the area.

Q. In relation to using the pounding of a Geoprobe, and you see limestone fragment at 11 feet, what does that mean?

A. That this material has fragments and -- limestone fragments usually tell me it's, you know, gravel size, maybe a little bit on the larger size of gravel within -- within this material.

So, you know, again, that this is probably within 20 feet or so of bedrock at some point. You know, that you are eventually going to get close to that bedrock, you know, weathered limestone fragments on top of weathered bedrock.

Q. All right. I want to turn to -- you can put that aside. Thank you.

And can you pull out Complainants' Exhibit 248N?

A. Yes.

Q. Okay. And this is the August 27th -- excuse me -- August 27, 2009 inspection report.

Mr. Gnat, after you did this inspection -- well, let's turn to page MWG13-15_19444.

A. Yes.

Q. Okay. After the bullet point, first full paragraph where it states, "KPRG met with Allied Landscaping", what was the point -- what was the purpose of meeting with Allied Landscape -- excuse me.

A. To go over the areas and to get their estimate for the necessary materials and labor to do the repairs that we would like them to do to address these areas that were identified.

Q. And were the repairs made?

A. Yes, they were.

Q. And do you recall discussing them at

the first hearing?

A. I believe we did, and I believe I generally said that we tried to -- I would get the contractor out the same day that I finished the inspection, get their costs, and we were trying to get these repairs done within anywhere of two to four weeks of the initial inspection.

Q. And for the record, the repair that was discussed was Midwest Gen Exhibit No. 800.

Turning to your observations of Area 2, which is on MWG13-15_19443.

A. Yes.

Q. Do you see in that Area 2 description where you say -- you describe the size of the gully as 50 feet long, up to 4 feet deep and 10 feet wide, and then you say there is evidence of --

THE COURT REPORTER: I'm sorry?

BY MS. GALE:

Q. I'm sorry. And then you say there is evidence of ash and slag in the bottom of the gully, G-U-L-L-Y. When you say evidence of ash and slag, what do you mean by that?

A. Well, when -- when I looked on the

sides, I didn't see any, but in the bottom of the gully where you actually saw -- I saw some -- you know, the exposed dirt, and so I saw some evidence of some -- some ash material kind of sparkly, sandy looking and some cindery material within that soil in the bottom of the gully itself. So that's -- that's what that was trying to describe.

Q. So when you are describing what you observe here in the ash and slag, are you saying that it's a monofill of ash or slag?

MS. BUGEL: Objection, leading.

HEARING OFFICER HALLORAN: All right. Can you rephrase, Ms. Gale?

BY MS. GALE:

Q. When you describe the ash and slag at the bottom of the gully and the ash and slag you see -- you saw in these various areas, what is the composition of the ash and slag?

A. It's part of the dirt that -- out of the exposed dirt that I was seeing. So it's not like it was just all solid ash or a wall of ash or something. It was just dirt with -- to me that was evidence of ash and cinder mixed in with it.

Q. Okay. You can put that aside.

Okay. And I would like you to pull out Exhibit 1513 and Exhibit 1519. We are going to look at those together.

A. Okay.

Q. Okay. Are you ready?

A. Yes.

Q. Okay. So, as you -- when you are out here -- so these pictures of your -- are of your -- as you walk along your inspection?

A. Yes.

Q. And, well, what order are the pictures in?

A. Well, I generally -- they should be in consecutive order of when I start my walk to when I finish it. So, as I am walking down along the embankment from -- in this particular case from west to east, I would be taking pictures of the embankment, but there are times also when I would turn around and take a picture looking up away from the -- from the river to -- you know, up -- up into the property itself, so -- but I would track along that way, and then on my way back as I am walking more on the interior of the property, then a sequence of the pictures on the

interior of the property.

Again, sometimes looking north, sometimes looking south. You know, there will be a time where I stop in a location, and I'll take a picture north, east, south, west type.

Q. Can you flip -- so in Exhibit 1519, can you flip to MWG13-15-108292?

A. Yes.

Q. If you recall, you were asked questions about this picture and other pictures like it, and the -- and this picture not depicting cobble?

A. Yes.

Q. Can you turn to Exhibit 1513 and go to picture MWG13-15_108293?

A. Yes.

Q. So compared to MWG13-15_108292 compared to 108293, what are you seeing in 293?

A. 293 is showing the embankment. On this particular picture, you can actually make out the cobbles, and some of them are bigger than cobbles, boulders.

Q. And I believe you said your process of going through is you will stop, and you'll take

pictures in various directions?

A. Yes.

Q. What happened here between these two pictures?

A. Well, this is probably 292 -- or 292 is taken facing north and turn around and 293 facing south.

Q. And then I would like you to then turn to the next photo in 13 -- excuse me -- 1519, MWG13-15_108302.

A. Yes.

Q. And I believe you said that it was hard to see cobbles in this photo, but if you could turn in Exhibit 1513, and turn to MWG13-15_108305, and comparing MWG13-15_108302 to 108305, what do you see?

A. Well, in the 305, which is a couple of pictures down, so a little bit further to the east along my walk, you can see the boulders and -- or cobbles and so on along the bank there. Well, this is -- the 302 is, you know, a little bit to the west of there, and you can't see it. I mean, certainly not from this angle, a fairly steep bank, lots of vegetation.

Q. So with lots of vegetation, what's under that vegetation?

MS. BUGEL: Objection, calls for speculation.

HEARING OFFICER HALLORAN: Well, you know, he has walked it. Evidently, this looks like it was in the fall. I see a lot of leaves. He can answer, if he is able.

BY THE WITNESS:

A. All right. And, again, even despite what you can't see in these pictures with lots of vegetation taken from a little bit further in, so if I knew I was going to take this picture to document for somebody that, in fact, I would see boulders or cobbles there, this picture would have been taken closer to the thing and focused down on it specifically for that purpose.

That wasn't necessarily for this purpose. I'm trying to document my walk. If somebody says, "Rich, please document that walk and with each picture take one that makes sure it sees the cobbles that you see there," I would do that. Certainly, what I'm looking for is not as much -- cobbles aren't what's of interest to me.

What's of interest to me is a seep.

And I have no pictures of seeps, because I have not seen any seeps, and so, you know, I guess, here I kind of sit here, and I'm trying to explain what I'm seeing. The pictures were taken to document the walk, to document whether or not I -- and documenting an erosional feature or if I'm documenting a seep.

If somebody said to me from the get-go, "Rich, walk, and every time you see a boulder, document it," I would have lots of pictures going along here, and ones where I'm not standing 15 feet or 10 feet off the side of the embankment with a lot of vegetation covering the embankment. If you went over there and took a look down, I will -- having walked this, you will see cobbles.

BY MS. GALE:

Q. And all this discussion of cobbles, I believe you testified cobbles were part of an indication to you of -- that there was dredging spoil. Do you recall that testimony?

A. Right. You know, and again, that's just the -- knowing of the construction history

of -- the history of that whole canal area and how all the canals in the areas were done, they were ripped into rock, and to see this type of materials along the sides doesn't surprise me.

Q. And -- but to your knowledge, are cobbles the only type of river spoils that would be seen?

A. No. Certainly there would also be any of the soft sediments, the sands, silts, clay or whatnot there are on top of rock as well. Those all get pulled up in any type of a project like that.

Q. Mr. Gnat, could you pull out book 3, please?

A. Okay.

Q. And can you turn to Exhibits 1515 and 1516?

A. Yes.

Q. And Exhibit 1515 and 1516 are the -- just for the record, the river gauges at Peoria Lock and Dam and the Kingston Mines.

Mr. Gnat, how often are these river gauges measured?

A. The river gauges are measured at

least on a daily basis.

Q. And so when you look at the historic crests on the bottom of each of those pages, what do the historic crests tell you?

A. To me, that -- so on Exhibit 1515, the oldest date on that is 1943 to 2019, and I believe this was the date -- I'm looking further up graph, created November 27, 2022. So what this tells me, these are the top five with the dates included of what the five highest historic crests were, and this is based on daily measurements.

So that's -- the highest crest ever was 546.57 feet on April 24th, 2013 based on daily recorded measurements by the USGS and NOAA.

MS. GALE: Nothing further, sir.

HEARING OFFICER HALLORAN: Thank you, Ms. Gale.

Ms. Bugel, re-cross?

MS. BUGEL: We don't have re-cross, but we do have two exhibits left over from this morning that we needed to make copies of.

HEARING OFFICER HALLORAN: Okay.

MS. BUGEL: And we have prepared those.

HEARING OFFICER HALLORAN: Okay.

MS. BUGEL: So, yeah, just for documentation, we are -- we are distributing a new copy of 1518, which is a demonstrative, and it has the correction that Mr. Gnat wrote on it, and the addition of Area 6 on the last page.

MS. GALE: Wait. Area 6 is on --

MS. BUGEL: No. You are looking at the wrong one. I was talking about --

MS. GALE: I see. Oh, got it. Okay.

(Whereupon, Complainants' Exhibit No. 1521 was marked for identification.)

MS. BUGEL: And then we have also distributed what is marked as a new exhibit, 1521, which is the excerpt that Mr. Gnat indicated the property fence line on in black marker, and that one, Complainants move for the admission of 1521 into the record.

HEARING OFFICER HALLORAN: Okay. I have 1521 up here? Oh, okay.

THE WITNESS: There is something on the back of 1521 as well, which on -- that's not

part of what I looked at or anything.

MS. BUGEL: The -- what is on the back of it -- because it is an excerpt from a previous exhibit. What is on the back of it is the -- and I believe it was 901? It was from 901, and the back of it is what was on the back of 901.

HEARING OFFICER HALLORAN: Okay. Let's take this one at a time.

Ms. Gale, Complainants' Exhibit 1518 with the corrections as to Area 3, to Area 2 -- is that the only markup you had, Ms. Bugel?

MS. BUGEL: No. The last page has Area 6 added to it. And Mr. Gnat put a black dot where Area 6 is, generally.

HEARING OFFICER HALLORAN: All right. Ms. Gale, exhibit -- demonstrative Exhibit 1518?

MS. GALE: We would continue our objection to the exhibit for the reasons we stated earlier.

HEARING OFFICER HALLORAN: Thank you. So noted. And, again, I will take it as a demonstrative, 1518. There's really no

substantive probative, but I think it would assist the Board in their decisionmaking.

(Whereupon, Complainants' Exhibit No. 1518 was accepted as a demonstrative exhibit.)

HEARING OFFICER HALLORAN: All right. Here we go. Complainants' Exhibit 1521. Ms. Gale?

MS. GALE: Well, the -- we are a little confused, because the one that we were handed earlier didn't have the second page, and Mr. Gnat said he doesn't know about the second page, but other -- you know, first page only.

MS. BUGEL: I believe the copy we distributed this morning did have the second page, and the reason it has the second page is it's because it's an excerpt from an exhibit. So we pulled it out the way -- that is the way it appears. I mean, it's the page 16 as it would appear in the original Exhibit 901.

But we are referencing -- obviously Exhibit 1521 is -- the focus is on page 15, and the marks that Mr. Gnat added for -- so that the Board can see where the fence line occurs

at Joliet 29.

MS. GALE: As long as it's clear to the Board that Mr. Gnat had nothing to do with the other side.

HEARING OFFICER HALLORAN: Okay. Yeah, that's all on the record. It's like déjà vu all over again from five years ago as far as the exhibits. We've got to make them a little cleaner, but the Board is to, I guess, disregard the back side, but Exhibit 1521 is admitted. Thank you.

(Whereupon, Complainants' Exhibit No. 1521 was admitted into evidence.)

MS. BUGEL: And with that, Complainants have no further questions.

HEARING OFFICER HALLORAN: Thank you, Ms. Bugel.

Ms. Gale, any re-re-direct?

MS. GALE: No.

HEARING OFFICER HALLORAN: All right. Mr. Gnat, it's been fun.

THE WITNESS: It's been a pleasure.

HEARING OFFICER HALLORAN: We'll go

off the record.

(Whereupon, a short break was taken.)

HEARING OFFICER HALLORAN: All right. We are back on the record. It's approximately 1:46. We are going to have a panel of two witnesses, which is kind of an anomaly for me, but it's been agreed to between the parties.

Gentlemen, if you could raise your right hand, Kari will swear you in.

(Whereupon, the witnesses, Mr. Dorgan and Mr. Maxwell, were duly sworn.)

HEARING OFFICER HALLORAN: Thank you. Ms. Nijman?

MS. NIJMAN: Thank you.

HEARING OFFICER HALLORAN: I'm ready.

WHEREUPON:

D O U G L A S D O R G A N

and

M I C H A E L M A X W E L L

called as witnesses herein, having been first duly sworn, deposeth and saith as follows:

D I R E C T E X A M I N A T I O N

MS. NIJMAN: So, again, for the record, we have two witnesses from Weaver Consulting Group, Mr. Douglas Dorgan and Mr. Michael Maxwell with agreement as a panel.

Mr. Dorgan, starting with you, would you describe current employment for both you and Mr. Maxwell?

MR. DORGAN: Mr. Maxwell and I are both employed by Weaver Consultants Group. We are an environmental, civil and geotechnical engineering consulting firm.

MS. NIJMAN: And tell me more about your respective role at Weaver.

MR. DORGAN: So I joined Weaver Consultants in 1995. In 2000, I became a principal in the firm. In 1990 -- or in 2017, I became the firm's co-president. I still serve in that capacity. Throughout my time with Weaver, I have been doing primarily environmental consulting, but I have done a -- quite a few other things as well.

I have led our environmental practice group. I've led our civil survey and

geotechnical group, and have been very involved in supporting the other business units within the company as a whole.

MS. NIJMAN: What was the role of Weaver Consulting Group -- and can we just refer to it as Weaver?

MR. DORGAN: Certainly.

MS. NIJMAN: What was Weaver's role in this matter?

MR. DORGAN: We were initially asked to consider the Board's opinion, both the 2019 and 2020 opinion with respect to what would be the appropriate remedy and relief with respect to the findings from the earlier phase of the hearing for the four Midwest Generation stations that have been the subject of this matter.

MS. NIJMAN: And would you explain how you and Mr. Maxwell divvied up, divided up that project?

MR. DORGAN: So Mike and I have collaborated quite closely on the project as a whole. Obviously, there was a lot of historic information to review. We have both been very involved in looking at the record as a whole.

Where we probably deviated was Mike -- Mr. Maxwell ended up focusing his attention more on the Will County and Joliet Stations, whereas I focused more on Waukegan and the Powerton Stations. Mike took the lead on some of the technical analysis as well, working with some of our support team.

MS. NIJMAN: Do you have a binder in front of you?

MR. DORGAN: Yes, I do.

MS. NIJMAN: Do you have that? And it's marked Weaver. Would you turn to the first tab of your binder?

And it is an excerpt from your expert report, which we will mark in a minute. So it's marked -- the CVs are identified and marked as Excerpt of Exhibit 1701.

Do you see that?

(Whereupon, Respondent's Exhibit No. 1701 was marked for identification.)

MR. DORGAN: Yes, I do.

MS. NIJMAN: Turning to the first page, is this your CV?

MR. DORGAN: Yes, it is.
MS. NIJMAN: Is the employment history and the certifications listed on the left of your CV, is that still correct?
MR. DORGAN: Yes, it is.
MS. NIJMAN: And in that box on the left of your CV on the page with your picture on it, you have a title called, "Fields of Expertise."
Do you see that?
MR. DORGAN: Yes, I do.
MS. NIJMAN: Would you tell me about your experience with brownfields redevelopment?
MR. DORGAN: So this callout box here is intended to be a summary of my general areas of focus throughout my really career and certainly my time while at Weaver. In particular, I have had a very concentrated focus in the area of brownfields redevelopment. That's been kind of a specialty of mine for quite a few years.
In brownfields redevelopment, we are looking at primarily older, industrial properties that are going through some form of closure or redevelopment, and the purpose is to

evaluate those properties with respect to the long-term uses and whether there is any legacy environmental concerns with these properties and how that might influence the redevelopment of and the future uses of the properties that are undergoing that redevelopment.

MS. NIJMAN: In your view, are the four Midwest Gen stations at issue here brownfields?

MR. DORGAN: I would consider them brownfields. While they may not necessarily going -- be going through a specific redevelopment, they certainly have a long history of industrial use. So they would -- they would fit into that type of classification.

MS. NIJMAN: Next on your list in your CV is the category of Remediation, Design, and Cost Modeling. Would you describe your experience there?

MR. DORGAN: Oftentimes as an outgrowth of the brownfields work, but not always, we will end up evaluating properties with respect to how to manage the environmental conditions that are characterized. We oftentimes do that using

risk-based strategies, sometimes to preset regulatory-driven closure standards, and I have been involved in all phases of the remediation, both the investigation side, and then the remedial design, the planning for the remedial implementation in terms of putting together technical and general specifications.

I've been involved in the bidding process; contractor review and selection, and ultimately contractor oversight, and then as the remediation is completed, we are doing a lot of the engineering oversight of that, and then the regulatory reporting to the appropriate regulatory agency.

MS. NIJMAN: You mentioned remedial measures. Does that -- when you assess a remedial measure, do you consider different types of remedies that might be appropriate?

MR. DORGAN: Certainly. And it can vary, depending upon -- depending upon which regulatory program you are working in. When we are looking at brownfields, we tend to look at it more from the state voluntary cleanup type of a strategy. This isn't a CERCLA site. It's not a

not RCRA site. So those standards don't necessarily apply. And in a situation with a typical brownfield in Illinois, we would do more of an alternatives evaluation. What are the various options we might have, and then what is technically feasible and economically practicable to implement?

MS. NIJMAN: You said just a minute ago that this is isn't a RCRA or CERCLA site.

Were you referring to one station, or all stations?

MR. DORGAN: I was referring to all four stations.

MS. NIJMAN: Tell me about the different type of media you work with in the brownfields work.

MR. DORGAN: Pretty much runs the gamut, including groundwater, surface water, sediments, surface waters. We look at -- oftentimes, we even get into air sampling, in terms of perimeter air sampling when that is called for.

MS. NIJMAN: And is your experience in Illinois?

MR. DORGAN: No. I have worked all around the country.

MS. NIJMAN: How much of your experience is in Illinois versus other parts of the country?

MR. DORGAN: I would say the majority of it has been in Illinois, but I have exposure to a number of other states and other programs, both at the federal and state level.

MS. NIJMAN: Can you estimate how many design projects you have worked on in your career?

MR. DORGAN: It's been in the hundreds.

MS. NIJMAN: And I should say remedial design projects.

MR. DORGAN: That would be the same.

MS. NIJMAN: Also, on your CV you list a groundwater impact assessment. What do you mean there?

MR. DORGAN: So in a groundwater impact assessment, we are looking at, you know, have there been releases at a facility that may have impacted groundwater, and if so, what's the

condition of the groundwater? What are the groundwater units that are involved? What's the plume condition? Oftentimes we evaluate downgradient receptors that may come in contact with groundwater impacts.

MS. NIJMAN: Does an analysis of risk have anything to do with that -- with that groundwater impact assessment?

MR. DORGAN: Yes, and it kind of dovetails into that next point there, which is the risk-based corrective action.

So we have instances where we are driven towards certain outcomes based upon the regulatory framework. In others, we are working within a context where a risk-based corrective action, RBCA, is more appropriate. We are looking there at what are the concentrations? What are the pathways? What are the receptors that may come in contact with those pathways?

And ultimately, we back into our remedy by concentrating first on what our receptor population and risk is to that receptor population. So that's kind of what I'm referring to there.

MS. NIJMAN: Is that an Illinois-based concept?

MR. DORGAN: Illinois certainly follows. This is more guidance that came out at the federal level under the risk-based corrective action.

MS. NIJMAN: On this issue of risk-based remediation in Illinois, we have bandied about in other testimony the word, "TACO". You are familiar with that word?

MR. DORGAN: The tiered approach to corrective action objectives?

MS. NIJMAN: And what is the first tier of this tiered approach?

MR. DORGAN: So in Illinois, the TACO program has three tiers. The first tier are a set of default criteria, that you can evaluate site conditions against. If you fall below the default criteria based upon your intended land use, you have no further to go. You have demonstrated that there is no risk, and therefore, the conditions are already managed.

MS. NIJMAN: And do the TACO Tier I standards provide a cleanup standard?

MR. DORGAN: Yes, they do.
MS. NIJMAN: You mentioned experience with remediation sites. Do you work with the -- well, we will just take Illinois -- Illinois agencies when you plan a remediation of a brownfield site?
MR. DORGAN: Yes, we -- I often have.
MS. NIJMAN: In the course of remediation, what happens if you disagree with an agency?
MR. DORGAN: Typically, there will be quite a bit of back and forth as you try to strike that balance in terms of bringing the Agency to a comfort level with your overall approach and strategy and the information that you have, and it's not uncommon you made submittals, you get a set of comments back, you respond to those comments, maybe you get further comments, and typically you'll eventually drive to an approval on whatever it is that you are seeking the approval for.
MS. NIJMAN: Have you served as an expert witness in the past?

MR. DORGAN: I have.
MS. NIJMAN: Have your opinions ever been rejected by a judicial body?
MR. DORGAN: Not that I am aware of.
MS. NIJMAN: In this case, have you had the opportunity to review reports filed by Mr. Quarles?
MR. DORGAN: Yes, I have.
MS. NIJMAN: And who is Mr. Quarles?
MR. DORGAN: My understanding is Mr. Quarles is the expert retained by the Plaintiffs as their expert.
Sorry. We're just missing a binder.
MS. NIJMAN: Do you recall reading Mr. Quarles' rebuttal report?
MR. DORGAN: Yes, I do.
MS. NIJMAN: Do you recall Mr. Quarles commenting on your qualifications?
MR. DORGAN: Yes, he did.
MS. NIJMAN: And he questioned your experience with remediations?
MR. DORGAN: Yes, with the remediation, and I think with respect to

experience within the CCR framework as well.

MS. NIJMAN: Is that surprising to you?

MR. DORGAN: Not necessarily. Certainly, when you have differences of opinion, I suppose there is an instance where you may choose to question qualifications, but that's not something I would do.

MS. NIJMAN: Had you ever met Mr. Quarles before the hearing -- this hearing in May?

MR. DORGAN: No, I had not.

MS. NIJMAN: And you have never worked with him before?

MR. DORGAN: I have not.

MS. NIJMAN: Would you detail for us your experience with CCR?

MR. DORGAN: I have been working -- well, with coal combustion byproducts for many years predating the CCR rules. Any number of project sites that I have been involved with have had coal combustion residues as a component of the site conditions.

But I also do have experience

working on sites that are exclusively CCB, including a large landfill in northwest Indiana that I have worked on for many years. I have also done a number of CCR closures of regulated units, two recent ones that we have just done in New Jersey.

MS. NIJMAN: Have you worked on CCR to the extent that it is also a part of another site?

MR. DORGAN: Yes. CCR, you tend to run into it especially here in the Chicago area. You run into it pretty frequently, especially as part of the Chicago fill materials that we're dealing with. Pretty much any site we do in the city involves Chicago fill materials, and CCRs are often a component of the materials we are dealing with.

MS. NIJMAN: And to be clear then, we're not -- we're -- how are you referring to CCRs when you are talking about Chicago fill material?

MR. DORGAN: I'm referring to it as just one of the constituents making up a matrix that we're managing.

MS. NIJMAN: Like a cinder or --

MR. DORGAN: It could be cinder. It could be combusted materials. Historically, many of the buildings downtown were heated with coal, and so you run into coal ash pretty frequently when you are dealing with city sites.

MS. NIJMAN: And going back to one of your comments about site remediations, are you familiar with the term "compliance commitment agreement"?

MR. DORGAN: Yes, I am.

MS. NIJMAN: How is that part of a site remediation?

MR. DORGAN: A compliance commitment agreement is generally a voluntary structure that you enter into with the regulatory agency, in this case, the IEPA. That spells out the steps you are going to take to remedy site conditions that are deemed to warrant that. It's a step-by-step process that outlines the individual, as the term says, commitments, that the owner is making to implement to try to address the concerns that have been identified. And those are usually spelled out in quite a bit of detail.

MS. NIJMAN: Were you present during Mr. Quarles' testimony in May?

MR. DORGAN: Yes, I was.

MS. NIJMAN: Did you hear Mr. Quarles say that he thought the CCA was intended to avoid compliance?

MR. DORGAN: I did hear him say that.

MS. NIJMAN: Do you agree with that characterization?

MR. DORGAN: No. When you enter into a compliance commitment agreement, you are taking proactive steps. You are doing it voluntarily. You are doing it in consultation with the regulatory agency. You are agreeing on the proposed course of action. The Agency is agreeing with you, and you are committing to certain follow-up actions.

So I -- I don't see something that is intending to avoid in -- compliance. I think it's intended to create a framework by which you can demonstrate compliance.

MS. NIJMAN: Mr. Maxwell, turning to you for a moment.

If you continue on what was Tab 1 in your binder, after Mr. Dorgan's CV, is that your CV?

MR. MAXWELL: Yes, it is.

MS. NIJMAN: And is your employment history and education on your CV still accurate?

MR. MAXWELL: The one item that I did want to update was I was recently licensed in the State of Wisconsin as a licensed professional geologist. So with that addition, that listing of education, certifications is accurate.

THE COURT REPORTER: Could you speak into the mic a little bit?

MR. MAXWELL: Oh, I'm sorry.

MS. NIJMAN: Better?

THE COURT REPORTER: Thank you.

MS. NIJMAN: And what is your -- yeah, I think you were tilting so we could see past Kari.

THE COURT REPORTER: Sorry.

MS. NIJMAN: No. Not at all.

What -- and looking at your professional history, what is your role at Weaver?

MR. MAXWELL: So I serve as the

Chicago Environmental Practice Group operations manager, and we have got a team of 10 to 12 geologists and engineers, that -- work in -- in the Chicago office, and so I assist with -- with managing that group.

MS. NIJMAN: And what is your experience with old industrial properties or brownfields, as we have been referring to them?

MR. MAXWELL: Yeah. So I actually began my career in -- at Weaver in 1996, which was the first year that the site remediation program and TACO program was promulgated. So I started at an interesting time in our industry, and have been able to learn the ropes, if you will, of the SRP and TACO program really right from the beginning of my career.

So I have worked on -- the focus of my practice has been Illinois and Indiana, and have had opportunity to work on probably in the low hundreds of numbers of what will be considered brownfields site investigations, and many cases they lead to evaluation of remediation, and ultimately remediation.

MS. NIJMAN: And similar to

Mr. Dorgan, what is your experience with designing a remedy for a site?

MR. MAXWELL: Yeah. So, again, having been involved in many, many brownfields, remedy evaluation is sort of a fundamental aspect of assessing brownfields. The process is to assess, to use that information and that data to try to design a -- the proper remedy that is going to be protective of human health and the environment based upon the data that has been collected.

And so there is a process that goes through where certain -- certain technologies are deemed more practicable and feasible than others, and there is a process that gets executed where you ultimately decide on what's best for each individual site based on the site characteristics, and based on the regulator program as well.

MS. NIJMAN: Is that what you and Mr. Dorgan did for the four Midwest Generation stations?

MR. MAXWELL: That was the general process that we undertook, yes, as it relates to

identifying the appropriate remedy.

MS. NIJMAN: Have you dealt with CCR as a component of remedies you've developed?

MR. MAXWELL: I have.

MS. NIJMAN: What -- can you explain that further?

MR. MAXWELL: Yep, yep. So, I guess in a couple of different aspects. The first would be, as Mr. Dorgan mentioned, cinders and ash and coal ash are commonly found in almost any site here in the city that we investigate, because of the historical Chicago fire. So those -- those materials are encountered just as a general course of investigating sites here in the city.

And then, secondly, there has been a -- several coal combustion residual landfills that are permitted under the different regulations, different than brownfield regulations, permitted under state regulations for industrial waste landfills or the federal CCR regulations that were promulgated in 2015.

MS. NIJMAN: Have you also had an opportunity to review Mr. Quarles' reports in this matter?

MR. MAXWELL: Yes, I have.
MS. NIJMAN: Did you note whether Mr. Quarles had a discussion about your qualifications?
MR. MAXWELL: Yep. I did notice that he commented on my qualifications.
MS. NIJMAN: And prior to this matter, had you ever met Mr. Quarles?
MR. MAXWELL: I have not, no.
MS. NIJMAN: And have you ever worked with Mr. Quarles?
MR. MAXWELL: I have not, no.
MS. NIJMAN: Do you recall what concerns Mr. Quarles raised about your qualifications?
MR. MAXWELL: He was concerned that my -- that a groundwater monitoring program that I was involved -- that I helped design was rejected by the regulator.
MS. NIJMAN: And was that right?
MR. MAXWELL: Absolutely not. As Mr. Dorgan mentioned, the -- this type of a process where you are satisfying a particular regulation on behalf of a client is a situation

where there is oftentimes give and take between a -- the regulator and the consultant in this case. And so that was the case in this particular instance. There was a tactical matter that needed to be resolved, and we ultimately resolved that, and the groundwater monitoring program that Weaver designed at this particular site is actually in play today and is being used to help monitor this particular site.

MS. NIJMAN: How many groundwater monitoring systems do you think you have installed in your career?

MR. MAXWELL: If you count the brownfields, because the brownfields are, you know, less formal and different regulations, many dozens of groundwater monitoring systems at both brownfield sites and sites that are under different -- different regulations in terms of CCR and solid hazardous waste landfills as well.

I think that's an important point, too, because the groundwater monitoring regulations under the CCR rules are mirrored after the Subtitle D and Subtitle C groundwater monitoring regulations for landfills that were --

that have been in place since the mid-90s.

So there is -- there is a lot of overlap there, and the CCR rules just came to be in 2015, but I have got experience dating back to the mid-90s in terms of designing groundwater monitoring programs.

HEARING OFFICER HALLORAN: Mr. Maxwell, could you please keep your voice up? It's getting --

MR. MAXWELL: I will.

HEARING OFFICER HALLORAN: -- very soft. Thank you.

MR. MAXWELL: Sure.

(Whereupon, a discussion was had off the record.)

MS. NIJMAN: We were talking about groundwater monitoring systems. Is it common then to -- for those kinds of groundwater monitoring systems that you have installed to get adjustments over time?

MR. MAXWELL: It absolutely is. Groundwater monitoring -- a groundwater monitoring system is -- it's a dynamic system. It's complex. Groundwater is constantly moving, constantly

flowing, and as additional information is collected, it's very common for the system to be adjusted based upon new information that might be collected during the course of the program.

So in the particular instance that Mr. Quarles was commenting on, we had -- only had a couple of data points had been collected out of the minimum of eight, and so during the course of finishing out the minimum of eight data points collection, additional information did come to light that did impact how the -- how the comment with the regulator ultimately was resolved.

MS. NIJMAN: And you mentioned that -- in that particular matter that your groundwater monitoring system is still being used today?

MR. MAXWELL: To my knowledge, yes.

MS. NIJMAN: Is that -- who is doing the monitoring?

MR. MAXWELL: There is another consultant that this client did bring in to perform the regular day-to-day monitoring. Weaver was hired to essentially do the initial hydrogeologic investigation and install the

initial network, design the initial network, collect the minimum of eight groundwater monitoring data points.

But then after that initial work was done, Weaver does not have offices down in this particular part of the state, and so the client opted to go with a consultant that was local in order -- it was a business decision, because Weaver wasn't -- wasn't present in that local market.

MS. NIJMAN: And the -- then the local consultant continued the monitoring of the wells that you had installed?

MR. MAXWELL: That's right.

MS. NIJMAN: Okay. I would move to qualify Mr. Dorgan and Mr. Maxwell as experts in site remediation for this matter.

HEARING OFFICER HALLORAN: Mr. Abel?

MR. RUSS: Yeah. I have no objection.

HEARING OFFICER HALLORAN: So qualified. Thank you.

MS. NIJMAN: If you would turn back to your binder at tab 2. And I will show you what

has been marked for identification as Exhibit 1701. And if you would turn to Appendix B of this report. Appendix B is the list of references. It comes right after your CV.

MR. DORGAN: 81497?

MS. NIJMAN: Thank you. Does this Appendix B list many of the documents that you cite in your report, Mr. Dorgan?

MR. DORGAN: Yes, it is.

MS. NIJMAN: Are there other documents that you relied on or use that are not cited here?

MR. DORGAN: There are others that aren't specifically referenced here, but are referenced in our document in the report itself, and then, of course, there has been a number of documents generated since this was created that wouldn't have been referenced at the time this report was published.

MS. NIJMAN: On the last page of this list of references, the second to last item is, "Seymour, John, 2015 July Midwest Gen Exhibit 903 Expert Report of John Seymour, P.E."

Do you see that?

MR. DORGAN: Yes, I do.
MS. NIJMAN: Who is Mr. Seymour?
MR. DORGAN: Mr. Seymour, to my understanding, was an expert that testified on behalf of Midwest Generation in the earlier phases of this matter.
MS. NIJMAN: Why is -- why did you review his report?
MR. DORGAN: His report helped to outline quite a bit of the historical record that had been generated up until that time. It provided both the historical review of each of the four stations, but it also outlined some of the information that had been exchanged as part of the technical analysis of the sites on behalf of Mr. Seymour.
MS. NIJMAN: Do you recall if Mr. Seymour did a trend analysis?
MR. DORGAN: I believe he did perform some trend analysis that was referenced in his document.
MS. NIJMAN: And do you recall if Mr. Seymour performed a risk assessment?
MR. DORGAN: He did, yes.

MS. NIJMAN: Do you recognize the name, Mr. Kunkel?

MR. DORGAN: Yes, I do.

MS. NIJMAN: I'm going to refer you to the third page of your references where you list on pages 3 and 4, the third or fourth pages, a series of transcripts. Do you see that, Illinois Pollution Control Board --

MR. DORGAN: Oh, yes, I do.

MS. NIJMAN. -- transcripts? Now, what were those transcripts of?

MR. DORGAN: I believe these were transcripts that were created as part of creation of the record in the earlier phase of this matter.

MS. NIJMAN: Do you recall reviewing testimony of someone named Mr. Kunkel or Dr. Kunkel?

MR. DORGAN: Yes, I do.

MS. NIJMAN: Who is Dr. Kunkel?

MR. DORGAN: I believe Dr. Kunkel was an expert retained by the Plaintiffs as part of the first phase of this matter.

MS. NIJMAN: Okay. Take a little side jaunt here for a second. And you heard

Mr. -- and you were here during the May hearing you already mentioned, correct?

MR. DORGAN: That's correct.

MS. NIJMAN: And you heard Mr. Gnat talk about the difference between filtered versus non-filtered sample results. Do you remember that --

MR. DORGAN: I do.

MS. NIJMAN: -- discussion? And what did -- what do you recall?

MR. DORGAN: I recall that it gets complicated in terms of the various analytical requirements with respect to the CCAs, the federal CCR rules and the state CCR rules, and so at these stations, both filtered and non-filtered or dissolved samples have to be collected for each of the constituents.

MS. NIJMAN: Do you agree -- well, is there essentially no difference at this site between the filtered versus non-filtered?

MR. DORGAN: For the --

MR. RUSS: Objection. Leading question.

HEARING OFFICER HALLORAN: Rephrase,

Ms. Nijman. Thank you.

MS. NIJMAN: Do you recall what Mr. Gnat said, whether there is a difference between filtered versus non-filtered sample results for total dissolved solids?

MR. DORGAN: I believe his testimony was that they are largely the same, very little difference between the two.

MS. NIJMAN: Do you agree with that?

MR. DORGAN: I do.

MS. NIJMAN: You mentioned that you have also looked at additional materials since your report was issued in 2020. What additional information has become available to you?

MR. DORGAN: Well, as Mr. Gnat testified, there has been quite a bit of ongoing work that has been done at each of the four stations pursuant to the federal and state and even the CCR requirements and the CCAs. There has been quite a bit of additional groundwater data collected. There have been alternate source demonstrations prepared. There have been closure plans prepared, permit documents prepared, and then there has been some additional newly

generated information that has come to our attention with respect to at least one of the stations.

MS. NIJMAN: And you also listened to the hearing, you mentioned?

MR. DORGAN: Yes, I did.

MS. NIJMAN: I think you mentioned new rules that have been proposed, did you, in your listing?

MR. DORGAN: No. I mentioned the current CCR, both the federal and state and the CCA obligations. What you may be referring to are the -- there is a state docket for regulation of historic fill, ash fill areas, and now there is a pending federal proposal that has hit the federal register here relatively recently that's -- will provide guidance what happens in some instances in the future.

MS. NIJMAN: Those are the pending proposed -- or the proposed rules for historic landfills? Is that what you are referring to?

MR. DORGAN: Yes.

MS. NIJMAN: You were not -- were you asked to perform a detailed review of the

materials that were submitted pursuant to the federal or state CCR rules?

MR. DORGAN: No, we have not.

MS. NIJMAN: So how did those submittals fit within your decisionmaking for remedy?

MR. DORGAN: It demonstrated that the steps needed to continue complying with the federal and state CCR requirements are ongoing. They just demonstrate the commitment to continuing to carry forward with meeting those regulatory obligations, and we feel that the continued consistency of application of those regulations was material to the way in which we evaluated the conditions at the four stations.

MS. NIJMAN: And as to the pending new historic fill rules, how do those pending new rule or proposed -- I should say -- proposed new rules impact your analysis in this matter?

MR. DORGAN: Well, we anticipate that these, both state and federal rules, when they are eventually promulgated will apply at least in some instances to various areas of the station, and when those rules are promulgated, we

would anticipate based upon the history of Midwest Gen continuing to work within the current regulatory framework, that they would apply those as well, and do what is necessary to comply with them.

MS. NIJMAN: We just heard from Mr. Gnat who talked about whether there might be seeps at the -- first of all, how do you define a seep?

MR. DORGAN: Typically, a seep would be a location where a liquid that would be contained within a waste material is finding a preferential migration pathway that it eventually ends up coming to the land surface, and usually exhibits either wet conditions and sometimes stain conditions, depending upon the material that the water is emanating from.

MS. NIJMAN: And did you -- what did you hear Mr. Gnat say about whether there were -- whether he saw seeps at any of the four stations?

MR. DORGAN: I believe his testimony was that he has looked for and had the opportunity to observe for the presence of seeps and has not seen any at any of the four stations.

MS. NIJMAN: Did that help inform your opinions in this case as well?

MR. DORGAN: Yes, it did.

MS. NIJMAN: Because we have taken you out of order, before Ms. Shealey could testify, I'm going to ask you about your knowledge of the current status of the -- each of the four stations that Ms. Shealey would have otherwise testified to.

Are you aware of the current status of the stations?

MR. DORGAN: Generally, yes.

MS. NIJMAN: What is happening at Joliet 29, to your knowledge?

MR. DORGAN: So Joliet is anticipating -- they have ceased burning coal a number of years ago. They have been burning natural gas, but it's my understanding that that's likely to end sometime in the current calendar year.

MS. NIJMAN: And as to Will and Waukegan?

MR. DORGAN: Those both are ceased burning coal as of last year, and it's my

understanding that is intended to continue.

MS. NIJMAN: And does the -- does that status of those facilities inform your opinions?

MR. DORGAN: It does. It's one more element of our overall evaluation. You know, it tells us that there is not going to be an ongoing source of CCR at these properties, and that certainly is a variable that we would consider.

MS. NIJMAN: Back to your expert report at the second tab in your binder, if you would look at page 4 of your report, Section 1.3 and in the second full paragraph in Section 1.3, did you have a correction you wanted to make on the record here?

MR. DORGAN: Yes. I believe we have a reference there under the -- towards the bottom of it, where it references 12(d). I believe we made an error there in how we referenced that.

MS. NIJMAN: So the parenthesis says (open dumping...) after 12(d). Should that be somewhere else?

MR. DORGAN: That's correct. It would be after 21(a) or -- yeah.

MS. NIJMAN: So, I'm sorry. The parenthesis was just put in the wrong place?

MR. DORGAN: Yes, that's correct.

MS. NIJMAN: Now, in your expert report, you have -- and you mentioned it earlier. You considered the Board's 2020 -- the Illinois Pollution Control Board's 2020 revised opinion or revised interim opinion. Do you recall mentioning that?

MR. DORGAN: Yes.

MS. NIJMAN: And that opinion -- what did that opinion address, to your recollection?

MR. DORGAN: Well, as we referenced in our report, I think the most material aspect of that update to their opinion was that it recognized that the GMZs that had been established at three of the four stations remained operative, that they had not been closed out.

MS. NIJMAN: And we have done this with other witnesses, but could you briefly describe a GMZ?

MR. DORGAN: A GMZ is a regulatory framework by which the Agency accepts that there

is a zone of groundwater on a property that is being managed through some sort of remedial program, and that it basically recognizes that there could be exceedances of relevant groundwater standards within that zone, which would not be -- constitute -- which would not constitute a violation as long as you are continuing to comply with the requirements of the GMZ.

MS. NIJMAN: Does implementing a GMZ in Illinois, require some sort of action, active action, prior to getting a GMZ?

MR. DORGAN: It does, and, in fact, if you look back at the CCAs, the CCAs had a list of commitments that Midwest Gen had to comply with to address certain conditions at each of the four sites. There is quite a bit of overlap, a little bit of uniqueness as well, and that as long as they complied with those, they could then apply for and have a GMZ approved, which is what they ultimately did. And, of course, as part of the GMZ, there is the obligation for ongoing monitoring of the groundwater. They have to continue to monitor the groundwater under the CCA in order to maintain the GMZ.

MS. NIJMAN: So is a GMZ alone a remedy?

MR. DORGAN: No. A GMZ is an acknowledgment of a remedy being implemented to address the groundwater conditions.

MS. NIJMAN: What is your experience dealing with GMZs in Illinois?

MR. DORGAN: We have had other sites that have fallen -- used the GMZ in a similar fashion to allow for the time to both evaluate and remedy impacted groundwater conditions.

MS. NIJMAN: Can you give us an example of something that comes to mind or a site that comes -- a situation that comes to mind in use of a GMZ?

MR. DORGAN: We have had -- we have had Illinois brownfield sites where we ended up recognizing the presence of a groundwater impact. We -- similar to what occurred here, we went in and undertook our remediation. We saw that the remediation was going to take time, applied for GMZs, had them approved, and then with that, we have to file an environmental land use control, which as Mr. Gnat testified, is a document that

actually attaches to the deed so that any current and future landowner understands that those conditions which preclude the use of groundwater are present.

MR. MAXWELL: Could I build on that just for a moment? We have experience with GMZs at solid and hazardous waste -- or solid waste landfills in Illinois. They are commonly utilized in -- if a site is capped, that's considered the remedy, and then the GMZ is implemented while the cap is -- it takes effect, essentially. So groundwater monitoring takes place during that process, and there is a few different solid waste landfills that we have worked with where that process has played out as well.

MS. NIJMAN: And how -- you are familiar with the term "monitored natural attenuation" or "natural attenuation"?

MR. MAXWELL: Yes.

MS. NIJMAN: And we can refer that -- to that as MNA, which is tricky. How does your experience with GMZs relate to MNA?

MR. MAXWELL: So MNA is the process that's part of the evaluation of the GMZ.

Typically, I mentioned the cap example. The cap is the active management aspect and the monitoring goes with that in order to evaluate whether or not the cap is actually having, in this example, the intended benefit.

So the GMZ essentially is the regulatory mechanism for properly evaluating the effectiveness of the remedy, or the cap in this example.

(Whereupon, Respondent's Exhibit No. 1702 was marked for identification.)

MS. NIJMAN: Thank you. If you would turn to the third tab of your binder. And we will also be showing this on the screen for ease of review. So we have marked for identification Exhibit 1702.

Mr. Dorgan, what is this document?

MR. DORGAN: This is a presentation that we prepared to provide an overview of the main elements of our report just to put it in a little more visual fashion, a little bit more bullet point-oriented just to help present some of

the technical information in a little more condensed and digestible format.

MS. NIJMAN: And turning to the first page, just your general approach, and this -- the third page, page 3 -- and the page numbers are on the right-hand bottom corner.

On page 3, what is -- what was the general approach for assessing the four stations operated by or previously operated by Midwest Gen?

MR. DORGAN: So what we have presented on this slide is when we say general approach, this is the high level overview of the approach we took for the effort at evaluating remedy and relief for the four sites. So it's really composed of three main elements.

The first was establishing the appropriate regulatory framework in terms of what applied to what areas of each of the stations, and certainly, the two primary drivers were the federal and the state CCR surface impoundment requirements, and the regulatory requirements that applied to the regulated units at each of the four stations, and then we also looked at the historic

fill areas that had been identified in previous phases and referenced in the Board's opinion.

And then after that, we kind of moved into looking at the sites themselves, and the background of each of the sites, and the conditions that existed both historically, and currently. A big driver to the point about our having looked at this risk-based corrective action approach, we took a look at what were the potential human -- exposures to both human and ecological receptors.

That's primarily ecologic receptors that may come in contact to the extent there was groundwater leaving the site to a surface water, and then the human exposures, we are looking at primarily is there or will there be groundwater wells that might be used for potable purposes that could then bring a contaminant in contact with the receptor?

So that was our primary focus with that. And then we took a look at the groundwater quality trends through a statistical analysis. We kind of built on what it had done previously, ran it through some statistical

testing that's consistent with good -- you know, best practices and recognized by the EPA in the -- both the state and federal as a tool, and then we did an evaluation of the downgradient groundwater quality. We did that as just more of that risk-based SRP, TACO-type strategy where the real emphasis is placed on do we have contamination that's coming in contact with receptors?

And then finally we considered the remedial assessment that might be appropriate for each of the four stations. Certainly, the CCR regulations under both the fed and the Illinois to some extent, even though we knew that there was an Illinois program coming, and we knew that there eventually would be a federal program coming for historic fill areas, that was part of our consideration as well.

And, really, we looked at a combination of our risk evaluation, the trends that we are seeing in groundwater downgradient of the -- in the downgradient well network protective of offsite receptors, and then the comparisons to the relevant regulatory standards to guide how we approached our remedy and relief strategy.

MS. NIJMAN: Can you describe whether you had any concern in your review of the CCR regulations, federal and state? Any concern about conflict with a remedy you might propose?

MR. DORGAN: I think what we saw was especially with respect to the upcoming subdocket at the PCB for the Illinois rulemaking and then now the proposed rule at the federal level, that there is the potential that anything we do now could come in conflict with whatever rule eventually gets promulgated. That's certainly consistent with the history of these four stations where they have kind of been victim of that in the past, having taken voluntary steps with respect to things like redoing their pond liners that eventually had to be redone after the rules came out and established a new standard that they had to meet. So that was a consideration.

MS. NIJMAN: In the absence of any CCR rules that might apply to an area at these stations, what regulatory framework would you apply to the four Midwest Gen stations?

MR. DORGAN: Well, we felt that the best framework available to us was through the

state's voluntary program, the site remediation program, and its related TACO objectives. There is two separate regulatory programs for those two things, but they dovetail together.

And so that's what we would do at any other brownfield site. A brown -- traditional brownfield site doesn't usually fall under some sort of -- it's not a CERCLA site. It's not a RCRA site. So in the absence of these other frameworks, we looked to what would be the most applicable, and we felt in this instance the SRP and TACO type of a framework would be best applied to the conditions at the sites where they weren't already regulated through the CCR rules.

MS. NIJMAN: Okay. Let's go to the next line, Regulatory Framework.

Now, you have already touched on this when you talked about your general approach. Did you divide out the regulatory framework that applies to the impoundments versus historic fill areas on this slide?

MR. DORGAN: Yes, we did. I kind of touched on that a minute ago, which is we recognize -- and others, Midwest Generation and

their consultants -- have previously made determinations in terms of which of their surface impoundments are regulated under either the federal and/or the state programs. And so we saw those continue to apply, and compliance with those requirements would be ongoing.

Certainly, the Board orders previously were considered in terms of their earlier findings. The fact that we have the CCAs that are still present, and with the GMZs and the related ELUCs that continued to apply, and then, of course, we continue to have data being collected, and it will continue to be collected as a result of the monitoring networks that exist for the regulated units at the site.

So we -- we kind of put that on one side of the ledger, and on the other side of the ledger was these historic fill areas, which had been recognized and documented at an earlier -- earlier phases of this matter, and in those cases, we fell back to general Illinois groundwater standards which would apply; the Illinois SRP and related TACO regulations, certainly the orders of the Board were considered

as -- for those areas as well, and then we know that we have got this Illinois subdocket that's pending and now a federal proposed rule for these fill areas. So they were considered.

And then, finally, we just looked at what information is available for each of these areas that we can use to frame up our understanding of the conditions for each of those areas and what might be appropriate for managing them going forward.

MS. NIJMAN: You mentioned a minute ago that Midwest Gen made determinations of which surface impoundments would fall within the rules.

Does that decision get reviewed, to your knowledge, by Illinois EPA?

MR. DORGAN: It's my understanding that they are required to file permits with the IEPA. They file their groundwater reports with the IEPA. So, yes, the IEPA is involved in that decisionmaking.

MS. NIJMAN: And do you know if the Illinois EPA also sends invoices as to ponds that might apply?

MR. DORGAN: That's my

understanding, yes.

MS. NIJMAN: You mentioned on the left side of the slide the CCAs, and we have talked about them a little bit. Why were the CCAs at the Midwest Gen station, four stations, relevant to your assessment?

MR. DORGAN: The CCAs had outlined a set of actions that Midwest Gen was required to take at each of their four stations, and by doing so, they were able to then apply for and have approved the GMZ.

So the fact that the GMZs remain in place, which has an impact on our risk analysis in terms of potential groundwater exposure and receptors was an element that was important to our considerations.

MS. NIJMAN: Did the CCAs begin collecting data -- groundwater data? Excuse me.

MR. DORGAN: Yes. And the CCAs, they -- Midwest Gen voluntarily agreed to begin looking at their units at the request of the Agency. They agreed to do so. That led to the installation of some groundwater wells, and then eventually that information led to broadening of

some of that, the groundwater monitoring programs, and then ultimately the federal CCR rules kicked in and brought further framework to the way in which the units at the four stations are being managed.

MS. NIJMAN: You have experience working with CCAs in Illinois?

MR. DORGAN: I do.

MS. NIJMAN: And what types of agreements might be entered into as an example of CCAs? What types of actions under a CCA?

MR. DORGAN: Well, the CC -- most of the CCAs -- we have done some brownfields. We have done landfill sites. We have done corrective action units under the RCRA program. And in each instance, there are -- there is a requirement that something has to be done to allow for the -- you know, you are committing to doing something in exchange for the GMZ. So, generally, there is a remedy that's ongoing as part of a CCA.

MS. NIJMAN: In your opinion, is a CCA a mitigating factor?

MR. DORGAN: In my opinion, it would be. A CCA is something that you are entering into

voluntarily. You are going to the Agency and saying, "We are ready to work with you, addressing the concerns that you may have." And so it's a -- it's a collaborative process with the regulator before you agree on the actual steps you are going to take. So there is a great deal of communication and interaction with the Agency's concerns, taken into account and then acted on them.

MS. NIJMAN: The next slide that describes your overall process is the Background Site Conditions. We are on slide 5 of Exhibit 1702.

Would you describe what you have listed here? And I can refer you to Section 1.5 on page 8 of your expert report as well, if you want to refer back and forth.

MR. DORGAN: So, once we kind of framed up the regulatory outline, we moved into looking at the condition of the sites themselves. The background that was available at each of the sites, that first led us to looking at what previous investigations have occurred at each of the sites there has been -- in most instances, a

series of them has occurred over time. Those investigations helped to inform our understanding of the physical and hydrogeologic conditions and the setting at each of the four sites.

They certainly helped in understanding the surrounding land uses, which are important to our evaluation. They had some useful information about past efforts at identifying offsite receptors, both ecological and groundwater -- potential groundwater or lack of potential groundwater users, and then, of course, the analytical results from the ongoing monitoring that's happened, and some of the historic investigations were an element in totality of how we considered what was going on at the stations.

And then from that, we kind of moved into more of a data analysis and evaluation process. So, now we know where our data is and where it came from. Let's take a look at it. Let's see how it helps inform our understanding of what's going on at these sites, the risks that may exist at the site. So, that was the first step, evaluating the risk through kind of a standard risk model evaluation.

And then we went into quite a bit of detail in looking at the -- into the data itself and the long record of data that we now have, given the period that the groundwater has been monitored at these four stations, and we looked at that data with respect to trends and focused our trend evaluation on the sensitive downgradient receptor population.

MS. NIJMAN: We had been discussing a few moments ago the updated information about each of the stations. Do you recall that?

MR. DORGAN: Yes.

MS. NIJMAN: Did you also prepare a summary document of updated information about each of the surface impoundments or ponds at the station?

MR. DORGAN: We did. We kind of felt that a cheat sheet of sorts would be helpful just to track what's going on at each of the sites, and quite a few of the updates that had happened since our original report was issued.

MS. NIJMAN: And I can refer you to the second to last page of this exhibit, 1702.

Is that the table of the surface

impoundments that you are referencing?

MR. DORGAN: Yes, it is. It would be page 97 in the presentation, numbering continued.

MS. NIJMAN: And who prepared this chart?

MR. DORGAN: Mike and I worked on it together. We had a little bit of a basis of this outline and just kept kind of building onto it as we recognized there was more information to be added.

MS. NIJMAN: So we will discuss this more when we get into each of the stations, but when you heard Mr. Gnat testify earlier, you heard him talk about how each of these stations are located or where each of the stations are located. Do you remember that?

MR. DORGAN: Yes, I do.

MS. NIJMAN: Is it your -- what is your opinion as to whether the stations are located in industrial areas?

MR. DORGAN: Certainly predominantly industrial. Some more than others. Waukegan is an example of a heavily industrial area, given its

surrounding land uses. We do have some residential uses located at a couple of the sites, but in -- relatively distant. Most instances the immediately surrounding properties are in some cases water bodies, other industrial users, some heavy industrial users quarrying operations. It kind of runs -- runs the gamut.

MS. NIJMAN: You also list on this slide potential receptors. Is that the same kind of review as, like, a pathway analysis?

MR. DORGAN: Yes. What -- what we are doing there is there is a concept and risk evaluation which talks about the risk triangle, and that's -- there is -- three things needed to be present for risk to occur. You have to have a contaminant source. You have to have a pathway by which that contaminant can move, and then you have to have a receptor.

So bring the contaminant to the receptor at concentrations that exceed our relative standard, that could be indicative of risk, but if you eliminate any one of those three things, you don't have a risk. So one of the things that we try to do in these types of

evaluations is look at that risk triangle.

Do we have a contaminant source? Do we have a pathway? Do we have a receptor? And when you can demonstrate that one of the three of those things is absent, it gives you a good understanding of the true risk posed by the site condition. So that was certainly part of our overall approach towards evaluating risk.

MS. NIJMAN: And is that an approach that you have used in other sites in Illinois with the Illinois EPA?

MR. DORGAN: Yes, it is.

MS. NIJMAN: Turning to the next slide, slide 6 in Exhibit 1702.

Here you discuss Evaluation of Risk to Surface Water. Can you describe what's happening here?

MR. DORGAN: So I think it's pretty clearly been demonstrated that each of the four sites are proximal to surface water bodies. So understanding the risks that may be posed by the conditions that exist at the sites to those surface water bodies was something that we wanted to understand.

So in this particular instance, we looked at the 35 IAC Part 302 Illinois Water Quality Standards, and also the water quality criteria for surface water, published sources that are available from the state, and then we compared the downgradient data to the relevant standards.

So, if there was a water quality standard, we used it, and if not, we used the Illinois chronic water quality criteria, so -- and basically there we are saying, if this groundwater came in contact with this surface water, would there be a risk to the surface water?

And then we, of course, made comparisons to those standards for the monitored constituents, which were primarily the Appendix III and Appendix IV parameters under the current regulatory monitoring program. And then we also looked at the average downgradient concentrations looking at the data set over time to do those comparisons.

So we were looking at what's that average concentration in our monitoring wells relative to these standards, and then we also considered whether there were any potable wells

that were in use downgradient of the stations.

MS. NIJMAN: And generally, high level, what did you find?

MR. DORGAN: Generally, we found that we weren't exceeding water quality criteria, and that in each of the four stations there were not potable wells in use that would allow potential receptors to come in contact with impacted groundwater.

MS. NIJMAN: Do you recall Mr. Quarles testifying about whether the CCR rules consider risk?

MR. DORGAN: Yes, I do.

MS. NIJMAN: And if you need to, I can refer you to his rebuttal report as well, but do you agree that the CCR rules do not consider risk?

MR. DORGAN: Oh, I think what he was -- I think what -- if I recall from his testimony at the earlier phase of the hearing is he was making reference to the Illinois groundwater standards that weren't necessarily based on risk, which we disagree with. The groundwater standards are predicated on risk

models similar to how the federal drinking water standards are promulgated.

So there are any number of risk criteria that are considered; toxicity, duration of exposure, sensitivity to the receptor as far -- and in terms of developing those standards. So there is a risk element just to the standards themselves.

MS. NIJMAN: I can refer you to page 45 of your expert report, but you also said it earlier, that Mr. Seymour prepared a risk analysis. Do you recall that?

MR. DORGAN: Yes, I do.

MS. NIJMAN: So in the first paragraph of your expert report, which is Exhibit 1701 on page 45, Section 4.4, you actually mention, "A similar statistical risk evaluation was presented in the expert opinion of John Seymour."

Do you see that?

MR. DORGAN: Yes, I do.

MS. NIJMAN: And what were Mr. Seymour's findings? And I just mean at a high level.

MR. DORGAN: I think Mr. Seymour came to the same conclusion in terms of his evaluation of the risk to downgradient receptors. He felt that there was an absence of risk posed by the four stations.

MS. NIJMAN: Since Mr. Seymour did a risk analysis, why did you do another one?

MR. DORGAN: It's part of our standard approach towards evaluating these types of sites. We certainly wanted to -- we considered Mr. Seymour's findings, but wanted to look at them independently and also just consider whether there were any change conditions that needed to be considered.

MS. NIJMAN: Mr. Maxwell, turning to you on the question of data evaluation, which is the next slide, how were you involved in conducting the data analysis or evaluation part of this project?

MR. MAXWELL: So I helped organize the statistical evaluation of the data, as has been testified -- as Mr. Gnat testified to. There is -- has been a number of different monitoring programs at the various stations under which data

has been collected. So I helped oversee the collection of that data, the organization of that data, and we utilized a statistical evaluation software known as Sanitas in order to perform some statistical testing.

And just backing up for a moment, the constituents that were evaluated -- just to offer a little bit more detail, the detection constituents under the 40 CFR 257, Appendix III, as well as the assessment constituents under Appendix IV under 257 was the -- were the constituents that were evaluated.

We also looked at the -- we wanted to look at as much data around the ponds as we could, so we took the historical data and wanted to focus the analysis on what we felt the wells that were the most representative and in terms of our analysis. And that was the monitoring wells that were on the downgradient side of the ponds.

MS. NIJMAN: You note here as one of your first bullet points that there is a substantial quantity of groundwater quality data for the facilities, and I can refer you to page 26

of your expert report if you'd like to see your discussion there.

What do you mean by that?

MR. MAXWELL: Yeah. So there has been quarterly groundwater monitoring occurring at these stations since the first monitoring event was performed in 2010, so we have got at this point over ten years of data at the stations, and there is multiple groundwater monitoring systems at the four stations, multiple monitoring wells, multiple constituents.

When you sum up the sum total of data, it's many thousands of individual data points are available to us to try to evaluate what the conditions are. So there was a substantial quantity of data that was available to us.

MS. NIJMAN: Do you have an opinion about whether existing data at a site should be used to develop a remedy or assess a remedy?

MR. MAXWELL: Well, absolutely. The data is the basis for the remedy, and that really is the -- that's -- that is the basis for designing a remedy.

MS. NIJMAN: If there are gaps in

data for a remedy assessment, can you fill that in as part of your remedy?

MR. MAXWELL: That is a common approach. It's difficult, and it's not practical in many instances, to answer every single question in terms of how a particular site is characterized. Data gaps are something that are often part of the process as you move from investigation into remedy, and designing and implementing a remedy is an opportunity to fill in those data gaps potentially, to the extent that they may exist.

MS. NIJMAN: Do you recall Mr. Quarles stating that he recommended a Nature and Extent Study at the four stations?

MR. MAXWELL: Yes.

MS. NIJMAN: Do you recall whether he said -- gave us a scope or any idea of what that would consist of?

MR. MAXWELL: Yeah. My recollection is that he did not offer much in the way of filling in what that would be. So there really wasn't a lot of definition to that, other than, you know, further investigation.

MS. NIJMAN: In your opinion, is there sufficient data to develop a remedy at the four stations?

MR. MAXWELL: In our opinion, there is. We feel like we have enough data to -- to develop a remedy, and I guess I would point out that the prior two experts felt the same way, and in the prior phase of the case, they were able to opine on an appropriate remedy. So we would agree. We would agree that the data that's available to us was -- was sufficient.

MS. NIJMAN: Turning to page 8 of the slide presentation at Exhibit 1702, Statistical Trend Tending.

Mr. Dorgan, is this you?

MR. MAXWELL: I think this is me.

MR. DORGAN: I think Mr. Maxwell is the guy for this.

MS. NIJMAN: Perfect. Okay.

What kind of trend testing did you conduct?

MR. MAXWELL: So the test by name was called the Mann-Kendall Test, and this is a test that is referenced in the USEPA statistical

literature. The March 20 -- 2009 Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Unified Guidance is the applicable reference here. It's a -- it's a quantitative non-parametric test that allows us to come to quantitative conclusions in terms of what the trends are looking like in the data.

And there is five potential outcomes that result. There is an upward trend, there's a downward trend, there's no trend -- I'm sorry. Let me back up.

There's a downward trend, a statistically significant downward trend, no trend, upward trend, statistically significant upward trend. So there's five potential outcomes, and this is a test that we have utilized on other projects where -- where GMZs have been employed -- other projects in Illinois where GMZs have been employed. We have utilized these tests on other CCR landfills that -- where closure had -- that have undergone a closure that have been capped.

And so it offers a -- we think a convenient, robust means of looking at what the overall trends are doing in terms of the

groundwater quality so that we can make that judgment about whether or not the -- the cap, the remedy, whatever it is, that's the -- the active remedy, whether or not it's being effective or not.

MS. NIJMAN: And this is an analysis that the Illinois regulators also rely on, the Mann-Kendall?

MR. RUSS: Objection, leading.

HEARING OFFICER HALLORAN: Sustained.

MS. NIJMAN: Will you describe your experience with Illinois regulators dealing with Mann-Kendall statistical testing?

MR. MAXWELL: We do have at least a couple of different sites that we deal with Illinois EPA that utilize the Mann-Kendall -- the Mann-Kendall testing, and on a regular basis. We have got one site that requires that we do an annual evaluation of the trends that's reviewed annually by Illinois EPA so that we can -- we have some confidence that the cap that has been put on the landfill continues to be -- continues to be effective.

MS. NIJMAN: You mentioned GMZs. How do we relate this trend testing back to the GMZs?

MR. MAXWELL: Yeah. The -- so the GMZs are in place because some type of remedy, the cap being the most obvious example, has been implemented. A GMZ -- the idea behind a GMZ is that you don't get it forever. You have got to be -- the regulation requires that you take steps to demonstrate compliance with the groundwater quality standards. Trend testings show you whether or not you are on the right track.

MS. NIJMAN: You mentioned the caps as an active potential remedy. In our situation, did you consider whether the liners for the CCAs, re-lining the ponds for the CCAs, were an active remedy?

MR. MAXWELL: Yeah, that would fall under the same or a similar category as a cap. The intended outcome of re-lining a pond is to -- is to have a benefit to the groundwater quality. So that would fall into the -- a similar category, yes.

MS. NIJMAN: Did you -- have you

reviewed the annual groundwater reports prepared by KPRG for the stations?

MR. MAXWELL: We did review them at a high level, yes.

MS. NIJMAN: And those reports as I recall -- or let me ask you.

Do you recall whether those reports have a time versus concentration analysis?

MR. MAXWELL: They do. They have got those graphs, and I would point out that those time versus concentration graphs, it allows for a visual representation of the patterns over time. However, it's not a quantitative test like the Mann-Kendall test is. So, it's more of a visual presentation that allows one to assess at a very high level what the concentrations of a constituent are doing over time.

MS. NIJMAN: You mentioned that you looked at the downgradient wells to use in your trend testing, right?

MR. MAXWELL: Yes.

MS. NIJMAN: Is the downgradient well the same at the four stations as the property boundary?

MR. MAXWELL: No. It's actually not. That's one of the elements that makes our -- this evaluation conservative, and that is that there is -- there is further opportunity for the groundwater to flow and allow the natural mechanisms of attenuation dispersion to take place, and as those mechanisms take place, the concentrations of the constituents in the groundwater typically will go down, and so that's what makes the analysis that we undertook with the wells further upgradient from the property boundary conservative.

MS. NIJMAN: So, let me to understand. You would -- usually in a Mann-Kendall would you usually use the property boundary location?

MR. MAXWELL: That depends on the regulatory program --

MS. NIJMAN: Okay.

MR. MAXWELL: -- would be the way I would answer that. Under TACO, under a TACO SRP type of approach, the property boundary is the applicable -- is the applicable location. It's the critical location, because that's the point at

which you lose the control of your property.

So you can put an ELUC, for example, on your property, and then that would end at your property boundary.

MS. NIJMAN: But that is not the situation here; is that right?

MR. RUSS: Objection.

MS. NIJMAN: Is that the situation with the four stations here, in that you went to the property boundary or not?

MR. MAXWELL: We did not go to the -- the wells that we assessed for the Mann-Kendall were not at the property boundary.

MS. NIJMAN: I would like you to refer to page 43 of your expert report at Exhibit 1701.

Do you see the first, full paragraph on page 43? Is that the discussion of the Mann-Kendall data analysis?

MR. MAXWELL: Yeah. That is the lead-in, yes.

MS. NIJMAN: In looking at the bullet points on page 43, does that list the wells?

MR. MAXWELL: Yes, it does.

MS. NIJMAN: And so -- well, you tell me. These -- the listing of wells you have for the four bullet points here for the four stations, what are these wells?

MR. MAXWELL: Those are -- those were the monitoring wells that were the subject of the Mann-Kendall testing that was performed.

MS. NIJMAN: Did you use all of the wells in your Mann-Kendall testing, all of the wells at each station?

MR. MAXWELL: We did not use all of the wells. Mr. Seymour, I -- did use all of the wells, and so we were building off of what Mr. Seymour had done, and as mentioned, the -- what we feel to be the most critical wells were evaluated, those wells that were on the downgradient side of the ponds.

MS. NIJMAN: On page 44 of your expert report, you have a discussion, again, for each station about the results of the trend testing. Generally, again at a high level -- we will get into more detail -- what did the trend -- the Mann-Kendall trend testing show?

MR. MAXWELL: So, at a high level it showed that the groundwater conditions were generally improving, that there were more -- there were more downward trends overall than upward trends, and that in many cases, there was a no trend conclusion or result. However, in the majority of those instances, that was due to the majority of the data being non-detect, not reported above the laboratory reporting limit.

MS. NIJMAN: Do you recall Mr. Quarles commenting that the CCR rules require compliance at the waste boundary when he was discussing your trend testing?

MR. MAXWELL: I do.

MS. NIJMAN: What was he saying there; do you recall?

MR. MAXWELL: Well, I think he was simply citing the federal CCR rules, and in practice, to put a -- it's just not practicable to put a well right at the waste boundary. Typically, what's done in practice is you get it as reasonably close to the waste boundary as you can, and I think we will see, as we get into our analysis, that the wells that we performed the

Mann-Kendall evaluation on were sufficiently close to the waste boundary.

MS. NIJMAN: Do you have Exhibit 1102 in front of you, which is Mr. Quarles' rebuttal report?

MR. MAXWELL: Yes, we do.

MS. NIJMAN: If you would look at page 31, the carryover paragraph of Mr. Quarles' rebuttal report, and it's on the screen as well. The bullet on the bottom of the page, and then carrying over to page 32, the remaining bullets. What was Mr. Quarles doing here?

MR. MAXWELL: Well, what he was -- sorry.

What he was doing was, I guess, presenting an alternate -- an alternate viewpoint of the way that we had summarized the data.

MS. NIJMAN: And is he -- does he redo your math?

MR. MAXWELL: That's essentially what he does. He makes a point about that -- he indicates that the decreasing trend conclusion he doesn't believe is correct, but what he is not considering is that -- the fact that the

non-detect or the no trend trends, the majority of those are actually a situation where you have got a non-detect result. And so it certainly is a mischaracterization of the way that we had presented the data in our report.

MS. NIJMAN: So are you saying that Mr. Quarles took the no trend data and assumed it was a downward trend?

MR. RUSS: Objection, leading question.

HEARING OFFICER HALLORAN: Sustained. Rephrase.

MS. NIJMAN: How did Mr. Quarles interpret your no trend data?

MR. MAXWELL: I believe that he -- well, he categorized the no trends together with the upward trends, is what he did, and so that very much mischaracterized the value or the importance of the no trends.

MS. NIJMAN: Did Mr. Quarles perform a Mann-Kendall trend test?

MR. MAXWELL: No, he did not. At least it wasn't in his report.

MS. NIJMAN: Could he have done so

with the data available?

MR. MAXWELL: I suspect that he could have, yes.

MS. NIJMAN: On page 32 of Mr. Quarles' rebuttal report, in the middle of the page, Mr. Quarles says that Weaver, WCG, "failed to include all historically contaminated wells in his statistical analysis." Do you see that?

MR. MAXWELL: Yes.

MS. NIJMAN: And we talked about this a little bit already.

What is your response to his criticism?

MR. MAXWELL: That those particular wells aren't necessarily critically important to the evaluation, No. 1. Those wells are -- are further upgradient, and in terms of the risk, those wells are covered under the GMZ under the ELUC, and by the time the groundwater gets further downgradient from those wells, those are the wells that we have evaluated. And so those are the critical wells in terms of the overall trends.

MS. NIJMAN: Do you know whether Mr. Seymour also reviewed all the wells?

MR. MAXWELL: Mr. Seymour did look at all of the wells in his trend analysis, yes.

MS. NIJMAN: Do you recall what Mr. Seymour's results were in his trend analysis at a high level?

MR. MAXWELL: Yeah. At a high level he found that the concentrations generally were downward. Not in all instances, but in general.

MS. NIJMAN: Let's go back to the PowerPoint.

Mr. Dorgan, looking at slide 9, the Remedial Assessment Process, can you describe this?

MR. DORGAN: So, we have established the steps that we took leading up to being at this point; most recently, the discussion with Mr. Maxwell about our trend testing. So once we had completed that, we began looking at what is needed here to manage the risks and the conditions that we have identified.

So there were several elements of that evaluation; the first being just the historic nature of CCR at the stations, the length of time that the CCR has been there, the length of

time that these stations have been operating. I think in two instances it's been over 50 years, and I think in two it's been close to 100.

So while it's recognized that there are CCRs present at the sites, most of that has been there for a very long time. And there is a defined mass of material that's present, and that hasn't been changing with time. The regulated units have been managing ash now for quite while, and so the fact that the conditions are somewhat static was something that was important to our evaluation.

We certainly looked at all the prior assessments. There has been Phase I and Phase II site assessments. There have been various investigations to address specific needs that the stations have had, and then, of course, there has been investigations, too, as part of the compliance with the CCR regulations.

We know that those CCR regulations are in place, and will continue to be in place. So, to the extent any ash continues to be generated, it will continue to be managed in accordance with those requirements, and with

surface impoundments, that we understand will be brought to compliance with the CCR regulations.

We've already discussed the fact that we took a more risk-based approach towards considering the conditions that exist at the site with respect to sensitive offsite receptors and what ultimately would be protective of human health and the environment. And then for those areas where ash has been documented to be present outside of the impoundments, we -- in the absence of any other regulatory framework, we have applied what we think is most relevant, which would be a more traditional SRP TACO-type approach towards it. So that was the basic foundation of how we approached the remedial assessment.

MS. NIJMAN: And if you look at pages 51 and 52 of your expert report, does that give you a high level review of the proposed remedy for the four stations?

MR. DORGAN: Yes. So after laying out in detail the things that we have just summarized in the presentation, we came to some basic conclusions in our report that appear on page 42 -- or 51 and continue on 52 and 53.

MS. NIJMAN: And, generally, you mentioned on your slide, slide 9, CCR regulations for further control of surface impoundments. And you have also mentioned CCR for monitoring.

Would you explain how the CCR rules relate to your remedy?

MR. DORGAN: Well, we -- we consider those to be important mechanisms to continue managing risk at the sites, and we would assume and anticipate that the CCR impoundments will continue to conform with the regulations and any modifications to the regulations that may be forthcoming.

And, of course, in most instances that's going to be closure of the surface impoundments, since most of them are no longer receiving ash. So, well, very recent developments continue to alter the perspective and the approach towards what's going on at these sites. So that -- we anticipate that to continue to evolve, and it's going to have to be adaptive and dynamic.

But, otherwise, we felt that with the conditions that are already in place for

three of the four sites; Joliet, Powerton and Will County in particular, that with the steps that have already been taken with respect to the CCR rules, the steps taken for the CCAs, the fact that we have monitored natural attenuation continuing to occur at those sites, and that we continue monitoring groundwater to evaluate the advancement of the MNA, that we felt that the proper mechanisms were already in place at those three stations to address the site conditions, with the caveat that new rules are coming, and then when they do come, they will have to be evaluated and, perhaps, considered with respect to any modification to that strategy.

MS. NIJMAN: You mentioned MNA, and I just wanted to -- we talked about it a few minutes ago.

How common is MNA used in Illinois? How commonly is it used in Illinois as part of the remedial process?

MR. DORGAN: MNA is regularly used in any number of different regulatory programs in Illinois. It's commonly accepted. The Agency does acknowledge MNA as a remedial strategy.

There is also a recognition that MNA takes time. It's not something that occurs -- sometimes it can occur relatively rapidly. Other -- other times it takes longer periods of time.

It's one of the reasons why you continue to monitor. It's why you have the GMZs in place. It's why you have the ELUCs. We want to -- while MNA takes place, we want to prevent exposures, and therefore, protect human health and the environment.

So, yes, MNA is -- MNA and the absence of risk as a whole are two common Illinois strategies to manage these types of conditions.

MS. NIJMAN: Can MNA be applied in Illinois if a portion of the waste is in contact with groundwater?

MR. DORGAN: Yes, it can.

MS. NIJMAN: In what kind of conditions have you seen that occur?

MR. DORGAN: We have seen that with historic landfill sites. We have seen that with historic industrial process byproducts like slag and foundry sand, plating tailings. Just because a waste material is in contact with the

groundwater doesn't mean it has to be removed. It means that it has to be managed, and MNA is a method to manage the conditions posed by those types of situations.

MS. NIJMAN: You described a few minutes ago something about a mass analysis. Could you describe your mass constituent that you mentioned?

MR. DORGAN: In making the tie-in to this idea that you could have waste below the water table, one of the things that you consider is, what is the waste material? What is the contaminant loading in the waste material? How long has that waste been in contact with the groundwater?

As you can probably envision, there is only a certain amount of, we will call it contamination, in a waste stream, and that as it migrates out of that waste stream, the concentrations in the source will diminish over time. In some instances, it can diminish to the point that it's no longer detected.

The longer it's been in contact with the groundwater conditions, the more time

there's been for mobilizing those contaminants, and what will be left will continue to diminish with time. So an understanding of what the materials are, how much contact there is with the groundwater, how long a period of time that those materials have been in contact with the groundwater are variables that need to be considered with respect to assessing remedy and appropriate actions.

MS. NIJMAN: What is your experience with applying MNA where an exact source of contaminant is not identified?

MR. DORGAN: As you can imagine, some of these brownfield sites can be quite large. It's often difficult to pinpoint every potential source that might exist on a brownfield.

I have an example of a 3100-acre former steel mill in Maryland that's going through a brownfields process. And as you can imagine, with a site that large, we can't always count on identifying every individual source. It's why we evaluate the groundwater on a system basis, and specifically look at the downgradient groundwater concentrations so that if there is an unidentified

source, we have the ability to pick it up in that groundwater -- downgradient groundwater monitoring network.

But that doesn't mean that we will identify every source over that, in this case, a 3100-acre property. It's just not feasible.

MS. NIJMAN: Now, even if you have a smaller property than 3100 acres, does that system basis analysis still apply?

MR. DORGAN: It does, yes.

MS. NIJMAN: Do you recall that Mr. Quarles discussed some articles about -- EPA guidance documents about MNA?

MR. DORGAN: He did.

MS. NIJMAN: I would like you to pull out in front of you what was previously marked as Exhibit 1104.

MR. DORGAN: I'm not sure we have that up here.

MS. NIJMAN: Mr. Dorgan, what is Exhibit 1104?

MR. DORGAN: Exhibit 1104 is a USEPA document entitled, "Use of Monitored Natural

Attenuation of Superfund, RCRA Corrective Action, and Underground Storage Tank Sites" with an effective date of April 21st, 1999.

MS. NIJMAN: Do you -- are you generally familiar with this document?

MR. DORGAN: I am familiar with this document.

MS. NIJMAN: I would like you to look at page 18 of this document. I will give you a Bates number. And if you would -- this is going to be page 18 of Exhibit 1104, which is also Bates No. COMP_67366. And if you would look at the paragraph beneath the bullets. And let me know when you have had a chance to read it.

MR. DORGAN: Yes, I have that.

MS. NIJMAN: What is that paragraph saying?

MR. DORGAN: It's basically outlining two scenarios for MNA; one where it's an appropriate strategy, and also where it may not be the best strategy to address site conditions.

MS. NIJMAN: And under the conditions, what are the conditions where it might be appropriate?

MR. DORGAN: Well, they lay out three basic expectations. One is -- it says specifically, "Of the above factors, the most important considerations regarding the suitability of MNA as a remedy include: Whether the contaminants are likely to be effectively addressed by natural attenuation processes, the stability of the groundwater contaminant plume and its potential for migration, and the potential for unacceptable risks to human health or environmental resources by the contamination."

MS. NIJMAN: And do the Midwest Generation stations fall into those categories?

MR. DORGAN: We believe we have made the argument that each of those conditions are met, making MNA an alternative approach for these sites.

MS. NIJMAN: And looking in particular at the bolded language at the bottom of that paragraph, can you read the bolded language?

MR. DORGAN: It says, "Therefore, sites where the contaminant plumes are no longer increasing in extent or are shrinking would be the most appropriate candidates for MNA remedies."

MS. NIJMAN: And how did you analyze -- did Weaver analyze that condition for the four stations?

MR. DORGAN: I think probably our trend testing was the most relevant analysis that we performed. By demonstrating that the groundwater conditions are generally improving and not getting worse is an indication that you have plume stability.

MS. NIJMAN: Can MNA be used on inorganics?

MR. DORGAN: Yes, it can.

MS. NIJMAN: Have you seen that successful in your experience?

MR. DORGAN: Yes, we have.

MS. NIJMAN: Does this document as a whole mean that every site has to meet every condition for MNA, in your opinion?

MR. RUSS: Objection, leading.

HEARING OFFICER HALLORAN: He can answer, if he is able.

MR. DORGAN: Like many EPA documents, it's a guidance document that's intended to provide you considerations. With

respect to evaluating MNA, I think there is even references here that, you know, you may have a number of the criteria met, but not all of them, and there is circumstances when the ones that you don't meet could still be supportive of an MNA strategy. So it's certainly when you do, that's helpful, but it's not a requirement by which you can apply these types of strategies.

MS. NIJMAN: How do individual sites need to be evaluated then in comparison to MNA?

MR. DORGAN: Well, I mean, each site has -- is going to have its own unique characteristics. It's going to have its own groundwater flow systems, its own mechanisms for the natural process of MNA in terms of absorption, retardation, attenuation, dispersion, diffusion, and then, of course, the source concentrations, the source materials themselves are going to vary.

So there is multiple considerations, but in totality, you evaluate that against these criteria to see whether it's an accepted strategy or not.

MS. NIJMAN: The second document Mr. Quarles referred to in his discussion of MNA

is -- has been marked as Quarles Exhibit 1105. And do you see that there?

MR. DORGAN: Yes, I do.

MS. NIJMAN: If you would just look at the title page of Exhibit 1105, which is Bates No. COMP_67391. What does this page say?

MR. DORGAN: Well, this, again, is another USEPA document dated August of 2015, and it's entitled, "Use of Monitored Natural Attenuation For Inorganic Contaminants in Groundwater At Superfund Sites."

MS. NIJMAN: Are any of the Midwest Gen stations Superfund sites?

MR. DORGAN: No, they are not.

MS. NIJMAN: And what is the difference between a Superfund site and a brownfield site?

MR. DORGAN: To be considered a Superfund site, you've already gone through a hazard ranking process to evaluate the presence of risks, and a risk has been determined to be present, and as a consequence, the evaluation, the response to those conditions is a bit more rigorous than when you can demonstrate that there

aren't risks.

MS. NIJMAN: What types of waste are at Superfund sites?

MR. DORGAN: Typically, waste regulated under CERCLA and also hazardous wastes under RCRA.

MS. NIJMAN: How did you compare the risk level at the Midwest Generation sites with this site -- excuse me.

How did you compare the risk level at the Midwest Generation sites?

MR. DORGAN: Well, so, at a Superfund site, there is a technical process that you go through to look at all of these inputs to your risk assessment to create a score, and if you score above a certain result, you are considered to fall under the Superfund requirements.

Certainly, that's not the case. That process has not happened and hasn't been requested to happen. We have seen that the conditions at the Midwest Gen facility, risks are being controlled. Offsite receptors are being protected. So there is really not a relevant comparison between evaluation under Superfund and

evaluation under a risk-based strategy like what we have done for the four stations.

MS. NIJMAN: You -- we spoke earlier back on slide 9 about the CCR rules adding further control. How do the CCR rule monitoring requirements fit into your remedy assessment process?

MR. DORGAN: So, the data collected from the ongoing monitoring was certainly considered. It's -- I think Mr. Maxwell talked about the thousands. I think at the time our report was generated it was something like 62,000 data points are available. That's a considerable body of evidence to evaluate, which we have done, so -- and that was, what, two years ago now?

So there is more data that has been collected since, and there is going to be more data collected in the years to come. There's going to be an extensive database by both which to evaluate the appropriate remedy and continue to monitor it going forward. So the ongoing CCR unit monitoring, both the data collected and the data that we are going to be collecting, was a significant consideration on how we evaluated risk

at the site.

MS. NIJMAN: Do the CCR rules for surface impoundments specify an actual cleanup method in the event of a release to groundwater?

MR. DORGAN: No, they don't. They specify that you monitor the groundwater around your regulated unit, and if there is a demonstrated impact that can be attributed to the unit, then an evaluation needs to occur in terms of how to address that, but it does not specify the methods for addressing it. That's site specific and dependent on the unit and the conditions encountered.

MS. NIJMAN: So there are specific -- once you have a release to groundwater, do the rules tell you what to do about how to remedy the groundwater?

MR. DORGAN: No. They simply require that you evaluate the groundwater conditions and whether or not they are related to your regulated unit and then take the steps necessary to address the groundwater conditions.

MS. NIJMAN: So in this situation with the four Midwest Generation stations then,

how did you determine what the remedy should be, given a -- the Board's finding of release to groundwater?

MR. DORGAN: We did not specify a remedy for the CCR regulated units themselves. We feel that that's already in a process. That process is moving forward. That process will come to a conclusion at some point, and that as long as the steps needed to comply with that process are being followed, we feel as though the risks are being properly managed.

So we were more holistic in our evaluation, again, taking that more SRP/TACO-type approach of looking at the downgradient and the protection of the offgradient receptors -- or off-property receptors.

MS. NIJMAN: When you considered your remedial assessment for the four stations, how did you consider other types of remedies in your analysis?

MR. DORGAN: A couple different ways that that occurred. First was, as we have indicated previously, there was a historic -- a record, past evaluation and discussions about

remedying that was already in the record that we took a look at. There's some discussion. Mr. Seymour in particular opined on what remedy was necessary. There had been some reference to earlier evaluations of alternatives that were deemed to be economically unreasonable, which we would agree with; specifically, the idea that mass removal would be kind of a default option.

And then, of course, we looked at from a more traditional alternatives evaluation process under more of an SRP/TACO strategy, we considered what would you normally be looking at? And that normal process takes into account the technical practicability, economic reasonableness, community impact, whether or not it will be successful in addressing the contaminant conditions in the ground, restoring the groundwater.

So, while that was part of our evaluation, we moved directly to the risk-based strategy that we felt had the best application to the conditions existing at the four sites.

MS. NIJMAN: Did you recall Mr. Quarles referencing a feasibility study?

MR. DORGAN: He mentioned that in his testimony, I believe.

MS. NIJMAN: And what is a feasibility study?

MR. DORGAN: A feasibility study would normally be done under a -- more of a Superfund-type process where you would -- and under RCRA, it's remedial measures evaluation. You are basically looking at the site conditions and running it -- you have to move it through a number of considerations. You have to estimate the costs related to those, and at the end of the day, you end up proposing what you find to be the best option. Much more rigorous, and applicable to those sites where they are regulated under those programs where the risks are more significant, and you are subject to those requirements; whereas, that's not the case with the four sites for Midwest Generation.

MS. NIJMAN: If you would look to the last tab in your binder. We have marked this for identification as Exhibit 1703.

(Whereupon, Respondent's Exhibit No. 1703 was marked for identification.)

MS. NIJMAN: Do you recognize this document?

MR. DORGAN: Yes, I do.

MS. NIJMAN: And what is this?

MR. DORGAN: It's my understanding that these are minutes that were captured by Mr. Kunkel in a communication that he had with Ms. Bugel.

MS. NIJMAN: And just to -- for the record, this is Bates No. COMP_041681. And, again, Mr. Kunkel being the prior expert for Complainants; is that right?

MR. DORGAN: That's correct.

MS. NIJMAN: If you would turn to the second page, COMP_041682, would you read what's in Paragraph No. 2, marked as No. 2 on this page?

MR. DORGAN: Yes, this reads -- J. Kunkel is on record in his July 22nd, 2014 letter report to Abel Russ that, "The existing ash ponds should be closed. However, Dr. Hennet's

recommendation of cleanup of existing groundwater contamination using the pump and treat alternative may be interpreted under the proposed USEPA rule as technically impracticable because of the proximity of canals, rivers, and Lake Michigan, which could result in increased water pumping and treatment if that alternative were utilized."

MR. RUSS: I'm going to object to the use of this exhibit. These witnesses don't have any familiarity with it. It's basically hearsay, as far as they are concerned.

HEARING OFFICER HALLORAN: Ms. Nijman?

MS. NIJMAN: Yes. Experts may rely on and consider all data available to them. Mr. Dorgan just testified that he considered that other experts in this matter have looked at other remedies, and this is one of the documents he considered to do that.

HEARING OFFICER HALLORAN: Yeah, you know, whether it's hearsay or not, I'm going back to the Board's Rule 101 -- what was that -- 626. Yeah, reasonable and prudent person would rely on it. So, thank you. Overruled. You may continue.

MS. NIJMAN: Do you agree with the assessment about whether a pump and treat remedy at the four stations would be technically impracticable?

MR. DORGAN: I agree with that finding.

MS. NIJMAN: If you would read what's listed at paragraph 6 on this page and carries over.

MR. DORGAN: This paragraph states, "Pump and treat as an option for groundwater restoration probably is not a technically practicable option for the four MWG power plant sites. IEPA prefers natural attenuation for the groundwater contaminants at power plant sites. There are no historical examples of pump and treat being used at ash disposal sites. J.K. will call A.R. tomorrow (8/21/14) to discuss this. It was agreed that for now the ELPC response to Question No. 9 of the Midwest Gen first interrogatory will be silent on pump and treat as a remedial option at the four power plant sites."

MS. NIJMAN: Do you agree with the statement that Illinois EPA prefers natural

attenuation for groundwater?

MR. DORGAN: I agree that they commonly approve natural attenuation for groundwater. They will certainly consider other alternatives as well, but this is -- this is one that they commonly accept.

MS. NIJMAN: I move to admit Exhibit 1703.

HEARING OFFICER HALLORAN: Mr. Abel?

MR. RUSS: Just same objection.

HEARING OFFICER HALLORAN: Okay. Your objection is noted. I am going to admit it over objection, Exhibit 1703, based on my prior ruling. Thank you.

(Whereupon, Respondent's Exhibit No. 1703 was admitted into evidence.)

MS. NIJMAN: How did Mr. Kunkel's assessment of pump and treat being technically impracticable impact your remedy analysis?

MR. DORGAN: We came to an understanding after our evaluation of the information in terms of framing up our historical understanding of the sites and the hydrogeologic

conditions, that pump and treat wasn't going to be viable. This was another data point that said, there are others that agree with that.

MS. NIJMAN: You had mentioned that you had reviewed Mr. Seymour's previous expert report in this matter?

MR. DORGAN: That's correct.

MS. NIJMAN: And I think you stated a few minutes ago that Mr. Seymour discussed concerns with a remedy. What was the remedy?

MR. DORGAN: I believe in that case he was commenting on a remedy that Mr. Kunkel had suggested, which was a removal option to excavate, haul offsite, and dispose at a landfill of the ash materials outside of the impoundments.

MS. NIJMAN: Do you recall what Mr. Seymour's concerns were about a removal option?

MR. DORGAN: If I recall correctly, I think his primary concern is he felt that the estimate of costs were significantly underreported, in that there were some key related costs that were excluded from Mr. Kunkel's analysis, and then he felt as though there hadn't

been an evaluation of community impact, impact to the surrounding roads, the number of trucks that would be required to support that type of an effort. So as a consequence, he did not deem that to be technically practicable.

MS. NIJMAN: And for the record, that's -- the Seymour report was Exhibit 903 in the previous hearing.

Do you agree with Mr. Seymour?

MR. DORGAN: Yes, I do.

MS. NIJMAN: What is your concern about -- or what do you agree with relating to truck travel?

MR. RUSS: Objection, leading.

HEARING OFFICER HALLORAN: I didn't hear the question, and I didn't hear the objection, so --

MS. NIJMAN: The question was, what do you agree with with regards to truck travel? What is not a leading question.

HEARING OFFICER HALLORAN: Yeah. Overruled. You may answer, if you are able.

MR. DORGAN: One of the considerations when you look at a removal action

is community impact, which is how many trucks are going to have to roll throughout the surrounding neighborhoods on a daily basis to accommodate the removal. Those trucks, you know, give off diesel exhaust and CO2 emissions, and they have an impact on the road conditions. The local infrastructure needs to be adequate to support it.

So, there is a number of variables that would be considered when looking at that option, and it doesn't appear that that had been the case, and they, in our opinion, would be significant.

MS. NIJMAN: And did you consider some of these factors when assessing applicable remedies for the four Midwest Gen stations?

MR. DORGAN: Yes, we did.

MS. NIJMAN: This might be a good time for a quick break, if anyone needs.

HEARING OFFICER HALLORAN: Ten minutes. We are off the record, Kari. Thank you.

(Whereupon, a short break was taken.)

HEARING OFFICER HALLORAN: Back on the record, Kari. You may proceed, Ms. Nijman.

Thank you.

MS. NIJMAN: Thank you.

If you could look at your expert report, Exhibit 1701, at pages 21 and 22. It was the second tab on your binder. And if it's helpful for you, for anybody, if you want to just take the text sections out of the binder to refer to as you go forward so it's easier to flip back and forth.

In looking at this Section 2, what -- would you describe what this is, Mr. Dorgan?

MR. DORGAN: These were several high-level issues that we identified with respect to Mr. Quarles' report and the way in which he -- either in our opinion misinterpreted or misapplied certain standards to situations at the four sites.

MS. NIJMAN: In looking at your first paragraph, Section 2.1, what was your concern there with Mr. Quarles' report?

MR. DORGAN: Well, the way Mr. Quarles had prepared his report, he consistently made references back to the CCR rules, but wasn't necessarily differentiating what

circumstances he was referring to. So it was our interpretation of the way that he made those references that he was attempting to apply the CCR rules at both the federal and state level to the entirety of the stations, not just the regulated units, and we don't think that's the correct application.

MS. NIJMAN: And do you recall in his rebuttal report if Mr. Quarles responded to your concern?

MR. DORGAN: He did.

MS. NIJMAN: And do you recall what he said?

MR. DORGAN: He basically felt that we had misinterpreted that, and that he understood that there wasn't an application of the CCR rules outside of the CCR-regulated units themselves.

MS. NIJMAN: In the next section, 2.2, what was your concern here about whether the impoundments are used for permanent disposal of ash?

MR. DORGAN: I believe that was largely predicated off of the heading to his section of the report which talked about CCR

impoundments and disposal of ash. And then the way in which he referenced that in his report suggested to us that he felt that the CCR impoundments themselves are being used as a permanent means of disposal, whereas they are really just a treatment mechanism to remove water before being dredged and removed. So that's what we were pointing to.

MS. NIJMAN: And do you recall if, again, Mr. Quarles responded to that concern?

MR. DORGAN: Again, he felt that we didn't construe that correctly, and that wasn't what he was implying.

MS. NIJMAN: The next section, 2.3, Quarles fails to consider the extensive data record available. What was the concern there?

MR. DORGAN: Well, Mr. Quarles in his report and also in his testimony referenced many times to the need for a Nature and Extent evaluation. We interpreted the Board's order that they were seeking identification of a remedy and the appropriate relief related to that remedy as it relates to what was already in the record. So while we understand and Mr. Maxwell testified that

there may be instances where some data gaps need to be filled, we felt that there was an extensive reference that he really didn't reference.

He just kept coming back to, need Nature and Extent, need Nature and Extent, need Nature and Extent, and we felt like there has been a lot of investigation and a lot of data collected at these sites over the last ten plus years that certainly warranted consideration, and we did so.

MS. NIJMAN: On the next page, in Section 2.4 of your expert report, Exhibit 1701, you note, Quarles did not consider -- oh, I'm sorry -- failed to consider specific factors used by the Board.

What were you addressing there?

MR. DORGAN: Well -- and as we reference later in our report, we were specifically speaking to the Environmental Protection Act Sections 33(c) and 42(h), which spell out in the selection of a remedy criteria that should be considered to determine their reasonableness and appropriateness for the conditions that you are addressing. And there

hadn't been any reference to those criteria in Mr. Quarles' report.

MS. NIJMAN: If you would turn back to Exhibit 1102, which is Mr. Quarles' rebuttal report, and turn to page 25 of that report, there is a paragraph that is there that's got the heading, "Groundwater Elevations for Aquifer Separation." Do you see that?

MR. DORGAN: Yes, I do.

MS. NIJMAN: Do you have an understanding of what Mr. Quarles was trying to say here?

MR. DORGAN: I think Mr. Quarles was being critical of our reference to groundwater elevations in our report with respect to the bottom of the various pond liners suggesting that we were somehow implying that the CCR impoundments in all instances complied with that separation criteria in the rule, which isn't necessarily what we were trying to do.

MS. NIJMAN: And what was he saying about assessing conditions beneath the pond?

MR. DORGAN: So when we referenced to the groundwater elevations with respect to the

bottom of the ponds, we were looking at the wells immediately around the ponds, which is what you do. And what Mr. Quarles suggested here is that you can't actually determine what the groundwater elevation is, because you don't have a well beneath your pond in order to demonstrate that you don't have leakage and groundwater mounding, and that's just inconsistent with typical procedures and practices. It would not be practical. It would be unwise to have a well through a pond to try to measure groundwater elevations under a pond.

MS. NIJMAN: Well, that's what I was going to ask you. How would you measure groundwater elevations beneath the pond, if not by wells around it?

MR. DORGAN: Well, that's really the only option you have, unless you put a well through your pond, which makes more sense and could create more problems than it solves.

MS. NIJMAN: What kind of problems?

MR. DORGAN: Obviously, you would have to penetrate your liner. You'd create a preferential migration pathway that could allow

contamination from the ash within the -- in the ponds to be communicated down to your underlying groundwater. So I can't -- Mr. Maxwell agrees with me. I can't think of an instance where that type of approach has been done.

MS. NIJMAN: I would like to turn to the next slide, slide 10, which is the Joliet 29 Station, and I believe you stated earlier that Mr. Maxwell focused more on Joliet 29.

MR. DORGAN: That's correct.

MS. NIJMAN: Okay. So, turning to page 11 of your PowerPoint at Exhibit 1702. And if you would also keep your expert report out, Exhibit 1701, because we will refer back and forth.

So looking at this slide, Mr. Maxwell, what is the purpose of laying it out this way?

MR. MAXWELL: So this is a summary of the background and setting for the Joliet 29 Station, and on the right here is an aerial photo showing the relevant features of this station. And the left side lays out the appropriate background material that we started with as we

started reviewing the materials in developing the appropriate remedy.

MS. NIJMAN: And what were the relevant factors as you go through here for Joliet 29's background and setting?

MR. MAXWELL: So the station initially began operating in the 1960s, and it wasn't acquired by Midwest Gen until 1999. The station has since ceased burning coal as of 2016, and in terms of the surrounding land use for the station, that has been discussed a little bit already here today, but it's located in a predominantly industrial area.

When you look at what is surrounding the station, off to the north is industrial commercial facilities out beyond vacant property to the north of US Highway 6. Off to the south you have got the Des Plaines River, and on the -- on the opposite side of the river is the Joliet 9 Generating Station, and then when you look at what's going on east and west of the station, on the east side is the Brandon Road Lock and Dam that Mr. Gnat had discussed earlier today. And then to the west is the a prior SRP site that

was a former industrial site that had gone through the SRP and attained an NFR letter and ultimately redeveloped into a warehouse use there off to the west of the station.

MS. NIJMAN: What does the -- so on your map you have this area in green on the left-hand side. What does that reflect?

MR. MAXWELL: That area in green is the -- is an ELUC, the environmental land use control that, as I understand, Midwest Gen agreed to as part of the -- the remedy associated with the SRP project there on the adjacent property. There was a groundwater -- there was information in that -- in that project file that indicated that groundwater contamination had the potential to come onto the Midwest Gen site.

And so in order to get the -- in order for the applicant on the adjacent property to get their no further remediation letter, this ELUC was agreed to by Midwest Gen.

MS. NIJMAN: You note in your last bullet that the Joliet 29 is scheduled to cease burning natural gas in 2023, and I think Mr. Dorgan also mentioned that.

How does that -- why is that an important fact for you?

MR. MAXWELL: Yeah. I guess, you know, not -- if a station is no longer producing power, then the -- there is no materials that are currently being produced that need to be sent to the ponds or treated or disposed of. So it's, I guess, a -- a source elimination, if you will, that the -- the station is intending to cease producing power.

MS. NIJMAN: And in the process of -- the remedy process general approach that Mr. Dorgan described, it was dividing the impoundments or looking at the impoundments on one side and the historic areas on the other side. Did you do that with Joliet 29?

MR. MAXWELL: Yes, we did.

MS. NIJMAN: And I can refer you to your expert report on pages 9 and 10, but I would like to go through that handy chart you prepared about the stations.

So the second to last page of your PowerPoint, Exhibit 1702, was the chart that Mr. Dorgan described earlier?

MR. MAXWELL: Yes.

MS. NIJMAN: And is Joliet 29 listed on this chart?

MR. MAXWELL: Yes. It is at the top.

MS. NIJMAN: Would you describe the ponds at Joliet 29?

MR. MAXWELL: Yes. So there are three ponds, and quite simply and easy to remember, they are labeled Pond 1, Pond 2, Pond 3, and none of them are currently receiving any CCR material, and in terms of the CCR regulatory status, Pond 2 is the only pond of the three that fall under either the state or the federal CCR rules, and Pond 2 actually falls under both.

In terms of liners, originally, all three were lined with a Poz-O-Pac material that dates back to 1978. As part of the CCA process that was referred to earlier, each of the ponds received an upgraded liner that was an HDPE liner in order to enhance the -- the liner of each of the three ponds. 2008 was the -- was the installation date for Pond 1 and 2, and 2013 was the date the HDPE was installed for Pond 3.

MS. NIJMAN: And looking at the next column on comments, what ponds contain ash at Joliet 29?

MR. MAXWELL: So, currently, none of those three ponds, Pond 1, Pond 2, Pond 3, currently contain CCR. There is -- there has been a couple of different studies that have documented that in the case of Pond 1 and Pond 3, and Pond 2, it's noted here the CCR was removed by November of 2019, and that Pond 2 was presently moving through the closure process under the -- the federal and Illinois CCR rules.

And in this particular case, there is a pending adjusted standard that is before the Pollution Control Board that is seeking to -- to close this pond and -- via repurposing it so the intent is to close by decontaminating the liner, rather than removing the liner.

And then just finishing out the background information for the table, the groundwater monitoring programs that are implemented related to the ponds. The compliance commitment agreement, the CCA agreement, applies to all three ponds, and there is quarterly

groundwater monitoring that's taking place in accordance with those requirements.

And then on top of that, there is -- there's CCR monitoring that's occurring related to Pond 2. Both the federal and state CCR groundwater monitoring is occurring for a network associated with Pond 2.

MS. NIJMAN: Okay. Let's turn to slide 12 of your PowerPoint at Exhibit 1702.

What is this map identifying?

MR. MAXWELL: So this is a summation, a compilation of the historical soil borings, groundwater monitoring wells, sediment locations that have been performed during the -- during the investigation history that we reviewed as part of the record.

MS. NIJMAN: Was this also Figure 5 from your expert report?

MR. MAXWELL: Yes, it was.

MS. NIJMAN: And why was looking at all the data in one place relevant to you?

MR. MAXWELL: Well, it gave us a perspective for the quantity of data that's available. I think it's a nice visual to show it

on a single map to demonstrate the quantity of the information that we have as a totality.

MS. NIJMAN: We are going to talk about it a little more later, but this map doesn't show what has been referred to as the northeast area on the far, right side of the map?

MR. MAXWELL: That is correct.

MS. NIJMAN: And are you aware of any more recent data about the northeast area?

MR. MAXWELL: There has been some more information that's been collected since our expert report in 2021. It was discussed during the hearing last month, and there were a -- there was an investigation that was performed by the Corp of Engineers, that involved some soil borings along the river bank, and also involved the collection of some sediment data along -- in the river channel itself.

MS. NIJMAN: To your recollection, did the borings show ash?

MR. MAXWELL: The borings along the river bank did not show ash in the boring logs, no.

MS. NIJMAN: To your recollection,

did the sediment samples show impact from the Joliet 29 Station?

MR. MAXWELL: My recollection is that the -- there was one or two lead results that exceeded the standards, but that was the other metals that were analyzed indicated that the concentrations were below the -- the standards.

MS. NIJMAN: Was there anything to suggest that the lead in the two instances you are referring to related to the Joliet 29 Station?

MR. MAXWELL: No, no. I don't have any reason to suspect that that would be connected.

MS. NIJMAN: Looking at slide 13 of Exhibit 1702, your PowerPoint. What are you identifying here?

MR. MAXWELL: So this is a bullet list of the various different investigations that have occurred through the years at the Joliet station that were shown on the prior slide as a visual. So this simply lists the various investigations that were performed in more of a bullet list.

MS. NIJMAN: And is this in

chronological order?

MR. MAXWELL: Yes, it is.

MS. NIJMAN: Turning to your next slide, slide 14. Is this the first stage of the investigation you listed on your prior slide?

MR. MAXWELL: That's right. In 1998, it was the first one in chronological order that was -- that was performed.

MS. NIJMAN: And you have noted some factors from this 1998 Phase II. Why was this relevant to you?

MR. MAXWELL: Well, this was the original -- this was the earliest information that was gathered, and we summarize here that there was a good number of borings, monitoring wells, and surface soil samples that were collected, including some sediment samples that were collected.

So a good quantity of data was collected. In particular, we felt that data from monitoring wells, MW-3 and MW-5, was particularly important.

MS. NIJMAN: Can you point those out?

MR. MAXWELL: So MW-3 is located -- if you see the -- the north arrow pointing north, it is off to the upper left from the north arrow. That's MW-3.

And then MW-5 is located -- it's located in the north -- northwest of MW-3. It's the first monitoring well that's located northwest of MW-3.

MS. NIJMAN: And the findings for those wells you have listed on the second bullet here?

MR. MAXWELL: That's right. So Monitoring Well 3 and Monitoring Well 5, there was -- there were groundwater samples that were collected from both of those wells, and they were analyzed for the eight RCRA metals, and those concentrations ended up being below the Class 1 groundwater quality standards.

MS. NIJMAN: Do you know whether it was Midwest Generation who engaged in this 1998 Phase II study?

MR. MAXWELL: My understanding, it was not Midwest Generation. It was the prior owner of the site was the -- as the one that

engaged the consultant that performed that work.

MS. NIJMAN: Is data from 1998 still useful to you?

MR. MAXWELL: It's a data point. It's part of the totality of information that we are looking at. There is a report that documents it. That report was generated by a -- what we know to be a reputable consultant in the industry. We recognize and acknowledge that 1998 is not the same as 2023. However, it's -- it was part of our evaluation in terms of the overall assessment that we made.

MS. NIJMAN: How did the data from 1998 have any relevance to the historic nature of ash at Joliet 29?

MR. MAXWELL: I'm not quite following.

MS. NIJMAN: Well, let me put it this way. Now, Mr. Dorgan earlier mentioned how long some of the stations had been operating.

What is your understanding of how long Joliet had been operating?

MR. MAXWELL: Yeah. So, Joliet had been operating since the 1960s as indicated in our

previous slide, and so the -- the groundwater samples that were collected here, for example, would -- would be representative of impacts, because the potential CCR materials would have been there for quite some time.

There would have been ample opportunity for migration to have occurred to the monitoring wells that were -- that were sampled as part of this -- as part of this assessment. Certainly sufficient time had passed since the beginning of the station to when this data was collected.

MS. NIJMAN: What were the conclusions of the Phase II ESA as listed on your slide 14?

MR. MAXWELL: So the conclusions was that there wasn't a concern as it relates to groundwater ingestion. It was pointed out that there is -- there were no -- although in 1998 there wasn't an ELUC or a GMZ, in 1998, there were no known potable water supply wells that would be a concern. So that was the basis for that.

The industrial land use was still -- it was still being used for industrial

land use as of 1998, and as a result, there was a low potential for human exposure to constituents of concern because of the industrial land use, and then finally, under Illinois environmental law, there was no -- no further requirement to further investigate or remediate the property was the conclusion in the Phase II.

MS. NIJMAN: Are you familiar with an area referred to sometimes as the southwest historic ash area?

MR. MAXWELL: Yes, I am.

MS. NIJMAN: And where is that on this map? I imagine to the southwest.

MR. MAXWELL: That's right. It's off to the -- so the southwest is the lower left in that map.

MS. NIJMAN: Did this Phase II provide data that was relevant to you regarding the southwest area?

MR. MAXWELL: We did believe that this information is relevant. Monitoring Well -- MW-3, we believe, is downgradient of at least the northwest portion of the southwest fill area. So when you look at the location of that well and the

fact that groundwater from that particular spot, that northwest corner of the southwest fill area, it's going to have an opportunity to laterally spread out the mechanisms that we have talked about before. The dilution, attenuation, advection, dispersion is going to take place, which is going to result in MW-3 representing -- samples from MW-3 representing an evaluation of potential impacts from that -- that location of the southwest fill yard.

MS. NIJMAN: And you already mentioned in your second bullet on the slide the results from MW-3.

Did you compare any of the MW-3 results with current Class 1 groundwater standards?

MR. MAXWELL: Yes, we did, and we found that the -- the results from 1998 meet current Class 1 standards.

MS. NIJMAN: Turn to your next slide, slide 15 of Exhibit 1702.

What does this slide represent?

MR. MAXWELL: So this is the -- the 2004 investigation that was a preliminary

investigation that looked at the viability of coal combustion byproduct, or otherwise known as beneficial use of CC -- CCR materials within that northwest area of the station.

MS. NIJMAN: Is this the -- you were here with Mr. Gnat this morning, and he referred to a wind barrier of some kind.

Is your -- what is your understanding with regard to this area and the wind barrier?

MR. MAXWELL: Yeah. So, my understanding is that this material was under consideration for beneficial reuse to build this wind berm, or wind barrier, that was discussed this morning by Mr. Gnat. And so this 2004 investigation was simply the preliminary assessment in order to evaluate whether or not the CC -- a CCB approach would be viable.

MS. NIJMAN: You mention on this slide the NLET analysis. And we have heard some testimony about that already. Just briefly, describe what it is.

MR. MAXWELL: So that's the neutral leaching extraction test, and that is a test that

is required by the CCB requirements in the Illinois Environmental Protection Act, and it essentially is -- as the name implies, it's a leach with a neutral pH, which is seven.

MS. NIJMAN: Turning to your next slide, slide 16. What are we seeing in 2005 at Joliet 29?

MR. MAXWELL: Okay. So in 2005, there were some geotechnical borings that were advanced, and there were a total of six. I guess they were probes, and the -- this provided a -- kind of a back -- this was, as we understand it, was Midwest Gen sort of trying to understand what they had in terms of the characteristics of the soils in the vicinity of the ponds as part of a preventative maintenance.

There was consideration even dating back to 2005 of install -- of evaluating the condition of the liners and upgrading the liners, and the char- -- the geotechnical characteristics of the soils was a part of that evaluation.

MS. NIJMAN: Turning to the next slide, slide 17 of Exhibit 1702. This refers to a

second CCB investigation in the northwest area.

What do you mean by that?

MR. MAXWELL: Right. So, this was following up on the 2004 CCB investigation that indicated that there was some viability to -- to the CCB approach, and so this was a more thorough investigation of the CCB viability, or beneficial reuse viability, and so it comprised -- it was comprised of 15 additional Geoprobes, and again, they collected composite samples of the vertical interval from each of the probes and had those composite samples analyzed for the NLET leach test in accordance with the Environmental Protection Act in order to evaluate the viability of the CCB material.

And we have got the results on this slide here as well, and the results were at every location other than one, GP-14A, the concentrations from the NLET result or testing were below the Class 1 groundwater quality standards, and the result for copper and lead at GP-14A were above the NLET Class 1 groundwater quality standards.

MS. NIJMAN: So, then, turning to

your next slide, what happened to the area around 14A?

MR. MAXWELL: So, again, additional investigation and evaluation was performed in order to delineate the extent of the material at 14A that -- that had -- that did not meet the NLET Class 1 groundwater standards. And so they looked at additional borings and probes, test pits, north, south, east and west, of the original GP-14A. They collected composite samples similar to the samples from before and were able to show that -- the extent of the materials that do not meet the NLET Class 1 groundwater quality standards was shown with a hatched area here around GP-14A, and subsequently, they coordinated a total of 52 truckloads of materials that were hauled away to a permitted landfill for proper disposal.

MS. NIJMAN: And why was this removal of importance or relevance to your opinions about Joliet 29?

MR. MAXWELL: Well, it -- it demonstrated that there was a process that -- an investigation process that was performed, that in

response to the investigation that specific actions were taken in order to address the conditions that were identified in the investigation.

MS. NIJMAN: And what does this tell you about the ash that remains in that area?

MR. MAXWELL: So, the ash that remains in that area, it qualifies as -- for beneficial reuse under the Illinois Environmental Protection Act. The concentrations of the constituents of concern are below the Class 1 groundwater quality standard as it relates to the NLET testing.

MS. NIJMAN: And how does that relate to your analysis of risk?

MR. MAXWELL: Well, it -- it demonstrates that those materials are -- there is not as much risk as if those materials had leached and exceeded the Class 1 groundwater quality standards. The leaching is of a benign nature.

MS. NIJMAN: Turning to slide 19 of Exhibit 1702. What are you showing here?

MR. MAXWELL: So this is a summary of the 2010 hydrogeologic investigation that was

performed by Patrick Engineering. Again, this has been discussed here a number of times during the -- during the hearing, but this was an investigation that was before the CCR rules were promulgated. It was voluntary, performed at the request of the Illinois EPA, and it involved the installation of 11 monitoring wells shown on the diagram here on the right, monitoring wells both north and south of the three ponds.

The -- the investigation involved the collection of one round of groundwater samples and the analysis of 11 potential CCR-related constituents, and we have the results here on the slide also. The boron concentrations -- and we mentioned boron, because boron, we believe, is a key CCR indicator. So we think that that's particularly important. The boron concentrations in the groundwater were below the Part 620 standards, the Class 1 standards, and they did identify chloride that was present upgradient above the Class 1 standard of 200 milligrams per liter.

MS. NIJMAN: You mentioned this was done by Patrick. Did you have anything to do with

the locations of these wells?

MR. MAXWELL: No, no, we did not. We simply reviewed the information and considered it as we looked at the proper remedy.

MS. NIJMAN: In your review of this document, which wells are the upgradient wells?

MR. MAXWELL: MW-11, MW-10, and MW-8 on north and northwest sides of the ponds are upgradient.

MS. NIJMAN: And do you have an understanding of whether those upgradient wells are installed in ash?

MR. MAXWELL: I do. And they are not installed in ash.

MS. NIJMAN: Looking upgradient from Monitoring Wells 8, 10, and 11, we have heard testimony from Mr. Gnat that that's a road.

Are you familiar with that?

MR. MAXWELL: Yes, I am. I have seen it myself as well.

MS. NIJMAN: Could those wells have been located any further upgradient, if you will?

MR. MAXWELL: No, they couldn't. There is no space, because they are right up

against a -- a berm that abuts the highway. So there is just no place else to put them on the property.

MS. NIJMAN: You discuss in slide 19 that -- in your fourth bullet that 11 potential CCR-related analytes were not detected.

Would you explain that?

MR. MAXWELL: So the potential CCR-related analytes, those, as I understand it, were selected at the -- under the -- under discussion with Illinois EPA. They were the constituents that would later become the 40 CFR 257 Appendix III and Appendix IV constituents that are associated with CCR. So there is various specific metals that are associated with -- and other analytes that are associated with CCR as promulgated by the regs later.

MS. NIJMAN: And then you mentioned already that boron was below the Part 620 standards. Did that finding of boron generally stay consistent over time?

MR. MAXWELL: It did. You know, groundwater does -- it's dynamic, but I -- there was a small number of instances historically where

boron may have possibly been higher or lower, but, yeah, for the most part, it is -- it has been below, consistently, the Class 1 standards.

MS. NIJMAN: You also mentioned chloride when you described this slide. Have you assessed the cause or the basis of chloride being found at Joliet 29?

MR. MAXWELL: Yeah. We have looked into that, the potential source of chloride, and as was discussed here earlier this morning, the highway to the north and northwest of the ponds does -- it's documented to have received road salt, calcium chloride being the primary category or primary type of road salt. And so it seems to -- to make sense the chloride and later the calcium would be -- would be associated with the -- with the road salt that was applied to the highway there to the north.

MS. NIJMAN: I would like to show you or ask you to turn to exhibit -- excuse me -- tab 4 in your binder. And this is -- has been marked as an excerpt of Exhibit 1605, because Ms. Shealey was going to discuss it. It is also an agreed exhibit on our list of agreed exhibits

with the Plaintiffs -- or excuse me -- Complainants.

What is this document, Mr. Maxwell?

MR. MAXWELL: This is an expert opinion that I prepared related to the adjusted standard that -- that is being sought for the Joliet Station.

MS. NIJMAN: And if you would read the date on it?

MR. MAXWELL: It is dated March 21st, 2022.

MS. NIJMAN: And did you -- you prepared this, you said?

MR. MAXWELL: Yes, I did.

MS. NIJMAN: Would you look at and read the Bullet Point No. 2 on this first page, read that out loud?

MR. MAXWELL: "Contaminant transport mechanisms related to migration of chloride from US Highway 6 located north of Pond 2 to the groundwater monitoring wells."

HEARING OFFICER HALLORAN: Mr. Maxwell, can you slow down a little, please?

MR. MAXWELL: I apologize.

HEARING OFFICER HALLORAN: Thank you.

MS. NIJMAN: Let's try it again.

MR. MAXWELL: "Contaminant transport mechanisms related to migration of chloride from US Highway 6 located north of Pond 2 to the groundwater monitoring wells located around Pond 2."

MS. NIJMAN: And is that the opinion you were giving in this report or describes what opinion you were going to give in this report?

MR. MAXWELL: Yes. That -- that set the table for my opinion there that's presented below that.

MS. NIJMAN: And in the paragraph below, you refer to a different expert opinion.

What was that about?

MR. MAXWELL: Yeah. So there were two opinions. There was an opinion -- this was the subsequent opinion that was prepared in response to information that was provided by the Illinois EPA, and so this opinion here was intended to be a response to that. The original

opinion was from December 6th of 2021, and I can go ahead and read the major conclusion from that December 6th, 2-0-2-1 opinion.

MS. NIJMAN: Yes. Thank you.

MR. MAXWELL: "Our expert opinion in support of Midwest Generation, LLC's opinion for adjusted standard, Joliet 29 Station, dated December 6th, 2021 indicated that groundwater data demonstrated that the groundwater is not impacted by CCR that was historically in Pond 2, nor -- nor indicative of potential sources of CCR outside the pond. The additional information presented herein in response to the above technical issues included in the Illinois EPA recommendation further supports WCG's analysis and opinions."

MS. NIJMAN: And just to be clear, I think you said expert opinion in support of Midwest Generation LLC's..." I think you said opinion, but the word is "petition," right?

MR. MAXWELL: Petition for adjusted standard, correct.

MS. NIJMAN: Yeah. And I would like to refer you to Bates page 122708 in this document. At the bottom of the page --

MR. MAXWELL: Okay.

MS. NIJMAN: -- there is a heading that says, "Evaluation of Contaminant Transport of Chloride." Do you see that?

MR. MAXWELL: I do.

MS. NIJMAN: What was the finding of your analysis of the chloride at Joliet 29?

MR. MAXWELL: Our finding was that the chloride -- the source of the chloride that was identified in the -- in the monitoring wells associated with Pond 2 was from the application of road salts on the highway adjacent to the station.

MS. NIJMAN: You mentioned here on the last line that Illinois EPA -- excuse me -- the first line under the heading you -- it states, "The Illinois EPA and Midwest Gen previously agreed in 2012 that exceedances of 35 IAC Section 620.410 groundwater quality standard for chloride in groundwater at monitoring wells around Pond 2 are due to road salts applied to US Highway 6 north of Pond 2."

What was your understanding of the agreement in 19 -- or 2012?

MR. MAXWELL: Yeah. So that was

actually cited in the Illinois EPA recommendation regarding the -- the adjusted standard, and that cited to -- so that was referenced by Illinois EPA, and as I recall, that cited to a 2012 letter that was between Midwest Gen and USEPA as the basis for -- for that idea that the chloride is related to the ponds -- or I'm sorry -- related to the highway.

MS. NIJMAN: I'm sorry. You said USEPA. Illinois EPA?

MR. MAXWELL: Illinois EPA.

MS. NIJMAN: And do you know personally if -- or have you looked into whether the City of Joliet uses calcium chloride on its roads?

MR. MAXWELL: I have. I've looked at their website.

MS. NIJMAN: And what does it show?

MR. MAXWELL: The website indicates that calcium chloride is the type of road salt that they use for -- for the roads.

MS. NIJMAN: Turning back to the slide presentation PowerPoint at Exhibit 1702, Slide No. 20. What does this reflect?

MR. MAXWELL: This is the groundwater elevation contour map that was included in the Patrick report on their initial hydrogeologic investigation that shows the groundwater elevation data from their initial groundwater monitoring activities, and they have contoured it in order to show the groundwater flow configuration.

MS. NIJMAN: Looking first at your first bullet, you state -- you have a discussion about potable wells. What was that about?

MR. MAXWELL: Yeah. So they did investigate the -- the presence or absence of potable wells, and the -- the conclusions was that no potable wells were located on the station downgradient of the ponds that would be -- that could be utilized as a source of drinking water.

MS. NIJMAN: And you noted depth to groundwater. Why was that relevant to you?

MR. MAXWELL: That just gave us a sense for how deep the uppermost groundwater unit was, and we reference it here as 29 to 34 feet. It -- that's getting pretty close to the -- to the bedrock by that point. So that just gave us a

sense for the hydrogeologic setting.

MS. NIJMAN: On the top, right side of this map in the northeast corner, what are those contour lines showing?

MR. MAXWELL: So the way those contour lines are curved, it shows a flow that is from the -- what has been referred to later as the northeast fill area there off to the northeast of this map here in the direction of well -- MW-1, and eventually MW-2 also.

MS. NIJMAN: And why was that relevant to you to show?

MR. MAXWELL: Well, we are showing an arrow here. Just hydrogeology 101 is the flow is perpendicular to the contour lines, and so the idea here is that these wells, at least for this particular monitoring event, showed that MW-1 was downgradient of the area that would later be called the northeast fill area as part of the record.

MS. NIJMAN: And did you see this general flow more than once in your review?

MR. MAXWELL: We did look in the record to see if there were other examples of --

of this flow, and we were able to find another one, yes.

MS. NIJMAN: And do you recall me asking Mr. Dorgan about his review of the Kunkel testimony from the first part of the hearing?

MR. MAXWELL: Yes, I do.

MS. NIJMAN: And did you also have the review -- opportunity to review some of Mr. Kunkel's testimony from first part of the hearing in this matter?

MR. MAXWELL: Yes, I did.

MS. NIJMAN: Do you recall if Mr. Kunkel testified about the flow from the northeast side of the station impacting these wells?

MR. MAXWELL: Yes. As I recall, Dr. Kunkel made a reference to what is shown on this boring -- or I'm sorry -- this map from Patrick in terms of the flow, on occasion, on a transient case being from the northeast fill area in the direction of pond -- of MW-1 and MW-2.

MS. NIJMAN: And what have been the findings in MW-1 and MW-2 as to the contaminants of concern for ash?

MR. MAXWELL: There haven't been any consistent concentrations of CCR constituents of concern above the Class 1 standard in MW-1 or MW-2.

MS. NIJMAN: And why was this groundwater flow direction from the northeast area relevant to your opinions?

MR. MAXWELL: Well, there has been mention of a lack of groundwater and monitoring well and soil boring data from the northeast fill area, and this was at least an example of an instance where at least on a temporary basis, the groundwater flow set-up that is shown here would indicate -- would be useful in terms of looking at MW-1 and whether or not the northeast fill area is having a detrimental impact on the groundwater at MW-1.

MS. NIJMAN: Do you recall whether Mr. Kunkel said anything about what was done with 95 percent of the ash at the Joliet site?

MR. MAXWELL: My recollection was that the testimony was that 95 percent of it was not disposed at Joliet 29, but was taken across the river to the Joliet 9 site and the -- the -- I

believe to the -- historically, most of it has gone to the Lincoln Stone Quarry for disposal via a pipe bridge.

MS. NIJMAN: How was that relevant to the conditions at Joliet 29, in your opinion?

MR. MAXWELL: Well, that demonstrates that historically minimal ash has been -- has been managed in the ponds, and that the majority of the ash has gone offsite. So you are just -- you're just talking about a smaller source volume, potential source volume.

MS. NIJMAN: I would like to refer you to page 35 of the Board opinion, the interim opinion from 2019. And we are going to put that up on the screen, the second full paragraph on page 35.

MR. MAXWELL: Is that Exhibit 1110?

MS. NIJMAN: No. This is the Board opinion, which was up there at some point --

MR. MAXWELL: Okay.

MS. NIJMAN: -- but I'm not sure is there anymore.

MR. MAXWELL: I'm not seeing it.

MS. NIJMAN: Yeah. We will have to

put it up on the screen. Page 35, second full paragraph on the page. So if you would read that second full paragraph from the opinion, starting, "The environmental groups..."

MR. MAXWELL: "The environmental groups provided a comparison of the median values of boron and sulfate in the monitoring wells with the 90th percentile statewide values from the statewide database. The comparison indicated exceedances of the 90th percentile statewide value of boron in well MW-11 and sulfate in well MW-09." And then it cites a citation. "All other wells have no exceedances of either boron or sulfate above the 90th percentile values."

MS. NIJMAN: Then, in the next paragraph on the last line, what is the Board saying about boron in MW-11?

MR. MAXWELL: They say that, "The Board finds that given that MW-11 is an upgradient well and no exceedances of the 90th percentile statewide value for boring occurred in any other well, coal ash stored in ash ponds or coal ash deposits outside of the ash ponds at the Joliet 29 site are not the likely sources causing boron

exceedances in MW-11.

MS. NIJMAN: So then the Board goes on in the next paragraph to discuss sulfate at MW-9. Do you see that?

MR. MAXWELL: Yes, I do.

MS. NIJMAN: So let's go to your slide 21 in your PowerPoint at Exhibit 1702. And what does this document reflect, or this page of your PowerPoint?

MR. MAXWELL: So this is an investigation that was performed in 2020 by Midwest Gen in response to the concentrations of primarily sulfate and TDS that were identified in well MW-09. That well stood out a little bit as an outlier in terms of the overall chemistry of groundwater quality at the Joliet site, and the investigation was performed in order to try to get a better assessment of potential -- the potential reason for the sulfate and TDS concentrations that we were seeing in that particular well.

MS. NIJMAN: And what was done as part of the investigation?

MR. MAXWELL: So, a total of 18 soil probes were advanced, and the soil samples --

samples of soil from the probes were analyzed for sulfate, iron, and manganese. They also attempted to take groundwater samples from temporary wells as well, and I believe that those temporary wells ended up being dry. So there was no groundwater samples that were collected, but -- so that was the -- that was what was done.

We discussed or looked at the boring logs from this specific investigation this morning. The results of the boring logs did not identify any CCR materials in the boring logs.

MS. NIJMAN: There was some discussion about the depths of the Geoprobe boring logs. Do you recall that from this morning?

MR. MAXWELL: Yes, I do.

MS. NIJMAN: Do you have any concern about the depths of the Geoprobe boring logs?

MR. MAXWELL: Yeah. I don't have any major concerns. The MW-9 was advanced to the -- to the bedrock. No CCR materials were identified in MW-09. The fact that we weren't able to get through the obstructions that were identified in some of these borings, I don't think is particularly material as it relates to the

other data that we have that shows what we believe the source to -- of the TDS and sulfate at MW-9 is.

MS. NIJMAN: Well, let's go to that. You mention in your fourth bullet, "pH of groundwater in MW-9 is acidic."

Why is that relevant to your opinions?

MR. MAXWELL: Yeah. So it is acidic, and in some cases it has been substantially acidic. It's important because that stands out. As mentioned, the sulfate and TDS stands out, but the pH stands out also when you look at the rest of the monitoring wells, and it's acidic, and the important part of that, I believe, is that it -- CCR materials, if you look at the -- the neut- -- or the natural pH under the LEAF tests for CCR materials, it's documented that it's basic, not acidic.

So the fact that you have got acidic pH was something that I think is giving us pause right out of the gate.

MS. NIJMAN: And I can refer you to page 37 of your expert report where you discuss

this investigation at MW-09. What were your findings -- or what were the findings? Sorry.

MR. MAXWELL: So what we did was we looked at -- we looked at the soils and what were the sources of the soils there, and what was the mineralogy of the sources of the soils there, and the -- the source of the native soils there is the underlying dolomite bedrock, and there was a citation that identified that there are certain sulfide minerals that are present in that particular dolomite bedrock unit that -- and we have seen, in fact, cobbles of that bedrock in the boring logs in this vicinity. So that is just an indication that this bedrock material is related to these soils.

The sulfide minerals that are part of these dolomite bedrock, when they are exposed to oxygen as you can have when you install a monitoring well and expose the soils to oxygen, whereas previously they weren't before the well was installed, that addition of oxygen to the -- to the soils ultimately results in a condition where the -- it oxidizes the minerals, the sulfide minerals, and that ultimately lowers the pH, and

the lower pH then subsequently mobilizes other constituents that are naturally present in the soil, and, like, sulfates, TDS, cobalt, nickel, these constituents all present as documented in the dolomite bedrock. Once you get the oxidation of the sulfide minerals, as a result of the low pH, it mobilizes these constituents, and ultimately results in the presence of them in the groundwater.

MS. NIJMAN: So I'm looking at page 7 -- 37 of your report in the second, full paragraph, and the last sentence reads, Thus, the sporadic sulfate and TDS groundwater concentrations are naturally occurring in the soil and are not due to station operations, including the presence of CCR in the soil or from a leaking pond."

Do you see that sentence?

MR. MAXWELL: Yes, I do.

MS. NIJMAN: Is that -- does that summarize your conclusion?

MR. MAXWELL: Yes. I provided the technical background the last few minutes, but yes, that absolutely succinctly summarizes the

source of the TDS and the sulfate.

MS. NIJMAN: Do you recall Mr. Quarles' opinion about this acidic pH?

MR. MAXWELL: I do.

MS. NIJMAN: And what did he say?

MR. MAXWELL: As I recall, it was sort of a generic reference to acidic pH and these types of concentrations of sulfate and TDS typically being associated with CCR materials.

MS. NIJMAN: Do you agree with that?

MR. MAXWELL: I don't. As mentioned, basic pH is much more typical of CCR impacts as evidenced by the LEAF leaching data that we have at this site, and so, no, I do not agree with that.

MS. NIJMAN: So, in your opinion, were any of the groundwater results -- excuse me -- any of the results in the area near MW-9 a result of CCR in that area?

MR. MAXWELL: No, no. We believe that what's being detected in the monitoring well there is related to the -- the oxidation of the sulfide minerals from the dolomite.

MS. NIJMAN: And in your opinion,

did your investigation of MW-9 address the Board's question about MW-9 sulfate?

MR. MAXWELL: I believe it did. I think that the Board -- at the time of the 2019 opinion -- interim opinion, they -- that information hadn't been collected yet, and so the information that was collected in 2020 I think was very useful and allowed us to -- to evaluate the data and come to the conclusions that we were able to come to.

MS. NIJMAN: Let's go back to your PowerPoint Exhibit 1702 and look at slide 22. This concerns -- the caption is, "Ongoing Groundwater Monitoring at Joliet 29."

What are you showing here?

MR. MAXWELL: So as part of the record, there is ongoing groundwater monitoring that's taking place at the Joliet 29 Station. There is a total of 12 monitoring wells that are installed around the ponds, and there is multiple groundwater monitoring programs that are being implemented. There is the federal detection or Appendix III constituents that are being evaluated. There is the federal Appendix IV

assessment constituents that are being analyzed for, and then there is also -- on top of that, there is quarterly monitoring that's occurring in compliance with the CCAs.

So this is just a summation of the ongoing groundwater monitoring that's taking place at the station as in compliance with these various items.

MS. NIJMAN: Okay. Turning to your next slide, slide 23. It concerns the northeast historic fill area that we have had a bit of discussion about already. What is the information you had to assess this northeast area?

MR. MAXWELL: So this is what I would call a -- kind of the sum accumulation or the totality of the lines of evidence of total information that we had at our disposal, a summary of that. We have had a fair amount of discussion this morning about the inspections that have been occurring on a regular basis at the northeast fill area.

So that's the first bullet there is that a regular evaluation is performed as to the top soil cover erosional features that might

be present in this area of this station. If those erosional features are identified, there has been discussion about addressing those issues and correcting those issues, repairing those issues, if those erosional features are observed.

There is no historical observation of seeps along the river bank, as testified to by Mr. Gnat. There is heavy vegetation. I think that it was referred to as quite a heavy jungle during certain times of the year. And I can attest to that as well. I visited that and saw that, and conversely, there is a lack of stressed vegetation to suggest that there is substantial harmful leachate or harmful materials in the soils that would be affecting the vegetation.

The sum total of information relates to groundwater flow also. We talked a couple slides ago about the flow in the Patrick depiction of groundwater -- of groundwater elevations, that there is flow from this area to the vicinity of MW-1 at Pond 3.

And then this last bullet is referring to the work along the Des Plaines River

that -- that was done recently last year coordinated by the Corp of Engineers that involved advancing some borings along the river bank, as well as collecting some sediment samples from the -- from the bank -- or the -- the surface of the river.

MS. NIJMAN: Now, we heard this morning -- also you mentioned the testimony this morning. We heard that there is potentially -- there is some evidence of ash that Mr. Gnat had identified in 2009. How does that impact your opinion?

MR. MAXWELL: Yeah. That was part of the record that we reviewed. That was part of the totality of the information that we were looking at. I believe in our deposition we didn't dispute the idea that some ash is present there, and the information that we do have, however, as just outlined, we believe is sufficient to -- in order to -- to arrive at the remedy that we have put forth for the Joliet Station.

MS. NIJMAN: Is any ash in your -- can you provide your opinion about whether any ash found means there is a source to groundwater?

MR. MAXWELL: Any ash found does not indicate automatically that there is a source to groundwater contamination. There has been data that we'll discuss later at other stations where analytical data shows that the concentrations are actually below the TACO remedial objectives in some instances where CCR has been logged in borings. So that is dependent -- you know, the chemistry of the CCR material that might be logged in a boring is -- is one of the driving factors, and so, you know, in many cases, the CCR material could be mixed with soil, as an example.

If it's mixed with soil, the quantities of that mixture is going to dictate whether or not it's ultimately going to result in a source or not. So you have got something that's mostly soil with a little ash, you know, that's less likely to be a source. The opposite would be true for the opposite.

So it really is dependent on the chemistry, and you certainly don't want to assume that any and all CCR that might be present in the boring is going to represent a source to groundwater contamination.

MS. NIJMAN: And do you recall --

HEARING OFFICER HALLORAN: Can you get closer to the mic, Mr. Maxwell, please? I'm sorry.

MR. MAXWELL: Will do.

MS. NIJMAN: Do you recall Mr. Gnat's testimony about that 2009 investigation he did, what he said about whether there was a mixture with soil?

MR. MAXWELL: My recollection is that there -- in that instance, there was soil mixed with CCR materials, yes.

MS. NIJMAN: You also mentioned the heavy vegetation that you saw. Can you come to any conclusions about soil cover based on the heavy vegetation you saw in this area?

MR. MAXWELL: Yeah. So if you see heavy vegetation, that typically is indicative of a decent thickness of topsoil. The heavy vegetation is going to -- it's going to need topsoil in order to thrive. So the vegetation suggests that there would be a sizable amount of topsoil cover where there is heavy vegetation.

MS. NIJMAN: How does topsoil relate

to infiltration?

MR. MAXWELL: It's certainly not a -- it's not considered an engineered clay cap, but it -- it has the potential to minimize infiltration, you know, depending on -- most topsoil is comprised of a mixture, what we call a loam of sand silts and clays. So, you know, the loamier or siltier or clayier parts of the soil are going to serve to minimize infiltration.

The way that it's contoured sloping to the river is going to minimize infiltration. So there are aspects of the cover that are beneficial as it relates to, I guess, separating the -- or minimizing the production of leachate.

MS. NIJMAN: You were present for the testimony of Ms. Shealey in May, I believe, correct?

MR. MAXWELL: Yes.

MS. NIJMAN: And did you hear her discussion about the Army Corp project to protect from Asian carp?

MR. MAXWELL: Yes, I did.

MS. NIJMAN: And what is your

recollection of her discussion about the material that was in this northeast area?

MR. MAXWELL: As I recall, Ms. Shealey's information was based on discussions with the Corp of Engineers who coordinated that investigation that we were speaking about, their impression was that that material along the river bank there was related to dredge, dredged spoilings from prior dredging along the river.

MS. NIJMAN: In your role as an expert in this matter, had you had other opportunity to speak to Ms. Shealey about what might be in this northeast area, or what she understood was in this northeast area?

MR. MAXWELL: I have. We have had interactions, yes.

MS. NIJMAN: And based on those discussions, do you have any understanding of whether it -- well, there was -- do you recall the discussions in the 1998 ENSR report you reviewed about where ash from Joliet 9 might have gone pre-1966?

MR. MAXWELL: I think there is -- the 1998 Phase II, it made an anecdotal, very

generic reference to ash from Joliet 9 coming to Joliet 29.

MS. NIJMAN: And have you discussed that question with Ms. Shealey?

MR. MAXWELL: Yes. And my impression from that discussion was that that would be operationally challenging; meaning, that it just wouldn't be convenient, as I understood it, to truck CCR material from Joliet 9 across the river across the bridge near the the Brandon Dam just because of the -- primarily because of the haul distance. You would almost have to be doing it on almost a regular basis.

It just wouldn't make a lot of sense because of the haul distance, the nature of that bridge. It just wouldn't be the first option for -- for managing CCR materials on the opposite side of the river, because it just isn't the most convenient means to deal with it is my understanding of her impression of the history.

MS. NIJMAN: And do you agree with that impression?

MR. MAXWELL: It makes sense to me, yes. The -- you -- in this type of an

application, you -- typically what's done is it -- it's dealt with in the most convenient manner. You want -- it's the path of least resistance, if you will. So, I mean, from a -- from a logical standpoint, it makes sense that it would be a challenge to continually truck the materials to that -- to that location from the opposite side of the river.

MS. NIJMAN: And, Mr. Hearing Officer, it's 5:20. I'm moving into a whole different area here. I can begin or --

HEARING OFFICER HALLORAN: Yeah. Whatever you feel comfortable with or, you know, I'm happy to quit now and continue to tomorrow at 9:00.

MS. NIJMAN: Okay. Let's do that then.

HEARING OFFICER HALLORAN: Okay. We are going to go off the record until tomorrow morning at 9:00 a.m., and hopefully, I will remember it's in 16-503. Thank you.

(END OF PROCEEDINGS.)

I, KARI WIEDENHAUPT, do hereby certify that the foregoing was reported by stenographic and mechanical means, which matter was held on the date, and at the time and place set out on the title page hereof and that the foregoing constitutes a true and accurate transcript of same.

I further certify that I am not related to any of the parties, nor am I an employee of or related to any of the attorneys representing the parties, and I have no financial interest in the outcome of this matter.

I have hereunder subscribed my hand on the ____ day of _____, 2023.

_____

KARI WIEDENHAUPT, CSR

A
A.D 1:18
a.m 1:18 321:20
A.R 260:18
Abel 2:9 6:14 141:14 188:18 258:23 261:9
ability 246:1
able 9:4 48:4 67:21 92:6 104:10 112:12 118:20 145:4,7 145:23 155:8 181:14 211:10 226:8 249:21 263:22 289:11 302:1 307:22 312:9
absence 207:19 208:9 222:4 240:10 243:12 300:13
absent 218:5
absolutely 112:16 132:1 184:21 186:21 224:20 310:24
absorption 250:15
abuts 293:1
accept 104:2 261:6
accepted 161:4 242:23 250:22
accepts 199:24
access 44:1 84:21 84:22,23
accommodate 264:3
account 213:8 256:13
accumulating 25:16,17
accumulation 313:15
accurate 48:10,11 89:22 103:17 180:6,11 322:7
accurately 91:19 93:7 94:15 95:20 96:24 99:7,24 101:15 103:4
acid 29:6
acidic 61:13 308:6 308:10,11,15,19 308:21 311:3,7
acknowledge 242:24 282:9
acknowledgment 201:4
acquired 133:18 272:8
acre 60:19
acres 246:9
act 30:24 268:20 287:2 288:14 290:10
acted 16:4 58:6 71:9 213:8
Acting 72:18
action 30:7 127:12 172:11 172:16 173:6,12 179:16 200:10 200:11 205:8 212:15 247:1 263:24
actions 179:18 211:8 212:11 245:9 290:2
active 200:10 203:2 228:3 229:14,16
activities 300:6
activity 13:23
actual 145:19 213:5 254:3
adaptive 241:21
add 106:17,19
added 160:14 161:23 216:11
adding 23:9 34:14 253:4
addition 33:16 37:20 133:11 138:4,12 159:6 180:10 309:21
additional 33:2,22 63:7 68:24 70:16 71:22 88:9 187:1,10 193:12,13,20,24 288:9 289:3,8 297:12
address 134:7 149:21 178:22 199:12 200:15 201:5 239:16 242:10 247:21 254:10,22 290:2 312:1
addressed 248:7
addressing 213:2 254:11 256:16 268:16,24 314:3
adequate 264:7
adjacent 15:14 43:16,17 78:18 273:12,18 298:12
adjusted 187:3 276:14 295:6 297:7,20 299:2
adjustment 53:11 125:15,18 126:8
adjustments 186:19
admission 48:22 64:1 103:13 159:19
admit 28:2 134:18 261:7,12
admitted 5:6 28:8 28:11 35:24 49:7,10 64:7,9 103:10 119:12 119:16,19 132:12 134:20 134:22 146:5 162:10,13 261:16
advanced 287:10 306:24 307:19
advancement 242:7
advancing 315:3
advection 285:6
advise 138:7 141:17 142:8
aerial 271:21
agencies 174:5
agency 26:13 169:14 174:11 174:15 178:16 179:15,16 199:24 211:22 213:1 242:23
Agency's 213:7
ago 13:13 90:10 162:7 170:9 197:17 208:23 210:12 215:10 242:17 244:6 253:15 262:9 314:19
agree 92:5 131:16 139:7 141:5 179:9 192:18 193:9 213:5 220:16 226:10 226:10 256:7 260:1,5,23 261:2 262:3 263:9,12 263:19 311:10 311:15 320:21
agreed 7:6 9:23 24:3 25:19 55:10 76:22 141:15,16 163:8 211:20,22 260:19 273:10 273:20 294:24 294:24 298:17
agreeing 179:15 179:17
agreement 23:22 55:24 65:18 66:24 164:5 178:10,15 179:12 276:23 276:23 298:23
agreements 212:10
agrees 271:3
ahead 297:2
aid 85:13
air 170:20,21
alkaline 61:15
Allied 149:15,16
allow 7:15 19:4 55:7 133:14 140:5 201:10 212:17 220:7 231:5 270:24
allowed 55:5 312:8
allows 14:12 140:8 227:5 230:11,15
alter 241:18
alternate 74:21 75:5,8,15,19,22 76:1,5,8,14 77:3 77:6,14 193:21 235:16,16
alternative 127:20 127:24 128:3,7 128:15 248:16 259:2,7
alternatives 127:16 130:8,21 131:23 132:4 133:8,9,11,16 134:9 170:4 256:5,10 261:5

amount 244:17 313:18 317:22
ample 283:6
an@nijmanfra... 3:12
analyses 29:5,21 60:4
analysis 24:22 66:10 127:17 130:9 132:4 133:17,19 166:6 172:6 190:15,18 190:20 195:19 205:23 211:13 214:17 217:10 221:12 222:7,18 223:16,18 227:2 228:6 230:8 231:10 232:19 234:24 237:8 238:2,4 244:6 246:10 249:5 255:20 261:20 262:24 286:20 290:15 291:12 297:15 298:7
analytes 293:6,9 293:16
analytical 27:15 60:2 192:12 214:12 316:5
analyze 26:12 249:2,2
analyzed 25:8 60:24 65:19 279:6 281:16 288:12 307:1 313:1
anchoring 116:16
and- 2:7
and/or 209:4
ANDREW 3:5
anecdotal 319:24
angle 112:12 116:5 144:24 145:4 154:23
announce 74:3
annual 30:6 57:3 57:10 228:20 230:1
annually 228:21
anomaly 163:7
answer 39:13 48:4 77:8 86:5 92:6 155:8 225:5 231:21 249:21 263:22
answered 122:3 130:16
anticipate 195:20 196:1 241:10,20
anticipated 15:3
anticipating 197:16
anybody 75:13 265:6
anymore 304:22
anyway 131:9
apologize 296:1
apostrophe 89:4,5 89:8,9 100:21
apparently 139:1
appeals 7:13
appear 92:22 117:11 161:20 240:23 264:10
APPEARANCES 2:1 3:1
appearing 107:24
appears 76:2 82:13 94:17 100:3 110:3 132:2 161:19
appendix 29:19 29:19 74:23 75:1,3 130:20 189:2,3,7 219:15 219:16 223:10 223:11 293:13 293:13 312:23 312:24
applicable 208:11 227:3 231:23,23 257:14 264:14
applicant 273:18
application 16:6 16:10,14,18 17:2 17:14,15,22 30:16,23 31:18 31:20 32:1,2,8 32:15,19 33:19 34:6,6,9,11,17 34:21,23 35:10 43:12 57:14,15 57:16,18,20,23 58:9,14,18,19 59:1,10,11,14 69:4,5,9,10,12 69:17,23,24 70:8 70:11 71:3,4,6 71:13,15,16,20 195:13 256:21 266:7,16 298:11 321:1
applications 16:3 30:10,13 31:10 32:4,12 35:4,8 35:13 43:15 57:13 69:7 72:5 72:9,14,17 73:1 73:6
applied 66:1 201:21 204:19 204:23 208:13 240:11 243:14 294:17 298:20
applies 208:20 276:23
apply 170:2 195:22 196:3 200:18 207:20 207:22 209:5,11 209:22 210:23 211:10 246:10 250:8 266:3
applying 245:11
approach 62:16 62:21 63:13,16 81:21 84:6 143:17 173:11 173:14 174:16 204:4,8,13,14 205:9 208:18 218:8,9 222:9 225:4 231:22 240:4,13 241:19 248:16 255:14 271:5 274:12 286:18 288:6
approached 206:24 240:15
approaches 62:18
approaching 111:17
appropriate 165:13 169:13 169:18 172:16 183:1 204:18 206:10 210:9 226:9 245:9 247:20,24 248:24 253:20 267:22 271:23 272:2
appropriateness 268:23
approval 174:21 174:22
approve 261:3
approved 200:19 201:22 211:11
approximately 16:9 17:20 32:7 34:10 35:9,12 37:9,12 58:9,14 59:10,13 70:1,5 71:22 72:24 73:4 85:9 93:9 105:11,24 106:1 106:16 123:15 137:20 163:6
approximation 102:5
April 27:6 41:4 45:3 158:13 247:3
Aquifer 269:7
area 12:12,16 13:17,24 14:13 14:21 15:5 18:19 20:19,19 43:16 49:16 50:2,7,13,15 51:2,18,21 54:3 54:6,9,14 55:20 55:22 60:8,11,13 60:16,19 62:13 63:17,19 64:24 67:15 68:3 80:18,22 81:5,15 82:21 83:1,18,24 84:19,19 85:1 88:4,10,12,19,23 90:18 91:20 92:3,9,23 93:8 93:16,20 94:9,16 95:1,6,11,15,21 96:3,7,18 97:1 97:13,16,19,23 97:24 98:2,2,10 98:14 99:1,8,18 100:1,10,14 101:4,9,16 102:22 103:5 104:8,19,19,22 105:7,9,11,14,15 105:24 106:10 106:16,17,18 110:6,11,16 116:4,24 117:3 118:3,4,5,6,17 120:1,5,15,16,18 121:6,10,18,22 135:19 136:1,19 136:20,23 137:1

137:6,6,8 148:4 148:6,10 150:11 150:13 157:1 159:6,7 160:10 160:11,14,15 167:18 177:11 207:20 216:24 272:13 273:6,8 278:6,9 284:9,10 284:19,23 285:2 286:4,9 288:1 289:1,14 290:6,8 301:8,18,19 302:20 303:6,11 303:15 311:18 311:19 313:11 313:13,21 314:1 314:21 317:16 319:2,13,14 321:11
areas 13:1,9 58:4 65:8 87:6 88:1 103:14 116:19 116:22 118:19 149:18,21 151:17 157:2 167:16 194:14 195:23 204:19 205:1 206:16 208:21 209:18 210:1,4,7,9 216:21 240:9 274:15
arguers 145:20
argument 139:17 248:15
Army 136:8,11 318:21
arrive 315:20
arrow 281:2,3 301:14
articles 246:13
ash 12:23 13:4,7,8 18:18 19:1 21:16 22:5,16,17 25:10 26:1,1 27:24 30:15,15 30:17,23,24 31:10,11 32:1,2 32:9,9 34:22,22 34:23 36:16 37:20,21,23 38:1 38:3 48:9 56:13 56:13 60:7,8,11 60:22,24 63:5 64:19 66:6 67:19 77:18,19 77:21,23 78:2,4 82:21 83:1,18 84:15,16 87:21 121:22 122:13 122:18 124:10 124:10 150:21 150:22 151:4,9 151:10,15,16,18 151:21,21,23 178:5 183:9,10 194:14 239:9,22 240:9 241:17 258:23 260:17 262:14 266:21 267:1 271:1 276:2 278:20,22 282:15 284:10 290:6,7 292:12 292:14 302:24 303:20 304:7,9 305:22,22,22,23 315:10,17,22,23 316:1,17 319:21 320:1
ash-like 25:18
Asian 318:22
aside 105:2 106:21 149:2 151:24
asked 42:14 53:18 60:15,21 63:14 132:8 142:23 153:9 165:10 194:24
asking 10:23 46:11 302:4
aspect 130:4 182:5 199:15 203:2
aspects 72:19 129:14 183:8 318:12
assess 169:16 182:7 224:19 230:15 313:13
assessed 232:12 294:6
assessing 182:6 204:8 245:8 264:14 269:22
assessment 29:17 127:12 146:7 171:19,22 172:8 190:23 206:10 211:6 223:10 225:1 238:12 240:15 252:15 253:6 255:18 260:2 261:19 282:11 283:9 286:17 306:18 313:1
assessments 239:14,15
assigned 6:5
assist 23:21 26:5 27:7 34:16 56:1 66:22 67:2 104:3 134:16 161:1 181:4
assisted 24:1 67:3
associated 22:20 34:1 55:8 62:11 68:16 76:20 136:7 273:11 277:7 293:14,15 293:16 294:16 298:11 311:9
association 121:7
assume 241:9 316:21
assumed 236:7
assuming 91:13 109:6,8
attaches 202:1
attained 273:2
attempted 307:2
attempting 266:3
attended 130:14
attending 72:22
attention 8:21 166:3 194:2
attenuation 202:18,18 231:6 242:5 247:1 248:7 250:16 251:10 260:14 261:1,3 285:5
attest 314:11
attorney 74:4
attorneys 322:11
attributed 254:8
auger 143:16 145:10,10,11,13 145:13,16 147:9 147:11,12
August 149:7,7 251:8
authenticate 42:1
authenticated 42:2
authenticity 49:3 49:5
automatically 316:2
available 71:1 109:17 193:14 207:24 210:6 213:21 219:5 224:14,16 226:11 237:1 253:13 259:15 267:16 277:24
Avelar 138:13
AVENUE 2:10
average 219:18,22
avoid 179:6,20
aware 175:4 197:10 278:8

B

B 4:11 74:23 75:1 75:3 189:2,3,7
back 14:19 15:7 22:15,15,17 42:10 46:19 47:4 49:13 63:6 72:2 73:16 74:1 74:6 76:15 81:10 87:2 93:10 95:23 98:3,5 100:6 104:18 105:3 106:23 109:24 115:13 128:20 135:9,12 136:18 137:5,19,19 152:23 159:24 160:3,4,6,6 162:10 163:5 172:20 174:13 174:18 178:7 186:4 188:23 198:10 200:13 209:21 213:17 227:11 229:2 238:9 253:4 259:21 264:23 265:8,23 268:4 269:3 271:14 275:18 287:12 287:18 299:22 312:11
background 32:13 33:7,12,23 66:8 70:20,23 71:8 114:9 205:5 213:11,21

271:20,24 272:5 276:20 310:23
backing 223:6
BAHRAMIPO... 84:10
balance 174:14
ball 141:1
bandied 173:9
bank 102:7 111:6 111:7 113:5,17 114:2,23 115:2 121:15 154:20 154:24 278:16 278:22 314:7 315:3,5 319:8
banks 101:20
bar 49:5
bare 13:2
barges 14:12,17
barrel 143:18
barrier 286:7,10 286:14
base 19:24 20:14 37:7 38:7,9 39:14,16 46:14 46:14 54:14
based 20:8 25:14 29:9 46:5 47:10 47:22 60:23 61:1 102:4 106:4 158:11,13 172:13 173:19 182:10,17,18 187:3 196:1 220:23 261:13 317:15 319:4,17
basic 43:13 240:14,23 248:2 308:19 311:12
basically 19:2 22:6 33:6 50:24 56:8,10,11 58:6 59:5 60:16 61:19 81:13 85:2 200:3 219:10 247:18 257:9 259:10 266:14
basin 18:18,18,19 19:1 21:16 22:5 22:8,10,13,16,18 22:20 23:10 25:1,8,21,21 26:1,2,7,18 27:16,22 30:15 30:15,17,18,23 30:23,24 31:10 31:11,11 32:1,1 32:2,9,9,10,19 32:22 33:13,20 34:9,22,22,24 35:1,19 36:17 37:8,13,23 38:1 38:4,6,8,10 39:15,17 48:9,17 70:17 122:13,18 122:19
basins 19:2,8,9 33:12 35:8 124:11
basis 14:18 27:18 28:24 29:22 65:20 158:1 216:8 224:21,22 228:18 245:22 246:10 264:3 283:22 294:6 299:6 303:12 313:20 320:13
bates 9:24 10:1,3 10:8,11,15,15,17 11:2 27:2 36:6 40:17 59:19 76:2 79:8 82:13 87:4 93:11 96:1 98:5 100:6 105:4 109:14,17 110:3,18 113:23 114:17 116:2 247:10,11 251:5 258:13 297:23
bathymetric 25:6 25:14
bear 119:22
becoming 139:3
bedrock 79:18,20 80:5 120:10,24 121:8 148:4,5,10 148:20,22,24 300:24 307:20 309:8,11,12,14 309:17 310:5
began 181:10 238:18 272:7
beginning 46:13 83:17 90:22 91:1 181:15 283:11
behalf 6:13,19 7:4 184:24 190:5,15
believe 14:3,10,21 16:3,11 17:17 21:4,19 24:5 26:10 37:3,5,19 38:5 42:13 49:24 52:2 53:9 54:15,23 55:11 58:11 60:23 61:8,12 65:6 67:5 74:10,13 76:16,19 77:5,19 77:20 78:7 79:15 83:5 85:13 91:18 92:8 93:7 94:14 95:20 96:24 99:7,24 101:15 103:3 111:16,19 112:2 116:20,21 117:18 122:12 122:20 124:3 125:20,21 126:24 127:3,23 128:18 136:11 140:6 150:2,2 153:23 154:12 156:20 158:7 160:5 161:14 190:19 191:12 191:20 193:6 196:21 198:16 198:18 235:23 236:15 248:14 257:2 262:11 266:22 271:8 284:20,22 291:16 304:1 307:4 308:1,15 311:20 312:3 315:16,19 318:17
belongs 39:9
benchmark 37:2
beneath 52:13,16 56:12 65:12 247:13 269:22 270:6,15
beneficial 286:3 286:13 288:7 290:9 318:13
benefit 70:20 203:5 229:21
benign 290:20
berm 53:12 125:15 286:14 293:1
berms 78:8
best 75:4,7 145:20 182:16 206:2 207:24 208:12 247:21 256:21 257:14
better 180:15 306:18
beyond 38:12,17 39:4 272:16
bid 15:6
bidding 169:9
big 16:9 17:14 32:2 35:9 58:9 59:11 70:2 71:15 72:24 107:8 120:22 145:18,19,21 205:7
bigger 144:19 153:21
binder 11:1 16:12 17:17,18 58:12 59:17 64:14 70:4 73:3 74:16 107:1 146:16 166:8,13 175:14 180:2 188:24 198:11 203:14 257:21 265:5,7 294:21
binders 32:4 74:11
bit 18:22 19:6 45:6 60:20 67:21 84:17 111:5,19 112:13 115:2 125:22 141:10 148:16 154:18,22 155:12 174:13 178:24 180:13 190:10 193:16 193:20 200:16 200:17 203:23 211:4 215:2 216:8 223:8 237:11 251:23 272:11 306:14 313:11
black 159:18 160:14
block 106:16
blue 91:7
Board 1:1 6:4 37:19 39:7 74:4 76:24 85:13 104:3 133:22 134:1,17 161:2

161:24 162:3,9 191:8 209:7,24 268:15 276:15 304:13,18 305:16,19 306:2 312:4
Board's 37:18 134:10 139:6 165:11 199:6,7 205:2 255:2 259:22 267:20 312:1
boats 14:12,16
bodies 217:5 218:20,23
body 175:3 253:14
boiler 51:23
bolded 248:19,20
book 18:2 26:20 35:22,22 40:13 51:9 74:17 107:1 109:17 123:23 124:1 142:19 157:13
boring 18:16 20:8 60:15,24 62:24 79:1,4,8,10,21 79:23 80:5 143:5,21 144:1,6 146:23 147:1,8 147:19 278:22 302:18 303:10 305:21 307:9,10 307:11,13,17 309:13 316:10 316:23
borings 60:18,19 62:22,23 63:17 80:4,6,8,11 142:24,24 143:4 277:13 278:15 278:20,21 280:15 287:9 289:8 307:23 315:3 316:8
boron 291:14,15 291:16,18 293:19,20 294:1 305:7,11,13,17 305:24
bottom 10:1 11:2 37:23 40:23 44:23 48:9 52:14 61:22 88:13,15 92:13 92:13 122:18 143:21 150:21 151:1,6,16 158:3 198:17 204:6 235:10 248:19 269:16 270:1 297:24
boulder 144:17,22 145:19,23 156:11
boulders 144:20 144:21 153:22 154:19 155:15
boundary 83:21 84:20 86:21 87:6,11,13,14 88:11 105:10 230:24 231:12 231:16,22 232:4 232:10,13 234:12,20,22 235:2
box 90:13,14,16 92:21 94:3 95:13 96:16 97:11 98:20 99:16 101:5 102:18,21 167:6 167:14
boxes 135:14
Bradley 1:15 6:3
brand 22:19
Brandon 13:20 14:6 81:8 272:22 320:10
break 15:4 20:1 73:18,22 121:19 121:23 122:4 135:6 137:16 145:3 163:2 264:18,21
bridge 304:3 320:10,16
briefly 199:21 286:21
bright 115:19
bring 33:3,3 50:21 66:4 145:16,22 147:16 187:21 205:18 217:19
bringing 8:20 31:18,22 140:18 174:14
broadening 211:24
brought 32:24 129:15 131:11 148:8 212:3 240:2
brown 8:12 74:5 208:6
brownfield 170:3 174:6 183:18 185:17 201:17 208:6,7 245:14 245:16 251:17
brownfields 167:13,19,21 168:9,11,21 169:22 170:16 181:8,21 182:4,6 185:14,14 212:13 245:19
brush 115:17
Bugel 2:2 4:5 6:12 6:12 7:3,17,20 8:14,18 11:4,5 17:8 28:4,5 31:4 38:11,15,16,22 39:3 41:20 45:14 46:10,16 48:2,24 49:1 64:3,4,6 73:17 73:19 74:7,9 81:17 82:1 84:11 85:12 86:9,15,18,19 90:7 91:23,24 92:11 95:1,2,5,9 97:21 103:20 104:5,17 108:14 109:19 110:5 119:21 128:9,10 128:13 129:7 131:9,10,20 133:5,6 134:3,6 134:24 135:10 135:11 137:12 137:15,22,24 138:5,11 139:12 139:15,19 141:2 141:13,16,21 142:1,8 151:11 155:3 158:18,19 158:23 159:2,8 159:15 160:2,12 160:13 161:14 162:15,18 258:11
build 67:21 202:5 286:13
building 216:9 233:14
buildings 91:7 178:4
built 205:23
bullet 88:14,16,19 88:22 90:18 93:13,14,16 95:24 96:3,6 98:7,10 100:7,10 149:13 203:24 223:22 232:23 233:4 235:10 273:22 279:17 279:23 281:10 285:12 293:5 295:17 300:10 308:5 313:22 314:23
bullets 235:11 247:13
burial 82:21 83:1 83:18
burning 197:16 197:17,24 272:9 273:23
bushes 115:10
business 165:2 188:8
Bypass 26:2 30:15 30:23 31:10 32:1,9 34:22
byproduct 14:23 286:2
byproducts 176:19 243:22

C

C 12:2,5 74:8 142:16 163:22 164:1 185:23
C021 36:4,9 37:6
calcium 15:23 16:1 294:13,16 299:14,20
calculation 33:24
calendar 197:19
call 42:21 57:5 67:23 82:16,17 244:17 260:17 313:15 318:6
called 12:3 37:3 144:20 163:23 167:8 170:22 226:23 301:19
callout 167:14
calls 155:3
campfires 81:12

canal 65:5 120:21 157:1
canals 157:2 259:5
candidates 248:24
cap 127:21 128:1 202:11 203:1,1,4 203:8 228:2,22 229:6,19 318:3
capacity 164:19
capped 202:9 227:21
caps 229:13
caption 312:13
captured 258:9
carbonate-type 15:23
care 60:17
career 167:16 171:12 181:10 181:16 185:12
carp 318:22
carries 260:9
carry 195:11
carrying 235:11
carryover 235:8
case 6:5,6,7 38:13 38:18 39:3,4,5 45:5 55:19 61:10 90:1 138:23,24 139:9 152:16 175:5 178:17 185:3,3 197:2 226:8 246:6 252:18 257:18 262:11 264:11 276:8,13 302:20
cases 140:16 181:21 209:21 217:5 234:5 308:10 316:11
categories 248:13
categorized 236:16
category 168:17 229:19,22 294:13
cause 294:6
caused 77:3,15
causing 305:24
caveat 242:11
CC 212:12 286:3 286:18
CCA 26:10 29:3 53:19 179:5 194:12 200:23 212:11,20,22,24 275:18 276:23
CCAs 26:5,6 192:13 193:19 200:13,13 209:9 211:3,4,7,17,19 212:7,11,13 229:15,16 242:4 313:4
CCB 177:1 286:18 287:1 288:1,4,6,7,14
CCR 24:18 28:15 28:21 29:11 30:1,2 53:6,7 56:16,20,22,22 61:1,23 68:10,13 68:19,23 126:15 126:18,21,22 127:10 132:23 133:17 176:1,17 176:20 177:4,7 177:10 183:2,20 185:18,22 186:3 192:14,14 193:19 194:11 195:2,9 198:8 204:21 206:11 207:3,20 208:14 212:2 220:11,16 227:20 234:11 234:18 238:23 238:24 239:19 239:20 240:2 241:2,4,5,10 242:3 253:4,5,21 254:2 255:5 265:23 266:3,16 266:24 267:3 269:17 275:11 275:12,14 276:6 276:9,12 277:4,5 283:4 286:3 291:4,16 293:14 293:16 297:10 297:11 303:2 307:11,20 308:16,18 310:16 311:9,12 311:19 316:7,9 316:11,22 317:12 320:9,17
CCR-regulated 266:17
CCR-related 291:13 293:6,9
CCRs 177:15,20 239:5
cease 273:22 274:9
ceased 197:16,23 272:9
Center 1:5,16
central 35:6 52:14
CERCLA 169:24 170:9 208:8 252:5
certain 58:3 172:13 179:18 182:13,13 200:15 244:17 252:16 265:17 309:9 314:10
certainly 14:5 23:8 32:11 34:14 43:11,19 44:13 58:2 62:17 109:9 117:14 119:8,10 129:16 144:23 147:14 154:23 155:23 157:8 165:7 167:17 168:13 169:19 173:3 176:5 198:9 204:20 206:11 207:11 209:7,24 214:5 216:22 218:7 222:10 236:3 239:13 250:6 252:18 253:9 261:4 268:9 283:10 316:21 318:2
certifications 167:3 180:11
certify 322:2,9
CFR 223:9 293:12
challenge 321:6
challenging 320:7
chance 247:14
change 222:13
changing 239:8
Channahon 13:21 15:13,14,18 76:20 85:5
channel 13:19 81:4 84:20 101:22 107:10 110:21 111:20 111:24 112:6 118:6 120:20 124:12,13,14,16 124:17,18,21 278:18
channels 49:20,24 50:3,4,20 120:24 124:8,9,24 125:4 125:8
char- 287:20
characteristics 182:18 250:13 287:14,21
characterization 179:10
characterized 168:24 225:7
chart 216:6 274:20,23 275:3
cheat 215:18
checking 125:8
chemistry 306:15 316:9,21
Chicago 1:17 3:8 65:5 120:21 177:11,13,15,20 181:1,4 183:12
chloride 15:8 16:1 291:20 294:5,6,9 294:13,15 295:20 296:6 298:4,7,9,9,18 299:6,14,20
choose 39:8 62:14 176:6
chose 61:2
chronic 219:9
chronological 280:1,7
chunk 121:12
chunks 107:8 120:9,11,22
cinder 151:23 178:1,2
cinders 13:4 183:9
cindery 151:5
circumstances 250:4 266:1
citation 305:12 309:9
cite 189:8
cited 189:12 299:1 299:3,4
cites 305:12
citing 234:18
CITIZENS 1:7
city 177:15 178:6

183:11,14 299:14
civil 164:11,24
clarify 19:18 84:2
Class 281:17 285:15,19 288:20,22 289:7 289:13 290:11 290:19 291:19 291:21 294:3 303:3
classification 168:15
clay 18:10,15,20 19:11,22,23 20:6 20:13,15,19 23:5 157:9 318:3
clayier 318:8
clays 318:7
cleaner 162:9
Cleaning 18:19 30:18 32:19,22 33:13,20 34:9 35:1 70:17
cleanup 169:23 173:24 254:3 259:1
clear 17:20 76:13 98:1 117:20 162:2 177:18 297:16
clearinghouse 16:5,23 31:1,14 31:22 34:3 35:6 58:2,6 59:5 69:20 71:10 72:19
clearly 218:19
Clerk 8:5
client 184:24 187:21 188:7
close 92:10 120:10 148:22 234:22 235:1 239:3 276:16,17 300:23
closed 199:19 258:24
closely 165:21
closer 114:23 155:16 317:3
closest 40:6 41:10
closure 55:5 56:7 127:1,21 128:15 128:19 130:21 131:22 132:3 133:8,9,11,15,16 134:8,14 167:24 169:2 193:22 227:20,21 241:15 276:11
closures 177:4
Club 1:3 6:13
co-counsel 135:1
co-president 164:18
CO2 264:5
coal 14:23 15:4 52:1 121:19 176:19,22 178:4 178:5 183:10,16 197:16,24 272:9 286:1 305:22,22
cobalt 310:3
cobble 111:8,20 111:23 112:7,17 112:20 115:1 117:19 118:7 144:15,24 145:2 145:5,18 147:15 153:12
cobble-size 145:14
cobbles 110:19,22 111:3,10 112:9 113:1,13,18,21 113:24 114:13 114:20 116:2,6 117:6,10,12,13 117:16 118:2,15 119:3,9 120:4,16 120:17 143:11 144:4,9,11,16,17 144:23 147:14 147:16 153:21 153:22 154:13 154:20 155:15 155:22,24 156:17,19,20 157:6 309:12
collaborated 165:21
collaborative 213:4
collect 17:21 28:23 29:3,8 61:11,21 62:23 63:6,20 71:20 188:2
collected 60:8 182:11 187:2,4,7 192:16 193:21 209:13,13 223:1 253:8,17,18,22 268:8 278:11 280:16,18,20 281:15 283:2,12 288:10 289:10 307:6 312:6,7
collecting 71:21 211:18 253:23 315:4
collection 187:10 223:2 278:17 291:11
colon 82:19
colored 9:24
column 276:2
combination 206:19
combined 66:6
combusted 178:3
combustion 14:23 176:19,22 183:16 286:2
come 15:5 22:21 62:3 125:22 126:2 138:14,15 138:16 172:4,19 187:10 194:1 205:13 207:10 220:8 227:5 242:12 253:18 255:7 273:16 312:9,10 317:14
comes 22:16 189:4 201:13,14,14
comfort 174:15
comfortable 321:13
coming 53:7 55:9 69:21 71:11 72:19 121:10 138:2,7,8 140:19 140:23 196:14 206:8,14,15 242:11 268:4 320:1
comma 91:4
comment 138:1 138:14,22 139:7 187:11
commented 184:6
commenting 175:19 187:6 234:11 262:12
comments 174:18 174:19,19 178:8 276:2
commercial 13:22 65:9 272:16
commitment 23:22 55:23 66:23 178:9,14 179:12 195:10 276:23
commitments 178:21 200:14
committing 179:17 212:18
common 42:24 43:3 186:17 187:2 225:3 242:18 243:12
commonly 183:10 202:8 242:19,23 261:3,6
commonplace 43:4
communicated 75:14 127:20 271:2
communication 213:7 258:10
community 256:15 263:1 264:1
COMP_041681 258:13
COMP_041682 258:18
COMP_67366 247:12
COMP_67391 251:6
company 15:6 165:3
compare 252:7,10 285:14
compared 153:17 153:18 219:5
comparing 154:15
comparison 132:4 250:10 252:24 305:6,9
comparisons 206:22 219:14 219:20
compilation 277:12
Complainants 1:9 2:13 7:5 9:22 103:9 119:11 131:3 132:11 146:24 159:19 162:16 258:15

295:2
Complainants' 4:18 5:12 10:20 38:18 82:4 85:22 90:4 108:11 119:16 119:18 129:4 134:19,21 139:9 146:3 149:4 159:12 160:9 161:3,7 162:12
completed 72:15 169:11 238:18
complex 186:23
compliance 23:22 55:23 66:5,23 132:24 133:2,19 133:21 178:9,14 179:6,12,20,22 209:5 229:10 234:12 239:19 240:2 276:22 313:4,7
complicated 192:12
complied 200:18 269:18
comply 196:4 200:7,14 255:9
complying 26:6 195:8
component 25:10 176:22 177:16 183:3
composed 15:21 204:16
composite 288:10 288:12 289:10
composition 151:18
comprised 288:8 288:9 318:6
compromised 22:18
concentrated 167:18
concentrating 172:21
concentration 219:22 230:8,11
concentrations 172:17 217:20 219:18 230:16 231:8 238:7 244:20 245:24 250:17 279:7 281:17 288:19 290:10 291:15 291:18 303:2 306:12,19 310:14 311:8 316:5
concept 173:2 217:12
concern 207:2,3 262:20 263:11 265:20 266:10 266:19 267:10 267:16 283:17 283:22 284:3 290:11 302:24 303:3 307:16
concerned 184:16 259:11
concerns 168:3 178:22 184:14 213:3,8 262:10 262:17 307:19 312:13 313:10
conclusion 25:13 25:19 222:2 234:6 235:22 255:8 284:7 297:2 310:21
conclusions 227:6 240:23 283:14 283:16 300:14 312:9 317:15
condensed 204:2
condition 61:14 61:15 172:1,3 213:20 218:7 249:2,18 287:19 309:22
conditions 168:23 173:18,22 176:23 178:18 195:15 196:15 196:16 200:15 201:5,11 202:3 205:6 208:13 210:8 213:12 214:3 218:22 222:13 224:15 234:2 238:19 239:10 240:5 241:24 242:10 243:13,19 244:3 244:24 247:21 247:23,23 248:15 249:7 251:23 252:21 254:13,20,22 256:17,22 257:9 262:1 264:6 268:24 269:22 290:3 304:5
conduct 25:2 56:19 226:21
conducted 53:5
conducting 222:18
confer 135:1
confidence 228:22
configuration 300:8
confirm 49:3 78:12 84:8 92:12 113:20 119:3
conflict 207:4,10
conform 241:11
confused 86:3 161:10
connected 19:3,21 20:11 279:13
connection 121:14
consecutive 152:14
consequence 251:22 263:4
conservative 231:3,12
consider 29:20 133:22 165:11 168:10 169:17 198:9 220:12,16 222:12 229:15 241:7 244:11 255:19 259:15 261:4 264:13 267:15 268:13 268:14
considerable 253:13
consideration 206:17 207:18 253:24 268:9 286:13 287:17
considerations 211:16 248:4 249:24 250:20 257:11 263:24
considered 29:18 66:2 134:13 181:20 199:6 202:9 206:9 209:8,24 210:4 214:15 219:24 221:4 222:10,14 242:13 245:8 251:18 252:16 253:10 255:17 256:12 259:16 259:19 264:9 268:22 292:3 318:3
considering 78:14 235:24 240:5
consist 225:19
consistency 195:13
consistent 206:1 207:12 293:21 303:2
consistently 265:23 294:3
consists 79:1
constantly 186:24 186:24
constituent 230:17 244:7
constituents 23:13 62:6 77:2,13 177:23 192:17 219:15 223:7,9 223:11,12 224:11 231:8 284:2 290:11 291:13 293:12 293:13 303:2 310:2,4,7 312:23 313:1
constitute 200:6,6
constitutes 322:7
construct 15:3 59:7
constructed 122:5
construction 16:17,20 17:13 17:15,21 22:6,24 30:20 34:17,21 34:23 35:7 36:11 43:12,14 53:13,20 57:16 58:17,19 59:1,9 69:7 72:4,9,17 73:5 107:17 121:4,19 126:8 156:24
construe 267:12
consult 44:5
consultant 55:14 185:2 187:21 188:7,12 282:1,8

consultants 17:3 31:15 34:5 69:21 71:11 72:20 164:10,16 209:1
consultation 179:14
consulted 43:7
consulting 36:12 58:5 59:4 164:4 164:12,21 165:5
Cont 12:5
contact 8:5 172:4 172:19 205:13 205:19 206:8 219:11 220:8 243:15,24 244:14,23 245:4 245:6
contain 276:2,6
contained 196:12
contains 74:21 102:21 132:3
contaminant 205:18 217:16 217:17,19 218:2 244:13 245:12 248:8,22 256:16 295:19 296:5 298:3
contaminants 245:1 248:6 251:10 260:15 302:23
contaminated 237:7
contamination 55:1,9 206:7 244:18 248:11 259:2 271:1 273:15 316:3,24
contents 25:3
context 172:15
continually 321:6
continue 84:3 131:19 160:19 180:1 195:8 198:1 200:23 209:5,12,13 239:21,23 240:24 241:8,11 241:18,20 242:6 243:6 245:2 253:20 259:24 321:14
continued 3:1 6:7 188:12 195:12 209:11 216:4
continues 228:23 228:23 239:22
continuing 195:10 196:2 200:7 242:5
contour 18:10 51:13 64:18 300:2 301:4,6,15
contoured 300:7 318:10
contractor 150:4 169:9,10
control 1:1 6:4 14:11 24:6 43:3 54:20 55:7 56:3 67:4 76:23 141:2 191:8 199:7 201:23 232:1 241:3 253:5 273:10 276:15
controlled 252:22
convenient 227:23 320:8,19 321:2
conversely 22:14 314:12
convert 90:2
converting 91:12
coordinated 289:15 315:2 319:5
coordinates 88:23 89:2,11,14,18 90:17 91:8 92:1 92:22 93:19,22 94:5,8 95:14 96:7,9,17 97:12 97:24 98:13,16 98:22,24 99:18 100:13,16 101:5 101:8 102:22 105:15
copies 158:21
copper 288:21
copy 16:12 85:19 86:8,9 104:10 159:4 161:14
core 143:18
corner 44:23 80:24 84:24 92:14 93:1 94:4 94:18 95:6,11 97:4 99:13,17,20 102:1,13,19 106:12,18 115:7 115:8,12 118:11 204:6 285:2 301:3
Corp 136:8,11 278:15 315:2 318:21 319:5
correct 10:4,8,11 10:15,18 12:18 13:11 14:24 15:16 16:7 17:4 17:7 19:9,20 21:22 31:3 45:13 70:13 74:24 75:22,23 76:2,3,5,6 77:10 77:11,24 79:2,3 79:11,12 82:11 83:9,24 84:1 86:24 87:1,11,12 87:14,15 88:2,8 88:11,20,23 89:6 89:15,16,20 91:2 91:5 93:20,24 94:1,9,10,17,19 95:22 96:4,5,7 96:11,12 97:9 98:11,12,14,18 98:19,22 99:1,11 100:4,11,12,14 100:18 101:2,18 101:21,23 102:2 102:16,17,22 103:6 104:8 105:15,16 108:1 108:2,4,7,8,16 109:6 110:11,12 110:19,20,24 112:10,20,21 113:14,21,22,24 114:1,4,5,14,21 114:22 115:4,14 115:19,24 116:3 118:13,14 122:18 123:6,8 123:15,17 124:15,16,19 125:4,5,10,12,16 126:12,16,19,23 127:2,7,10,17,22 130:12,13 132:5 132:6 136:13 144:10 167:4 192:2,3 198:23 199:3 235:23 258:16 262:7 266:6 271:10 278:7 297:21 318:18
correcting 314:4
correction 159:5 198:14
corrections 160:10
corrective 30:7 127:12,13 172:11,15 173:5 173:12 205:8 212:14 247:1
correctly 118:3 262:19 267:12
correlation 121:2
corridor 68:1
cost 130:20 131:22,22 132:4 132:8 168:18
costs 150:5 257:12 262:21,23
counsel 10:20
count 139:11 185:13 245:20
country 43:1 171:2,5
County 64:13,19 64:21 65:1,2,22 66:21 68:12 126:10,11 127:2 127:6 128:16 138:14 166:3 242:2
couple 7:1 13:12 33:2 114:10 154:17 183:8 187:7 217:2 228:16 255:21 276:7 314:19
course 148:1 174:9 179:16 183:13 187:4,8 189:16 200:20 209:12 214:11 219:13 239:17 241:14 250:17 256:9
COURT 150:18 180:12,16,20
cover 313:24 317:15,23 318:12
covered 13:12 83:24 135:3 237:18
covering 156:14

covers 56:11 130:20
create 179:21 252:15 270:20 270:23
created 83:12 158:8 189:17 191:13
creation 191:13
crest 41:2 45:2 158:12
crests 40:24 44:24 47:1,9,12,14,14 47:18,23 48:13 158:3,4,10
crew 125:2,6
crews 48:16 122:21 123:2,14
criteria 173:17,19 219:4,9 220:5 221:4 250:3,21 268:21 269:1,19
critical 231:24 233:16 237:22 269:14
critically 237:15
criticism 237:13
cross 36:15,15,22 73:18 104:22 141:14
crow 102:7,8
crunch 91:11,13
CSR 1:21 322:22
cubic 63:10
current 164:7 194:11 196:2 197:7,10,19 202:1 219:16 285:15,19
currently 205:7 274:6 275:11 276:4,6
curved 301:6
CV 166:24 167:4 167:7 168:17 171:18 180:2,3,6 189:4
CVs 166:16

D

D 4:1 12:2,5 142:16 163:20 163:20 164:1 185:23
daily 158:1,11,14 264:3
dam 13:21 14:7,8 14:8,9 40:6,20 41:3 44:24 46:6 47:24 81:6 107:17 121:5 157:21 272:23 320:10
dams 14:11
darker 84:18
data 27:15 30:4 40:19 47:5,7,8 54:16 57:6 63:2 71:22 72:19 182:7,10 187:7,9 188:3 193:20 209:12 211:18 211:18 214:17 214:18 215:2,3,6 219:6,19 222:16 222:18,21,24 223:2,3,14,15,23 224:8,13,13,16 224:18,21 225:1 225:7,11 226:2,5 226:10 227:2,7 232:19 234:8 235:17 236:5,7 236:14 237:1 253:8,13,16,18 253:22,22 259:15 262:2 267:15 268:1,7 277:21,23 278:9 278:17 280:19 280:20 282:2,4 282:13 283:11 284:18 297:8 300:5 303:10 308:1 311:13 312:9 316:3,5
database 253:19 305:9
date 7:8 158:6,7 247:3 275:23,24 295:10 322:5
dated 27:6 251:8 295:11 297:7
dates 158:9 275:18
dating 186:4 287:18
datum 37:4 45:7
day 1:17 10:5 30:3 57:7 123:11 140:9 150:4 257:13 322:15
day-to-day 187:22
days 7:8 30:3 57:6 90:10 122:24 123:4,5,15
DC 2:11
deadline 7:6
deal 213:6 228:16 320:19
dealing 177:14,16 178:6 201:7 228:13
dealt 183:2 321:2
December 297:1,3 297:8
decent 317:19
decide 182:16
decided 83:8
deciding 134:1
decision 188:8 210:14
decisionmaking 134:2 161:2 195:5 210:20
decontaminating 276:17
decreasing 235:22
deed 24:14 55:18 67:13 202:1
deem 263:4
deemed 178:19 182:14 256:6
deep 150:15 300:21
deepen 120:24
default 173:17,19 256:8
Defendant 1:12
define 196:8
defined 61:1 239:7
definition 225:23
definitive 117:21
degrees 89:3,5,12 89:15,18,22,23 91:8 93:23,23 96:10,10 98:17 98:17 100:17,17
déj 162:6
delineate 289:5
demonstrate 179:22 195:10 218:4 229:10 251:24 270:6 278:1
demonstrated 173:21 195:7 218:19 254:8 289:23 297:9
demonstrates 290:17 304:7
demonstrating 249:6
demonstration 74:21 75:12,15 75:19 76:1,14 77:3,6,14,17
demonstrations 193:22
demonstrative 90:9 103:19,21 104:3 159:4 160:17,24 161:5
dependent 254:12 316:8,20
depending 22:3 61:20 144:24 169:20,20 196:16 318:5
depends 82:7 89:24 231:17
depicted 36:9 51:12 52:8
depicting 153:11
depiction 314:20
deposeth 12:4 163:24
deposition 315:16
deposits 305:23
depth 300:18
depths 307:13,17
Des 13:19 14:13 65:4 81:4 87:22 101:20 102:5 107:5,13,18,22 110:23 120:20 272:18 314:24
describe 13:16 18:8 20:9 51:18 64:24 80:21 150:14 151:7,15 164:7 168:18 199:22 207:1 213:14 218:16 228:12 238:12 244:7 265:11 275:6 286:22
described 135:24 244:5 274:13,24 294:5
describes 213:11 296:11

describing 151:8
description 31:1 88:3 150:14
design 36:13 168:17 169:5 171:11,16 182:8 184:18 188:1
designed 36:15 185:7
designing 182:1 186:5 224:23 225:9
desire 63:14
despite 155:10
detail 176:16 178:24 215:2 223:8 233:23 240:21
detailed 60:16,22 194:24
detected 244:22 293:6 311:21
detection 29:16 223:9 312:22
determination 75:5,9,12
determinations 209:2 210:12
determine 14:22 77:2,13 255:1 268:22 270:4
determined 251:21
detrimental 303:16
develop 224:19 226:2,6
developed 59:2,3 128:21 183:3
developing 221:6 272:1
development 13:2
developments 241:18
deviated 166:1
dewatered 22:6 22:11,13
diagram 291:8
diameter 147:12
dictate 316:14
diesel 264:4
difference 103:15 147:7 192:5,19 193:3,8 251:16
differences 176:5
different 24:23 29:15 53:22 61:16 62:18 86:23 87:13 125:23 129:24 134:12 144:14 145:9,12 169:17 170:15 183:8,17 183:18 185:15 185:18,18 202:13 222:23 228:16 242:22 255:21 276:7 279:18 296:17 321:11
differentiating 265:24
differently 32:21 90:21
difficult 225:4 245:15
diffusion 250:16
digestible 204:2
dilution 285:5
diminish 244:20 244:21 245:2
direct 11:12 39:1 131:10 141:9,12
direction 19:12,15 19:17 52:17 65:11 130:7 301:9 302:21 303:6
directions 154:1
directly 15:13,14 256:20
dirt 151:3,19,20 151:22
disagree 174:10 220:23
discontinuous 18:17
discovered 20:5
discuss 132:24 216:12 218:15 260:18 293:4 294:23 306:3 308:24 316:4
discussed 12:11 15:12 23:11 28:14 56:15 60:10 68:9 125:12,14 130:11 131:12 133:9,10 135:19 150:9 240:3 246:13 262:9 272:11,23 278:12 286:14 291:2 294:10 307:8 320:3
discussing 12:10 80:15 120:1 131:14 149:24 215:9 234:13
discussion 12:13 15:8,10 73:13 76:19 86:1 109:21 156:19 184:3 186:14 192:9 224:2 232:18 233:20 238:16 250:24 256:2 293:11 300:10 307:13 313:12,18 314:3 318:21 319:1 320:6
discussions 52:19 76:17 255:24 319:4,18,20
dispersion 231:6 250:16 285:6
disposal 134:10 260:17 266:20 267:1,5 289:18 304:2 313:17
dispose 262:14
disposed 274:7 303:23
dispute 315:17
disputed 21:8
disregard 39:7 162:9
dissolved 23:15 53:1,19 65:21 192:16 193:5
distance 114:1,3 320:12,15
distant 217:3
distribute 81:18 106:24 108:9
distributed 159:16 161:15
distributing 159:3
divide 208:19
divided 165:18
dividing 274:13
divvied 165:18
DNR 136:11
docket 194:13
document 27:3,8 42:20 47:11 59:16 97:16 103:13 118:19 118:20 129:9,12 129:22 130:5,10 130:19,24,24 131:2,13,23 132:1,17 133:1,7 133:10,18,24 155:14,19,20 156:6,6,11 189:15 190:21 201:24 203:19 215:14 246:24 247:5,7,9 249:16 249:23 250:23 251:8 258:5 292:6 295:3 297:24 306:8
documentation 159:3
documented 55:1 209:19 240:9 276:7 294:12 308:18 310:5
documenting 118:22 156:7,8
documents 17:3 128:6 130:1 131:2,6 189:7,11 189:17 193:23 246:14 249:23 259:18 282:6
doing 21:4 44:13 53:18,24 60:18 61:21 62:21 63:16 68:12,14 68:17,22 81:11 116:15 123:2 125:3,8 141:9,13 142:4 164:20 169:11 179:13 179:14 187:18 211:9 212:18 217:12 227:24 230:17 235:12 235:15 320:12
dolomite 107:8 120:10,22 121:11,13 309:8 309:11,17 310:5 311:23
dolomite-type 148:5
Don 8:11
door 131:16
Dorgan 4:8 163:12 164:4,6,9

164:15 165:7,10 165:20 166:10 166:22 167:1,5 167:11,14 168:10,20 169:19 170:12 170:17 171:1,6 171:13,17,21 172:9 173:3,11 173:15 174:1,7 174:12 175:1,4,8 175:10,17,20,23 176:4,12,15,18 177:10,22 178:2 178:11,14 179:3 179:7,11 182:1 182:21 183:9 184:22 188:16 189:5,8,9,13 190:1,3,9,19,24 191:3,9,12,18,20 192:3,8,11,21 193:6,10,15 194:6,10,22 195:3,7,20 196:10,21 197:3 197:12,15,23 198:5,16,23 199:3,10,14,23 200:12 201:3,8 201:16 203:18 203:20 204:11 207:5,23 208:22 210:16,24 211:7 211:19 212:8,12 212:23 213:18 215:12,17 216:2 216:7,18,22 217:11 218:12 218:18 220:4,13 220:18 221:13 221:21 222:1,8 226:15,17 238:11,14 240:20 241:7 242:21 243:17 243:20 244:9 245:13 246:11 246:15,19,21,23 247:6,15,18 248:1,14,21 249:4,12,15,22 250:11 251:3,7 251:14,18 252:4 252:12 253:8 254:5,18 255:4 255:21 257:1,5 258:6,8,16,21 259:16 260:5,10 261:2,21 262:7 262:11,19 263:10,23 264:16 265:12 265:13,21 266:11,14,22 267:11,17 268:17 269:9,13 269:23 270:17 270:22 271:10 273:24 274:13 274:24 282:19 302:4

Dorgan's 180:2

dot 106:16 160:14

Douglas 4:8 164:4

dovetail 208:4

dovetails 172:10

downgradient 66:18 78:16 172:4 206:4,20 206:21 215:8 219:6,18 220:1 222:3 223:19 230:19,22 233:18 237:20 245:23 246:2 255:14 284:22 300:16 301:18

downstream 41:11 44:10,12 44:16

downtown 178:4

downward 227:10 227:12,13 234:4 236:8 238:8

dozens 185:16

Dr 191:17,19,20 258:24 302:17

draft 79:5

draw 85:8 106:15

drawings 36:11

drawn 60:6

dredge 50:12,12 50:14,20,24 51:4 319:8

dredged 50:1,22 107:21 108:7 121:16 267:7 319:8

dredging 50:13,13 50:16,18 107:5,9 107:13,22 108:7 111:24 156:21 319:9

Drew 6:19

drill 19:21

drilling 79:17 87:20 143:9,15 145:12,18 147:10,13

drinking 221:1 300:17

drive 7:23,23 81:10 174:20

driven 172:13

driver 205:7

drivers 204:20

driving 316:10

drop 22:1,12

drops 67:18

dry 148:1 307:5

due 234:7 298:20 310:15

duly 11:15 12:3 163:13,23

dumping 198:21

duration 221:4

dynamic 186:23 241:22 293:23

E

E 2:2 4:1,11 12:5 12:5 74:8 142:16,16,16 163:22,22 164:1 164:1

E-L-U-C 24:6,12

e-mail 7:4,15 139:9

earlier 16:4 42:13 105:17 119:24 121:17 122:8 131:1 145:8 160:21 161:11 165:14 190:5 191:14 199:5 209:9,20,20 216:14 220:20 221:11 253:3 256:5 271:8 272:23 274:24 275:19 282:19 294:10

earliest 47:11 280:13

ease 203:16

easier 106:9 265:8

easily 16:16 73:7

east 13:20 18:22 25:20 26:6,18 27:15,22 52:13 53:12,12 54:3,3 54:6,6,10 55:2 56:12 57:21,23 58:21 65:5 84:17,24 118:10 124:11 125:15 125:15 152:17 153:5 154:19 272:21,22 289:9

east/southeasterly 52:17

east/west 36:14

eastern 124:11

easy 275:9

ecologic 205:12

ecological 205:11 214:9

economic 256:14

economically 170:6 256:6

education 180:6 180:11

effect 22:7 24:9,12 66:13 67:9,12 128:4 202:11

effective 228:4,24 247:3

effectively 248:6

effectiveness 203:8

effort 143:8 204:14 263:4

efforts 130:8 214:8

eight 26:11 33:12 33:23 34:12 70:24 72:2 111:3 117:5 144:18 187:8,9 188:2 281:16

either 87:19,19 112:10 115:20 118:3 145:21 196:15 209:3 265:16 275:14 305:13

electronic 7:7,9 7:21

element 198:6 211:15 214:14 221:7

elements 203:22 204:16 231:2 238:21

elevation 37:7,10 37:12 42:20 48:19 270:5 300:2,5
elevations 21:24 36:19,21,23 47:20 269:7,15 269:24 270:11 270:15 314:21
eliminate 217:22
elimination 274:8
ELPC 260:19
ELUC 24:5,6,11 24:12 54:16,19 55:8,15,16 56:5 56:10,10 67:11 232:2 237:19 273:9,20 283:20
ELUCs 209:11 243:7
emanating 196:17
embankment 67:23 113:7 114:16 119:7 120:13,15,18 152:16,18 153:19 156:14 156:15
emissions 264:5
emphasis 206:7
employed 164:10 227:17,19
employee 322:10
employees 37:20
employment 164:7 167:2 180:5
encounter 19:22 20:13 27:24
encountered 79:16,20,24 183:13 254:13
encounters 145:14 147:15
ended 56:8 60:18 139:16 166:2 201:17 281:17 307:5
ends 196:14
enforcement 6:6
engaged 281:20 282:1
engineered 318:3
engineering 128:22 146:8 147:19 164:12 169:12 291:1
engineers 136:9 136:12 181:3 278:15 315:2 319:5
enhance 275:21
ENSR 319:20
enter 178:16 179:11
entered 212:10
entering 212:24
entire 22:24 43:5 52:10 58:7 69:22 71:13 81:3,13 113:15 122:22
entirety 266:5
entitled 246:24 251:9
entrance 81:8
ENVIRONEM... 2:8
environment 1:8 182:10 240:8 243:10
environmental 1:4 6:14 24:5 54:20 55:7 56:2 61:8 67:4 74:5 164:11,20,23 168:3,23 181:1 201:23 248:11 268:19 273:9 284:4 287:2 288:13 290:9 305:4,5
envision 244:16
EPA 21:3,8 23:17 24:4 25:19 29:17 53:1,14,17 54:24 65:18 75:8,13 126:21 128:4 206:2 210:15,22 218:11 228:17 228:21 246:13 249:22 260:24 291:6 293:11 296:23 297:14 298:14,16 299:1 299:4,10,11
equally 89:22
erosion 87:20 88:10
erosional 156:7 313:24 314:2,5
error 198:19
ESA 283:14
especially 177:11 177:12 207:6
Essence 74:5
essentially 187:23 192:19 202:11 203:6 235:20 287:3
establish 24:2 42:2 133:24
established 37:2 40:22 41:23 42:18 43:1 46:11,18 60:14 61:10 66:8 67:7 80:1 133:7 199:17 207:17 238:14
establishing 56:1 204:17
establishment 70:22
estimate 17:5 114:6 149:19 171:10 257:11 262:21
estimated 103:15
estimates 131:22 132:4,8
Eurofins 60:3
evaluate 25:9 76:4 168:1 172:3 173:17 201:10 203:3 224:14 242:7 245:22 250:20 251:20 253:14,20 254:19 286:17 288:14 312:8
evaluated 195:14 223:7,12 233:17 237:21 242:12 250:10 253:24 312:24
evaluating 43:10 168:22 203:7 204:14 214:23 218:8 222:9 250:1 287:18
evaluation 78:11 170:4 181:22 182:5 198:6 202:24 206:4,19 214:7,17,24 215:7 217:13 218:15 221:17 222:3,16,18,21 223:3 228:20 231:3 235:1 237:16 238:22 239:12 251:22 252:24 253:1 254:9 255:13,24 256:10,20 257:8 261:22 263:1 267:20 282:11 285:8 287:22 289:4 298:3 313:23
evaluations 218:1 256:5
event 224:6 254:4 301:17
eventually 148:21 174:20 195:22 196:13 206:15 207:11,16 211:24 301:10
everybody 6:2
everybody's 74:20 82:10
evidence 5:6 13:4 28:12 49:10 64:10 68:8 81:11 119:20 134:23 150:17 150:21,22 151:3 151:23 162:14 253:14 261:17 313:16 315:10
evidenced 311:13
evident 111:21
Evidently 155:6
evolve 241:21
exact 245:11
Exactly 83:2
EXAMINATION 4:2
example 18:24 31:16 201:13 203:1,4,9 212:10 216:24 229:6 232:3 245:17 283:2 303:11 316:12
examples 260:16 301:24
excavate 50:20 262:13
excavated 50:22
excavation 51:1
exceed 217:20

exceedances 200:4 298:17 305:10 305:13,20 306:1
exceeded 279:5 290:19
exceeding 220:5
excerpt 35:23 51:9 64:16 84:7 124:2,4 135:13 135:18 146:3,6 159:17 160:3 161:17 166:14 166:17 294:22
excerpts 49:14
exchange 212:19
exchanged 190:14
excluded 262:23
exclusively 177:1
excuse 10:13 15:4 17:1 27:19 41:8 58:23 59:8 60:12 68:21 69:10 70:6 71:18 104:2 146:16 147:2 149:7,17 154:9 211:18 252:9 294:20 295:1 298:14 311:17
executed 182:15
exhaust 264:5
exhibit 4:13,18 5:1,7,12,16 9:21 18:7 26:19,22 28:2,8,10 35:22 35:23 40:8,17,18 41:12,13,16,17 42:11 44:4,8,21 45:23 46:18,18 46:24 47:5,6,17 49:8,14 51:10 59:18,20,21 64:7 64:8,17 74:15,20 78:23 79:1 80:13,16 81:14 81:19 82:3,4 84:7 85:9,15 87:3 88:14 90:5 90:9,11,18 92:13 92:18 93:10 94:3,6,22 95:15 95:23 96:14,18 97:11 98:4,21 100:6 101:4,9 103:8,10,19,24 104:3 105:4,18 106:10,22,24 107:1,2,6 108:10 108:12,15 109:3 109:5,8,9,16 119:12,16,19 123:18 124:2 129:2,2,5 132:12 134:19,22 135:13,17,19 136:3,14,19 142:21 146:4,16 146:17,24,24 149:4 150:9 152:2,2 153:6,14 154:14 157:19 158:5 159:13,16 160:4,10,17,18 160:20 161:4,5,7 161:17,20,22 162:10,13 166:17,19 189:2 189:23 203:10 203:17 213:13 215:23 218:14 221:16 226:13 232:16 235:4 246:18,22,23 247:11 251:1,5 257:22 258:1 259:9 261:8,13 261:15 263:7 265:4 268:12 269:4 271:12,14 274:23 277:9 279:15 285:21 287:24 290:22 294:20,22,24 299:23 304:17 306:7 312:12
exhibits 7:7,9,21 8:2 42:3 48:22 49:3 74:12 83:24 85:19 157:16 158:20 162:8 196:15 294:24
exist 209:14 214:22 218:22 225:12 240:5 245:16
existed 20:6,7 205:6
existing 224:18 256:22 258:23 259:1
expanded 56:2,4 56:10
expect 22:19 112:6 113:2,8,18 118:3
expectations 248:2
expeditious 63:15
expeditiously 60:21 62:20
experience 48:12 89:21 167:13 168:19 170:23 171:4 174:3 175:22 176:1,17 176:24 181:7 182:1 186:4 201:6 202:6,22 212:6 228:13 245:10 249:14
expert 108:1,6 136:14 166:15 174:24 175:11 175:12 189:23 190:4 191:21 198:10 199:4 213:16 221:10 221:15,18 224:1 232:15 233:20 240:17 258:14 262:5 265:3 268:12 271:13 274:19 277:18 278:12 295:5 296:17 297:5,17 308:24 319:11
expertise 59:4 167:9
experts 9:2,7 188:16 226:7 259:14,17
explain 50:17 156:5 165:17 183:5 241:5 293:7
expose 309:19
exposed 87:20 151:3,20 309:18
exposure 171:8 211:14 221:5 284:2
exposures 205:10 205:15 243:9
express 89:17
expressed 89:14 90:20 91:8
extended 22:11
extension 7:6,12
extensive 253:19 267:15 268:2
extent 177:8 205:13 206:13 225:11,15 239:22 248:23 267:19 268:5,5,6 289:5,12
extraction 286:24
extremely 61:13 61:14

F

facilities 198:3 223:24 227:3 272:16
facility 44:15,16 83:22 87:7 88:11 105:11 171:23 252:21
facing 111:12 154:6,7
fact 22:20 23:5 25:10 27:22 67:19 108:3 145:6 155:14 200:12 209:9 211:12 235:24 239:10 240:3 242:4 274:2 285:1 307:21 308:20 309:12
factor 212:22
factors 248:3 264:14 268:14 272:4 280:10 316:10
facts 46:11
failed 237:6 268:14
fails 267:15
fair 82:9,9 116:23 313:18
fairly 54:11 60:14 63:22 67:18 68:6 121:8 154:23
Faith 2:2 4:5 6:12
fall 66:2 137:1,8 155:7 173:18 208:7 210:13 229:18,22 248:13 252:17 275:14
fallen 201:9
falls 20:22 275:15
familiar 25:21

39:19 108:19 109:3 110:7 129:8 173:10 178:9 202:17 247:5,6 284:8 292:18
familiarity 259:10
far 73:4 102:5 114:6,7 117:22 140:18 162:7 221:5 259:11 278:6
farther 6:9
fashion 201:10 203:23
fast 19:5 20:21 23:8
fbugel@gmail.c... 2:6
feasibility 256:24 257:4,5
feasible 170:6 182:14 246:7
feature 156:8
features 271:22 313:24 314:2,5
February 27:17 27:17 146:8
fed 206:12
federal 24:18 28:15,21 29:7,15 29:20,23 32:23 33:9 53:6,7,11 53:22 56:16,19 56:22 57:2 65:24 66:3,5,8 68:10,13,14,15 70:19,20 78:19 126:15,18,22 127:2,4,11 128:3 128:7,16 171:9 173:5 183:20 192:13 193:18 194:11,15,15 195:2,9,21 204:21 206:3,15 207:3,8 209:4 210:3 212:2 221:1 234:18 266:4 275:14 276:11 277:5 312:22,24
feed 34:5
feel 195:12 226:5 233:16 255:6,10 321:13
feet 37:15,22 38:9 39:16,18 41:4 45:3,7,8,9,10,12 45:19 46:3,8 48:1,8,18 79:10 79:14 81:2 84:5 92:15 93:2 94:19 97:6,8,9 99:13,21 102:1,9 102:10,15 105:11 106:5,11 114:10 122:17 144:4,5,8 147:5 147:20,23 148:13,20 150:15,15,16 156:13,13 158:13 300:22
fell 209:21
felt 207:23 208:11 215:18 222:4 223:16 226:7 241:23 242:8 256:21 262:20 262:24 266:14 267:3,11 268:2,6 280:20
fence 80:24 81:2 84:3,13,14 85:2 85:4,9 86:22 87:10 111:9,10 118:4,8,9,10 159:18 161:24
fenced 83:21 86:21 87:6,11,13 88:10 105:10
field 24:21 29:2,5 53:24 57:7 145:19
Fields 167:8
fifth 51:8
figure 52:6,14 54:2 277:17
figures 130:20 131:22
file 7:9,22 201:23 210:17,18 273:14
filed 175:6
filing 7:6
fill 121:8 148:7 177:13,15,20 194:14,14 195:17 205:1 206:16 208:20 209:18 210:4 225:1,10 284:23 285:2,10 301:8 301:19 302:20 303:10,15 313:11,20
filled 268:2
filling 225:22
filter 24:21 29:5
filtered 29:3 192:5 192:15,20 193:4
filtering 53:24
final 72:11,24
finalized 72:15
finally 10:16 206:9 210:5 284:4
financial 322:12
find 43:20 116:18 123:21 220:3 257:13 302:1
finding 196:12 255:2 260:6 293:20 298:6,8
findings 165:14 209:9 221:23 222:11 281:9 302:23 309:2,2
finds 305:19
fine 9:14,17 42:8 148:1
finish 9:6 87:17 152:15
finished 150:4
finishing 187:9 276:19
fire 183:12
firm 36:12 125:24 126:6,7,14 129:11 164:12 164:17
firm's 164:18
firms 58:5 59:4 129:15
first 7:2 12:3,22 18:6,9,14 25:16 35:24 38:2 44:11 47:18 66:7 79:7 83:16 83:16,18 87:3,4 90:12 93:13 129:19 143:21 146:5,10 149:13 150:1 161:13 163:23 166:12 166:23 172:21 173:13,16 181:11 183:8 191:22 196:8 204:4,17 213:22 214:22 221:14 223:22 224:6 232:17 238:22 255:22 260:20 265:19 280:4,7 281:7 295:17 298:15 300:9,10 302:5,9 313:22 320:16
first-hand 41:24 107:20
fishing 81:12
fit 168:15 195:5 253:6
five 47:18,20 62:22,22 73:10 73:12 87:6 88:1 97:9 114:12,14 123:4,5 135:1 139:11,12,15 144:18 158:9,10 162:7 227:8,15
flash 7:23
flies 102:7,8
flip 42:10 49:12 51:8 64:13 112:23 119:23 142:21 153:6,7 265:8
flipping 80:3 81:14 137:5
flood 14:11 43:2,2 43:10
flooded 37:21
flooding 38:18,22
flow 52:12,15,16 65:11,12 138:24 231:5 250:14 300:7 301:6,14 301:22 302:1,13 302:19 303:6,13 314:18,19,21
flowing 19:13 37:24 187:1
flows 19:16
fluctuate 22:3
fluctuations 22:23 23:1
focus 161:22 167:16,18 181:17 205:20 223:16
focused 115:15 155:16 166:4

215:7 271:9
focusing 48:8 166:2
FOIA 131:8
follow-up 179:18
followed 13:21 255:10
following 282:17 288:4
follows 12:4 163:24 173:4
force 126:19,22
foregoing 322:3,6
forever 229:8
forgot 74:3
form 89:18 167:23
formal 83:1 185:15
format 204:2
former 13:23 19:1 30:17,24 31:11 32:2,9 34:23 37:24 82:21 83:1,18 245:18 273:1
forth 174:13 213:17 265:9 271:15 315:21
forthcoming 241:13
forward 53:23 195:11 210:10 253:21 255:7 265:8
found 74:23 183:10 220:4 238:7 285:18 294:7 315:24 316:1
foundation 42:3 49:6 91:21,24 103:17 240:14
foundry 243:23
four 39:18 73:6 123:7 138:6 144:17 150:7 165:15 168:8 170:13 182:21 190:13 193:17 195:15 196:20 196:24 197:7 199:18 200:15 204:8,15,23 206:11 207:12 207:22 211:5,9 212:4 214:4 215:5 218:19 220:6 222:5 224:10 225:15 226:3 230:23 232:9 233:4,4 240:19 242:1 249:3 253:2 254:24 255:18 256:22 257:19 260:3,13,22 264:15 265:17
fourth 191:6 293:5 308:5
fraction 145:14
fragment 148:9 148:12
fragments 147:24 148:3,3,14,15,23
frame 210:7
framed 213:19
framework 61:9 134:12 172:14 176:1 179:21 196:3 199:24 204:18 207:21 207:24 208:12 208:16,19 212:3 240:11
frameworks 208:10
framing 261:23
FRANZETTI 3:2
frequently 177:12 178:5
front 74:11 82:2 105:19 123:21 124:4 129:1 135:18 166:9 235:4 246:17
fulfill 53:20
fulfilled 66:19
full 29:18 61:22 139:20 149:14 198:13 232:17 304:15 305:1,3 310:11
fully 77:19
fun 162:22
fundamental 182:5
further 18:22,23 45:6 65:8 81:10 110:23 111:6 112:13 115:2 137:12 154:18 155:12 158:7,15 162:16 173:20 174:19 183:6 212:3 225:24 231:4,11 237:17 237:19 241:3 253:4 273:19 284:5,5 292:22 297:14 322:9
future 168:5 194:18 202:2

G

G 12:2 35:22 163:20,20
G-U-L-L-Y 150:22
Gale 3:4 4:4,6 6:17,18,18 7:1 8:4,9,13,23 9:12 9:15,18,19 11:9 11:19 12:6 17:12 27:1 28:1 28:13 31:8 38:19,23,24 39:9 39:11 40:11 42:4,5,9 45:17 46:1,12,21,22 48:7,20 49:11 63:24 64:11 73:9 86:3 91:21 97:15 103:11,12 103:24 104:12 104:14 119:13 119:14 128:5 130:22 132:13 132:14 133:14 133:15 139:24 142:14,17 150:19 151:13 151:14 156:18 158:15,17 159:7 159:10 160:9,17 160:19 161:8,9 162:2,19,20
Gale's 11:12 137:23
gamut 170:18 217:7
gaps 224:24 225:7 225:11 268:1
Garmin-type 89:1
gas 52:2 197:18 273:23
gate 85:2,3 308:22
gathered 280:14
gauge 40:5,7 41:10,11 44:10 44:12,15,22 45:5 45:6
gauges 39:20,22 39:23 42:14,16 42:18,23 43:7 44:18 157:20,23 157:24
gauging 40:19,21 44:14
Gen 28:15,18 37:20 40:16 41:13,15 42:11 56:16 64:1 68:10,13,18 75:18 126:15 136:16 150:9 168:8 189:22 196:2 200:14 204:10 207:22 210:12 211:5,8 211:20 251:13 252:21 260:20 264:15 272:8 273:10,16,20 287:13 298:16 299:5 306:12
Gen's 28:2 139:21
general 18:19 51:23 62:8 77:13 167:15 169:7 182:23 183:13 204:4,8 204:12 208:18 209:21 238:8 274:12 301:22
generally 28:20 29:12 56:18 60:20 63:13 79:18 116:17 117:1 133:10 150:3 152:13 160:15 178:15 197:12 212:19 220:2,4 233:22 234:3 238:7 241:1 247:5 249:7 293:20
generated 31:20 58:2 130:1 189:17 190:11 194:1 239:23 253:12 282:7
Generating 27:5 272:20
Generation 1:11 6:20 24:4 48:21

50:11 53:13 55:6,10,10 83:7 85:16 135:20 136:12 137:3,10 165:15 182:21 190:5 208:24 248:13 252:8,11 254:24 257:19 281:20,23 297:6 297:18
Generation's 39:1 58:22
generic 311:7 320:1
Gentlemen 163:9
Geodetic 37:4
Geologic 40:1 42:19
geologist 180:10
geologists 181:3
geology 130:3
Geoprobe 79:16 143:8,14,14,15 143:22 144:22 145:1,2,9 148:12 307:13,17
Geoprobes 288:9
geotechnical 164:11 165:1 287:9,20
get-go 33:22 156:10
getting 43:15 114:23 144:19 147:16 186:9 200:11 249:8 300:23
give 62:5 88:22 93:19 98:13 141:7 146:3 185:1 201:12 240:18 247:9 264:4 296:12
given 83:11 85:6,7 215:4 216:24 255:2 305:19
gives 92:14 96:6 98:21 218:5
giving 296:11 308:21
glass 90:13 92:21 94:4 95:14 96:17 98:21 99:16 101:6 102:19
GMZ 199:22,23 200:8,9,11,19,21 200:24 201:1,3,9 201:15 202:10 202:24 203:6 211:11 212:19 229:7,7 237:18 283:20
GMZs 199:17 201:7,22 202:6 202:22 209:10 211:12 227:17 227:18 229:1,3,5 243:6
Gnat 4:3 9:1,6,22 10:24 11:11,13 11:18 12:8 18:2 18:4 28:14 35:15,22 36:3 38:2 39:12,19 40:12,18 41:6,15 41:23 42:10 46:24 49:12 51:7 59:20 61:5 64:12 68:9 74:10 82:6 84:12 85:6 86:4 86:20 92:1 95:10 104:5,7,18 107:4 108:15 109:24 118:8 119:24 129:8 131:10 135:15 135:16 142:15 142:18,19 149:9 157:13,22 159:5 159:17 160:14 161:12,23 162:3 162:22 192:4 193:3,15 196:7 196:19 201:24 216:14 222:22 272:23 286:6,15 292:17 314:8 315:10
Gnat's 86:10 317:7
go 6:9 7:2 14:19 18:16 20:21 39:4 42:5 43:20 43:22,24 44:1 47:4 50:19 62:21 63:6 72:2 76:10 84:17 85:3,22 104:18 109:19 111:2,4 119:2 122:21,24 123:9 139:4 145:15,20 149:18 153:14 161:7 162:24 173:20 188:7 208:15 231:9 232:11 238:9 252:14 265:8 272:4 274:20 297:2 306:6 308:4 312:11 321:19
goes 32:13 46:19 47:8 52:12 54:13 85:4 87:16,18 115:15 134:6,8 147:5 182:13 203:3 306:2
going 17:8 18:1 32:24 37:17 38:12,15,16 41:21 54:10,11 81:17,18 82:18 84:6 104:2 106:4,22,23 128:4 130:23 140:5 144:20 145:22 146:2 148:22 152:3 153:24 155:13 156:12 163:6 167:23 168:12 168:12 178:7,18 182:8 191:4 197:6 198:7 201:21 210:10 213:1,5 214:15 214:21 215:19 241:15,19,21 245:18 247:10 250:12,13,18 253:17,19,21,23 259:8,21 261:12 262:1 264:2 270:14 272:21 278:3 285:3,6,7 294:23 296:12 304:14 316:14 316:15,23 317:20,20 318:9 318:11 321:19
goings 131:14
good 6:2 7:17 11:14 12:8,9 63:17 86:18 206:1 218:5 264:17 280:15 280:19
GP-14A 288:18 288:22 289:10 289:15
GPS 89:1
grab 135:17
graph 158:8
graphic 91:7
graphs 230:10,11
gravel 19:4 20:1 144:15 148:16 148:17
gravely 18:12,12
great 11:6 213:6
green 273:6,8
grid 62:14
ground 13:2 68:1 147:24 256:17
groundwater 9:7 15:8 18:10 19:12,13,15,16 21:2,12,24 22:1 22:2,23 23:2,7 23:14,19 24:2,8 24:8,17 27:4 28:23 29:8 30:7 33:7 43:13,13 51:13 52:12,15 52:16,20 53:4,24 55:1,20,21 64:18 65:11,12,15,23 66:7,9,12,20 67:6,9 68:15 69:2,3 125:3 133:3 170:18 171:19,21,24 172:1,2,5,8 184:17 185:6,10 185:16,21,23 186:5,17,18,22 186:22,24 187:15 188:2 193:20 200:1,4 200:22,23 201:5 201:11,18 202:3 202:12 205:14 205:17,22 206:4 206:20 209:22 210:18 211:14 211:18,23 212:1 214:10,10,11 215:4 219:10 220:9,22,24 223:23 224:5,9 227:2 228:1

229:10,21 230:1 231:5,9 234:2 237:19 242:7 243:16 244:1,15 244:24 245:5,7 245:22,23 246:2 246:2 248:8 249:7 250:14 251:11 254:4,6 254:16,17,19,22 255:3 256:18 259:1 260:11,15 261:1,4 269:7,14 269:24 270:4,7 270:11,15 271:3 273:13,15 276:21 277:1,6 277:13 281:14 281:18 283:1,18 285:1,15 288:20 288:22 289:7,13 290:12,19 291:12,18 293:23 295:22 296:8 297:8,9 298:18,19 300:2 300:5,6,7,19,21 303:6,9,13,16 306:16 307:3,5 308:6 310:9,13 311:17 312:14 312:17,21 313:6 314:18,20,20 315:24 316:3,24

group 164:4,10,24 165:1,5 181:1,5

groups 305:4,6

guarantee 60:17

guess 104:10 120:19 146:10 156:4 162:9 183:7 226:6 235:15 274:3,8 287:10 318:13

guessing 106:4

guidance 173:4 194:17 227:3 246:14 249:23

guide 206:23

gully 150:15,22 151:2,6,16

guy 8:11 226:18

H

H 4:11 12:2 163:22

half 52:14

Halloran 1:15 6:1 6:3,16,21 7:10 7:18 8:7,10,15 8:19 9:10,13,16 11:3,6,10,17 17:10 28:3,6 31:6 38:14,20,23 39:6 42:4,7 45:15,21 46:20 48:3,23 49:4 64:2,5 73:11,15 73:20,24 81:22 85:24 86:7,12,16 91:22 92:5 94:24 95:4,7 103:11,18,22 104:1,9,15 109:23 119:13 119:15 128:8,11 131:7,15 132:13 133:4,13 134:4 134:15 135:4,8 137:14,18 138:3 138:10 139:5,13 139:18 140:2,13 140:17,24 141:4 141:19,22 142:2 142:6,11 151:12 155:5 158:16,22 159:1,21 160:7 160:16,22 161:6 162:5,17,21,24 163:4,14,17 186:7,11 188:18 188:21 192:24 228:10 236:11 249:20 259:12 259:20 261:9,11 263:15,21 264:19,23 295:23 296:2 317:2 321:12,18

hammer 143:19

hammering 143:17,18

hand 11:13 134:11,11 163:10 322:14

handed 161:11

handful 63:17

handheld 89:1

handle 147:14

handled 8:1 138:22

handles 8:6

handy 274:20

happen 252:20

happened 24:17 65:23 66:12 138:20,21 154:3 214:13 215:21 252:19 289:1

happening 20:10 197:13 218:17

happens 141:8 174:10 194:17

happy 321:14

hard 36:4 114:8 154:13

harmful 314:14 314:14

hatched 289:14

haul 262:14 320:12,15

hauled 289:17

hay 116:16

hazard 251:20

hazardous 185:19 202:7 252:5

HDPE 275:20,24

head 23:9 145:5

header 129:18

heading 266:23 269:7 298:2,15

health 182:9 240:8 243:9 248:10

hear 39:12 179:4 179:7 196:19 263:16,16 318:20

heard 191:24 192:4 196:6 216:14,14 286:20 292:16 315:7,9

hearing 1:15 6:1,3 6:16,21 7:8,10 7:16,18 8:7,10 8:15,19,24 9:10 9:13,16 10:20 11:3,6,10,17 17:10 28:1,3,6 31:6 35:24 38:11,14,20,23 39:6 41:20 42:4 42:7 45:15,21 46:12,20 48:3,20 48:23 49:4 63:24 64:2,5 73:9,11,15,20,24 81:20,22 82:3 85:12,24 86:7,12 86:16 91:22 92:5 94:24 95:4 95:7 98:4 103:11,18,22 104:1,6,9,15 109:23 119:13 119:15 128:8,11 130:22 131:7,11 131:15 132:13 133:4,13 134:4 134:15,24 135:4 135:8 137:14,18 138:3,10,18 139:5,13,18 140:2,13,17,24 141:4,19,22 142:2,6,11 146:5 150:1 151:12 155:5 158:16,22 159:1,21 160:7 160:16,22 161:6 162:5,17,21,24 163:4,14,17 165:14 176:10 176:10 186:7,11 188:18,21 192:1 192:24 194:5 220:20 228:10 236:11 249:20 259:12,20 261:9 261:11 263:8,15 263:21 264:19 264:23 278:13 291:3 295:23 296:2 302:5,10 317:2 321:9,12 321:18

hearings 76:18

hearsay 259:11,21

heart 134:7

heated 178:4

heavily 51:20 114:22 216:24

heavy 217:6 314:8 314:10 317:14 317:16,18,19,23

height 125:21 126:2

held 72:12 322:4

help 185:8 197:1 203:24

helped 184:18 190:9 214:2,5 222:20 223:1

helpful 215:18

250:7 265:6
helps 214:20
Hennet's 258:24
hereof 322:6
hereunder 322:14
high 38:8 39:15 48:13 61:14,20 63:6 68:1 204:13 220:2 221:23 230:4,16 233:22 234:1 238:5,6 240:18
high-level 265:14
higher 19:6 23:4 45:9 294:1
highest 41:2 44:24 47:2,20 158:10 158:12
highs 46:5
highway 272:17 293:1 294:11,18 295:21 296:7 298:12,20 299:8
hired 187:23
historic 32:13 44:23 45:2 47:1 47:12,14,18,23 48:13 158:2,4,10 165:22 194:14 194:20 195:17 204:24 206:16 208:20 209:18 214:13 238:23 243:21,22 255:23 274:15 282:14 284:10 313:11
historical 37:21 40:24 183:12 190:10,12 223:15 260:16 261:23 277:12 314:6
historically 178:3 205:6 237:7 293:24 297:10 304:1,7
history 156:24 157:1 167:3 168:13 180:6,23 196:1 207:12 277:15 320:20
hit 80:5 145:5,6 194:15
hits 145:1
hitting 143:11 145:2
holding 23:7 118:16,21
holistic 255:12
hollow 145:11,19 147:9,11,12
homogenous 63:9 63:12
honestly 128:21
hopeful 9:4
hopefully 104:11 135:17 321:20
horizontally 63:18
Horton 10:22 74:3
hours 16:13,15,16 16:22 17:6,20,24 32:7,16 34:10,15 35:13,14 58:15 58:16 59:13,15 70:5,7,9 71:22 72:1 73:5,8
house 128:23
housekeeping 6:23 7:3 137:22 142:12
hub 31:13 34:3 35:5 58:1 69:20 71:9 72:18
human 182:9 205:10,10,15 240:7 243:9 248:10 284:2
hundred 39:18 81:2 84:5 97:9 102:9,10 114:10
hundreds 16:11 16:16,21 17:5,16 17:23 32:4,16,16 34:14 35:11,14 58:10,16 59:12 59:15 70:3,9 71:17,24 73:2,7 171:14 181:20
Hutchins 10:21 10:21,22
hydraulic 143:19
hydraulically 19:3 19:20
hydroelectric 14:9
hydrogeologic 23:18 146:7 187:24 214:3 261:24 290:24 300:4 301:1
hydrogeologist 43:6
hydrogeology 130:3 301:14
hydrologically 20:10

I

IAC 219:2 298:17
ID 4:12 147:10
idea 62:10 63:18 225:18 229:7 244:10 256:7 299:6 301:16 315:17
ideal 141:6
identification 26:20,24 40:10 40:16 41:13,19 59:18,23 90:6 108:13 129:6 159:14 166:21 189:1 203:12,17 257:22 258:3 267:21
identified 10:7,7 10:11 13:3,7,10 23:16 32:24 84:16 87:6 88:10 90:17 92:3 127:24 149:21 166:16 178:23 205:1 238:20 245:12 265:14 290:3 298:10 306:13 307:21,23 309:9 314:2 315:11
identify 47:12 78:20 128:18 246:5 291:20 307:11
identifying 183:1 214:8 245:21 277:10 279:16
IEPA 178:17 210:18,19,19 260:14
II 83:5 239:15 280:10 281:21 283:14 284:7,17 319:24
III 29:19 219:16 223:10 293:13 312:23
ill 9:3
Illinois 1:1,17 2:4 3:8 6:4 15:18 21:3,8 23:17 24:4 25:19 29:11,17 30:1 36:24 37:24 39:20 40:20 46:7 49:17 50:21 53:1,14,17 54:24 65:18 68:19,23 75:8,13 76:23 126:21 127:10 128:4 132:23 133:17 170:3,24 171:4,7 173:3,8,15 174:4 174:5 181:18 191:8 199:7 200:10 201:7,17 202:8 206:12,14 207:7 209:21,23 210:2,15,22 212:7 218:10,11 219:2,9 220:21 227:18 228:7,13 228:17,21 242:19,19,23 243:12,15 260:24 276:12 284:4 287:2 290:9 291:6 293:11 296:23 297:14 298:14 298:16 299:1,3 299:10,11
Illinois-based 173:2
image 91:16 94:12 96:21 101:12 123:20
imagine 122:22 245:13,19 284:13
immediately 51:23 78:18,18 217:4 270:2
impact 171:19,22 172:8 187:11 195:19 201:18 211:13 254:8 256:15 261:20 263:1,1 264:1,5 279:1 303:16 315:11
impacted 171:24 201:11 220:9 297:9
impacting 302:14

impacts 172:5 283:3 285:9 311:13
implement 170:7 178:22
implementation 169:6
implemented 201:4 202:10 229:7 276:22 312:22
implementing 200:9 225:10
implies 287:3
implying 267:13 269:17
importance 236:19 289:20
important 133:16 185:20 211:15 214:7 237:15 239:12 241:8 248:4 274:2 280:22 291:17 308:11,15
impoundment 77:20 122:22 204:21
impoundments 69:3 208:20 209:3 210:13 215:15 216:1 240:1,10 241:3 241:10,16 254:3 262:15 266:20 267:1,4 269:17 274:14,14
impracticable 259:4 260:4 261:20
impression 319:7 320:6,20,22
improving 234:3 249:7
inability 49:2
inaccurate 103:13
inch 147:10
inches 144:18,18
include 17:6 121:11 148:8 237:7 248:5
included 66:14 131:24 158:10 297:13 300:3
includes 121:9 130:5
including 34:11 61:16 71:21 170:18 177:2 280:17 310:15
inconsistent 270:8
incorrect 10:17 97:20
incorrectly 10:7 10:10,14
increased 144:4,9 259:6
increasing 248:23
independently 222:12
Indiana 177:2 181:18
indicate 78:16 106:17 144:12 303:14 316:2
indicated 27:21 159:17 255:23 273:14 279:6 282:24 288:5 297:8 305:9
indicates 79:20,23 235:22 299:19
indication 20:17 54:12 80:4,7 156:21 249:8 309:14
indicative 217:21 297:11 317:18
indicator 291:16
individual 35:2 178:20 182:17 224:13 245:21 250:9
industrial 13:22 13:24 14:3,5 51:20 167:22 168:14 181:7 183:20 216:21 216:23,24 217:5 217:6 243:22 272:13,16 273:1 283:23,24 284:3
industry 181:13 282:8
infiltration 318:1 318:5,9,12
influence 168:4
inform 197:1 198:3 214:2,20
information 16:18 16:20 24:2 29:8 34:4 43:4,18,21 69:20 71:10 165:23 174:16 182:7 187:1,3,10 190:14 193:14 194:1 204:1 210:6 211:24 214:8 215:10,14 216:10 261:23 273:13 276:20 278:2,11 280:13 282:5 284:21 292:3 296:22 297:12 312:6,7 313:12,17 314:17 315:15 315:18 319:4
infrastructure 264:6
ingestion 283:18
initial 30:16,16 52:23 56:5 57:14,16 69:4,5 69:8,12 71:8 150:7 187:23 188:1,1,4 300:3 300:5
initially 138:5 165:10 272:7
inner 147:12
inorganic 29:1 251:10
inorganics 23:16 24:20 53:2 55:2 65:20 249:11
inputs 252:14
inquiry 7:21
inside 111:9
inspected 80:18 80:22
inspection 81:1 82:22 87:5 110:15 113:17 125:20,21 149:8 149:10 150:5,7 152:9
inspections 12:16 12:20,23,24 13:10 14:15 109:1 313:19
install 33:2,22 70:15 187:24 287:18 309:18
installation 33:5 211:23 275:23 291:7
installations 72:2
installed 55:14,22 66:3,17 68:24 71:7 185:11 186:19 188:13 275:24 292:12 292:14 309:21 312:20
installing 34:11 67:20 71:21
instance 176:6 185:4 187:5 208:11 212:16 219:1 271:4 303:12 317:11
instances 172:12 194:17 195:23 213:24 217:3 225:5 234:7 238:8 239:2 241:15 244:21 268:1 269:18 279:9 293:24 316:7
intake 13:19 26:17 49:24 81:4 101:22 110:21,21 111:18 118:5
integrity 2:8 6:14 31:16
intended 167:15 173:19 179:6,21 198:1 203:5 229:20 249:24 296:24
intending 179:20 274:9
intent 276:17
interaction 213:7
interactions 319:16
interest 155:24 156:1 322:12
interesting 181:13
interim 199:8 304:13 312:5
interior 37:7 113:4,5 114:15 152:23 153:1
interlocutory 7:13
internal 113:16 119:6 121:13
interpret 22:10 45:8 47:19 236:14
interpretation 21:9 130:7

266:2
interpretations 20:8
interpreted 259:3 267:20
interrogatory 260:20
interrupt 106:8
interrupts 138:24 138:24
interval 288:11
introduce 6:10
introduced 146:5
investigate 183:11 284:6 300:13
investigating 183:14
investigation 23:18 25:3,5,13 54:21 56:6,7 62:13 169:4 187:24 225:9,24 268:7 277:15 278:14 280:5 285:24 286:1,16 288:1,4,7 289:4 289:24 290:1,4 290:24 291:4,10 300:4 306:11,17 306:22 307:9 309:1 312:1 317:7 319:6
investigations 181:21 213:23 214:2,14 239:16 239:18 279:18 279:22
invoices 210:22
involved 30:19 31:15 107:12,13 107:16 125:19 126:7,14 129:21 130:3,6 165:1,24 169:3,8 172:2 176:21 182:4 184:18 210:19 222:17 278:15 278:16 291:6,11 315:2
involves 177:15
iron 307:2
isolated 65:3
issue 133:12 168:8 173:7
issued 193:13 215:21
issues 265:14 297:13 314:3,4,4
item 180:7 189:21
items 32:15 313:8
IV 29:19 219:16 223:11 293:13 312:24

J

J 258:21
J.K 260:17
James 1:15
jars 29:6
jaunt 191:24
Jennifer 3:3 4:9 6:19
Jersey 177:6
jn@nijmanfran... 3:10
John 189:22,23 221:18
joined 164:15
jointly 7:7 8:5
Joliet 12:12 13:14 13:17 14:16,21 15:9,15 16:5 17:15,21 23:12 24:16 28:16 31:2 52:19 56:17 78:6,9 82:21 83:19 87:7 88:11 91:20 93:8 94:16 95:21 97:1 99:8 100:1 101:16 103:5 105:10 110:11 116:12 120:1 136:5 162:1 166:3 197:14,15 242:1 271:7,9,20 272:4,20 273:22 274:16 275:2,7 276:3 279:2,10 279:19 282:15 282:22,23 287:7 289:21 294:7 295:8 297:7 298:7 299:14 303:20,23,24 304:5 305:23 306:16 312:14 312:18 315:21 319:21 320:1,2,9
judgment 228:2
judicial 175:3
July 189:22 258:22
jump 7:23
June 1:17 6:8
jungle 314:10
jurisdiction 66:2 66:15

K

Kari 1:21 74:1 163:10 180:19 264:20,24 322:2 322:22
keep 142:9 186:8 271:13
kept 216:9 268:4
key 262:22 291:16
kg@nijmanfra... 3:11
kicked 33:10 212:2
kind 7:11 29:24 31:13 35:5 52:14 53:4 54:14 62:7 65:3 69:20 70:17 81:7 84:18 111:22 114:8,24 115:9 117:19 121:1 142:4 151:4 156:4 163:7 167:19 172:9,23 205:3 205:23 207:13 208:22 209:16 213:18 214:16 214:23 215:17 216:9 217:7,9 226:20 243:18 256:8 270:21 286:7 287:12 313:15
kinds 186:18
Kingston 41:10 44:11,22,24 46:6 47:24 157:21
knew 42:14,16 155:13 206:13 206:14
know 8:1,16,20,21 14:1,4 17:23 20:3 22:16,17 32:11 33:10 39:7,8 42:3,22 43:2,17 46:14 52:3 62:7,22 63:14,15 65:17 67:22 68:6 70:18 71:7,10 74:2 75:6,10,17 75:20 79:13,24 82:17 83:3 84:1 89:24 91:12,14 106:5 107:9 108:21,24,24 109:7,10 111:16 116:11,14,23 117:20 121:1,4,7 121:8,10,16 122:4,23 123:9 126:4,5 128:2,14 129:13 130:4,19 130:24 131:3,4 131:16 132:20 138:18 139:17 140:6,10,19 141:22 143:6 144:14,17 145:2 145:17 148:16 148:19,21,22 151:3 152:20 153:3 154:21 155:6 156:4,23 161:12,13 171:22 185:15 198:6 206:1 210:1,21 212:18 214:18 225:24 237:23 239:20 247:13 250:2 259:21 264:4 274:4 281:19 282:8 293:22 299:12 316:8,11 316:17 318:5,7 321:13
knowing 38:7 39:14 62:7 114:24 120:23 143:7 148:4 156:24
knowledge 15:20 21:15 24:7 38:3 41:24 50:6 67:8 75:4,7 107:20 157:5 187:17 197:6,14 210:15
known 223:4 283:21 286:2
knows 8:17
KPR 16:3
KPRG 16:4,14,15 17:21 21:1,2

25:2 27:7 29:12 30:10 31:20 32:6,7,17 34:10 34:16 35:13 50:6,8,9 58:15 59:14 60:12 67:2 68:12,21,22 70:7 73:5 75:18 87:5 123:20 129:18,18 149:14 230:2
KPRG's 31:12,13 35:3 57:24 58:24 69:18 71:5,23 72:16
Kristen 3:4 4:4,6 6:18
Kunkel 191:2,16 191:17,19,20 258:10,14,22 262:12 302:4,13 302:17 303:19
Kunkel's 261:18 262:23 302:9

L

L 163:20,22,22,22
L-E-A-F 60:7
lab 60:3 61:3
labeled 41:14 101:4 275:10
labor 149:20
laboratory 234:9
lack 214:10 303:9 314:13
laid 49:6
Lake 56:14 259:5
land 24:6 54:20 55:7 56:2 67:4 135:19 136:10 136:15 137:9 173:19 196:14 201:23 214:6 217:1 272:10 273:9 283:23 284:1,3
landfill 177:2 212:14 228:23 243:21 262:14 289:17
landfills 183:17 183:20 185:19 185:24 194:21 202:8,14 227:20
landowner 202:2
Landscape 149:17
Landscaping 149:15
language 248:19 248:20
large 60:14 132:17 143:11 145:1,5 177:2 245:14,20
largely 193:7 266:23
larger 17:17 36:5 121:12 143:11 144:14,18 148:17
LASALLE 3:6
lateness 131:1,4,6
laterally 285:3
LAUGHRIDGE 3:4 4:4,6
law 1:4 284:4
lay 49:2 248:1
layer 18:10,20 19:22,23 20:14 20:15,22 78:3 147:15
layers 78:5
laying 120:12 121:13 240:20 271:17
lays 271:23
leach 77:1,9,12 287:4 288:12
leachate 61:11,21 314:14 318:15
leached 290:18
leaching 61:7,8,9 286:24 290:20 311:13
lead 166:5 181:22 279:4,9 288:21
lead-in 232:21
leading 17:9 31:4 45:14 48:2 151:11 192:22 228:9 236:9 238:15 249:19 263:14,20
LEAF 60:6 61:3,5 62:2,3 77:6,8,9 308:17 311:13
Leah 81:18,21 84:6,8 85:7 135:13
leakage 270:7
leaking 22:10,21 310:16
learn 181:14
learned 138:1
leaves 155:7
leaving 205:14
led 164:23,24 211:22,24 213:22
ledger 209:17,18
left 44:23 99:17 147:14 158:20 167:3,7 211:3 245:2 271:23 281:3 284:15
left-hand 90:14 92:20 94:4 95:6 95:11 99:17 101:6 102:19 106:18 273:7
legacy 168:2
legal 134:12,12
legible 11:2 109:18
length 80:17,22 81:3,13 238:23 238:24
lens 115:21
let's 47:17 51:5 63:16 100:6 140:3 149:10 160:8 208:15 214:19,20 238:9 277:8 296:4 306:6 308:4 312:11 321:16
letter 82:11,18,20 83:8,16,23 92:3 92:22 258:22 273:2,19 299:4
letting 20:20
level 36:24 37:10 37:16 171:9 173:5 174:15 204:13 207:8 220:3 221:24 230:4,16 233:22 234:1 238:5,6 240:18 252:8,11 266:4
levels 19:6 21:13 22:1,2,7,12,21 23:3,4 47:2 61:16 122:12,17 123:10
liability 6:6 81:19 98:4
License 1:22
licensed 37:1 180:8,9
light 13:22 187:11
limestone 120:22 147:24 148:2,5,9 148:12,15,23
limit 234:9
limitations 142:5 145:17
Lincoln 304:2
line 10:6,10,14,17 41:21 56:9 80:24 82:16,18 82:20 83:9,18 84:3,13,14 85:10 86:23,23 87:10 118:10,12 136:4 136:5,7,9 159:18 161:24 208:16 298:14,15 305:16
lined 275:17
liner 22:15,19 46:14 270:23 275:20,21,21 276:18,18
liners 207:15 229:15 269:16 275:16 287:19 287:20
lines 68:1 301:4,6 301:15 313:16
liquid 61:20 196:11
list 24:22 29:21 52:24 53:22 61:23 65:18 168:16 171:19 189:3,7,21 191:6 200:13 217:8 232:23 279:18 279:23 294:24
listed 61:23 167:3 213:15 260:8 275:2 280:5 281:10 283:14
listened 194:4
listing 180:10 194:9 233:3
lists 279:21
liter 291:22
literally 32:5,15 143:18
literature 227:1
little 18:22 19:6 29:15 45:6 60:20 67:21

81:9 84:17,21 86:3 88:24 89:4 89:4 111:5,19 112:13 115:2 125:22 136:15 141:10 148:16 154:18,21 155:12 161:10 162:8 180:13 191:23 193:7 200:16 203:23 203:23 204:1 211:4 216:8 223:8 237:11 272:11 278:4 295:24 306:14 316:17
LLC 6:20
LLC's 297:6,18
LLP 3:2
loading 244:13
loam 318:7
loamier 318:8
local 121:10 188:8 188:10,12 264:6
located 25:24 27:11 40:6 41:10 51:19 65:1 91:20 93:8 94:16 95:21 97:1 99:8 100:1 101:16 103:5 105:9,24 116:11 124:23 216:16 216:16,21 217:2 272:12 281:1,5,6 281:7 292:22 295:21 296:7,8 300:15
location 42:21 47:3 56:12 153:4 196:11 231:16,23,24 284:24 285:9 288:18 321:7
locations 277:14 292:1
lock 13:20 14:7,8 14:11 40:6,20 41:3 46:6 47:24 81:6 107:17 121:5 157:21 272:22
log 20:8 116:16 143:21 144:1,6 147:1,2,19
logged 316:7,9
logical 321:4
logs 18:17 79:2,4 142:24 143:5,6 278:22 307:9,10 307:11,14,17 309:13
long 21:2 49:20 141:23 150:15 162:2 168:13 200:7,17 215:3 239:6 244:14 245:5 255:8 282:20,22
long-term 168:2
longer 24:21 55:13 139:2 241:17 243:4 244:22,23 248:22 274:4
look 7:15 44:5,8 44:13 47:16 62:24 63:8,16,19 84:15 95:24 99:12 106:23 108:20 109:3,10 113:11 136:19 147:4,18 152:3 156:16 158:2 169:22 170:19 198:12 200:13 205:9,21 214:19 218:1 222:11 223:14 235:7 238:1 240:16 245:23 247:9,12 251:4 252:14 256:2 257:20 263:24 265:3 272:14,21 284:24 295:16 301:23 308:14 308:16 312:12
looked 44:19 62:4 68:4 106:6 140:7 150:24 160:1 193:12 196:22 204:24 205:8 206:18 208:10 210:6 215:6 219:2,18 223:13 230:19 239:13 256:9 259:17 286:1 289:7 292:4 294:8 299:13,16 307:8 309:4,4
looking 37:6,11 40:23 44:4,21,23 54:2 62:9 65:10 67:14 75:3 76:1 79:7 87:3 88:13 98:20 101:3,19 101:24 110:18 111:14 112:5,13 112:14 113:3,4,7 115:11,16 116:13 117:1 138:6 146:23 151:5 152:19 153:2,3 155:23 158:7 159:8 165:24 167:22 169:22 171:22 172:16 180:22 205:4,16 211:21 213:20,22 215:2 219:19,21 227:7 227:23 232:22 238:11,18 248:18 255:14 256:12 257:9 264:9 265:10,18 270:1 271:16 274:14 276:1 277:20 279:14 282:6 292:15 300:9 303:14 310:10 315:16
looks 36:10 37:9 84:21 95:22 99:10 103:6 115:18 116:9 155:6
lose 232:1
lot 8:21 33:11 81:9,11 148:6 155:7 156:14 165:22 169:11 186:2 225:23 268:7,7 320:14
lots 62:17 110:22 154:24 155:1,11 156:11
loud 295:18
low 49:5 61:13,20 63:3 181:20 284:2 310:7
lower 93:1 94:18 97:4 99:12,20 101:24 102:13 106:11 284:15 294:1 310:1
lowers 309:24
lunch 137:16,20 139:21 140:9
lunchtime 85:20

M

M 12:5 74:8 142:16 163:22 163:22 164:1
magnifying 90:13 92:21 94:4 95:13 96:17 98:21 99:16 101:6 102:19
main 203:22 204:16
maintain 49:1 50:23 200:24
maintenance 50:14 287:16
major 297:2 307:19
majority 171:7 234:7,8 236:1 304:9
making 177:23 178:21 220:21 244:9 248:16
manage 168:23 238:19 243:13 244:3
managed 173:22 200:2 212:5 239:23 244:2 255:11 304:8
management 24:3 24:8 67:6,9 203:2
manager 181:2
managing 177:24 181:5 210:9 239:9 241:9 320:17
manganese 307:2
Mann-Kendall 226:23 228:8,14 228:17,18 230:14 231:15 232:13,19 233:8 233:10,24 235:1 236:21
manner 321:2
Mans-Johnsville 51:21
map 18:8,8,9,14 49:17 51:9,12,13

52:7,8,10,11,12 64:16,17,18 65:10 105:20 106:2,7 123:19 123:19 146:19 273:6 277:10 278:1,4,6 284:13 284:16 300:2 301:3,9 302:18
maps 18:7 21:6 49:13
March 227:1 295:12
Marine 52:4
mark 85:19 91:3 105:23 106:13 166:15
marked 4:12 26:20,23 40:9,15 41:13,18 59:17 59:22 79:4 82:3 85:14 86:11,13 90:5,10 106:11 108:12 129:2,5 159:13,16 166:12,16,16,20 189:1 203:11,16 246:18 251:1 257:21 258:2,19 294:22
marker 85:7 104:7,21 159:18
market 188:10
marks 161:23
markup 160:11
marshy 54:14
Maryland 245:18
mass 63:5,22 239:7 244:6,7 256:7
material 15:23 20:2 23:6 32:13 61:18 87:21 144:13 148:14 148:18 151:4,5 177:21 195:14 196:12,16 199:15 239:7 243:24 244:12 244:13 271:24 275:12,17 286:12 288:15 289:5 307:24 309:14 316:9,11 319:1,7 320:9
materialized 122:2
materials 25:15 62:5 65:6 148:7 149:19 157:4 177:13,15,16 178:3 183:13 193:12 195:1 245:4,6 250:18 262:15 272:1 274:5 283:4 286:3 289:12,16 290:17,18 307:11,20 308:16,18 311:9 314:15 317:12 320:17 321:6
math 45:18 123:14 235:19
matrix 177:23
matter 7:3 142:13 165:9,16 183:24 184:8 185:4 187:14 188:17 190:6 191:14,22 195:19 209:20 259:17 262:6 302:10 319:11 322:4,13
matters 6:24
Maxwell 4:8 163:12 164:5,8,9 165:18 166:2 179:23 180:4,7 180:14,24 181:9 182:3,23 183:4,7 184:1,5,9,12,16 184:21 185:13 186:8,10,13,21 187:17,20 188:14,16 202:5 202:19,23 222:15,20 224:4 224:20 225:3,16 225:20 226:4,16 226:17,22 228:15 229:4,18 230:3,9,21 231:1 231:17,20 232:11,20 233:1 233:6,12 234:1 234:14,17 235:6 235:13,20 236:15,22 237:2 237:9,14 238:1,6 238:17 253:10 267:24 271:3,9 271:17,19 272:6 273:8 274:3,17 275:1,4,8 276:4 277:11,19,22 278:7,10,21 279:3,11,17 280:2,6,12 281:1 281:12,22 282:4 282:16,23 283:16 284:11 284:14,20 285:17,23 286:11,23 287:8 288:3 289:3,22 290:7,16,23 292:2,7,13,19,23 293:8,22 294:8 295:4,5,11,15,19 295:24 296:1,5 296:13,19 297:5 297:20 298:1,5,8 298:24 299:11 299:16,19 300:1 300:12,20 301:5 301:13,23 302:6 302:11,16 303:1 303:8,21 304:6 304:17,20,23 305:5,18 306:5 306:10,23 307:15,18 308:9 309:3 310:19,22 311:4,6,11,20 312:3,16 313:14 315:13 316:1 317:3,5,10,17 318:2,19,23 319:3,15,23 320:5,23
Mayor 138:8
mean 8:4 20:11 23:2 36:22,23 37:10,15 47:1,15 56:4 62:17 63:8 83:11 120:9 132:15 139:6 140:9,18 143:23 148:3,13 150:23 154:23 161:19 171:20 221:23 224:3 244:1 246:4 249:17 250:11 288:2 321:4
meaning 320:7
means 46:2 227:23 244:2 267:5 315:24 320:19 322:4
measure 169:17 270:11,14
measured 157:23 157:24
measurement 45:4
measurements 158:11,14
measures 127:13 169:16 257:8
mechanical 322:4
mechanism 203:7 267:6
mechanisms 231:6,7 241:8 242:9 250:14 285:4 295:20 296:6
media 170:15
median 305:6
meet 66:16 207:18 249:17 250:5 285:18 289:6,13
meeting 72:12,13 72:22 127:6,9,16 127:19 128:1 130:11,14,17 131:11,12,13 132:8,23 133:8,9 149:16 195:11
mention 221:17 286:19 303:9 308:5
mentioned 14:6 15:14 17:13 29:1 32:18 58:17 69:9 70:10 72:4 145:8 169:15 174:2 183:9 184:22 187:13 192:2 193:11 194:5,7,10 199:5 203:1 210:11 211:2 229:1,13 230:18 233:15 241:2,4 242:15 244:8 257:1 262:4 273:24 282:19 285:12 291:15,23 293:18 294:4 298:13 308:12 311:12 315:8

317:13
mentioning 199:9
mess 141:8
met 149:14 176:9 184:8 248:16 250:3
metal 32:18 33:19 34:8 116:9
metals 18:19 23:16 24:22 29:1 30:18 32:22 33:13 35:1 53:9,17,19 53:22 65:21 66:9 70:17 279:6 281:16 293:15
method 79:17 145:12 147:10 147:13 244:3 254:4
methods 145:18 254:11
mic 180:13 317:3
Michael 4:8 164:5
Michigan 56:14 259:5
mid-90s 186:1,5
middle 11:12 51:2 115:9,18 140:22 141:11,18,20 237:5
Midwest 1:11 6:20 24:4 28:2 28:15,18 37:20 38:24 40:16 41:12,15 42:11 48:21 50:11 53:13 55:6,9,10 56:16 58:22 60:12 64:1 68:10,13,18 75:18 83:6 85:16 126:15 135:20 136:12 136:16 137:3,9 139:21 150:9 165:15 168:8 182:21 189:22 190:5 196:1 200:14 204:10 207:22 208:24 210:12 211:5,8 211:20 248:12 251:12 252:8,11 252:21 254:24 257:19 260:20 264:15 272:8 273:10,16,20 281:20,23 287:13 297:6,18 298:16 299:5 306:12
Midwest's 134:17
migrates 244:19
migration 196:13 248:9 270:24 283:7 295:20 296:6
Mike 165:20 166:2,5 216:7
mill 245:18
milligrams 291:22
mind 201:13,14
mine 44:24 48:1 167:20
mineralogy 309:6
minerals 309:10 309:16,23,24 310:6 311:23
Mines 41:10 44:11,22 46:7 157:21
minimal 304:7
minimize 318:4,9 318:11
minimizing 318:14
minimum 70:23 187:8,9 188:2
minus 45:10
minute 82:5 88:5 119:22 137:15 166:15 170:8 208:23 210:11
minutes 73:10,12 73:21 89:10,12 89:13,15,18,22 89:23 90:1,2 91:8,12 93:23,24 96:10,11 98:17 98:18 100:17,18 101:1 135:1 139:2,14,15 141:7 142:5,7,9 242:17 244:6 258:9 262:9 264:20 310:23
mirrored 185:22
misapplied 265:16
mischaracteriza... 236:4
mischaracterized 236:18
Mischaracterizes 128:6
misinterpreted 265:16 266:15
misread 10:2
missing 100:22 175:13
misspoke 19:7
mitigating 212:22
mixed 13:7 151:23 316:12,13 317:12
mixture 316:14 317:9 318:6
MNA 202:21,22 202:23 242:8,15 242:18,21,24 243:1,8,11,11,14 244:2 245:11 246:14 247:19 248:5,16,24 249:10,18 250:1 250:5,10,15,24
mobile 62:10
mobilize 62:6
mobilizes 310:1,7
mobilizing 245:1
model 214:24
modeling 43:14 44:13,17 130:6,8 168:18
models 221:1
modification 242:14
modifications 241:12
modify 9:23
MOHAWK 2:3
moment 105:2 179:24 202:6 223:7
moments 215:10
monitor 185:8 200:23 243:6 253:21 254:6
monitored 202:17 215:5 219:14 242:5 246:24 251:9
monitoring 27:5 29:16,17 30:7 33:2,3,22 66:4,7 66:9,16,20 68:15 69:1,2,3 70:16 72:3 124:7,20,23 125:3,9 146:12 146:21 147:1,1,2 147:20 184:17 185:6,11,16,21 185:24 186:6,17 186:18,22,22 187:15,19,22 188:3,12 200:22 202:12 203:2 209:14 212:1 214:12 219:17 219:22 222:23 223:19 224:5,6,9 224:10 227:2 233:7 241:4 242:7 246:2 253:5,9,22 276:21 277:1,4,6 277:13 280:15 280:21 281:7,13 281:13 283:8 284:21 291:7,8 292:16 295:22 296:8 298:10,19 300:6 301:17 303:9 305:7 308:14 309:19 311:21 312:14 312:17,19,21 313:3,6
monofill 151:10
month 123:12 278:13
monthly 123:10 123:10
months 123:12
morning 6:2 9:3 11:14 12:8,9 126:11 138:16 158:21 161:15 286:6,15 294:10 307:10,14 313:19 315:8,9 321:20
motion 7:12,12 86:6,14
mounding 270:7
move 9:6 10:1 14:12 18:1 28:2 64:12 85:21 103:9 104:12 106:22 119:11 132:11 159:19 188:15 217:17 225:8 257:10

261:7
moved 205:4 213:19 214:17 256:20
moves 48:21 64:1
moving 55:2 128:24 186:24 255:7 276:10 321:10
multiple 224:9,10 224:11 250:19 312:20
MW-09 146:22 305:11 306:14 307:21 309:1
MW-1 301:9,17 302:21,23 303:3 303:15,17 314:22
MW-10 292:7
MW-11 292:7 305:11,17,19 306:1
MW-2 301:10 302:21,23 303:4
MW-3 280:21 281:1,4,6,8 284:22 285:7,8 285:13,14
MW-5 280:21 281:5
MW-8 292:7
MW-9 306:4 307:19 308:2,6 311:18 312:1,2
MWG 260:13
MWG13-15-10... 153:7
MWG13-15_10... 153:17
MWG13-15_10... 153:15
MWG13-15_10... 154:10,15
MWG13-15_10... 154:15
MWG13-15_12... 41:14
MWG13-15_12... 40:17
MWG13-15_19... 150:11
MWG13-15_19... 149:11
MWG13-15_34... 36:1
MWG13-15_34... 36:7
MWG13-15_48... 27:3
MWG13-15_81... 59:19

N

N 4:1 12:2,5,5 74:8,8 90:21 142:16,16 163:20 164:1,1
N41 89:3 93:22 96:9 98:16 100:16
name 6:2 10:21 123:21 191:2 226:22 287:3
named 191:16
Nancy 82:4
National 37:4 40:5 41:9
native 309:7
natural 36:11 61:18 197:18 202:17,18 231:5 242:5 246:24 248:7 250:15 251:9 260:14,24 261:3 273:23 308:17
naturally 310:2 310:14
nature 17:9 25:15 25:17 225:14 238:23 267:19 268:5,5,6 282:14 290:20 320:15
navigation 121:1
navigational 121:15
near 311:18 320:10
nearest 40:21 44:14,16
necessarily 112:11 112:14,15 117:11 135:20 155:18 168:11 170:2 176:4 220:22 237:15 265:24 269:19
necessary 149:19 196:4 254:22 256:4
need 9:5 36:6 63:20 82:5 140:8 142:9 220:14 245:7 250:10 267:19 268:1,5,5,6 274:6 317:20
needed 43:18 125:18 126:2 158:21 185:4 195:8 217:14 222:13 238:19 255:9
needs 39:3 239:16 254:9 264:7,18
neighborhoods 264:3
neither 122:20 141:5
network 1:6 6:15 188:1,1 206:21 246:3 277:6
networks 209:14
neut- 308:17
neutral 61:16 286:23 287:4
never 48:16 54:11 122:1,16,17 139:17 176:13
new 22:19 34:12 85:14 90:9 159:3,16 177:5 187:3 194:8 195:17,17,18 207:17 242:11
newly 193:24
NFR 273:2
NGVD 37:4
nice 277:24
nickel 310:4
Nijman 3:2,3 4:9 6:17,19 138:18 139:7,22 140:11 140:15,21 141:1 142:4,10 163:15 163:16 164:2,13 165:4,8,17 166:8 166:11,23 167:2 167:6,12 168:7 168:16 169:15 170:8,14,23 171:3,10,15,18 172:6 173:1,7,13 173:23 174:2,9 174:23 175:2,5,9 175:15,18,21 176:2,9,13,16 177:7,18 178:1,7 178:12 179:1,4,9 179:23 180:5,15 180:17,21 181:6 181:24 182:20 183:2,5,22 184:2 184:7,10,13,20 185:10 186:16 187:13,18 188:11,15,23 189:6,10,20 190:2,7,17,22 191:1,4,10,15,19 191:23 192:4,9 192:18 193:1,2,9 193:11 194:4,7 194:19,23 195:4 195:16 196:6,18 197:1,4,13,21 198:2,10,20 199:1,4,11,20 200:9 201:1,6,12 202:16,20 203:13 204:3 207:1,19 208:15 210:11,21 211:2 211:17 212:6,9 212:21 213:10 215:9,13,22 216:5,12,19 217:8 218:9,13 220:2,10,14 221:9,14,22 222:6,15 223:21 224:17,24 225:13,17 226:1 226:12,19 228:6 228:12 229:1,13 229:24 230:5,18 230:22 231:13 231:19 232:5,8 232:14,22 233:2 233:9,19 234:10 234:15 235:3,7 235:18 236:6,13 236:20,24 237:4 237:10,23 238:3 238:9 240:16 241:1 242:15 243:14,18 244:5 245:10 246:8,12 246:16,21 247:4 247:8,16,22 248:12,18 249:1 249:10,13,16 250:9,23 251:4 251:12,15 252:2

252:7 253:3 254:2,14,23 255:17 256:23 257:3,20 258:4,7 258:12,17 259:13,14 260:1 260:7,23 261:7 261:18 262:4,8 262:16 263:6,11 263:18 264:13 264:17,24 265:2 265:18 266:8,12 266:18 267:9,14 268:11 269:3,10 269:21 270:13 270:21 271:6,11 272:3 273:5,21 274:11,18 275:2 275:6 276:1 277:8,17,20 278:3,8,19,24 279:8,14,24 280:3,9,23 281:9 281:19 282:2,13 282:18 283:13 284:8,12,17 285:11,20 286:5 286:19 287:5,23 288:24 289:19 290:5,14,21 291:23 292:5,10 292:15,21 293:4 293:18 294:4,19 295:9,13,16 296:4,10,16 297:4,16,22 298:2,6,13 299:9 299:12,18,22 300:9,18 301:2 301:11,21 302:3 302:7,12,22 303:5,18 304:4 304:12,18,21,24 305:15 306:2,6 306:21 307:12 307:16 308:4,23 310:10,20 311:2 311:5,10,16,24 312:11 313:9 315:7,22 317:1,6 317:13,24 318:16,20,24 319:10,17 320:3 320:21 321:9,16

nine 26:11 27:16
Nishioka 3:5 6:19
NLET 286:20 288:12,19,22 289:6,13 290:13
NOAA 40:5 41:9 41:23 43:7,24 158:14
non-detect 234:8 236:1,3
non-filtered 192:6 192:15,20 193:4
non-parametric 227:5
normal 22:23 256:13
normally 62:18 256:12 257:6
north 13:21 15:15 18:23 51:21 65:8 66:14,18 69:14 71:1 85:4 153:2,5 154:6 272:15,17 281:2 281:2,3,6 289:9 291:9 292:8 294:11,18 295:21 296:7 298:21
north/south 36:14
northeast 12:11 12:16 83:19 110:11,16 118:11 278:5,9 301:3,8,8,19 302:14,20 303:6 303:10,15 313:10,13,20 319:2,13,14
northerly 19:16
northwest 14:20 120:1,5,16 121:6 121:18,22 177:2 281:6,7 284:23 285:2 286:4 288:1 292:8 294:11
Nos 49:9
note 111:6 139:16 184:2 223:21 268:13 273:21
noted 134:17 160:23 261:12 276:9 280:9 300:18
notes 10:3,4
notice 184:5
November 18:11 18:13 51:14 64:20 158:8 276:9
number 4:12 10:8 10:15,16,17,18 85:16 91:10,13 171:8 176:20 177:4 189:16 197:17 221:3 222:23 242:22 247:10 250:3 257:11 263:2 264:8 280:15 291:2 293:24
numbering 216:3
numbers 9:24 10:1,3 11:2 109:15,17 110:3 181:20 204:6
numerical 43:13
NW 2:10

O

O 12:5 74:8,8 142:16 163:20 163:20 164:1
o'clock 1:18
oath 142:15
object 17:8 38:12 38:17 41:21 103:12 104:13 130:23 259:8
objected 131:4
objection 7:14 11:5 28:5,9 31:4 39:2 45:14 46:10,16 48:2 49:2,6 64:4 91:21 97:15 103:23 119:14 119:17 128:5 131:1,5 132:14 134:18 151:11 155:3 160:20 188:20 192:22 228:9 232:7 236:9 249:19 261:10,12,13 263:14,17
objections 132:16 134:17
objectives 173:12 208:2 316:6
obligation 200:21
obligations 194:12 195:12
observation 117:15 314:7
observations 150:10
observe 151:9 196:23
observed 35:18 54:9 67:15 68:5 314:5
obstructions 307:22
obtained 53:13
obvious 229:6
obviously 13:13 22:4 84:4 161:22 165:22 270:22
occasion 302:19
occasions 37:22
occur 217:15 242:6 243:3,19 254:9
occurred 201:19 213:23 214:1 255:22 279:19 283:7 305:21
occurring 224:5 277:4,6 310:14 313:3,20
occurs 161:24 243:2
off-property 255:16
offer 138:14 223:8 225:21
offering 108:6
offers 227:22
offgradient 255:15
office 181:4
officer 1:15 6:1,3 6:16,21 7:10,18 8:7,10,15,19,24 9:10,13,16 10:20 11:3,6,10,17 17:10 28:1,3,6 31:6 38:11,14,20 38:23 39:6 41:20 42:4,7 45:15,21 46:13 46:20 48:3,21,23 49:4 63:24 64:2 64:5 73:9,11,15 73:20,24 81:22 85:13,24 86:7,12 86:16 91:22 92:5 94:24 95:4

95:7 103:11,18 103:22 104:1,6,9 104:15 109:23 119:13,15 128:8 128:11 130:22 131:7,15 132:13 133:4,13 134:4 134:15,24 135:4 135:8 137:14,18 138:3,10,19 139:5,13,18 140:2,13,17,24 141:4,19,22 142:2,6,11 151:12 155:5 158:16,22 159:1 159:21 160:7,16 160:22 161:6 162:5,17,21,24 163:4,14,17 186:7,11 188:18 188:21 192:24 228:10 236:11 249:20 259:12 259:20 261:9,11 263:15,21 264:19,23 295:23 296:2 317:2 321:10,12 321:18
offices 188:5
offsite 78:13 148:8 206:22 214:9 240:6 252:22 262:14 304:9
oftentimes 168:20 168:24 170:20 172:3 185:1
oh 16:11 45:21 76:16 115:13 132:1 159:10,22 180:14 191:9 220:18 268:13
okay 7:10 8:14,18 9:13,15 14:19 18:6,14 21:15 27:12 35:21 36:3,21 40:14 41:6 44:7 47:10 47:22 49:4,15 50:16 52:18 66:11 73:20 74:10,14 75:2 79:13 80:14 81:17 82:9,24 86:7,12,15 87:2 87:10 92:12 93:12 94:21,23 95:4 96:2,15 97:22 98:3,6 102:11 104:1,15 104:24 105:5,17 106:15,20 107:3 109:14,23 110:10 114:19 115:22 116:1 117:4 118:1 119:1 121:3 123:14 125:14 128:24,24 132:11 134:6 135:4 136:14,18 136:22 137:12 138:10 140:2 142:1,20,22 147:4,18 149:6 149:13 151:24 152:1,4,5,7 157:15 158:22 159:1,11,21,22 160:7 162:5 188:15 191:23 208:15 226:19 231:19 261:11 271:11 277:8 287:8 298:1 304:20 313:9 321:16,18
old 51:20,22 52:1 52:3,5 181:7
older 167:22
oldest 158:6
once 7:9 20:12 22:14 32:23 34:13,13 140:12 213:18 238:17 254:15 301:22 310:5
ones 34:2 69:19 156:12 177:5 250:4
ongoing 193:16 195:9 198:7 200:21 209:6 212:20 214:12 253:9,21 312:13 312:17 313:6
online 22:17 43:22
open 18:2 198:21
opened 131:17
operated 204:9,9
operating 16:5,9 16:15,24 17:2 30:14,16,19,22 31:9,24 32:8,19 33:19 34:9 57:15,17,19,22 58:8,13 69:5,8,9 69:13,17,24 70:11 71:14 239:1 272:7 282:20,22,24
operational 51:24
operationally 320:7
operations 107:9 181:1 217:6 310:15
operative 199:18
operator 100:21
opine 226:9
opined 256:3
opinion 37:18 86:5 165:11,12 176:5 199:8,8,11 199:12,16 205:2 212:21,23 216:20 221:18 224:17 226:1,4 249:18 264:11 265:16 295:6 296:10,12,14,17 296:20,21,23 297:1,3,5,6,17 297:19 304:5,13 304:14,19 305:3 311:3,16,24 312:5,5 315:12 315:23
opinions 108:7 175:2 197:2 198:4 289:21 296:20 297:15 303:7 308:8
opportunity 175:6 181:19 183:23 196:22 225:10 231:4 283:7 285:3 302:8 319:12
opposed 147:16
opposite 272:19 316:18,19 320:17 321:7
opted 188:7
option 134:9 256:8 257:14 260:11,13,21 262:13,18 264:10 270:18 320:16
options 134:13 170:5
order 7:16 9:1 45:11 66:15 152:11,14 188:8 197:5 200:24 203:3 223:4 267:20 270:6 273:17,18 275:21 280:1,7 286:17 288:14 289:5 290:2 300:7 306:17 315:20 317:21
orders 209:7,24
organics 53:2
organization 223:2
organize 222:20
original 9:1 161:20 215:21 280:13 289:9 296:24
originally 275:16
Outboard 52:4
outcome 229:20 322:13
outcomes 172:13 227:9,15
outfall 26:17
outgrowth 168:21
outlier 306:15
outline 190:10 213:19 216:9
outlined 190:13 211:7 315:19
outlines 178:20
outlining 247:19
outside 13:9 83:21 87:6 240:10 262:15 266:17 297:11 305:23
overall 174:15 198:6 213:11 218:8 227:24 234:4 237:22 282:11 306:15
overgrown 114:23 117:13,15 118:16
overkill 60:20
overlap 186:3 200:16

overruled 39:10 48:4 49:7 92:6 131:18 259:24 263:22
oversee 223:1
oversight 169:10 169:12
overview 203:21 204:13
owned 135:20 137:2,9
owner 178:21 281:24
oxidation 310:6 311:22
oxidizes 309:23
oxygen 309:18,19 309:21

P

P.E 189:23
package 58:7 59:6 60:3 69:23
pads 67:21
page 10:6,10,10 10:13,14,16 37:18,18 40:24 79:8 82:14 84:9 87:3,4 88:15,16 90:12 92:18 93:11,11,14 94:2 94:22 95:3 96:1 96:13 97:11,16 97:19 98:1,2,5,8 98:22 99:3,15,15 100:5,7,8 101:3 102:12 104:19 104:19 105:4,6 105:18 106:10 111:1 112:8,22 114:11,17 116:1 117:4 129:19 137:5 146:10 149:10 159:6 160:13 161:11 161:13,13,15,16 161:19,22 166:24 167:7 189:20 191:5 198:12 204:4,5,5 204:5,7 213:16 215:23 216:3 221:9,16 223:24 226:12 232:15 232:18,23 233:19 235:8,10 235:11 237:4,6 240:24 247:9,11 251:5,6 258:18 258:20 260:8 268:11 269:5 271:12 274:22 295:17 297:23 297:24 304:13 304:16 305:1,2 306:8 308:24 310:10 322:6
pages 10:19 16:11 17:16 32:5 35:9 35:9,11 58:10 59:12 70:3 71:17 72:21 73:2 111:3 112:23 114:12 114:14 117:5 136:21 158:3 191:6,6 240:17 265:4 274:19
pan 62:14
panel 163:6 164:5
paragraph 37:19 87:5 149:14 198:13 221:15 232:18 235:8 247:13,16 248:20 258:19 260:8,10 265:19 269:6 296:16 304:15 305:2,3 305:16 306:3 310:12
parameters 24:22 25:9 26:12 29:19 52:24 61:1,23 65:19 219:16
parenthesis 198:20 199:2
parking 81:9
part 9:24 32:23 43:11 52:22 55:4,15,23 107:17 109:2 110:20 111:7 113:16 119:6 125:20,23 130:1 133:18,20 140:14 151:19 156:20 160:1 177:8,13 178:12 188:6 190:14 191:13,21 200:20 202:24 206:16 212:20 218:7 219:2 222:8,18 225:2,8 239:18 242:20 256:19 273:11 275:18 277:16 282:5,10 283:9,9 287:15,21 291:19 293:19 294:2 301:19 302:5,9 306:22 308:15 309:17 312:16 315:13 315:14
particular 36:14 40:3 45:5 52:11 55:19 60:5 61:10 62:8 90:1 116:4 118:21 143:8 152:16 153:20 167:17 184:23 185:3,7,9 187:5,14 188:6 219:1 225:6 237:14 242:2 248:19 256:3 276:13 280:20 285:1 301:17 306:20 309:11
particularly 280:21 291:17 307:24
parties 6:10 163:8 322:10,12
parts 39:23 171:4 318:8
passed 283:10
passing 90:8
path 321:3
pathway 196:13 217:10,16 218:3 270:24
pathways 172:18 172:19
Patrick 146:8 147:19 291:1,24 300:3 302:19 314:19
pattern 62:15
patterns 230:12
pause 308:22
PCB 1:10 6:5 207:7
peculating 23:8
pencil 45:20
pending 194:15 194:19 195:16 195:17 210:3 276:14
penetrate 270:23
people 81:9,11 82:17 121:9 138:2,6,8
Peoria 40:6,20 41:3 46:6 47:24 157:20
percent 303:20,22
percentile 305:8 305:10,14,20
perched 20:18
percolate 19:5 20:20
percolates 20:23
Perfect 226:19
perform 187:22 190:20 194:24 223:4 236:20
performed 190:23 224:7 233:8 234:24 249:6 277:14 278:14 279:22 280:8 282:1 289:4,24 291:1,5 306:11 306:17 313:23
perimeter 170:21
period 22:11 47:3 47:21,23 215:4 245:5
periods 243:4
permanent 266:20 267:5
permeable 23:6
permit 16:2,5,9 16:16,17,21 17:1 17:14,15,21 30:10,12,12,14 30:17,20,20,22 31:9,23,24 32:8 32:15,19 33:19 34:5,9,17,21 35:4,7 43:12,14 53:13,16,21 57:13,15,16,18 57:19,22 58:5,9 58:13,18,19 59:1 59:10 69:7,8,10 69:13,17,24 70:11 71:3,6,13 71:14 72:5,9,17 73:6 126:8 193:23

permits 69:4,5 210:17
permitted 183:17 183:19 289:17
perpendicular 301:15
person 259:23
personal 48:12
personally 107:13 299:13
perspective 241:18 277:23
pertains 133:7
petition 297:19,20
pH 61:12,12,16,18 61:18,20,20 62:8 287:4 308:5,13 308:17,21 309:24 310:1,7 311:3,7,12
phase 6:6 81:19 83:5 165:14 191:14,22 220:20 226:8 239:14,15 280:10 281:21 283:14 284:7,17 319:24
phased 62:21 63:16
phases 169:3 190:5 205:2 209:20
photo 10:7,8,9,9 10:11 154:9,13 271:21
photographed 110:7
photos 10:24 11:1 12:11,15 108:16 108:18,18 109:2 110:10,14,15 117:7
pHs 62:7
physical 25:9 214:3
pick 246:1
picking 144:13
picture 110:19 111:5,12,21 112:5,10,18,19 113:24 114:21 114:24 115:2,4 116:3,5,9,14 117:12,14,18,21 118:2 119:10 152:19 153:5,10 153:11,15,20 155:13,15,21 167:7
pictures 9:21,23 108:20 109:7,7 109:10 110:7 113:1,3,6,12,13 113:16,21 114:13,15 118:21 119:2,4,6 119:8 152:8,12 152:17,24 153:10 154:1,4 154:18 155:11 156:2,5,12
piece 65:3 121:13 139:14,16
pile 15:5 121:19
pin 91:15,19 93:4 93:7 94:11,15 95:17,20 96:20 96:24 99:3,7,24 101:11,15,19 102:5 103:1,4
pinpoint 245:15
pipe 304:3
pits 289:8
place 14:10 56:11 67:22 127:21 128:1 186:1 199:2 202:12 211:13 229:5 231:7,7 239:21 239:22 241:24 242:9 243:7,8 277:1,21 285:6 293:2 312:18 313:7 322:5
placed 22:15,15 50:15 51:1 55:8 55:17 56:5 82:2 206:7
placement 107:21
placing 29:5 129:1
Plaines 13:19 14:13 65:4 81:4 87:22 101:20 102:6 107:5,14 107:18,22 110:23 120:20 272:18 314:24
Plaintiffs 175:12 191:21 295:1
plan 174:5
planning 169:5
plans 127:1 193:23
plant 13:20 43:17 44:12 51:24 54:23 260:13,15 260:22
plating 243:23
play 24:19 53:7 185:8
played 34:2 202:15
please 6:11 13:17 18:3,8 42:11 74:14 75:1 80:12,21 83:15 84:13 88:7 92:17 93:11 94:21 95:24 96:13 97:10 98:4 102:12 103:7 104:18,21 105:3 106:15 111:1 113:9 117:4 124:6 135:17 136:19 142:19 155:20 157:14 186:8 295:24 317:3
pleasure 162:23
plume 172:3 248:8 249:9
plumes 248:22
plus 29:22 45:10 268:8
point 7:20 53:23 77:19,22 85:4 90:18 95:24 111:15,20 118:24 123:10 128:20 148:21 149:13,15 172:10 185:21 205:7 224:8 226:6 230:10 231:24 235:21 238:16 244:22 255:8 262:2 280:23 282:4 295:17 300:24 304:19
point-oriented 203:24
pointed 283:18
pointing 267:8 281:2
points 42:19 187:7,9 188:3 223:22 224:14 232:23 233:4 253:13
pole 116:9,14
policy 1:5 139:6
Pollution 1:1 6:4 76:23 191:8 199:7 276:15
pond 25:3 26:4 27:24 52:13,13 53:12 54:3,6 57:21,21 58:18 58:21,21 60:9,11 62:14 78:1,2 84:16,16 125:15 207:15 229:20 269:16,22 270:6 270:10,12,15,19 275:10,10,10,13 275:13,15,23,24 276:5,5,5,8,8,8 276:10,16 277:5 277:7 295:21 296:7,8 297:10 297:12 298:11 298:19,21 302:21 310:17 314:22
ponds 37:21 52:16 56:13,13 57:19 57:23 59:10 64:19 65:12 66:1,6,14,18 67:15,19 69:6,7 69:13,14,16 70:1 70:12 71:1,15 72:5 73:6 77:23 78:6,9,17,17 124:10,18 127:2 127:7,13 128:15 134:9 210:22 215:15 223:14 223:20 229:16 233:18 258:23 270:1,2 271:2 274:7 275:7,9,20 275:22 276:2,5 276:22,24 287:15 291:9 292:8 294:11 299:7 300:16 304:8 305:22,23 312:20
pop 117:14
popular 62:4

population 172:22 172:23 215:8
portion 243:15 284:23
Portions 129:23
posed 218:6,21 222:4 244:3
possibility 76:9
possible 7:22 62:20 89:17
possibly 134:16 294:1
potable 55:21 205:17 219:24 220:7 283:21 300:11,14,15
potential 205:10 207:9 211:14 214:10,11 217:9 220:8 227:8,15 229:14 245:15 248:9,9 273:15 283:4 284:2 285:9 291:13 293:5,8 294:9 297:11 304:11 306:18,18 318:4
potentially 121:18 225:11 315:9
pounding 148:11
pounds 143:9
power 68:1 260:13,15,22 274:5,10
PowerPoint 238:10 271:12 274:23 277:9 279:15 299:23 306:7,9 312:12
Powerton 18:2 21:3 23:12,20,21 24:16 25:1 27:5 28:18,21 29:12 30:9,13 34:17 35:8,16 40:7 41:11 49:13 52:19 56:17 70:18 122:8 123:1,11,16,20 166:5 242:1
Poz-O-Pac 78:5 275:17
practicability 256:14
practicable 170:6 182:14 234:19 260:13 263:5
practical 225:4 270:9
practice 42:24 164:24 181:1,18 234:19,21
practices 206:2 270:9
Prairie 1:5 6:15
pre-1966 319:22
pre-numbered 85:18
precipitation 22:4
preclude 202:3
predating 176:20
predicated 220:24 266:23
predominantly 216:22 272:13
preferential 196:13 270:24
preferred 127:23 128:2,7
prefers 260:14,24
preliminary 285:24 286:16
preparation 129:22
prepare 16:14 29:9 30:1,2,10 30:13 34:8,11 57:1,13 58:13 69:10 70:8 71:18 215:13
prepared 30:14 30:19 34:4 72:11 146:7 158:23 193:22 193:23,23 203:21 216:5 221:11 230:1 265:22 274:20 295:6,14 296:21
preparing 27:7 32:8 33:18 34:16 35:4,13 59:1,14 67:2,3 71:6 72:16,20 73:5
presence 196:23 201:18 251:20 300:13 310:8,16
present 18:21,23 21:24 127:16 179:1 188:9 202:4 203:24 209:10 217:15 239:5,7 240:9 251:22 291:20 309:10 310:2,4 314:1 315:17 316:22 318:16
presentation 203:20 216:3 226:13 230:15 240:22 299:23
presented 85:15 204:12 221:18 236:5 296:14 297:12
presenting 138:23 235:16
presently 276:10
preserved 29:6
preset 169:1
pretty 63:4 92:9 111:16 114:22 117:13,15 118:15,17 120:10 132:17 170:17 177:12 177:14 178:5 218:18 300:23
prevent 243:8
preventative 287:16
previous 69:19 76:17,18,21 82:3 109:11,12 160:4 205:1 213:23 262:5 263:8 283:1
previously 35:24 204:9 205:24 209:1,8 246:17 255:23 298:16 309:20
primarily 15:22 26:3 164:20 167:22 205:12 205:16 219:15 306:13 320:11
primary 204:20 205:20 262:20 294:13,14
principal 164:17
printout 44:6,9 45:2
printouts 41:22 41:24
prior 29:5 65:14 76:18 83:6 128:3 184:7 200:11 226:7,8 239:14 258:14 261:13 272:24 279:20 280:5 281:23 319:9
proactive 179:13
probably 44:2 62:20 92:9 107:9 111:24 116:15 117:2 123:17 129:14 145:3 148:20 154:5 166:1 181:19 244:16 249:4 260:12
probative 104:4 161:1
probes 287:11 288:11 289:8 306:24 307:1
problem 8:16
problems 270:20 270:21
procedures 270:8
proceed 6:24 39:9 74:7 86:17 264:24
proceeding 108:1 133:12,19,20 134:7,14
proceedings 1:14 133:2 321:22
proceeds 81:3
process 72:10,14 86:4 121:4,4 153:23 169:9 178:20 182:6,12 182:15,24 184:23 202:13 202:15,23 213:4 213:11 214:18 225:8 238:12 242:20 243:22 245:19 250:15 251:20 252:13 252:19 253:7 255:6,7,7,9 256:11,13 257:7 274:11,12 275:19 276:11 289:23,24
processes 248:7
produced 274:6
producing 274:4 274:10
production

318:14
professional 180:9 180:23
program 24:19 28:21 29:7,11 53:8 54:24 55:6 56:8 169:21 173:16 181:11 181:12,15 182:19 184:17 185:6 187:4 200:3 206:14,15 208:1,2 212:15 219:17 231:18
programs 171:9 186:6 208:3 209:4 212:1 222:24 242:22 257:16 276:21 312:21
project 2:8 6:14 15:2 121:24 122:1 125:23 136:8 157:11 165:19,21 176:21 222:19 273:12,14 318:21
projects 171:11 171:16 227:17 227:18
prompt 137:21
promulgated 181:12 183:21 195:22,24 207:11 221:2 291:5 293:17
proper 182:8 242:8 289:17 292:4
properly 203:7 255:11
properties 167:23 168:1,3,5,22 181:7 198:8 217:4
property 24:5 37:2 55:3,8,10 55:18,22 56:6,9 56:9 65:3 67:5,7 81:1,10 83:6,19 86:23 87:14 92:2 116:12 118:12 136:4,5,7 136:9,11,12,13 136:16 137:2 152:21,24 153:1 159:18 200:1 230:23 231:11 231:15,22 232:1 232:3,4,10,13 246:6,9 272:17 273:12,18 284:6 293:3
proposal 85:15 122:1 194:15
propose 62:20 207:4
proposed 179:16 194:8,20,20 195:18,18 207:8 210:3 240:18 259:3
proposing 257:13
protect 243:9 318:21
protected 252:23
protection 255:15 268:20 287:2 288:13 290:10
protective 182:9 206:21 240:7
provide 30:4,6 105:14 173:24 194:17 203:21 249:24 284:18 315:23
provided 10:19 52:24 83:4 90:10 104:22 148:9 190:12 287:11 296:22 305:6 310:22
provides 45:6 47:8,18 100:13
providing 7:22
proximal 218:20
proximity 259:5
prudent 259:23
public 72:11,13 72:22 127:24 138:1,21 139:7
published 189:19 219:4
pull 63:9 149:3 152:2 157:13 246:17
pulled 43:19 58:6 59:5 69:22 83:3 129:16 135:14 157:11 161:18
pulling 24:1 34:6 71:13
pump 259:2 260:2 260:11,16,21 261:19 262:1
pumped 22:5
pumping 259:6
purchase 83:6
pure 63:11
purely 63:9
purpose 40:1 55:16,17 126:5 149:16 155:17 155:19 167:24 271:17
purposes 22:7 40:16 43:10,19 59:18 63:15 126:3 127:10,15 205:18
pursuant 28:15 56:16 68:10,12 68:13 132:23 193:18 195:1
put 7:16 14:10 33:16 37:17 38:13 56:11 109:13 118:16 118:22 143:6 149:2 151:24 160:14 199:2 203:22 209:16 228:22 232:2 234:19,20 270:18 282:18 293:2 304:14 305:1 315:21
putting 169:6

Q

qualifications 175:19 176:7 184:4,6,15
qualified 188:22
qualifies 290:8
qualify 188:16
quality 205:22 206:5 219:3,3,7 219:9 220:5 223:23 228:1 229:11,21 281:18 288:20 288:23 289:13 290:12,19 298:18 306:16
quantitative 227:4,6 230:13
quantities 316:14
quantity 223:23 224:16 277:23 278:1 280:19
Quarles 175:7,9 175:11,19 176:10 179:5 184:3,8,11,14 187:6 220:11 225:14 234:11 235:12 236:7,13 236:20 237:6 246:13 250:24 251:1 256:24 265:22 266:9 267:10,15,17 268:13 269:11 269:13 270:3
Quarles' 175:16 179:2 183:23 235:5,8 237:5 265:15,20 269:2 269:4 311:3
quarries 121:10
quarry 65:6 304:2
quarrying 217:6
quarter 123:4,5
quarterly 27:4,17 28:24 29:22 57:4 65:20 69:2 123:3 224:5 276:24 313:3
quarters 123:12
question 24:11 39:13 46:17 67:11 76:13 82:7 86:20 122:4 131:21 176:7 192:23 222:16 225:5 236:10 260:19 263:16,18,20 312:2 320:4
questioned 175:21
questions 17:9 31:5 41:21 42:6 130:16,23 132:7 137:13 142:23 143:1 153:10 162:16
quick 264:18
quicker 20:24
quit 321:14
quite 19:5 20:21 23:8 114:1,3 145:14 164:21 165:21 167:20

190:10 193:16 193:20 200:16 215:1,20 239:10 245:14 275:9 282:16 283:5 314:10
quote 87:19 89:2

R

R 1:15 12:2,2,5 74:8 142:16,16 163:20 164:1
R-E 82:19
rain 20:22
raise 11:12 163:9
raised 131:12 184:14
ran 205:24
Randolph 1:16
range 61:12 62:7 62:8
ranges 37:14 61:12
ranking 251:20
rapidly 243:3
RBCA 172:16
RCRA 170:1,9 208:9 212:15 227:2 247:1 252:6 257:8 281:16
re-cross 158:18,19
re-direct 137:23 141:12 142:15
re-lined 21:16
re-lining 22:12 229:16,20
re-re-direct 162:19
reach 48:1
reached 46:7 47:2 47:20
read 10:3 36:5 40:4 76:11 88:3 247:14 248:20 258:18 260:7 295:9,17,18 297:2 305:2
reading 175:15
reads 41:7 258:21 310:12
ready 18:4 152:5 163:18 213:2
real 206:6
really 160:24 167:16 181:15 204:16 206:18 224:21 225:22 252:23 267:6 268:3 270:17 316:20
reason 22:18 91:18 93:6 94:14 95:19 96:23 99:6,23 101:14 103:3 161:16 279:12 306:19
reasonable 259:23
reasonableness 256:14 268:23
reasonably 234:22
reasons 160:20 243:5
rebuttal 175:16 220:15 235:5,9 237:5 266:9 269:4
recall 12:13 15:10 21:16,18 54:17 80:19 107:4,7 120:2 121:20 122:9,14 132:7 135:22 136:1 143:1 149:24 153:9 156:22 175:15,18 184:13 190:17 190:22 191:15 192:10,11 193:2 199:9 215:11 220:10,19 221:12 225:13 225:17 230:6,7 234:10,16 238:3 246:12 256:23 262:16,19 266:8 266:12 267:9 299:4 302:3,12 302:16 303:18 307:14 311:2,6 317:1,6 319:3,19
recalled 37:20
received 61:19 275:20 294:12
receiving 241:17 275:11
receptor 172:21 172:22 205:19 215:8 217:18,20 218:3 221:5
receptors 172:4 172:18 205:11 205:13 206:8,22 211:15 214:9 217:9 220:8 222:3 240:6 252:22 255:15 255:16
recognition 243:1
recognize 29:16 118:2 191:1 208:24 258:4 282:9
recognized 199:17 206:2 209:19 216:10 239:4
recognizes 200:3
recognizing 201:18
recollection 16:8 74:20 82:10 199:13 225:20 278:19,24 279:3 303:21 317:10 319:1
recommendation 104:6 259:1 297:14 299:1
recommended 225:14
record 6:7 10:5 11:7 17:19 42:20 46:5 47:22 73:12,14 73:16,21 74:1 75:24 76:13 85:22 86:2 103:10 109:19 109:22,24 119:12 132:12 134:18 135:5,9 135:24 137:15 137:19 140:3 146:4 150:8 157:20 159:20 162:6 163:1,5 164:3 165:24 186:15 190:10 191:14 198:15 215:3 255:24 256:1 258:13,22 263:6 264:20,24 267:16,23 277:16 301:20 301:24 312:17 315:14 321:19
recorded 41:3 158:14
recording 40:2 47:3,21,23
rectangular 49:20
red 91:15,19 93:4 93:7 94:11,15 95:17,20 96:20 96:24 99:3,7,24 101:11,15,19 103:1,4
redeveloped 13:24 14:1 273:3
redevelopment 14:2 167:13,19 167:21,24 168:4 168:6,13
redo 235:19
redoing 207:15
redone 207:16
refer 30:5 82:18 83:15 98:5 111:23 126:10 165:5 191:4 202:20 213:15 213:17 215:22 220:15 221:9 223:24 232:15 265:7 271:14 274:18 296:17 297:23 304:12 308:23
reference 76:9 87:8 107:10 198:17 220:21 227:4 256:4 268:3,3,18 269:1 269:14 300:22 302:17 311:7 320:1
referenced 76:8 77:8,14 127:5,6 130:12 189:14 189:15,18 190:20 198:19 199:14 205:2 226:24 267:2,18 269:23 299:3
references 75:21 100:10 189:4,21 191:5 198:18 250:2 265:23 266:3
referencing 83:4 107:4 131:13 161:21 216:1 256:24
referred 84:12

86:22 250:24 275:19 278:5 284:9 286:6 301:7 314:9
referring 76:13,15 87:2 120:7 135:12,18 136:18 170:10 170:12 172:23 177:19,22 181:8 194:12,21 266:1 279:10 314:24
refers 82:21 83:17 83:23 88:19 93:16 96:3 98:10 287:24
reflect 11:7 273:7 299:24 306:8
reflection 115:19 115:21
refresh 74:19 82:10
refusal 79:15,23 79:23 80:8 143:10 145:6
regard 286:9
regarding 107:21 248:4 284:18 299:2
regards 72:12 263:19
register 194:16
regs 293:17
regular 14:18 187:22 228:18 313:20,23 320:13
regularly 242:21
regulated 177:4 204:23 208:14 209:3,15 239:9 252:5 254:7,21 255:5 257:15 266:5
regulation 184:24 194:13 229:9
regulations 183:18,19,19,21 185:15,18,22,24 195:13 206:12 207:3 209:23 239:19,21 240:2 241:2,11,12
regulator 182:18 184:19 185:2 187:12 213:4
regulators 228:7 228:13
regulatory 169:13 169:13,21 172:14 178:16 179:15 195:11 196:3 199:23 203:7 204:18,22 206:23 207:21 208:3,16,19 213:19 219:17 231:18 240:11 242:22 275:12
regulatory-driven 169:2
rejected 175:3 184:18
relate 202:22 229:2 241:6 290:15 317:24
related 23:11 24:16 26:6 65:23 66:12 68:11 133:2,20 208:2 209:11,23 254:20 257:12 262:22 267:22 276:22 277:5 279:10 295:6,20 296:6 299:7,7 309:14 311:22 319:8 322:9,11
relates 182:24 267:23 283:17 290:12 307:24 314:18 318:13
relating 263:12
relation 122:12 148:11
relative 36:23 37:3,10 217:21 219:23
relatively 194:16 217:3 243:3
release 254:4,15 255:2
releases 171:23
relevance 132:14 282:14 289:20
relevant 132:21 133:1,11,24 134:16 200:4 206:23 211:6 219:6 240:12 249:5 252:23 271:22 272:4 277:21 280:11 284:18,21 300:19 301:12 303:7 304:4 308:7
relied 189:11
relief 165:13 204:15 206:24 267:22
rely 228:7 259:14 259:23
remain 78:8 211:12
remained 199:18
remaining 235:11
remains 290:6,8
remedial 169:4,5 169:15,16 171:16 200:2 206:10 238:12 240:15 242:20 242:24 255:18 257:8 260:21 316:6
remediate 284:6
remediation 54:24 55:5 168:17 169:3,11 173:8 174:3,5,10 175:24 178:13 181:11,22,23 188:17 201:20 201:21 208:1 273:19
remediations 175:22 178:8
remedies 169:18 183:3 248:24 255:19 259:18 264:15
remedy 133:12,21 134:10,14 165:13 172:21 178:18 182:2,5,8 183:1 195:6 201:2,4,11 202:10 203:8 204:15 206:24 207:4 212:20 224:19,19,21,23 225:1,2,9,10 226:2,6,9 228:3 228:4 229:5,14 229:17 240:19 241:6 245:8 248:5 253:6,20 254:17 255:1,5 256:3 260:2 261:20 262:10 262:10,12 267:21,22 268:21 272:2 273:11 274:12 292:4 315:20
remedying 256:1
remember 26:17 110:22 111:7,22 128:22 192:6 216:17 275:10 321:21
remind 42:15 60:11
remnants 116:18
removal 256:8 262:13,17 263:24 264:4 289:20
remove 267:6
removed 77:18,19 78:4 244:1 267:7 276:9
removing 276:18
rep 140:19,22 141:10,17
rep's 141:3
repair 150:8
repaired 13:11 116:20,22
repairing 314:4
repairs 116:15,17 118:16,19 149:20,22 150:6
rephrase 31:7 45:16 46:21 128:10 136:24 151:13 192:24 236:12
replace 11:1 104:23
report 13:7 27:5 30:8 146:7 149:8 166:15 175:16 189:3,8 189:15,19,23 190:8,9 193:13 198:11,12 199:5 199:15 203:22 213:16 215:21 220:15 221:10 221:15 224:1 232:15 233:20 235:5,9 236:5,23 237:5 240:17,23

253:12 258:23 262:6 263:7 265:4,15,20,22 266:9,24 267:2 267:18 268:12 268:18 269:2,5,5 269:15 271:13 274:19 277:18 278:12 282:6,7 296:11,12 300:3 308:24 310:11 319:20
reported 1:21 234:9 322:3
REPORTER 150:18 180:12 180:16,20
reporting 57:3,11 60:2 68:16 69:1 169:13 234:9
reports 21:2,6 29:9,24 30:5 57:1,6,8 175:6 183:23 210:18 230:1,5,8
represent 63:22 91:19 93:8 94:15 95:21 97:1 99:8 100:1 101:16 103:4 285:22 316:23
representation 230:12
representative 63:4,7,11,21 138:13 223:17 283:3
representing 2:13 3:13 6:15 285:7 285:8 322:11
represents 100:24
repurposing 276:16
reputable 282:8
request 23:17 121:24 131:8 138:13 211:21 291:6
requested 9:22 50:11 51:3 55:6 62:19 252:20
requesting 138:15
require 200:10 234:11 254:19
required 16:20 29:21,23 30:8 57:5 58:4 69:1 70:23 210:17 211:8 263:3 287:1
requirement 24:20 57:11 78:20 212:16 250:7 284:5
requirements 23:21 33:1,4 53:10,16,20 57:3 66:16,19,23 192:13 193:19 195:9 200:8 204:22,22 209:6 239:24 252:17 253:6 257:18 277:2 287:1
requires 29:18 228:19 229:9
resampling 123:9
residential 65:9 217:2
residual 183:16
residues 176:22
resistance 321:3
resolved 185:5,5 187:12
resources 36:11 248:11
respect 165:12,13 168:1,22 175:24 192:13 194:2 207:6,14 215:6 240:6 242:3,13 245:8 250:1 265:14 269:15 269:24
respective 164:14
respond 134:3 174:18
responded 266:9 267:10
Respondent 3:13 7:5
Respondent's 4:13 5:1,7,16 26:22 28:10 40:8 41:17 49:8 59:21 64:8 166:19 203:10 258:1 261:15
responding 66:22
response 39:4 53:10 133:14 237:12 251:23 260:19 290:1 296:22,24 297:13 306:12
rest 56:10 87:18 308:14
restoration 260:12
restoring 256:17
restricts 55:19,20
result 23:5,9 103:16 209:14 227:9 234:6 236:3 252:16 259:6 284:1 285:7 288:19,21 310:6 311:19 316:15
results 61:2 103:17 192:6 193:5 214:12 233:21 238:4 279:4 285:13,15 285:18 288:16 288:17 291:14 307:10 309:22 310:8 311:17,18
retained 175:11 191:21
retardation 250:16
retention 26:4
reuse 286:13 288:8 290:9
review 21:23 82:6 165:23 169:9 175:6 183:23 190:8,12 194:24 203:16 207:2 217:10 230:3 240:18 292:5 301:22 302:4,8,8
reviewed 21:12 75:4,8,14,18 210:14 228:20 230:1 237:24 262:5 277:15 292:3 315:14 319:20
reviewing 191:15 272:1
revised 199:8,8
revisit 23:12
Rich 155:20 156:10
RICHARD 4:3
rig 143:9,22
right 6:2 9:9 11:11,13 12:17 13:14 14:23 15:15 16:6 17:3 18:1 24:14 34:13 44:1,21 45:12 46:12 47:16 51:5 55:18 72:6 74:1 79:24 83:10 84:19,24 91:13 93:9 97:22 101:1 110:2 111:17,22 115:9 115:16,23 116:7 118:4 121:5,15 132:11 135:9 137:19 142:12 145:11 146:1,19 147:5,9 149:1 151:13 155:10 156:23 160:17 161:7 162:22 163:5,10 181:15 184:20 188:14 189:4 229:12 230:20 232:6 234:20 258:15 271:21 278:6 280:6 281:12 284:14 288:3 291:8 292:24 297:19 301:2 308:22
right-hand 92:13 93:1 94:18 97:4 99:13,20 102:1 102:13 106:12 115:7,8,11 204:6
rigorous 251:24 257:14
ripped 120:23 157:3
rising 37:22 122:12
risk 172:7,22 173:21 190:23 206:19 211:13 214:23,24 217:12,13,15,22 217:23 218:1,6,8 218:16 219:12 220:12,17,23,24 221:3,7,11,17 222:3,4,7 237:17 241:9 243:12 251:21 252:8,10

252:15 253:24 290:15,18
risk-based 55:4 169:1 172:11,15 173:5,8 205:8 206:6 240:4 253:1 256:20
risks 214:21 218:21 238:19 248:10 251:21 252:1,21 255:10 257:16
river 13:19 14:13 14:17 37:24 38:9 39:16,20,20 39:22,24 40:2,5 40:7,20 41:9,11 42:14,16,18,20 42:21,22 43:7,16 43:16 44:10,12 44:14,15,18,22 46:7 47:20 48:1 49:17,20 50:21 65:4,7 68:3 81:5 87:22 101:20 102:6 107:5,14 107:18,22 110:24 111:14 111:18 114:4,7,9 115:3,6,9,15,19 120:20 152:20 157:6,20,23,24 272:18,19 278:16,18,22 303:24 314:7,24 315:3,6 318:11 319:7,9 320:10 320:18 321:8
rivers 1:6 6:15 42:19 259:5
road 2:3 13:21 14:6 15:13,14,18 15:19,20 76:9,20 76:20 77:4,15 78:19 81:8 84:21,22,23 85:5 264:6 272:22 292:17 294:12 294:14,17 298:12,20 299:20
roads 15:17,18 121:9 263:2 299:15,21
robust 62:16 227:23
rock 157:3,10
role 31:12,13 33:16,18 34:1 35:3 57:24 58:24 69:11,18 71:5 72:16 164:14 165:4,8 180:23 319:10
roles 141:1
roll 264:2
Room 1:16
ropes 181:14
rotary-type 143:17
roughly 94:17 95:22 99:10 100:3,3 101:18 103:6 123:4
round 60:17 291:11
rounds 26:11 27:16 33:12,23 34:12 70:24 72:3
routinely 131:3 132:16
RPF 15:5
RUINING 1:7
rule 29:2,14,15,20 29:23 30:1,3,8 30:18 32:23 33:1,4,9,10 53:6 53:11,23 56:22 56:23 57:2,4 61:1,24 65:24 66:3,5,8,13,15 66:17,20 68:13 68:14,15,16,19 68:23 70:19,20 78:20 126:15,18 126:21,22 127:2 127:4,10,12 128:3,4,7,17 132:24,24 133:17 195:18 207:8,10 210:3 253:5 259:3,22 269:19
rulemaking 207:7
rules 24:18 28:16 56:17,20 68:10 133:3 140:6 176:20 185:22 186:3 192:14,14 194:8,20 195:2 195:17,19,21,24 207:16,20 208:14 210:13 212:2 220:11,16 234:11,18 241:6 242:4,11 253:4 254:2,16 265:24 266:4,16 275:15 276:12 291:4
ruling 261:14
run 61:3,17,19,21 61:22 68:1 71:3 177:11,12 178:5
running 257:10
runoff 25:21 26:3 26:3,7 27:16,22 27:23 82:22
runs 170:17 217:7 217:7
rural 13:2
Russ 2:9 6:14 188:19 192:22 228:9 232:7 236:9 249:19 258:23 259:8 261:10 263:14

S

S 4:11 74:8,8 163:20
saith 12:4 163:24
salt 15:19,21 76:9 76:20 77:4,15 294:13,14,17 299:20
salts 298:12,20
sample 26:11,15 50:10,12 51:3 61:11 63:7,10,11 77:22 192:6 193:4
sampled 23:14 52:20 65:16 121:18 283:8
sampler 143:10
samples 27:20,21 29:3 50:7,9 54:1 60:6,7,24 61:3 62:24 63:4,7,21 192:16 279:1 280:16,17 281:14 283:2 285:8 288:10,12 289:10,11 291:12 306:24 307:1,3,6 315:4
sampling 14:22 15:1 23:19 24:16 25:7,15 26:11,14 27:15 27:16 30:3 33:7 33:9,24 34:12 52:23 53:4,8,18 56:21,24 57:5,7 57:9 60:15,16,22 62:17 70:21,24 71:9 122:21 123:3,3 170:20 170:21
sand 18:12 19:3 19:14,24 20:6 144:15 148:1 243:23 318:7
sands 20:15 157:9
sandy 20:23 151:5
Sanitary 65:5 120:21
Sanitas 223:4
sat 132:22
satellite 123:20
satisfying 184:23
saturated 20:1,13 20:16
saw 7:11 13:3,4 22:22 48:16 122:16,17 151:2 151:2,3,17 196:20 201:20 207:5 209:4 314:12 317:14 317:16
saying 106:5 120:15 151:9 213:2 219:10 234:15 236:6 247:17 269:21 305:17
says 40:24 47:17 87:5 92:14 95:10 97:16 105:9 106:18 109:8,9 143:22 144:3,9 147:10 155:20 178:21 198:20 237:6 248:2,21 298:3
SB3 144:1
SB4 144:6
scale 92:14,14 93:2 94:19 97:3 97:6 99:13,21 102:1,4,12,15 106:2,3,6,11 114:8

scenarios 247:19
schedule 141:3
scheduled 273:22
scientist 74:5
scope 38:12,17 39:5 225:18
score 252:15,16
scratch 33:7,14
screen 37:18 203:15 235:9 304:15 305:1
sea 36:24 37:10,15
search 90:13,14 90:16 94:3 96:16 97:11 98:20 99:16 101:5 102:18,21 103:16
season 22:3
second 18:11 85:23 87:4 92:18 95:24 109:20 124:17 146:10 161:11 161:12,15,16 189:21 191:24 198:11,13 215:23 250:23 258:18 265:5 274:22 281:10 285:12 288:1 304:15 305:1,3 310:11
Secondary 37:23 38:3 48:9 122:13
secondly 183:15
seconds 89:12,19 89:23 90:2 91:9 91:12
section 198:12,13 213:15 221:16 265:10,19 266:18,24 267:14 268:12 298:17
sections 31:15,19 36:15,16,22 58:3 59:3,3 69:22 71:12 72:21 265:7 268:20
sediment 25:8 277:13 278:17 279:1 280:17 315:4
sediments 25:16 157:9 170:19
see 8:6,16 12:23 14:16 22:5,7,12 22:14,21 23:1 40:24 49:16,16 49:21 50:2 54:2 68:7 82:22 83:20 84:18,20 84:21 87:8,23 88:17 90:14,16 90:22 91:6,7,15 92:15,21 93:2,4 93:13 94:5,11,19 95:10,14,17 96:17,20 97:3,12 98:7 99:3,17,21 100:7 101:4,11 102:12,18,24 105:6,12 106:3 107:7 109:14,18 110:23 111:3 112:6,12,16,16 113:8,18,21 114:9 115:1,3,6 115:10 116:6,8 117:17 118:1,6 118:15 119:8,8 120:16,22 121:12 129:24 132:20 141:7 143:20 144:3,11 146:12 148:12 150:13 151:1,17 154:13,16,19,22 155:7,11,14,22 156:10,17 157:3 159:10 161:24 166:18 167:10 179:19 180:18 189:24 191:7 214:20 221:20 224:1 232:17 234:23 237:8 250:21 251:2 269:8 281:2 298:4 301:21,24 306:4 310:18 317:17
seeing 23:4 54:8 77:2 78:15 80:17 110:22 111:8,23 151:20 153:18 156:5 206:20 287:6 304:23 306:20
seeking 7:5,7 174:21 267:21 276:15
seen 13:8 22:1 86:4 119:9 120:4,17 156:3 157:7 196:24 243:19,20,21 249:13 252:20 292:20 309:12
seep 156:1,8 196:9 196:10
seeps 54:12 68:7,8 80:17 156:2,3 196:8,20,23 314:7
sees 155:22
selected 127:20 128:16 293:10
selection 169:9 268:21
semi-annual 57:3
sends 210:22
sense 270:19 294:15 300:21 301:1 320:15,23 321:5
sensitive 215:7 240:6
sensitivity 221:5
sent 7:4 274:6
sentence 83:16,17 87:4,16,17,18 310:12,18
separate 34:24 69:14 70:11,14 71:3 208:3
separating 318:14
separation 269:8 269:18
sequence 110:4 113:15 152:24
sequential 109:15
series 80:3 108:16 109:4 191:7 214:1
serve 164:18 180:24 318:9
served 174:23
service 18:18 24:24 35:18 36:17 37:8,13 38:6,8,10 39:15 39:17 40:5 41:9 48:17 122:19
set 36:14 39:24 62:22 63:4,21 105:1 106:21 110:2 113:12 119:1 173:17 174:18 211:8 219:19 296:13 322:5
set-up 303:13
sets 35:2
setting 214:4 271:20 272:5 301:1
Settling 37:23 38:4
setups 43:4
seven 287:4
seventy-one 39:18
Seymour 189:22 189:23 190:2,3 190:16,18,23 221:11,19 222:1 222:6 233:13,15 237:24 238:1 256:3 262:9 263:7,9
Seymour's 221:23 222:11 238:4 262:5,17
shallow 121:8
shame 143:7
Sharene 9:2,3
Shealey 9:2,3 197:5,8 294:23 318:17 319:12 320:4
Shealey's 319:4
sheet 36:4,9 37:6 37:12 87:19 215:18
sheets 36:1
Ship 65:5 120:21
shoreline 117:11
short 73:22 81:5 85:5 135:6 163:2 264:21
shorten 140:9
show 27:20 64:17 99:13 136:3,4 188:24 229:11 233:24 277:24 278:5,20,22 279:1 289:11 294:19 299:18 300:7 301:12
showed 234:2 301:17
showing 94:19 118:22 153:19

203:15 271:22 290:22 301:4,13 312:15
shown 124:12 147:23 279:20 289:14 291:7 302:17 303:13
shows 36:19 52:10 97:6,8 102:1,15 136:15 300:4 301:6 308:1 316:5
shrinking 248:23
sic 51:21
side 65:7 67:14 83:19 90:14 101:6 111:10 124:7,11,21 125:7 128:22 145:3,15,16 156:13 162:4,10 169:4 191:24 209:17,17 211:3 223:20 233:18 271:23 272:19 272:22 273:7 274:15,15 278:6 301:2 302:14 320:18 321:7
sides 151:1 157:4 292:8
Sierra 1:3 6:13
signature 82:13
significant 227:13 227:14 253:24 257:17 264:12
significantly 262:21
signifies 147:11
silent 260:21
silt 18:10,12 20:6
siltier 318:8
silting 50:23
silts 157:9 318:7
silty 18:15,20 19:11,22,23 20:13,14,19 148:1
similar 16:17 24:15 31:1 32:12 52:18 65:14 67:11 70:17 120:6,17 181:24 201:9,19 221:1,17 229:19 229:22 289:10
simply 9:7 10:24 234:18 254:18 275:9 279:21 286:16 292:3
single 88:14,15 225:5 278:1
sir 9:19 158:15
sit 145:22 156:4
site 51:22,23 52:2 52:3,4,5 54:21 54:24 55:5 62:9 62:23 70:18 110:12 113:16 118:18 123:19 123:19 169:24 170:1,9 173:18 174:6 176:23 177:9,14 178:8 178:13,18 181:11,21 182:2 182:17,17 183:10 185:7,9 188:17 192:19 201:13 202:9 205:14 208:1,6,7 208:8,9 209:15 213:12 214:22 218:6 224:18 225:6 228:19 239:15 240:5 242:10 245:20 247:21 249:17 250:11 251:16 251:17,19 252:9 252:13 254:1,11 257:9 272:24 273:1,16 281:24 303:20,24 305:24 306:16 311:14
sites 174:3 176:21 177:1 178:6 183:14 185:17 185:17 190:15 200:16 201:8,17 204:15 205:4,5 208:13 212:14 213:20,22,24 214:4,21 215:20 217:2 218:10,20 218:22 222:10 228:16 239:5 241:9,20 242:1,6 243:21 245:14 247:2 248:17,22 250:9 251:11,13 252:3,8,11 256:22 257:15 257:19 260:14 260:15,17,22 261:24 265:17 268:8
sits 19:1,8,8 24:13
situation 170:2 184:24 201:14 229:14 232:6,8 236:2 254:23
situations 244:4 265:17
six 51:8 62:23 112:23 113:12 144:8 287:10
sizable 317:22
size 36:5 144:16 148:16,17 150:14
sizes 121:11 144:15,15
sky 115:9
slag 87:21 150:21 150:23 151:9,10 151:15,16,18 243:22
slash 89:5 91:3 93:23 96:10 98:17 100:17,20
slew 61:15
slide 204:12 208:21 211:3 213:10,12 217:9 218:14,14 222:17 226:13 238:11 241:2,2 253:4 271:7,7,16 277:9 279:14,20 280:4,4,5 283:1 283:15 285:12 285:21,21,22 286:20 287:6,6 287:24,24 288:17 289:1 290:21 291:14 293:4 294:5 299:23,24 306:7 312:12 313:10 313:10
slides 314:19
slightly 23:4,6 24:23 26:1 53:22 90:21
slope 54:11,13 68:7
sloping 318:11
slow 295:24
slurry 22:17
small 13:22 293:24
smaller 246:9 304:10
soft 157:9 186:12
software 223:4
soil 13:3,5,8 151:6 277:12 278:15 280:16 303:10 306:23,24 307:1 310:3,14,16 313:24 316:12 316:13,17 317:9 317:11,15 318:8
soils 148:6 287:15 287:21 309:4,5,6 309:7,15,19,22 314:15
solid 151:21 185:19 202:7,7 202:13
solids 193:5
solves 270:20
somebody 123:13 155:14,20 156:9
somewhat 31:21 34:2 65:3 67:23 76:22 239:11
sooner 104:11
sorry 18:12 36:16 36:18 38:16 39:12 69:6 75:11 76:12 86:21 87:17 88:14 97:7 100:5,21 106:22 109:24 123:19 131:11 143:13 146:10 150:18 150:20 175:13 180:14,20 199:1 227:11 235:14 268:14 299:7,9 302:18 309:2 317:4
sort 7:23 14:2 182:5 200:2,10 208:8 287:13 311:7
sorts 215:18
sought 295:7
sound 45:12
source 74:21 75:5 75:8,15,19,22

76:1,5,8,14 77:3 77:6,14 78:12,12 78:17,21 193:21 198:8 217:16 218:2 244:20 245:11,16,21 246:1,5 250:17 250:18 274:8 294:9 298:9 300:17 304:11 304:11 308:2 309:7 311:1 315:24 316:2,16 316:18,23
sources 219:4 297:11 305:24 309:5,6
south 3:6 13:18 25:24 51:23 52:1,4 56:13 65:6 66:1,1,14 66:18 69:13,13 69:15,16,17 70:1 70:1 71:1 127:3 127:4,13,13,21 127:21 128:15 128:16 153:3,5 154:7 272:18 289:9 291:9
southeast 80:24
southwest 284:9 284:13,15,19,23 285:2,10
space 89:3,5 292:24
sparkly 151:4
speak 25:18 38:15 180:12 319:12
speaking 28:20 29:12 56:18 268:19 319:6
specialty 34:5 58:4 71:11 167:20
specific 32:14 77:11 78:20,21 79:21,22 126:4 168:12 239:16 254:12,15 268:14 290:1 293:15 307:9
specifically 80:10 155:17 189:14 245:23 248:3 256:7 268:19
specifications 169:7
specified 26:12 29:2 53:16
specify 254:3,6,10 255:4
speculate 117:2
speculation 155:4
spell 268:21
spelled 178:23
spells 178:17
spend 32:7 35:13 58:15 59:14 123:15
spent 71:23 73:5
spin 145:15
spinning 143:16 145:13
split 139:19
splits 111:18
splitting 140:16
spoil 156:22
spoilings 319:9
spoils 50:12,12,14 50:18 51:1,4 107:21 108:7 157:6
spoke 253:3
sporadic 310:13
spot 115:18 285:1
spread 15:17 47:5 47:6 285:4
SRP 55:1 56:8 181:14 206:6 208:12 209:23 231:21 240:13 272:24 273:2,12
SRP/TACO 256:11
SRP/TACO-type 255:13
stability 125:21 126:3 248:8 249:9
staff 74:4
stage 40:2 42:21 44:14 280:4
stages 43:11,16
stain 196:15
stalled 147:17
stand 89:9
standard 22:23 23:1 173:24 207:17 214:23 217:21 219:8 222:9 276:14 290:12 291:21 295:7 297:7,21 298:18 299:2 303:3
standards 169:2 170:1 173:24 200:5 206:23 209:22 219:3,6 219:14,23 220:22,24 221:2 221:6,7 229:11 265:17 279:5,7 281:18 285:16 285:19 288:21 288:23 289:7,14 290:20 291:19 291:19 293:20 294:3
standing 112:13 156:13
standpoint 321:5
stands 61:8 308:12,13,13
start 9:5 12:19 27:2 33:6,14 34:13 50:23 73:18 81:1 84:2 84:4 100:6 111:23 144:19 152:14
started 12:22 21:4 53:7 181:12 271:24 272:1
starting 53:4 144:19 164:6 305:3
starts 36:1 59:19
state 28:15 29:14 30:2,18 33:1,4 33:10 56:16,22 57:4 66:13,15,17 66:20 140:19,22 141:3,10,17 169:23 171:9 180:9 183:19 188:6 192:14 193:18 194:11 194:13 195:2,9 195:21 204:21 206:3 207:3 209:4 219:5 266:4 275:14 277:5 300:10
state's 208:1
stated 10:14 14:21 42:13 160:20 262:8 271:8
statement 260:24
states 37:19 43:5 105:7 149:14 171:8 260:10 298:15
statewide 305:8,9 305:10,21
static 239:11
stating 225:14
station 13:14,17 14:16 15:3,15 21:3 27:5 28:18 30:9,13 34:18 35:16 40:7,21 41:11 44:14,16 47:21 49:13 51:14,16,19 52:7 52:9,10,20 54:1 54:5,17 55:24 56:17,18 57:12 60:4 64:13,19,22 65:1,2 66:21 68:12 136:5 170:11 195:24 211:5 215:16 233:11,21 271:8 271:21,22 272:6 272:9,11,15,20 272:22 273:4 274:4,9 279:2,10 279:20 283:11 286:4 295:8 297:7 298:12 300:15 302:14 310:15 312:18 313:7 314:1 315:21
stations 44:18 65:15 68:11 77:7 165:15 166:4,5 168:8 170:11,13 182:22 190:13 192:15 193:18 194:3 195:15 196:20,24 197:8 197:11 199:18 204:9,19,24 206:11 207:12 207:21,22 211:5 211:9 212:4 214:15 215:5,11 216:13,15,16,20 220:1,6 222:5,24 224:6,8,10 225:15 226:3 230:2,23 232:9

233:5 238:23 239:1,17 240:19 242:10 248:13 249:3 251:13 253:2 254:24 255:18 260:3 264:15 266:5 274:21 282:20 316:4
statistical 70:23 205:22,24 221:17 222:21 223:3,5 226:14 226:24 227:1 228:14 237:8
statistically 63:1,8 63:19,23 227:13 227:14
statistics 33:24
status 72:8 197:7 197:11 198:3 275:13
stay 293:21
steel 245:18
steep 54:11 154:24
steeply 67:19
stem 145:11,19 147:9,11,12
stenographic 322:3
step 214:22
step-by-step 178:19
steps 178:17 179:13 195:8 207:14 213:5 229:9 238:15 242:2,4 254:21 255:9
stipulation 40:4 41:8,8
Stone 304:2
stood 306:14
stop 53:19 103:8 140:21 141:11 141:14 153:4,24
stopped 80:9
stops 79:10,13
Storage 247:2
stored 305:22
stormwater 26:3 27:23
straight 112:14
strategies 169:1 243:13 250:8
strategy 169:24 174:16 206:6,24 242:14,24 247:20,21 250:6 250:22 253:1 256:11,21
stream 244:18,19
Street 1:16 3:6
stressed 314:13
strictly 143:17
strike 136:23 174:14
strip 136:10,15 137:2,9
structural 31:16
structure 14:10 178:15
struggling 138:19
studies 276:7
study 225:15 256:24 257:4,5 281:21
stuff 8:21
subdocket 207:6 210:2
subject 165:16 233:7 257:17
submit 57:5 85:20
submittal 31:23 35:2 58:11 72:11
submittals 130:2 174:17 195:5
submitted 21:1,2 26:13 31:17 195:1
subscribed 322:14
subsequent 296:21
subsequently 289:15 310:1
subset 60:5 61:2
substantial 223:23 224:15 314:14
substantially 308:11
substantive 161:1
Subtitle 185:23,23
successful 249:14 256:16
succinctly 310:24
sufficient 226:2 226:11 283:10 315:19
sufficiently 235:1
suggest 8:5 48:17 279:9 314:13
suggested 262:13 267:3 270:3
suggesting 269:16
suggests 317:22
suitability 248:4
SUITE 2:10 3:7
sulfate 305:7,11 305:13 306:3,13 306:19 307:2 308:2,12 310:13 311:1,8 312:2
sulfates 310:3
sulfide 309:10,16 309:23 310:6 311:23
sum 224:12,12 313:15 314:17
summaries 57:6
summarize 280:14 310:21
summarized 235:17 240:22
summarizes 310:24
summary 27:14 30:4 167:15 215:14 271:19 290:23 313:17
summation 277:12 313:5
sun 115:20
Superfund 51:22 52:3,5 247:1 251:11,13,16,19 252:3,13,17,24
Superfund-type 257:7
supply 283:21
support 43:14 130:5,8 166:7 263:3 264:7 297:6,17
supporting 165:2
supportive 250:5
supports 297:15
suppose 176:6
sure 13:18 18:9 31:9 39:8 42:6 43:8 46:23 51:6 66:19 80:23 84:15 85:11,24 103:15 111:16 135:3 155:21 186:13 246:19 304:21
surface 26:3 113:18 119:7 120:11 145:16 170:18,19 196:14 204:21 205:15 209:2 210:13 215:15 215:24 218:16 218:20,23 219:4 219:11,12 240:1 241:3,16 254:3 280:16 315:5
Surge 18:18 21:16 22:16 26:1 30:15,23 31:10 32:1,9 34:22 36:16
surprise 131:4,5 132:19 157:4
surprising 176:2
surrounding 13:17 214:6 217:1,4 263:2 264:2 272:10,15
survey 25:7,14 40:1 42:19 164:24
surveyed 36:24 37:1 136:7
surveyor 37:1
suspect 237:2 279:12
Sustained 17:11 31:7 45:16 228:11 236:12
swear 163:10
sworn 11:16 12:4 163:13,24
system 33:3 39:24 62:11 66:4 107:18 186:23 186:23 187:2,15 245:22 246:9
systems 185:11,16 186:17,19 224:9 250:14

T

T 3:3 4:9,11 12:2 12:5,5 74:8 142:16,16 164:1 164:1
tab 18:6 35:22 40:13 41:7 51:8 64:14 166:13 180:1 188:24

198:11 203:14 257:21 265:5 294:21
table 19:23 27:10 27:13,14 131:21 132:1,2,3,15,18 215:24 244:11 276:20 296:14
TACO 173:9,16 173:23 181:12 181:15 208:2,12 209:23 231:21 231:21 316:6
TACO-type 206:6 240:13
tactical 185:4
tailings 243:23
take 10:24 17:20 60:17 61:11 62:24 63:19 70:8 73:17 84:15,23 88:5 104:21 108:21 115:13 145:5 152:19 153:4,24 155:13,21 160:8 160:23 174:4 178:18 185:1 191:23 201:21 211:9 213:6 214:19 229:9 231:6,7 254:21 265:7 285:6 307:3
taken 1:14 50:7 73:23 108:21 109:10 110:10 111:5,17 114:24 118:23 135:7 137:17 154:6 155:12,16 156:6 163:3 197:4 207:14 213:8 242:3,4 264:22 290:2 303:23
takes 123:4 202:11,12 243:1 243:4,8 256:13
talk 14:19 140:4 192:5 216:15 278:3
talked 121:17 132:15,18 196:7 208:18 211:4 237:10 242:16 253:10 266:24 285:4 314:18
talking 122:7,11 159:9 177:20 186:16 304:10
talks 217:13
Tank 247:2
tannery 51:22 54:22 55:15 56:6
TDS 306:13,19 308:2,12 310:3 310:13 311:1,8
team 166:7 181:2
technical 132:17 166:6 169:7 190:15 204:1 252:13 256:14 297:13 310:23
technically 170:6 259:4 260:3,12 261:19 263:5
technologies 36:12 182:13
technology 143:9 143:12
tell 9:8 80:4 84:13 111:2 112:24 114:8,12 117:6 117:16 124:6 148:15 158:4 164:13 167:12 170:14 233:3 254:16 290:5
tells 9:8 158:9 198:7
temporary 303:12 307:3,4
ten 73:21 144:18 224:8 264:19 268:8
tend 144:17 169:22 177:10
Tending 226:14
tends 78:16
term 51:3 143:14 145:10 178:9,20 202:17
terminal 14:4
terminology 83:1 83:9,10,12
terms 89:15 111:8 112:7 120:7 145:17 169:6 170:21 174:14 185:18 186:5 192:12 204:18 209:2,8 211:14 221:6 222:2 223:18 225:6 227:6,24 237:17 237:22 250:15 254:9 261:23 272:10 275:12 275:16 282:11 287:14 302:19 303:14 306:15
test 60:6,7 61:4,6 61:7,9 62:2,3 77:9 226:22,23 226:24 227:5,16 230:13,14 236:21 286:24 286:24 288:12 289:8
testified 16:4,24 54:15 80:17 126:11 132:22 156:20 190:4 193:16 197:9 201:24 222:22 222:22 259:16 267:24 302:13 314:8
testify 197:6 216:14
testifying 107:6 220:11
testimony 14:20 54:17 76:7,15,17 76:22 80:16 115:12 135:21 156:22 173:9 179:2 191:16 193:6 196:21 220:20 257:2 267:18 286:21 292:17 302:5,9 303:22 315:8 317:7 318:17
testing 61:9 77:1 77:7,9,9,12 206:1 223:5 226:20 228:14 228:18 229:2 230:20 233:8,10 233:22,24 234:13 238:17 249:5 288:19 290:13
testings 229:11
tests 227:19 308:18
text 265:7
thank 6:16,21 7:17,18 8:20 9:19 10:22 11:7 11:17 12:7 19:10 28:6 31:7 46:4 48:20 51:5 64:5 65:14 73:21 81:23 95:7 97:10 102:11 104:4 105:1 119:11,15 128:11 134:5 135:9 137:14,20 142:10,11 149:2 158:16 160:22 162:11,17 163:14,16 180:16 186:12 188:22 189:6 193:1 203:13 259:24 261:14 264:20 265:1,2 296:2 297:4 321:21
Thanks 74:6
thickness 317:19
thing 9:17 29:14 44:7 109:12 155:16
things 8:23 77:17 120:23 164:22 207:15 208:4 217:14,23,24 218:5 240:21 244:11
think 9:17 11:11 16:24 19:7 47:11 49:5,5 50:17 52:6 74:17 112:21 122:3 131:7,16 131:16,24 134:16 142:6,14 145:9 161:1 175:24 179:21 180:18 185:11 185:20 194:7 199:15 207:5 218:18 220:18 220:19 222:1 226:16,17 227:22 234:17 234:23 239:2,3 240:12 249:4 250:1 253:10,11 262:8,20 266:6

269:13 271:4 273:23 277:24 291:17 297:17 297:18 307:23 308:21 312:4,7 314:9 319:23
thinking 92:9 116:5 128:19
thinks 8:6
third 98:7 191:5,6 203:14 204:5
Thompson 1:16
thorough 60:22 288:6
thought 103:18 179:5
thousand 34:15 72:1
thousands 224:13 253:11
three 35:1 51:8 60:5,5,7,24 61:2 68:11 70:15 78:6,8 90:10 102:9 138:2,3 139:2,10,10,14 139:15 141:7 142:5,7,9 173:16 199:18 204:16 217:14,22 218:4 242:1,9 248:2 275:9,13,17,22 276:5,24 291:9
three-inch 16:12 17:17,18 32:4 58:11 70:3 73:3
thrive 317:21
tie-in 244:9
tier 173:14,16,23
tiered 173:11,14
tiers 173:16
tilting 180:18
time 7:24 22:11 22:24 29:4 40:3 53:9,17 71:23 83:13 104:12 134:5 138:17 139:21 140:7 142:5 153:4 156:10 160:8 164:19 167:17 181:13 186:20 189:18 190:11 201:10,21 214:1 219:19 230:8,11 230:12,17 237:19 238:24 239:1,6,8 243:1 243:4 244:21,24 245:3,5 253:11 264:18 283:5,10 293:21 312:4 322:5
timeframe 21:5 21:20 72:13
timeliness 141:5
times 123:7 139:1 152:18 243:3 267:19 291:2 314:10
tipping 34:15 72:1
title 167:8 251:5 322:6
today 6:8 74:4,12 119:24 121:17 122:8 125:12 185:8 187:16 272:12,23
told 139:9 142:5
tomorrow 138:1 138:16 260:18 321:14,19
tool 143:15 206:3
top 19:19 37:13 37:14 49:17 79:18 106:3 112:14 145:22 148:23 157:10 158:9 275:5 277:3 301:2 313:2,24
topsoil 317:19,21 317:23,24 318:6
total 24:20,21 29:1,1 53:8,17 53:21 66:9 193:5 224:12 287:10 289:16 306:23 312:19 313:16 314:17
totality 214:14 250:20 278:2 282:5 313:16 315:15
touched 16:2 208:17,23
toxicity 221:4
track 152:22 215:19 229:12
traditional 208:7 240:13 256:10
transcript 1:14 10:5,10,14,16 322:7
transcripts 191:7 191:10,11,13
transient 75:22,22 76:5,8 78:12 302:20
transparent 138:12
transport 87:21 295:19 296:5 298:3
travel 263:13,19
treat 32:20 259:2 260:2,11,16,21 261:19 262:1
treated 274:7
treatment 51:24 259:7 267:6
trend 190:18,20 215:7 226:14,20 227:9,10,10,12 227:13,14,14,15 229:2,11 230:20 233:21,23,24 234:6,13 235:22 236:1,7,8,14,21 238:2,4,17 249:5
trends 205:22 206:19 215:6 227:7,24 228:20 234:4,5 236:1,16 236:17,19 237:22
triangle 217:13 218:1
triangular-shap... 84:18,19 85:1
tricky 202:21
tried 150:3
truck 263:13,19 320:9 321:6
trucking 14:4
truckloads 289:16
trucks 263:2 264:1,4
true 88:1 218:6 316:19 322:7
truly 62:10
trust 117:17
try 45:18 118:18 141:23 174:13 178:22 182:8 217:24 224:14 270:11 296:4 306:17
trying 129:24 150:5 151:7 155:19 156:5 269:11,20 287:13
turbidity 29:22
turn 15:7 24:24 25:20 26:19 27:10 35:21 36:4 40:12 41:7 59:16 74:14 75:1 78:22 80:12 92:17 93:11 94:21 96:13 97:10 102:12 103:7 105:3 113:9 114:17 125:11 144:1 145:23 146:9,15 149:1 149:10 152:19 153:14 154:6,9 154:14,14 157:16 166:12 188:23 189:2 203:14 258:17 269:3,5 271:6 277:8 285:20 294:20
turning 18:6 93:10 94:2 95:23 98:3 99:15 100:5,6 105:17 112:8,22 113:23 116:1 119:1 150:10 166:23 179:23 204:3 218:13 222:15 226:12 271:11 280:3 287:5,23 288:24 290:21 299:22 313:9
two 8:23 21:9 44:18 49:20 50:4 51:8 60:23 66:6 102:9 124:9,24 138:6 139:1,10 140:9 150:6 154:3 158:20 163:7 164:3 177:5 193:8 204:20 208:3,3 226:7 239:2,3 243:12 247:19 253:15 279:4,9 296:20

type 13:22 17:17 53:24 56:24 73:3 77:11 112:17 144:18 148:8 153:5 157:3,6,11 168:15 169:23 170:15 184:22 208:12 229:5 231:22 263:3 271:5 294:14 299:20 320:24
types 169:17 212:9,11 217:24 222:9 243:13 244:4 250:8 252:2 255:19 311:8
typical 44:6 170:3 270:8 311:12
typically 174:12 174:20 196:10 203:1 231:9 234:21 252:4 311:9 317:18 321:1

U

U 163:20
ultimately 169:10 172:20 181:23 182:16 185:5 187:12 200:20 212:2 240:7 273:2 309:22,24 310:8 316:15
unacceptable 248:10
uncommon 174:17
undergoing 168:6
undergone 227:21
Underground 247:2
underlies 18:17 18:21
underline 18:21
underlying 20:15 87:21 271:2 309:8
underneath 19:4 97:16
underreported 262:22
understand 39:1 218:24 231:14 240:1 267:24 273:10 287:12 287:13 293:9
understanding 15:22 24:10 25:18 26:2 43:2 43:15 62:5 67:10 72:23 76:21 83:13 122:6 126:1,5 136:6 175:10 190:4 197:18 198:1 210:8,16 211:1 214:2,6,20 218:6,21 245:3 258:8 261:22,24 269:11 281:22 282:21 286:9,12 292:11 298:22 319:18 320:20
understands 202:2
understood 266:15 319:14 320:8
undertook 182:24 201:20 231:10
undeveloped 65:8
unfortunate 9:11
unfortunately 10:2
unidentified 245:24
Unified 227:3
unique 250:12
uniqueness 200:17
unit 18:11,13,15 18:17 19:1,6,8,8 19:11,14,18 20:6 20:6,23 89:1,1 253:21 254:7,9 254:12,21 300:21 309:11
United 43:5
units 21:9 165:2 172:2 177:4 204:23 209:15 211:21 212:4,15 239:9 255:5 266:6,17
unreasonable 256:6
unsaturated 20:2
unwise 270:10
upcoming 207:6
update 180:8 199:16
updated 215:10 215:14
updates 215:20
upfront 72:3
upgraded 275:20
upgradient 78:15 78:17,18 231:11 237:17 291:21 292:6,9,11,15,22 305:19
upgrading 287:19
upheld 132:19
upload 8:2
upper 16:16 17:23 32:16 34:14 73:7 90:13 92:20 94:3 95:5 95:11 99:17 101:5 102:19 106:18 115:7,8 115:11,23 281:3
uppermost 300:21
upstream 40:7,21 44:15
upward 227:9,14 227:15 234:4 236:17
use 14:4,5 24:6 46:17 54:20 55:7,13,20 56:2 62:1,4 67:4 76:19 83:9 104:7 121:9 139:20 143:22 168:14 173:20 182:7 189:11 201:15,23 202:3 210:7 220:1,7 230:19 231:15 233:9,12,13 246:24 251:9 259:9 272:10 273:3,9 283:23 284:1,3 286:3 299:21
useful 214:7 282:3 303:14 312:8
USEPA 75:4 226:24 246:23 251:8 259:3 299:5,10
users 214:11 217:5,6
uses 168:2,5 214:6 217:1,2 299:14
USGS 43:1 44:3 158:14
usually 118:18 148:15 178:23 196:14 208:7 231:14,15
utility 67:24
utilize 228:17
utilized 202:8 223:3 227:16,19 259:7 300:17

V

vacant 272:16
value 104:4 236:18 305:10 305:21
values 305:6,8,14
Vanessa 74:3
variability 63:1,3 63:5,20
variable 198:9
variables 245:7 264:9
various 13:22 39:23 42:19 62:6 121:11 151:17 154:1 170:5 192:12 195:23 222:24 239:16 269:16 279:18,21 293:14 313:8
vary 169:20 250:18
vegetation 118:23 154:24 155:1,2 155:12 156:14 314:9,13,16 317:14,16,18,20 317:21,23
VERMONT 2:10
versus 29:16 171:4 192:5,20 193:4 208:20 230:8,11
vertical 37:4 288:10
vertically 63:18
viability 286:1 288:5,7,8,14
viable 262:2 286:18
vicinity 287:15 309:13 314:22
victim 207:13
view 112:18,19

120:12,14,19 168:7
viewed 54:6
viewpoint 235:16
violation 200:7
violations 134:8
virtually 135:2
visible 54:13 110:19 112:9,20 113:1,13,24 114:13,20 116:2 117:6 119:3
visited 35:15 51:15 314:12
visits 54:5
visual 203:23 230:12,14 277:24 279:21
voice 186:8
volume 8:2 304:11 304:11
voluntarily 179:14 211:20 213:1
voluntary 23:18 52:23 65:18 169:23 178:15 207:14 208:1 291:5
vs 1:10
vu 162:6

W

W 90:24 163:22
W88 89:5 93:23 96:10 98:17 100:17
wait 86:13 137:6 141:10,17 159:7
waiting 7:11
walk 80:23 84:2 109:11 110:12 120:13 152:9,14 154:19 155:19 155:20 156:6,10
walked 81:15 92:2 155:6 156:16
walking 120:20 121:14 125:4,7 152:15,23
walkover 110:15
walks 118:18 120:7
wall 125:22 126:2 151:21
want 7:2 9:9 10:4 14:19 15:7 24:24 25:20 35:21 36:4 45:18 46:21 49:19 73:17 88:5 117:2 118:24 125:11 126:10 130:2 135:2 138:7,11 146:15 147:4 149:1 180:8 213:17 243:7,8 265:6 316:21 321:3
wanted 65:19 198:14 218:23 222:10,11 223:14,16 242:16
warehouse 273:3
warning 78:3
warrant 178:19
warranted 268:9
wash 87:20
WASHINGTON 2:11
wasn't 25:16 70:19 103:15 125:19,23 155:18 188:9,9 225:23 236:23 262:1 265:24 266:16 267:12 272:8 283:17,20
waste 183:20 185:19 196:12 202:7,7,13 234:12,20,22 235:2 243:15,24 244:10,12,13,14 244:18,19 252:2 252:4
wastes 252:5
wastewater 51:24
water 18:18 19:2 19:4,5,23 20:18 20:20 22:7,12,15 22:21 23:3,4,9 24:24 26:16,16 27:22,23 35:19 36:17 37:8,13,22 38:6,8,10 39:15 39:17 48:16,17 48:18,19 50:21 55:21 115:14,24 122:11,17,19,22 123:10 170:18 196:17 205:15 217:5 218:16,20 218:23 219:2,3,4 219:7,9,11,12 220:5 221:1 244:11 259:6 267:6 283:21 300:17
waters 170:19
waterway 121:15
Waukegan 51:14 51:15,19 52:7,9 53:3 54:1,16 55:24 56:1,18 57:12,17 58:8,14 59:7,9 60:4 125:11,12,16 138:9 166:4 197:22 216:23
way 20:4 33:17 45:7 47:19 56:12,13 81:5 111:13 117:24 119:5 140:11 141:1 143:7 147:5 152:22,22 161:18,18 195:14 212:3 225:21 226:7 231:20 235:17 236:4 265:15,21 266:2 267:2 271:18 282:19 301:5 318:10
ways 255:21
WCG 237:6
WCG's 297:15
we'll 162:24 316:4
we're 137:19 140:3 175:13 177:13,19,19,24
We've 162:8 240:3
Weather 40:5 41:9
weathered 148:10 148:23,23
Weaver 164:3,10 164:14,15,19 165:5,6 166:12 167:17 180:23 181:10 185:6 187:22 188:5,9 237:6 249:2
Weaver's 165:8
website 7:24 43:23,24 44:2 299:17,19
week 9:20 72:12 123:4 127:6 130:12 131:12 132:9,23 138:21 138:23 139:4,20
weeks 13:13 150:7
well-vegetated 68:7
wells 29:4 33:2,6,8 33:11,23 34:12 54:16,19,21 55:11,14,21,21 66:3,17 67:20,22 68:2 69:1 70:16 71:8,21 78:16 124:7,12,20,23 125:9 188:13 205:17 211:23 219:22,24 220:7 223:17,19 224:10 230:19 231:11 232:12 232:24 233:3,5,7 233:10,11,13,14 233:16,17 234:24 237:7,15 237:16,18,20,20 237:22,24 238:2 270:1,16 277:13 280:15,21 281:10,15 283:8 283:21 291:7,8 292:1,6,6,11,16 292:21 295:22 296:8 298:10,19 300:11,14,15 301:16 302:15 305:7,12 307:3,4 308:14 312:19
went 9:21 12:10 122:1 156:15 201:19 215:1 232:9
weren't 62:19 208:14 220:5,22 307:21 309:20
west 1:16 13:23 19:13 20:21 26:1 51:22 52:13 54:22 57:21,23 58:21 60:8,8,11,11 62:13,14 65:4,13 67:14 68:2 81:2

84:2,5 105:11 124:7,13,17,21 125:7 152:17 153:5 154:22 272:21,24 273:4 289:9
western 124:21
wet 147:24 196:15
whatnot 81:12 83:12 115:21 121:9 141:12 143:11 157:10
whatsoever 68:8
white 115:18
wide 61:12 150:16
Wiedenhaupt 1:21 322:2,22
WILMETTE 2:4
wind 15:3 121:19 121:23 122:4 286:7,10,14,14
windshield 15:4
winter 15:18
Wisconsin 180:9
witness 4:2 11:14 11:15 12:3 45:22 48:5 60:1 92:7 97:18 108:1,3 110:1 135:14 140:22 155:9 159:23 162:23 174:24
witness' 49:2
witnesses 9:1 139:21 140:18 163:7,11,23 164:3 199:21 259:9
woke 9:3
word 46:17 79:24 173:9,10 297:19
work 8:2,11 17:6 28:14,17 32:17 36:13,13 56:15 56:19,19 68:10 68:18 83:5 126:15 129:11 168:21 170:15 170:16 174:3 181:3,19 188:4 193:17 196:2 213:2 282:1 314:24
worked 129:13,16 171:1,11 176:14 177:3,7 181:17 184:11 202:14 216:7
working 55:15 166:6 169:21 172:14 176:18 177:1 212:7
worse 249:8
wouldn't 112:6,11 112:15 113:2,8 113:17 118:3 189:18 320:8,14 320:16
wrapping 135:2
write 45:23 106:17
writing 71:12 83:8
written 46:15
wrong 159:9 199:2
wrote 69:21 82:11 92:3 159:5

X

X 4:1,11 12:5 74:8 142:16 163:22 164:1

Y

yard 25:20 26:7 26:18 27:15,22 285:10
yards 63:10
yeah 7:11 8:7,9,13 8:18 9:12 13:1 17:18 21:5 71:19 91:10 97:19,20 103:23 106:13 115:20 115:23 116:16 127:23 131:15 134:15 136:21 139:5,18 140:3 141:20,21 147:18 159:2 162:6 180:18 181:9 182:3 188:19 198:24 224:4 225:20 229:4,18 232:20 238:6 259:20,23 263:21 274:3 282:23 286:11 294:2,8 296:19 297:22 298:24 300:12 304:24 307:18 308:9 315:13 317:17 321:12
year 122:24 123:7 123:16 181:11 197:20,24 314:11 315:1
years 109:12 162:7 167:20 176:20 177:3 197:17 224:8 239:2 253:15,18 268:9 279:19
yep 115:13,14 183:7,7 184:5

Z

zone 20:13,18 24:3,8 67:6,9 200:1,5

0

06.419 89:5
06.621 93:24
06.683 96:11
06.732 98:18
06.947 100:18
084-004725 1:22

1

1 66:14,14,18,18 69:14,15 71:1,1 88:19,23 90:18 91:20 92:3,23 93:8 180:2 237:16 275:10 275:23 276:5,8 281:17 285:15 285:19 288:20 288:22 289:7,13 290:11,19 291:19,21 294:3 303:3
1,000 92:15 99:13 102:1
1.3 198:12,13
1.5 213:15
1:00 138:7,8,15
1:10 137:20
1:46 163:6
10 3:6 40:4 55:11 102:12 106:10 136:21 144:5 150:16 156:13 181:2 271:7 274:19 292:16
10-acre 60:19
100 1:16 239:3
100,000 63:10
1004 2:3
101 259:22 301:14
108 4:20
108284 110:18
108285 111:2
108292 111:2
108293 153:18
108302 112:9
108305 154:16
108313 112:23
108318 112:24
108323 113:9,12
108328 113:12
108329 113:23
108335 114:18
108337 116:2
108338 117:5,8
108340 117:15
108341 117:18
108342 118:1
108343 118:4,8
108344 118:14
108345 117:5 118:17
108350 10:9,11
108351 10:8
108352 10:12,15
108375 10:16,17
108382 119:2
108386 10:18
108393 119:2,5
11 41:9 55:11 66:3 147:20,23 148:13 271:12 291:7,12 292:16 293:5
1100 2:10
1102 235:4 269:4
1104 246:18,22,23 247:11
1105 251:1,5
1110 304:17
114021 76:2,2
119 5:13
12 4:4 10:14 55:11 66:4 181:2 277:9 312:19
12(d) 198:18,21
122708 297:23
129 4:21
12C 146:4,4,24
12th 1:17 6:8
13 55:13 61:14 66:17 67:20 154:9 279:14
13-15 1:10 6:5

13-15_48742 27:11
1307 18:7 49:14 124:2,4
1310 51:10
1314 64:17
134 5:14
14 7:7 55:12,12 66:17 67:20 280:4 283:15
142 4:6
14A 289:2,6
15 40:16 55:12 66:18 67:20 84:9 105:18 106:22 144:4 156:13 161:23 285:21 288:9
1502 74:15,20
1503 146:17,19,21 147:2
1504 78:23 79:1 142:21
1511 80:13,16 83:24
1512 81:14 83:24
1513 9:21 106:24 107:1 109:3,5,9 109:16 152:2 153:14 154:14
1514 4:14 5:8 26:20,23 28:2,8 28:11
1515 4:15 5:9 40:9 40:17,18 41:22 42:11 44:4 46:24 47:5 48:22 49:7,9 157:16,19 158:5
1516 4:16 5:10 41:13,16,18,22 44:8,21 47:1,6 47:17 48:22 49:7,9 157:17,19
1517 4:17 5:11 59:18,20,22 64:1 64:7,9
1518 4:19 90:5,11 94:3,22 96:14 97:11 98:21 101:4 103:10,19 106:10 135:17 136:19 159:4 160:10,18,24 161:4
1519 4:20 5:13 108:10,12,15 109:8 119:12,16 119:19 152:2 153:6 154:9
1520 4:21 5:14 129:2,5 132:12 134:19,22
1521 4:22 5:15 159:13,16,19,22 159:24 161:7,22 162:10,13
159 4:22
16 161:19 287:6
16-503 321:21
1605 294:22
162 5:15
164 4:9
166 5:2
17 79:10,14 287:24
1701 5:2 166:17 166:20 189:2 221:16 232:16 265:4 268:12 271:14
1702 5:3 203:11 203:17 213:13 215:23 218:14 226:13 271:12 274:23 277:9 279:15 285:21 287:24 290:22 299:23 306:7 312:12
1703 5:4,17 257:22 258:2 261:8,13,16
18 247:9,11 306:23
19 290:21 293:4 298:23
1943 47:5,7,12 158:6
19442 87:4 88:15
19443 93:11 96:1 98:5 100:7
19444 82:14 105:4
1960s 272:7 282:24
1978 275:18
1990 164:17
1995 164:16
1996 181:10
1998 280:7,10 281:20 282:2,9 282:14 283:19 283:20 284:1 285:18 319:20 319:24
1999 83:5 247:3 272:8
19th 6:8 10:6
1N 70:12 71:15 72:5
1S 70:12 71:15 72:5

2

2 10:13 11:1 61:13 66:1 69:13,16 70:1 74:17 78:1 78:2 93:17,20 94:9,16 95:6,11 95:15,21 97:23 97:24 98:2 104:23 107:1,1 127:3,13,21 128:15 132:2,2,3 142:19 146:16 146:16 150:11 150:13 160:11 188:24 258:19 258:19 265:10 275:10,13,15,23 276:5,8,10 277:5 277:7 295:17,21 296:7,9 297:10 298:11,19,21
2-0-2-1 297:3
2.1 265:19
2.2 266:19
2.3 267:14
2.4 268:12
20 10:17 148:20 227:1 299:24
200 93:2 97:6 99:21 102:15 106:11 291:21
2000 47:6 164:16
20005 2:11
2004 285:24 286:15 288:4
2005 287:6,8,18
2008 275:22
2009 12:21,23 82:22 149:7 227:1 315:11 317:7
2010 23:13,15 52:20,22 65:15 224:7 290:24
2011 146:8
2012 21:5,11,12 21:19,24 298:17 298:23 299:4
2012/2013 21:5
2013 21:21,22 27:17 41:5 45:3 158:13 275:23
2014 258:22
2015 24:16,18 27:6,17 47:7 53:3,6 65:22 126:19 128:20 183:21 186:4 189:22 251:8
2016 272:9
2017 164:17
2019 37:18 47:6 77:20 138:20 158:6 165:11 276:10 304:14 312:4
202 2:12
2020 46:19 165:12 193:13 199:7,8 306:11 312:7
2021 18:13 51:14 64:20 66:11 77:17 126:24 278:12 297:1,8
2022 40:4 41:8 47:8 158:8 295:12
2023 1:18 6:8,8 273:23 282:10 322:15
203 5:3
209 10:6,10
21 10:10 265:4 306:7
21(a) 198:24
210 10:14,17
21st 18:11 247:3 295:12
22 265:4 312:12
229 136:5
22nd 258:22
23 313:10
248N 82:4 87:3 90:18 93:10 94:6 95:15,23 96:18 98:4 100:6 105:4 149:4
24th 27:6 41:4 45:3 158:13
25 269:5
251-5250 3:9

257 223:9,11 293:13
258 5:4
26 4:14 223:24
26.54 45:3,8
261 5:17
27 149:7 158:8
27th 149:7
28 5:8
282-9119 2:5
285 111:5
286 111:8
287 111:9
289 111:12
29 12:12 13:14,17 14:16,21 15:9,15 16:5 17:15,21 23:12 24:16 28:16 31:2 52:19 56:17 82:21 83:19 87:7 88:11 91:20 93:8 94:16 95:21 97:1 99:9 100:2 101:17 103:5 105:10 116:12 162:1 197:14 271:7,9,20 273:22 274:16 275:2,7 276:3 279:2,10 282:15 287:7 289:21 294:7 297:7 298:7 300:22 303:23 304:5 305:23 312:14 312:18 320:2
29's 272:5
29.889 100:17 101:1
29.894 98:17
29.916 96:10
29.950 93:23
290 111:15
291 111:15
292 112:2,3 154:5 154:5
293 153:18,19 154:6
296-8800 2:12
2S 72:5

3

3 10:6 18:3 27:10 27:13,14 66:1 69:13,16 70:1 84:16,16 94:2 96:3,7,18 97:1 97:13,17,19 98:2 104:19,19,22 117:3 124:1 127:3,13,21 128:15 157:13 160:10 191:6 204:5,7 275:10 275:24 276:5,8 281:13 314:22
30 37:22 38:9 39:16 48:8 122:17
30.0 90:1
30.068 89:3,13 90:1
302 154:21 219:2
305 154:17
31 235:8
3100 246:9
3100-acre 245:17 246:6
312 2:5 3:9
313 113:6
318 113:6,6
32 235:11 237:4
33(c) 268:20
339 117:12
34 300:22
345 117:24
35 147:5 219:2 298:17 304:13 304:16 305:1
3600 3:7
37 123:15 308:24 310:11
39 37:18,19
3S 72:5

4

4 60:19 94:22 95:1 95:3 98:10,14 99:1,8,18 100:1 104:8 137:6,8 150:15 191:6 198:12 294:21
4.25 147:10
4.25-inch 147:11
4.4 221:16
40 4:15 60:18 223:9 293:12
41 4:16 89:12
42 240:24
42(h) 268:20
428 45:7,9
428N 101:9
43 232:15,18,23
44 233:19
440 37:9 45:9
441 37:10,10 38:8 39:15
45 221:10,16
454 45:10
454.5 45:12
454.54 46:3
456.57 41:4
459 37:15,15
460 37:15
471 46:8 48:1,18
475 48:18
49 5:9,10

5

5 96:13 98:1 100:11,14 101:4 101:9,16 102:22 103:5 105:11 106:10,16,17,19 136:19,20,23 137:1 213:12 277:17 281:13
5:20 321:10
50 150:15 239:2
50/50 139:19
500 94:19 97:8 105:11 106:5
503 1:17
51 240:17,24
52 240:17,24 289:16
53 240:24
546.57 158:13
59 4:17

6

6 88:12 97:11,16 97:19 98:2 104:19,19 105:7 105:9,14,15,24 106:17,17,19 159:6,7 160:14 160:15 218:14 260:8 272:17 295:21 296:7 298:20
60 30:3 57:6
60-day 30:5 57:6
60091 2:4
601 135:13,19 136:3,14
60603 3:8
62,000 253:12
620 133:3,21 291:19 293:19
620.410 298:18
626 259:22
64 5:11
6th 297:1,3,8

7

7 98:22 99:4 310:11
710 35:23
74 4:5
79341 79:8

8

8 99:15 213:16 226:12 292:16
8/21/14 260:18
800 150:9
81497 189:5
845 133:18,20

9

9 101:3 136:21 146:13 147:1,20 238:11 241:2 253:4 260:20 272:20 274:19 303:24 319:21 320:1,9
9:00 1:18 321:15 321:20
90 4:19
901 84:7,9 105:18 160:5,5,6 161:20
903 189:23 263:7
90th 305:8,10,14 305:20
95 303:20,22
97 216:3

Exhibit 32

ILLINOIS POLLUTION CONTROL BOARD

SIERRA CLUB, ENVIRONMENTAL LAW AND POLICY CENTER, PRAIRIE RIVERS NETWORK, and CITIZENS AGAINST RUINING THE ENVIRONMENT, Complainants, vs. MIDWEST GENERATION, LLC, Respondent.	)))))))	PCB 13-15

REPORT OF THE PROCEEDINGS held in the above-entitled cause before HEARING OFFICER BRADLEY P. HALLORAN, taken by Raelene Stamm, CSR, Certified Shorthand Reporter licensed by the State of Illinois, at 100 West Randolph Street, Chicago, Illinois, on the 13th day of June, 2023, commencing at the hour of 9:00 a.m.

Reported By: Raelene Stamm, CSR

License No.: 084-004445

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ALSO PRESENT:

MS. DAGMARA AVELAR, Public Comment
MS. DESTINY ORTIZ, Public Comment
MS. ANN TAYLOR, Public Comment

I N D E X

WITNESS	DX	CX	RDX	RCX
MICHAEL B. MAXWELL				
By Ms. Nijman	11			
By Mr. Russ		186		
DOUGLAS G. DORGAN, JR.				
By Mr. Nijman	46			
By Mr. Russ		192		

E X H I B I T S

NUMBER	MARKED	ADMITTED
Respondent Exhibit		
No. 1701		184
No. 1702		185

HEARING OFFICER HALLORAN: All right. We're on the record. Good morning, everybody. My name is Brad Halloran. I'm a hearing officer with the Illinois Pollution Control Board, and I'm, likewise, assigned to this case. Today is June 13, 2023. This is continued on record from yesterday, June 12. This is PCB 13-15. It's an enforcement case, land and water.

I do want to let the record reflect that we have Marie Tipsord from the Board here, general counsel. We have Anand Rao, environmental scientist. We have Essence Brown, environmental scientist, and Vanessa Horton, staff attorney.

Right now we're from yesterday continuing in the direct -- Midwest's direct of their two experts, Mr. Maxwell and Mr. Dorgan. But before that we declared, at least for now, public comment day. And I believe Mr. -- Ms. Bugel has a party that wishes to speak, and we can reserve a time if she would like to sit up here or move up here. It looks like the governor took the podium when he left the building, so wherever you feel comfortable with.

MS. BUGEL: Thank you. We have

Representative Dagmara Avelar present to offer public comment.

HEARING OFFICER HALLORAN: Thank you. Could you spell that for the court reporter, please?

MS. AVELAR: I'll just sit there, and I'm hoping that I'm projecting high enough. The name is spelled Dagmara, D-a-g-m-a-r-a, Avelar, A-v-e-l-a-r. Can I proceed?

HEARING OFFICER HALLORAN: Yes, you may.

MS. AVELAR: Thank you. Good morning, everybody, and thank you so much for having me today and thank you for the opportunity to offer public comment this morning. I'm State Representative Dagmara Avelar. I represent the 85th District of Illinois which includes the NRG's Will County coal ash pond in Romeoville.

I represent the district that's majority Will County with a little bit of DuPage and issues with regard to not just coal ash, but underground groundwater monitoring, et cetera, having issues that are very sensitive to our community.

I came here today to offer public comment. Significant portions of my district surrounding the coal ash site are environmental justice communities

with working class families living in the surrounding areas. Constituents in my district have been concerned about the impacts and legacy of coal ash pollution for over a decade and have asked to have these sites cleaned to no avail.

All of the venues to address coal ash cleanup in the ongoing groundwater contamination at the sites have not delivered action, and the Illinois EPA still has not issued a single draft closure permit. And as we know as well, the USEPA is now only getting around to closing the significant loopholes in its federal coal ash standards.

I'm here today because I believe that the Board has a critical -- a critically important opportunity, a moral obligation to act on the issue and help deliver the justice our communities have been demanding for years. To be clear, I do have concerns about the pollution impact of trucking coal ash waste off site as our district is already overburdened with dust and diesel emissions. However, the current status of the coal ash at Romeoville and the company's plan to cap the waste in place are unacceptable.

So I am here to urge the Board to reach a timely decision in the case and to require energy to properly clean up their coal ash and remove it from the groundwater. I hope I stayed at the three-minute mark.

HEARING OFFICER HALLORAN: You did, Representative. Thank you so much.

MS. AVELAR: Thank you so much. All right.

HEARING OFFICER HALLORAN: All right. We may proceed with direct of Mr. Dorgan and Mr. Maxwell, if Ms. Nijman is ready.

MS. NIJMAN: Thank you. Yes.

HEARING OFFICER HALLORAN: We can go off the record for a second.

(WHEREUPON, a short recess was taken.)

HEARING OFFICER HALLORAN: We're back on the record.

(WHEREUPON, the witness was duly sworn.)

HEARING OFFICER HALLORAN: Thank you.

You may proceed, Ms. Nijman.

MS. NIJMAN: Thank you.

MICHAEL B. MAXWELL,

called as a witness herein, having been first duly sworn, was examined and testified as follows:

BY DIRECT EXAMINATION

BY MS. NIJMAN:

Q. Good morning. When we left off yesterday, we were discussing the Joliet 29 station.

Do you recall that, Mr. Maxwell?

A. Yes.

Q. And I believe you left off completing your discussion about monitoring well one and its relationship to the northeast area?

A. That's right. That sounds right.

Q. Did you also review sediment data for the Des Plaines River that was performed in 2008?

A. Yes. We did review that information.

Q. And I believe you also said you reviewed Army Corps information from 2021 or 2?

A. 2022, yes.

Q. So I'd like to discuss the 2008 data. You should have in front of you Exhibit 1110, and I would like to pull up on the screen --

A. 1100 you said?

Q. Yes. No, 1110.

A. Got it.

Q. Thank you.

I'm gonna direct you to -- is this the document that you reviewed?

A. Yes, it is.

Q. Okay. If I can show you Bates Page MWG 1315 underscore 107873?

A. Okay.

Q. What is this document, this page of Exhibit 1110?

A. So this is titled, Figure 2, Concentrations of Metals That Exceed Sediment Quality Guidelines.

Q. And can you describe what we're seeing in the top right-hand corner of this map?

A. So in the legend there's a circle that has -- is basically broken up into various different pie slices indicating a total of eight different metal concentrations that is sort of the key for the -- for reporting the data in the various stretches of the river.

Q. And I see references to BR in the little white boxes. There's references to BR, and there's also references to DR.

Can you explain what those references mean?

A. So BR signifies the Brandon reach of the river which is defined as the reach upstream of the Brandon damn. The DR abbreviation indicates the Dresden reach of the river which is the -- which is immediately downstream of the Brandon reach.

Q. And where is the Joliet 29 station relative to the BR and DR indications on this map?

A. So the Joliet 29 station is located just downstream of the BR sample locations. The first -- the most upstream of the Dresden samples are taken in the vicinity of the Joliet 29 station.

Q. And the BR is above the damn.

Is that what you said?

A. BR is at the damn and above.

Q. And what are you seeing as the results of the metals testing of sediment in the Des Plaines River?

A. So what they're doing here is they are comparing the reported metals concentrations to a couple of different sediment standards. The first being the threshold effects concentration or TEC. What this is is the concentration in which you're

going to have some adverse biological impact to the river environment. And then second -- and that signified -- if there's a concentration above TEC, that's signified in yellow on this drawing or on this figure.

And then the other indication or comparison that's made is to the probable effects concentration or PEC, and what this is is it's basically the 50 percent point of impacts where if you exceed that concentration, you're more likely than not to have adverse impacts. So 50 percent -- or 51 percent or higher.

So the data presented on the various circles throughout the course of the stream, the river, indicate the -- how the concentrations compare to these two standards.

Q. And what are you seeing when you compare the BR above the damn versus the DR?

A. So what I'm seeing in the BR samples including BR 08-3, BR 08-4, BR 08-2 and BR 08-1, a majority of those sediment sample locations are exhibiting concentrations that exceed the probable effects concentration, the PEC, and therefore are signified in red on this drawing and indicate that

there's more likely than not to be an adverse biological impact based on these sediment concentrations upstream of Joliet 29.

Q. So what is that tell you about potential impact to the river from Joliet 29 station?

A. Well, what this tells me is that this river, it's -- there's relatively consistent concentrations of sediment that pose a risk upstream of the river. And so what I'm seeing is downstream of the river, downstream or at the Joliet 29 station, I'm not seeing any type of concentration that's higher than the upstream.

Q. And if we turn to pages -- to Bates Number 107876?

A. Okay.

Q. What is this table showing?

A. This table summarizes the analytical data that was just presented in graphic -- or on the figure that we were looking at previously. And it also shows the numeric numbers associated with the TEC and the PEC.

Q. And the TEC and PEC were the standards being used?

A. Correct.

Q. Did you also have the opportunity to review updated sediment data?

A. We did. There was a study that was performed by the U.S. Army Corps of Engineers related to the characteristics of this reach of the river as it relates to the potential construction of a barrier to prevent the Asian carp, I believe, from ultimately entering Lake Michigan.

Q. Would you locate Exhibit 1111 on your desk?

A. Got it.

Q. Have you had the opportunity to review this report, the Kaskaskia, K-a-s-k-a-s-k-i-a, Engineering Group report dated July 5, 2022, revised October 10, 2022, revised October 31, 2022?

A. Yes, I have.

Q. Is this the report you were referring to concerning the Army Corps project?

A. Yes, it is.

Q. How was this data relevant to the 2008 data you reviewed?

A. This was -- this data was collected more recently. It gave some additional insight into what the sediment concentrations were like in the

vicinity of the Joliet 29 station.

Q. And was that information -- is that information relevant to your opinions?

A. I think it is, yes.

Q. Why is that?

A. It shows that the concentrations are a bit lower overall relative to the 2008 data, and I would also like to point out that the sample locations in 2000 -- in the more recent 2022 data are more -- are closer to the shore, so a little bit more relevant.

Q. We heard -- well, you were hear during Mr. Quarles' testimony; is that right, Mr. Maxwell?

A. Yes.

Q. And did you recall in that -- my discussion with Mr. Quarles that we talked about shoreline samples that the Army Corps took as part of this report?

A. When you say shoreline samples --

Q. I'm sorry, soil samples, borings.

A. Yes, yes.

Q. And did you review those boring samples in this report?

A. Yes, I did.

Q. What did you find -- well, first of all, how many samples were taken?

A. How many borings were taken?

Q. Correct.

A. I believe that there were 10 or 11 along the shore of the northeast fill area.

Q. Let's take a look. I think it was five.

MR. RUSS: I just want to for the record maintain that we have an objection to that exhibit being used.

HEARING OFFICER HALLORAN: Okay. What exhibit is it?

MS. NIJMAN: 1111.

HEARING OFFICER HALLORAN: Okay. So noted. The transcript will so note.

BY MS. NIJMAN:

Q. So if you would turn in this report to the maps, Attachment A, and you'll see Page 5 of 7 on the right-hand side of the maps?

A. Yep.

Q. Okay. So what is that map called?

A. The title of this is, Attachment A, Boring Location Plan.

Q. And can you see the borings on this map?

A. I can. They're noted right along the shoreline, and there's lines pointing to circles indicating the location of the borings.

Q. And does that help you determine how many borings there were?

A. Let's see here. So one -- there's six that are shown on Reach 5. And then I believe if you turn to Reach 4, there's another one, two, three, four, five, six, seven or six that are shown on the prior page, Reach 4.

Q. So turning back to Page 5, Map 5 out of 7, did you have the opportunity to review the boring logs for those borings?

A. Yes, I did.

Q. And what did you find?

A. The materials that were presented in those boring logs were a mixture of sand, silts and clays, and those borings also extended to the uppermost dolomite bedrock. And I think most notably as far as the relevant information as far as data that was useful to us was that none of the borings indicated any CCR materials.

Q. And what did you learn about the sediment sampling from this project, Exhibit 1111?

A. So our understanding of this -- the purpose of this project was that sediment samples were collected in order to get a better understanding of what the characteristics of the sediment were, we believe, for purposes of the planned project so that once those dredge spoils were removed, there would be some idea as to how they should be properly managed from an environmental standpoint.

Q. And, again, you heard me discuss each of these samples with Mr. Quarles.

Did you have your own method of reviewing this data?

A. I did look at the data, and I did put it into my own summary table.

Q. If I can refer you to the very last page of the PowerPoint which is Exhibit 1702, and we'll put that up.

Is this the summary chart of the data that you reviewed?

A. Yes, it is.

Q. And what did this data review tell you?

A. So it told me that the vast majority of these concentrations that were reported based on

this data are below both the TEC and the PEC.

Q. And why did you choose the BR samples at the top of your chart? You selected 110 to 100?

A. Yeah. Those are the most relevant to the shore of the northeast fill area. They're the closest and therefore the most relevant.

Q. So I see in bold at BR 102 one number for lead. Do you see that?

A. Yes.

Q. And was that lead finding that you referred to in your testimony yesterday?

A. Yes, it is.

Q. And when you compare lead in 2022 with what you saw in 2008 that we just reviewed, can you come to any conclusions?

A. The concentration of lead in the 2022 data is -- has decreased compared to the 2008 data.

Q. And do you have any indication that the lead found in BR 102 was a result of the Joliet 29 station?

A. No. We did not find that indication. Our focus as directed by the Board was to focus on the groundwater impacts. And the likelihood that groundwater from the Joliet 29 station would be

impacting the sediment in this reach of the river we don't think is very great, and the overall data that we've looked at from the 2008 and 2022 indicates that the river is -- it's got concentrations of heavy metals in it unrelated to Joliet 29 upstream and downstream.

Q. Did you see results -- higher results of lead upstream?

A. We did, yes.

Q. How did this data provide further support for your review of the 2008 data?

A. Well, this was a -- it gave us a second data point in time, a second temporal data point, to get a feeling for are conditions improving or are conditions deteriorating. And based on the more recent data, the conditions in the river are actually improving.

Q. Did it help confirm any data from any opinions you had from the 2008 data?

A. It -- well, it confirmed that the groundwater from Joliet 29 is not impacting the sediments.

Q. I'd like to go back to your PowerPoint presentation and go to Slide 25 of Exhibit 1702. I

believe that's where we left off yesterday. Yeah, we'll come back.

Okay. So on slide 25, what are you addressing on Joliet 29 Slide 25 concerning data analysis potential receptors?

A. So the purpose of this slide is to summarize the data analysis that was performed in terms of what the potential receptors were. What we looked at were both on-site and surrounding land use to begin with in order to be able to evaluate what the risks were.

We talked at the beginning of the Joliet section about the surrounding industrial land use regarding the facilities to the north of Channahon Road being industrial, the SRP site to the west being a redeveloped -- an SRP site that was redeveloped into a warehouse site. So the expected future land use was expected to continue to be industrial which played into how we analyzed the data.

Relative to receptors, potential receptors, the information from Patrick in the 2010 hydrogeologic investigation indicated that there were no potable groundwater wells downgradient of

the station which eliminates the receptor in terms of groundwater. Mr. Dorgan mentioned the risk assessment triangle, if you will, if any one of those sides of the triangle are eliminated, then the risks can be controlled.

We point out that -- just as further support for the -- that the lack of a risk with regard to groundwater, that the City of Joliet is actually in the process of converting Lake Michigan water for their municipal water. So that's going to just further minimize the chance that groundwater actually poses a risk.

And on the prior slide we show Slide 24. We show an ELUC that we discussed yesterday that relates to the adjoining SRP site. That site exhibited some soil and groundwater impacts, and the ELUC was agreed to by Midwest Gen for the benefit of the remedial applicant at that site. And the reason was because there were impacts emanating from that site onto the Midwest Gen property. So that ELUC covers control -- it prohibits the installation and use of groundwater wells in that area.

And then the GMZ was also discussed.

That's shown in green on this slide here. That applies in response to -- it related to the CCAs that were -- the CCA that was entered in 2012. And then that pretty much covers the on-site potential receptors. The off-site receptors are potentially the Des Plaines River which we've discussed here as well as part of our evaluation.

Q. Looking back at the map you just identified on Page 24 of your Exhibit 1702, and you show there the GMZ in green?

A. Yes.

Q. Was there a -- in order to obtain the GMZ, what was the active control measure that had to take place?

A. So the CCA specified that the LEAF Pond 3 needed to be refined, and that was -- that was the active -- that was the primary active remedial measure that allowed for the GMZ ultimately to be put in place.

Q. Let's go to the next slide, Slide 26, Joliet 29 Groundwater Trend Testing.

What does this chart describe?

A. So this is a graphical summary of the results of the Mann-Kendall trend testing that was

performed that was described in our expert report.

Q. And can you describe what you were seeing here at Joliet 29 based on your Mann-Kendall testing?

A. Yes. So I really like this summary presentation. The pie chart indicates in dark blue that there's 26 percent of the data that exhibited a downward trend compared to just 10 percent of the data that exhibited an upward trend. So just comparing the upward to downward trends, there's two and a half times the number of downward trends as there are upward trends.

Something I don't think I have touched on just yet is the idea of the Mann-Kendall being capable of perform -- of resulting in a conclusion about whether or not something is statistically significant downward or upward. The Mann-Kendall test is rigorous enough not only to identify just a generic, if you will, upward or downward trend, but it's capable of identifying basically a steep downward and a steep upward trend.

And so that's indicated in our bar chart on this figure here where only one statistically significant upward trend was identified compared to

over ten statistically significant downward trends. So that I think at Joliet in particular is quite telling in terms of what the chemistry is showing.

Q. And I can also refer you to Pages 43 and 44 of your report where you discuss this trend testing. One of the things I see on this circle chart is the no trend at 64 percent. What does that mean?

First of all, what does no trend mean?

A. So no trend means that when all of the comparisons are made that is required by the Mann-Kendall test, there's a matrix of comparisons that get done of all of the data. And at the end of the day what that is saying is that the number of positive points when you make those comparisons is equal to the number of negative points. So it's essentially a flat -- a flat line.

Q. Well, can no trend mean two different things or --

MR. RUSS: Object, leading question.

HEARING OFFICER HALLORAN: Sustained.

BY MS. NIJMAN:

Q. How does the no trend data get interpreted as to no detect?

A. Yeah. So the fact that there's no trend by itself isn't as telling. I think it is very useful, and we've done so. We've sort of drilled into the no trend results and taken a closer look at the reasons why we're getting no trend. And we were asked about this actually at the deposition, and we drilled in a little bit further to try to provide some useful information for the Board in terms of the breakdown of that 64 percent no trend.

And so in looking at the -- at the data, we identified that of the 64 percent of the trend results that were no trends, that ended up being 85 individual results. 58 of those or 68 percent of those were primarily related to non-detect data meaning that the data was not reported by the analytical lab.

So Mr. Quarles tried to interpret a no trend data as being somehow not positive in terms of the pattern of groundwater quality, but we certainly have the opposite view that the majority of the no trend data is related -- is because the majority of the data isn't even detected which obviously is a good thing.

Q. And you have two notations at the bottom

of this circle chart. Take the first bullet, what is that saying?

A. So when you look at the downgradient groundwater monitoring wells, the trend testing indicates that we're seeing improving groundwater quality in the long term. I should point out that we looked at data from 2010 was the first sampling event through the end of 2020. So we had a full ten years worth of data which in the groundwater statistics world is a pretty robust set of data, so we feel like we can draw some reasonably reliable conclusions based on the quantity of the data.

Q. You mentioned that 68 percent of the 64 percent of the no trends were non-detect. What about the rest of them? What are they?

A. Well, I guess I would want to point out that in many instances a good portion of that data is non-detect as well, just not a majority of the data is non-detect. So as I had indicated previously, it's no trend because there's a few detections here and there that ultimately when you perform the comparisons per the Mann-Kendall test, like I said, you end up with the same number of positive trend signs as you do negative. So that

results in a no trend conclusion.

Q. What does the second bullet under the circle chart mean?

A. So if you do have a statistically significant increase, and here we've got one, commonly what we'll do is we'll want to look to see whether or not that's meaningful or not. And a statistically significant upward trend by itself wouldn't necessarily be meaningful, but if that were paired with a situation where the concentration was a statistically significant upward trend combined with a concentration that was above some type of a groundwater protection standard, that might give us some concern.

The one statistically significant upward trend that was identified at Joliet was not -- did not exhibit any concentrations historically above the Class 1 standard.

Q. If you would look at the next page, Page 27 of your Exhibit 1702, what is this map showing?

A. This is a map that shows the location of the monitoring wells that we utilized for -- it's actually both the trend analysis as well as the

potential groundwater impact to surface water analysis that we'll be discussing here momentarily.

Q. And how close are these wells to the surface impoundments?

A. Yes. So this figure here shows that actually they are right up against the waste boundary of the ponds. So, you know, from a practical perspective they really couldn't get too much closer. I think that we've gotten them about as close as they can be to the waste boundary.

Q. Do you recall Mr. Quarles' testimony where he was concerned about the distance from the waste boundary?

A. I do.

Q. Do you believe -- well, what is your opinion about his concern?

A. I think that concern is unfounded because, as I just indicated, there's really not much ability to move these wells any closer to the waste pond than they are.

Q. And earlier yesterday I think you referred to the trend testing as conservative. What did you mean by that as it relates to Joliet and these locations?

A. What I mean by that is that these locations are not at the property line -- at the downgradient property line. They're close to the ponds as we indicated. And once the groundwater flows past these wells, there's still opportunity for natural mechanisms of adverse action dispersion attenuation to take place on the groundwater as its flowing further downgradient. That's only going to act to further reduce the concentrations as they move further down downgradient.

Q. You mentioned your conclusion -- overall conclusion about the Joliet 29 Mann-Kendall testing. Do you expect your downward trend to continue?

A. We do. The reason for that is that the station is no longer producing any CCR. We talked yesterday that the station is going to be -- is expected to stop producing power. So there's no CCR materials there being produced. The ponds don't -- the three ponds don't contain any CCR currently, and the one pond that's subject to the federal and state CCR rules, Pond 2, is undergoing closure pursuant to those rules.

Q. Let's look to Slide 28 of Exhibit 1702.

It's titled, Groundwater to Surface Water Analysis.

Is this the risk analysis we were talking about yesterday?

A. Yes, it is.

Q. And what does this page show?

A. So this summarizes the scope of the groundwater to surface water risk analysis that we performed.

Q. And can you describe the systems that you used?

A. So in order to try to keep it high level, we looked at the average concentration from December 2010 through the end of 2020, the same set of data that we utilized for the trend tests. We utilized the Sanitas software to output the average concentration for comparison purposes. The -- as was mentioned earlier, there's a good quantity of the data that actually is non-detect. And in instances where we had 75 percent or more of those samples that were not reported above the reporting limit, we reported that data for purposes of the comparison using the reporting limit, which again we think is conservative, because if it's reported as less than the reporting limit, using the

reporting limit itself is the maximum that concentration could be.

That 75 percent threshold is a threshold that's mentioned in the USEPA guidance document regarding calculating the 95 percent upper confidence limits. So that was the source of that. We attempted to cast as wide a net in terms of constituents. We looked at the detection constituents from the 40 CFR 257 Appendix 3, and as well as the assessment of constituents in Appendix 4. And the points of comparison were the surface water standards from 35 IAC 302. And if a water quality standard wasn't available, we compared to the water quality criteria.

And the last bullet is the -- is the results, and those results indicate that none of the groundwater concentrations here at Joliet at those downgradient monitoring wells that were marked on the prior figure exhibit a concentration exceeding the surface water quality standard.

Q. I'll also refer you to Page 46 of your expert report, Exhibit 1701, where you discuss the same results. If you would turn the page to Slide 29 of Exhibit 1702 -- well, before we go on,

in your expert report where are all the results of your risk analysis? Are they in one -- I can refer you to Appendix D if that's helpful.

A. From recollection, Appendix D.

Q. Okay. And so all the data for all the stations is located in your expert report; is that right?

A. Correct.

Q. Before we look at Slide 29, you had mentioned yesterday that Mr. Seymour also did a risk analysis?

A. Correct. Yes.

Q. And would you remind folks who Mr. Seymour is?

A. Mr. Seymour was the expert for the respondents in the liability phase of the hearing.

Q. And how did Mr. Seymour's analysis of risk differ from yours or the Weaver analysis?

A. So ours was -- we sort of built upon the risk that Seymour had performed. We use very similar methods and ultimately came to similar conclusions in terms of the risk.

Q. You noted that you used average, I think you testified, average concentrations.

What did Mr. Seymour use?

A. I believe he used the individual concentrations.

Q. And you noted that you didn't use all of the wells. What did Mr. Seymour use?

A. Mr. Seymour did use all of the wells.

Q. So how do you -- how does that compare then?

A. Well, I think that ultimately our evaluation is sufficiently conservative primarily because the wells that we utilized assume that the surface water is right at the well essentially. Whereas, in fact, as was mentioned, there's further groundwater flow that happens before the groundwater actually discharges into the surface water. So we view our assessment as sufficiently significant in terms of evaluating the risk.

Q. How was your analysis -- how did it confirm or not what Mr. Seymour found?

A. Well, it confirmed that the overall character of the groundwater is -- it doesn't rise to a level or a concentration that is going to result in an impact to surface waters upon discharge to surface water.

Q. Thank you.

Looking at this Slide 4, boron, Joliet 29 Slide 29 of the PowerPoint Exhibit 1702.

What are you showing here?

A. This is a graphical presentation of the boron concentrations that were part of our analysis, and it compares to the surface water standard which is shown with the bar towards the top at roughly 7.7 or so milligrams per liter.

Q. So the bar at the top is -- would you explain that again?

A. That bar is the surface water quality standard that was the point of comparison to the groundwater concentrations across the bottom.

Q. And what is this showing for boron at seven wells at the down -- the seven downgradient wells, I believe you said, at Joliet 29?

A. So the average concentrations in the wells are substantially below the surface water standard that's shown here with that bar on the upper part of the graph.

Q. And you mentioned something a minute ago, and I want to make sure I understand it.

Let's say I take MW-4, are you assuming

that the -- in this analysis that the surface water is actually at the location of MW-4 for the purposes of risk analysis?

A. That is correct. That's the conservative nature of the analysis when that, in fact, isn't true, but for purposes of a conservative assessment.

Q. If we could turn to Slide 30 of your PowerPoint, Exhibit 1702, what are you showing here?

A. So this is the summary of the conclusions that we've made based upon the data that we've evaluated for the Joliet 29 station.

Q. So what are these points that you've listed to support your opinions?

A. So the ponds aren't adversely impacting groundwater. That conclusion is based on a few different things. Primarily the concentrations that are observed in the groundwater are not exceeding the class water groundwater quality standards. We do have this -- I guess let me qualify that, not exceeding the class water groundwater standards attributable to the ponds.

The seconds bullet point is MW-09. There

are concentrations there that exceed the Class 1 standard, and we reviewed the investigation there that based on the 2020 borings that we believe is sufficient to indicate that the concentrations that are observed at MW-9 are related to natural phenomena associated with the sulfite minerals sourced from the native dolomite.

The trend analysis also indicates that the concentrations in groundwater are decreasing overall. We talked about that being expected to continue based on the condition of the ponds. The risk that's posed to both on-site and off-site receptors at the Joliet station, we don't believe there's any unacceptable risk based on the analysis that we performed. The groundwater is located based upon the historical hydrogeologic investigations at some depth which provides some separation between potential receptors, so the depth of the groundwater is roughly 25, 30 feet.

The historical fill areas are the last two bullets on this slide, and the -- there's a coal combustion byproduct investigation performed at the northwest historical fill area in order to show that the majority of those materials actually do

meet the beneficial reuse requirements per the Environmental Protection Act.

The southwest fill area, we looked at the monitoring wells from the 1998 Phase 2. The data from those indicates the RCRA metals concentrations are below the Class 1 groundwater quality standards. And we spent some time talking about the lines of evidence with the northeast historical fill area relating to the inspections that they're regularly performed, that the lack of seeps, the lack of stress vegetation, the fact that when erosional issues are identified they get promptly addressed.

We talked about the at least transient flow from the northeast fill area historically in the direction of MW-1 near Pond 3, and then, lastly, as it relates to the northeast fill area, the 2008 and the 2022 sediment and boring data that was collected in proximity of the northeast fill area.

Q. Turning to your next slide, Slide 31, of Exhibit 1702, and I can refer you to your expert report at Page 51.

What are you summarizing here?

A. So these are opinions in terms of what we recommend moving forward. An important part of our recommended remedies continue to follow the federal and state CCR rules. Midwest Gen has taken the steps to comply with those rules. The closure of the ponds is -- the pond I should say, singular, is proceeding -- the groundwater monitoring is proceeding. So we want to -- we recommend that that continue.

There's groundwater monitoring. That's a requirement associated with the GMZ also in order to confirm that the active remedial measure that resulted in attainment of the GMZ continues to be effective, so that quarterly monitoring will continue.

Another key aspect of our recommendations is at the time of our expert report we're aware that there are state and federal proposed rules that contemplate covering the historical fill areas likely, and once those come into -- are promulgated, if they become promulgated, we would recommend that Midwest Gen follow those rules in the same way that they follow the existing CCR rules.

Q. I'm looking at Bullet 2, and I see the reference to CCR rules per the GMZ.

Should that be the CCA?

MR. RUSS: Objection.

MS. NIJMAN: I'm asking whether there's a typographical error here.

HEARING OFFICER HALLORAN: He may answer if he's able.

MR. MAXWELL: The GMZ was implemented in response to the CCA, correct.

MS. NIJMAN: Thank you.

BY MS. NIJMAN:

Q. You mentioned complying with the potential new rules -- the proposed new rules for historic fill areas; is that right?

A. Yes.

Q. What is your concern about implementing any other remedy prior to those rules being promulgated?

MR. RUSS: Objection, coaching the witness.

HEARING OFFICER HALLORAN: I didn't hear you, Mr. Russ.

MR. RUSS: She's coaching the witness, leading question.

HEARING OFFICER HALLORAN: Yeah, could you rephrase, Ms. Nijman? Thank you.

BY MS. NIJMAN:

Q. Do you have an opinion about whether there is a potential conflict that might exist?

A. I do, yes.

Q. And what is that?

A. Our concern is that -- and this is based on instances in the past where Midwest Gen has implemented something in the CCAs. For example, they've lined the ponds in a certain way, and this was pre-CCR rules being implemented. So they took steps that -- in consultation with IEPA related to the CCA to line these ponds in a certain way with HDPE liners. And, low and behold, once the actual CCR rules are implemented, something different is required, and so they end up potentially having to repeat efforts.

And so the concern would be that some scope of remedy investigation, what have you, be implemented. And for whatever reason -- based on sound science, judgment, experts, what have you. If that conflicts with the way the rules read when they're ultimately promulgated, that could be

wasteful. It could be inefficient. It could result in having to repeat work, and so we would like to avoid that if at all possible.

Q. Based on our discussion about Joliet, and refer to Page 54 of your expert report, how does this remedy relate to being economically reasonable?

A. So it certainly is economically reasonable. The -- it's a continuation of the measures that are in place. The groundwater monitoring is economically reasonable. The groundwater monitoring is there in order to make sure that the concentrations continue on the trajectory that they're own. If something deviates, then something would need to be done; but certainly in our opinion the recommendations, the opinions, indicate that what we've performed is economically reasonable.

Q. And, similarly, how does it relate to the question of technically reasonable?

A. I think technically practicable is applicable as well. And it -- the monitoring -- monitored natural attenuation or MNA approach is something that -- there's a track record of it.

There's a USEPA history of it. So that puts it in the category of it being technically practicable and reasonable.

DOUGLAS G. DORGAN, JR.,

called as a witness herein, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MS. NIJMAN:

Q. We are moving to the Powerton station, if you could turn to, Mr. Dorgan, I believe you said you took the lead for the Powerton station?

A. That's correct.

Q. Turning to Slide 33 of Exhibit 1702, similar to Joliet 29, how did you begin your analysis?

A. We took the same approach for each of the four sites starting by looking at the background and the setting in which the sedation is located, in this particular case Powerton station. A few key items that we formed the basis of our early understanding of the sites was the fact that it's been there and operating for just over a century, started operations in 19 -- in the 1920s. That was acquired by Midwest Gen in 1999.

The surrounding land uses are a mix with the Illinois River and Powerton Lake being located to the west and north. To the south we have more agricultural uses once you move off the station and across the roads. To the east we have primarily industrial users, and we do have some mixed industrial users further to the east as well. And so that kind of roughed out our understanding of the basic industrial setting that the site sits in.

And then of course we try to get our hands around the various basins that exist at this site. Powerton is a little bit unique in that it had more basins than the other stations did. And so the ones that have been previously identified that we've discussed in our report include the ash surge basin, of which each of these shown on the figure to the right, the ash bypass basin, the metal cleaning basin, the secondary ash basin also known as the service water basin, the former ash basin, the east yard runoff basin and the limestone runoff basin.

Q. And all of those basins are located in this green area on your map?

A. Yes, that's correct. They're east of the

intake channel and fall within the GMZ that was established under the CCA terms.

Q. So the green area is for the GMZ designation?

A. Yes, that's correct.

Q. I'd like you to turn to the second to last page in this Exhibit 1702 which is the summary chart Weaver prepared?

A. Yes, that's correct.

Q. Would you describe briefly the status of the ponds and the status as it relates to more recent CCR regulations?

A. Certainly. So I think a particular note what we've done with this chart for all of the stations is identify whether they are still receiving CCR, and at Powerton only one of them continues to receive CCR. That's the ash surge basin. The others have ceased receiving CCR, and under that column we have the N for no to show that, and then what regulatory program they were covered under relative to the -- when they received materials.

And the specific state and federal requirements are shown in that next column which

shows that three of the four were covered under the federal and state program. And then just the one, the metal cleaning basin, fell subject to the state program, but not the federal program.

And then from there we provide an update on the lining history as we understand it, what it was lined with, when it was lined. You can see most of that lining work dates back to the late '70s. The liners were upgraded a time similar to when the Joliet 29 station upgrades took place ranging from 2010 to 2013, and those were for the ponds that were regulated.

And then we move on to discussing what additional steps have been taken as part of the closure planning, and the closure plans for each of those units has are -- have been submitted and, as we understand it, are under review which will eventually once approved allow them to go in and move forward with the closure process.

And then a few pieces of information about each basin are shown there in the comments section just helping us keep straight what's planned to occur with each one of them.

And then, finally, the groundwater

monitoring program that each basin falls under. All of them fall subject to the CCA monitoring program, and others fall under the CCR requirements. And then to the extent ASDs were submitted, those are referenced in the final column of that chart.

Q. Thank you.

Question, I see the listing for the former ash basin, the FAB, and under your comments there. Do you recall what the -- what this Board found in its interim finding about the FAB?

A. Yes. It's my recollection that the FAB was not identified as a source. And there are two components to the FAB, the north component and south component, and they have plans for addressing those as part of their closure process.

Q. On your chart for the ash surge basin you note ACD in the third column from the left.

What is that?

A. So the alternate source demonstration was an evaluation --

Q. Sorry, ACD. I'm in the third column --

A. Oh, I'm sorry.

Q. -- from the left.

A. Oh, okay. So the ash surge basin had an alternate closure demonstration that was submitted since that is a unit that will continue to receive ash, and that was done because given the circumstances at the site and the timing on how the rules came out, they were going to need more time to come up with their alternative management system. And that's what that particular submittal was helping to establish.

Q. Is an ACD characterized as a delay?

A. No. It's contemplated within the rules, and it's -- the rules recognize that circumstances at these different regulated stations are going to need some flexibility. And that was built into the rules giving them the option of submitting these requesting extensions for, in most instances, a defined time period.

Q. And by rules, are you referring to Illinois or federal rules?

A. In this case both, but the federal rules in particular.

Q. Going back to the pages of the PowerPoint at Page 34, Exhibit 1702, you mention a historic fill area here. What are you describing?

A. Yes. In the previous Board's findings they had one historic fill area that was mentioned, and that's the area south of the bypass basin which is shown here to the bottom right of the figure.

MR. RUSS: I have to object to this line. It mischaracterizes the Board opinion. There were five historic fill areas at Powerton described in the -- or historic ash areas described in the Board's Opinion 1.

HEARING OFFICER HALLORAN: Well, if Ms. Nijman can rephrase. If not, you can remedy on cross. Thank you, Mr. Russ.

BY MS. NIJMAN:

Q. What happened to the area south of the bypass basin that was mentioned by the Board?

A. That was an area where a number of years ago there was a temporary need to set down cinders during a turnover that was happening in one of the other basins. And that material was set down, was there for approximately two to three months and, as I understand it in the winter, and then was moved and managed in accordance with the requirements of the site. So it was recognized as having been placed. It was also recognized as having been

moved and managed accordingly within a fairly short period of time.

Q. Now, in your expert report you also mentioned two other areas that Mr. Quarles said he suspected of being historic fill areas.

Do you recall that?

A. Yes, I do.

Q. And it's on Page 15, I believe, of your expert report. And did you have the opportunity to review Mr. Quarles' rebuttal report on this question?

A. Yes, I did.

Q. What was Mr. Quarles referring to when he said he believed there was an additional historic area he was concerned about?

A. There was one area that was located at the very farthest south area of our figure that he considered to be a suspect historic fill area, and then the second one that he identified was further north. It would be the land in between the intake and discharge channels which are shown kind of towards the center of the figure up towards the -- where the Illinois River bend is shown.

Q. I'd like you to pull out Mr. Quarles'

rebuttal report, Exhibit 1102. It should be in front of you. I'm sorry. Actually, it's in his -- well, we'll go there first, his rebuttal report Exhibit 1102 on Page 27.

A. I have that.

Q. And in this rebuttal report in the first paragraph after the bullet points, what does Mr. Quarles refer to to support his opinion that there might be other suspect areas?

A. He is referencing to a figure that was included in his report that showed both a topographic map and an aerial photo.

Q. So if we go now to that map, we have to go to his original report at Exhibit 1101, and we have to look at Figure 4.

A. I have that.

Q. Would you describe what we're looking at here?

Let's pull that up on the map if we can, on the screen.

A. So this is a split figure that has an aerial photo with various of the site features identified in it including the monitoring wells and the basins. And then this is where he labels two

suspect -- well, actually three, but the two to the north are adjacent to each other. So he's identified three suspect disposal areas on this figure, and then he includes the topographic map. They're dated a little bit differently. The aerial photo is from 1961. The topo map was from 1967, but it basically shows the same areas of the property.

Q. And did you have an opportunity to determine whether there's a basis for this suspect disposal area identified by Mr. Quarles?

A. Not -- not that we're aware of. We mention that in our report and -- that there wasn't any specific evidence or information presented interpreting why he felt that there was the suspect disposal areas, and we weren't aware of any as well. So, again, he's -- I think his conclusion is based exclusively from looking at these maps, and I'm not sure how he got there.

Q. And were you here yesterday during Mr. Gnat's testimony?

A. Yes, I was.

Q. Did you hear what Mr. Gnat said about the two areas between the intake and the discharge

channel?

A. His comment was that what he understands about those areas where there is disturbances and the lack of vegetative growth is that's because of the placement of dredging material from the two -- the discharge channel and the intake channel having been put there at some point.

And I think the only other thing I would point out on the 1967 photo, and you can still see at least remanence of those -- or you can see remnants of those features on the 1961 aerial. There's railroad tracks that are shown utilizing that area of the property for rail operation support for the plant operations.

Q. And why is that relevant to your opinion that there were rail lines there?

A. I don't see that they would be trying to place CCR materials in that area if they're using it as part of their facility rail operations.

Q. Going back to your PowerPoint on Slide 35 of Exhibit 1702, what are we seeing on this map?

A. Again, consistent with what we've done with the other stations, we wanted to frame up the historic investigation work that's occurred at the

stations. And this figure shows the locations where soil probes and borings were advanced, where samples were collected, where monitoring wells were installed, and where sediment sampling was performed as part of that historic investigation approach.

Q. Have there been -- has there been some investigation to the west of the channels we were just talking about, the intake and discharge channels that are in the middle of this map?

A. Yes. I think as this figure shows, the investigation was located across the station. Concentration obviously around the ash basins, around the main plant itself, and then of course there's additional borings and wells that were installed further west as part of, in particular, the earlier investigations.

Q. If you would pull up Slide 36, please, turn to Page 36 of your PowerPoint.

What does this summarize?

A. Just a chronological listing of the different investigations that have been performed at the Powerton site.

Q. Okay. So turning to the next page,

Page 37 is the 1998 Phase 2 ESA.

What did you learn from this?

A. This was the very early documentation with respect to the investigations that have occurred at the site. There were quite a few data points that were collected. They had 28 soil borings. 6 monitoring wells were installed as part of that effort. 17 surface soil samples and 12 sediment samples. And then particularly relevant from MW-1 and MW-2 which are near the east yard runoff basin and the former ash basin, that investigation detected no RCRA metals above the Class 1 groundwater standards.

And main conclusions as outlined in that report was that the groundwater ingestion was not deemed to be a potential exposure pathway, that based on the industrial land use and low potential for human exposure that there weren't direct contact exposures that they were concerned about. And then their ultimate conclusion was that their findings suggested that under the Illinois regulations at the time that there was no further requirement to investigate or remediate the property.

Q. And this 1998 report, when was it prepared in relation to Midwest Generation's acquisition of Powerton?

A. This was preceding their acquisition of the plant.

Q. Turning to the next page, Slide 38 of Exhibit 1702, what are you showing here?

A. So this was -- a what they termed at the time a geotechnical investigation that was performed in 2005 similar to the other stations at about the same time. They -- it's our understanding they were beginning to consider their ponds and what kind of condition they were in, and beginning to collect information that would ultimately allow them to plan O&M operations, perhaps some upgrades. So there were a total of nine probes that were done at that time as part of that investigation.

Q. Turning to the next slide, Slide 39 of Exhibit 1702, I can refer you to Page 38 of your expert report for this discussion.

What are you addressing here in 2010?

A. So in 2010 this now is the effort that was initiated to begin taking a closer look at their

impoundments based upon their dialogue with the IEPA. This was the initial voluntary investigation that they did before the CCR rules had been promulgated. They put a total of 10 wells in, and groundwater samples were collected from those wells.

Twelve of the CCR -- potential CCR related analytes were not detected. Boron and manganese, however, were detected above the 620 Class 1 standards both upgradient and downgradient of select ponds. And this was a one-time event getting a snapshot at the time that the investigation was performed.

And then the final conclusion there is in the case of boron, the sole exceedance was identified in an upgradient well. So that was -- that was the initial look at the groundwater conditions on a more current basis around their regulated ponds.

Q. And if we turn to the next page, you're continuing this discussion?

A. So some useful information came from this effort as it normally does when you put a fairly robust groundwater monitoring network in. They

were able to get a good understanding of the site hydrogeology which is primarily sands and gravels that near the surface with the silt seam that intersects or underlies a portion of the site, and then below that more sands and gravels.

Groundwater flow as a result of their preliminary evaluation of the data that they collected as part of this effort was that groundwater was flowing to the north which I think is consistent with what they would have expected given the proximity to the river. They did do a water well search as part of that effort, and there were no water wells that were detected downgradient of their ponds between the ponds and the Illinois River.

But they did identify two supply wells that provided water to the station, and those were further to the west. They were tested, deemed to have been found to not have exceedances of the groundwater quality standards and were in use at least at one time. I'm not sure about their current status.

Q. Turning to the next slide, Page 41, you mentioned the flow direction in 2010. Has there

been some discussion about two aquifer units at Powerton?

A. Yes. As additional wells have been installed, that's given them additional hydrogeologic information, and what has come to be determined is that there's really two monitored units. Mr. Gnat yesterday testified that there is a hydraulic connection between the two and that you see saturated conditions through the soil column. But what you find is that particularly on the western side of this area of the station, you've got this silty seam that is a lower hydraulic conductivity zone, so it's holding up the flow of groundwater.

And when you look at the well network in and through and around that zone, you see two separate potentiometric surfaces. You find a shallow zone and a deeper zone. And the shallow zone is being monitored. The deeper zone is being monitored. And they're being contoured accordingly as both a shallow zone and a deeper zone, and that is what is shown on the figure that's up on the screen, Slide 41.

Q. And do you agree with these KPRG

groundwater flow analyses that you just described?

A. We do. We think this is the proper conclusion and analysis of the groundwater conditions underneath the site. I would also mention that these groundwater flow diagrams have been routinely submitted to the agencies as part of their compliance with the CCAs and with the CCR rules. So the agency has seen these as well.

Q. Do you recall Mr. Quarles disagreeing during his testimony with this analysis?

A. I do.

Q. What did he argue?

A. His basic argument was that because the two zones are considered to be interconnected, they should be mapped using all of the wells. And when you do that, you get a much different interpretation of the groundwater flow conditions at the site.

Q. And do you agree with Mr. Quarles?

A. I do not.

Q. For what reasons?

A. Well, for the reasons previously stated. We have at least one of the wells that screens across that silty clay zone which is going to bias

the groundwater elevations. When you look at the cross-section that looks at the wells screen and the more shallow interval, the wells screen and the more deeper interval, you clearly see that different potentiometric surface, and as a consequence the wells that KPRG has selected to map these two zones we believe are the proper ones to be using.

Q. And do you recall -- you said yesterday you reviewed Mr. Kunkel's testimony in the first phase of this hearing.

Do you recall his opinions about these two mapping units?

A. I believe he agreed that there were two units.

Q. I would like you to pull out Exhibit 1102.

Well, before I do, that, would you remind everybody who Mr. Kunkel was?

A. Mr. Kunkel was an expert on behalf of the complainants in the earlier phase of the proceeding.

Q. Thank you.

Yes, Exhibit 1102, Mr. Quarles' rebuttal report, if you would go to Page 28 of that report?

A. Yes, I'm there.

Q. There's the second full paragraph from the bottom of the page that begins, according to, can you take a minute to review that paragraph?

A. This would be the second full paragraph on this page, correct?

Q. Yes.

A. Yes, I see that.

Q. What is Mr. Quarles saying here about the CCR rule and CCR Illinois regulations?

A. So he has cited to the rule which in his opinion would justify why all of the wells would be evaluated to create a single contour map, but it's my opinion that this hasn't been applied correctly given the specific circumstances that exist at the station.

Q. What do you mean? Would you explain that?

A. So if I could just read what the rule states, it says, the uppermost aquifer means the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically interconnected with this aquifer within the facility's property boundary. Upper limit is measured at a point

nearest to the natural ground surface to which the aquifer rises during the wet season.

Q. What does that mean to you with regard to groundwater flow mapping?

A. So he earlier made the point that we're in agreement that there is a hydraulic connection between the upper and lower units, but in my opinion the way that the agency specifically recognizes the uppermost aquifer and then lower aquifers that are hydraulically connected acknowledges that there could be two different zones that need to be monitored within the same aquifer. That's what we're saying, and we think that's the correct interpretation of this particular citation.

Q. Does the rule say anything about how to map those zones, what you just read?

A. It doesn't specifically, no. That's some professional judgment needed in that.

Q. In the chart -- and we started to talk about it this morning, in the pond's chart that we went through, you started to talk about -- when I asked you about an ACD, you mentioned an alternative source demonstration at Powerton?

A. Yes, that's correct.

Q. And I can refer you to Page 30 and 31 of your expert report, Exhibit 1701, if you'd like to refer to it.

What is the purpose of an ASD, alternative source demonstration?

A. Alternative source demonstration is typically performed when you have been evaluating your downgradient groundwater conditions with respect to your background conditions. And when you detect constituents that are part of your monitoring program that exceed your relevant standard, then you are required to consider the source of that with the specific emphasis on the regulated unit that is immediately upgradient of these downgradient locations.

And so in this particular instance testing was done of ash within the basins that we've identified here on Page 30, and the conclusion that was determined was that by comparison of the leachate from the ash with the constituents being detected in the groundwater, that there was not a relationship, and that the regulated unit itself was not the source of the downgradient groundwater

quality exceedances of the appropriate compliance standard, and that some other alternative source was responsible for those conditions.

Q. When you mention other alternative source, was that identified?

A. It was not.

Q. What do the rules state with regard to identifying an other alternative source?

A. They do not specify a course of action for identifying alternative sources.

Q. Do you recall what Mr. Quarles said about ASDs and identification of alternative sources in his testimony?

A. I believe his basic testimony was that alternate sources were again a way of avoiding a remedy and a way of dispelling the idea that the regulated units are responsible for what's being detected in the downgradient wells.

Q. Do you agree with his assessment?

A. No. The process that they went through is contemplated within the rules. It's there to address these types of circumstances. From what we've looked at and the means in which they were approached and the information that was collected

and was submitted, they seem to be consistent with what we would expect to see, and so I think they're simply following through on the following the regulatory requirements.

Q. And if there were an alternate source around the pond in this area, how does your assessment, your remedy assessment, address that alternate source?

A. Our remedy assessment considers, as we've testified previously, the groundwater conditions in those downgradient wells with respect to posing threats to off-site receptors. And so to that extent, alternate sources that may be present, we feel would be reflective -- reflected in the groundwater monitoring that's being performed through the wells that we've selected that are protective of the human health and the environment in the off-site receptors. So it's factored in even if that specific source that might have been referred to has not been identified.

Q. Thank you.

Let's go to Page 42 of your PowerPoint at Exhibit 1702. Is this the ongoing groundwater monitoring you were just referencing?

A. That's correct.

Q. And what are you describing here?

A. So at the site quarterly sampling of the groundwater monitoring network continues since -- and has began when the CCAs were implemented in 202. There's a total of 12 monitoring wells. Those wells are also complying as needed with the federal CCR rules and the Illinois CCR rules. I mentioned that additional monitoring wells were installed after the 2010 study which did allow for improved understanding of what was going on with the groundwater flow and the groundwater conditions.

As just we just recently testified, there have been two units identified for purposes of contouring the groundwater elevations. There's this upper silty clay unit, and that unit flows nearly directly west towards the discharge -- intake and discharge basins and ultimately Powerton Lake, and then the lower gravelly -- more gravelly sand unit which flows more westerly and northwesterly more towards the Illinois River.

And that -- with the program that's in place, there's sampling analysis taking place for a

total of 34 constituents four times a year, and that's expected to continue.

Q. Why did you believe it was important to summarize this all in one place?

A. So as we've discussed previously, our overall remedy considers the fact that there is a means to continue monitoring groundwater at the stations. Specifically with respect to the MNA alternative that we've been discussing, that's an important component.

It allows us to demonstrate that MNA continues to occur, at some point gives us some ability to begin looking at how long it might take, but, most importantly, the sites aren't just gonna be walked away from. We'll continue to watch them and evaluate them, especially now that some of the changes are occurring with closures of the different units that are no longer gonna be used.

Q. Going to Slide 43 of Exhibit 1702, we've talked about the GMZ already.

What are you showing here with regard to the ELUC?

A. The map on the left where the green hatching is located is the GMZ that's been

established with the IEPA, and then with that goes the environmental land use control, mentioned previously that that document actually attaches to the deed, make sure that any current or future owner of the property understand that there's a restriction in place prohibiting the installation of groundwater use wells within that geographic area of the property.

Q. How did the CCA relining of the ponds, how was that relevant to the GMZs?

A. The relining had been a condition of the CCAs when they were originally established. Those relining steps as a means to address the agencies concerned about those being potential sources was corrective measures that was implemented allowing the groundwater management zone to be established and approved by the agency.

Q. Turning to Slide 44, would you discuss potential receptors at Powerton?

A. Yes. So, again, our overall strategy was to try to evaluate risk, and risk is a function of whether there's a receptor. And so our evaluation of Powerton looked at both the on-site and surrounding land use. And as I mentioned I think

on one of the first slides, the surrounding land uses are primarily industrial, and we would envision that continuing into the foreseeable future just given their character and what properties are being used.

We do have some industrial properties to the east, and then of course we've got the water features that are present to the north and the west. Downgradient groundwater quality, there aren't any potable use wells that are in that downgradient zone.

Based upon the report that Patrick prepared in 2010, as part of their hydrogeologic investigation, they didn't find any water wells within a 2500-foot radius of the site, but what's most important to us is what's going on downgradient. Use of the groundwater is prohibited under the ELUC, and the GMZ is giving us the means by which to continue monitoring the groundwater and adapting as necessary.

Q. And I wanted to ask you about the water well search by Patrick. I think you mentioned earlier that there were two wells to the far west; is that correct?

A. That's correct. We understand that within that 2500-foot radius there were two wells that are on the Midwest Gen property, but they're located farther to the west over towards Powerton Lake and to the south. And my understanding is that they are tested regularly and found to be compliant with the potable groundwater standards.

Q. And then, lastly, as far as potential ecological receptors -- well, we can go into that when we get to the additional risk analysis.

Let's turn to the next page, Page 45, groundwater trend testing. What was done here at Powerton similar to Joliet 29?

A. Yes. Exactly what Mr. Maxwell testified, this is just the output from the analysis of the Powerton groundwater data. It provides a graphical representation of the output of the trend testing, and I think what we've identified here, the pie chart to the left shows that the majority of the tests were no trend. And similar to Joliet 29, the majority of those no trends were because the data was reported below the reporting limit.

So there's actually no data to -- when there's no data to apply a trend to, it's

considered a no trend. But of the data that did demonstrate a trend, 30 percent of the analysis showed a downward trend. 6 percent showed an upward trend. And similar to Joliet 29, when you break out the trends, there's a difference between the trend that's not statistically significant and one that is.

And as you can see in the bar charts on the right for the downward trends, roughly 25 out of the 70 were statistically significant. Conversely, for the upward trends, only 3 out of the 15 were statistically significant upward trends.

So this again is a means to allow us to assess what's going on with the downgradient groundwater quality and demonstrating the degree of plume stability we have and what's happening with the downgradient groundwater chemistry over time.

Q. And similar as to Joliet, were you able to look at the no trend data in more detail?

A. We did. And I would maybe ask Mr. Maxwell to touch on that, if he may.

Q. Yes.

Mr. Maxwell, what did you find about the

no trend data at Powerton?

BY MR. MAXWELL:

A. So the 64 percent at Powerton was a total of 148 trend tests. Of those 148 no trend tests, 100 of them related to -- primarily related to non-detect results. That accounts for 68 percent of the total no trend results.

Q. So out of the 64 percent of no trends, 68 percent of those were no detects.

Am I saying that correctly?

A. You're saying that correctly. Primarily non-detects, yes.

Q. And when -- what were the others then, do you know? So the other 23 percent.

A. Those others would have been instances where there -- in some cases there were some non-detects, maybe just not quite as many. And the -- they resulted in an evaluation. Again, when you run through the Mann-Kendall test process, that the number of upward -- the number of upward comparisons to the data equals the number of downward.

And so if you have some of the data that's non-detect, the detection limit is generally

consistent, and so that just increases the chances of being a no trend. So that's what accounts for the rest of the no trend results.

Q. Thank you.

Mr. Dorgan, does the Mann-Kendall testing identify if constituents are above or below the 620 Illinois Groundwater Standards?

BY MR. DORGAN:

A. It does not. It simply analyzes the trends that will exist in the data over time.

Q. And turning to -- well, what did this chart on Page 45 of your Exhibit 1702 tell you about?

A. Yeah. The callout that is shown there below the pie graph just simply summarizes that there were only two constituents at one well with statistically significant upward trends that had concentrations above the Class 1 groundwater standards. And that was for sulfate in TDS MW-13. Just, you know, when you consider the volume of data, these were the only two that exceeded those standards.

Q. At one location?

A. Correct.

Q. Turning to the next page, 46 of Exhibit 1702, what are you showing here, Powerton groundwater to surface water analysis?

A. So as part of our risk evaluation, one was human health, one was off-site groundwater resources -- or surface water resources, excuse me. So this just summarizes the steps we took to evaluate the risks to the proximal surface waters.

Q. So looking at this map on Page 46, what are -- are these the wells that were used?

A. That's correct.

Q. And looking at this map, I'll ask the same as I did with Mr. Maxwell.

How close are these wells that were used for your Mann-Kendall, how close are they to the waste areas of the ponds?

A. They're very close to the waste boundaries for the ponds that they're positioned near, about as probably as close as you're going to be able to get. And as you can see in this figure, it's cut off. You can't see the Illinois River to the north, but you can see Powerton Lake off there to the northwest. So there's a great deal of distance before you hit either Powerton Lake or the Illinois

River to the north.

Q. Again, Mr. Quarles mentioned that he was concerned that the wells were -- for the Mann-Kendall testing were too far down, excuse me, that were not close enough to the waste boundary.

Do you agree with that?

A. I don't agree with that. I mean, you can see it on these maps how close they are. I don't know that you can get any closer, so . . .

Q. How does this relate to the conclusion in your report that this -- you used a conservative analysis?

A. So we -- again, similar to Mr. Maxwell's testimony for Joliet 29, we looked at the concentrations in those wells and compared them directly to the surface water criteria. And that would not provide any opportunity for those natural groundwater transport mechanisms to take place such as absorption, retardation, diffusion, attenuation.

So this would be in laymen's terms. Like those wells are immediately next to the surface waters. And we're showing that there's not a threat even under that scenario, but the reality is there's a great deal of distance that those natural

groundwater flow mechanisms are going to act on. Any concentrations being detected in our immediately perimeter downgradient wells are going to attenuate by the time they reach those surface water bodies.

Q. When we were discussing about the Mann-Kendall trend testing, I should have asked you then. Do you expect those trends at Powerton to continue?

MR. RUSS: Object, leading question.

HEARING OFFICER HALLORAN: Sustained.

Rephrase, please.

BY MS. NIJMAN:

Q. How do you see the trends in the future at Powerton?

A. Well, we think on the surface with what we are looking at given the current circumstances, we would anticipate continued improvement, continued downward trends. But we also know that at Powerton and the other stations the current regulated units, most of them are going to be going through a closure process, ash being removed, ponds being closed in accordance with their closure permits.

We know that ongoing production of ash is

going to or has already or will be ceasing. And as a result, that's just another variable that tells us in the absence of ongoing production and management, we should continue to see improvement in that groundwater chemistry over time.

Q. Turning to Page 47 of your Exhibit 1702, is this the description of the risk assessment you performed?

A. Yes. This just outlines our technical approach, how we did that evaluation.

Q. And, generally, what did you find as to the risk analysis at Powerton?

And I can refer you to Page 46 of your expert report.

A. In general, having looked at the average concentrations over time, looked at the frequency at which the data was actually detected in the samples and what's been reported, we considered the full list of monitored constituents including the Appendix 3 detection monitoring parameters, as well as the Appendix 4 assessment parameters. And then we did the comparison to the surface water standards that are outlined at 35 IAC 302. And after having done that, we have assessed that

there's not a risk to the off-site surface water conditions.

Q. Let's look again at one example for boron, Page 48 of your PowerPoint. What is this showing?

A. So this is just an example of one of the constituents that's being monitored, boron being one of the CCR indicator constituents. What this shows is the concentration on the left Y axis, the wells that are being monitored, what their detected average concentrations along the X axis. And then the blue bar across the top, roughly, let's call it 7.7 milligrams would be the criteria for the surface water that was compared against.

Q. And as we talked about with Joliet, how is travel distance assumed or addressed in this risk assessment?

A. It's not. As I mentioned, travel distance will have an impact on these concentrations, but we use these average concentrations at these wells for purposes of that comparison. It's a more conservative approach.

Q. What is your opinion as to the sufficiency of the investigation at Powerton for your remedial assessment?

A. We feel as though there's been a great deal of data collected at the Powerton station, that since the CCAs were agreed on and the wells were installed and the wells began being subject to a quarterly groundwater monitoring program, there's been more data collected. We feel as that there's a sufficient spacing and volume of data to allow us the reasonable opportunity to assess a remedy that would be appropriate for the site.

Q. And have you visited the Powerton station?

A. Yes, I have.

Q. You said you were present during Mr. Gnat's testimony about his site visits as I recall?

A. Yes, I was.

Q. Do you recall what Mr. Gnat said about the distance -- and you just touched upon it a minute ago -- from the, for instance, the former ash basin to the river?

A. I don't recall the specific distance he might have referenced, but it's considerable and heavily vegetated between the water surface and the ash basin.

HEARING OFFICER HALLORAN: Ms. Nijman, can you

keep your voice up, please? Thanks. I know it's getting two hours in.

BY MS. NIJMAN:

Q. And in your opinion given the distance to the Illinois River, would you expect to see seeps?

A. No, I would not.

Q. Looking at Page 49 of your PowerPoint at Exhibit 1702, would you go through the summary then of your conclusions for the remedial assessment analysis?

A. So we looked at background data from the upgradient wells to assess what's going on with the regulated units. We feel that those units need to remain compliant with the CCR rules. It appears to us that the necessary steps are being taken to provide that. That should continue. There are regular inspections and notification obligations that go with those programs and that they would be followed.

The trend testing that we've done at the downgradient monitoring wells shows that the groundwater is improving over time, and we believe that will continue over the long term. We don't believe that there's an unacceptable risk to

on-site or off-site receptors. The downgradient concentrations at downgradient monitoring wells did not exceed the surface water standards.

The Board previously concluded that the former ash basin is not a source, and it will be undergoing closure in accordance with plans at the site. There was one location that was identified that ash had been placed and stored there temporarily. That was for a short duration, occurred during the winter months when we would have expected the ground surfaces to be frozen, and it was then removed and managed accordingly. So pretty short duration thing that we concentrated more on the regulated units in the period that they've been operated.

And then as Mr. Gnat has testified, our site visit was not as rigorous as what he's required to do as part of his quarterly groundwater sampling, but he had testified as having seen no seeps, and we certainly didn't either during our visit to the site.

Q. Turning to your next page on Page 50 of your PowerPoint, what is your recommendation as to the remedial assessment for Powerton?

A. Well, as noted, the site should continue to follow both the federal and state CCR surface impoundment rules. And those -- obviously as the stations continue to close down and the different ponds are being brought out of service, those will be continued to be addressed under the rules accordingly.

They're in assessment monitoring which should continue. That's the larger, broader range of constituents that are being monitored. If there is exceedance of the groundwater protection standard and it is attributable to the regulated surface impoundments, then the proper corrective action should take place. That's required by the rules. And then complete for those ponds that do need to continue being used, that they implement the closures and as appropriate retrofits to make sure that they are compliant with the current CCR surface impoundment rules.

And then we've got the topic of the docket that's before the Board with respect to state regulations for the historic fill areas, and now within the last several weeks there's been a proposal for historic fill area regulations. And

as those become promulgated, assuming that they will, that whatever those requirements are then be applied to the site, and they follow whatever their obligations are under those new sets of rules.

Q. How do the GMZs -- GMZ at Powerton, how does the GMZ at Powerton relate to your remedy assessment?

A. The GMZ is there as we mentioned previously related to the steps that were taking -- taken under the compliance commitment agreements. We envision that as long as there are exceedances of the groundwater standards, that that GMZ would continue to remain in place, that the ELUC that goes with that GMZ would continue to remain in place. And as a consequence it provides a means for mitigating potential exposure concerns to use of that groundwater.

Q. How does this remedy analysis comport with being technically practicable?

A. We feel what's being done is technically practicable, and we also feel that it's economically reasonable and consistent with our experience at other similar sites.

MS. NIJMAN: Mr. Hearing Officer, this would be

a good time for a short break, if you don't mind.

HEARING OFFICER HALLORAN: Okay. We'll take 10 minutes. Before we go off the record I do want to note, and again I was remiss, this hearing today was noticed up previously at 16-504. We are now in 16-503, and I have posted a note notifying the people that we had moved. I posted that about 8:00 a.m. this morning.

Thank you. See you in 10.

(WHEREUPON, a short recess was taken.)

HEARING OFFICER HALLORAN: We're back on the record back from lunch. It's approximately 11:04.

Mr. Russ had a bit of a housekeeping matter. You may proceed, Mr. Russ.

MR. RUSS: Thank you. So Exhibit 1111 was admitted as an offer of proof in May, and the testimony regarding that exhibit was marked as being offer of proof testimony. And we're asking that the testimony on this exhibit today also be noted as an offer of proof.

HEARING OFFICER HALLORAN: Yes. I'm sorry.

Go ahead, Miss Nijman.

MS. NIJMAN: May I respond?

HEARING OFFICER HALLORAN: Yes, you may.

MS. NIJMAN: Experts are in a different position. They are entitled to rely upon information that is not necessarily in the record. That does not make it part of the offer of proof. This expert relied on that information to update previous data, and they are entitled to do so.

HEARING OFFICER HALLORAN: Okay. What is Exhibit 1111? I don't have it.

MS. NIJMAN: It's the 2012 -- 2022 sediment Des Plaines sampling.

MR. RUSS: If I can clarify --

HEARING OFFICER HALLORAN: Okay. You know what, let's hold this later cause I don't have the exhibit in front of me, and I'm not sure I can deal with it appropriately now.

MR. RUSS: Okay. That's fine.

HEARING OFFICER HALLORAN: So, yeah, Mr. Russ, remind me. We'll talk about it later when I have the exhibits in front of me.

MR. RUSS: Sure.

HEARING OFFICER HALLORAN: You may proceed, Ms. Nijman.

MS. NIJMAN: Thank you.

BY MS. NIJMAN:

Q. Mr. Maxwell, I'd lake to go back to something. When we talked about Exhibit 1111, would you pull that up in front of you? And we were looking at the maps in that exhibit when I asked you to identify boring locations?

BY MR. MAXWELL:

A. Yes.

Q. If you would turn to Map 4 of 7, if you look at the legend on the right, what does that say?

A. So there are both boring -- it says boring location and sediment grab sample.

Q. And it has boring location as what color?

A. Pinkish.

Q. So when you were identifying boring locations on this map, Map Area 4, were you counting these pink items?

A. I believe that I mistakenly included some of the yellow, and so I intended to only include five of the borings along the shore. I counted extra because it was a little confusing in terms it of how it was presented.

Q. So if we go back to Page 5 of 7, are those

the five borings you're referring to?

A. Correct. There's five that are shown in pink along the shore there.

Q. Thank you.

Mr. Maxwell, while we were talking with you, let's move to Will County. If you would pull up your PowerPoint again, Exhibit 1702, we can go right to Page 52 of that exhibit.

A. Okay.

Q. Similar to Joliet 29 and Powerton, what did you do with regard to background and setting?

A. Well, we wanted to take a look -- we wanted to review the surrounding land uses in order to try to get a sense for the overall setting of the station. And in terms of the operation history, first off, it started in 1955 in terms of it actually producing power. There's four surface impoundments that are noted there in purple on the figure on the screen marked as Ponds 1N, 1S and then 2S and 3S moving from north to south. Those ponds were first constructed in 1977.

This station ceased burning coal in 2022, so none of the ponds currently receive CCR material. And in terms of the surrounding land

use, the -- it's surrounded on two sides by surface water features, the Des Plaines River, and the Chicago Sanitary Ship Canal to the east, the Des Plaines River to the west. There's a gravel quarry operation located to the south of the station, just south of Material Road there shown on the figure. And to the north is various heavy industrial use including a refinery.

Q. Now, on Pages 16 and 17 of your expert report you talk about each of the impoundments, but let's also go to the second to last page of this Exhibit 1702 where you have your summary chart, and the bottom station on the summary chart is Will County.

Would you describe some of the key factors on this chart regarding current status of Will County ponds?

A. Yes. So Ponds 1N and 1S are the two northern most ponds. As mentioned, none of them are presently receiving CCR, so that applies to all four of them, but those ponds are considered state ponds in terms of the CCR rules. They were originally lined with a Poz-O-Pac in the late 70s, in 1977. 36 inches, if my memory serves, in terms

of the thickness.

As part of the compliance commitment agreement which Illinois EPA instituted in 2012, a -- there was a system that's been installed to -- that removes the water from these ponds so that they don't retain surface water. So that's been in place, like I said, pursuant to the CCR rules. There's current plans to close both Ponds 1N and 1S under the Illinois CCR rules, and the groundwater monitoring associated with Ponds 1N and 1S is the -- there's overlap.

There's the CCA requirements as well as the CCR groundwater monitoring requirements. And because these ponds are state ponds and the state rules have been promulgated most recently, there's been a couple of new monitoring wells that have been added to the system related to Ponds 1N and 1S in terms of the groundwater monitoring program.

And the other two ponds, Ponds 2S and 3S are considered both federal and state ponds, and those also were lined with -- originally lined with a Poz-O-Pac liner, upgrade -- subsequently upgraded to HDPE liners and along with the protection and warning layers associated with the HDPE. Those

ponds are also currently undergoing closure, and there's groundwater monitoring that are -- that's been conducted pursuant to the CCR rules, the federal and the state CCR rules related to those two ponds and --

Q. Let me ask you, on Pond 2S you note ACD withdrawn in your comments.

Do you know why the ACD was withdrawn?

A. Yes. So the alternate closure demonstration that was originally submitted in 2020 I believe is no longer required because that alternate capacity is no longer needed because the facility hasn't been producing CCR materials since June of 2022. So there's no need for it at this point in time.

Q. Let's go back to Page 53 of your PowerPoint. Would you identify what's on this slide?

A. This is a close-up of the four surface impoundments that are referenced on our table that we just discussed.

Q. And the green area is?

A. That green area is the ELUC and the GMZ that has been established related to the prior CCA.

Q. The area in the middle, just to remind people, what is that area in the middle?

A. That area in the middle is land that -- my understanding is it's not owned by Midwest Generation. It I believe is still owned -- I believe on the record Com Ed is the owner of that land, so it's sort of a carveout not owned by Midwest Gen.

Q. Turning to the next page, Page 54 of your Exhibit 1702, what are you showing here?

A. Two historic fill areas were identified by the Board in the 2019 interim order by name. One area was the area noted around the surface impoundments which is the area around these -- the ponds noted in purple on this drawing.

And then, secondly, there was an area to the southeast -- in the southeast portion of the station that was also called out by name by the Board in the 2019 interim order.

Q. And do you know the -- what is the status of the southeast area?

A. That area has been investigated. That area was identified as part of the 1998 Phase 2 ESA that was performed before Midwest Gen acquired and

started operating the stations. I think we're gonna talk about that later, but there's been borings and monitoring well -- two borings and a monitoring well installed in that area, and we've collected some data to characterize what's there.

Q. And as to the areas around surface impoundments, as it relates to your remedy assessment, have you considered those areas in your remedy assessment?

A. Yes, we have. To the extent that CCR materials may be present in the vicinity of the ponds, our remedy does account for that -- those materials, and we believe it is still protective of human health and the environment, yes.

Q. Looking at Page 55 of your PowerPoint presentation, what are you showing here?

A. This is a figure -- a diagram showing the historical site investigation locations that have been performed at this station over the course of the facility record, and it's planning them all on one figure so that we can have a comprehensive understanding of all the various investigation work that's been performed.

Q. And is this also Figure 7 in your expert

report?

A. I believe that's correct, yes.

Q. Turning to the next slide, 56, concerning Will County investigations, what does this summarize?

A. So this is just a bullet listing of the individual historical investigations that have been performed starting in 1998 before the acquisition of the station and continuing right up until current in terms of the ongoing groundwater monitoring that's being performed under both the CCA and the CCR rules.

Q. Let's turn to Page 57 of the PowerPoint in Exhibit 1702, and here you discuss the 1998 Phase 2 ESA. What was relevant to you about this investigation?

A. So this slide summarizes the scope of the investigation. There were 18 borings, 5 monitoring wells, 23 surface soil samples, 14 sediment samples that were collected. The specific sample locations are shown on the figure here to the right.

What was of particular importance is the next two bullets, the borings down from the southeast fill area, B1, B2 and MW-1. Although

coal ash mixed with soils was identified in the boring logs in this particular area, the actual analytical data that was collected once it was compared to TACO Tier 1 site -- soil remediation objectives actually indicated that the concentrations were below the Tier 1 soil remediation mediation objectives in terms of RCRA metals.

Q. I'd like to refer you to Page 39 of your expert report, if you would pull that up. So the last paragraph -- do you have it?

A. Yeah, we do.

Q. The last paragraph on Page 39 discusses this information you were talking about in the southeast area; is that right?

A. Yes.

Q. And then if you look to Page 40 of your report?

A. Right. So the top of that page notes that although coal ash was noted within the southeast portion of the station, sufficient investigation has been performed to evaluate whether the area presents an unacceptable risk to human health and the environment.

Q. Right. And then if you look at the next paragraph, the last sentence, would you read that starting with, this historical?

A. This historical analytical data supports the conclusion that the mere presence of CCR within historical boring logs does not necessarily mean that these areas serve as sources and represent a threat to human health and the environment.

Q. What do you mean by that?

A. So we mentioned this a little earlier, but in instances where CCR may be identified by name and borings, in some cases it may be mixed with soil. And if it's mixed with soil, that has an impact on the chemistry once that sample is analyzed.

And in this particular instance the soil data indicated the concentrations were below the generic Tier 1 soil remediation objectives under TACO, so therefore wouldn't pose any type of an acceptable risk.

Q. Looking back at Slide 57 of your PowerPoint, what were the conclusions of the ENSR report?

A. So ENSR in their Phase 2 for Will County

concluded that the groundwater ingestion is not a potential exposure pathway. Based on the industrial land use and the low potential for human exposure to constituents of concern, they concluded that there isn't a requirement under Illinois law to further investigate or remediate the property.

Q. Let's go to Page 58. Here you're discussing the 2005 geotechnical investigation.

Why was that relevant to you?

A. So these are some additional data points that were collected again around the same time frame as the other similar investigations at Powerton and Joliet 29 intended to collect information, intended to evaluate proactive maintenance that was being considered in terms of the infrastructure of the ponds.

And so this information that was gathered provided some information on the physical characteristics of the soils in the areas tested, that they looked at a total of five soil probes, and ultimately found that bedrock here encountered is relatively shallow also 3 to 10 feet below ground surface.

Q. Turning to Slide 59, like the other

stations, this describes the 2010 hydrogeologic investigation. What did you conclude?

A. Yeah. So this, again, was the initial voluntary hydrogeologic assessment of the site conditions performed at the request of Illinois EPA. The original 10 monitoring wells are shown here in the figure off to the right, and they -- the monitoring wells were each installed in the uppermost groundwater unit, and the depths of the wells ranged from 8 to 11 feet.

They collected one round of groundwater samples and found that upon analysis that 12 of those analyzed were detected. And they did identify manganese, boron, sulfate TDS above the 620 Class 1 groundwater quality standards on both sides of the ponds, both east and west.

A potable well search was also performed, and the conclusion was that there was no potable well use within that shallow monitored aquifer at the -- within 2500 feet.

Q. Turning to Slide 60, here you describe a 2015 CCB investigation.

Would you explain that, please?

A. So this was an assessment that was focused

on evaluating the coal combustion byproduct viability of the materials here in this area to the east of Pond 1. Similar to the investigation that was performed in the northwest fill area at Joliet 29, the objective was to try to categorize whether or not these materials met the CCB requirements under the Illinois Environmental Protection Act, and that's done using the NLET testing.

There was a total of 120 samples that were collected from the vertical profile. We list the metals there that were non-detect. The majority of the metals that they looked at were non-detect. They did identify boron, iron and sodium that were detected, but below the Class 1 groundwater quality standard in the NLET testing.

And a statistical analysis was presented in KPRG's report documenting this work that indicates that the materials exhibit characteristics in terms of NLET that are below the Class 1 standards. So, ultimately, this material was found to meet -- to be considered coal combustion byproduct.

Q. And how does that finding relate to your

assessment of remedy with regard to this ash?

A. So this is a data point -- well, it's multiple data points that show that the leaching characteristics of this ash comply with the Class 1 groundwater quality standards. The degree of leaching under this test is acceptable in accordance with the Illinois Environmental Protection Act.

Q. Turning to Page 60, the ongoing groundwater monitoring, would you summarize that slide, please?

A. So this shows the -- or this summarizes the groundwater monitoring network that's ongoing. There's quarterly monitoring that's being performed for -- under the CCA constituents since 2012. There's 10 monitoring wells. There's a total of 34 constituents that are analyzed twice per year, I'm sorry, four times per year. So a substantial quantity of data continues to be collected.

On top of that, there's monitoring that's intended to comply with both the federal and the Illinois CCR rules. And I'll point out that there has been two additional monitoring wells that were installed on the west side of Pond 1N subsequent to

the May 2020 figure that's shown in this particular slide. So the groundwater network has actually been augmented and increased even since 2020. That was something we found out during the May -- during the May hearing.

Q. And just for the record, I note that I called this Page 60, but it's Page 61 of your PowerPoint, the Will County ongoing groundwater monitoring.

A. And, lastly, just let me note that the groundwater flow in the vicinity of the ponds is shown as being predominantly from the east to the west discharging to the Des Plaines River to the west.

Q. And the next slide, we've spoken briefly about it, but would you describe the GMZ and ELUC at Will County?

A. So the green hashing here on the left side of this figure on Slide 62 is signifying the GMZ. The ELUC, it largely is consistent with the GMZ. The ELUC, however, as Mr. Dorgan has noted before, it goes on the property deed. And because the property there in the middle isn't owned by Midwest Gen, we can't put the ELUC on that property.

The GMZ however, does apply to that property. And, again, the GMZ has been attained in response to the various remedial measures that were implemented pursuant to the CCA including the dewatering system associated with Ponds 1N and 1S and as well as the relining of Ponds 2S and 3S.

Q. Turning to Slide 63 of your PowerPoint in Exhibit 1701, this is your discussion of receptors for the Will County station.

Would you describe that?

A. Yes. So, again, similar to the prior two stations, we wanted to look at both on-site potential receptors as well as the surrounding land use, and the on-site land use is industrial. We expect that to continue into the foreseeable future. We talked at the beginning of this section about the historical or the surrounding land use in terms of what the potential receptors may be.

The lack of a potable shallow groundwater use is noted here in the second main bullet based upon the historical water well search that's been performed. The potable well use is prohibited by the ELUC in addition to there being no wells, and the GMZ is -- has been established and is being

actively monitored as well.

And then the potential off-site ecological receptors is primarily the Des Plaines River which is located off to the west of the ponds.

Q. You mention the GMZ. How does the GMZ relate to your analysis of receptors at Powerton? Or Will County, excuse me.

A. So the GMZ, that allows for groundwater -- a temporary exceedance of the groundwater quality standards in order to allow for the remedial measures to take effect. So that's the purpose of the GMZ is to -- is to allow for that -- those remedial measures to take place while the groundwater quality is being evaluated.

Q. Turning to Slide 64, this is titled, Will County Groundwater Testing, similar to the other stations. What does this graph show about the Mann-Kendall groundwater testing at Will County?

A. So the total number of downward trends is 27 percent compared to 16 percent upward trends, so a much greater number of downward trends than upward trends just in terms of the general trend.

When you look at the statistically significant downward trends in comparison to the

statistically significant upward trends, there's more than double the number of -- the number of statistically significant downward trends is more than double the number of statistically significant upward trends.

And jumping back to the pie chart, the 57 percent no trend data, again, similar to the prior two stations, of that 57 percent that ended up testing out as no trend, that was a total of 80, 8-0, trend test results. 62 of those were primarily related to the non-detect results which accounts for 78 percent of the no trends data.

Q. So I'm sorry. 78 percent of this no trend data is what?

A. Is primarily related to the non-detect.

Q. The non-detect?

A. The non-detect nature of the analytical results.

Q. Thank you.

And if we turn to the next slide on Page 65 of your PowerPoint, what is that identifying?

A. So this lists the specific groundwater wells that were utilized both for our surface water

analysis risk assessment as well as the trend testing.

Q. And I'll ask the same question we did before.

How close to the waste impoundments, the surface impoundments, are these monitoring wells?

A. So we believe that these wells are located quite close, about as close as they could practicably be to the downgradient boundary of the ash ponds which, as we've discussed previously, we believe makes both the trend analysis as well as the groundwater to surface water risk assessment analysis conservative and contrary to the opinion of Mr. Quarles that these wells are adequately located close enough to the ponds.

Q. And looking back at Slide 64 for a minute, what is your statement underneath the circle chart?

A. So, again, it's useful. We find it useful to drill down to look at the situations when we've got a statistically significant upward trend whether or not you've got a situation where you exceed the groundwater quality standard. And one of these five statistically significant upward trends, there happened to be a situation where the

Class 1 groundwater quality standard was exceeded.

Q. And what does that mean to you?

A. And that was at MW-9. What that means to me is -- I guess the way I can best phrase it is that nothing is perfect in nature. Our job when we assess this data is to -- is to look at the data from a high level perspective and to expect that you're going to have 100 percent of one thing or the other. It's just not reality. So it's a situation that exists, but do we think it has significance in terms of our overall assessment of a remedy, we don't.

Q. And the trend that you analyzed here, the downward trends, do you expect them to continue at Will County?

MR. RUSS: Objection, leading question.

HEARING OFFICER HALLORAN: Sustained, rephrase.

BY MS. NIJMAN:

Q. What do you expect to happen to the trends at Will County?

A. So with -- we've recommended that the existing Illinois and CCR rules continue to be followed including groundwater monitoring, including the closure process. There's no CCR

that's being produced at this site any longer, so there's no materials being added -- CCR materials being added to the pond. The closure is going to contribute to improved groundwater quality with time. So all these factors we believe are gonna contribute individually to the downward trends continuing.

And I'll just point out that in the event that they don't, there is a groundwater monitoring network that's in place, and we can deviate from the existing closure plans if needed if the groundwater data happens to show something unexpected moving forward.

Q. Going to Page 66 of your PowerPoint at Exhibit 1702, you're discussing the groundwater to surface water analysis or what we've been referring to as the risk assessment?

A. That's correct.

Q. And what were your conclusions with the Will County risk assessment?

A. The surface water standard that -- well, this just -- Slide 66 just lists the summary, so the --

Q. Oh, I can refer you to Page 46 of your

expert report.

A. Yeah, that'd be helpful. Hang on just a moment. So there was a -- with one exception, the constituent concentrations in the groundwater are compliant with the surface water standards. The exception was noted at Well MW-9 for PH, and what we indicate is that -- again, MW-9 is located some distance from the Des Plaines River itself. The assumption was that the surface water was present right at the well.

In fact, there's some distance where further natural mechanisms of groundwater flow will have an opportunity to take effect, and so it's believed that that PH that was noted at that well is going to ultimately result in a PH that meets the surface water quality standard before it actually discharges to the surface water, the Des Plaines River.

Q. How does your finding at MW-9 relate to your previous testimony about where these wells are assessed compared to surface water distance?

A. So these wells are assessed some distance away from the actual surface water. So I guess the way I could best describe it would be there's a

buffer zone further downgradient of these wells that's relevant as we're assessing this data.

Q. Let's turn to -- looking at boron again on Page 67 of your presentation, and again the remaining constituents that you reviewed I believe you said were in Appendix D?

A. Correct.

Q. So what are you showing on Page 67 as to the risk assessment relating to boron?

A. So this -- the bar graph lists the average concentrations of boron at the wells that are the subject of the evaluation, and the line at the top indicates the boron surface water standard. And the -- across the board there, the concentrations of boron that are noted in the groundwater in comparison to the surface water are substantially below the surface water standard.

And just one other point that I'd like to make in terms of the conservative nature of our assessment, in addition to the location issue of the monitoring wells, once surface water actually discharges -- I'm sorry. Once groundwater actually discharges into surface water, there's a mixing that occurs. And so the very nature of using

groundwater concentrations in comparison to surface water numbers, the surface water numbers are in surface water, and so this mixing is just going to further impact the groundwater as the groundwater discharges to the surface water which is just another layer that makes this assessment -- this risk assessment conservative.

Q. You again mentioned a second ago the location issue. And by location issue, what do you mean?

When I look at MW-07 on your chart, where is MW-07 being assessed as compared to surface water?

A. It's not -- well, it's not being assessed at the actual location where surface water discharge occurs which makes it conservative because the assumption is that the surface water discharge would occur right at that well.

Q. Have you had the opportunity to visit the Will County station personally?

A. Yes, I have.

Q. And were you able to see the Des Plaines River during your visit?

A. Yes. We did observe the river.

Q. And you were -- I think you said you were here during Mr. Gnat's testimony?

A. Correct.

Q. And did you see -- what did Mr. Gnat say in your recollection about whether he saw seeps?

A. So my recollection is that seeps are not observed along that part of the station, and we observe -- while we were there we observed the -- we observed the river, but from our vantage point we couldn't necessarily see the slope of the river.

Q. I'd like to go to Exhibit 1102 which is Mr. Quarles' rebuttal report.

A. All right.

Q. And if you turn to Page 30 of that report -- are you there?

A. I am, yes.

Q. So you see in Section 2.4.6, Mr. Quarles has comments about Will County?

A. Yes, I do.

Q. And in his first sentence he makes a citation to WCG which is your Weaver at 68?

A. Yes.

Q. What is your understanding of his reference to the pages in your report?

A. So I believe he -- Mr. Quarles has a statement at the front of this report indicating that those pages are to the PDF and not necessarily to the sequential page numbers in the hard copy of our report which makes it a little confusing if you're looking at a paper copy, but I believe that's what's indicated in his report.

Q. Okay. And on the top of Page 31 of the rebuttal report, do you see where Mr. Quarles is discussing an investigation of the former slag bottom ash disposal area and the area east of Pond 1 North?

A. Yes.

Q. And looking at that paragraph at the last sentence, what is Mr. Quarles saying about consistent methodologies here?

A. Are you speaking about the bullet on the top of Page --

Q. No, the first paragraph under the bullet?

A. Okay.

Q. The last sentence.

A. Okay. Where he claims that a completed nature and extent investigation?

Q. Correct.

A. Okay. I think what he's trying to say here is that basically we haven't done enough or that the historical investigations have not been sufficient or have been haphazard or inconsistent in some way.

And, you know, my response to that is that, first off, the historical investigations were done for different purposes. The 1998 Phase 2 ESA wasn't even coordinated by Midwest Gen, so that was done for a completely different reason.

And then, secondly, the phase -- the CCB investigation that was performed to the east of ash pond -- of the Ash Pond 1N, again, the purpose of that was to evaluate the CCB characteristics of those materials. So each of those investigations was done for different purposes. So to expect that you would have a consistent comprehensive investigation related to those two -- those two investigations, just isn't -- it's not warranted.

Q. In your experience is it -- how often would you see or do you see one area of a site investigated more than another?

A. Quite often. You know, we try to avoid a one-size-fits-all approach. We will try to use all

data that we've got at our disposal whether it's boring data, groundwater data, historical data. We try to use that to come to as comprehensive an understanding as we can in terms of -- within the applicable regulations that we're working under in order to help guide where we investigate.

So it's sort of the same ideas as the lines of evidence idea that we've put forth in our looking at with the historical fillers at these stations. We have some information, and we're gonna use that information to the best that we can to try to figure out where we want to investigate maybe in a little bit more detail and maybe where we want to investigate in a little bit less detail, depending on what data we might have at the time.

Q. And what is your opinion about the sufficiency of the investigation for your remedial assessment at Will County?

A. So when you take a sum total of the historical data that's been collected, we believe that it is sufficient in order to help inform the remedy that we have put forward.

Q. Let's turn to Slide 68, and if you would describe the factors that led to your conclusion.

A. Sure. So there's background data that's been utilized from upgradient wells to -- it is used to help assess the regulated units. We've collected regular groundwater elevation contour maps to show what the groundwater flow configuration has been over time. The -- we don't have evidence of groundwater flow from the ponds in the -- to the west in the direction of the upgradient wells making the data on the west side of the ponds upgradient.

The units are undergoing the process and are scheduled to close under the CCR rules, both the federal and the state rules. So we are certainly recommending that those regulations continue to be followed, that those steps be taken.

The trend testing at the downgradient monitoring wells on the west side of the ponds, as we've talked about, does show improving groundwater quality over the long term. And, again, that data was collected from 20 -- the end of 2010 to 2020. So there's a substantial quantity of data.

Given that the station isn't producing CCR any longer, the ponds are going to be undergoing closure. The downward trends we do expect to

continue. And the off-site risk assessment with comparison of the surface water standards is indicating that we don't have an unacceptable off-site risk to potential receptors in the Des Plaines River.

Q. And turning to Slide 69 of your PowerPoint in Exhibit 1702, what is your remedy assessment for Will County?

A. Yeah. So this -- these bullets summarize the four main points of our recommended remedy, and that is as Midwest Gen has done to this point, continue to follow the -- as they've taken the steps to this point, continue to follow the federal and state CCR rules. Regular groundwater monitoring should be continuing under the CCR rules, both the federal and the state.

The closure of the CCR surface impoundments is part of continuing to follow the federal and state CCR rules, so that would warrant its own bullet here because that's particularly important. And to the extent that these proposed federal rules and the state rules that may pertain to historic fill areas, historical landfills, to the extent that those may become promulgated at

some point, if those do become regulation, that the station -- if there are areas of the station that are found to be applicable under those new rules, that those new rules be followed as well.

Q. And how did your previous discussion of the GMZ at Will County relate to this remedy assessment?

A. So the GMZ is again integral to our remedy. The GMZ is there to allow the time for the remedial measures that have been previously implemented to take effect, and it -- a GMZ to some degree goes hand in glove with an MNA approach. And our recommendation is to continue to follow the MNA approach based -- and continue to monitor in order to confirm that the trends that we've observed to this point will continue.

Q. And how is -- what is your opinion as to whether you're selected remedy assessment is technically practicable to implement?

A. Yeah. There's a nice historical record at many sites of monitoring natural attenuation being a viable method, so that's -- that certainly makes it technically practicable. There's -- similarly, there's, you know, many CCR ponds that are

undergoing a closure process and following the CCR rules, so that makes that part of it technically practical as well.

Q. And similar question, how does this opinion relate to -- your opinion on remedy assessment relate to whether this is economically reasonable?

A. Yes. Certainly in comparison to some of the other remedies that we considered at least at a high level, the -- this particular remedy, it is more economically feasible than a number of other remedies that at least were part of our evaluation process such as pump and treat or removal.

MS. NIJMAN: Mr. Hearing Officer, it's five to twelve. This is the end of this station, so it to would be a good time to --

HEARING OFFICER HALLORAN: Okay. That's good. Before we go off the record, I did take a look at my May 15 notes when Midwest offered Exhibit 1111. I took it as an offer of proof. However, I believe Ms. Nijman is correct that experts can rely on articles, opine on articles that are not in evidence. With that said, I would allow the direct testimony to stand, and I will allow Midwest

obviously cross outside the offer of proof.

MR. RUSS: Thank you.

HEARING OFFICER HALLORAN: Anyway, try to be back here at no later than five after one, please. Thank you.

(WHEREUPON, a short recess was taken.)

HEARING OFFICER HALLORAN: All right. Good afternoon, everyone. We just came back from lunch. I thank everyone for getting back here before one. We have some public comment we've agreed to take place at 1 o'clock. I believe we have three or four people. You can step up, and we had a public comment here this morning. She sat here in front of the court reporter. Maybe sign your name, and I think we agreed to like around three minutes each.

MS. BUGEL: And, Hearing Officer, we just have two members of the public to comment.

HEARING OFFICER HALLORAN: Okay. You may proceed.

MS. ORTIZ: My name is Destiny Ortiz. I'm a resident of Romeoville, Illinois, and an elected member of the Will County Board. The Will County Generating Station is less than two miles from my

home and is adjacent to the Des Plaines River and the Heidelberg Materials, formerly known as the Hanson Materials Service Quarry, which is set to contain their blasting area. The dangerously close proximity of the blasting is likely to damage the coal ash pond liners cracking the structures and causing contaminants from the waste ponds to leach into the groundwater, private wells --

HEARING OFFICER HALLORAN: If you could slow down.

MS. ORTIZ: Sorry.

HEARING OFFICER HALLORAN: I'm not transcribing it. Rae is.

MS. ORTIZ: Oh, I'm so sorry. I'm sorry.

HEARING OFFICER HALLORAN: Thank you.

MS. ORTIZ: Thereby further limiting the scarce clean water sources. Last week Midwest Generation hosted two public hearings where I presented a bipartisan statement rejecting their proposal for a cap-and-place closure method for four coal ash ponds in my district.

The statement signed over -- signed by over 20 local and state elected officials reads as follows, signed on June 7, 2023, and addressed to

Midwest Generation's CEO, CPO and the Illinois EPA Director. We support the residents of Romeoville and the surrounding areas who are petitioning for the clean closure of the Will County Generating Station's coal ash ponds by excavation and complete removal of the ash from the waste ponds. We demand Midwest Generation amend their proposal to cap and place and instead remove the ash from the ponds for beneficial reuse to a federally regulated lined landfill away from water sources.

The groundwater near the Will County Generating Station is reported as contaminated from coal ash at a magnitude that exceeds federal health based guidelines since soil testing showed that arsenic and molybdenum contaminants were twice as high as safe levels recommended by the EPA. Romeoville relies on aquifers for its water supply, and recent studies have revealed that these aquifers are not viable long-term sources for the village's potable water supply.

Midwest Generation should not be allowed to put people's water supply at risk as Romeoville will soon need a new source of clean water. It's crucial for Romeoville where the water is such a

precious resource to make sure that the water is left as clean as possible. The cap-and-place closure does not prevent leaching by groundwater contact with coal ash underneath the cap. And if the cap is left in contact with groundwater, toxic contaminants will -- I'm sorry. If the ash is left in contact with groundwater, toxic contaminants will continue to leach into the drinking water and perpetuity.

Cap-and-place also leaves coal ash ponds permanently vulnerable to catastrophic failure due to floods or cap failure during extreme storms. Removal of the coal ash mitigates both the source of groundwater pollution and the risk of catastrophic spills from impoundment failures due to floods and other extreme weather events.

Clean closure is a permanent solution to waste pond water pollution and allows restoration of wetlands, rivers, streams and lakes. Clean closure of coal ash ponds is a more thorough process that employs more people and therefore leads to greater wages and spending in the community.

Our community is calling on Midwest

Generation to submit an application to the IEPA to remove the coal ash from the Will County Generating Station's waste pond. We hope that one way or the other this is made possible. Thank you.

HEARING OFFICER HALLORAN: Thank you. The Board thanks you for your public comment.

MS. ORTIZ: Thank you.

HEARING OFFICER HALLORAN: Good afternoon.

MS. TAYLOR: Good afternoon, everyone. I'm Waukegan Mayor Ann Taylor. The City of Waukegan is home to, according to the census, approximately 90,000 residents; however, we know we service 125,000 to 127,000. It is a 64 percent Latino community, 19 percent Caucasian and 17 percent African American, and I'm here today to speak on their behalf.

Before I begin my statement, I want to thank the dedicated members of this Board for all their work to restore, protect and enhance the quality of Illinois' environment. I appreciate you allowing me to make this statement today.

Midwest Generation's coal plant in Waukegan has negatively impacted Waukeganites during the operation and continues to negatively

impact residents since it ceased its coal-fired operations last year. The coal plant in Waukegan, unlike many other communities, is very -- in very close proximity to Lake Michigan, adjacent to the Waukegan municipal beach and the city's water treatment plant. Our Waukegan residents, both young and old, have increased rates of asthma and upper respiratory challenges.

Midwest Generation has not been a good partner with the city. The city has been requesting that Midwest Generation clean up all the toxic coal ash from the coal ponds in the city and other surface coal ash, but they have blatantly refused. This has happened even as Midwest Generation's own hazard assessment states that a hypothetical failure at their coal ash ponds quote, unquote, has the potential to flow directly into Lake Michigan and cause off-site environmental impacts.

Despite overwhelming public input in favor of removing all the coal ash from the site at their public closure meetings, Midwest Generation has not changed its original plans to leave unlined coal ash at the site. The company wants to do even less

than the bare legal minimum and not what is right or best for the residence of Waukegan.

The scientists and experts hired by NRG themselves have reported unacceptable high levels of toxic metals in the groundwater around the Waukegan plant. Groundwater testing at the site shows that arsenic exceeds safe levels in the groundwater monitoring wells by over 2,000 times. Boron levels are more than 16 times Illinois' drinking water standard, and chromium exceeds safe levels by more than 480 times. Lithium, mycelium and sulfite also exceed safe levels many times over. These toxic metals cause cancer, neurological congenital disabilities and can harm the liver, kidneys, stomach and reproductive organs.

Waukegan already has five EPA superfund sites within its borders. Waukegan residents can't afford the costs associated with another environmental disaster caused by a private company, a company that will just reported having a net income of $1.2 billion last year.

I'd ask every person on this Board, would you allow a company to do this to your family or to

your neighbors? Waukegan residents deserve better. They deserve to be listened to. They deserve to be heard. They deserve clean and safe drinking water. And they deserve not to have to worry about what happens to unaddressed coal ash and how it'll impact their children and grandchildren in years to come.

Today I ask that the Illinois Pollution Control Board consider our Waukegan residents and take urgent action to ensure that Midwest Generation removes the coal ash from the coal ash ponds and all other surface coal ash. In short, we want Midwest Generation to treat Waukegan residents respectfully. In doing so, they will help protect current Waukeganites and residents for generations while protecting Lake Michigan, a vital and irreplaceable water source for millions of people. Thank you.

HEARING OFFICER HALLORAN: Thank you, Mayor, for your comment.

MS. TAYLOR: Thank you.

HEARING OFFICER HALLORAN: We can call your witnesses, Ms. Nijman.

MS. NIJMAN: Certainly.

HEARING OFFICER HALLORAN: Mr. Dorgan, Mr. Maxwell, you're still under oath.

BY MS. NIJMAN:

Q. Mr. Dorgan, if you would turn to Page 70 of your PowerPoint which is Exhibit 1702 and let's go right to the -- well, just so I understand, I believe you said at the beginning of your testimony that you took the lead for the Waukegan station; is that a fair statement?

BY MR. DORGAN:

A. Yes, that's correct.

Q. And turning to Page 71 of your PowerPoint, as with the other stations, would you describe the review you undertook of background and setting?

A. Yes. So we initially just wanted to frame our basic understanding of the history and the setting of the site. In this particular case, the plant began operating in 1923. Midwest Gen acquired the property in 1999. Just last year in June they ceased burning coal. And the surrounding land uses are a mix of primarily industrial properties.

To the north we have the Johns-Manville superfund site. To the west we have the former

Griess-Pfleger Tannery and also General Boiler properties. To the south is the waste water treatment plant, and then of course to the east as you can see in the figure is Lake Michigan.

Q. Turning to your next slide, Slide 72, what are you describing here?

A. This is just to provide the geographic context of the historic fill area that had been identified in previous phases of this matter known as the former slag area or often times also just referenced as the FS area, and that's shown just to the west of the west ash pond.

Q. And if you would refer to the second to last page in this PowerPoint which is the summary of the ponds that you -- that Weaver created, would you provide me a summary of what's the status of the two ponds listed at Waukegan?

A. Yes. So as I mentioned, the site's no longer burning coal. So it's no longer generating ash, and therefore neither the east pond or the west pond is currently receiving ash. Both of the two ponds are regulated under both the federal and state CCR rules. They were initially lined in 1977 and went through modifications to those liners in

the case of the east pond in 2003 and the west pond in 2004.

And then there are closure plans that are in place for them with respect to their closure, and in one instance they plan on reusing the west pond for other needs for liquids management. And there is an adjusted standard that was -- that's pending to address that. In the case of the east pond, that's proposed for a cap-and-place, and there's an alternate closure demonstration that's been submitted in support of that.

And then, finally, both the east and the west ponds are covered under a detection monitoring program and then also the CCA monitoring requirements.

Q. And if we turn to Page 73 of Exhibit 1702, what are you presenting here?

A. So as we've done with the other three stations, this figure captures the past environmental investigations that have occurred and specifically shows the locations of individual samples, wells, sediment samples. The legend on the left side references which particular investigation that these borings and monitoring

wells and samples were collected.

Q. And I've asked this with other stations, why was it relevant for you to place this all on one map?

A. To provide a visual of the investigations that have occurred at the site and the coverage of the site through those investigations.

Q. Turning to Page 74 of Exhibit 1702, would you describe this summary?

A. Yes. This is, again, a chronological summary of the past investigations that identify the first was prior to Midwest Generation's ownership of the site performed in 1998. It was a Phase 2 environmental site assessment. Then Midwest Gen first initiated further investigation of the site in 2005 when they did a geotechnical investigation proximal to various ponds located on the property.

Then in response to the request from the agency to investigate their ponds, they implemented an investigation in 2010 which involved the advancement of monitoring wells. And then in 2020 there was an investigation performed of the FS area specifically that was also undertaken by KPRG. As

I mentioned, there is ongoing groundwater monitoring occurring under both the CCR rules and the CCA.

Q. Okay. Looking at your next slide, Slide 75, what about the Phase 2 ESA was relevant to your analysis of Waukegan?

A. Well, the Phase 2 provided understanding of the site hydrogeology, the groundwater conditions at the time of the investigation, some of the soil conditions. As referenced here, that investigation included 22 soil borings with 5 monitoring wells installed. There were 13 surface oil samples collected and 6 sediment samples.

Q. And the second bullet you have B-22 noted. What is the relevance of that?

A. Yes. That was a specific boring advanced just at the north -- northern end of the FS area west of the ash -- west ash pond. And the significance there, the findings of the sampling that were done, was that other than arsenic, the RCRA metals in that sample were all below the Tier 1 site mediation objectives under TACO.

And the arsenic concentration that was

detected was at 14 milligrams per kilogram which is just slightly against the site remediation objective which is based on area background of 13 parts per million.

Q. And what were the conclusions drawn by the consultants in 1998?

A. Their basic conclusions was that groundwater ingestion was not a concern based upon the absence of potable wells, based on the industrial land use that there was a low potential for human exposure to the constituents of concern. And their opinion at the time was that there was no requirement under Illinois environmental law to further investigate or remediate the site.

Q. I'd like to turn to Page 76 of your PowerPoint. What are you referencing on this map?

A. So Waukegan has two locations just to the west of their property that were historical industrial operations. The one that's highlighted with the yellowish circle is the former Griess-Pfleger Tannery, and then also south and east of that you can see the former General Boiler site. Both of these sites are known to be causing contamination that is migrating from those

properties onto the Waukegan station property.

Q. Why was it important to you to call out these off-site sources?

A. It just shows that there are other contributing factors to the groundwater quality at the site that will need to be considered as part of an ongoing evaluation of the risks and the remedy.

Q. And do you recall what the Board found in its interim order regarding these locations?

A. I believe the Board recognized and acknowledged that there was contamination coming from these properties onto the Waukegan station.

Q. The next slide, 77, is the 2005 geotechnical investigation. And briefly describe that as you did with the other stations.

A. Yes. That was done to begin collecting data about the conditions around their ponds as they were beginning to consider what their operations and maintenance needs needed to look like and even some preliminary planning around potential upgrades to liner systems.

Q. The next slide, Slide 78, Exhibit 1702, would you describe the key factors that related to your assessment concerning the 2010 hydrogeologic

investigation at Waukegan?

A. So their initial efforts resulted in these five monitoring wells being installed. That was done voluntarily through discussion with the IEPA. This was before the CCR regulations came into play. Groundwater was sampled from each of the five wells. Fourteen of the potential CCR related analytes were not detected as part of that sampling event.

However, antimony, arsenic and boron were detected above the Part 620 groundwater quality standards downgradient of the east pond during that one sampling event. However, there were also concentrations that exceeded the Class 1 groundwater standards in the upgradient well, and those were for more on manganese sulfate and total dissolved solids.

Q. On that last point, the last bullet, why was that relevant to you?

A. It showed that there were conditions impacting MW-5 that were not likely related to the pond operations themselves.

Q. Turning to the next slide, Slide 79, would you describe the continuation of the 2010

hydrogeologic investigation?

A. So the findings of this investigation helped assess the type of soil stratigraphy present at the site which was described as being predominantly sands and silts underlain by sand and gravel. The uppermost groundwater unit was encountered at depths of approximately 22 to 23 feet below ground surface.

The well network installed. They determined that the groundwater flow was to the east towards Lake Michigan, and then they did a water well search and found that there were no water wells located downgradient of the ash ponds that would have been used for potable water purposes.

Q. As to this last point on the water well search, have you had opportunity to review updated water well searches?

A. I have. I understood that there was the requirement that as part of their permitting process that an update to the water well search be performed.

Q. And do you know if that was for all four stations?

A. I believe so.

Q. And do you know if there were any changes or a significant change to --

A. I don't -- I don't believe so. I don't -- I think it was consistent with the earlier findings in terms of downgradient groundwater wells.

Q. Turning to the next slide, Slide 80 of Exhibit 1702, what are you referencing here with the 2020 FS area investigation?

And I can refer you to Page 41 of your expert report, if you want.

A. So this figure is showing a callout of the FS area. You can see that the mapping to the left is a blowup of the area immediately to the west of the west pond, and it shows the location of 40 probes that were advanced. They were done on a 1,000-by-400-foot grid. In this investigation they found that coal ash was present ranging from near the ground surface to varying depths between 7 and 17 feet below ground.

They used the natural PH LEAF methodology for the various metals associated with CCR materials to evaluate the leach potential of those constituents. And the concentrations were

primarily below the Class 1 groundwater quality standards. Although, they did find boron at three locations and arsenic at one location that exceeded those standards.

Q. Do you know why this analysis was performed?

A. There was documentation in the record of this alleged presence of this slag fill area west of the west ash pond. It previously mentioned the groundwater quality that was detected at MW-5. So there was a feeling that further evaluation of this specific suspected area was necessary to further evaluate the contributions to MW-5.

Q. Let's turn to Page 81. You already mentioned the ongoing groundwater monitoring.

Would you describe the details of that monitoring that occurs at Waukegan?

A. So at present there are a total of now 12 monitoring wells that have been installed around the ponds in the FS area. Those 12 wells are subject to both the detection monitoring under Appendix 3 and the assessment monitoring under Appendix 4.

They also include the constituents

required under the Illinois CCC -- CCR rules. Quarterly sampling is taking place and has been since 2012. And so at present they're sampling and analyzing for 34 constituents 4 times a year for a total of 12 wells.

Q. Turning to your next slide, 82.

What are we describing in here?

A. So these are two environmental land use controls that have been attached to the property. The heavy -- well, they're both relatively heavy, but the darker dashed area on the western part of the site was actually implemented at the request of the adjacent property owner. That was done voluntarily by Midwest Generation to prohibit the installation of potable groundwater wells within that area of the property to avoid creating receptors to the groundwater contamination migrating from the adjacent former tannery site.

And then the other ELUC which is shown on the southern half of the site extending from the eastern boundary of the western ELUC all the way to Lake Michigan, that is the ELUC that was put into place pursuant to the 2012 compliance commitment agreement.

Q. How do these ELUCs relate to your opinion with regard to risk?

A. They're one element in our evaluation of the potential receptors being impacted by the groundwater at the site. The presence of this area having been covered under an ELUC eliminates the potential for groundwater wells to go in and keeps there from being receptors that could come in contact with the groundwater.

Q. Is an ELUC in and of itself a remedy?

A. Not necessarily. An ELUC is often done as part of a remedy to acknowledge that there are groundwater impacts and that those groundwater impacts need to be managed by avoiding people coming in contact with the contaminated groundwater.

Q. Turning to your next slide, Slide 83, would you discuss your analysis of potential receptors for the Waukegan site?

A. As I mentioned with the first slide, this is in a very heavily industrialized area that's been that historically. So the site to the north we have a superfund site across East Greenwood Avenue. We have both the Griess-Pfleger and the

General Boiler sites to the west that have gone through an SRP process. We know from those sites we have contamination migrating onto the Midwest Generation station.

We've got the sewage treatment plant to the south, and then further to the south of that we have another superfund site. So it's a pretty, pretty heavy industrialized area that's likely to stay that way for sometime to come.

And then ultimately we wanted to -- obviously as part of our risk evaluation, we're looking at potential receptors. The fact that there weren't any wells in the downgradient location that would be impacted by station conditions was a variable that we considered, and of course the future installation of wells is restricted by the presence of the ELUC. And then ultimately we considered Lake Michigan as a potential off-site receptor as well.

Q. Now, you noted the ELUC on your map, but not a GMZ; is that correct?

A. That's correct.

Q. Do you know why there's no GMZ at Waukegan?

A. As I understand it, the GMZ was not considered for Waukegan because of the timing on the pond relining and the requirements of the CCA.

Q. What do you mean about timing of the pond relining?

A. Well, the ponds at Waukegan were undergoing their relining before the CCR regulations came out, and so they were still being done on a voluntary basis with the agency.

Q. When we were looking at your chart of ponds, I think you noticed -- noted on Waukegan -- well, let me do it this way.

If you could -- I can refer you to Page 32 of your report where you discuss an ASD for Waukegan, alternate source demonstration?

A. Yes.

Q. And when you noted that on Page 32 in your discussion, what was the relevance of that discussion?

A. Well, what KPRG had determined was that there were statistical evaluations that determined that in the downgradient wells there were statistically significant increases for boron, PH and sulfate. And the alternate source

demonstration was designed to evaluate those particular constituents with respect to the condition of the ash within the ponds themselves.

Q. And was it relevant to your remedy assessment at Waukegan to know that alternative source for those constituents?

A. It was an element of understanding the potential contribution from the ponds themselves relative to the findings of the alternate source demonstration.

Q. And how did that fit into your assessment, your remedy assessment?

A. It let us know the conditions of the ponds and the contributions from the ponds wasn't driving the conditions that were being observed in those downgradient wells.

Q. And does your remedy for Waukegan account for the fact that there might be an alternative source -- alternate source in that area?

A. Yes, it does.

Q. How does it do that?

A. Two components, one is the continued evaluation of the downgradient conditions with respect to off-site receptors, both groundwater and

ecological. And then as our report indicates, we've considered additional actions for the former slag area as well.

Q. Let's turn to Page 84 of your PowerPoint in Exhibit 1702. This is entitled, Groundwater Trend Testing.

As you did with the other stations, would you describe the Mann-Kendall trend testing done for the Waukegan station?

A. Yes. So in the three previous stations we had similar presentation. The same methodology was used to evaluate the data at Waukegan. We have presented it the same way on this particular figure. The high points are that the no trend results accounted for 60 percent of the overall output. Somewhat unique from the other three locations, the downward and upward trends were more evenly divided. In fact, there's a slightly more number of upward trends than there is downward trends. 21 percent of the trends were upward while 19 percent were downward.

The other three sites were relatively consistent. This one's a little bit unique that way. However, of those trends, when you look at

the graphs on the right, the downward trend, roughly 9 of the 26 were deemed to be statistically significant, and you have of the upward trends, 6 out of the roughly 28 are deemed to be statistically significant. So that ratio held somewhat consistent.

Q. And why was that relevant to that ratio?

A. It is telling us that of the trends that are occurring, even though they're relatively similar in terms of total number, the statistically significant trends weight toward the downward from the upward. So that is demonstrating some ongoing groundwater improvement, but the trends themselves are more evenly divided.

Q. As to the no trend data, were you able to develop or drill down into that information as you did in the other stations?

A. I did. And I would again defer to Mr. Maxwell since he crunched the numbers.

Q. Mr. Maxwell, what was found with regard to the no trend data at Waukegan?

BY MR. MAXWELL:

A. What we found was out of the 81 no trend test results for Waukegan, 67 of those 81 were

primarily related to non-detect analytical results which accounts for 83 percent of the no trend results on the chart.

Q. And would you explain the notation at the bottom of the circle chart?

BY MR. DORGAN:

A. Yes. As we did with some basic takeaways from our evaluation of the trend testing, we noted that with the exception of boron at MW-2 there was no well with a statistically significant upward trend that had exceeded the Class 1 groundwater protection standards.

Q. Turning to your next page, Page 85 of Exhibit 1702, would you describe the wells being shown on this map?

A. Yes. The four wells east of the east ash pond were the wells that we used for both our risk assessment and our analysis for potential risks to the surface water bodies.

Q. And is that -- are those the same wells as used for the risk analysis?

A. Yes, they are.

Q. And how close in your opinion are those wells to the --

(Reporter clarification.)

BY MS. NIJMAN:

Q. How close are those wells to the boundaries of the pond?

A. They are quite close. They sit just off the perimeter access road that routes around the east side of the east ash pond.

Q. Would you determine whether there's -- is there any concern in your mind that these wells are too far downgradient from the ponds?

A. No.

Q. We mentioned in the other stations that the location of these ponds was conservative.

Can you describe that here at Waukegan?

A. I think how we've been discussing that is because these wells which are already there providing monitoring for the east and west ash ponds, they are near the ponds and not near the downgradient property boundary, which is what we would normally be looking at, so that we feel looking at those with respect to the chemistry conditions in them is conservative and that the distance between there and the nearest surface water body there'd be natural geochemical

interactions occurring that would further lower the concentrations by the time that water would reach the adjacent surface water. So from that perspective we consider that to be a conservative evaluation.

Q. How did your trend analysis at Waukegan -- how is it relevant to your opinion for Waukegan, your ultimate remedy opinion?

A. Well, the trend analysis showed us we had slightly different conditions going on at Waukegan than we did at the other sites. Ultimately, we did feel as though we've got good protection for the off-site receptors and potential receptors for both the groundwater and surface water, but we did feel as though additional actions relative to the slag area would be warranted.

Q. Turning to Page 86 of Exhibit 1702, that's the risk analysis that we've been talking about?

A. Yes, that's correct.

Q. And would you describe what's on this slide for Waukegan's risk analysis?

A. Yes. This is the surface water component of that risk analysis. What we did as we did with the other stations, we took a look at the historic

data record for the groundwater wells and the wells that we referenced previously. We created average groundwater concentrations using the Sanitas software.

What we found is that the constituents were non-detect in 75 percent or more of the samples, and the report -- in those instances the reporting limit rather than half the reporting limit was used for purposes of the trend testing. Often -- and the surface water, the averaging of the groundwater.

Often times in certain applications, one day is non-detect. You might use half the detection limit, but another means to create more conservatism was to use the full reporting limit. And then the constituents analyzed are the CCR constituents under Appendices 3 and 4. And then that groundwater data was compared to the surface water standards that we've -- same surface water standards we've discussed previously.

Q. I can refer you to Page 47 of your expert report where you discuss the findings of your risk analysis.

A. 47?

Q. 47.

A. Yes. So second paragraph of that page, our conclusion was that the results of the surface water risk evaluation indicate that downgradient groundwater conditions at each of the four stations do not pose unacceptable risk to surface water receptors.

And it's WCG's opinion it's consistent with the expert report of John Seymour who concluded that it was his opinion that groundwater conditions do not pose risk to surface water receptors.

Q. You noted a finding in the paragraph above on Page 47 that there was a different view as to Monitoring Well 1.

Can you describe your analysis there?

A. Yes. At Monitoring Well 1, the difference of MW-1 was that there was a slightly higher PH concentration than in the other wells. That PH concentration was measured at an average basis at 9.74 units, and the surface water standard for PH ranges between 6.5 and 9. So in that particular instance the average concentration for PH does exceed the surface water concentration.

Q. And what was the conclusion in the risk analysis for MW-1?

A. Well, as I've mentioned previously as we've noted here, there's approximately 700 feet of distance between MW-1 and Lake Michigan. So those processes of absorption, diffusion, dispersion, would be having an impact on that PH as it migrated eastward, and we felt would not be at a concentration exceeding those surface water standards by the time it reached the surface water body.

Q. Turning to the next slide in 1702, as we did with the other stations, would you review the risk analysis findings for boron at Waukegan?

A. Yes. Again, this was provided as an example of one of the constituents that were averaged. This is boron again showing the range of concentrations on the left-hand side, the Y axis. The wells themselves are along the X axis at the bottom.

We show the average concentration for boron for both total and dissolved at each of those four wells. And then the blue bar across the top of the graph shows the groundwater protection or

the surface water protection standard.

Q. And as with the other stations, for this testing looking at, say, MW-2, what was the location of MW-02 relative to the actual surface water?

A. Again, this is roughly 700 feet from the surface water. So similar to the discussion about PH, these concentrations would likely be much lower through these other hydrogeochemical processes by the time it would reach the surface water.

Q. So does your analysis account for any travel time as we see it on this Page 87?

A. Yes, it does. It picks up that distance that the groundwater would -- you know, one way of looking at this as it's been described previously would be even if the -- these wells were right at the beach for Lake Michigan and this groundwater was flowing directly into Lake Michigan, it would not be flowing in at a concentration posing a risk.

Q. You had the opportunity to visit the Waukegan station?

A. Yes, I have.

Q. And you just talked about the 700-foot distance to the lake. Given that

distance, what is your opinion about the potential for seeps?

A. I don't think it's likely, and I believe there's been previous testimony that others that have walked and inspected those areas of the downgradient slope from the site have not seen any seeps.

Q. Turning to Page 88 of Exhibit 1702, would you summarize the main points relating to your remedy assessment at Waukegan?

A. Yes. So we have quite a bit of background data from upgradient wells that help us understand contributions to what's going on at the regulated units. There's regular groundwater elevation data that's being contoured and contour maps that are showing a consistent groundwater gradient.

There's no evidence of groundwater flow from the ponds to the upgradient wells. And as noted previously, the units that have been receiving coal ash are no longer receiving them now, nor will they in the future. And the ponds will either be closed or repurposed for other needs.

The trend testing that we've done on the

downgradient groundwater wells shows that the downgradient groundwater quality shows that they're lightly more upward trends than downward when you look just simply at the trends, not at the statistically significant trends. We don't think that that's entirely unexpected given the presence of what we know coming from off site and upgradients and also what we believe to be contributed from the uncapped fill area to the west of the west pond.

And as a consequence, we believe that a remedy for that area is warranted so that as part of that remedy a groundwater management zone would be instituted coupled with what's already in place from an environmental land use control to continue providing adequate protection of potential receptors. But even with that, in looking at on-site and off-site, we don't see that there are receptors present which would support the overall strategy that we're proposing.

HEARING OFFICER HALLORAN: Ms. Nijman, could you raise your voice a little, please? Thank you.

BY MS. NIJMAN:

Q. Referring you to Slide 89 on Exhibit 1702,

what was your remedy analysis then for Waukegan?

A. Several components to that. Consistent with the other stations, we feel as though the federal and state CCR surface impoundment rules should continue to be complied with and to continue following the steps necessary to close the surface impoundments. We agree that the continued monitoring of the groundwater is appropriate under the various frameworks that are already in place.

We believe, as I noted, to close the surface impoundments and repurpose them as needed. We have proposed a presumptive remedy including a capping of the FS area. And then consistent with the other three stations, we know that there's both a state and a federal rulemaking that's in the process and that when they, assuming that they are, and when they are promulgated, that whatever those requirements may lay out as it applies to the station, that they be followed.

Q. And let's turn to the next slide which describes, I believe, the presumptive remedy, the cap you mentioned.

Would you describe that, please?

A. So we know that there's some cover on the

fill area as shown by the borings that were done and by the fact that it is supporting a vegetative cover, but that is not an engineered cover. So we're proposing to have a low permeability cap installed over that area which we have used regularly to address similar conditions at other sites both in Illinois and in the area as a whole.

What that cap will do and based upon preliminary modeling that we've already done using standard modeling software is basically eliminate the infiltration of rainwater into the unsaturated ash that would exist below the cap once the cap is installed. You can see it goes from 0.4 inches per year to 0.0003 inches which is nearly -- it says here a 99.9 percent reduction. So we'd basically be eliminating ongoing contribution of rainwater migrating through those unsaturated fills. And then we feel that that will help us drive the groundwater conditions to a condition below the Class 1 groundwater standards quicker than if nothing was done.

And then of course we have this complicating factor of the federal and state historic fill area rules that may have an influence

on what happens here as well. So there's some timing issues with respect to when this cap should be done versus when there's some certainty around what those rules may require for this area.

Q. When you say that about the timing, what is your concern?

A. Well, I think we've highlighted previously that there have been past actions that Midwest Gen has taken voluntarily before the rules came out, and after the rules came out, those voluntary actions had to be redone to bring in particular with the lining of the ponds into compliance with the rules after they were promulgated.

And so we're just leery of there being conflicts between what might be done as part of our proposed cap remedy which we think is appropriate -- an appropriate remedy given the circumstances of the site, but also want to be careful that we don't have to go back and redo something if the new rules demand other actions for these types of areas.

Q. How does your analysis of the cap over the FS area relate to what you explained yesterday about the mass of contaminants that exist -- a

finite mass that exists in CCR?

A. So I think yesterday I mentioned that our primary concern with the former slag area is that there is a majority -- in fact, the analysis we've done says something on the order of 80 percent of the waste materials that are there are in the VADOSE zone. That's in the area above the groundwater table so that they're not in regular contact with groundwater.

We do acknowledge that approximately 20 percent of that waste mass is in contact with the groundwater, but the part that's in contact with groundwater has been for many years based upon our understanding of this -- the ash that's in this particular area.

So as you mentioned, there's a finite amount of inorganics that are contained in that ash that will leach out over time, and that amount of leaching will diminish with the passage of time. However, the same can't be said for the ash in the VADOSE zone. So as precipitation events occur, the surface water, some will shed off of the area, but much of it will infiltrate through the soil cover, through the ash materials, ultimately down to the

water table.

And so our remedy would cut that migration potential off. So we would have a situation where those VADOSE zone ashes which are regularly wetted and given the opportunity to leach materials from the ash, we would eliminate that because there would no longer be rainfall infiltrating through the VADOSE zone ash materials.

Q. You mentioned a few minutes ago that the off-site groundwater from off-site sources, I think you said the tannery and the boiler?

A. That's correct.

Q. Will contaminated groundwater from off site continue moving onto the Waukegan station in your opinion?

A. Yes, we do think so.

Q. And how does this contamination from off-site migration factor into your remedy assessment?

A. Well, we know it's a condition that we'll be managing for sometime, but we have had the ELUCs put into place which is prohibiting the installation of wells within those areas. Our remedy for the FS area is not going to do anything

about what's being contributed from those off-gradient -- or off-site upgradient sources.

In that case, we're still relying more on that downgradient receptor evaluation that we've done for each of the four stations to help us understand that even with these ongoing contributions, some of those mechanisms that we've talked about frequently hydrogeologically are going to continue to influence even those plumes, and that we should be protective with the monitoring network that we have in place and the conditions that we've already modeled.

Q. Either you or Mr. Maxwell mentioned before that caps are a common remedial approach.

Am I correct in that?

A. Yes, that's correct.

Q. Okay. Could you give me some examples of when you have installed a cap as a remedial approach?

A. So I think a good example would be a project that both Mr. Maxwell and I worked on together, a steel mill in northwest Indiana. There were a mix of steelmaking waste materials that had been placed in a remote area of the property and

had been sitting there for many years. That site was subject to a RCRA corrective action process, so that area was designated as a solid waste management unit.

And the remedy that we proposed and had approved through both state and federal agencies in that instance was to place a cap over the shmoo area and then continue monitoring it, and that cap was very successful in interrupting the rainwater infiltration to the point that we were even able to discontinue our monitoring after not too many years after the cap went into place.

Q. Do you have examples of using a cap if waste materials are in contact with groundwater?

A. Yes. And this site was one where that was the case.

Q. Do you recall Mr. Quarles testifying about a report that he reviewed from EPRI, the Electric Power Research Institute?

A. Yes. I recall his reference to that document, and I've reviewed that document myself.

Q. If you would pull it out, it should be in front of you, Exhibit 1103.

A. I have that.

Q. What is the date on this report?

A. On the second page behind the cover page, it says that it's the final report dated September of 2001.

Q. Does this -- in the title says it refers to three unlined coal ash impoundments.

Do you see that?

A. I do.

Q. What does an impoundment refer to in this 2001 report?

A. The impoundments that they're referring to here were in most instances comprised of several ponds that were receiving sluiced ash material from an ongoing operation.

Q. And this 2000 date was prior to any -- to the federal CCR regulations?

A. That's correct.

Q. Do you know if EPRI was referring to the federal definition of an impoundment?

MR. RUSS: Objection, leading.

HEARING OFFICER HALLORAN: Sustained.

MR. DORGAN: I'm not sure if it was or not.

HEARING OFFICER HALLORAN: I think you were supposed to rephrase, but that's fine.

BY MS. NIJMAN:

Q. At the same time that we're looking at this, could you pull up Exhibit 1102, Mr. Quarles' rebuttal report, at Page 11?

A. I have this.

Q. Do you see Section 2.3.5 where he discusses this EPRI article? Second full paragraph.

A. Yes, I see it.

Q. What is Mr. Quarles' concern with the cap that Weaver is proposing in the FS area?

A. I think the operative statement he made in this paragraph is the second sentence where he says, WCG's plan to construct a cap over saturated CCRs at the FS -- FAS area at Waukegan might increase, emphasis added, groundwater contamination -- contaminant concentrations rather than improving conditions stated by WCG.

Q. And going on there, does he rely on this EPRI report?

A. Yes. He specifically referenced the findings of this particular study to support that conclusion.

Q. What is your opinion about applying this

EPRI discussion to the Waukegan station?

A. I think this is a kind of apples and oranges comparison. When you read this, you can see and even the figures show individual ponds within what they're considering to be an impoundment area. They were receiving ongoing contributions of ash that was being sluiced, so it was a combination of both ash and water. The water was going in. The water was leaching out.

And they had -- of the three instances, there was one area where the amount of accumulated ash in one of the ponds still sat within the groundwater table. And what I found particularly interesting is when they discussed the watering in the context of this report, they're talking about stopping the inflow of water. They're not talking about removal of groundwater. So, again, I didn't think that they're particularly related as a consequence. I'm not sure that I agree with Mr. Quarles' findings.

Q. And in this study was a cap actually placed on the pond that Mr. Quarles was concerned about?

A. No. They had done modeling to project

what they thought was gonna happen, but they never actually put the caps in.

Q. And you mentioned the age of these impoundments. Why was that relevant in the EPRI study?

A. I don't know that I necessarily mentioned the age. I think what I was referring to is that these had been operational ponds for quite sometime receiving sluiced ash and water, and so the fact that they had been used unlined for as long as they had was more of what I'm referring to.

Q. If you look at the EPRI report at Page 3-1?

A. I'm there.

Q. In the first paragraph under the site description in about two-thirds of the way down there's a sentence that begins, the west impoundment and unlined portions of the east impoundment were removed from service in late 1996.

Do you see that statement?

A. Yes, I do.

Q. So given what you said about the date of this report in 2001, does that date of 1996 have any relevance?

A. Certainly the fact that they did the study in 2001 after these were removed from service in 1996 would have allowed conditions to have changed between the two dates, but I still look at it more from the fact that we're not dealing with the pond for the former slag area. These were -- they're much different circumstances.

Q. Thank you.

I'd like to go back to Mr. Quarles' rebuttal report just one page back at Page 29.

A. I'm sorry. What page?

Q. Page 29. And if we focus on the last bullet on Page 29, Mr. Quarles refers to a former fly ash storage area located in the northwest corner of the property, not illustrated on the WCG figure. See Figure 6, my prior report.

Do you see that?

A. Yes, I do.

Q. And have you had an opportunity to look at Mr. Quarles' Figure 6 of his prior report?

A. I did.

Q. If we can turn to Exhibit 1101 and look at Figure 6?

A. It's -- I'm looking at that figure.

Q. And what is this Figure 6?

A. This is from his report. It's titled, Historic Site Conditions 1972 Waukegan Station.

Q. And if you look to the northwest in the corner, Mr. Quarles has identified a former fly ash storage area up there?

A. Yes, that's correct.

Q. Is that on Midwest Generation's property?

A. No, it's not.

Q. And do you know if -- well, do you have an opinion of the location groundwaterwise of that property?

A. It remains upgradient of the Waukegan station.

Q. What is your opinion about the sufficiency of the investigations for the purposes of your remedy assessment at Waukegan station?

A. We feel that, as we've demonstrated in our report, there's been quite a bit of historic work performed at the Waukegan station, that the monitoring network that's in place allows us to evaluate potential risks to on-site and off-site receptors; and that while as we've acknowledged with the other stations, there may be some data

gaps at some point that we need to address that in totality we feel that there's a reasonable amount of information allowing us to help the Board evaluate appropriate remedies for the conditions that have been represented at the sites, and we continue to believe that.

Q. Let's turn to your next slide, Slide 91 of Exhibit 1702. We'll jump right to Slide 92, your overall conclusions for the four stations.

Would you go over these, please?

A. Yes. So this is our summary of what we're proposing for the stations as a whole, similar components for each starting with the continued monitoring of groundwater under the federal and state CCR rules. Skipping ahead just a little bit, we also recommend that the monitoring that's being done under the terms of the CCAs relative to the GMZs be continued, so fundamentally continue doing the groundwater monitoring that's ongoing at the sites.

Close and/or retrofit the surface impoundments under the CCR rules, and in each instance I believe that process is already under way. Continue to evaluate the groundwater

conditions with respect to ongoing implementation of the monitored natural attenuation strategy. We believe it's occurring. We believe it will continue to occur, and we believe that the groundwater monitoring will give us the basis to continue evaluating that.

Maintain institutional controls, we talked about the ELUCs that existed at each of the four sites. Those should be maintained. The only way that they wouldn't would be to remove them from the deed. We certainly don't envision that happening. Then we're recommending this cap as a presumptive remedy for the Waukegan FS area west of the west pond.

And then, again, as we've noted a number of times, as the new regulations with respect to historic fill areas are promulgated at both the state and federal level, that whatever those rules end up looking like, they should be adhered to and implemented for each of the four stations.

Q. When you have on this bullet, the third bullet from the bottom, maintain institutional controls, does that also include the groundwater management zones?

A. Yes, it does.

Q. And how does the Waukegan -- I know you've answered this.

The Waukegan FS area presumptive remedy, how does that relate to groundwater management zones?

A. So once we propose a remedy that we agree to implement will have the ability to seek a groundwater management zone for the relevant areas of the Waukegan station.

Q. The second bullet you have, the closing and retrofitting of the surface impoundments under the CCR rules, can you describe whether that -- whether you consider that to be a closure or, excuse me, a control mechanism?

A. Well, we know that with the exception of one basin at Powerton, all the other basins are no longer receiving or will be receiving coal ash. In fact, none of them but one are currently receiving coal ash. So through a remove -- through a closure process materials will be appropriately managed, whether that be through clean closure or closure in place, and we would see that as at least helping to address potential contributions from the surface

impoundments that are present at each of the stations. So in some measure, yes, that would be a control for at least those materials at the sites.

Q. Before we go on, I just want to make sure the record is correct on one thing. If we go back to your chart of ponds for Powerton?

A. Yes, I'm looking at it.

Q. So the first three ash basins, ash surge, bypass and metal cleaning, the comments under current closure plans is two retrofits. So I didn't -- you made a statement about one pond, and I just wanted to clarify whether --

A. No. I'm sorry. I was referring to the one pond that's still receiving ash at Powerton which is the ash surge basin. I wasn't necessarily referring to the closure plans.

Q. Okay. Because these -- to your understanding, these two other ponds may also receive some ash?

MR. RUSS: Objection, leading.

HEARING OFFICER HALLORAN: Sustained.

Rephrase, please.

BY MS. NIJMAN:

Q. What is your understanding about the two

other ponds receiving ash as the -- for the purpose of the retrofitting?

A. Yes. I was speaking to what's receiving ash now. There's one pond that's receiving ash currently. They are addressing the other two ponds that may be used occasionally for ash management, but they're not currently receiving ash.

Q. Thank you.

I can refer you to your report, expert report, which is Exhibit 1701, at Pages 53 and 54 where you provide some information to the Board about 33C and 42H factors.

Do you recall that section of your report?

A. Yes, I do.

Q. And if we go to your slides, your PowerPoint?

A. Yes.

Q. Number Page 93 of your PowerPoint at Exhibit 1702, what are you addressing here?

A. So Section 4.9 of your report is titled, Relevant Section 33C and 42H Criteria. Our understanding was that the Board wanted these criteria to be evaluated with respect to what would be an appropriate remedy and relief for the four

Midwest Generation stations. So we considered those criteria with respect to what we're proposing as a remedy, and we've outlined each of them.

And the first was the character and degree of injury caused by the conditions at the site, and several of the variables that should be considered as part of that are the longevity and the location of the injury. And what we just wanted to highlight here is that two of the stations have been in operation for over 50 years, two of the other stations for more than a hundred years. And that previously we established that the predominant land use at each of the four stations is industrial, not the exclusive, but the predominant.

And particularly at Waukegan, we know that there are multiple superfund sites and other SRP sites located in close proximity to that particular station. We know at Joliet 29 we have the former Caterpillar site to the west. That's an SRP site that's gone through the SRP and has contributed contamination to the western side of that parcel.

At Will County, we've got a quarry to the south and a refinery to the north that have been there for many years and will likely continue to be

operating there in the years to come. And then Powerton, a little bit different from the other three stations. It's located along the river. Generally, the surrounding land uses are industrial, but we also have the water bodies to the northwest and some residential off to the east.

Q. Turning to Slide 94, technical practicability and economic reasonableness, what did you consider -- what would you like to point out here?

A. Well, there's been past testimony and documentation in this matter that's looked at alternative remedial approaches for the stations, and a number of them have been determined to be not technically practicable or economically reasonable. So we believe that what we've laid out in the recommended actions that we proposed to take are consistent with Brownfield's TACO type of a strategy, which we've got a lot of experience in Illinois with, and that they would be -- could be approvable under that type of a framework.

We believe that the trend testing, our evaluation of risk, the presence of the institutional controls, the evaluation of off-site

receptors all demonstrates that what we're proposing to do is appropriately protective. And then we have the monitoring that's ongoing and various controls that are applied through the CCR rules with respect to the regulated units at each of the sites.

Alternative remedies were considered, but in that process of considering them, they were deemed to be not technically practicable and economically reasonable which is why we landed where we did. And then, finally, again, it keeps coming up I know, but these proposed ash fill area rules at the state and federal level has an impact on the way that we look at that just knowing that there's a new framework that's going to be applied at some point in the not too distance future.

Q. And then turning to 95, Page 95 of your Exhibit 1702, subsequent compliance and due diligence, what factors did you want to point out here?

A. Well, a few things that we felt were important to consider was that Midwest Gen voluntarily initiated investigation of the sites once they acquired the properties in consultation

and coordination with the Illinois Environmental Protection Agency. They voluntarily agreed to install monitoring wells and conduct hydrogeologic investigations pursuant to those communications and ongoing dialogue with the IEPA.

It's my understanding that they were one of the, if not, the only operator in Illinois that agreed to do that. They were one of many. Midwest Gen voluntarily then entered into the compliance commitment agreements in 2012 that led to a lot of the later work that has been performed at the sites. All of that work was performed, and the agency ultimately acknowledged that that work was performed consistent with their expectations through future subsequent documentation.

Midwest Gen voluntarily relined their ponds before the CCR rules came out. In some instances they relined them again after the CCR rules came out. They're actively complying with the monitoring required under the CCAs that allows them to continue applying the GMZs at three of the four sites.

And we feel as though the fact that the agency has not taken further enforcement actions

with respect to the conditions that have been reported to them and the steps that have been taken is a sign of a degree of acceptance on their part.

Q. And then turning to Slide 96, duration and gravity, what factors would you like to point out under that consideration?

A. So, as noted, Midwest Gen entered into the CCAs voluntarily. That allowed them to establish the GMZ which gives them the opportunity to monitor the monitored natural attenuation that's taking place while the GMZs are in place, and we have exceedances of the groundwater protection standards that stays those conditions from being considered a violation. So we agree that they should continue to remain in place.

The violations that were identified before the GMZs were in place and even the one instance of open dumping were of very limited duration. They did not go on for an extended period of time. They were not ignored. They were -- steps were taken to address the conditions in a matter consistent with what the IEPA was asking.

The comparison of the groundwater data to the surface water standards shows that we don't

have an observed risk to the proximal surface water bodies for each of the four stations. The ELUCs are an important instrument to prevent the use of groundwater for portable purposes at these stations, especially downgradient of the areas that we've discussed at each of the four stations. So we don't have potential receptors for that groundwater. We're eliminating one of those components of the risk triangle.

And then, finally, as I mentioned the 12D violation at Powerton or, actually, 21A, at Powerton was a very brief two- to three-month type of thing and occurred during the winter when the records suggest the ground was frozen and then it was remedied. And so we feel as though the likelihood of that having been a substantial contributor to ongoing contamination was limited.

Q. How do the historic fill areas identified at the stations fit into these factors that you've identified on Exhibit 94, 95, 96 -- Pages 94, 95, 96?

A. They certainly factor in. We are aware of both documented and suspected fill areas. We, again, have looked holistically at these sites with

respect to this off-site receptor, potential receptor scenario. So we feel as though we do have means by which to assess some of these fill areas. There may be, as I've said before, some data gaps that get addressed.

Perhaps there's additional work done as part of the new fill area rules, but that in the totality of what's in place now and the historic dataset with respect to what we were asked to do by the Board, we feel like we've taken a reasonable approach, supported it technically, and that we've come to a reasonable outcome that's workable.

MS. NIJMAN: Mr. Hearing Officer, I believe I am about done, if I could just take two minutes.

HEARING OFFICER HALLORAN: Sure. Off the record.

(WHEREUPON, a short recess was taken.)

HEARING OFFICER HALLORAN: We're back on the record. It's approximately 2:37. Ms. Nijman is still in her direct with her experts.

You may proceed.

MS. NIJMAN: Thank you.

BY MS. NIJMAN:

Q. Just a couple of things to finish up.

Mr. Maxwell, you have provided the numbers for each of the stations for defining no trends, what that meant?

BY MR. MAXWELL:

A. Correct, yes.

Q. I neglected to ask you how you calculated those numbers, how you reached them.

A. Yeah. So what I did was I looked at the percentages or the data that was 100 percent non-detect and also added to that the data that was at least 90 percent non-detect. So when I say -- I was using the phrase primarily non-detect. I meant 90 percent or more non-detect.

Q. And why did you take that 90 percent threshold?

A. That was intended to reflect an overwhelming majority of the data were non-detect. As I think I mentioned, there were others that fell into the no trend category that still had less than 90 percent non-detects, but 90 percent was the threshold that I used to be considered substantially non-detect.

Q. And whether it was a hundred percent or 90 percent, did that change your opinion?

A. It did not, no.

Q. And then, Mr. Dorgan, at Waukegan you mentioned the VADOSE zone at 80 percent, I believe, the ash -- the material in the FS area; is that right?

BY MR. DORGAN:

A. Yes, that's correct.

Q. How did you calculate that figure?

A. Well, I looked at the data. Mr. Maxwell and I looked at it together. He's the one that looked at the individual boring logs, so I'll maybe let him answer that question.

BY MR. MAXWELL:

A. So we took the boring logs from the 2020 FS area investigation and looked at the total sum footage of ash, and then looked at the total sum footage of wet that was logged on the boring logs. So as an example, if there was a thousand feet of total ash that was logged, and 200 feet were logged as wet, 200 over a thousand would be considered 20 percent.

And I'm just using round numbers, but

that's the results of our analysis without having the logs in front of me.

Q. And did you go through each log to do that in the FS area?

A. I did. I went through and marked out where it was wet and then obviously the total thickness of ash in order to come to that calculation.

Q. Thank you.

Mr. Dorgan, have your opinions today been given with a reasonable degree of scientific certainty?

BY MR. DORGAN:

A. Yes they have.

Q. And, Mr. Maxwell, have your opinions today been given with a reasonable degree of scientific certainty?

BY MR. MAXWELL:

A. Yes, they have.

MS. NIJMAN: At this point, Mr. Hearing Officer, I move to admit Exhibit 1701, the expert report.

MR. RUSS: No objection.

HEARING OFFICER HALLORAN: Admitted, 1701

admitted.

(WHEREUPON, Exhibit No. 1701 was admitted into evidence.)

MS. NIJMAN: And I move to admit 1702, the PowerPoint presentation we went through today.

MR. RUSS: Is this not as a demonstrative?

MS. NIJMAN: No, as an exhibit as we have done with the our PowerPoints in this hearing.

MR. RUSS: I mean, I don't recall how we admitted them in the past, to be honest, but this seems like a demonstrative to me more than --

MS. NIJMAN: Well, interestingly enough, I made that objection at the first hearing.

MR. RUSS: That may be true.

MS. NIJMAN: And it was overruled, and all the PowerPoints were allowed in as exhibits.

HEARING OFFICER HALLORAN: I don't see a problem with it, Mr. Russ.

MR. RUSS: Yeah. So the two problems I guess are that, one, we had some demonstratives that were just demonstratives. So for consistency I think it would be the same. But also because we have some objections to the facts presented in this exhibit, this set of slides, as being inaccurate.

We still maintain that this is -- this presentation was used as a tool for them to testify, but I don't believe it was -- it doesn't take the form of an exhibit that the Board can rely on.

HEARING OFFICER HALLORAN: Okay. Well said. It's noted in the transcript, but I'm going to admit 1702, admitted and not as a demonstrative.

(WHEREUPON, Exhibit No. 1702 was admitted into evidence.)

MS. NIJMAN: Thank you, Mr. Hearing Officer. I'm completed with my direct.

HEARING OFFICER HALLORAN: All right.

Mr. Russ, cross.

MR. RUSS: Thank you.

HEARING OFFICER HALLORAN: Thank you.

CROSS-EXAMINATION

BY MR. RUSS:

Q. And thank you both for sitting through this for so many days. My name is Able Russ. I'm an attorney for the Environmental Integrity Project in D.C. I'm gonna start with some background questions.

Yesterday one or both of you, I can't

remember who it was, said that you had implemented multiple monitoring well networks at various sites. Maybe both of you have.

HEARING OFFICER HALLORAN: You have to say yes or no.

MR. DORGAN: Both of us have, but I think Mr. Maxwell answered affirmatively to that question.

MR. MAXWELL: Yes.

BY MR. RUSS:

Q. Okay. So I'll ask you both this question. Mr. Maxwell, how would you go about designing a monitoring well network generally speaking?

BY MR. MAXWELL:

A. Just completely -- I mean, without a site?

Q. A 40-acre rectangle of landfill, I believe.

A. Well, I guess that's little hard to answer. It obviously is dependent on the regulations. I'll start off by saying that. We, when presented with that type of a problem, would default to the regulations. The most substantial groundwater monitoring networks that I've designed

in my career are related to solid waste landfills and CCR units. So, again, you know, those regulations would apply.

So, you know, very generally you would -- you would -- you know, the state requirements are a little bit different, but you want to, for the most part, begin -- I mean, the starting point would be if you got a rectangle, as you referenced, you want to do it in phases to be efficient ideally. You want to maybe start with the four corners to see what information might be available specific to your site.

Before you even did that, you would want to look at whatever information you can get from the literature in order to try to get a feel for what the groundwater units would be. So that would get me going in terms of just hypothetically how it would -- how I would go about designing a network.

Q. And with respect to groundwater flow, I presume you would want to install some upgradient wells or one at least; is that right?

A. In most cases -- well, there are provisions in the rules that allow for an intrawell type of an approach. That is an option under many

regulations. So in some instances identifying upgradient, it may be difficult.

Q. Right.

A. And so you've got that option in your pocket to use intrawell.

Q. Okay. If the groundwater flow allows for an upgradient well, is that something you would typically install?

A. If we could discern and we were confident that the -- we were -- we knew upgradient to a reasonable degree of certainty, you would design your network to try to identify some upgradient, some downgradient, because the idea is you want to try to identify a change between upgradient and downgradient.

Q. Right, right. Thank you. That's basically where I was headed with that.

So when you said some downgradient, what's -- I mean, I know it varies by site, but what's a number of wells that you would want to start with, a minimum number of downgradient wells?

MS. NIJMAN: Objection, vague.

HEARING OFFICER HALLORAN: He can answer if he's able. Overruled.

MR. MAXWELL: Highly dependent on the regulation that you're dealing with, the size of the site. It's just too hard to -- too hard to answer just as a generic question.

BY MR. RUSS:

Q. Have you ever implemented a groundwater monitoring network with just one downgradient well?

A. I don't recall ever having done that. It -- I mean, when you say a groundwater monitoring network, I'm thinking of a large network. We monitor groundwater as part of Brownfield's investigations, just as an example.

UST site investigations, as an example, it's certainly very possible that I have installed just one downgradient well in order to identify potential impacts associated with the UST, as an example.

Q. Right.

A. Again, it's just so site specific.

Q. And for the record, UST is an underground water storage tank?

A. Correct.

Q. And it's not very large?

A. Exactly. So one may be able to cover you

in that particular example.

Q. Okay. What about a 40-acre rectangle?

MS. NIJMAN: Object to --

BY MR. RUSS:

Q. How many wells --

HEARING OFFICER HALLORAN: I'm sorry. Counsel, we can't talk over one another.

Ms. Nijman has an objection, and what is your objection?

MS. NIJMAN: Object to vagueness of the hypothetical.

HEARING OFFICER HALLORAN: You can rephrase, Mr. Russ, please.

BY MR. RUSS:

Q. Would you recommend a monitoring well network for a 40-acre rectangle that only had one downgradient monitoring well?

MS. NIJMAN: Same objection.

HEARING OFFICER HALLORAN: He can answer if he's able.

MR. MAXWELL: I -- the question is have I ever -- would I recommend a one monitoring well downgradient for a 40-acre hypothetical site?

BY MR. RUSS:

Q. That's my question, yes.

MS. NIJMAN: Same objection.

HEARING OFFICER HALLORAN: Same ruling.

MR. MAXWELL: I don't know that I can answer that, sir. I -- it really -- it really depends on the site, the regulation you're under. Is it possible, maybe. I just -- I can't give you a yes, no.

BY MR. RUSS:

Q. You've mentioned the federal and CCR rules a number of times, right?

Are you familiar with the minimum requirements for the monitoring well networks under the federal CCR rule?

A. I believe that I am.

Q. How many downgradient wells do they require?

A. I believe that they require a minimum of four.

Q. Mr. Dorgan, same question, have you ever designed a monitoring well network or a monitoring well situation with just one downgradient well?

BY MR. DORGAN:

A. Possibly. Same circumstances, a small site, something like a LUST or a related spill area maybe.

Q. Okay. Have you ever designed a monitoring well network with more than one downgradient well?

A. Yes, I have.

Q. Okay. I'm gonna move on. I think we're good there. This is another question for both of you.

I'll start with you, Mr. Dorgan, cause both of your resumes say that you have experience with fate and transport modeling.

Can you explain what that is?

A. Fate and transport modeling is -- there's several different ways of doing it. It is where you look at a particular contaminant. You look at the hydrogeologic setting, and then you model the potential migration over time of that contaminant within that hydrogeologic setting.

Q. And so within the rubric of fate and transport modeling, have you done groundwater related fate and transport modeling?

A. Yes, I have.

Q. What are some of the software packages you've used in that work?

A. Probably -- well, there's two-dimensional model which are fairly routine. Once you start to get into more three-dimensional modeling, the one that's most frequently used is MODFLOW. There are others, but that's one that's used regularly.

Q. Okay. And, Mr. Maxwell, have you ever used MODFLOW?

BY MR. MAXWELL:

A. When you say used --

Q. Let me ask a background question.

Are you familiar with MODFLOW?

A. I'm familiar with it. I refer to the results from those types of models.

Q. Okay.

A. Honestly, at this point in my career I would have to say that I rely on some support staff to actually do the modeling itself.

HEARING OFFICER HALLORAN: You have to speak up, Mr. Maxwell, please. Thank you.

MR. MAXWELL: Sorry.

BY MR. RUSS:

Q. Understood.

Now, moving on to a different topic, just doing some background cleanup before I get into some other questions I have, but this has come up a number of times, the difference between dissolved in total or unfiltered and filtered. And I believe, sorry again, apologies for not remembering who said it.

Somebody said that they're basically the same at these sites for these constituents; is that right?

BY MR. DORGAN:

A. I believe that was my testimony at some point yesterday.

Q. Okay. And is that true for all of the constituents that we've been looking at --

A. Well --

Q. -- equally?

A. I don't think we said it was a 100 percent correlation. I think what the past testimony and our observation of the data is that there's very little variability between dissolved and total. So for all practical purposes, in some instances there's quite a bit of difference, and that's just not the case in most of the data that's been

collected for these four sites.

Q. Okay. And, Mr. Maxwell, do you agree, same opinion about the difference between filtered and unfiltered?

BY MR. MAXWELL:

A. Yes, I do. I do. And I would just add that I think all of these sites, I think the primary reason for that is the way we sample. The way we sample is with low flow methodology which tends to create minimal disturbance and sediment stir-up as the sample is removed resulting in the total concentrations being about the same as the dissolved.

Q. So the methods you use don't produce a lot of suspended solids, is that --

A. We don't do the monitoring, but the procedures that are implemented result in a sample that doesn't tend to create a lot of suspended sediments, at least that's the intent of the sample protocol.

Q. Okay. Thank you.

Now, yesterday and then again today Ms. Nijman was asking about mass analysis, do you remember that? I believe this was you, Mr. Dorgan.

BY MR. DORGAN:

A. Yes, I do.

Q. And you listed some of the information you need to perform a mass analysis, if I remember correctly?

A. I think I referenced to information that might be used for that, but I don't know that I provided a comprehensive list.

Q. One of the things you said was how much contact there is, and I was wondering what you meant by how much contact.

A. I think what I was referencing there was the period of time in which the mass has been in contact with the fluid, and I think we were specifically speaking to groundwater at that point in time. So the longer duration of the exposure, the more likelihood that more of the mass has been pulled out of that matrix.

Q. So the amount of time that there's been contact between the mass and the groundwater is what you're talking about?

A. Yes, I am.

Q. And would the amount of contact, you know, three-dimensionally also be a relevant factor?

A. Not necessarily. With a more homogeneous waste you'd have relatively similar starting concentrations, so the aerial element of it would be less of a variable than the time would be.

Q. So pivoting to you, Mr. Maxwell, sorry to do this, but you were talking about at the former slag ash area at Waukegan, 80 percent of the coal ash is the VADOSE zone and 20 percent -- or maybe it was you, Mr. Dorgan -- 20 percent is in the water table or saturated.

So that -- to the question of how much contact when you're doing a mass analysis, is that the kind of information, 80 percent, 20 percent, that you would use when you're conducting a mass analysis?

BY MR. MAXWELL:

A. I think as Mr. Dorgan said, it would be one consideration. Quantifying it we felt was useful which is why we went through the exercise, but it would be one aspect of an evaluation that will would be useful to us.

Q. Okay. Is starting concentration in the mass a relevant factor?

BY MR. DORGAN:

A. That's an interesting question because in the circumstance we're referring to, we're not sure we could know the starting concentration because the contact has been as long as it has. So where it started is difficult to know.

Q. Good point.

So in that situation, I guess, the current concentration is something you would want to know?

A. Current concentration is useful, yes.

Q. Did you perform a mass analysis at any of these four sites?

A. When you say mass analysis, what are you referring to?

Q. I don't know. It's what you said. So whatever you were talking about when you said mass analysis, I'm just wondering if you did that at these --

A. I was referring to the mass of the contaminant within the matrix itself and how that might change over time. I wasn't necessarily trying to quantify in the terms of an analysis. I was simply referencing that the longer that mass has been in contact with the groundwater, the more

past leaching has occurred and diminishing the original mass of the contaminant at whatever concentration that may have been.

Q. What do you mean by matrix?

A. In this particular case I'm referring to ash, but it could be other waste types that could have been deposited in a condition where it comes in contact with groundwater.

Q. Is it possible to calculate the change in mass over time?

A. That would be very difficult. It would require a lot of very specific information both about the current conditions and the past history. So I don't want to say it couldn't be done, but it would be extremely difficult.

Q. Okay. Now, shifting gears again, Ms. Nijman asked you about Slide 14 in your presentation and the Phase 2 ESA at -- oh, I didn't write down the name of the site, but it's Slide 14 in your presentation, if you could turn to that. Probably Joliet given the low number. Yeah.

Do you have it front of you?

A. Yes, we do.

Q. I guess this would be for Mr. Maxwell.

Ms. Nijman was asking you about wells M-3 -- MW-3 and MW-5, and you discussed the sampling of those wells. And it says here eight RCRA metals.

What are the eight RCRA metals?

BY MR. MAXWELL:

A. Let's see if I -- this is a little pop quiz. Arsenic is one of them, chromium, lead, cadmium, nickel, mercury. Without looking -- they're heavy metals. They're common heavy metals that -- they're the most commonly analyzed when you're looking at heavy metals.

Q. Right. Is boron one of the eight RCRA metals?

A. Boron is not.

Q. Is sulfate?

A. Sulfate isn't considered a metal.

Q. So here where you're talking about the eight RCRA metals at MW-3 and 5, this doesn't include boron and sulfate data, right?

A. I don't believe boron and sulfate data were within the scope of that -- of that Phase 2 ESA. Those -- the purpose of the Phase 2 ESA was more to assess impacts to human health in the environment as it relates to less common

constituents. Those boron and sulfate are more common wet chemistry type constituents.

Q. Okay. Now I'm gonna turn to your trend analysis which is discussed on Pages 42 to 44 of your report and Appendix C of your report, as you know. I'll give you second to just get those up in front of you. Some of these questions will be a little redundant, but bear with me. I want to make sure the record is clear.

On Page 3 of 3 for the Joliet summary trends, it's not paginated the way that your report is, so I don't know what -- it's Bates Page 81507, if that helps.

A. Got it.

Q. At the bottom of this -- well, first of all, right below the table is a summary. And this is something we talked about before during direct, so I'm not gonna ask this question actually.

Then below that first set of statistics, below the bold text there's three rows of text, and the first row says 47 total tests.

Do you see that?

A. Yes.

Q. Why did you compare the number of downward

trends to the number 47 in this table?

A. So 47 is the sum of 34 and 13 which is the downward -- the total number of downward and upward trends. So the idea was where there was a trend that was detected or identified, we wanted to look to see what percentage of those trends were upward, what percentage of those percentages were downward.

Q. Yeah. And I know we've already talked about this, but just for the record, why did you exclude the no trend tests from that total of 47?

A. No trend is a flat slope, a flat curve, and that to me just is not meaningful in the way of is it trending upward or is it trending downward. There's no trend. It's flat. So -- and as we had discussed, in the majority of the instances it's flat because the majority of the data is non-detect. So we believe that it was appropriate to treat that separate from the results that actually returned a trend.

Q. And in your deposition you said that no trend means that it's non-detect, right.

Do you remember that?

A. I don't believe that I stated it that way.

Q. Can you turn to your deposition at

Page 176? On Line 15 there's a question.

So is it fair to say a majority of the trend tests were not downward? Ms. Nijman, objection, misstates -- Mr. Maxwell, the majority of the trend tests were no trends. 64 percent of them were no trends, and I would point out that no trend actually indicates the constituent wasn't detected. So no trend means that essentially no constituent was detected, and so that's the majority of the trend test. In this instance, 85 of the 132 are no trend.

Did I read that correctly?

A. You did. And I would point out that I did use the word essentially. I didn't necessarily say one hundred percent.

Q. Right. And to be fair, later in your deposition you said in most instances it's flat because there were non-detects. That's what you said today.

Could you now turn to Page 81517 of your report? That's the Bates. Again, the pagination

gets confusing, so I'm gonna use the Bates page for this stuff.

A. Okay.

Q. I'm sorry. Bear with me for just a second.

Can you explain what this is showing?

A. The page that says trend test at the top?

Q. That's the one, yep.

A. Okay. So this is the output from the Sanitas statistical software that is a fairly concise summary of the trend test results that were performed. It lists the constituents and the wells along the left side, and then the data following the wells is the -- is the statistical output that we used in order to tally up the various results from the individual trend tests. So each row here equates to a row in the summary tables preceding this statistical output.

Q. Okay. Can you explain what the slope column is showing?

A. I'm sorry. Could you repeat that, sir?

Q. Can you explain the column that says slope at the top is showing?

A. So that's a calculation of the slope for

each individual constituent at each individual well, and the -- so in instances where there's no slope, that equates to no trend.

Q. So slope of zero is no trend; is that right?

A. Correct.

Q. Okay. Can you explain what the column that says at the top, percent NDs, is showing?

A. That is percent non-detects in the data. ND refers to non-detect.

Q. Okay. And in your deposition when you refer to situations where no constituent was detected, that's the same as a non-detect, right?

Just to clarify, in your deposition you said no constituent was detected. That phrase is the same as saying a non-detect; is that right?

A. Correct.

Q. And that's the same as an ND in this table?

A. ND indicates non-detect.

Q. Right.

A. Yes.

Q. Thank you.

Now, on 81517, the row for arsenic, comma,

total and MW-04, do you see that?

A. Yes.

Q. Does this table also have a row for dissolved arsenic in the same well?

A. Yes, it does.

Q. And I believe you said earlier that at these sites total and dissolved are basically the same?

MS. NIJMAN: Objection, that misstates --

HEARING OFFICER HALLORAN: Can you speak up, Ms. Nijman?

MS. NIJMAN: Objection, it misstates the testimony which related to TDS.

MR. RUSS: I don't believe it did refer to TDS. So earlier --

HEARING OFFICER HALLORAN: I'll allow him to answer the question, and if need be, you can remedy on redirect.

You may continue.

MR. MAXWELL: Would you repeat the question, sir?

BY MR. RUSS:

Q. Earlier in our cross you said that at these sites the dissolved and total concentrations

were basically the same; is that right?

A. For purposes of looking to add the analytical results for purposes of a trend test, we wanted to be thorough. Okay. So that's why we included both. We just -- we didn't want to be questioned about why certain data wasn't included. So for purposes of attempting to be thorough, we did the tests.

Q. But just to be clear, in the case of arsenic in Well MW-4, there are two results for arsenic in Well MW-4; is that right?

A. There are two --

Q. There are two rows with results in this table that would have been counted separately; is that right?

A. For purposes of tallying the trend tests.

Q. Yeah. Are there other constituents with both dissolved and total results in this table?

A. I believe that there are, yes.

Q. So for a number of well constituent pairs, there will be two results that you're tallying?

A. There'll be a total. There'll be a dissolved result. We tested for trend. Again, just attempting to be thorough here, it's

information -- I'll point out that I don't know that we -- I'm quite sure we've never said that the total and dissolves are identical. They are -- in most cases they're similar. They're not necessarily identical. You don't necessarily see that in nature. So because they're not identical, we thought there was value in testing both, again, just to be thorough.

Q. Okay. Now, if you turn back to Page 81507, so just 10 pages earlier, did you find a trend for dissolved selenium at MW-1 at Joliet 29?

A. That resulted in an upward trend.

Q. Okay. And was it statistically significant in the fourth column?

A. We indicate no.

Q. What's the difference between an up trend that is statistically significant and one that isn't?

A. So it -- it has to do with the -- basically the slope of the line or the steepness of the line. A line that's only slightly up or slightly down is going to dispute what I'll refer to as a regular trend.

A statistically significant trend is a trend that's even -- that rises to a level of statistical -- a statistical level of upward or downward. So it's generally a steeper trend upward or downward.

Q. And in your line of work I assume you use statistical significance in a lot of context. It's not just for trends; is that right?

A. Statistical evaluation of data is something that we do outside of the scope of trend testing.

Q. Yeah. I mean, you calculate a value with a certain degree of statistical confidence. I'll leave it there for now, but there was a trend for selenium in MW-1. It was not significant.

So now please turn to 81519, 12 pages forward. This is gonna the corresponding details in the -- so for selenium in MW-01, what is the slope for that row?

A. That slope is a positive number that's actually cut off.

Q. Because it's very small, right?

A. Cause it's very small. The three dots indicate that it's cut off. So the slope is a

positive number that resulted in us indicating a positive trend in the summary table.

Q. Right. With a shallow slope?

A. Correct. It wasn't statistically significant.

Q. Right. And then in that same well, and looking again at selenium in MW-01, what percent of the data was non-detect?

A. In that particular well, 37.5 percent of the data was non-detect.

Q. Okay. So like you were saying earlier with Ms. Nijman, you can have some non-detects and still have enough detected data to calculate a trend. I think that's what this is showing.

A. That's what this is showing. That 37.5 number, that suggests that over a third of the data is non-detect, but enough of the data was detected where we were able to -- and we had enough different numbers essentially to be able to differentiate a slope or, I'm sorry, a slight upward trend in this instance.

Q. Okay. Now, flipping just two pages back, 81517, arsenic total in MW-04, what's the slope for that one?

A. That's a zero slope.

Q. What percent of the data was non-detect in that case?

A. 45 percent of that data was non-detect.

Q. I'm sorry. I'm looking at arsenic total.

A. Oh, I'm sorry. I was looking at arsenic dissolved.

Q. Yeah.

A. Arsenic total, which well?

Q. MW-4?

A. So that slope is zero, and the percent NDs are zero.

Q. Okay. So you had a hundred percent of the data above the detection limit in this case, and the slope was zero?

A. That's right.

Q. Okay. As you were saying earlier, sometimes you have no trend because of non-detects, and sometimes you have no trend and it's not related to non-detects?

A. This is an instance where there was enough -- the number of upward and downward indications in the data were equal.

Q. Yeah.

A. The same number of upward as there were downward, that zeros out.

Q. Okay. So in this case arsenic total in MW-04, there are no non-detects. Do you consider that to be a relevant data point?

A. I think that to some degree all data points are relevant. This is a data point. We've evaluated the data. We've summed the total upward, downward and no trends. And, you know, we have come to the conclusion that the data -- the trend testing data demonstrates, especially in the case of Joliet, that the concentrations generally are downwards.

Are they downward everywhere, no, but the overall assessment of the data indicates that the groundwater conditions are improving.

Q. Yeah. I guess what I'm getting at is, you in your summary statistics omitted the no trend data. So you were comparing the downward and the upward, and you left the no trend data out. And I think your explanation in your deposition was that that's usually related to non-detects, and so we're not gonna look at that.

Here we have a data point that's not

related to non-detects, and I'm wondering if you still agree with keeping this out of your summary statistics.

A. Well, the point I would make is this is one data point. My testimony has been that -- was at the deposition and is now, that a substantial number of the non -- of the no trends are related to non-detects. You've picked one example that doesn't necessarily change the conclusions that the majority of the no trend data are related to the non-detect issue.

Q. Right. But I'm asking about the summary statistics where you calculate how many are going down out of the total number of relevant data points, and I'm wondering if you still agree with keeping a data point like this out of that summary calculation because this isn't related to the non-detects.

MS. NIJMAN: Asked and answered.

MR. RUSS: I don't think he did answer.

HEARING OFFICER HALLORAN: I disagree. I don't think he answered.

MR. MAXWELL: I don't think that -- I don't think that if we were to add the situations where

there was zero non-detects into the -- into the analysis of the summary, that it's going to change our conclusions.

BY MR. RUSS:

Q. Okay. Let's look at another example. Can you look at barium dissolved on the same page in Well MW--7?

A. Okay.

Q. What percentage of the -- what's the slope for that?

A. That slope is zero.

Q. And how many non-detects?

A. There's zero.

Q. Okay. And MW-4 boron total, same page, what slope?

A. I'm sorry. You said boron?

Q. Yeah, boron total in the MW-04.

A. Yeah, that's zero.

Q. And how many non-detects?

A. That's zero.

Q. Okay. That's just on one page. I found a few. Now let's look at a different situation. On the next page, 81518, chloride in Well MW-2. I'm sorry. Don't bother with that one. That's another

zero zero.

Lithium total in MW-3 on this page, do you see that row?

A. Yep.

Q. What's the slope for that?

A. Slope is zero.

Q. And what percentage of the data were non-detect?

A. Ten.

Q. Okay. So that's not zero, but you still had enough data to generate a slope estimate; is that right?

A. That's correct.

Q. Okay. On Page 81519, the next page, selenium dissolved in Well MW-3, what's the slope there?

A. That slope is zero.

Q. And what percentage of the data were non-detect?

A. 32 and a half.

Q. And again that's enough -- you still have enough data to calculate a slope, right?

A. 32 and a half is still a third of the data being non-detect which does bias the data, and so

there's enough non-detects here that it still is influencing the no trend result.

And I just want to point out that we're talking in the case of Joliet of 135 total tests performed. Okay. So we've talked about a handful and, however, that's a handful. And the majority of the no trends are at least related to the non -- to some of them being non-detect.

Q. Right. Well, in fact, I think you gave us the numbers in your testimony earlier today. There are -- let's see if I can remember. Let's see. That's Waukegan. Well, I'm probably not gonna be able to find it now, but at Joliet -- at each of the four sites you gave a number that were related to the non -- a number of no trends that related to non-detects and another number that were not related to non-detects; is that right?

And as you're saying, the majority were due to non-detects in your opinion?

A. I believe we just focused on the non-detects.

Q. Right. You might not have given a number, but you gave a number that were related to non-detects out of the total and so you could

subtract --

A. Yeah, of course.

Q. Okay. I don't have to belabor the point. I mean, I had a whole bunch of questions to go through all of the examples of the non-detects -- the no trends not being related to non-detects at Joliet, but I don't want to belabor it.

MS. NIJMAN: I'll object to the reference of a whole bunch of data.

HEARING OFFICER HALLORAN: Sustained.

BY MR. RUSS:

Q. Okay. Did you conduct -- so looking at your summary of trends tests in your report which would be at -- for Joliet 29 starts on Page 81505, the very first page of Appendix C.

Did you conduct any trend tests for MW-5 at Joliet 29?

A. While we didn't look at MW-5 at Joliet 29, I believe that the prior expert, Mr. Seymour, did look at MW-5. I know that he looked at additional monitoring wells in addition to the ones that we used. And as we explained in our prior testimony, the wells that we focused on were at the downgradient edge of the ponds which we felt were

most appropriate in terms of evaluating whether or not the -- in assessing the overall character of the groundwater.

Q. Okay. Did you do trend tests for MW-08 at Joliet 29?

A. Again, I believe that Mr. Seymour performed trend tests for that well. The reason that we didn't is because that well was not deemed to be at the downgradient edge of the ponds and, therefore, most appropriate to include within the scope of our evaluation.

Q. Okay. And I apologize for the tedious questions, but did you do trend tests for MW-09 at Joliet 29?

A. I would give the same answer. Again, given the location of MW-9, the fact that there are additional monitoring wells that are further downgradient and more appropriate for our evaluation, we focused on those wells that were most appropriate for our evaluation.

Q. Okay. Can you now turn to Exhibit -- I think we put them in front of you -- 1307. I believe that starts on Bates Page 118236, and this should be the fourth quarter 2021 Joliet 29

groundwater monitoring results for the CCA.

Does that look right?

A. Yes, that's correct.

Q. Can you turn to Page 118355 which is also called Figure 2? I'm sorry. Did I get this wrong? Yeah. I'm sorry. That's not the figure. 118355 is a chart of data, I believe.

MS. NIJMAN: Sorry, is this Exhibit 1307?

MR. RUSS: Yeah.

MS. NIJMAN: 118 --

MR. RUSS: 355, it should be near the end. It's one of the data trend charts over time.

MR. DORGAN: That doesn't line -- sorry, but that doesn't line up with the cited Bates number.

MR. RUSS: Shoot.

MR. DORGAN: Do you have a figure number?

MR. RUSS: Bear with me just a second. Let me grab my copy. I may have made a mistake with the numbering here.

HEARING OFFICER HALLORAN: Let's go off the record.

(WHEREUPON, a short recess was taken.)

HEARING OFFICER HALLORAN: We're back on the

record. Thank you.

BY MR. RUSS:

Q. In the back of this quarterly monitoring report, there should be some data plots of constituents over time.

Do you see those?

BY MR. DORGAN:

A. Yes, we do.

Q. Can you find the chart for dissolved boron versus time?

A. I think we have that.

Q. Okay. Just to clear up my own confusion, can you tell me what the Bates page is on that chart?

A. 18355.

Q. Okay. Great. That's what I said. We're good.

So what does this chart show?

A. This is a chart showing boron concentrations in the various monitoring wells at the station over time.

Q. Okay. As dissolved --

MS. NIJMAN: I'm sorry. Are we talking about Joliet?

MR. RUSS: Yeah.

MS. NIJMAN: This is Powerton.

MR. DORGAN: This is Powerton. I'm sorry. Oh.

MR. RUSS: Oh, yeah. That's interesting. All right. I'm so sorry. Scratch that. Forget about this for a minute. Yeah. That's a mistake in my notes.

BY MR. RUSS:

Q. Let's turn to a different exhibit. Let's turn to Exhibit Number 1314 which should be the quarterly -- the annual and quarterly groundwater monitoring report for Will County.

Do you have that?

BY MR. MAXWELL:

A. Yes, we have it.

Q. Okay. Can you turn to Page 118465? I believe I got it right this time. This should show dissolved boron at Will County.

A. Okay.

Q. All right. Great. Has dissolved boron in Well MW-2 at Will County ever exceeded the standard shown on this chart?

A. It looks like -- yes.

Q. Okay.

A. Certain concentrations of boron are higher than the standard of two for MW-2.

Q. Right. Was boron exceeding the standard in the most recent sample shown here?

A. Yes, it was.

Q. And, in fact, that looks like it's probably the highest it ever was up to that point in time over the period of data shown here; is that right?

A. That's what this graph indicates.

Q. Okay. Has dissolved boron in Well MW-3 at Will County ever exceeded the standard?

A. We're trying to decipher the color.

Q. Yeah. There's a lot of wells here. The dark green squares look like MW-3.

A. There's an awful lot of data on the chart.

Q. Might be easier to look below the standard and see whether MW-3 shows up there very often.

A. I'm having a difficult time deciphering the color. There's a dark square that shows up below the standard for a good period. I can't -- just based on the way the color is printed, I can't quite make out --

Q. Okay.

A. -- if that's MW-3 or not.

Q. Okay. Fair enough.

How about MW-04, can you distinguish that from the other data?

A. Yeah. That one's easier to distinguish.

Q. And is that ever below the standard at Will County?

MS. NIJMAN: Object to ever.

BY MR. RUSS:

Q. Do you see any values for MW -- for dissolved boron in MW-4 below the standard on this chart?

A. This chart does not indicate any concentrations that are below the standard.

Q. Okay. Now, did you include any of the wells we just talked about in your trend test at Will County?

A. I'd have to refer to my report.

Q. Sure. That would be on Page 81511.

A. So, again, those wells weren't included in our trends analysis because those wells are further upgradient at the station, and for purposes of the evaluation that we undertook for trend, the wells that were on the downgradient edge were the wells

that we focused on --

Q. Right.

A. -- because those were deemed most relevant and useful in terms of the trend analysis that was performed.

Q. Okay. Can you turn back to the same exhibit we were looking at before, 13 -- 1314, Will County? Figure 2, it's on Page 118383. I got that right.

Do you see that?

A. Figure 2?

Q. Yeah.

A. Yeah.

Q. Which of these wells are the downgradient ones we were just talking about?

A. So the groundwater flow that's depicted here is generally from the east to the west, and the wells that are downgradient are the wells along the west side of the ponds.

Q. Okay. So does that include some of these pink wells?

A. Those pink wells are non-CCA wells according to this figure. And it looks like our analysis -- our trend analysis does include MW-11,

MW-12. However, MW-13, 14 and 15 I believe are more recent wells that were installed after we conducted our trend analysis. So Wells 13, 14 and 15, those were not included because we weren't aware of them, and they weren't -- I don't believe that they were installed --

Q. Right.

A. -- at the time of our trend testing.

Q. That's my understanding, too.

I have a question about how you know that these are downgradient. The -- can you explain how you know from looking at a chart like this what the downgradient wells are?

A. You said a chart. What chart are you referring to?

Q. I'm sorry. An image like this, a potentiometric contour map, how do you know where the downgradient wells are when you look at something like this?

A. So the contour lines are in blue on this chart. The contour lines signify equal groundwater elevations.

Q. Yeah.

A. And then you can see on the figure that

the pinkish arrows or the reddish arrows are perpendicular to the contour lines. That signifies the groundwater flow direction.

Q. How do the contour lines relate to the little numbers in purple underneath each well label?

Do you see what I'm talking about?

A. The purple -- like, for example, MW-05, 582 --

Q. Yeah.

A. -- point 62?

Q. Yeah.

A. The 582.62 si the groundwater elevation that's been measured at that well.

Q. So the contour lines interpolating the data from the wells?

A. First off, just I want to point out, Weaver didn't prepare this.

Q. Sure. Understood. Understood.

A. So just to be clear.

Q. Yeah.

A. These contour lines -- the data that's shown there in purple, that's the basis -- those are the data points by which the contour surface is

generated.

Q. And so is it fair to say that the well -- it looks to me like the wells on the downgradient side have lower groundwater elevations; is that correct?

A. Yeah. Groundwater will flow from higher elevations to lower elevations, correct.

Q. Okay. So the -- when you're talking about the downgradient edge, you mean the wells with the lowest elevation?

A. I don't like to use the term lowest. That's too extreme. We've utilized the wells that are on the downgradient side of the ponds as stated previously.

Q. Okay. Now, I want to go back to the exhibit that was giving me a problem before, but I think I can -- I think this is gonna be okay. Exhibit 1303 for Joliet, can you turn to Page 118138?

Do you see that?

A. Is that Figure 2?

Q. Yes, Figure 2, same kind of map we were just looking at, but for Joliet 29.

A. Okay.

Q. Which of the wells here are the downgradient wells?

A. MW-7, MW-6, MW-4, MW-3, MW-2.

Q. Okay. Now, what about MW-5, what's the groundwater elevation in MW-5?

A. That's 505.46 according to this drawing.

Q. Okay. Do you see any wells with a groundwater elevation lower than that on this map?

A. Not on this map which of course represents one -- one point in time.

Q. Sure. For this point in time, MW-5 is downgradient, is it not?

A. I think -- when you say downgradient, I'm not quite sure what you're referencing.

Downgradient of what?

Q. Well, I mean, you were talking about how you selected wells on the downgradient edge. MW-5 has the lowest elevation of all of these wells. I'm wondering why you wouldn't have selected that. There aren't any wells downgradient of MW-5.

A. Not on this particular drawing, no. What we did was, though, we looked at an evaluation of the data as a whole and looked to identify those wells that were downgradient most consistently.

Q. Okay. So you didn't run any trend tests on MW-5? That would be 81505 in your report.

A. Again, MW-5 was looked at before by Mr. Seymour in terms of the trend tests. So, again, we didn't feel as though that one was as useful as the other monitoring wells. MW-5 is close to MW-6, and so we did capture MW-6 in the evaluation. And so that's what we included in our evaluation.

Q. Okay. Can you now turn to Exhibit 1310 which is the same kind of report, but for Waukegan? It should start on 118489.

MS. NIJMAN: So this is January 2022?

MR. RUSS: Yeah.

MS. NIJMAN: Is that the right one?

MR. RUSS: That's the right one.

BY MR. RUSS:

Q. Can you turn to Page 118493 which is also like the other ones in Figure 2?

BY MR. DORGAN:

A. I've opened to that page.

Q. Which wells are downgradient here?

A. This particular figure as represented by the data collected on this date would suggest for

historical downgradient Wells MW-01, 2, 3 and 4, would be downgradient, as would MW-7 which is -- on this particular date has a component of flow that's in that direction.

Q. Okay. And when you say in that direction, there's some groundwater that's flowing south at this point in time; is that right?

A. Yes. At the date that this data was collected, that was the case.

Q. Okay. MW-7, is that one that you did trend tests for? That would be on Page 81515.

A. We did not include MW-7.

Q. Okay. I'm gonna do the same thing with Powerton, so Exhibit 1307, January 14, 2022, fourth quarter 2021, CCA groundwater report for Powerton, starts on 118236.

Can you look at Page 118241, Figure 3?

A. Yes.

Q. Which wells are downgradient here?

A. So the wells in a downgradient position on this particular date as represented by this figure would include MW-02, 03, 04, 05 and 07.

Q. Okay. And can you turn to Page 81509 -- I'm sorry.

81508 of your report in this is where the Powerton stuff starts?

A. Yes.

Q. Did you include trend tests for MW-2?

I think you just said that was a downgradient well.

A. This particular date, it reflects a downgradient flow position, but it was not included in our trend testing.

Q. Okay. So the trend tests exclude some wells that are at least some of the time on the downgradient edge; is that right?

A. Trend testing that we did. Trend testing was performed by Mr. Seymour on all of the wells. We then concentrated on the predominant groundwater flow direction and the wells that are in that direction.

Q. Okay. Now, I want to just go back to the Waukegan exhibit one more time. This is a different kind of a question. This is Exhibit 1310, starts on 118489.

Can you turn to Page 118603? Should be dissolved boron over time at Waukegan.

A. I'm at that figure.

Q. Okay. Which of these wells have exceeded concentration of 10 milligrams per liter?

A. Well, that's a little difficult to interpret because the scatter on the graph and the fact that you had so many of the data points around the standard that's reflected on here.

There's certainly some that are demonstrated to be above it. Picking out each one would take some time.

Q. Yeah, right. I agree. That's why I'm asking about not the standard necessarily -- which I believe is 2 milligrams per liter; is that right?

A. That looks to be the case, yes.

Q. I'm wondering how many wells show concentrations that are greater than 10 milligrams per liter, so at least five times the standard.

A. Well, again, there's quite a bit of data here, but it looks like there's at least two and maybe a third that has had a couple -- at least a couple incidents where concentrations were detected above 10.

Q. Okay. And that would be MW-5, 6 and 7; is that right?

A. That looks to be the three, correct.

Q. And did you do trend tests on any of these wells, 5, 6 and 7, at Waukegan?

A. No, we did not. But again, as stated previously, it's been done by earlier experts in the matter.

Q. Okay. I'm gonna move on from that.

Now I want to ask you about some of the historic ash areas at Joliet, and so we're on the same page about what those are. I'm hoping you can turn to the 2019 Board opinion and order which I believe you have a copy of. And on Pages 26 to 28, the opinion describes the areas.

You've read this, correct?

A. Yes.

Is my mic still on.

Q. Yes.

Are you familiar with what the Board describes as the northeast area?

MS. NIJMAN: Which page are you on?

MR. RUSS: I'm on Page 26.

MR. MAXWELL: Yes, I see that referenced here on Page 26.

BY MR. RUSS:

Q. Do you know what the Board is talking

about when they describe the northeast area?

BY MR. MAXWELL:

A. I think I'm generally aware having read this -- these particular pages many times. There's some confusing references in terms of the language that's presented here. I think I'm generally aware as to which area they're referring to.

Q. Okay. And are you familiar with the southwest area that the Board mentions on Page 27?

A. Again, I would give the same answer that I think that when they say southwest area on Page 27 in that heading, I think I know generally where they're referring to.

Q. Okay. And not to belabor it -- I'm sorry. I think your answers are perfectly acceptable, but on Page 28 for the northwest area, would you give the same answer?

A. I would. We're generally familiar with that area. Although, later on in the language there's references to different phrasing in terms of historical ash areas, historical coal ash storage and fill areas. There's some confusing language to me that's difficult to decipher, but generally I'm aware of where those areas are.

Q. Okay. Great. Thanks.

This is -- you'll recognize these questions from your deposition, but for the northeast area of Joliet when you were developing your opinions, did you evaluate the depth of ash in that area?

A. The depth of the ash wasn't necessarily a consideration when you looked at our overall remedy. So are we generally aware of the -- of that area? Yes. Did we consider the depth? We did consider it in the overall evaluation of our remedy.

Q. How so?

A. Well, the -- I don't think -- I don't think that there was a reason to look at the -- to investigate the depth of the ash in the northwest -- in the northeast fill area.

Q. Okay. So you did not consider the depth of the ash then?

A. Would it be possible to refer to our deposition?

Q. Sure, of course. If you turn to Page 65 -- cause actually Mr. Dorgan answered the questions about Joliet, this set of questions. I

don't know why, but that's the way it is. And, actually, if you want to start with the original question, it starts on Page 64 at Line 23.

The question begins, okay. Let's start with northeast -- the northeast ash fill area, what you call the northeastern portion of the facility. Did you consider any information on the depth of the ash in that area?

And Mr. Dorgan said, I don't recall at this point what depth of information was available that we considered as part of our evaluation.

A. I'm sorry. What page are you on?

Q. I'm on Page -- it starts on Page 64, Line 23, and then it moves over to Page 65.

BY MR. DORGAN:

A. Okay. So since I answered this question in the deposition, let's see if I can field it for you now. So what's the question?

Q. Sure.

Did you consider the depth of ash when you were developing your opinions in the northeast

area?

A. Well, there's been testimony that there's ash present. We knew that from the inspections that Mr. Gnat has been performing. He's described ash being present in some of the erosion rails. We also looked at the absence of the seeps that have never been documented to be present along the northeast ash area.

So while we didn't have any specific information or knowledge that there had been a quantification of ash in that area, we certainly considered that it was there relative to the remedy that we had proposed.

Q. Okay. So I guess I'm just wondering, do you know how deep the ash is in that area?

MS. NIJMAN: Object, misstatements of the ash in that area, misstates testimony.

HEARING OFFICER HALLORAN: Can you rephrase, Mr. Russ?

BY MR. RUSS:

Q. Do you have any information about ash at any depth in that area?

BY MR. DORGAN:

A. I'm not aware of any specific information

that documents the depth of ash in that area.

Q. Okay. Did you evaluate whether there was any ash in contact with groundwater in that area?

A. Only to the extent that we considered whether or not there were any seeps which would be indicative of groundwater being in ash, but no, we did not evaluate ash depths with respect to the relationship with groundwater. We're not aware of that information being available.

Q. Okay. And did you calculate the square footage of that area in terms where the ash might be?

A. No, we did not.

Q. Okay. So since -- I mean, I'm sorry for the redundant questions, but since you don't know the thickness or the square area, it wasn't possible to calculate the volume of ash; is that right?

A. That's correct.

Q. Okay. And in your deposition you said, and I think you said basically the same thing today, you didn't feel it was particularly relevant; is that right?

A. That's right.

Q. Is that still your opinion?

A. It is.

Q. Okay. These questions are gonna get redundant. I'm sorry.

Turning to the southwest area at Joliet, did your team estimate the horizontal extent of ash in that area?

A. No, we did not.

Q. Did you estimate the volume of ash in that area?

A. No, we did not.

Q. Did you evaluate the extent to which that ash is in contact with groundwater?

A. No, we did not.

Q. For the northwest area, did you estimate the volume of ash in that area?

A. We did not estimate the volume, nor did we calculate the square footage.

Q. Okay. And did you estimate the extent of any contact between ash and groundwater in the northwest area?

A. We weren't aware of any contact of ash and groundwater in the northwest area.

Q. Okay. Now, on Page 69 of your deposition

on Lines 8 and 9, you were asked, did you consider whether ash on the southwest side was in contact with groundwater. You've already answered that question, but I'm gonna read your response from the transcript here.

> **I don't recall as I sit here today if we specifically considered ash being in contact with groundwater as we did not feel that that was particularly relevant to our ability to assess the remedy which we proposed.**

Did I read that right?

A. Yes, you did.

Q. And on the same page, Line 19, starting on -- there's a question on Line 15.

> **Did anyone on your team calculate the volume of ash in the are on the southwest side?**

Your answer was, as I sit here today I'm not aware that anybody calculated the volume of ash. And again I'd state that we didn't feel it was particularly relevant to our ability to assess an appropriate

remedy for the site.

Is that right?

A. That's how it reads, yes.

Q. And if you recall from your deposition, this went back and forth for a while, same kinds of questions and the same kinds of answers. And you said frequently, not particularly relevant at this site; is that right?

MS. NIJMAN: I'm gonna object to the frequently reference.

HEARING OFFICER HALLORAN: Yeah. Rephrase, please.

MR. RUSS: Sure. I didn't want to go through them all, but okay.

BY MR. RUSS:

Q. So on Page 70, Line 3 --

MS. NIJMAN: Sorry, one more interruption before we continue. I'm not understanding how this is an impeachment with his deposition. What are we impeaching?

HEARING OFFICER HALLORAN: Well, a couple of times or at least once Mr. Maxwell asked Mr. Russ to go to his deposition I guess to reflect or recall his recollection.

MS. NIJMAN: Right, but I'm not sure what we're referencing now going through pieces of the deposition. In response to what? What is this cross-examination of? You said he answered the question here, that he didn't find it relevant.

HEARING OFFICER HALLORAN: Mr. Russ.

MR. RUSS: There two components to the answer. One is whether they did the analysis, and one is why they didn't. And I'm getting to the second part which is why they didn't. And the way --

MS. NIJMAN: But you haven't asked that question.

MR. RUSS: Well, I have asked that question. I asked what you said in your deposition, is it still your opinion that you didn't think it was relevant.

MS. NIJMAN: Right. So then what are we crossing? What's the --

MR. RUSS: I have to establish that that was the reason in a number of different instances.

HEARING OFFICER HALLORAN: Overruled.

You may continue, Mr. Russ.

MR. RUSS: Thank you.

BY MR. RUSS:

Q. So on Page 70, Line 3, there was a

question that started on Page 69, Line 22.

Did you consider the horizontal extent of the ash on the southwest side?

Your response was, we certainly considered the extent as it was mapped on the drawings that we reviewed as part of our evaluation. However, again didn't feel that the aerial extent was particularly relevant to the remedy that we identified as being appropriate for the site.

Is that right?

BY MR. DORGAN:

A. That's how it reads.

Q. Is that still your opinion?

A. Yes, it is.

Q. Now, I don't have to go through the transcript. I just want -- I can ask in a general way if you'd prefer.

With the historic sites, you didn't evaluate the volume of ash in those historic areas; is that right?

A. We looked at the mapping that had been

done through the record about where these were located. We looked at what the Board had to say about the individual fill areas that were referenced. We considered the area certainly as it was mapped, but we're not aware that there was any specific information that had been generated about ash volumes, ash in contact with groundwater.

But even now we feel as though with the information that is available, we have the ability to move towards a remedy that's appropriate for the risks that exist at the site.

Q. Right. I understand. Just for completeness so it's clear on the record, I guess I should ask you about the Waukegan former slag area as you've described it.

That's one place where you actually do have information about the depth of ash and groundwater; is that right?

A. That's correct.

Q. Setting that unit aside, for the historic ash areas at Joliet northeast, northwest, southwest, you've already answered these questions.

Turning to Powerton, the Board opinion at Page 41, sorry, 40 to 41, this is where the Board

has a heading that says, Historical Coal Ash Sites. And the first three that they mention are actually basins that I think you guys would have included as impoundments; is that right?

A. I believe that's correct.

Q. And then after that, there's a heading that says, Coal Ash Fill Through the Site, on Page 41; is that right?

A. Yes, that's correct.

Q. Then on Page 42 there's a heading that says, Ash Cinders Stored on Land; is that right?

A. That's what it says, yes.

Q. In your PowerPoint slides you said there was only one area that the Board identified as a historic ash site at Powerton?

MS. NIJMAN: Objection, misstates the testimony in the slide.

BY MR. RUSS:

Q. Okay. Let's turn to that slide. It's Slide 34.

A. Yes.

Q. So is says historic fill area, and the slide says just one area mentioned by the Board?

MS. NIJMAN: Historic fill area, correct.

MR. RUSS: Well --

MS. NIJMAN: That wasn't your question. That was my objection. Thank you.

MR. RUSS: Can I continue?

BY MR. RUSS:

Q. So the area that you describe on this slide is the area where cinders were temporarily stored in the winter; is that right?

A. That's correct.

Q. Is that a fill area?

A. I'm not sure if that was characterized that way in the Board's order specifically, but it was one of the violations that was found to have occurred at the Powerton site, and it's why we referenced it here.

Q. Okay. And this slide doesn't mention the area described by the Board on Page 41 which is coal ash fill through the site; is that right?

A. That's correct.

Q. Did you evaluate that area described by the Board as coal ash fill through the site?

A. We certainly considered it. And part of the issue is it's referencing to very specific locations where ash had been detected, so it's not

referring to an area per se. So it wasn't something that we were trying to map or could map.

So we considered it in that there's documentation of ash at these locations, but, again, our focus had looked at the downgradient conditions and their off-site receptors and potential risks related to that. So this was considered, but we didn't specifically map it in our figure.

Q. Okay. To be clear for the record, Slide 34 where it says just one area mentioned by the Board is not accurate, right?

MS. NIJMAN: Objection, asked and answered.

HEARING OFFICER HALLORAN: He may answer if he's able.

MR. DORGAN: The Board mentioned three basins, and we included those and discussed those at length. The Board then discussed coal ash fill throughout the site referencing to specific borings where coal ash was encountered.

And then it references to ash cinders stored on land. That's what this is specifically highlighting because that was a location that was referenced and documented.

MR. RUSS: Okay.

(Technical difficulty.)

MR. DORGAN: I'll speak up.

HEARING OFFICER HALLORAN: Sure, thank you. The state apologizes.

BY MR. RUSS:

Q. I have to do this for the record. I apologize.

Did you evaluate the horizontal extent of the ash fill described on Page 41 under the heading, Coal Ash Fill Through the Site?

A. As I stated previously, this coal ash fill throughout the site is referring to specific borings. It's not referring to some map area or geographic -- geographically coded portion of the site.

So, yes, it was considered, but it's not included in a map because it wasn't a specific area.

Q. So at Waukegan there was the former slag area, and there's that nice grid, 40 borings laid out in a hundred-foot grid; is that right?

A. I don't recall the specific dimension of the grid, but it had a grid that was implemented.

Q. And you cited that in your report?

A. Yes, we did.

Q. How -- why did you find that useful?

A. At Waukegan, as I described in my testimony earlier today, we found conditions that were a bit different than what we were seeing at the other three stations. We had MW-5 upgradient of the west pond that was showing CCR constituents that were being detected, and we've got the further upgradient wells that are being impacted by some of the off-site properties.

And then in between those areas we had this pretty well-defined and documented -- the Board documented the presence of a slag fill area, and Midwest Generation elected to undertake some investigation of that area. Certainly as we did with all of the sites, we wanted to consider all the investigatory data that had been collected, and so we looked at that information. And we coupled the impacts that we're seeing in MW-5 with the potential leaching from, in particular, the VADOSE zone coal ash at that location, which is why we ended up with an additional remedy proposal for Waukegan as compared to the other stations.

Q. Yeah. The reason I brought it up is I'm wondering if something similar could have been done at Powerton.

Is there any reason you couldn't have done a sampling grid like that at Powerton to determine where the ash is in this area discussed by the Board?

A. We were tasked, again, through the Board order with assessing a remedy and the appropriate relief. We had a lot of historic information already. We didn't believe we were being tasked with going out and doing additional investigation.

So as I've mentioned any number of times today, there may be some additional investigation that occurs in these areas as a result of the upcoming state and federal coal ash fill regulations that are being promulgated. If that's the case, that'll certainly happen, but we relied on the information that we had at our disposal to assess remedy and relief.

Q. Okay. If you had a sampling grid like the one at Waukegan at Powerton, would that information be useful to you?

MS. NIJMAN: Object to vague as to what areas

we're talking about.

HEARING OFFICER HALLORAN: Sustained.

BY MR. RUSS:

Q. So on Page 41 of the Board order they talk about coal ash fill through the site. If you read through that paragraph, you starting on Line 1, 2, 3, 4, 5, 6, 7, you see where a sentence starts, another five borings taken in 2005 by KPRG.

Do you see that sentence?

A. I see that sentence.

Q. It goes on to say, during the geotechnical testing showed coal ash fill starting at around 2 feet below surface and going as deep as 14 feet mainly in areas around secondary basin, ash surge basin and ash bypass basin.

So -- and then if you scan down a couple lines, there's a sentence in the middle of the paragraph that starts, soil borings from December 2010 when MWG installed monitoring wells, particularly borings for Wells MW-9, 11 and 12, shows cinders in fill that extends from the surface to as much as 24.5 feet below the surface.

Do you see that?

A. I see that.

Q. So there are two areas, one around the secondary basin, ash surge basin and ash bypass basin, and another around MW-9, 11 and 12.

In those areas if you had a sampling grid like we have for Waukegan, would that information be useful to you?

A. Any information would be useful, but that information wasn't available to us. We had the data that came from these specific borings that were done that are referenced in the order. They're referenced in our report. They -- most of these data points were from around the ash basins which we've mapped and shown on our drawings and have considered in our remedy choices.

Q. Okay. So in the Waukegan boring grid, as Mr. Maxwell testified, he estimates that 80 percent of the ash is in the VADOSE zone and 20 percent is below the water table.

Do you have enough information at Powerton to make that kind of calculation from these borings?

A. You could perhaps do the same analysis in the individual borings, especially the monitoring wells, but that would not necessarily be

representative of a larger area. You'd be limited to just what's going on in the individual boring log.

Q. Right. And if you had a grid of 40 borings evenly spaced, would that more helpful in estimating that kind of thing?

A. If you had a grid with more spacing, you would certainly look at that in its totality to assess what's going on in that area.

Q. Okay. Thanks. Turning back to the tedious questions, I just have to get these clear in the record.

Did you evaluate the extent to which the fill we're talking about at Powerton, the coal ash fill through the site, is in contact with groundwater?

A. We did not do a specific analysis of the coal ash that's encountered in some of these borings around the site in terms of how much fill area was in contact with groundwater.

Q. Okay.

A. Cause that wasn't necessarily suggested by the data.

Q. Okay. And also, I'm assuming, because you

didn't feel like it was relevant to your remedy?

MS. NIJMAN: Objection, he answered that part of the question.

HEARING OFFICER HALLORAN: I agree. Sustained.

MR. RUSS: Okay.

BY MR. RUSS:

Q. Now turning to Will County, Page 56 of the Board order, there is a paragraph with a heading, Coal Ash Buried Around the Ash Ponds.

Do you see that?

A. Yes, I do.

Q. And you talked about this earlier today.

You're familiar with the area that the Board is describing here?

A. Yes, I am.

Q. Did your team ever investigate the horizontal extent of the ash fill around the ash bonds?

A. Our team evaluated the information that was already included in the record, so in terms of an evaluation took place but with the data that was already available.

Q. So you don't necessarily know the lateral extent how far it goes two-dimensionally, that area

described by the Board; is that right?

A. Not other than the data that has already been looked at in the wells and borings that are available.

Q. Okay. And did you try to estimate the volume of ash around these ash ponds?

A. We did not estimate independently the volume of ash around the ash ponds.

Q. Okay. And did you estimate the extent of contact between that ash fill and the groundwater at Will County?

A. No, we did not.

Q. Okay. Thank you. Those questions are done I'm sure everyone will be pleased to know.

Now I'm gonna ask some questions about the Waukegan soil investigation. You mentioned it on Page 41 of your report, I believe, if you want to turn to that.

MS. NIJMAN: Can we take a bathroom break?

MR. RUSS: I'd be happy to take one, if you'd like. You want to take a break?

HEARING OFFICER HALLORAN: Sure. I was thinking 5:20-ish again.

MR. RUSS: Sure.

HEARING OFFICER HALLORAN: Okay. Off the record. Thank you.

(WHEREUPON, a short recess was taken.)

HEARING OFFICER HALLORAN: We're back on the record, Mr. Russ.

MR. RUSS: Thank you.

BY MR. RUSS:

Q. Turning to your report on Page 41 which is Bates Page 81458, this -- the top should say 4.2.4 Waukegan.

Do you see that?

A. Yes, I do.

Q. And down at the bottom, the third paragraph starts with a discussion of the FS area.

Do you see that?

A. Yes, I do.

Q. And this goes on to describe the boring grid that we were just talking about a few minutes ago; is that right?

A. Yes, that's right.

Q. On the next page, Page 42, you describe the L-E-A-F, LEAF test, right?

A. That's correct.

Q. Can you describe what that is?

A. The Leaching Environmental Assessment Framework is another one of the leaching tests that's been discussed at various times in the record. Again, it's a means to -- similar to the synthetic precipitation leaching procedure which was mentioned earlier in the sentence, just another leaching methodology that follows a certain standard with respect to subjecting a sample to evaluation to see what leaches out of it.

Q. And you actually mention this more on Page 30. If you turn to Page 30 of your report, this is under the Powerton ASD, but you're talking about the LEAF test again in the second paragraph.

Do you see that?

A. Yes, I do.

Q. The fourth line from the bottom -- fifth line from the bottom, there's a sentence that starts, natural PH results are believed to be the most applicable to field conditions.

Do you see that?

A. Yes, I do.

Q. Can you explain how using a leach test at the natural PH is useful to you?

A. So this particular method looks at leaching potential at a range of different PH, and the natural PH is the PH of the pour water in the sample when it's collected. So that's representative of what the ash is encountering in the environment rather than the other PH ranges that the sample is subjected to which aren't present in the environment where the ash sample is collected from.

Q. How is it helpful to have the -- why is the PH significant to the result? I guess I should ask that.

A. Varying PHs can lead to varying degrees of leaching of different constituents, and different constituents can respond to different types of PH ranges whether acidic or corrosive.

Q. Okay. Here you say the natural PH represents the best approximation of field conditions, right?

A. That's what's stated in the report, yes.

Q. Is that your opinion still?

A. Yes, we believe that.

Q. Another leach test that has been mentioned and that you cite in your report is NLET test,

right?

A. That's correct.

Q. What does the N stand for?

A. Neutral.

Q. And is that in reference to PH?

A. That's correct.

Q. So that leach test uses a PH of seven; is that right?

A. I believe it's seven or around seven.

Q. Okay. And not the natural PH?

A. That's correct. The natural PH can be different than seven.

Q. Right.

A. Depends on the sample itself.

Q. Okay. Thank you.

So Page -- going back to Page 42 for Waukegan, which constituents had LEAF samplings that exceeded Class 1 standards here?

You talk about that in the only real full paragraph on Page 42.

A. I've had a chance to look at this, but can you repeat your question?

Q. Sure.

Which constituents had LEAF samples that

exceeded Class 1 standards?

A. I believe you're referring to boron which was detected in several of the samples, and I believe arsenic was also detected in one of the samples slightly above the Class 1 groundwater standard.

Q. Right. Okay. Thanks.

If you turn to Page 814, excuse me, 81487 of your report, that will be towards the back or somewhere in the middle. It's where the tables are. And this may be hard to read. I have a magnifying glass if it'll help you. It should say Table 4 historical leaching data.

Do you see that?

A. Yes, I do.

Q. And the box on the far right, the box of six columns or seven columns says at the top, KPRG. I believe it says, Bates soil investigation, November 2020; is that right?

A. I believe that's what it says.

Q. And is this the same data that we were just looking at your discussion of on Page 42?

Feel free to take a moment to flip back. I just want to make sure it's the same.

A. I believe it is based upon a review of some of the references both from Page 42 and then what's on the headings for the columns.

Q. Okay. Now, according to this table, how many of these soil probes were subjected to a LEAF test for boron?

A. It looks like three of them.

Q. Okay. Yep.

And how many exceeded the SRO?

A. All three exceeded the Tier 1 SRO.

Q. Right, okay. Thanks. And, you know, while we're here, for molybdenum, it's also the case that all three exceeded the SRO; is that right?

A. This shows that the three samples that were subjected to the LEAF analysis exceeds the Tier 1 SRO reference that they include on the table which is the soil migration for protection of groundwater standard.

Q. Okay. When you say they include on the table, did someone else prepare this table?

A. I believe this was -- I believe this is a table we created using their data.

Q. Okay. I think that's probably right just

because you have some KPRG data, and you have some other data here, too.

Given these results for the historic ash area or the historic fly -- it goes by different names, the historic -- the former slag and fly ash storage area is I think what the Board calls it.

Is it fair to assume that the ash in the bonds is also leaching boron, molybdenum and sometimes arsenic at levels above the SRO?

MS. NIJMAN: Objection, foundation.

HEARING OFFICER HALLORAN: Mr. Russ.

MR. RUSS: I don't -- I don't know. I mean, the results are what they are.

BY MR. RUSS:

Q. You have results for some coal ash for Waukegan here. Is it fair to assume that the same results would be obtained from the ash ponds?

MS. NIJMAN: Same --

MR. DORGAN: I'm not sure which ash samples you're referring to.

BY MR. RUSS:

Q. These soil investigation results I believe are soil borings from the former slag and fly ash area which we've talked about earlier today

contains --

A. Yes, but I thought your question had to do with ash in the ponds.

Q. My question is whether -- you have these results for the ash in the former slag area.

Is it safe to assume that you'd get the same results from the ash in the ponds at Waukegan?

MS. NIJMAN: Same objection to foundation.

HEARING OFFICER HALLORAN: Yeah, sustained.

BY MR. RUSS:

Q. Do you have any LEAF test data from the ash in the ponds at Waukegan?

A. I'm not sure if there is LEAF from the ash in the ponds, but I would not say you can draw the conclusion that pond data and the ash data from the slag area are going to be representative of the same thing. They're different materials, different sources generated at different times located in different areas.

So could there be similarities, I'd like to say they'd be the same. If one is indicative of the other, I wouldn't go there.

Q. You wouldn't want to take the leach test data from one area and apply it to another area, is

what I'm getting at.

MS. NIJMAN: Misstates testimony.

HEARING OFFICER HALLORAN: He can answer it. I think he already did, but you can answer if you're able.

MR. DORGAN: On this table there's LEAF data that was collected from the samples that were drilled in the former slag area or the fly ash area that you do reference. That's what we were just discussing were those results.

So if you're speaking to specific results from other LEAF samples from other ash materials from the site, I can't necessarily speak to that, but I would stipulate that they would not be necessarily the same.

BY MR. RUSS:

Q. Okay. Thank you.

I actually think -- I wasn't gonna ask about this, but it does appear to me that you have LEAF test data from the ponds in this table.

The two middle columns where it says, KPRG alternate source demonstration composite, appear to be east pond ash, west pond ash LEAF test results; is that right?

A. That's what it's referenced as in the header, yes.

Q. Okay. And indeed as you were saying, the results for boron are different.

They're below the SRO; isn't that right?

A. Boron was detected at concentrations at -- either at or below the referenced standard.

Q. Right. Okay. So like you were saying, different material, different history, different profile, you get different results?

MS. NIJMAN: Objection, misstates testimony.

HEARING OFFICER HALLORAN: I can't hear you, Ms. Nijman.

MS. NIJMAN: Misstates testimony.

HEARING OFFICER HALLORAN: Could you rephrase?

MR. RUSS: Sure.

HEARING OFFICER HALLORAN: Thanks.

BY MR. RUSS:

Q. Do these results corroborate what you were saying before, that when you sample different ash from different areas, you can get different results?

MS. NIJMAN: Again, misstates his testimony.

HEARING OFFICER HALLORAN: He can answer if

he's able. I think he somewhat answered.

MR. DORGAN: There are differences in the boron concentrations between the samples collected from the former slag area and the samples collected from -- as represented by the two ash samples that are referred here. They're not -- we're talking relative differences at this point between a concentration of two and a concentration of five, but I would -- I would agree that there are some differences, yes.

BY MR. RUSS:

Q. Okay. And just to be clear for the record, not to be rude or anything, but the boron result for Boring C705 is 13, right?

A. Yes, that's correct.

Q. Okay. Did you review any LEAF test data from the northeast area at Joliet?

A. I don't recall that there's LEAF test data from the northeast area of Joliet. If you'd like to point me to that --

Q. Well, I guess I can -- yeah, I can point you to just a couple pages before. 81483 I guess is where the historical leaching data for Joliet start. You can see where the different types of

tests were used.

Looking at this page and at the next page, do you see any LEAF test data at all for Joliet 29?

A. I'd need to relate back to what this summary table was. This was I believe based upon the title at the top of the columns for the sample locations, this is the CCB determination that was done in the northwest area which was discussed as having been performed for purposes of evaluating if that material could have been used to build a windscreen.

So this data is not related to the northeast area. And to answer your specific question, I do not see that there is LEAF data here, but for the CCB beneficial reuse purposes, they use the NLET method which is the data that's presented on this table.

Q. Right. Okay. Thanks. So my understanding of these tables, and correct me if I'm wrong, is that they compile all of the leaching data for the four sites; but if I'm wrong, that's fine.

The next -- the table continues on to the next page, and it talks about the ash slag removal.

And then it switches over to Powerton, and you'll see starting on Page 81485 that there are a lot of different areas of Powerton described in that table.

MS. NIJMAN: I'm sorry. Is there a question?

MR. RUSS: Yeah, there is.

BY MR. RUSS:

Q. The question is, do you -- am I wrong -- do you recall whether there's any leaching data that you didn't include in these tables or is this a summary of all the leaching data that you had available to you?

A. Best of my recollection, the data that we had available to us was represented --

Q. Okay.

A. -- or maybe data that's been collected since then which clearly wouldn't be in here, but . . .

Q. Okay. That's -- I'll move on. I think we have enough to go on.

There was -- now, at Joliet 29 there was some leach testing done at the northwest area; is that right? We talked about that earlier today.

A. I believe I just referenced it a moment

ago.

Q. Yeah. And can you explain how those data were used? We just talked about the removal of ash.

How were the leach data used to inform the removal of ash?

BY MR. MAXWELL:

A. So the purpose of that particular investigation was a CCB, a coal combustion byproduct, beneficial reuse investigation. And so the purpose of that particular investigation was to look at whether or not the material qualified for beneficial reuse under the Environmental Protection Act.

So the specific test that we used was -- or that was used was dictated by the regulations, and that was the test that was implemented, the NLET test.

Q. Right. Okay. Now, if you turn to your report at Page 81453, it looks like, if I'm reading this correctly, the top paragraph, particularly the second half of the top paragraph, talks about concentrations of NLET copper and lead below the Class 1 quality groundwater standards which

adequately delineated the limited extent of the soils exhibiting concentrations of NLET copper and lead above the Class 1 groundwater quality standards; is that right?

A. I think you've read the last part of that paragraph.

Q. Okay. And if you -- for more context on the prior page, Page 35, the bottom paragraph, the middle of that bottom paragraph there's a sentence that says, concentrations of copper and lead from GP 14A were higher than the Class 1 groundwater quality standards; is that right?

A. That was the information that was utilized to -- that informed the subsequent decision to further delineate the area in the vicinity of GP 14A as it related to the results from GP 14A for copper and lead.

Q. Yeah. And is it your understanding that the area where the test results exceeded the Class 1 groundwater quality standards was the area that was excavated?

A. That it exceeded the -- yes. The area that was excavated was delineated -- the delineation was utilized in order to map out the

area of soils that were -- that were -- that did not exhibit the NLET results below Class 1 groundwater standards.

Q. Okay. And turning to Page -- one of the slides in your slideshow talks about this. I believe it's -- yeah, Slide 12.

Do you see the area that we were just talking about where there was ash excavated?

A. So, yes, there's -- on Figure 5 from our report there is an area that's marked in green in the vicinity of GP 14A in the northwest fill area.

Q. Okay.

A. That area that's in green in the legend is indicated KPRG approximate removal area.

Q. Okay. And I believe you said in your report, 52 trucks loads and a little over a thousand tons of ash; is that right? Page 36.

A. Yes. Also, Slide 18 references 52 trucks loads.

Q. Oh, yeah. Okay. Thanks.

And just to be clear, so there's -- the northwest historical fill area as it's shown on this map is much bigger than the area that was excavated; is that right?

A. The majority of the northwest fill area exhibited concentrations using the NLET test that were below Class 1 standards. So that was the standard -- that was the regulatory standard.

So, correct, there was no need to do anything further for purposes of this investigation on the majority of the area. It was just this one particular location that warranted action in light --

Q. Right.

A. -- of the objectives of this study.

Q. Right. Okay. Just had to make that clear for the record. Thanks.

While we're on the topic of removal, has any other ash been removed from Joliet 29 that you're aware of?

A. Historically, there's ash that's been removed from the ponds when the ponds operated, so they were routinely emptied as warranted and as needed.

Q. Do you know where all that ash -- not to say a lot, you know -- where did that ash go?

Do you know?

A. My understanding is that the operational

procedures were to take that to the Lincoln Stone Quarry on the south side of the river after it was removed from the ash ponds.

Q. Similar to some of the other sites, I think in your report you talked about how a lot of these ash ponds are used for temporary storage of ash; is that right?

A. I don't know that I would use the term storage. In fact, I -- well, if you -- if by storage you mean temporary, with that clarification.

Q. Yeah. I just mean temporary because it was taken somewhere else. At Powerton, for example, some of those ash ponds were periodically cleaned out; is that right?

A. That's our understanding.

Q. Do you know where that ash was sent?

BY MR. DORGAN:

A. I don't know offhand.

BY MR. MAXWELL:

A. I don't either.

Q. Okay. That's fine. I'll move on.

So turning to Powerton, on Page 81485 of your report, that's gonna be a table with a little

tiny Bates number. I think it's Table 2, Historical Leaching Data for Powerton. I think it's gonna be hard to read this. Again, I have a magnifying glass if it will help.

What areas as shown in this table were tested with a LEAF test?

BY MR. DORGAN:

A. Yeah. It looks like, as summarized on this table, the very far right columns reference data that was collected as part of the alternate source demonstrations that KPRG performed.

Q. Okay. And then turning to Page 81447 of your report, which is the text --

A. 447?

Q. Yep. In the third paragraph, second sentence, it says, KPRG recommended that the ash surge basin and bypass basin be shifted from detection monitoring into assessment monitoring.

Did the groundwater -- so how did the groundwater monitoring program change in response to the -- how did the LEAF data influence the decision to change from detection monitoring to assessment monitoring?

MS. NIJMAN: Objection, foundation.

MR. RUSS: Just looking at the description they made in the report.

HEARING OFFICER HALLORAN: Try to rephrase. It was -- yeah. I think you can do it, Mr. Russ. Thank you.

MR. RUSS: You want me to rephrase?

HEARING OFFICER HALLORAN: Yeah, try.

BY MR. RUSS:

Q. So the first sentence of the third -- the second paragraph discusses the LEAF test results for the ASD; is that right?

A. There's discussion of the ASD and LEAF samples in the first couple sentences of that paragraph, yes.

Q. And this is what we were -- this is what we were looking at earlier where further down in the second paragraph you talk about how the natural PH results are believed to be the most applicable to field conditions, right?

Is that right?

A. That's what it states, yes.

Q. And then the third paragraph starts, KPRG concluded that the data relative to the bypass basin was not definitive, and potential

contribution of leachate from the bypass basin to the local downgradient groundwater impacts could not be ruled out.

My question is, where it says KPRG concluded that the data, are you talking about the LEAF test data in that section of your report?

A. We don't cite specifically to the data, but you had alternate source demonstrations happening for the two basins. The LEAF data was referenced for the ash surge basin. And in the case of the bypass basin, they felt there was less definition to a clear outcome of that analysis.

If I go back -- so I believe we are referencing to the LEAF data since the LEAF data is included on the table we were looking at previously for both the ash bypass basin and ash surge basin.

Q. Okay. Great. Thank you. So I guess just my -- I just want to make sure I'm reading this right.

The LEAF test data informed KPRG's recommendation that the ash surge basin and the bypass basin be shifted from detection monitoring to assessment monitoring?

MS. NIJMAN: Again, foundation as to what KPRG

concluded.

MR. RUSS: I'm just reading what they wrote in their report and trying to understand it.

HEARING OFFICER HALLORAN: Yeah, I'll allow it.

MR. DORGAN: So I think we stated in our report, and there's a footnote to that particular citation or there's a citation there to KPRG's report which shows at the bottom of this page and explains their thought process around the findings for the ash surge basin and the bypass basin.

And if you look at that, this is a reference to what's stated in KPRG's reports. We were just highlighting previous conclusions by the other consultant.

BY MR. RUSS:

Q. Okay. I'll stop there on that. Going back to 81485, the table of leach data from Powerton that we were looking at before, other than the ash bypass basin and the ash surge basin, do you see any other LEAF test data at Powerton in this table?

MS. NIJMAN: Asked and answered.

HEARING OFFICER HALLORAN: I thought I heard you object asked and answered?

MS. NIJMAN: Yes, sir.

HEARING OFFICER HALLORAN: I don't remember, but if he can answer, please do so.

MR. DORGAN: Other than the two basins referenced, the ash bypass basin and the ash surge basin, in two different efforts on the part of KPRG there's no other LEAF data represented on this table.

BY MR. RUSS:

Q. Okay. Do you -- can you explain what the other data -- the big block of data that says at the top, Andrews Environmental Engineering, do you remember what that's referring to?

A. I believe that was part of their -- what we refer to as the geotechnical investigation. I need to go back and just double-check that real quick, but we had highlighted that earlier in our testimony earlier with respect to Powerton.

Q. Okay. So in your testimony earlier -- maybe this will help. If we look at your slides, Page -- let's see. One of those site-wide maps of Powerton might help explain this, maybe Slide 35.

In the legend on Page 35 there's a description of the Andrews 2004 basin sampling test

pit location?

A. Yes, I see that.

Q. I -- oh, man. I don't -- now, I used to think I knew where this was on the map, but I don't see it now.

Do you recall where that is?

A. On our map we have it shown as being just to the east of the ash surge basin, and there's a callout of that --

Q. Oh, yeah.

A. -- Figure 6 of our report.

Q. Okay. Great. Figure 6 of your report, I'm gonna turn to that. Thank you. So what I want to clarify is whether the test pit there -- yes, this is perfect.

So is this what has elsewhere been described as the limestone runoff basin? Do you recall?

A. No. I don't believe that's the case.

Q. Let's look at the Board opinion, Page 40. There's a heading that says, Limestone Runoff Basin. It says, limestone runoff basin is located east of the ash surge basin. And then in the middle of the paragraph, right in the middle, there

is a sentence that starts, in 2004 Anders Engineering analyzed samples from the test pits in the nine locations in the basin. I believe they meant Andrews.

Does this refresh your memory about that area?

A. Yes. Thank you. Yes. I believe as you flip between these, that this area east of the ash surge basin, the callout on the test pits and the reference under the limestone runoff basin is referring to the same effort.

Q. Okay. Thank you.

I think you've already answered the question I was going to ask next, but aside from the limestone runoff basin and the ash bypass basin and the ash surge basin, there's one other area of leach test data in the that table on 81485. I'm wondering if you can explain what that is. It looks like it says -- correct me if I'm wrong.

You've got Andrews Environmental Engineering first. Then you come to the MWG bottom ash sampling from February 27, 2007?

A. We're referring to the Table 2?

Q. Yes. Yep.

Do you recall where that sample came from?

A. I would need to refresh from taking a quick look if that's discussed in our report, if I could.

Q. Sure. Yeah. So that would be -- well, I actually don't know exactly where in your report that would be, but I assume it would be near Page 30 cause that's where the rest of this is discussed. I might be wrong. You know what, we can move on. I'll try to find it myself, and we can come back to this tomorrow.

I know I'm gonna get an objection on this, but I want to get it clear for the record.

Other than the areas we just discussed shown on 81485, are you familiar -- are you aware of any other leach testing data at Powerton?

A. Not that I'm aware of, at least at the time our report was generated.

Q. Okay. Thank you.

Can you now turn to Page 814 Waukegan -- 818 -- no, I got this wrong. 81486 is what I think I meant to type as the next page, and it's where the Will County data starts. I believe these leaching data in the first set, MWG bottom ash

sampling December 2010, it says, Composite 3 south bottom ash.

My understanding is that that ash was taken from Pond 3 south. Do you recall if that's right?

BY MR. MAXWELL:

A. Yeah. That's what our table indicates here.

Q. Okay. Sorry to ask an obvious question like that. The next -- now I wanted to really ask about the next couple sets of data.

The CCB determination, I believe this is what we were talking about earlier, that area east of Ash Pond 1N; is that right?

A. I believe that's correct.

Q. So that's that set, and that goes all the way over towards the end. And then there are two remaining columns, the KPRG alternate source demonstration. And it looks like there's a row below that that describes where the samples were taken from, I think, AP 2S ash, AP 3S ash.

Is it your understanding that that means these are ash samplings from those two ponds, Ponds 2S and 3S?

A. Yeah. AP I do believe signifies Ash Pond 2S and 3S.

Q. Okay.

A. That was collected as part of the alternate source demonstration.

Q. Okay. And are you aware of any other leach testing data for Will County other than what's shown in this table?

A. Again, at the time that we performed or that we prepared our report, I don't believe that we knew of any additional leach testing.

And I would just like to point out, too, that leach testing is summarized here. We also have groundwater monitoring testing as well --

Q. Right.

A. -- that helped to inform our opinion as to remedies.

So I just want to put a reminder out there about that.

Q. Fair enough. Yeah. So that's all I'm gonna ask about leaching for a moment. I'm gonna switch gears entirely for my last 13 minutes here.

On Page 53 of your report you discuss the HELP model, H-E-L-P model, and you also included

HELP model files as Appendix E to your report; is that right?

(Reporter clarification.)

MR. DORGAN: Well, we do discuss the HELP modeling that was performed at the top of Page 53. And just scanning through here -- do you have a Bates number for the Appendix?

BY MR. RUSS:

Q. Oh, yeah. It's far into the depths of the report. Let's see.

A. I think I found it.

Q. Okay.

A. 82178.

Q. It's the last bunch of pages there. For the record, it starts on Page 82178. That's the title page anyway. And then 82179 is where the actual HELP model documentation starts; is that right?

A. Yes.

Q. Okay. So on Page 53 of your report starting on Line 3, you wrote, according to the model result, the cap has significantly reduced infiltration and thereby would be expected to mitigate potential leaching from ash materials to

groundwater; is that right?

A. That's what that states, yes.

Q. Okay. And then I think earlier today you said something slightly different which is that the cap would be expected to mitigate potential leaching from ash in the VADOSE zone; is that right?

A. That's right also.

Q. Okay. So would the cap mitigate potential leaching from ash below the water table?

A. Well, first of all, the first part of your question regarding the differences between the two representations are basically saying the same thing but in different ways.

Q. Okay.

A. So leaching to groundwater implies --

Q. Sure.

A. -- the ash above the groundwater to the groundwater.

And then the leaching from the VADOSE zone would be the unsaturated zone of ash above the groundwater to the groundwater. So I just want to clarify that's really just the same thing stated differently.

Q. Okay.

A. So then I believe the second part of your question had to do with groundwater, and so we were -- this HELP model only looked at the inhibition of infiltration as a result of the cap.

Q. Okay. So the HELP model doesn't estimate changes in leaching behavior, for example; is that right?

A. No, it doesn't. It simply models what the cap design you input how much infiltration and passage of water through that cap you're likely to see.

Q. Okay. So you can use the HELP model to calculate how much infiltration would change, but the HELP model doesn't give you a number for how much leaching would change; is that right?

A. Right. The HELP model simply looks at the infiltration through the cap.

Q. Okay. Are there other models that would be able to estimate changes in leaching behavior?

A. There would be models that you could attempt to use. The earlier study that we referenced was using a model to try to predict what might happen with respect to leaching, but we did

not do that as part of this analysis.

Q. Okay. And the earlier study, do you mean the EPRI document we were talking about?

A. That's correct.

Q. Okay. I have a couple questions about that, and I think that might be a good way to close out the last few minutes here. I believe the document you're referring to is Exhibit Number 1103 that starts on Bates Page 65921. Make sure I have my copy here. Here we go.

On Page 3-10 of this report, it talks about HELP results at the top, and then it talks about MODFLOW slash MT 3D results at the bottom; is that right?

A. That's what the heading of that paragraph is, yes.

Q. And MODFLOW is -- I believe MODFLOW is one of those groundwater fate transport models that you were talking about earlier today?

A. That's correct.

Q. So that's the kind of model that you could use to estimate changes in leaching behavior?

A. Theoretically, that could be applied given the circumstances and the type of outcomes or the

types of outputs you were looking for.

Q. Okay. Now, on Page Roman Numeral 6, Paragraph 2 of this report?

A. I'm sorry. I'm not with you.

Q. Oh, okay.

A. Where are you?

Q. There's a page -- one of the early pages, Roman Numeral 6?

A. Yes.

Q. In Paragraph 2, second sentence, the authors write, this site differed from the other two in that a portion of the ash was below the current water table, and the full extent of which was not known prior to closure of the site was not reflected in the closure model; is that right?

A. That's what that says.

Q. And so this is talking about one of the three impoundments that they modeled, right?

A. One of the three impoundments that were comprised of multiple ponds at each of the impoundments.

Q. Okay. I should say maybe then one of the three sites. Although, they say -- I mean, the first sentence in that paragraph says one of the

three impoundments, right?

A. Yes.

Q. So on Paragraph 2, Line 4, or, yeah, Line -- starts on Line 5. It says, in this particular case -- I'm sorry. That's not the sentence I meant to direct your attention to.

On Line 4, the sentence starts at the beginning of the line. It says, dewatering and closure were not effective at this site because leaching continued from the saturated ash; is that right?

A. That's what the statement says, yes.

Q. And then it goes on to say that in this particular case concentrations actually increased because the contact time of groundwater moving through the saturated ash increased when the hydraulic gradient of the pond was removed. A cap would have had little or no effect on this process.

Did I read that right?

A. You read that correctly, but this is the same topic that I testified to earlier when I mentioned that this study references dewatering.

Q. Yeah.

A. And that dewatering that they're referring

to is of ponds --

Q. Yep.

A. -- not of the groundwater.

This is talking about stopping the infiltration of water coming into the pond. So that's why I was drawing the distinction between the way in which this study was conducted and its findings versus the conditions that we were referring to at Waukegan.

Q. Right. I understand that. And my question -- I have a couple questions related to that, but not exactly the same thing.

Can you just for background describe what hydraulic gradient means? They refer to the hydraulic gradient being removed.

A. Well, again, I believe in this context, the hydraulic gradient they're referring to is the incoming water which is creating its own gradient, that water is infiltrating and finding a path to migrate through.

In other instances gradient is a reflection of the groundwater surface conditions and the difference over distance between data points expressing a groundwater surface which would

give you an understanding of what your groundwater gradient is.

Q. Okay. And the infiltration at Waukegan that you were talking about, is that also hydraulic gradient?

A. That would be a form of hydraulic gradient which would be the precipitation moving vertically through the unsaturated zone as it migrates towards the groundwater table.

Q. Okay. And so at this site described by EPRI when the hydraulic gradient was removed, it affected groundwater flow. A cap at Waukegan would also remove the hydraulic gradient of infiltration; is that right?

A. Can you restate that question?

Q. Sure.

A. I want to make sure I answer it properly.

Q. I'll ask the second part, keep it simple.

Would -- the cap that you're proposing at Waukegan would eliminate or virtually eliminate infiltration, right?

A. That's the -- that's the goal.

Q. And so that would also eliminate the hydraulic gradient associated with that

infiltration?

A. That would eliminate the gradient of surface water infiltrating to groundwater.

Q. Okay. And at the site EPRI described, when they removed the hydraulic gradient, the groundwater started moving more slowly.

Is that your understanding?

A. That's because they eliminated the incoming water flow to the ponds. That was part of the ash management system. So you had ponds that were receiving large quantities of ash and water that were then migrating in addition to the precipitation. So it wasn't simply surface precipitation infiltration. It was a combination of that with the incoming water from the sluicing operations.

(Reporter clarification.)

MR. RUSS: Okay. I think I'm done with that line of questioning. Probably a good time to stop.

HEARING OFFICER HALLORAN: Okay. Yeah. We can adjourn until tomorrow at 9:00 a.m., June 14, 2023.

Thank you.

(WHEREUPON, proceedings were adjourned until June 14, 2023, at 9:00 a.m.)

STATE OF ILLINOIS)
) SS:
COUNTY OF C O O K)

RAELENE STAMM being first duly sworn, on oath says that she is a court reporter doing business in the City of Chicago; and that she reported in shorthand the proceedings of said hearing, and that the foregoing is a true and correct transcript of her shorthand notes so taken as aforesaid, and contains the proceedings given at said hearing.

_____

Certified Shorthand Reporter

A
A-v-e-l-a-r 8:8
a.m 1:19 87:8 292:21 293:3
abbreviation 13:5
ABEL 3:13
ability 31:19 70:13 171:8 240:10,24 244:9
able 23:10 42:8 60:1 74:19 77:19 112:22 146:15 162:10 185:20 188:24 189:24 190:20 210:18,19 216:13 247:15 264:5 266:1 286:20
above-entitled 1:14
absence 80:3 134:9 237:6
absorption 78:19 152:6
acceptable 98:20 102:6 234:15
acceptance 178:3
access 148:6
account 95:12 144:17 153:11
accounted 145:15
accounts 75:6 76:2 106:12 147:2
accumulated 165:11
accurate 247:12
ACD 49:18,22 50:10 65:23 93:6,8
acidic 258:16
acknowledge 141:12 159:10
acknowledged 135:11 168:23 177:13
acknowledges 65:11
acquired 45:24 94:24 129:19 176:24
acquisition 58:2,4 96:8
act 9:16 32:9 40:2 79:1 101:8 102:8 269:14
action 9:8 32:6 67:9 85:14 128:10 162:2 272:8
actions 145:2 149:15 158:8,11 158:20 175:17 177:24
active 25:13,17,17 41:12
actively 105:1 177:19
actual 43:15 97:2 110:23 112:15 153:4 284:17
adapting 72:20
add 195:6 207:2 213:24
added 92:17 109:2,3 164:16 181:12
addition 104:23 111:20 217:21 292:12
additional 16:23 48:14 52:14 56:15 61:3,4 69:9 73:10 99:10 102:23 145:2 149:15 180:6 217:20 218:17 249:23 250:12,14 283:11
address 9:6 67:22 68:7 71:13 131:8 157:6 169:1 171:24 178:21
addressed 40:13 81:15 85:6 122:24 180:5
addressing 23:4 49:15 58:22 173:5,19
adequate 155:16
adequately 107:14 270:1
adhered 170:19
adjacent 54:2 122:1 126:4 140:13,18 149:3
adjoining 24:15
adjourn 292:21
adjourned 293:2
adjusted 131:7
admit 183:21 184:4 185:8
admitted 6:2 87:17 183:24 184:1,3,10 185:8 185:10
advanced 56:2 133:17 138:16
advancement 132:22
adverse 14:1,11 15:1 32:6
adversely 38:16
aerial 53:12,22 54:5 55:11 197:3 243:9
affirmatively 186:7
afford 127:19
aforesaid 294:11
African 125:15
afternoon 121:9 125:8,9
age 166:3,7
agencies 62:6 71:13 162:6
agency 62:8 65:8 71:17 132:20 143:9 177:2,13 177:24
ago 37:22 51:17 82:18 112:8 160:9 256:20 269:1
agree 61:24 62:19 67:19 78:6,7 156:7 165:19 171:7 178:14 195:2 213:2,15 232:10 254:4 266:9
agreed 24:17 63:14 82:3 121:11,16 177:2 177:8
agreement 65:6 92:3 140:24
agreements 86:10 177:10
agricultural 46:4
ahead 87:23 169:15
alleged 139:8
allow 48:18 58:15 69:10 74:14 82:7 105:10,12 119:9 120:23,24 127:24 187:23 206:16 277:4
allowed 25:18 123:21 167:3 178:8 184:16
allowing 71:15 125:21 169:3
allows 70:11 105:8 124:18 168:21 177:21 188:6
alternate 49:20 50:2 67:15 68:5 68:8,13 93:9,12 131:10 143:15 143:24 144:9,19 264:22 274:10 276:8 282:18 283:5
alternative 50:7 65:24 66:5,7 67:2,4,8,10,12 70:9 144:5,18 175:13 176:7
amend 123:7
American 125:15
amount 159:17,18 165:11 169:2 196:19,23
analyses 62:1
analysis 23:5,7 30:24 31:2 33:1 33:2,7 35:2,11 35:17,18 36:18 37:7 38:1,3,5 39:8,14 45:15 62:3,10 69:24 73:10,15 74:2 77:3 78:12 80:12 83:10 86:18 100:12 101:17 105:6 107:1,11,13 109:16 133:6 139:5 141:18 147:18,21 149:6 149:9,18,21,23 150:23 151:16 152:2,14 153:11 156:1 158:22 159:4 183:1 195:23 196:4 197:12,15 198:11,13,17,22 201:4 214:2

223:21 224:4,24 224:24 225:3 242:8 252:22 253:17 261:16 276:12 287:1
analytes 59:8 136:8
analytical 15:17 28:16 97:3 98:4 106:17 147:1 207:3
analyzed 23:19 98:15 100:13 102:17 108:13 150:16 200:10 280:2
analyzes 76:9
analyzing 140:4
Anand 2:7 7:11
and/or 169:21
Anders 280:1
ANDREW 4:5
Andrews 278:12 278:24 280:4,20
Ann 4:16 125:10
annual 221:11
answer 42:7 182:14 186:20 188:23 189:4 190:19 191:5 206:17 213:20 218:15 234:10 234:17 240:19 242:7 247:14 264:3,4 265:24 267:13 278:3 291:17
answered 171:3 186:7 213:19,22 235:23 236:19 240:3 242:4 244:22 247:13 254:2 266:1 277:22,24 280:13
answers 234:15 241:6
anticipate 79:18
antimony 136:10
anybody 240:20
anyway 121:3 284:16
AP 282:21,21 283:1
apologies 194:6
apologize 218:12 248:8
apologizes 248:5
appear 264:19,22
APPEARANCES 2:1 3:1 4:1
appears 83:14
Appendices 150:17
Appendix 34:9,11 35:3,4 80:20,21 111:6 139:22,23 201:5 217:15 284:1,7
apples 165:2
applicable 44:22 116:5 119:3 257:20 275:18
applicant 24:18
application 125:1
applications 150:12
applied 64:14 86:3 176:4,15 287:23
applies 25:2 91:20 156:18
apply 73:24 104:1 187:3 263:24
applying 164:24 177:21
appreciate 125:20
approach 44:23 45:16 56:6 80:10 81:21 115:24 119:12 119:14 161:14 161:19 180:11 187:24
approached 67:24
approaches 175:13
appropriate 67:1 82:9 85:17 156:8 158:17,17 169:4 173:24 202:17 218:1,10 218:18,20 240:24 243:12 244:10 250:9
appropriately 88:16 171:21 176:2
approvable 175:21
approved 48:18 71:17 162:6
approximate 271:14
approximately 51:20 87:13 125:11 137:7 152:4 159:10 180:20
approximation 258:18
aquifer 61:1 64:19 64:21,23 65:2,9 65:13 100:19
aquifers 64:22 65:10 123:17,19
area 11:12 18:6 21:5 24:23 39:23 40:3,9,15 40:17,20 46:23 47:3 50:24 51:2 51:3,14,16 52:15 52:16,17,18 54:11 55:13,18 61:11 68:6 71:8 85:24 89:17 93:22,23 94:1,2 94:3,13,13,14,16 94:21,22,23 95:4 96:24 97:2,15,22 101:2,4 114:11 114:11 115:21 122:4 130:8,10 130:11 132:23 133:18 134:3 138:9,13,14 139:8,12,20 140:11,16 141:5 141:21 142:8 144:19 145:3 149:16 155:9,12 156:13 157:1,5,7 157:24 158:4,23 159:3,7,15,22 160:24 161:24 162:3,8 164:11 164:15 165:6,11 167:6,14 168:6 170:13 171:4 176:12 180:7 182:6,17 183:4 192:3 197:7 233:18 234:1,7,9 234:11,16,19 235:4,6,10,17 236:6,10 237:1,8 237:11,15,17,22 238:1,3,11,16 239:5,7,10,15,16 239:21,23 244:4 244:14 245:14 245:22,23,24 246:6,7,10,17,20 247:1,11 248:14 248:19,21 249:14,16 250:6 253:1,9,20 254:13,24 256:15 262:4,6 262:24 263:5,16 263:24,24 264:8 264:8 266:4,17 266:19 267:8,13 268:22 270:15 270:19,20,22 271:1,7,10,11,13 271:14,22,23 272:1,7 280:6,8 280:16 282:13
areas 9:2 39:20 41:19 42:15 51:7,8 52:4,5 53:9 54:3,7,16 54:24 55:3 77:16 85:22 94:11 95:6,8 98:7 99:19 118:23 119:2 123:3 154:5 158:21 160:23 170:17 171:9 179:5,18,23 180:3 233:8,12 234:21,22,24 243:22 244:3,21 249:12 250:15 250:24 251:14 252:1,4 263:19 265:21 268:3 274:5 281:14
argue 62:12
argument 62:13
Army 11:18 16:4 16:18 17:17
arrows 226:1,1
arsenic 123:15 127:7 133:21,24 136:10 139:3 200:7 205:24 206:4 207:10,11 210:23 211:5,6,9 212:3 260:4 262:9
article 164:7
articles 120:22,22

ASD 66:5 143:14 257:13 275:11 275:12
ASDs 49:4 67:12
ash 8:16,19,24 9:4 9:6,12,20,22 10:3 46:15,17,18 46:19 47:17 49:9,17 50:1,4 51:8 56:13 57:11 66:18,21 79:22,24 82:18 82:23 84:5,8 97:1,20 102:1,4 107:10 114:11 115:12,13 122:6 122:20 123:5,6,8 123:13 124:4,6 124:10,13,20 125:2 126:12,13 126:16,21,24 128:5,11,11,12 130:12,20,21 133:19,19 137:13 138:18 139:9 144:3 147:16 148:7,17 154:20 157:12 159:14,17,20,24 160:6,8 163:6,13 165:7,8,12 166:9 167:14 168:5 171:18,20 172:8 172:8,14,15,19 173:1,4,4,6,7 176:12 182:6,18 182:21 183:7 197:7,8 199:6 233:8 234:21,21 235:5,7,16,19 236:6,10,23 237:3,5,8,11,15 237:16,21 238:1 238:3,6,7,11,17 239:6,9,13,16,20 239:22 240:2,7 240:17,21 243:3 243:22 244:7,7 244:17,21 245:1 245:7,11,15 246:18,21,24 247:4,18,20,21 248:10,11,12 249:22 250:6,16 251:5,12,14,15 252:2,2,12,17 253:14,18 254:9 254:9,17,17 255:6,6,8,8,10 258:5,8 262:3,5 262:7,15,17,19 262:23 263:3,5,7 263:12,13,15 264:8,12,23,23 265:20 266:5 267:24 269:4,6 271:8,17 272:15 272:17,21,22 273:3,6,7,14,17 274:16 276:10 276:16,16,21 277:10,19,19 278:5,5 279:8,23 280:8,15,16,22 281:24 282:2,3 282:14,21,21,23 283:1 284:24 285:6,10,18,21 288:12 289:10 289:16 292:10 292:11
ashes 160:4
Asian 16:7
aside 244:20 280:14
asked 9:4 28:6 65:23 79:7 89:6 132:2 180:9 199:17 213:19 240:1 241:22 242:11,13,14 247:13 277:22 277:24
asking 42:5 87:19 178:22 195:23 200:1 213:12 232:11
aspect 41:16 197:20
assess 74:15 82:8 83:12 108:6 117:3 137:3 180:3 200:23 240:10,24 250:20 253:9
assessed 80:24 110:21,22 112:12,14
assessing 111:2 218:2 250:9
assessment 24:3 34:10 36:16 38:7 67:19 68:7 68:7,9 80:7,21 81:16,24 83:9 84:24 85:8 86:7 95:8,9 100:4,24 102:1 107:1,12 108:11 109:17 109:20 111:9,20 112:6,7 116:18 118:1,7 119:7,18 120:6 126:15 132:14 135:24 139:22 144:5,11 144:12 147:18 154:10 160:19 168:17 212:15 257:2 274:18,23 276:23
assigned 7:5
associated 15:20 39:6 41:11 92:10,24 104:5 127:19 138:22 189:16 291:24
assume 36:11 209:6 262:7,16 263:6 281:7
assumed 81:15
assuming 37:24 86:1 156:16 253:24
assumption 110:9 112:17
asthma 126:7
attached 140:9
attaches 71:3
Attachment 18:18 18:22
attained 104:2
attainment 41:13
attempt 286:22
attempted 34:7
attempting 207:7 207:24
attention 289:6
attenuate 79:4
attenuation 32:7 44:23 78:19 119:21 170:2 178:10
attorney 2:5 7:13 185:21
attributable 38:23 85:12
augmented 103:3
authors 288:11
avail 9:5
available 34:13 187:11 236:13 238:9 244:9 252:8 254:22 255:4 268:12,14
Avelar 4:14 8:1,5 8:7,10,14 10:8
Avenue 3:15 141:24
average 33:12,15 35:23,24 37:18 80:15 81:10,19 111:10 150:2 151:20,23 152:21
averaged 152:17
averaging 150:10
avoid 44:3 115:23 140:16
avoiding 67:15 141:14
aware 41:17 54:12 54:16 179:22 225:5 234:3,6,24 235:9 237:24 238:8 239:22 240:20 244:5 272:16 281:15 281:17 283:6
awful 222:16
axis 81:8,10 152:18,19

B

B 5:3 6:1 11:1
B-22 133:15
B1 96:24
B2 96:24
back 10:17 19:11 22:23 23:2 25:8 48:8 50:22 55:20 87:12,13 89:2,24 93:16 98:21 106:6 107:16 121:4,9 121:10 158:19 167:9,10 172:5 180:19 208:9 210:22 219:24 220:3 224:6 227:15 231:18 241:5 253:10 256:5 259:16 260:9,23 267:4 276:13 277:17 278:16 281:11

background 45:17 66:10 83:11 90:11 117:1 129:14 134:3 154:11 185:22 193:12 194:2 290:13
bar 26:22 37:8,10 37:12,20 74:8 81:11 111:10 152:23
bare 127:1
barium 214:6
barrier 16:7
based 15:2 20:24 22:15 26:3 29:12 38:12,17 39:3,11,14,16 43:8,21 44:4 54:18 57:17 59:1 72:12 99:2 104:20 119:14 123:14 134:3,8,9 157:8 159:13 222:22 261:1 267:5
basic 46:9 62:13 67:14 129:16 134:7 147:7
basically 12:17 14:9 26:20 54:7 115:2 157:10,15 188:17 194:8 206:7 207:1 208:21 238:21 285:13
basin 46:16,17,18 46:18,19,19,20 46:21 47:18 48:3,21 49:1,9 49:17 50:1 51:3 51:15 57:10,11 82:18,23 84:5 171:17 172:15 251:14,15,15 252:2,2,3 274:17 274:17 275:24 276:1,10,11,16 276:16,21,22 277:10,10,19,19 278:5,6,24 279:8 279:17,22,22,23 280:3,9,10,15,15 280:16
basins 46:11,13 46:22 51:19 53:24 56:13 66:18 69:19 171:17 172:8 245:3 247:16 252:12 276:9 278:4
basis 45:20 54:10 59:18 143:9 151:20 170:5 226:23
Bates 12:7 15:14 201:12 203:24 204:1 218:23 219:14 220:13 256:10 260:18 274:1 284:7 287:9
bathroom 255:19
beach 126:5 153:17
bear 201:8 204:4 219:17
bedrock 19:19 99:21
began 69:5 82:4 129:18
beginning 23:12 58:12,14 104:16 129:7 135:18 289:8
begins 64:3 166:17 236:4
behalf 2:15 3:10 3:19 4:9 63:19 125:16
behavior 286:7,20 287:22
behold 43:15
belabor 217:3,7 234:14
believe 7:18 9:14 11:10,17 16:7 18:5 19:7 20:5 23:1 31:15 36:2 37:17 39:3,13 45:10 52:8 63:7 63:14 67:14 70:3 83:22,24 89:19 93:11 94:5,6 95:13 96:2 107:7,11 109:5 111:5 114:1,6 116:20 120:20 121:12 129:7 135:10 138:1,4 154:3 155:8,11 156:10 156:21 169:6,23 170:3,3,4 175:16 175:22 180:13 182:5 185:3 186:18 191:16 191:19 194:6,12 195:24 200:20 202:17,23 206:6 206:14 207:19 216:20 217:19 218:6,23 219:7 221:17 225:1,5 232:12 233:11 245:5 250:11 255:17 258:22 259:9 260:2,4,18 260:20 261:1,22 261:22 262:22 267:5 268:24 271:6,15 276:13 278:14 279:19 280:3,7 281:23 282:12,15 283:1 283:10 286:2 287:7,17 290:16
believed 52:14 110:14 257:19 275:18
bend 52:23
beneficial 40:1 123:9 267:15 269:10,13
benefit 24:18
best 108:4 110:24 116:11 127:2 258:18 268:13
better 20:3 128:1
bias 62:24 215:24
big 278:11
bigger 271:23
billion 127:22
biological 14:1 15:2
bipartisan 122:19
bit 8:18 17:6,11 28:7 46:12 54:5 87:14 116:13,14 145:23 154:11 168:19 169:15 175:2 187:6 194:23 232:17 249:6
blasting 122:4,5
blatantly 126:13
block 278:11
blowup 138:14
blue 26:6 81:11 152:23 225:20
board 1:1 2:3 7:4 7:10 9:15 10:1 21:22 28:8 49:10 51:6,15 84:4 85:21 94:12,19 111:14 121:23 125:6,18 127:23 128:9 135:8,10 169:3 173:11,22 180:10 185:4 233:10,17,24 234:9 244:2,23 244:24 245:14 245:23 246:17 246:21 247:12 247:16,18 249:14 250:7,8 251:4 254:8,14 255:1 262:6 279:20
Board's 51:1,9 246:12
bodies 79:5 147:19 175:5 179:2
body 148:24 152:11
boiler 130:1 134:22 142:1 160:11
bold 21:7 201:20
bonds 254:18 262:8
borders 127:18
boring 17:22 18:22 19:12,17 40:18 89:6,12,12 89:14,16 97:2 98:6 116:2 133:17 182:13 182:16,19 252:15 253:2 256:18 266:14
borings 17:20 18:3,24 19:3,5 19:13,18,22 39:3 56:2,15 57:6 89:21 90:1 95:3 95:3 96:18,23 98:12 131:24 133:11 157:1 247:19 248:14 248:21 251:8,18

251:20 252:9,21 252:23 253:5,19 255:3 262:23
boron 37:2,6,15 59:8,15 81:3,6 100:14 101:14 111:3,9,11,13,15 127:9 136:10 139:2 143:23 147:9 152:14,17 152:22 200:12 200:14,19,20 201:1 214:14,16 214:17 220:9,19 221:18,20 222:1 222:3,11 223:11 231:23 260:2 261:6 262:8 265:4,6 266:2,13
bother 214:24
bottom 28:24 37:14 51:4 64:3 91:13 114:11 147:5 152:20 170:22 201:15 256:14 257:17 257:18 270:8,9 277:8 280:21 281:24 282:2 287:13
boundaries 77:17 148:4
boundary 31:7,10 31:13 64:24 78:5 107:9 140:21 148:19
box 260:16,16
boxes 12:23
BR 12:22,23 13:3 13:9,11,14,16 14:18,19,20,20 14:20,20 21:2,7 21:19
Brad 7:3
BRADLEY 1:15
Brandon 13:3,5,7
break 74:5 87:1 255:19,21
breakdown 28:9
brief 179:12
briefly 47:10 103:15 135:14
bring 158:11
broader 85:9
broken 12:17
brought 85:5 250:1
Brown 2:6 7:12
Brownfield's 175:18 189:11
buffer 111:1
Bugel 2:10 7:18 7:24 121:17
build 267:10
building 7:22
built 35:19 50:14
bullet 29:1 30:2 34:15 38:24 42:1 53:7 96:6 104:20 114:17 114:19 118:20 133:15 136:18 167:13 170:21 170:22 171:11
bullets 39:21 96:23 118:9
bunch 217:4,9 284:14
Buried 254:9
burning 90:22 129:20 130:19
business 294:7
bypass 46:17 51:3 51:15 172:9 251:15 252:2 274:17 275:23 276:1,11,16,22 277:10,19 278:5 280:15
byproduct 39:22 101:1,23 269:10

C

C 201:5 217:15 294:3
C705 266:14
cadmium 200:8
calculate 182:10 199:9 209:12 210:13 213:13 215:22 238:10 238:17 239:18 240:16 286:14
calculated 181:8 240:20
calculating 34:5
calculation 183:8 204:24 213:17 252:20
California 3:7
call 81:11 128:22 135:2 236:6
called 11:2 18:21 45:5 94:18 103:7 219:5
calling 124:24
callout 76:14 138:12 279:9 280:9
calls 262:6
Canal 91:3
cancer 127:13
cap 9:23 123:7 124:4,5,12 156:22 157:4,8 157:12,12 158:2 158:16,22 161:18 162:7,8 162:12,13 164:10,14 165:21 170:12 284:22 285:5,9 286:5,10,11,18 289:17 291:12 291:19
cap-and-place 122:20 124:2,10 131:9
capable 26:15,20
capacity 93:12
capping 156:13
caps 161:14 166:2
capture 229:7
captures 131:19
career 187:1 193:17
careful 158:19
carp 16:7
carveout 94:7
case 7:5,8 10:2 45:19 50:20 59:15 129:17 131:1,8 161:3 162:16 194:24 199:5 207:9 211:3,14 212:3 212:11 216:4 230:9 232:13 250:18 261:13 276:11 279:19 289:5,14
cases 75:16 98:12 187:22 208:4
cast 34:7
catastrophic 124:11,15
categorize 101:5
category 45:2 181:21
Caterpillar 174:19
Caucasian 125:14
cause 1:14 88:14 126:18 127:13 192:11 209:23 235:23 253:22 281:8
caused 127:20 174:5
causing 122:7 134:23
CCA 25:3,15 42:3 42:10 43:14 47:2 49:2 71:9 92:12 93:24 96:12 102:15 104:4 131:14 133:3 143:3 219:1 230:15
CCAs 25:2 43:10 62:7 69:5 71:12 82:3 169:17 177:20 178:8
CCB 100:22 101:6 115:11,14 267:7,15 269:9 282:12
CCC 140:1
CCR 19:22 32:16 32:19,20,22 41:4 41:23 42:2 43:16 47:12,16 47:17,18 49:3 55:18 59:3,7,7 62:7 64:10,10 69:8,8 81:7 83:14 85:2,18 90:23 91:20,22 92:7,9,13 93:3,4 93:13 95:10 96:12 98:5,11 102:22 108:22 108:24 109:2 117:12,22 118:14,16,17,19 119:24 120:1 130:23 133:2 136:5,7 138:22 140:1 143:7 150:16 156:4 159:1 163:16 169:15,22 171:13 176:4 177:17,19 187:2 191:11,15 249:8

CCRs 164:15
ceased 47:18 90:22 126:1 129:20
ceasing 80:1
census 125:11
center 1:4 52:22
century 45:22
CEO 123:1
certain 43:11,14 150:12 207:6 209:13 222:1 257:8
certainly 28:20 44:8,16 47:13 84:20 117:14 119:22 120:8 128:24 167:1 170:11 179:22 189:14 232:7 237:11 243:5 244:4 246:22 249:16 250:18 253:8
certainty 158:3 183:12,17 188:11
Certified 1:16 294:15
cetera 8:20
CFR 34:9
challenges 126:8
chance 24:11 259:21
chances 76:1
change 138:3 182:2 188:14 198:21 199:9 213:9 214:2 274:20,22 286:14,16
changed 126:23 167:3
changes 70:17 138:2 286:7,20 287:22
Channahon 23:14
channel 47:1 55:1 55:6,6
channels 52:21 56:8,10
character 36:21 72:4 174:4 218:2
characteristics 16:5 20:4 99:19 101:20 102:4 115:14
characterize 95:5
characterized 50:10 246:11
chart 20:19 21:3 25:22 26:6,22 27:7 29:1 30:3 47:8,14 49:6,17 65:20,21 73:19 76:12 91:12,13 91:16 106:6 107:17 112:11 143:10 147:3,5 172:6 219:7 220:9,14,18,19 221:22 222:16 223:12,13 225:12,14,14,21
charts 74:8 219:12
chemistry 27:3 74:18 80:5 98:14 148:21 201:2
Chicago 1:17 4:8 91:3 294:7
Chief 2:7
children 128:6
chloride 214:23
choices 252:14
choose 21:2
chromium 127:10 200:7
chronological 56:21 132:10
cinders 51:17 245:11 246:7 247:21 251:21
circle 12:16 27:6 29:1 30:3 107:17 134:20 147:5
circles 14:14 19:2
circumstance 198:3
circumstances 50:5,12 64:15 67:22 79:17 158:18 167:7 192:2 287:24
citation 65:15 113:21 277:7,7
cite 258:24 276:7
cited 64:11 219:14 249:1
CITIZENS 1:5
city 24:8 125:10 126:10,10,12 294:7
city's 126:5
claims 114:22
clarification 148:1 273:11 284:3 292:17
clarify 88:12 172:12 205:14 279:14 285:23
class 9:1 30:18 38:20,22 39:1 40:6 57:12 59:9 76:18 100:15 101:15,21 102:4 108:1 136:14 139:1 147:11 157:20 259:18 260:1,5 269:24 270:3,11,20 271:2 272:3
clay 62:24 69:17
clays 19:18
clean 10:3 122:17 123:4,23 124:2 124:17,19 126:11 128:3 171:22
cleaned 9:5 273:15
cleaning 46:18 48:3 172:9
cleanup 9:7 194:2
clear 9:18 201:9 207:9 220:12 226:20 244:13 247:10 253:11 266:12 271:21 272:12 276:12 281:13
clearly 63:4 268:17
close 31:3,10 32:3 77:14,15,17,19 78:5,8 85:4 92:8 107:5,8,8,15 117:12 122:4 126:4 147:23 148:3,5 156:6,10 169:21 174:17 229:7 287:6
close-up 93:19
closed 79:23 154:22
closer 17:10 28:4 31:9,19 58:24 78:9
closest 21:6
closing 9:11 171:11
closure 9:10 32:23 41:5 48:15,15,19 49:16 50:2 79:22,23 84:6 93:1,9 108:24 109:3,11 117:24 118:17 120:1 122:20 123:4 124:3,17,20 126:22 131:3,4 131:10 171:14 171:20,22,22 172:10,16 288:14,15 289:9
closures 70:17 85:17
Club 1:3 2:16 3:4 3:11
coaching 42:20,23
coal 8:16,19,24 9:4,6,12,20,22 10:3 39:21 90:22 97:1,20 101:1,22 122:6 122:20 123:5,13 124:4,10,13,20 125:2,22 126:2 126:12,12,13,16 126:21,23 128:5 128:11,11,12 129:20 130:19 138:18 154:20 163:6 171:18,20 197:7 234:21 245:1,7 246:18 246:21 247:18 247:20 248:11 248:12 249:22 250:16 251:5,12 253:14,18 254:9 262:15 269:9
coal-fired 126:1
coded 248:15
collect 58:14 99:13
collected 16:22 20:3 40:19 56:3 57:6 59:5 60:8 67:24 82:2,6 95:5 96:20 97:3 99:11 100:11

101:11 102:19 116:20 117:4,20 132:1 133:13 195:1 229:24 230:9 249:18 258:4,9 264:7 266:3,4 268:16 274:10 283:4
collecting 135:16
color 89:14 222:13,20,22
column 47:19,24 49:5,18,22 61:9 204:20,22 205:7 208:15
columns 260:17 260:17 261:3 264:21 267:6 274:9 282:18
Com 94:6
combination 165:8 292:14
combined 30:12
combustion 39:22 101:1,23 269:9
come 21:15 23:2 41:20 50:7 61:5 116:3 128:7 141:8 142:9 175:1 180:12 183:7 194:3 212:10 280:21 281:11
comes 199:7
comfortable 7:22
coming 135:11 141:15 155:7 176:12 290:5
comma 205:24
commencing 1:18
comment 4:14,15 4:16 7:17 8:2,13 8:22 55:2 121:11,14,18 125:6 128:20
comments 48:21 49:9 93:7 113:18 172:9
commitment 86:10 92:2 140:23 177:10
common 161:14 200:9,24 201:2
commonly 30:6 200:10
communications 177:4
communities 8:24 9:17 126:3
community 8:21 124:23,24 125:14
company 126:24 127:20,21,24
company's 9:23
compare 14:16,17 21:13 36:7 201:24
compared 21:17 26:8,24 34:14 78:15 81:13 97:4 105:20 110:21 112:12 150:18 249:24
compares 37:7
comparing 13:21 26:10 212:19
comparison 14:7 33:16,22 34:11 37:13 66:20 80:22 81:20 105:24 111:16 112:1 118:2 120:8 165:3 178:23
comparisons 27:11,12,15 29:22 75:21
compile 267:20
Complainant 2:15 3:10,19
complainants 1:7 63:20
complete 85:15 123:5
completed 114:22 185:12
completely 115:10 186:16
completeness 244:13
completing 11:10
compliance 62:7 67:1 86:10 92:2 140:23 158:12 176:18 177:9
compliant 73:6 83:14 85:18 110:5
complicating 157:23
complied 156:5
comply 41:5 102:4 102:21
complying 42:13 69:7 177:19
component 49:14 49:15 70:10 149:22 230:3
components 49:14 144:22 156:2 169:13 179:9 242:7
comport 86:18
composite 264:22 282:1
comprehensive 95:21 115:17 116:3 196:8
comprised 163:12 288:20
concentrated 84:13 231:15
concentration 13:23,24 14:3,8 14:10,23 15:12 21:16 30:11,12 33:12,16 34:2,19 36:22 56:13 81:8 133:24 151:19,20,23,24 152:9,21 153:19 197:22 198:4,9 198:10 199:3 232:2 266:8,8
concentrations 12:12,19 13:21 14:15,22 15:3,8 16:24 17:6 20:24 22:5 30:17 32:9 34:17 35:24 36:3 37:6,14,18 38:18 39:1,4,9 40:5 44:13 76:18 78:15 79:2 80:16 81:10,18,19 84:2 97:6 98:17 110:4 111:11,14 112:1 136:14 138:24 149:2 150:3 152:18 153:8 164:17 195:12 197:3 206:24 212:12 220:20 222:1 223:14 232:15 232:20 265:6 266:3 269:23 270:2,10 272:2 289:14
concern 30:14 31:16,17 42:17 43:8,19 99:4 134:8,11 148:9 158:6 159:3 164:10
concerned 9:3 31:12 52:15 57:19 71:14 78:3 165:22
concerning 16:18 23:4 96:3 135:24
concerns 9:19 86:16
concise 204:11
conclude 100:2
concluded 84:4 99:1,4 151:10 275:23 276:5 277:1
conclusion 26:15 30:1 32:11,12 38:17 54:17 57:20 59:14 62:3 66:19 78:10 98:5 100:18 116:24 151:3 152:1 164:23 212:10 263:15
conclusions 21:15 29:12 35:22 38:11 57:14 83:9 98:22 109:19 134:5,7 169:9 213:9 214:3 277:13
condition 39:11 58:13 71:11 144:3 157:19 160:20 199:7
conditions 22:14 22:15,16 59:18 61:9 62:4,17 66:9,10 67:3 68:10 69:13 81:2 100:5 133:9,10 135:17 136:20 142:15 144:13,15,23 148:22 149:10 151:5,11 157:6

157:19 161:11 164:18 167:3 168:3 169:4 170:1 174:5 178:1,13,21 199:13 212:16 247:6 249:5 257:20 258:19 275:19 290:8,22
conduct 177:3 217:12,16
conducted 93:3 225:3 290:7
conducting 197:14
conductivity 61:13
confidence 34:6 209:13
confident 188:9
configuration 117:6
confirm 22:18 36:19 41:12 119:15
confirmed 22:20 36:20
conflict 43:5
conflicts 43:23 158:15
confusing 89:22 114:5 204:1 234:5,22
confusion 220:12
congenital 127:14
connected 65:10
connection 61:8 65:6
consequence 63:6 86:15 155:11 165:19
conservatism 150:15
conservative 31:22 33:23 36:10 38:4,6 78:11 81:21 107:13 111:19 112:7,16 148:13 148:22 149:4
consider 58:12 66:13 76:20 128:9 135:18 149:4 171:14 175:9 176:22 212:4 235:10,11 235:18 236:8,23 240:1 243:2 249:17
considerable 82:21
consideration 178:6 197:18 235:8
considered 52:18 62:14 74:1 80:18 91:21 92:20 95:8 99:15 101:22 120:9 135:6 142:15,18 143:2 145:2 174:1,6 176:7 178:13 181:23 182:22 200:16 236:13 237:12 238:4 240:7 243:5 244:4 246:22 247:3,8 248:17 252:14
considering 165:5 176:8
considers 68:9 70:6
consistency 184:21
consistent 15:7 55:22 60:10 68:1 76:1 86:22 103:20 114:16 115:17 138:5 145:23 146:6 151:8 154:16 156:2,13 175:18 177:14 178:21
consistently 228:24
constituent 110:4 203:9,11 205:1 205:12,15 207:20
constituents 9:2 34:8,9,10 66:11 66:21 70:1 76:6 76:16 80:19 81:6,7 85:10 99:4 102:15,17 111:5 134:11 138:24 139:24 140:4 144:2,6 150:5,16,17 152:16 194:9,15 201:1,2 204:12 207:17 220:5 249:8 258:14,15 259:17,24
construct 164:14
constructed 90:21
construction 16:6
consultant 277:14
consultants 134:6
consultation 43:13 176:24
contact 57:19 124:4,5,7 141:9 141:15 159:9,11 159:12 162:14 196:10,11,14,20 196:23 197:12 198:5,24 199:8 238:3 239:13,20 239:22 240:2,8 244:7 253:15,20 255:10 289:15
contain 32:20 122:4
contained 159:17
contains 263:1 294:11
contaminant 164:17 192:17 192:19 198:20 199:2
contaminants 122:7 123:15 124:6,7 158:24
contaminated 123:12 141:15 160:13
contamination 9:7 134:24 135:11 140:17 142:3 160:17 164:17 174:21 179:17
contemplate 41:19
contemplated 50:11 67:21
context 130:8 165:15 209:7 270:7 290:16
continuation 44:9 136:24
continue 23:18 32:14 39:11 41:3,9,15 44:13 50:3 70:2,7,15 72:19 79:9 80:4 83:16,23 85:1,4 85:9,16 86:13,14 104:15 108:14 108:22 117:15 118:1,12,13 119:13,14,16 124:8 155:15 156:5,5 160:14 161:9 162:8 169:6,18,24 170:4,6 174:24 177:21 178:14 206:19 241:18 242:21 246:4
continued 3:1 4:1 7:6 79:18,18 85:6 144:22 156:7 169:13,18 289:10
continues 41:13 47:17 69:4 70:12 102:19 125:24 267:23
continuing 7:14 59:21 72:3 96:9 109:7 118:15,18
contour 64:13 117:4 154:15 225:17,20,21 226:2,4,15,22,24
contoured 61:20 154:15
contouring 69:16
contrary 107:13
contribute 109:4 109:6
contributed 155:9 161:1 174:20
contributing 135:5
contribution 144:8 157:16 276:1
contributions 139:13 144:14 154:13 161:7 165:7 171:24
contributor 179:17
control 1:1 2:3 7:4 24:21 25:13 71:2 128:9 155:15 171:15 172:3
controlled 24:5
controls 140:9

170:7,23 175:24 176:4
Conversely 74:11
converting 24:9
coordinated 115:9
coordination 177:1
copper 269:23 270:2,10,17
copy 114:4,6 219:18 233:11 287:10
corner 12:15 167:15 168:5
corners 187:10
Corps 11:18 16:4 16:18 17:17
correct 15:24 18:4 35:8,12 38:4 42:10 45:12 46:24 47:5,9 64:6 65:14 66:1 69:1 72:24 73:1 76:24 77:11 90:2 96:2 109:18 111:7 113:3 114:24 120:21 129:11 142:21,22 149:19 160:12 161:15,16 163:17 168:7 172:5 181:7 182:9 189:22 205:6,17 210:4 215:13 219:3 227:5,7 232:24 233:13 238:19 244:19 245:5,9 245:24 246:9,19 256:24 259:2,6 259:11 266:15 267:19 272:5 280:19 282:15 287:4,20 294:10
corrective 71:15 85:13 162:2
correctly 64:14 75:10,11 196:5 203:15 269:21 289:20
correlation 194:19
corresponding 209:17
corroborate 265:19
corrosive 258:16
costs 127:19
counsel 2:4 7:11 190:6
counted 89:21 207:14
counting 89:18
County 8:16,18 90:6 91:14,17 96:4 98:24 103:8,17 104:9 105:7,16,18 108:15,20 109:20 112:20 113:18 116:18 118:8 119:6 121:23,23 123:4 123:11 125:2 174:22 221:12 221:18,21 222:12 223:7,17 224:8 254:7 255:11 281:23 283:7 294:3
couple 13:22 92:16 181:2 232:19,20 241:21 251:16 266:22 275:13 282:11 287:5 290:11
coupled 155:14 249:19
course 14:14 46:10 56:14 67:9 72:7 95:19 130:3 142:16 157:22 217:2 228:9 235:22
court 8:4 121:15 294:6
cover 156:24 157:3,3 159:23 163:2 189:24
coverage 132:6
covered 47:21 48:1 131:13 141:6
covering 41:19
covers 24:21 25:4
CPO 123:1
cracking 122:6
create 64:13 150:14 195:10 195:18
created 130:15 150:2 261:23
creating 140:16 290:18
criteria 34:14 78:16 81:12 173:21,23 174:2
critical 9:15
critically 9:15
cross 51:11 121:1 185:14 206:23
cross-examinati... 185:17 242:4
cross-section 63:2
crossing 242:17
crucial 123:24
crunched 146:19
CSR 1:15,23
current 9:22 59:18 60:22 71:4 79:17,20 85:18 91:16 92:8 96:10 128:15 172:10 198:8,10 199:13 288:13
currently 32:21 90:23 93:1 130:21 171:19 173:5,7
curve 202:11
cut 77:20 160:2 209:21,24
CX 5:2

D

D 5:1 35:3,4 111:6
D-a-g-m-a-r-a 8:7
D.C 185:22
Dagmara 4:14 8:1 8:7,14
damage 122:5
damn 13:5,14,16 14:18
dangerously 122:4
dark 26:6 222:15 222:20
darker 140:11
dashed 140:11
data 11:14,20 12:20 14:13 15:17 16:2,20,21 16:22 17:7,9 19:21 20:13,14 20:19,22 21:1,16 21:17 22:2,10,11 22:13,13,16,18 22:19 23:4,7,20 26:7,9 27:13,23 28:10,14,15,18 28:21,22 29:7,9 29:10,12,17,19 33:14,18,21 35:5 38:12 40:4,18 57:5 60:7 73:16 73:21,23,24 74:1 74:20 75:1,21,23 76:10,21 80:17 82:2,6,7 83:11 88:7 95:5 97:3 98:4,17 99:10 102:2,3,19 106:7 106:12,14 108:6 108:6 109:12 111:2 116:1,2,2 116:2,15,20 117:1,9,19,21 135:17 145:12 146:15,21 150:1 150:18 154:12 154:14 168:24 178:23 180:4 181:11,12,19 182:11 194:20 194:24 200:19 200:20 202:16 204:13 205:9 207:6 209:9 210:8,10,13,17 210:17 211:2,4 211:14,23 212:5 212:6,7,8,10,11 212:15,19,20,24 213:5,10,14,16 215:7,11,18,22 215:23,24 217:9 219:7,12 220:4 222:8,16 223:4 226:16,22,24 228:23 229:24 230:8 232:5,17 249:18 252:9,12 253:23 254:21 255:2 260:13,21 261:23 262:1,2 263:11,15,15,24 264:6,20 266:16 266:18,23 267:3 267:12,14,16,21 268:9,11,13,16 269:2,5 274:2,10 274:21 275:23

276:5,6,7,9,14 276:14,20 277:17,20 278:7 278:11,11 280:17 281:16 281:23,24 282:11 283:7 290:23
dataset 180:9
date 163:1,15 166:22,23 229:24 230:3,8 230:21 231:7
dated 16:14 54:5 163:3
dates 48:8 167:4
day 1:18 7:18 27:14 150:13
days 185:20
DC 3:17
deal 77:23 78:24 82:2 88:15
dealing 167:5 189:2
decade 9:4
December 33:13 251:19 282:1
decipher 222:13 234:23
deciphering 222:19
decision 10:2 270:14 274:22
declared 7:17
decreased 21:17
decreasing 39:9
dedicated 125:18
deed 71:4 103:22 170:11
deemed 57:16 60:18 146:2,4 176:9 218:8 224:3
deep 237:15 251:13
deeper 61:18,19 61:21 63:4
default 186:23
defer 146:18
defined 13:4 50:17
defining 181:4
definition 163:19 276:12
definitive 275:24
degree 74:16 102:5 119:12 174:4 178:3 183:11,16 188:11 209:13 212:6
degrees 258:13
delay 50:10
delineate 270:15
delineated 270:1 270:23
delineation 270:24
deliver 9:17
delivered 9:8
demand 123:6 158:20
demanding 9:18
demonstrate 70:11 74:2
demonstrated 168:18 232:8
demonstrates 176:1 212:11
demonstrating 74:16 146:12
demonstration 49:20 50:2 65:24 66:6,7 93:10 131:10 143:15 144:1,10 264:22 282:19 283:5
demonstrations 274:11 276:8
demonstrative 184:6,11 185:8
demonstratives 184:20,21
dependent 186:20 189:1
depending 116:15
depends 191:6 259:14
depicted 224:16
deposited 199:7
deposition 28:6 202:20,24 203:20 205:11 205:14 212:21 213:6 235:3,21 236:20 238:20 239:24 241:4,19 241:23 242:3,14
depth 39:17,19 235:5,7,10,16,18 236:9,12,23 237:22 238:1 244:17
depths 100:9 137:7 138:19 238:7 284:9
Des 11:15 13:18 25:6 88:11 91:2 91:4 103:13 105:3 110:8,18 112:22 118:5 122:1
describe 12:14 25:22 26:2 33:9 47:10 53:17 91:15 100:21 103:16 104:10 110:24 116:24 129:13 132:9 135:14,23 136:24 139:16 145:8 147:14 148:14 149:20 151:16 156:23 171:13 234:1 246:6 256:18,22 257:1 290:13
described 26:1 51:7,8 62:1 137:4 153:15 237:4 244:15 246:17,20 248:10 249:4 255:1 268:3 279:17 291:10 292:4
describes 100:1 156:21 233:12 233:18 282:20
describing 50:24 69:2 130:6 140:7 254:14
description 80:7 166:16 275:1 278:24
deserve 128:1,2,2 128:3,4
design 188:11 286:10
designated 162:3
designation 47:4
designed 144:1 186:24 191:22 192:5
designing 186:13 187:18
desk 16:10
Despite 126:20
Destiny 4:15 121:21
detail 74:20 116:13,14
details 139:16 209:17
detect 27:24 66:11
detected 28:22 57:12 59:8,9 60:13 66:22 67:18 79:2 80:17 81:9 100:13 101:15 134:1 136:8,11 139:10 202:5 203:10,12 205:13,15 210:13,18 232:20 246:24 249:9 260:3,4 265:6
detection 34:8 75:24 80:20 131:13 139:21 150:14 211:14 274:18,22 276:22
detections 29:21
detects 75:9
deteriorating 22:15
determination 267:7 282:12
determine 19:4 54:10 148:8 250:5
determined 61:6 66:20 137:10 143:20,21 175:14
develop 146:16
developing 235:4 236:24
deviate 109:10
deviates 44:15
dewatering 104:5 289:8,22,24
diagram 95:17
diagrams 62:5
dialogue 59:1 177:5
dictated 269:16
diesel 9:21
differ 35:18
differed 288:11
difference 74:5

151:17 194:4,23 195:3 208:17 290:23
differences 266:2 266:7,10 285:12
different 12:18,19 13:22 27:18 38:18 43:16 50:13 56:22 62:16 63:5 65:11 70:18 85:4 88:2 115:8 115:10,16 149:10 151:14 167:7 175:2 187:6 192:16 194:1 210:19 214:22 221:9 231:20 234:20 242:19 249:6 258:2,14,14,15 259:12 262:4 263:17,17,18,19 265:4,9,9,9,10 265:20,21,21 266:24 268:3 278:6 285:4,14
differentiate 210:20
differently 54:5 285:24
difficult 188:2 198:6 199:11,15 222:19 232:3 234:23
difficulty 248:2
diffusion 78:19 152:6
diligence 176:19
dimension 248:23
diminish 159:19
diminishing 199:1
direct 7:15,15 10:10 11:4 12:3 45:7 57:18 120:23 180:21 185:12 201:17 289:6
directed 21:22
direction 40:16 60:24 117:8 226:3 230:4,5 231:16,17
directly 69:18 78:16 126:17 153:18
Director 123:2
disabilities 127:14
disagree 213:21
disagreeing 62:9
disaster 127:20
discern 188:9
discharge 36:24 52:21 54:24 55:6 56:9 69:18 69:19 112:16,18
discharges 36:15 110:17 111:22 111:23 112:5
discharging 103:13
discontinue 162:11
discuss 11:20 20:10 27:5 34:22 71:18 96:14 141:18 143:14 150:22 283:23 284:4
discussed 24:14 24:24 25:6 46:15 70:5 93:21 107:10 150:20 165:14 179:6 200:2 201:4 202:15 247:17,18 250:6 257:4 267:8 281:3,9,14
discusses 97:13 164:7 275:10
discussing 11:7 31:2 48:13 70:9 79:6 99:8 109:15 114:10 148:15 264:10
discussion 11:11 17:16 44:4 58:21 59:21 61:1 104:8 119:5 136:4 143:18,19 153:7 165:1 256:15 260:22 275:12
dispelling 67:16
dispersion 32:6 152:6
disposal 54:3,11 54:16 114:11 116:1 250:19
dispute 208:23
dissolved 136:17 152:22 194:4,21 195:13 206:4,7 206:24 207:18 207:23 208:11 211:7 214:6 215:15 220:9,22 221:18,20 222:11 223:11 231:23
dissolves 208:3
distance 31:12 77:23 78:24 81:15,17 82:17 82:20 83:4 110:8,11,21,22 148:23 152:5 153:13,24 154:1 176:16 290:23
distinction 290:6
distinguish 223:3 223:5
district 8:15,17,23 9:2,20 122:21
disturbance 195:10
disturbances 55:3
divided 145:18 146:14
docket 85:20
document 12:4,9 34:4 71:3 162:21,21 287:3 287:8
documentation 57:3 139:7 175:12 177:15 247:4 284:17
documented 179:23 237:7 247:24 249:13 249:14
documenting 101:18
documents 238:1
doing 13:20 128:14 169:18 192:16 194:2 197:12 250:12 294:6
dolomite 19:19 39:7
Dorgan 5:7 7:16 10:10 24:2 45:4 45:10 76:5,8 103:21 129:1,4 129:10 147:6 163:22 182:4,8 183:10,13 186:6 191:21 192:1,11 194:11 195:24 196:1 197:9,17 198:1 219:13,16 220:7 221:3 229:20 235:23 236:11,18 237:23 243:14 247:16 248:3 262:19 264:6 266:2 273:18 274:7 277:5 278:4 284:4
dots 209:23
double 106:2,4
double-check 278:16
DOUGLAS 5:7 45:4
downgradient 23:24 29:3 32:3 32:8,10 34:18 37:16 59:10 60:13 66:9,16,24 67:18 68:11 72:9,11,17 74:15 74:18 79:3 83:21 84:1,2 107:9 111:1 117:16 136:12 137:13 138:6 142:13 143:22 144:16,23 148:10,19 151:4 154:6 155:1,2 161:4 179:5 188:13,15,18,21 189:7,15 190:17 190:23 191:17 191:23 192:6 217:24 218:9,18 223:24 224:14 224:18 225:11 225:13,18 227:3 227:9,13 228:2 228:12,13,15,17 228:20,24 229:22 230:1,2 230:19,20 231:6 231:8,12 247:5 276:2
downstream 13:7 13:11 15:10,10 22:6
downward 26:8

26:10,11,17,19 26:21 27:1 32:13 74:3,9 75:22 79:19 105:19,21,24 106:3 108:14 109:6 117:24 145:17,20,21 146:1,11 155:3 201:24 202:3,3,7 202:13 203:3 209:4,5 211:22 212:2,9,14,19
downwards 212:13
DR 12:24 13:5,9 14:18
draft 9:9
draw 29:11 263:14
drawing 14:4,24 94:15 228:6,21 290:6
drawings 243:7 252:13
drawn 134:5
dredge 20:6
dredging 55:5
Dresden 13:6,12
drill 107:19 146:16
drilled 28:3,7 264:8
drinking 124:8 127:10 128:3
drive 157:18
driving 144:14
due 124:11,15 176:18 216:19
duly 10:20 11:2 45:5 294:5
dumping 178:18
DuPage 8:18
duration 84:9,13 178:4,18 196:16
dust 9:21
DX 5:2

E

E 5:1 6:1 284:1
earlier 31:21 33:17 56:17 63:20 65:5 72:23 98:10 138:5 206:6,15 206:23 208:10 210:11 211:17 216:10 233:4 249:5 254:12 257:7 262:24 268:23 275:16 278:17,18,19 282:13 285:3 286:22 287:2,19 289:21
early 45:20 57:3 288:7
easier 222:17 223:5
east 46:5,7,20,24 57:10 72:7 91:3 100:16 101:3 103:12 114:11 115:12 130:3,20 131:1,8,12 134:22 136:12 137:11 141:23 147:16,16 148:7 148:7,17 166:18 175:6 224:17 264:23 279:8,23 280:8 282:13
eastern 140:21
eastward 152:8
ecological 73:9 105:2 145:1
economic 175:8
economically 44:6 44:8,11,18 86:22 120:6,11 175:15 176:10
Ed 94:6
edge 217:24 218:9 223:24 227:9 228:17 231:12
effect 105:11 110:13 119:11 289:18
effective 41:14 289:9
effects 13:23 14:7 14:23
efficient 187:9
effort 57:8 58:23 59:23 60:8,12 280:11
efforts 43:18 136:2 278:6
eight 12:18 200:3 200:4,12,18
either 77:24 84:20 154:22 161:13 265:7 273:21
elected 121:22 122:23 249:15
Electric 162:18
element 141:3 144:7 197:3
elevation 117:4 154:14 226:13 227:10 228:5,8 228:18
elevations 63:1 69:16 225:22 227:4,7,7
eliminate 157:10 160:6 291:20,20 291:23 292:2
eliminated 24:4 292:8
eliminates 24:1 141:6
eliminating 157:16 179:8
ELUC 24:14,17 24:21 70:22 72:18 86:13 93:23 103:16,20 103:21,24 104:23 140:19 140:21,22 141:6 141:10,11 142:17,20
ELUCs 141:1 160:21 170:8 179:2
emanating 24:20
emissions 9:21
emphasis 66:14 164:16
employs 124:21
emptied 272:19
encountered 99:21 137:7 247:20 253:18
encountering 258:5
ended 28:12 106:8 249:23
energy 10:2
enforcement 7:7 177:24
engineered 157:3
Engineering 16:14 278:12 280:2,21
Engineers 16:4
enhance 125:19
ENSR 98:22,24
ensure 128:10
entered 25:3 177:9 178:7
entering 16:8
entirely 155:6 283:22
entitled 88:3,7 145:5
environment 1:6 14:2 68:17 95:14 97:24 98:8 125:20 200:24 258:6,8
environmental 1:3 2:6,7 3:14 7:11,12 8:24 20:9 40:2 71:2 101:7 102:7 126:18 127:20 131:20 132:14 134:13 140:8 155:15 177:1 185:21 257:2 269:13 278:12 280:20
envision 72:3 86:11 170:11
EPA 9:9 92:3 100:6 123:1,16 127:17
EPRI 162:18 163:18 164:7,20 165:1 166:4,12 287:3 291:11 292:4
equal 27:16 211:23 225:21
equally 194:17
equals 75:21
equates 204:17 205:3
erosion 237:5
erosional 40:12
error 42:6
ESA 57:1 94:23 96:15 115:8 133:5 199:18 200:22,22
especially 70:16 179:5 212:11 252:23
Essence 2:6 7:12
essentially 27:17 36:12 203:11,17 210:19
establish 50:9

178:8 242:18
established 47:2 71:1,12,16 93:24 104:24 174:12
estimate 215:11 239:6,9,15,17,19 255:5,7,9 286:6 286:20 287:22
estimates 252:16
estimating 253:6
et 8:20
evaluate 23:10 70:16 71:21 77:8 97:22 99:14 115:14 138:23 139:13 144:1 145:12 168:22 169:4,24 235:5 238:2,7 239:12 243:22 246:20 248:9 253:13
evaluated 38:13 64:13 105:14 173:23 212:8 254:19
evaluating 36:17 66:8 101:1 170:6 218:1 267:9
evaluation 25:7 36:10 49:21 60:7 71:22 75:18 77:4 80:10 111:12 120:12 135:7 139:11 141:3 142:11 144:23 147:8 149:5 151:4 161:4 175:23,24 197:20 209:9 218:11,19,20 223:23 228:22 229:8,9 235:11 236:14 243:8 254:21 257:10
evaluations 143:21
evenly 145:18 146:14 253:5
event 29:8 59:11 109:8 136:9,13
events 124:16 159:21
eventually 48:18
everybody 7:2 8:11 63:18
evidence 40:8 54:14 116:8 117:7 120:23 154:17 184:3 185:10
exactly 73:14 189:24 281:6 290:12
EXAMINATION 11:4 45:7
examined 11:3 45:6
example 43:10 81:3,5 152:16 161:20 182:20 189:12,13,17 190:1 213:8 214:5 226:8 273:14 286:7
examples 161:17 162:13 217:5
excavated 270:21 270:23 271:8,24
excavation 123:5
exceed 12:12 14:10,22 39:1 66:12 84:3 107:22 127:12 151:24
exceedance 59:15 85:11 105:9
exceedances 60:19 67:1 86:11 178:12
exceeded 76:21 108:1 136:14 139:3 147:11 221:21 222:12 232:1 259:18 260:1 261:9,10 261:13 270:19 270:22
exceeding 34:20 38:20,22 152:9 222:3
exceeds 123:13 127:7,10 261:16
exception 110:3,6 147:9 171:16
exclude 202:10 231:10
exclusive 174:14
exclusively 54:18
excuse 77:6 78:4 105:7 171:15 260:8
exercise 197:19
exhibit 6:3 11:21 12:10 16:9 18:9 18:11 19:24 20:17 22:24 25:9 30:17,20 32:24 34:19,22 34:24 37:3 38:9 40:22 45:13 47:7 50:23 53:1 53:4,14 55:21 58:7,20 63:16,23 66:3 68:23 70:19 76:12 77:2 80:6 83:8 87:16,18,20 88:9 88:15 89:3,5 90:7,8 91:12 94:10 96:14 101:19 104:8 109:15 113:11 118:7 120:19 129:5 131:16 132:8 135:22 138:8 145:5 147:14 149:17 154:8 155:24 162:23 164:3 167:22 169:8 173:10,19 176:18 179:20 183:21 184:2,7 184:23 185:4,9 218:21 219:8 221:9,10 224:7 227:16,18 229:10 230:14 231:19,21 271:2 287:8
exhibited 24:16 26:7,9 272:2
exhibiting 14:22 270:2
exhibits 88:20 184:16
exist 43:5 46:11 64:15 76:10 157:12 158:24 244:11
existed 170:8
existing 41:23 108:22 109:11
exists 108:10 159:1
expect 32:13 68:2 79:8 83:5 104:15 108:7,14 108:19 115:16 117:24
expectations 177:14
expected 23:17,18 32:18 39:10 60:10 70:2 84:11 284:23 285:5
experience 86:23 115:20 175:19 192:12
expert 26:1 34:22 35:1,6,15 40:22 41:17 44:5 52:3 52:9 58:21 63:19 66:3 80:14 88:6 91:9 95:24 97:10 110:1 138:11 150:21 151:9 173:9 183:21 217:19
experts 7:16 43:22 88:2 120:21 127:3 180:21 233:4
explain 13:1 37:11 64:17 100:23 147:4 192:14 204:6,19,22 205:7 225:11 257:23 269:2 278:10,22 280:18
explained 158:23 217:22
explains 277:9
explanation 212:21
exposure 57:16,18 86:16 99:2,4 134:11 196:16
exposures 57:19
expressing 290:24
extended 19:18 178:19
extending 140:20
extends 251:21
extensions 50:16
extent 49:4 68:13 95:10 114:23 118:21,24 238:4 239:6,12,19

243:3,6,9 248:9 253:13 254:17 254:24 255:9 270:1 288:13
extra 89:22
extreme 124:12 124:16 227:12
extremely 199:15

F

FAB 49:9,11,12 49:14
facilities 23:14
facility 55:19 93:13 95:20 236:8
facility's 64:23
fact 28:1 36:13 38:5 40:11 45:21 70:6 110:11 142:12 144:18 145:18 157:2 159:4 166:9 167:1,5 171:19 177:23 216:9 218:16 222:6 232:5 273:9
factor 157:23 160:18 179:22 196:24 197:23
factored 68:18
factors 91:15 109:5 116:24 135:5,23 173:12 176:19 178:5 179:19
facts 184:23
failure 124:11,12 126:16
failures 124:15
fair 129:9 203:2 203:19 223:2 227:2 262:7,16 283:20
fairly 52:1 59:23 193:4 204:10
FAITH 2:10
fall 47:1 49:2,3
falls 49:1
familiar 191:13 193:13,14 233:17 234:8,18 254:13 281:15
families 9:1
family 127:24
far 19:20,20 72:23 73:8 78:4 148:10 254:24 260:16 274:9 284:9
farther 73:4
farthest 52:17
FAS 164:15
fate 192:13,15,21 192:23 287:18
favor 126:20
fbugel@gmail.c... 2:14
feasible 120:11
features 53:22 55:11 72:8 91:2
February 280:22
federal 9:12 32:22 41:3,18 47:23 48:2,4 50:19,20 69:8 85:2 92:20 93:4 102:21 117:13 118:13 118:16,19,22 123:13 130:22 156:4,15 157:23 162:6 163:16,19 169:14 170:18 176:13 191:11 191:15 250:16
federally 123:9
feel 7:22 29:11 68:14 82:1,6 83:13 86:20,21 148:20 149:12 149:14 156:3 157:18 168:18 169:2 177:23 179:15 180:2,10 187:15 229:5 238:22 240:9,22 243:9 244:8 254:1 260:23
feeling 22:14 139:11
feet 39:19 99:22 100:10,20 137:8 138:20 152:4 153:6 182:20,21 251:13,13,22
fell 48:3 181:20
felt 54:15 152:8 176:21 197:18 217:24 276:11
field 236:20 257:20 258:18 275:19
fifth 257:17
figure 12:11 14:5 15:19 26:23 31:5 34:19 46:16 51:4 52:17,22 53:10 53:15,21 54:4 56:1,11 61:22 77:20 90:19 91:7 95:17,21,24 96:21 100:7 103:1,19 116:12 130:4 131:19 138:12 145:14 167:16,16,20,23 167:24 168:1 182:10 219:5,6 219:16 224:8,11 224:23 225:24 227:21,22 229:19,23 230:17,21 231:24 247:9 271:9 279:11,12
figures 165:4
files 284:1
fill 18:6 21:5 39:20,23 40:3,9 40:15,17,19 41:19 42:15 50:24 51:2,7 52:5,18 85:22,24 94:11 96:24 101:4 118:23 130:8 139:8 155:9 157:1,24 170:17 176:12 179:18,23 180:3 180:7 234:22 235:17 236:6 244:3 245:7,22 245:24 246:10 246:18,21 247:18 248:10 248:11,12 249:14 250:16 251:5,12,21 253:14,15,19 254:17 255:10 271:11,22 272:1
fillers 116:9
fills 157:17
filtered 194:5 195:3
final 49:5 59:14 163:3
finally 48:24 131:12 176:11 179:10
find 18:1 19:15 21:21 61:10,17 72:14 74:24 80:11 107:18 139:2 208:10 216:13 220:9 242:5 249:3 281:10
finding 21:10 49:11 101:24 110:19 151:13 290:19
findings 51:1 57:21 133:20 137:2 138:5 144:9 150:22 152:14 164:22 165:20 277:9 290:8
fine 88:17 163:24 267:22 273:22
finish 181:2
finite 159:1,16
first 11:2 13:12,22 18:1 27:9 29:1,7 45:5 53:3,6 63:10 72:1 90:16,21 113:20 114:19 115:7 132:12,15 141:20 166:15 172:8 174:4 184:13 201:15 201:19,21 217:15 226:17 245:2 275:9,13 280:21 281:24 285:11,11 288:24 294:5
fit 144:11 179:19
five 18:7 19:9 51:7 89:21 90:1,2 99:20 107:23 120:14 121:4 127:17 136:3,6 232:16 251:8 266:8
flat 27:17,17 202:11,11,14,16 203:20
flexibility 50:14
flip 260:23 280:8
flipping 210:22

floods 124:12,16
flow 36:14 40:15 60:6,24 61:13 62:1,5,17 65:4 69:12 79:1 103:11 110:12 117:5,7 126:17 137:10 154:17 187:19 188:6 195:9 224:16 226:3 227:6 230:3 231:8,16 291:12 292:9
flowing 32:8 60:9 153:18,19 230:6
flows 32:5 69:17 69:21
fluid 196:14
fly 167:14 168:5 262:4,5,23 264:8
focus 21:22,22 167:12 247:5
focused 100:24 216:20 217:23 218:19 224:1
folks 35:13
follow 41:3,22,23 85:2 86:3 118:12,13,18 119:13
followed 83:19 108:23 117:15 119:4 156:19
following 68:3,3 120:1 156:6 204:13
follows 11:3 45:6 122:24 257:8
footage 182:18,19 238:11 239:18
footnote 277:6
foregoing 294:9
foreseeable 72:3 104:15
Forget 221:5
form 185:4 291:6
formation 64:20
formed 45:20
former 46:19 49:8 57:11 82:18 84:5 114:10 129:24 130:10 134:20,22 140:18 145:2 159:3 167:6,13 168:5 174:18 197:6 244:14 248:20 262:5,23 263:5 264:8 266:4
formerly 122:2
forth 116:8 241:5
forward 41:2 48:19 109:13 116:22 209:17
found 21:19 36:19 49:10 60:19 73:6 99:21 100:12 101:22 103:4 119:3 135:8 137:12 138:18 146:20 146:23 150:5 165:13 214:21 246:13 249:5 284:11
foundation 262:10 263:8 274:24 276:24
four 19:9 45:17 48:1 70:1 90:17 91:21 93:19 102:18 118:10 121:13 122:20 137:23 147:16 151:5 152:23 161:5 169:9 170:8,20 173:24 174:13 177:22 179:2,6 187:10 191:20 195:1 198:12 216:14 267:21
Fourteen 136:7
fourth 208:15 218:24 230:14 257:17
frame 55:23 99:12 129:15
framework 175:21 176:15 257:3
frameworks 156:9
FRANZETTI 4:6
free 260:23
frequency 80:16
frequently 161:8 193:6 241:7,9
front 11:21 53:2 88:15,20 89:4 114:2 121:14 162:23 183:2 199:22 201:7 218:22
frozen 84:11 179:14
FS 130:11 132:23 133:18 138:9,13 139:20 156:13 158:23 160:24 164:11,15 170:13 171:4 182:6,17 183:4 256:15
full 29:8 64:2,5 80:19 150:15 164:7 259:19 288:13
function 71:21
fundamentally 169:18
further 22:10 24:6 24:11 28:7 32:8 32:9,10 36:13 46:7 52:19 56:16 57:22 60:18 99:6 110:12 111:1 112:4 122:16 132:15 134:14 139:11,12 142:6 149:1 177:24 218:17 223:21 249:9 270:15 272:6 275:16
future 23:18 71:4 72:4 79:14 104:16 142:16 154:21 176:16 177:15

G

G 5:7 45:4
GALE 4:4
gaps 169:1 180:4
gathered 99:17
gears 199:16 283:22
Gen 24:17,20 41:4 41:22 43:9 45:24 73:3 94:8 94:24 103:24 115:9 118:11 129:18 132:15 158:8 176:22 177:9,16 178:7
general 2:4 7:10 80:15 105:22 130:1 134:22 142:1 243:19
generally 75:24 80:11 175:4 186:13 187:4 209:4 212:12 224:17 234:3,6 234:12,18,24 235:9
generate 215:11
generated 227:1 244:6 263:18
generating 121:24 123:4,12 125:2 130:19
Generation 1:9 94:5 122:17 123:7,21 125:1 126:9,11,22 128:11,13 140:14 142:4 174:1 249:15
Generation's 58:2 123:1 125:22 126:15 132:12 168:8
generations 128:15
generic 26:19 98:18 189:4
geochemical 148:24
geographic 71:7 130:7 248:15
geographically 248:15
geologic 64:20
geotechnical 58:9 99:8 132:16 135:14 251:11 278:15
getting 9:11 28:5 59:12 83:2 121:10 212:17 242:9 264:1
give 30:14 161:17 170:5 191:8 201:6 218:15 234:10,16 286:15 291:1
given 50:4 60:11 61:4 64:15 72:4 79:17 83:4 117:22 153:24 155:6 158:17 160:5 166:22

183:11,16 199:21 216:22 218:16 262:3 287:23 294:11
gives 70:12 178:9
giving 50:15 72:18 227:16
glass 260:12 274:4
glove 119:12
GMZ 24:24 25:10 25:12,18 41:11 41:13 42:2,9 47:1,3 70:20,24 72:18 86:5,6,8 86:12,14 93:23 103:16,19,20 104:1,2,24 105:5 105:5,8,12 119:6 119:8,9,11 142:21,23 143:1 178:9
GMZs 71:10 86:5 169:18 177:21 178:11,17
Gnat 54:23 61:7 82:16 84:16 113:4 237:4
Gnat's 54:21 82:13 113:2
go 10:13 22:23,24 25:20 34:24 48:18 53:3,13,13 63:24 68:22 73:9 83:8,18 87:3,23 89:2,24 90:7 91:11 93:16 99:7 113:11 120:18 129:6 141:7 158:19 167:9 169:10 172:4,5 173:15 178:19 183:3 186:12 187:18 217:4 219:20 227:15 231:18 241:13 241:23 243:18 263:22 268:20 272:22 276:13 278:16 287:10
goal 291:22
goes 71:1 86:14 103:22 119:12 157:13 251:11 254:24 256:18 262:4 282:16 289:13
going 14:1 24:10 32:8,17 36:22 50:6,13,22 55:20 62:24 69:11 70:19 72:16 74:15 77:19 79:1,3,21,21 80:1 83:12 108:8 109:3,14 110:15 112:3 117:23 149:10 154:13 160:24 161:8 164:19 165:9 176:15 185:7 187:17 208:23 213:13 214:2 242:2 250:12 251:13 253:2,9 259:16 263:16 277:16 280:14
gonna 12:3 70:14 70:18 95:2 109:5 116:11 166:1 185:22 192:8 201:3,18 204:1 209:17 212:23 216:12 227:17 230:13 233:6 239:3 240:4 241:9 255:15 264:18 273:24 274:3 279:13 281:12 283:21,21
good 7:2 8:10 11:6 28:23 29:17 33:17 60:1 87:1 120:16,17 121:8 125:8,9 126:9 149:12 161:20 192:9 198:7 220:17 222:21 287:6 292:19
gotten 31:9
governor 7:21
GP 270:11,16,16 271:11
grab 89:13 219:18
gradient 154:16 289:17 290:14 290:15,17,18,21 291:2,5,6,11,13 291:24 292:2,5
grandchildren 128:6
graph 37:21 76:15 105:17 111:10 152:24 222:10 232:4
graphic 15:18
graphical 25:23 37:5 73:16
graphs 146:1
gravel 91:4 137:6
gravelly 69:20,20
gravels 60:2,5
gravity 178:5
great 22:2 77:23 78:24 82:1 220:16 221:20 235:1 276:17 279:12
greater 105:21 124:22 232:15
green 25:1,10 46:23 47:3 70:23 93:22,23 103:18 222:15 271:10,13
Greenwood 141:23
GREG 3:3
greg.wannier@... 3:9
grid 138:17 248:21,22,24,24 250:5,21 252:4 252:15 253:4,7 256:19
Griess-Pfleger 130:1 134:21 141:24
ground 64:20 65:1 84:11 99:23 137:8 138:19,20 179:14
groundwater 8:20 9:7 10:4 21:23 21:24 22:21 23:24 24:2,8,12 24:16,22 25:21 28:19 29:4,5,9 30:13 31:1 32:4 32:7 33:1,7 34:17 36:14,15 36:21 37:14 38:17,19,20,23 39:9,15,19 40:6 41:7,10 44:10,12 48:24 57:13,15 59:5,17,24 60:6 60:9,20 61:14 62:1,3,5,17 63:1 65:4 66:9,22,24 68:10,15,23 69:4 69:12,12,16 70:7 71:7,16 72:9,17 72:19 73:7,12,16 74:16,18 76:7,18 77:3,5 78:18 79:1 80:5 82:5 83:22 84:18 85:11 86:12,17 92:9,13,18 93:2 96:10 99:1 100:9,11,15 101:15 102:5,10 102:13 103:2,8 103:11 104:19 105:8,9,14,16,18 106:23 107:12 107:22 108:1,23 109:4,9,12,15 110:4,12 111:15 111:22 112:1,4,4 116:2 117:4,5,7 117:18 118:14 122:8 123:11 124:3,5,7,14 127:5,6,8 133:1 133:8 134:8 135:5 136:6,11 136:15 137:6,10 138:6 139:1,10 139:15 140:15 140:17 141:5,7,9 141:13,13,16 144:24 145:5 146:13 147:11 149:14 150:1,3 150:11,18 151:5 151:10 152:24 153:14,17 154:14,16,17 155:1,2,13 156:8 157:19,20 159:8 159:9,12,13 160:10,13 162:14 164:16 165:13,17 169:14,19,24 170:5,23 171:5,9 178:12,23 179:4 179:8 186:24 187:16,19 188:6

189:6,9,11 192:22 196:15 196:20 198:24 199:8 212:16 218:3 219:1 221:11 224:16 225:21 226:3,13 227:4,6 228:5,8 230:6,15 231:15 238:3,6,8 239:13 239:20,23 240:3 240:8 244:7,18 253:16,20 255:10 260:5 261:19 269:24 270:3,11,20 271:3 274:19,20 276:2 283:14 285:1,16,18,19 285:22,22 286:3 287:18 289:15 290:3,22,24 291:1,9,12 292:3 292:6
groundwaterwise 168:11
Group 16:14
growth 55:4
guess 29:16 38:21 108:4 110:23 184:19 186:19 198:8 199:24 212:17 237:14 241:23 244:13 258:11 266:21 266:22 276:17
guidance 34:4
guide 116:6
guidelines 12:13 123:14
guys 245:3

H

H 6:1
H-E-L-P 283:24
half 26:11 140:20 150:8,13 215:20 215:23 269:22
Halloran 1:15 7:1 7:3 8:3,9 10:6,9 10:13,17,21 18:11,14 27:21 42:7,21 43:1 51:10 79:11 82:24 87:2,12,22 88:1,8,13,18,22 108:17 120:17 121:3,8,19 122:9 122:12,15 125:5 125:8 128:19,22 129:1 155:21 163:21,23 172:21 180:15 180:19 183:24 184:17 185:6,13 185:16 186:4 188:23 190:6,12 190:19 191:4 193:20 206:10 206:16 213:21 217:10 219:20 219:24 237:18 241:11,21 242:6 242:20 247:14 248:4 251:2 254:4 255:22 256:1,5 262:11 263:9 264:3 265:12,15,17,24 275:3,7 277:4,23 278:2 292:20
hand 119:12
handful 216:5,6
hands 46:10
Hang 110:2
Hanson 122:3
haphazard 115:4
happen 108:19 166:1 250:18 286:24
happened 51:14 107:24 126:14
happening 51:18 74:17 170:11 276:9
happens 36:14 109:12 128:5 158:1
happy 255:20
hard 114:4 186:19 189:3,3 260:11 274:3
harm 127:14
hashing 103:18
hatching 70:24
hazard 126:15
HDPE 43:15 92:23,24
headed 188:17
header 265:2
heading 234:12 245:1,6,10 248:11 254:8 279:21 287:15
headings 261:3
health 68:17 77:5 95:14 97:23 98:8 123:13 200:23
hear 17:12 42:21 54:23 265:12
heard 17:12 20:10 128:3 277:23
hearing 1:14 7:1,3 8:3,9 10:6,9,13 10:17,21 18:11 18:14 27:21 35:16 42:7,21 43:1 51:10 63:11 79:11 82:24 86:24 87:2,4,12,22 88:1,8,13,18,22 103:5 108:17 120:14,17 121:3 121:8,17,19 122:9,12,15 125:5,8 128:19 128:22 129:1 155:21 163:21 163:23 172:21 180:13,15,19 183:20,24 184:8 184:13,17 185:6 185:11,13,16 186:4 188:23 190:6,12,19 191:4 193:20 206:10,16 213:21 217:10 219:20,24 237:18 241:11 241:21 242:6,20 247:14 248:4 251:2 254:4 255:22 256:1,5 262:11 263:9 264:3 265:12,15 265:17,24 275:3 275:7 277:4,23 278:2 292:20 294:9,12
hearings 122:18
heavily 82:22 141:21
heavy 22:5 91:7 140:10,10 142:8 200:9,9,11
Heidelberg 122:2
held 1:13 146:5
help 9:17 19:4 22:18 116:6,21 117:3 128:14 154:12 157:18 161:5 169:3 260:12 274:4 278:20,22 283:24 284:1,4 284:17 286:4,6 286:13,15,17 287:12
helped 137:3 283:16
helpful 35:3 110:2 253:5 258:10
helping 48:22 50:9 171:23
helps 201:13
high 8:6 33:11 108:7 120:10 123:16 127:4 145:14
higher 14:12 15:12 22:7 151:18 222:1 227:6 270:11
highest 222:7
highlight 174:9
highlighted 134:19 158:7 278:17
highlighting 247:23 277:13
Highly 189:1
hired 127:3
historic 42:14 50:23 51:2,7,8 52:5,14,18 55:24 56:5 85:22,24 94:11 118:23 130:8 149:24 157:24 168:3,19 170:17 179:18 180:8 233:8 243:21,22 244:20 245:15 245:22,24 250:10 262:3,4,5
historical 39:16 39:20,23 40:8 41:19 95:18 96:7 98:3,4,6 104:17,21 115:3 115:7 116:2,9,20 118:23 119:20

134:18 230:1 234:21,21 245:1 260:13 266:23 271:22 274:2
historically 30:17 40:15 141:22 272:17
history 45:1 48:6 90:16 129:16 199:13 265:9
hit 77:24
hold 88:14
holding 61:13
holistically 179:24
home 122:1 125:11
homogeneous 197:1
honest 184:10
Honestly 193:17
hope 10:4 125:3
hoping 8:6 233:9
horizontal 239:6 243:2 248:9 254:17
Horton 2:5 7:13
hosted 122:18
hour 1:19
hours 83:2
housekeeping 87:14
human 57:18 68:17 77:5 95:14 97:23 98:8 99:3 134:11 200:23
hundred 174:11 182:1 203:18 211:13
hundred-foot 248:22
hydraulic 61:8,12 65:6 289:17 290:14,15,17 291:4,6,11,13,24 292:5
hydraulically 64:22 65:10
hydrogeochemi... 153:9
hydrogeologic 23:23 39:16 61:5 72:13 100:1,4 135:24 137:1 177:3 192:18,20
hydrogeologically 161:8
hydrogeology 60:2 133:8
hypothetical 126:16 190:11 190:23
hypothetically 187:17

I

IAC 34:12 80:23
idea 20:7 26:14 67:16 116:8 188:13 202:4
ideally 187:9
ideas 116:7
identical 208:3,5 208:6
identification 67:12
identified 25:9 26:24 28:11 30:16 40:12 46:14 49:13 52:19 53:23 54:3,11 59:16 66:19 67:5 68:20 69:15 73:18 84:7 94:11,23 97:1 98:11 130:9 168:5 178:16 179:18,20 202:5 243:11 245:14
identify 26:18 47:15 60:16 76:6 89:6 93:17 100:14 101:14 132:11 188:12 188:14 189:15 228:23
identifying 26:20 67:8,10 89:16 106:22 188:1
IEPA 43:13 59:2 71:1 125:1 136:4 177:5 178:22
ignored 178:20
Illinois 1:1,17,18 2:3,12 4:8 7:4 8:15 9:9 46:2 50:19 52:23 57:21 60:14 64:10 69:8,22 76:7 77:21,24 83:5 92:3,9 99:5 100:5 101:7 102:7,22 108:22 121:22 123:1 128:8 134:13 140:1 157:7 175:20 177:1,7 294:1
Illinois' 125:20 127:9
illustrated 167:15
image 225:16
immediately 13:7 66:15 78:21 79:3 138:14
impact 9:19 14:1 15:2,5 31:1 36:23 81:18 98:14 112:4 126:1 128:6 152:7 176:13
impacted 125:23 141:4 142:14 249:10
impacting 22:1,21 38:16 136:21
impacts 9:3 14:9 14:11 21:23 24:16,19 126:19 141:13,14 189:16 200:23 249:20 276:2
impeaching 241:20
impeachment 241:19
implement 85:16 119:19 171:8
implementation 170:1
implemented 42:9 43:10,12,16,21 69:5 71:15 104:4 119:11 132:20 140:12 170:20 186:1 189:6 195:17 248:24 269:17
implementing 42:17
implies 285:16
importance 96:22
important 9:15 41:2 70:3,10 72:16 118:21 135:2 176:22 179:3
importantly 70:14
impoundment 85:3,19 124:15 156:4 163:9,19 165:6 166:18,19
impoundments 31:4 59:1 85:13 90:18 91:10 93:20 94:14 95:7 107:5,6 118:18 156:7,11 163:6,11 166:4 169:22 171:12 172:1 245:4 288:18,19,21 289:1
improved 69:11 109:4
improvement 79:18 80:4 146:13
improving 22:14 22:17 29:5 83:22 117:18 164:18 212:16
inaccurate 184:24
inches 91:24 157:13,14
incidents 232:20
include 46:15 89:20 139:24 170:23 200:19 218:10 223:15 224:20,24 230:12,22 231:4 261:17,20 268:10
included 53:11 89:19 133:11 207:5,6 223:20 225:4 229:8 231:8 245:3 247:17 248:18 254:20 276:15 283:24
includes 8:15 54:4
including 14:20 53:23 80:19 91:8 104:4 108:23,24 156:12
income 127:22
incoming 290:18 292:9,15
inconsistent 115:4

increase 30:5 164:16
increased 103:3 126:7 289:14,16
increases 76:1 143:23
independently 255:7
Indiana 161:22
indicate 14:15,24 34:16 39:4 44:17 110:7 151:4 208:16 209:24 223:13
indicated 19:22 23:23 26:22 29:19 31:18 32:4 97:5 98:17 114:7 271:14
indicates 13:5 22:4 26:6 29:5 39:8 40:5 101:19 111:13 145:1 203:9 205:20 212:15 222:10 282:7
indicating 12:18 19:3 114:2 118:3 210:1
indication 14:6 21:18,21
indications 13:9 211:23
indicative 238:6 263:21
indicator 81:7
individual 28:13 36:2 96:7 131:21 165:4 182:13 204:16 205:1,1 244:3 252:23 253:2
individually 109:6
industrial 23:13 23:15,19 46:6,7 46:9 57:17 72:2 72:6 91:8 99:3 104:14 129:21 134:10,19 174:14 175:5
industrialized 141:21 142:8
inefficient 44:1
infiltrate 159:23
infiltrating 160:7 290:19 292:3
infiltration 157:11 162:10 284:23 286:5,10 286:14,18 290:5 291:3,13,21 292:1,14
inflow 165:16
influence 157:24 161:9 274:21
influencing 216:2
inform 116:21 269:5 283:16
information 11:16 11:18 17:2,3 19:20 23:22 28:8 48:20 54:14 58:14 59:22 61:5 67:24 88:4,6 97:14 99:14,17 99:18 116:10,11 146:16 169:3 173:11 187:11 187:14 196:3,6 197:13 199:12 208:1 236:9,12 237:10,21,24 238:9 244:6,9,17 249:19 250:10 250:19,22 252:5 252:7,8,19 254:19 270:13
informed 270:14 276:20
infrastructure 99:16
ingestion 57:15 99:1 134:8
inhibition 286:5
initial 59:2,17 100:3 136:2
initially 129:15 130:23
initiated 58:24 132:15 176:23
injury 174:5,8
inorganics 159:17
input 126:20 286:10
insight 16:23
inspected 154:5
inspections 40:9 83:17 237:3
install 177:3 187:20 188:8
installation 24:22 71:6 140:15 142:16 160:23
installed 56:4,16 57:7 61:4 69:10 82:4 92:4 95:4 100:8 102:24 133:12 136:3 137:9 139:19 157:5,13 161:18 189:14 225:2,6 251:19
instance 66:17 82:18 98:16 131:5 151:23 162:7 169:23 178:17 203:14 210:21 211:21
instances 29:17 33:19 43:9 50:16 75:15 98:11 150:7 163:12 165:10 177:18 188:1 194:22 202:15 203:20 205:2 242:19 290:21
Institute 162:19
instituted 92:3 155:14
institutional 170:7,22 175:24
instrument 179:3
intake 47:1 52:20 54:24 55:6 56:9 69:19
integral 119:8
Integrity 3:14 185:21
intended 89:20 99:13,14 102:21 181:18
intent 195:19
interactions 149:1
interconnected 62:14 64:22
interesting 165:14 198:2 221:4
interestingly 184:12
interim 49:11 94:12,19 135:9
interpolating 226:15
interpret 28:17 232:4
interpretation 62:17 65:14
interpreted 27:23
interpreting 54:15
interrupting 162:9
interruption 241:17
intersects 60:4
interval 63:3,4
intrawell 187:23 188:5
investigate 57:23 99:6 116:6,12,14 132:20 134:14 235:16 254:16
investigated 94:22 115:22
investigation 23:23 39:2,22 43:20 55:24 56:5,8,12 57:11 58:9,18 59:2,13 72:14 81:23 95:18,22 96:16 96:18 97:21 99:8 100:2,22 101:3 114:10,23 115:12,18 116:17 131:24 132:15,17,21,23 133:9,11 135:14 136:1 137:1,2 138:9,17 176:23 182:17 249:16 250:12,14 255:16 260:18 262:22 269:9,10 269:11 272:6 278:15
investigations 39:17 56:17,22 57:4 96:4,7 99:12 115:3,7,15 115:19 131:20 132:5,7,11 168:16 177:4 189:12,13
investigatory 249:18
involved 132:21
iron 101:14
irreplaceable 128:17
issue 9:16 111:20 112:9,9 213:11 246:23

issued 9:9
issues 8:18,20 40:12 158:2
it'll 128:5 260:12
items 45:20 89:18

J

January 229:13 230:14
JENNIFER 4:3
job 108:5
John 151:9
Johns-Manville 129:23
Joliet 11:7 13:8,10 13:13 15:3,5,11 17:1 21:19,24 22:6,21 23:4,12 24:8 25:21 26:3 27:2 30:16 31:23 32:12 34:17 37:2,17 38:13 39:13 44:4 45:14 48:10 73:13,20 74:4,19 78:14 81:14 90:10 99:13 101:5 174:18 199:21 201:10 208:12 212:12 216:4,13 217:7,14,17,18 218:5,14,24 220:24 227:18 227:23 233:8 235:4,24 239:5 244:21 266:17 266:19,23 267:3 268:21 272:15
JR 5:7 45:4
judgment 43:22 65:19
July 16:14
jump 169:8
jumping 106:6
June 1:18 7:5,7 93:14 122:24 129:20 292:21 293:2
justice 8:24 9:17
justify 64:12

K

K 294:3
K-a-s-k-a-s-k-i-a 16:13
Kaskaskia 16:13
keep 33:11 48:22 83:1 291:18
keeping 213:2,16
keeps 141:7 176:11
key 12:20 41:16 45:20 91:15 135:23
kidneys 127:15
kilogram 134:1
kind 46:8 52:21 58:13 165:2 197:13 227:22 229:11 231:20 252:20 253:6 287:21
kinds 241:5,6
knew 188:10 237:3 279:4 283:11
know 9:10 31:7 75:14 76:20 78:9 79:19,24 83:1 88:13 93:8 94:20 115:6,23 119:24 125:12 137:23 138:2 139:5 142:2,23 144:5,13 153:14 155:7 156:14,24 160:20 163:18 166:6 168:10 171:2,16 174:15 174:18 176:12 187:2,4,5 188:19 191:5 196:7,23 198:4,6,9,15 201:6,12 202:8 208:1 212:9 217:20 225:10 225:12,17 233:24 234:12 236:1 237:15 238:15 254:23 255:14 261:11 262:12 272:21 272:22,23 273:8 273:17,19 281:6 281:9,12
knowing 176:14
knowledge 237:10
known 46:18 122:2 130:9 134:23 288:14
KPRG 61:24 63:6 132:24 143:20 251:8 260:17 262:1 264:21 271:14 274:11 274:16 275:22 276:4,24 278:6 282:18
KPRG's 101:18 276:20 277:7,12
KRISTEN 4:4
Kunkel 63:18,19
Kunkel's 63:10

L

L-E-A-F 256:23
lab 28:16
label 226:6
labels 53:24
lack 24:7 40:10,11 55:4 104:19
laid 175:16 248:21
lake 16:8 24:9 46:2 69:20 73:4 77:22,24 89:2 126:4,18 128:16 130:4 137:11 140:22 142:18 152:5 153:17,18 153:24
lakes 124:19
land 7:8 23:9,13 23:18 46:1 52:20 57:17 71:2,24 72:1 90:13,24 94:3,7 99:3 104:13,14 104:17 129:21 134:10 140:8 155:15 174:13 175:4 245:11 247:22
landed 176:10
landfill 123:10 186:17
landfills 118:23 187:1
language 234:5,19 234:23
large 189:10,23 292:11
largely 103:20
larger 85:9 253:1
LaSalle 4:7
lastly 40:17 73:8 103:10
late 48:8 91:23 166:19
lateral 254:23
Latino 125:13
LAUGHRIDGE 4:4
law 1:3 99:5 134:13
lay 156:18
layer 112:6
layers 92:24
laymen's 78:20
leach 122:7 124:8 138:23 159:18 160:5 257:23 258:23 259:7 263:23 268:22 269:5 277:17 280:17 281:16 283:7,11,13
leachate 66:21 276:1
leaches 257:10
leaching 102:3,6 124:3 159:19 165:9 199:1 249:21 257:2,3,6 257:8 258:2,14 260:13 262:8 266:23 267:20 268:9,11 274:2 281:24 283:21 284:24 285:6,10 285:16,20 286:7 286:16,20,24 287:22 289:10
lead 21:8,10,13,16 21:19 22:8 45:11 129:8 200:7 258:13 269:23 270:3,10 270:17
leading 27:20 42:23 79:10 108:16 163:20 172:20
leads 124:22
LEAF 25:15 138:21 256:23 257:14 259:17 259:24 261:5,16 263:11,13 264:6 264:12,20,23 266:16,18 267:3 267:14 274:6,21 275:10,12 276:6 276:9,14,14,20

277:20 278:7
learn 19:23 57:2
leave 126:23 209:14
leaves 124:10
led 116:24 177:10
leery 158:14
left 7:22 11:6,10 23:1 49:18,24 70:23 73:19 81:8 103:18 124:2,5,6 131:23 138:13 204:13 212:20
left-hand 152:18
legacy 9:3
legal 127:1
legend 12:16 89:10 131:22 271:13 278:23
length 247:18
let's 18:7 19:6 25:20 32:24 37:24 53:19 68:22 73:11 81:3,11 88:14 90:6 91:11 93:16 96:13 99:7 111:3 116:23 129:5 139:14 145:4 156:20 169:7 200:6 214:5,22 216:11,11 219:20 221:9,9 236:4,20 245:19 278:21 279:20 284:10
level 33:11 36:22 108:7 120:10 170:18 176:13 209:2,3
levels 123:16 127:4,7,9,11,12 262:9
liability 35:16
License 1:24
licensed 1:16
light 272:9
lightly 155:3
likelihood 21:23 179:16 196:17
likewise 7:5
limestone 46:20 279:17,21,22 280:10,15
limit 33:21,22,24 34:1 64:24 73:22 75:24 150:8,9,14,15 211:14
limited 178:18 179:17 253:1 270:1
limiting 122:16
limits 34:6
Lincoln 273:1
line 27:17 32:2,3 43:14 51:5 111:12 203:1 208:21,22,22 209:6 219:13,14 236:3,17 240:14 240:15 241:16 242:24 243:1 251:6 257:17,18 284:21 289:3,4,4 289:7,8 292:19
lined 43:11 48:7,7 91:23 92:21,21 123:9 130:23
liner 92:22 135:21
liners 43:15 48:9 92:23 122:6 130:24
lines 19:2 40:8 55:16 116:8 225:20,21 226:2 226:4,15,22 240:1 251:17
lining 48:6,8 158:12
liquids 131:6
list 80:19 101:11 196:8
listed 38:15 130:17 196:3
listened 128:2
listing 49:8 56:21 96:6
lists 106:23 109:22 111:10 204:12
liter 37:9 232:2,12 232:16
literature 187:15
Lithium 127:11 215:2
little 8:18 12:22 17:10 28:7 46:12 54:5 89:22 98:10 114:5 116:13,14 145:23 155:22 169:15 175:2 186:19 187:6 194:21 200:6 201:8 226:5 232:3 271:16 273:24 289:18
liver 127:15
living 9:1
LLC 1:9
LLP 4:6
loads 271:16,19
local 122:23 276:2
locate 16:9
located 13:10 35:6 39:15 45:18 46:2,22 52:16 56:12 70:24 73:3 91:5 105:4 107:7,15 110:7 132:17 137:13 167:14 174:17 175:3 244:2 263:18 279:22
location 18:23 19:3 30:22 38:2 76:23 84:7 89:13,14 111:20 112:9,9,15 138:15 139:3 142:14 148:13 153:4 168:11 174:7 218:16 247:23 249:22 272:8 279:1
locations 13:11 14:21 17:9 31:24 32:2 56:1 66:16 89:6,17 95:18 96:20 131:21 134:17 135:9 139:3 145:17 246:24 247:4 267:7 280:3
log 183:3 253:3
logged 182:19,21 182:21
logs 19:13,17 97:2 98:6 182:13,16 182:19 183:2
long 29:6 70:13 83:23 86:11 117:19 166:10 198:5
long-term 123:19
longer 32:16 70:18 93:11,12 109:1 117:23 130:19,19 154:20 160:7 171:18 196:16 198:23
longevity 174:7
look 18:7 20:14 28:4 29:3 30:6 30:19 32:24 35:9 53:15 58:24 59:17 61:15 63:1 74:20 81:3 89:10 90:12 97:17 98:1 104:12 105:23 107:19 108:6 112:11 120:18 135:19 145:24 149:24 155:4 166:12 167:4,19 167:22 168:4 176:14 187:14 192:17,17 202:5 212:23 214:5,6 214:22 217:18 217:20 219:2 222:15,17 225:18 230:17 235:15 253:8 259:21 269:12 277:11 278:20 279:20 281:3
looked 22:3 23:9 29:7 33:12 34:8 40:3 67:23 71:23 78:14 80:15,16 83:11 99:20 101:13 175:12 179:24 181:10 182:11 182:12,13,17,18 217:20 228:22 228:23 229:3 235:8 237:6 243:24 244:2 247:5 249:19 255:3 286:4
looking 15:19 25:8 28:10 37:2 42:1 45:17 53:17 54:18 70:13 77:9,12 79:17 83:7 89:5

95:15 98:21 107:16 111:3 114:6,14 116:9 133:4 142:12 143:10 148:20 148:21 153:3,15 155:17 164:2 167:24 170:19 172:7 194:15 200:8,11 207:2 210:7 211:5,6 217:12 224:7 225:12 227:23 260:22 267:2 275:1,16 276:15 277:18 288:1
looks 7:21 63:2 221:23 222:6 224:23 227:3 232:13,18,24 258:1 261:7 269:20 274:8 280:19 282:19 286:17
loopholes 9:12
lot 175:19 177:10 195:14,18 199:12 209:7 222:14,16 250:10 268:2 272:22 273:5
low 43:15 57:17 99:3 134:10 157:4 195:9 199:21
lower 17:7 61:12 64:21 65:7,9 69:20 149:1 153:8 227:4,7 228:8
lowest 227:10,11 228:18
lunch 87:13 121:9
LUST 192:3

M

M-3 200:1
magnifying 260:12 274:4
magnitude 123:13
main 56:14 57:14 104:20 118:10 154:9
maintain 18:9 170:7,22 185:1
maintained 170:9
maintenance 99:15 135:19
majority 8:17 14:21 20:23 28:20,22 29:18 39:24 73:19,21 101:12 159:4 181:19 202:15 202:16 203:2,5 203:13 213:10 216:6,18 272:1,7
making 117:9
man 279:3
managed 20:8 51:22 52:1 84:12 141:14 171:21
management 50:7 71:16 80:4 131:6 155:13 162:4 170:24 171:5,9 173:6 292:10
managing 160:21
manganese 59:8 100:14 136:16
Mann-Kendall 25:24 26:3,14,17 27:12 29:22 32:12 75:19 76:5 77:15 78:4 79:7 105:18 145:8
map 12:15 13:9 18:21,24 19:11 25:8 30:20,22 46:23 53:12,13 53:19 54:4,6 55:21 56:10 63:6 64:13 65:17 70:23 77:9,12 89:9,17 89:17 132:4 134:16 142:20 147:15 225:17 227:22 228:8,9 247:2,2,8 248:14 248:18 270:24 271:23 279:4,7
mapped 62:15 243:6 244:5 252:13
mapping 63:13 65:4 138:13 243:24
maps 18:18,19 54:18 78:8 89:5 117:5 154:15 278:21
Marie 2:4 7:10
mark 10:5
marked 6:2 34:19 87:18 90:19 183:5 271:10
mass 158:24 159:1 159:11 195:23 196:4,13,17,20 197:12,14,23 198:11,13,16,19 198:23 199:2,10
material 51:19 55:5 90:24 91:6 101:21 163:13 182:6 265:9 267:10 269:12
materials 19:16 19:22 32:19 39:24 47:22 55:18 93:13 95:11,13 101:2,6 101:19 109:2,2 115:15 122:2,3 138:23 159:6,24 160:5,8 161:23 162:14 171:21 172:3 263:17 264:12 284:24
matrix 27:12 196:18 198:20 199:4
matter 87:15 130:9 175:12 178:21 233:5
maximum 34:1
Maxwell 5:3 7:16 10:10 11:1,8 17:13 42:9 73:14 74:21,24 75:2 77:13 89:2 89:7 90:5 129:2 146:19,20,22 161:13,21 181:3 181:6 182:11,15 183:15,18 186:7 186:9,12,15 189:1 190:21 191:5 193:8,10 193:21,22 195:2 195:5 197:5,16 199:24 200:5 203:5 206:20 213:23 221:14 233:21 234:2 241:22 252:16 269:7 273:20 282:6
Maxwell's 78:13
Mayor 125:10 128:19
mean 13:2 27:8,9 27:18 30:3 31:23 32:1 64:17 65:3 78:7 98:6,9 108:2 112:10 143:4 184:9 186:16 187:7 188:19 189:9 199:4 209:12 217:4 227:9 228:16 238:14 262:12 273:10,12 287:2 288:23
meaning 28:15
meaningful 30:7,9 202:12
means 27:10 64:19 67:23 70:7 71:13 72:18 74:14 86:15 108:3 150:14 180:3 202:21 203:11 257:5 282:22 290:14
meant 181:5,14 196:11 280:4 281:22 289:6
measure 25:13,18 41:12 172:2
measured 64:24 151:20 226:14
measures 44:10 71:15 104:3 105:11,13 119:10
mechanism 171:15
mechanisms 32:6 78:18 79:1 110:12 161:7
mediation 97:7 133:23
meet 40:1 101:22
meetings 126:22
meets 110:15
member 121:23
members 121:18 125:18

memory 91:24 280:5
mention 50:23 54:13 62:5 67:4 105:5 245:2 246:16 257:11
mentioned 24:2 29:13 32:11 33:17 34:4 35:10 36:13 37:22 42:13 51:2,15 52:4 60:24 65:23 69:9 71:2,24 72:22 78:2 81:17 86:8 91:19 98:10 112:8 130:18 133:1 139:9,15 141:20 148:12 152:3 156:22 159:2,16 160:9 161:13 166:3,6 179:10 181:20 182:5 191:11 245:23 247:11 247:16 250:13 255:16 257:7 258:23 289:22
mentions 234:9
mercury 200:8
mere 98:5
met 101:6
metal 12:19 46:17 48:3 172:9 200:16
metals 12:12 13:18,21 22:5 40:5 57:12 97:8 101:12,13 127:5 127:13 133:22 138:22 200:3,4,9 200:9,11,13,18
method 20:12 119:22 122:20 258:1 267:16
methodologies 114:16
methodology 138:21 145:11 195:9 257:8
methods 35:21 195:14
mic 233:15
MICHAEL 5:3 11:1
Michigan 16:8 24:9 126:4,18 128:16 130:4 137:11 140:22 142:18 152:5 153:17,18
middle 56:10 94:1 94:2,3 103:23 251:17 260:10 264:21 270:9 279:24,24
Midwest 1:9 24:17,20 41:4,22 43:9 45:24 58:2 73:3 94:4,8,24 103:23 115:9 118:11 120:19 120:24 122:17 123:1,7,21 124:24 125:22 126:9,11,14,22 128:10,13 129:18 132:12 132:15 140:14 142:3 158:8 168:8 174:1 176:22 177:8,16 178:7 249:15
Midwest's 7:15
migrate 290:20
migrated 152:7
migrates 291:8
migrating 134:24 140:18 142:3 157:17 292:12
migration 160:2 160:18 192:19 261:18
miles 121:24
mill 161:22
milligrams 37:9 81:12 134:1 232:2,12,15
million 134:4
millions 128:17
mind 87:1 148:9
minerals 39:6
minimal 195:10
minimize 24:11
minimum 127:1 188:21 191:13 191:19
minute 37:22 64:4 82:17 107:16 221:6
minutes 87:3 121:16 160:9 180:14 256:19 283:22 287:7
mischaracterizes 51:6
misstatements 237:16
misstates 203:4 206:9,12 237:17 245:16 264:2 265:11,14,23
mistake 219:18 221:6
mistakenly 89:19
mitigate 284:24 285:5,9
mitigates 124:13
mitigating 86:16
mix 46:1 129:21 161:23
mixed 46:6 97:1 98:12,13
mixing 111:23 112:3
mixture 19:17
MNA 44:23 70:8 70:11 119:12,14
model 192:18 193:4 283:24,24 284:1,17,22 286:4,6,13,15,17 286:23 287:21 288:15
modeled 161:12 288:18
modeling 157:9 157:10 165:24 192:13,15,22,23 193:5,19 284:5
models 193:15 286:9,19,21 287:18
MODFLOW 193:6,9,13 287:13,17,17
modifications 130:24
Mohawk 2:11
molybdenum 123:15 261:12 262:8
moment 110:3 260:23 268:24 283:21
momentarily 31:2
monitor 119:14 178:9 189:11
monitored 44:23 61:6,19,20 65:12 80:19 81:6,9 85:10 100:19 105:1 170:2 178:10
monitoring 8:20 11:11 29:4 30:23 34:18 40:4 41:7,10,14 44:11,12,22 49:1 49:2 53:23 56:3 57:7 59:24 66:12 68:15,24 69:4,6,9 70:7 72:19 80:20 82:5 83:21 84:2 85:8 92:10,13,16 92:18 93:2 95:3 95:4 96:11,18 100:6,8 102:10 102:13,14,16,20 102:23 103:9 107:6 108:23 109:9 111:21 117:17 118:15 119:21 127:8 131:13,14,24 132:22 133:2,12 136:3 139:15,17 139:19,21,22 148:17 151:15 151:17 156:8 161:10 162:8,11 168:21 169:14 169:16,19 170:5 176:3 177:3,20 186:2,13,24 189:7,9 190:15 190:17,22 191:14,22,22 192:5 195:16 217:21 218:17 219:1 220:3,20 221:12 229:6 251:19 252:23 274:18,18,20,22 274:23 276:22 276:23 283:14
months 51:20 84:10
moral 9:16
morning 7:2 8:10 8:13 11:6 65:21 87:8 121:14
move 7:20 31:19

32:10 46:4 48:13,19 90:6 183:21 184:4 192:8 233:6 244:10 268:19 273:22 281:10
moved 51:21 52:1 87:7
moves 236:17
moving 41:2 45:9 90:20 109:13 160:14 194:1 289:15 291:7 292:6
MT 287:13
multiple 102:3 174:16 186:2 288:20
municipal 24:10 126:5
MW 223:10
MW--7 214:7
MW-01 209:18 210:7 230:1
MW-02 153:4 230:22
MW-04 206:1 210:23 212:4 214:17 223:3
MW-05 226:8
MW-07 112:11,12
MW-08 218:4
MW-09 38:24 218:13
MW-1 40:16 57:9 96:24 151:18 152:2,5 208:11 209:15
MW-11 224:24
MW-12 225:1
MW-13 76:19 225:1
MW-2 57:10 147:9 153:3 214:23 221:21 222:2 228:3 231:4
MW-3 200:1,18 215:2,15 222:11 222:15,18 223:1 228:3
MW-4 37:24 38:2 207:10,11 211:10 214:14 223:11 228:3
MW-5 136:21 139:10,13 200:2 217:16,18,20 228:4,5,11,17,20 229:2,3,6 232:22 249:7,20
MW-6 228:3 229:7,7
MW-7 228:3 230:2,10,12
MW-9 39:5 108:3 110:6,7,19 218:16 251:20 252:3
MWG 12:7 251:19 280:21 281:24
mycelium 127:11

N

N 5:1 47:19 259:3
name 7:2 8:6 94:12,18 98:11 121:15,21 185:20 199:19
names 262:5
native 39:7
natural 32:6 39:5 44:23 64:20 65:1 78:17,24 110:12 119:21 138:21 148:24 170:2 178:10 257:19,24 258:3 258:17 259:10 259:11 275:17
nature 38:5 106:17 108:5 111:19,24 114:23 208:6
ND 205:10,18,20
NDs 205:8 211:11
near 40:16 57:10 60:3 77:18 123:11 138:18 148:18,18 219:11 281:7
nearest 64:20 65:1 148:23
nearly 69:18 157:14
necessarily 30:9 88:4 98:6 113:10 114:3 141:11 166:6 172:15 197:1 198:21 203:17 208:5,5 213:9 232:11 235:7 252:24 253:22 254:23 264:13 264:15
necessary 72:20 83:15 139:12 156:6
need 44:15 50:6 50:14 51:17 65:12 83:13 85:16 93:14 123:23 135:6 141:14 169:1 196:4 206:17 267:4 272:5 278:16 281:2
needed 25:16 65:19 69:7 93:12 109:11 135:19 156:11 272:20
needs 131:6 135:19 154:23
negative 27:16 29:24
negatively 125:23 125:24
neglected 181:8
neighbors 128:1
neither 130:20
net 34:7 127:21
network 1:5 59:24 61:15 69:4 102:13 103:2 109:10 137:9 161:11 168:21 186:13 187:18 188:12 189:7,10 189:10 190:16 191:22 192:6
networks 186:2 186:24 191:14
neurological 127:14
Neutral 259:4
never 166:1 208:2 237:7
new 42:14,14 86:4 92:16 119:3,4 123:23 158:20 170:16 176:15 180:7
nice 119:20 248:21
nickel 200:8
NIHMAN 4:6
Nijman 4:3 5:4,8 10:11,12,22,23 11:5 18:13,16 27:22 42:5,11,12 43:2,3 45:8 51:10,13 79:13 82:24 83:3 86:24 87:23,24 88:2,10,23,24 89:1 108:18 120:14,21 128:23,24 129:3 148:2 155:21,23 164:1 172:23 180:13,20,23 181:1 183:20 184:4,7,12,15 185:11 188:22 190:3,8,10,18 191:3 195:23 199:17 200:1 203:4 206:9,11 206:12 210:12 213:19 217:8 219:8,10 220:23 221:2 223:8 229:13,15 233:19 237:16 241:9,17 242:1 242:11,16 245:16,24 246:2 247:13 250:24 254:2 255:19 262:10,18 263:8 264:2 265:11,13 265:14,23 268:5 274:24 276:24 277:22 278:1
nine 58:17 280:3
NISHIOKA 4:5
NLET 101:8,16 101:20 258:24 267:16 269:18 269:23 270:2 271:2 272:2
non 213:7 216:7 216:15
non-CCA 224:22
non-detect 28:14 29:14,18,19 33:18 75:6,24 101:12,13 106:11,15,16,17 147:1 150:6,13 181:12,13,14,15 181:19,24

202:17,21 205:10,13,16,20 210:8,10,17 211:2,4 213:11 215:8,19,24 216:8
non-detects 75:12 75:17 181:22 203:21 205:9 210:12 211:18 211:20 212:4,22 213:1,8,18 214:1 214:12,19 216:1 216:16,17,19,21 216:24 217:5,6
normally 59:23 148:20
north 23:14 46:3 49:14 52:20 54:2 60:9 72:8 77:22 78:1 90:20 91:7 114:12 129:23 133:18 141:22 174:23
northeast 11:12 18:6 21:5 40:8 40:15,17,19 233:18 234:1 235:4,17 236:5,5 236:24 237:8 244:21 266:17 266:19 267:13
northeastern 236:7
northern 91:19 133:18
northwest 39:23 77:23 101:4 161:22 167:14 168:4 175:6 234:16 235:17 239:15,21,23 244:21 267:8 268:22 271:11 271:22 272:1
northwesterly 69:22
notably 19:20
notation 147:4
notations 28:24
note 18:15 47:13 49:18 87:4,6 93:6 103:6,10
noted 18:14 19:1 35:23 36:4 85:1 87:21 90:18 94:13,15 97:20 103:21 104:20 110:6,14 111:15 133:15 142:20 143:11,17 147:8 151:13 152:4 154:19 156:10 170:15 178:7 185:7
notes 97:19 120:19 221:7 294:10
noticed 87:5 143:11
notification 83:17
notifying 87:6
November 260:19
NRG 127:3
NRG's 8:15
number 6:2 15:14 21:7 26:11 27:14,16 29:23 51:16 75:20,20 75:21 105:19,21 106:2,2,4 120:11 145:19 146:10 170:15 173:18 175:14 188:20 188:21 191:12 194:4 199:21 201:24 202:1,3 207:20 209:20 210:1,16 211:22 212:1 213:7,14 216:14,15,16,22 216:23 219:14 219:16 221:10 242:19 250:13 274:1 284:7 286:15 287:8
numbering 219:19
numbers 15:20 112:2,2 114:4 146:19 181:3,9 182:24 210:19 216:10 226:5
Numeral 288:2,8
numeric 15:20
NW 3:15

O

O 294:3,3
o'clock 121:12
O&M 58:15
Oakland 3:7
oath 129:2 294:6
object 27:20 51:5 79:10 190:3,10 217:8 223:8 237:16 241:9 250:24 277:24
objection 18:9 42:4,20 108:16 163:20 172:20 183:23 184:13 188:22 190:8,9 190:18 191:3 203:4 206:9,12 245:16 246:3 247:13 254:2 262:10 263:8 265:11 274:24 281:12
objections 184:23
objective 101:5 134:3
objectives 97:5,7 98:18 133:23 272:11
obligation 9:16
obligations 83:17 86:4
observation 194:20
observe 112:24 113:8
observed 38:19 39:5 113:7,8,9 119:16 144:15 179:1
obtain 25:12
obtained 262:17
obvious 282:9
obviously 28:23 56:13 85:3 121:1 142:11 183:6 186:20
occasionally 173:6
occur 48:23 70:12 112:18 159:21 170:4
occurred 55:24 57:4 84:10 131:20 132:6 179:13 199:1 246:14
occurring 70:17 133:2 146:9 149:1 170:3
occurs 111:24 112:16 139:17 250:15
October 16:15,15
off-gradient 161:2
off-site 25:5 39:12 68:12,18 77:5 81:1 84:1 105:2 118:1,4 126:18 135:3 142:19 144:24 149:13 155:18 160:10 160:10,18 161:2 168:22 175:24 180:1 247:6 249:11
offer 8:1,12,22 87:17,19,21 88:5 120:20 121:1
offered 120:19
offhand 273:19
officer 1:14 7:1,3 8:3,9 10:6,9,13 10:17,21 18:11 18:14 27:21 42:7,21 43:1 51:10 79:11 82:24 86:24 87:2,12,22 88:1 88:8,13,18,22 108:17 120:14 120:17 121:3,8 121:17,19 122:9 122:12,15 125:5 125:8 128:19,22 129:1 155:21 163:21,23 172:21 180:13 180:15,19 183:21,24 184:17 185:6,11 185:13,16 186:4 188:23 190:6,12 190:19 191:4 193:20 206:10 206:16 213:21 217:10 219:20 219:24 237:18 241:11,21 242:6 242:20 247:14 248:4 251:2 254:4 255:22 256:1,5 262:11 263:9 264:3 265:12,15,17,24 275:3,7 277:4,23 278:2 292:20
officials 122:23

oh 49:23 50:1 109:24 122:14 199:18 211:6 221:3,4 271:20 279:3,10 284:9 288:5
oil 133:13
okay 12:6,8 15:15 18:11,14,21 23:3 35:5 50:1 56:24 87:2 88:8,13,17 90:9 114:8,20,22 115:1 120:17 121:19 133:4 161:17 172:17 185:6 186:11 188:6 190:2 192:5,8 193:8,16 194:14 195:2,21 197:22 199:16 201:3 204:3,9,19 205:7,11 207:4 208:9,14 210:11 210:22 211:13 211:17 212:3 214:5,8,14,21 215:10,14 216:5 217:3,12 218:4 218:12,21 220:12,16,22 221:16,19,24 222:11,24 223:2 223:15 224:6,20 227:8,15,17,24 228:4,7 229:1,10 230:5,10,13,23 231:10,18 232:1 232:22 233:6 234:8,14 235:1 235:18 236:4,19 237:14 238:2,10 238:14,20 239:3 239:19,24 241:14 245:19 246:16 247:10 248:1 250:21 252:15 253:10 253:21,24 254:5 255:5,9,13 256:1 258:17 259:10 259:15 260:7 261:4,8,11,20,24 264:17 265:3,8 266:12,16 267:18 268:15 268:19 269:19 270:7 271:4,12 271:15,20 272:12 273:22 274:12 276:17 277:16 278:10 278:19 279:12 280:12 281:19 282:9 283:3,6 284:12,20 285:3 285:9,15 286:1,6 286:13,19 287:2 287:5 288:2,5,22 291:3,10 292:4 292:18,20
old 126:7
omitted 212:18
on-site 23:9 25:4 39:12 71:23 84:1 104:12,14 155:18 168:22
once 20:6 32:4 41:20 43:15 46:4 48:18 97:3 98:14 111:21,22 157:12 171:7 176:24 193:4 241:22
one's 145:23 223:5
one-size-fits-all 115:24
one-time 59:11
ones 46:14 63:7 217:21 224:15 229:19
ongoing 9:7 68:23 79:24 80:3 96:10 102:9,13 103:8 133:1 135:7 139:15 146:12 157:16 161:6 163:14 165:6 169:19 170:1 176:3 177:5 179:17
open 178:18
opened 229:21
operated 84:15 272:18
operating 45:22 95:1 129:18 175:1
operation 55:13 90:15 91:5 125:24 163:14 174:10
operational 166:8 272:24
operations 45:23 55:14,19 58:15 126:2 134:19 135:19 136:22 292:16
operative 164:12
operator 177:7
opine 120:22
opinion 31:16 43:4 44:16 51:6 51:9 53:8 55:15 64:12,14 65:8 81:22 83:4 107:13 116:16 119:17 120:5,5 134:12 141:1 147:23 149:7,8 151:8,10 154:1 160:15 164:24 168:11,15 182:2 195:3 216:19 233:10,12 239:1 242:15 243:16 244:23 258:21 279:20 283:16
opinions 17:3 22:19 38:15 41:1 44:17 63:12 183:10,15 235:5 236:24
opportunity 8:12 9:16 16:1,12 19:12 32:5 52:9 54:9 78:17 82:8 110:13 112:19 137:17 153:20 160:5 167:19 178:9
opposite 28:20
option 50:15 187:24 188:4
oranges 165:3
order 20:3 23:10 25:12 33:11 39:23 41:11 44:12 90:13 94:12,19 105:10 116:6,21 119:15 135:9 159:5 183:7 187:15 189:15 204:15 233:10 246:12 250:9 251:4 252:10 254:8 270:24
organs 127:16
original 53:14 100:6 126:23 199:2 236:2
originally 71:12 91:23 92:21 93:10
Ortiz 4:15 121:21 121:21 122:11 122:14,16 125:7
outcome 180:12 276:12
outcomes 287:24
outlined 57:14 80:23 174:3
outlines 80:9
output 33:15 73:15,17 145:16 204:9,14,18
outputs 288:1
outside 121:1 209:10
overall 17:7 22:2 32:11 36:20 39:10 70:6 71:20 90:14 108:11 145:16 155:19 169:9 212:15 218:2 235:8,11
overburdened 9:21
overlap 92:11
overruled 184:15 188:24 242:20
overwhelming 126:20 181:19
owned 94:4,5,7 103:23
owner 71:5 94:6 140:13
ownership 132:13

P

P 1:15
packages 193:1
page 12:7,9 18:18 19:10,11 20:16 25:9 30:19,20 33:5 34:21,23 40:23 44:5 47:7 50:23 52:8 53:4 56:19,24 57:1 58:6,20 59:20 60:23 63:24 64:3,6 66:2,19

68:22 73:11,11 76:12 77:1,9 80:6,13 81:4 83:7 84:22,22 89:24 90:8 91:11 93:16 94:9,9 95:15 96:13 97:9,13,17 97:19 99:7 102:9 103:7,7 106:21 109:14 109:24 111:4,8 113:14 114:4,8 114:18 129:4,12 130:14 131:16 132:8 134:15 138:10 139:14 143:13,17 145:4 147:13,13 149:17 150:21 151:2,14 153:12 154:8 163:2,2 164:4 166:13 167:10,10,11,12 167:13 173:18 176:17 201:10 201:12 203:1,23 204:1,7 208:10 214:6,14,21,23 215:2,14,14 217:14,15 218:23 219:4 220:13 221:16 223:19 224:8 227:19 229:18 229:21 230:11 230:17,23 231:22 233:9,19 233:20,22 234:9 234:11,16 235:23 236:3,15 236:16,16,17 239:24 240:14 241:16 242:24 243:1 244:24 245:8,10 246:17 248:10 251:4 254:7 255:17 256:9,10,22,22 257:12,12 259:16,16,20 260:8,22 261:2 267:2,2,24 268:2 269:20 270:8,8 271:4,17 273:23 274:12 277:8 278:21,23 279:20 281:8,20 281:22 283:23 284:5,15,16,20 287:9,11 288:2,7

pages 15:13 27:4 50:22 91:9 113:24 114:3 173:10 179:20 201:4 208:10 209:16 210:22 233:11 234:4 266:22 284:14 288:7

paginated 201:11

pagination 203:24

paired 30:10

pairs 207:20

paper 114:6

paragraph 53:7 64:2,4,5 97:11 97:13 98:2 114:14,19 151:2 151:13 164:8,13 166:15 251:6,18 254:8 256:15 257:14 259:20 269:21,22 270:6 270:8,9 274:15 275:10,14,17,22 279:24 287:16 288:3,10,24 289:3

parameters 80:20 80:21

parcel 174:21

part 17:17 25:7 37:6,20 41:2 48:14 49:16 55:19 56:5,16 57:7 58:17 60:8 60:12 62:6 66:11 72:13 77:4 84:18 88:5 92:2 94:23 113:7 118:18 120:2,12 135:6 136:8,11 137:20 140:11 141:12 142:11 155:12 158:15 159:12 174:7 178:3 180:7 187:7 189:11 236:14 242:10 243:7 246:22 254:2 270:5 274:10 278:6,14 283:4 285:11 286:2 287:1 291:18 292:9

particular 27:2 45:19 47:13 50:8,21 56:16 65:15 66:17 96:22 97:2 98:16 103:1 120:10 129:17 131:23 144:2 145:13 151:22 158:11 159:15 164:22 174:17 190:1 192:17 199:5 210:9 228:21 229:23 230:3,21 231:7 234:4 249:21 258:1 269:8,11 272:8 277:6 289:5,14

particularly 57:9 61:10 118:20 165:13,18 174:15 238:22 240:9,23 241:7 243:10 251:20 269:21

partner 126:10

parts 134:4

party 7:18

passage 159:19 286:11

path 290:19

pathway 57:16 99:2

Patrick 23:22 72:12,22

pattern 28:19

PCB 1:5 7:7

PDF 114:3

PEC 14:8,23 15:21,22 21:1

pending 131:8

people 87:7 94:2 121:13 124:21 128:17 141:14

people's 123:22

percent 14:9,11 14:12 26:7,8 27:7 28:9,11,13 29:13,14 33:19 34:3,5 74:2,3 75:3,6,8,9,14 105:20,20 106:7 106:8,12,13 108:8 125:13,14 125:14 145:15 145:20,21 147:2 150:6 157:15 159:5,11 181:11 181:13,15,17,22 181:22 182:1,2,5 182:23 194:18 197:7,8,9,13,13 203:7,18 205:8,9 210:7,9 211:2,4 211:11,13 252:16,17

percentage 202:6 202:7 214:9 215:7,18

percentages 181:11 202:7

perfect 108:5 279:15

perfectly 234:15

perform 26:15 29:22 196:4 198:11

performed 11:15 16:4 23:7 26:1 33:8 35:20 39:15,22 40:10 44:17 56:5,22 58:10 59:13 66:8 68:15 80:8 94:24 95:19,23 96:8,11 97:22 100:5,17 101:4 102:14 104:22 115:12 132:13 132:23 137:22 139:6 168:20 177:11,12,14 204:12 216:5 218:7 224:5 231:14 267:9 274:11 283:9 284:5

performing 237:4

perimeter 79:3 148:6

period 50:17 52:2 84:14 178:19 196:13 222:8,21

periodically 273:14

permanent 124:17

permanently 124:11
permeability 157:4
permit 9:10
permits 79:23
permitting 137:20
perpendicular 226:2
perpetuity 124:9
person 127:23
personally 112:20
perspective 31:8 108:7 149:4
pertain 118:22
petitioning 123:3
PH 110:6,14,15 138:21 143:24 151:19,20,22,23 152:7 153:8 257:19,24 258:2 258:3,3,6,11,16 258:17 259:5,7 259:10,11 275:18
phase 35:16 40:4 57:1 63:11,20 94:23 96:14 98:24 115:8,11 132:14 133:5,7 199:18 200:21 200:22
phases 130:9 187:9
phenomena 39:6
photo 53:12,22 54:6 55:9
phrase 108:4 181:14 205:15
phrasing 234:20
PHs 258:13
physical 99:18
picked 213:8
Picking 232:8
picks 153:13
pie 12:18 26:6 73:18 76:15 106:6
pieces 48:20 242:2
pink 89:18 90:3 224:21,22
pinkish 89:15 226:1
pit 279:1,14
pits 280:2,9
pivoting 197:5
place 9:24 25:14 25:19 32:7 44:10 48:10 55:18 69:24,24 70:4 71:6 78:18 85:14 86:13,15 92:7 105:13 109:10 121:12 123:8 131:4 132:3 140:2,23 155:14 156:9 160:22 161:11 162:7,12 168:21 171:23 178:11 178:11,15,17 180:8 244:16 254:21
placed 51:24 84:8 161:24 165:22
placement 55:5
Plaines 11:15 13:18 25:6 88:11 91:2,4 103:13 105:3 110:8,18 112:22 118:5 122:1
plan 9:23 18:23 58:15 131:5 164:14
planned 20:6 48:22
planning 48:15 95:20 135:20
plans 48:15 49:15 84:6 92:8 109:11 126:23 131:3 172:10,16
plant 55:14 56:14 58:5 125:22 126:2,6 127:6 129:18 130:3 142:5
play 136:5
played 23:19
please 8:4 56:18 79:12 83:1 100:23 102:11 121:4 155:22 156:23 169:10 172:22 190:13 193:21 209:16 241:12 278:3
pleased 255:14
plots 220:4
plume 74:17
plumes 161:9
pocket 188:5
podium 7:21
point 14:9 17:8 22:13,13 24:6 29:6,16 37:13 38:24 55:7,9 64:24 65:5 70:12 93:15 102:2,22 109:8 111:18 113:9 118:11,13 119:1 119:16 136:18 137:16 162:10 169:1 175:9 176:16,19 178:5 183:20 187:7 193:17 194:13 196:15 198:7 203:8,16 208:1 212:5,7,24 213:4 213:5,16 216:3 217:3 222:7 226:11,17 228:10,11 230:7 236:12 266:7,20 266:21 283:12
pointing 19:2
points 27:15,16 34:11 38:14 53:7 57:5 99:10 102:3 118:10 145:14 154:9 212:7 213:15 226:24 232:5 252:12 290:24
POLICY 1:4
pollution 1:1 2:3 7:4 9:4,19 124:14,18 128:8
pond 8:16 25:15 31:20 32:21,22 40:16 41:6 68:6 93:6 101:3 102:24 109:3 114:12 115:13 115:13 122:6 124:18 125:3 130:12,20,21 131:1,1,6,9 133:19 136:12 136:22 138:15 139:9 143:3,4 147:17 148:4,7 155:10 165:22 167:5 170:14 172:11,14 173:4 249:8 263:15 264:23,23 282:4 282:14 283:2 289:17 290:5
pond's 65:21
ponds 31:7 32:4 32:19,20 38:16 38:23 39:11 41:6 43:11,14 47:11 48:12 58:13 59:11,19 60:14,14 71:9 77:16,18 79:22 85:5,15 90:19,21 90:23 91:17,18 91:19,21,22 92:5 92:8,10,14,14,17 92:19,19,20 93:1 93:5 94:15 95:12 99:16 100:16 103:11 104:5,6 105:4 107:10,15 117:7 117:10,17,23 119:24 122:7,21 123:5,6,8 124:10 124:20 126:12 126:16 128:12 130:15,17,22 131:13 132:17 132:20 135:17 137:13 139:20 143:6,11 144:3,8 144:13,14 148:10,13,18,18 154:18,21 158:12 163:13 165:4,12 166:8 172:6,18 173:1,5 177:17 217:24 218:9 224:19 227:13 254:9 255:6,8 262:17 263:3,7,12,14 264:20 272:18 272:18 273:3,6 273:14 282:23 282:24 288:20 290:1 292:9,10
pop 200:6
portable 179:4
portion 29:17 60:4 94:17 97:21 236:7 248:15 288:12
portions 8:23 166:18

pose 15:8 98:19 151:6,11
posed 39:12
poses 24:12
posing 68:11 153:19
position 88:3 230:20 231:8
positioned 77:18
positive 27:15 28:18 29:24 209:20 210:1,2
possible 44:3 124:2 125:4 189:14 191:8 199:9 235:20 238:17
Possibly 192:2
posted 87:6,7
potable 23:24 72:10 73:7 100:17,18 104:19,22 123:20 134:9 137:14 140:15
potential 15:4 16:6 23:5,8,21 25:4 31:1 39:18 42:13 43:5 57:16,17 59:7 71:14,19 73:8 86:16 99:2,3 104:13,18 105:2 118:4 126:17 134:10 135:21 136:7 138:23 141:4,7,18 142:12,19 144:8 147:18 149:13 154:1 155:16 160:3 168:22 171:24 179:7 180:1 189:16 192:19 247:7 249:21 258:2 275:24 284:24 285:5,9
potentially 25:5 43:17
potentiometric 61:17 63:5 225:17
pour 258:3
power 32:18 90:17 162:19
PowerPoint 20:17 22:23 37:3 38:9 50:22 55:20 56:19 68:22 81:4 83:7 84:23 90:7 93:17 95:15 96:13 98:22 103:8 104:7 106:21 109:14 118:6 129:5,12 130:14 134:16 145:4 173:16,18 184:5 245:13
PowerPoints 184:8,16
Powerton 45:9,11 45:19 46:2,12 47:16 51:7 56:23 58:3 61:2 65:24 69:19 71:19,23 73:4,13 73:16 75:1,3 77:2,22,24 79:8 79:15,19 80:12 81:23 82:2,10 84:24 86:5,6 90:10 99:13 105:6 171:17 172:6,14 175:2 179:11,12 221:2 221:3 230:14,15 231:2 244:23 245:15 246:14 250:3,5,22 252:19 253:14 257:13 268:1,3 273:13,23 274:2 277:18,20 278:18,22 281:16
Poz-O-Pac 91:23 92:22
practicability 175:8
practicable 44:21 45:2 86:19,21 119:19,23 175:15 176:9
practicably 107:9
practical 31:8 120:3 194:22
Prairie 1:4 3:20
pre-CCR 43:12
preceding 58:4 204:17
precious 124:1
precipitation 159:21 257:6 291:7 292:13,14
predict 286:23
predominant 174:12,14 231:15
predominantly 103:12 137:5
prefer 243:20
preliminary 60:7 135:20 157:9
prepare 226:18 261:21
prepared 47:8 58:1 72:13 283:10
presence 98:5 139:8 141:5 142:17 155:6 175:23 249:14
present 4:12 8:1 68:13 72:8 82:12 95:11 110:9 137:3 138:18 139:18 140:3 155:19 172:1 237:3,5,7 258:8
presentation 22:24 26:6 37:5 95:16 111:4 145:11 184:5 185:2 199:18,20
presented 14:13 15:18 19:16 54:14 89:23 101:17 122:18 145:13 184:23 186:22 234:6 267:17
presenting 131:17
presently 91:20
presents 97:23
presume 187:20
presumptive 156:12,21 170:12 171:4
pretty 25:4 29:10 84:13 142:7,8 249:13
prevent 16:7 124:3 179:3
previous 51:1 88:7 110:20 119:5 130:9 145:10 154:4 277:13
previously 15:19 29:20 46:14 62:22 68:10 70:5 71:3 84:4 86:9 87:5 107:10 119:10 139:9 150:2,20 152:3 153:15 154:19 158:7 174:12 227:14 233:4 248:12 276:15
primarily 28:14 36:10 38:18 46:5 60:2 72:2 75:5,11 105:3 106:11,15 129:21 139:1 147:1 181:14
primary 25:17 159:3 195:8
printed 222:22
prior 19:10 24:13 34:19 42:18 93:24 104:11 106:8 132:12 163:15 167:16 167:20 217:19 217:22 270:8 288:14
private 122:8 127:20
proactive 99:14
probable 14:7,22
probably 77:19 193:3 199:21 216:12 222:7 261:24 292:19
probes 56:2 58:17 99:20 138:16 261:5
problem 184:18 186:22 227:16
problems 184:19
procedure 257:6
procedures 195:17 273:1
proceed 8:8 10:10 10:22 87:15 88:22 121:20 180:22
proceeding 41:7,8 63:21
proceedings 1:13 293:1 294:8,11

process 24:9 48:19 49:16 67:20 75:19 79:22 108:24 117:11 120:1,13 124:21 137:21 142:2 156:16 162:2 169:23 171:21 176:8 277:9 289:18
processes 152:6 153:9
produce 195:14
produced 32:19 109:1
producing 32:16 32:18 90:17 93:13 117:22
production 79:24 80:3
professional 65:19
profile 101:11 265:10
program 47:20 48:2,4,4 49:1,3 66:12 69:23 82:5 92:18 131:14 274:20
programs 83:18
prohibit 140:14
prohibited 72:17 104:22
prohibiting 71:6 160:22
prohibits 24:22
project 3:14 16:18 19:24 20:2,6 161:21 165:24 185:21
projecting 8:6
promptly 40:12
promulgated 41:21,21 42:19 43:24 59:4 86:1 92:15 118:24 156:17 158:13 170:17 250:17
proof 87:17,19,21 88:5 120:20 121:1
proper 62:2 63:7 85:13
properly 10:3 20:8 291:17
properties 72:5,6 129:22 130:2 135:1,12 176:24 249:11
property 24:21 32:2,3 54:8 55:13 57:24 64:23 71:5,8 73:3 99:6 103:22,23,24 104:2 129:19 132:18 134:18 135:1 140:9,13 140:16 148:19 161:24 167:15 168:8,12
proposal 85:24 122:19 123:7 249:23
propose 171:7
proposed 41:18 42:14 118:21 131:9 156:12 158:16 162:5 175:17 176:12 237:13 240:11
proposing 155:20 157:4 164:11 169:12 174:2 176:2 291:19
protect 125:19 128:14
protecting 128:16
protection 30:13 40:2 85:11 92:23 101:8 102:8 147:12 149:12 152:24 153:1 155:16 177:2 178:12 261:18 269:13
protective 68:17 95:13 161:10 176:2
protocol 195:20
provide 22:10 28:8 48:5 78:17 83:16 130:7,16 132:5 173:11
provided 60:17 99:18 133:7 152:15 181:3 196:8
provides 39:17 73:16 86:15
providing 148:17 155:16
provisions 187:23
proximal 77:8 132:17 179:1
proximity 40:19 60:11 122:5 126:4 174:17
public 4:14,15,16 7:17 8:2,13,22 121:11,13,18 122:18 125:6 126:20,22
pull 11:22 52:24 53:19 56:18 63:16 89:4 90:6 97:10 162:22 164:3
pulled 196:18
pump 120:13
purple 90:18 94:15 226:5,8,23
purpose 20:2 23:6 66:5 105:11 115:13 173:1 200:22 269:8,11
purposes 20:5 33:16,21 38:3,6 69:15 81:20 115:8,16 137:15 150:9 168:16 179:4 194:22 207:2,3,7,16 223:22 267:9,15 272:6
pursuant 32:23 92:7 93:3 104:4 140:23 177:4
put 20:14,18 25:19 55:7 59:4 59:23 103:24 116:8,22 123:22 140:22 160:22 166:2 218:22 283:18
puts 45:1

Q

qualified 269:12
qualify 38:22
quality 12:13 28:19 29:6 34:13,14,20 37:12 38:20 40:6 60:20 67:1 72:9 74:16 100:15 101:15 102:5 105:9,14 107:22 108:1 109:4 110:16 117:19 125:20 135:5 136:11 139:1,10 155:2 269:24 270:3,12 270:20
quantification 237:11
quantify 198:22
Quantifying 197:18
quantities 292:11
quantity 29:12 33:17 102:19 117:21
Quarles 17:16 20:11 28:17 52:4,13 53:8 54:11 62:9,19 64:9 67:11 78:2 107:14 113:17 114:1,9,15 162:17 165:22 167:13 168:5
Quarles' 17:13 31:11 52:10,24 63:23 113:12 164:3,10 165:20 167:9,20
quarry 91:5 122:3 174:22 273:2
quarter 218:24 230:15
quarterly 41:14 69:3 82:5 84:18 102:14 140:2 220:3 221:11,11
question 27:20 42:24 44:20 49:8 52:11 79:10 107:3 108:16 120:4 182:14 186:8,11 189:4 190:21 191:2,21 192:9 193:12 197:11 198:2 201:18 203:1 206:17,20 225:10 231:20 236:3,4,19,21 240:4,15 242:5 242:12,13 243:1 246:2 254:3 259:22 263:2,4 267:14 268:5,8 276:4 280:14 282:9 285:12

286:3 290:11 291:15
questioned 207:6
questioning 292:19
questions 185:23 194:3 201:7 217:4 218:13 235:3,24,24 238:15 239:3 241:6 244:22 253:11 255:13 255:15 287:5 290:11
quick 278:17 281:3
quicker 157:20
quite 27:2 57:5 75:17 107:8 115:23 148:5 154:11 166:8 168:19 194:23 208:2 222:23 228:14 232:17
quiz 200:7
quote 126:16

R

radius 72:15 73:2
Rae 122:13
Raelene 1:15,23 294:5
rail 55:13,16,19
railroad 55:12
rails 237:5
rainfall 160:7
rainwater 157:11 157:16 162:9
raise 155:22
Randolph 1:17
range 85:9 152:17 258:2
ranged 100:10
ranges 151:22 258:6,16
ranging 48:11 138:18
Rao 2:7 7:11
rates 126:7
ratio 146:5,7
RCRA 40:5 57:12 97:7 133:22 162:2 200:3,4,12 200:18
RCX 5:2
RDX 5:2
reach 10:1 13:3,4 13:6,7 16:5 19:7 19:8,10 22:1 79:4 149:2 153:10
reached 152:10 181:9
read 43:23 64:18 65:17 98:2 165:3 203:15 233:13 234:3 240:4,12 251:5 260:11 270:5 274:3 289:19,20
reading 269:20 276:18 277:2
reads 122:23 241:3 243:15
ready 10:11
real 259:19 278:16
reality 78:23 108:9
really 26:5 31:8 31:18 61:6 191:6,6 282:10 285:23
reason 24:19 32:15 43:21 115:10 195:8 218:7 235:15 242:19 250:1,4
reasonable 44:7,9 44:11,18,20 45:3 82:8 86:22 120:7 169:2 175:15 176:10 180:10,12 183:11,16 188:11
reasonableness 175:8
reasonably 29:11
reasons 28:5 62:21,22
rebuttal 52:10 53:1,3,6 63:23 113:12 114:9 164:4 167:10
recall 11:8 17:15 31:11 49:10 52:6 62:9 63:9 63:12 67:11 82:14,16,20 135:8 162:17,20 173:13 184:9 189:8 236:11 240:6 241:4,24 248:23 266:18 268:9 279:6,18 281:1 282:4
receive 47:17 50:3 90:23 172:19
received 47:21
receiving 47:16,18 91:20 130:21 154:20,20 163:13 165:6 166:9 171:18,18 171:19 172:14 173:1,3,4,7 292:11
receptor 24:1 71:22 142:19 161:4 180:1,2
receptors 23:5,8 23:21,22 25:5,5 39:13,18 68:12 68:18 71:19 73:9 84:1 104:8 104:13,18 105:3 105:6 118:4 140:17 141:4,8 141:19 142:12 144:24 149:13 149:13 151:7,12 155:17,19 168:23 176:1 179:7 247:6
recess 10:15 87:10 121:6 180:17 219:22 256:3
recognize 50:12 235:2
recognized 51:23 51:24 135:10
recognizes 65:9
recollection 35:4 49:12 113:5,6 241:24 268:13
recommend 41:2 41:8,22 169:16 190:15,22
recommendation 84:23 119:13 276:21
recommendations 41:16 44:16
recommended 41:3 108:21 118:10 123:16 175:17 274:16
recommending 117:14 170:12
record 7:2,6,9 10:14,18 18:8 44:24 87:3,13 88:4 94:6 95:20 103:6 119:20 120:18 139:7 150:1 172:5 180:16,20 189:20 201:9 202:9 219:21 220:1 244:1,13 247:10 248:7 253:12 254:20 256:2,6 257:5 266:13 272:13 281:13 284:15
records 179:14
rectangle 186:17 187:8 190:2,16
red 14:24
reddish 226:1
redeveloped 23:16 23:17
redirect 206:18
redo 158:19
redone 158:11
reduce 32:9
reduced 284:22
reduction 157:15
redundant 201:8 238:15 239:4
refer 20:16 27:4 34:21 35:2 40:22 44:5 53:8 58:20 66:2,4 80:13 97:9 109:24 130:13 138:10 143:13 150:21 163:9 173:9 193:14 205:12 206:14 208:23 223:18 235:20 278:15 290:14
reference 42:2 113:24 162:20 217:8 241:10 259:5 261:17 264:9 274:9 277:12 280:10
referenced 49:5 82:21 93:20 130:11 133:10 150:2 164:21 187:8 196:6

233:21 244:4 246:15 247:24 252:10,11 265:1 265:7 268:24 276:10 278:5 286:23
references 12:22 12:23,24 13:1 131:23 234:5,20 247:21 261:2 271:18 289:22
referencing 53:10 68:24 134:16 138:8 196:12 198:23 228:14 242:2 246:23 247:19 276:14
referred 21:11 31:21 68:20 266:6
referring 16:17 50:18 52:13 90:1 109:16 155:24 163:11 163:18 166:7,11 172:13,16 198:3 198:14,19 199:5 225:15 234:7,13 247:1 248:13,14 260:2 262:20 278:13 280:11 280:23 287:8 289:24 290:9,17
refers 163:5 167:13 205:10
refined 25:16
refinery 91:8 174:23
reflect 7:9 181:18 241:23
reflected 68:14 232:6 288:15
reflection 290:22
reflective 68:14
reflects 231:7
refresh 280:5 281:2
refused 126:14
regard 8:19 24:8 65:3 67:7 70:21 90:11 102:1 141:2 146:20
regarding 23:14 34:5 87:18 91:16 135:9 285:12
regular 83:17 117:4 118:14 154:14 159:8 208:24
regularly 40:10 73:6 157:6 160:4 193:7
regulated 48:12 50:13 59:19 66:15,23 67:17 79:20 83:13 84:14 85:12 117:3 123:9 130:22 154:13 176:5
regulation 119:1 189:2 191:7
regulations 47:12 57:22 64:10 85:22,24 116:5 117:14 136:5 143:8 163:16 170:16 186:21 186:23 187:3 188:1 250:17 269:16
regulatory 47:20 68:4 272:4
rejecting 122:19
relate 44:6,19 78:10 86:6 101:24 105:6 110:19 119:6 120:5,6 141:1 158:23 171:5 226:4 267:4
related 16:5 25:2 28:14,21 39:5 43:13 59:7 75:5 75:5 86:9 92:17 93:4,24 106:11 106:15 115:18 135:23 136:7,21 147:1 165:18 187:1 192:3,23 206:13 211:20 212:22 213:1,7 213:10,17 216:7 216:14,15,17,23 217:6 247:7 267:12 270:16 290:11
relates 16:6 24:15 31:23 40:17 47:11 95:7 200:24
relating 40:9 111:9 154:9
relation 58:2
relationship 11:12 66:23 238:8
relative 13:9 17:7 23:21 47:21 144:9 149:15 153:4 169:17 237:12 266:7 275:23
relatively 15:7 99:22 140:10 145:22 146:9 197:2
relevance 133:16 143:18 166:24
relevant 16:20 17:3,11 19:20 21:4,6 55:15 57:9 66:12 71:10 96:15 99:9 111:2 132:3 133:5 136:19 144:4 146:7 149:7 166:4 171:9 173:21 196:24 197:23 212:5,7 213:14 224:3 238:23 240:10 240:23 241:7 242:5,15 243:10 254:1
reliable 29:11
relied 88:6 250:18
relief 173:24 250:10,20
relies 123:17
relined 177:16,18
relining 71:9,11 71:13 104:6 143:3,5,7
rely 88:3 120:21 164:19 185:4 193:18
relying 161:3
remain 83:14 86:13,14 178:15
remaining 111:5 282:18
remains 168:13
remanence 55:10
remedial 24:18 25:17 41:12 81:23 83:9 84:24 104:3 105:10,13 116:17 119:10 161:14,18 175:13
remediate 57:23 99:6 134:14
remediation 97:4 97:7 98:18 134:2
remedied 179:15
remedies 41:3 120:9,12 169:4 176:7 283:17
remedy 42:18 43:20 44:6 51:11 67:16 68:7,9 70:6 82:8 86:6,18 95:7,9 95:12 102:1 108:12 116:22 118:7,10 119:6,9 119:18 120:5,10 135:7 141:10,12 144:4,12,17 149:8 154:10 155:12,13 156:1 156:12,21 158:16,17 160:2 160:18,24 162:5 168:17 170:13 171:4,7 173:24 174:3 206:17 235:9,12 237:12 240:11 241:1 243:11 244:10 249:23 250:9,20 252:14 254:1
remember 186:1 195:24 196:4 202:22 216:11 278:2,13
remembering 194:6
remind 35:13 63:17 88:19 94:1
reminder 283:18
remiss 87:4
remnants 55:11
remote 161:24
removal 120:13 123:6 124:13 165:17 267:24 269:3,6 271:14 272:14
remove 10:3

123:8 125:2 170:10 171:20 291:13
removed 20:7 79:22 84:12 166:19 167:2 195:11 272:15 272:18 273:3 289:17 290:15 291:11 292:5
removes 92:5 128:11
removing 126:21
repeat 43:18 44:2 204:21 206:20 259:22
rephrase 43:2 51:11 79:12 108:17 163:24 172:22 190:12 237:18 241:11 265:15 275:3,6
report 1:13 16:13 16:14,17 17:18 17:23 18:17 26:1 27:5 34:22 35:1,6 40:23 41:17 44:5 46:15 52:3,9,10 53:1,3,6,11,14 54:13 57:15 58:1,21 63:24,24 66:3 72:12 78:11 80:14 91:10 96:1 97:10,18 98:23 101:18 110:1 113:12,15,24 114:2,5,7,9 138:11 143:14 145:1 150:7,22 151:9 162:18 163:1,3,10 164:4 164:20 165:15 166:12,23 167:10,16,20 168:2,19 173:9 173:10,13,20 183:22 201:5,5 201:11 203:24 217:13 220:4 221:12 223:18 229:2,11 230:15 231:1 249:1 252:11 255:17 256:9 257:12 258:20,24 260:9 269:20 271:10 271:16 273:5,24 274:13 275:2 276:6 277:3,6,8 279:11,12 281:3 281:6,18 283:10 283:23 284:1,10 284:20 287:11 288:3
reported 1:23 13:21 20:24 28:15 33:20,21 33:23 73:22 80:18 123:12 127:4,21 178:2 294:8
reporter 1:16 8:4 121:15 148:1 284:3 292:17 294:6,15
reporting 12:20 33:20,22,24 34:1 73:22 150:8,8,15
reports 277:12
represent 8:14,17 98:7
representation 73:17
representations 285:13
representative 8:1 8:14 10:7 253:1 258:5 263:16
represented 169:5 229:23 230:21 266:5 268:14 278:7
represents 228:9 258:18
reproductive 127:15
repurpose 156:11
repurposed 154:22
request 100:5 132:19 140:12
requesting 50:16 126:11
require 10:2 158:4 191:18,19 199:12
required 27:11 43:17 66:13 84:18 85:14 93:11 140:1 177:20
requirement 41:11 57:23 99:5 134:13 137:20
requirements 40:1 47:24 49:4 51:22 68:4 86:2 92:12,13 101:7 131:15 143:3 156:18 187:5 191:14
Research 162:19
reserve 7:19
residence 127:2
resident 121:22
residential 175:6
residents 123:2 125:12 126:1,6 127:18 128:1,9 128:13,15
resource 124:1
resources 77:6,6
respect 57:4 66:10 68:11 70:8 85:21 131:4 144:2,24 148:21 158:2 170:1,16 173:23 174:2 176:5 178:1 180:1,9 187:19 238:7 257:9 278:18 286:24
respectfully 128:14
respiratory 126:8
respond 87:24 258:15
Respondent 1:10 4:9 6:3
respondents 35:16
response 25:2 42:10 104:3 115:6 132:19 240:4 242:3 243:5 274:20
responsible 67:3 67:17
rest 29:15 76:3 281:8
restate 291:15
restoration 124:18
restore 125:19
restricted 142:17
restriction 71:6
result 21:19 36:23 44:2 60:6 80:2 110:15 195:17 207:23 216:2 250:15 258:11 266:14 284:22 286:5
resulted 41:13 75:18 136:2 208:13 210:1
resulting 26:15 195:11
results 13:17 22:7 22:7 25:24 28:4 28:12,13 30:1 34:16,16,23 35:1 75:6,7 76:3 106:10,11,18 145:15 146:24 147:1,3 151:3 183:1 193:15 202:18 204:11 204:15 207:3,10 207:13,18,21 219:1 257:19 262:3,13,15,17 262:22 263:5,7 264:10,11,23 265:4,10,19,22 270:16,19 271:2 275:10,18 287:12,13
resumes 192:12
retain 92:6
retardation 78:19
retrofit 169:21
retrofits 85:17 172:10
retrofitting 171:12 173:2
returned 202:19
reuse 40:1 123:9 267:15 269:10 269:13
reusing 131:5
revealed 123:18
review 11:14,16 16:2,12 17:22 19:12 20:22 22:11 48:17 52:10 64:4 90:13 129:14 137:17 152:13 261:1 266:16
reviewed 11:17 12:4 16:21

20:20 21:14 39:2 63:10 111:5 162:18,21 243:7
reviewing 20:12
revised 16:15,15
right 7:1,14 10:8 10:9 11:13,13 17:13 19:1 31:6 35:7 36:12 42:15 46:17 51:4 74:9 89:10 90:8 96:9,21 97:15,19 98:1 100:7 110:10 112:18 113:13 121:8 127:1 129:6 146:1 153:16 169:8 182:7 185:13 187:21 188:3,16 188:16 189:18 191:12 194:10 200:12,19 201:16 202:21 203:19 205:5,13 205:16,21 207:1 207:11,15 209:8 209:22 210:3,6 211:16 213:12 215:12,22 216:9 216:17,22 219:2 221:5,17,20 222:3,9 224:2,9 225:7 229:15,16 230:7 231:12 232:10,12,23 238:18,23,24 240:12 241:2,8 242:1,16 243:13 243:23 244:12 244:18 245:4,8 245:11 246:8,18 247:12 248:22 253:4 255:1 256:20,21,23 258:19 259:1,8 259:13 260:7,16 260:19 261:11 261:14,24 264:24 265:5,8 266:14 267:18 268:23 269:19 270:4,12 271:17 271:24 272:10 272:12 273:7,15 274:9 275:11,19 275:20 276:19 279:24 282:5,14 283:15 284:2,18 285:1,7,8 286:8 286:16,17 287:14 288:15 288:18 289:1,11 289:19 290:10 291:14,21
right-hand 12:15 18:19
rigorous 26:18 84:17
rise 36:21
rises 65:2 209:2
risk 15:8 24:2,7 24:12 33:2,7 35:2,11,17,20,22 36:17 38:3 39:12,14 71:21 71:21 73:10 77:4 80:7,12 81:1,15 83:24 97:23 98:20 107:1,12 109:17 109:20 111:9 112:7 118:1,4 123:22 124:14 141:2 142:11 147:17,21 149:18,21,23 150:22 151:4,6 151:11 152:1,14 153:19 175:23 179:1,9
risks 23:11 24:5 77:8 135:7 147:18 168:22 244:11 247:7
river 11:15 12:21 13:4,6,19 14:2 14:15 15:5,7,9 15:10 16:6 22:1 22:4,16 25:6 46:2 52:23 60:11,15 69:22 77:21 78:1 82:19 83:5 91:2 91:4 103:13 105:3 110:8,18 112:23,24 113:9 113:10 118:5 122:1 175:3 273:2
rivers 1:4 3:20 124:19
road 2:11 23:15 91:6 148:6
roads 46:5
robust 29:10 59:24
Roman 288:2,8
Romeoville 8:16 9:23 121:22 123:2,17,22,24
roughed 46:8
roughly 37:9 39:19 74:9 81:11 146:2,4 153:6
round 100:11 182:24
routes 148:6
routine 193:4
routinely 62:6 272:19
row 201:21 204:16,17 205:24 206:3 209:19 215:3 282:19
rows 201:20 207:13
rubric 192:21
rude 266:13
RUINING 1:6
rule 64:10,11,18 65:16 191:15
ruled 276:3
rulemaking 156:15
rules 32:22,23 41:4,5,18,22,24 42:2,14,14,18 43:12,16,23 50:6 50:11,12,15,18 50:19,20 59:3 62:8 67:7,21 69:8,8 83:14 85:3,6,15,19 86:4 91:22 92:7 92:9,15 93:3,4 96:12 102:22 108:22 117:12 117:13 118:14 118:16,19,22,22 119:3,4 120:2 130:23 133:2 140:1 156:4 157:24 158:4,9 158:10,13,20 169:15,22 170:18 171:13 176:5,13 177:17 177:19 180:7 187:23 191:11
ruling 191:4
run 75:19 229:1
runoff 46:20,20 57:10 279:17,21 279:22 280:10 280:15
Russ 3:13 5:5,9 18:8 27:20 42:4 42:20,22,23 51:5 51:12 79:10 87:14,15,16 88:12,17,18,21 108:16 121:2 163:20 172:20 183:23 184:6,9 184:14,18,19 185:14,15,18,20 186:10 189:5 190:4,13,14 191:1,10 193:23 206:14,22 213:20 214:4 217:11 219:9,11 219:15,17 220:2 221:1,4,8 223:9 229:14,16,17 233:20,23 237:19,20 241:13,15,22 242:6,7,13,18,21 242:22,23 245:18 246:1,4,5 248:1,6 251:3 254:5,6 255:20 255:24 256:6,7,8 262:11,12,14,21 263:10 264:16 265:16,18 266:11 268:6,7 275:1,4,6,8 277:2,15 278:9 284:8 292:18

S

S 6:1
safe 123:16 127:7 127:10,12 128:3 263:6
sample 13:11 14:21 17:8 89:13 96:20 98:14 133:22

195:8,9,11,17,19 222:4 257:9 258:4,7,8 259:14 265:20 267:6 281:1
sampled 136:6
samples 13:12 14:19 17:17,19 17:20,22 18:2 20:2,11 21:2 33:20 56:3 57:8 57:9 59:5 80:18 96:19,19 100:12 101:10 131:22 131:22 132:1 133:13,14 150:7 259:24 260:3,5 261:15 262:19 264:7,12 266:3,4 266:5 275:13 280:2 282:20
sampling 19:24 29:7 56:4 69:3 69:24 84:19 88:11 133:20 136:8,13 140:2,3 200:2 250:5,21 252:4 278:24 280:22 282:1
samplings 259:17 282:23
sand 19:17 69:21 137:5
sands 60:2,5 137:5
Sanitary 91:3
Sanitas 33:15 150:3 204:10
sat 121:14 165:12
saturated 61:9 164:14 197:10 289:10,16
saw 21:14 113:5
saying 27:14 29:2 64:9 65:13 75:10,11 114:15 186:21 205:16 210:11 211:17 216:18 265:3,8 265:20 285:13
says 64:19 89:12 157:14 159:5 163:3,5 164:14 200:3 201:21 204:7,22 205:8 245:1,7,11,12,22 245:23 247:11 260:17,18,20 264:21 270:10 274:16 276:4 278:11 279:21 279:22 280:19 282:1 288:16,24 289:4,8,12 294:6
scan 251:16
scanning 284:6
scarce 122:16
scatter 232:4
scenario 78:23 180:2
scheduled 117:12
science 43:22
scientific 183:11 183:16
scientist 2:6,8 7:12,13
scientists 127:3
scope 33:6 43:20 96:17 200:21 209:10 218:11
Scratch 221:5
screen 11:22 53:20 61:23 63:2,3 90:19
screens 62:23
se 247:1
seam 60:3 61:12
search 60:12 72:22 100:17 104:21 137:12 137:17,21
searches 137:18
season 65:2
second 10:14 14:2 22:12,13 30:2 47:6 52:19 64:2 64:5 91:11 104:20 112:8 130:13 133:15 151:2 163:2 164:7,13 171:11 201:6 204:5 219:17 242:9 257:14 269:22 274:15 275:10 275:17 286:2 288:10 291:18
secondary 46:18 251:14 252:2
secondly 94:16 115:11
seconds 38:24
section 23:13 48:21 104:16 113:17 164:6 173:13,20,21 276:6
sedation 45:18
sediment 11:14 12:12 13:18,22 14:21 15:2,8 16:2,24 19:23 20:2,5 22:1 40:18 56:4 57:8 88:10 89:13 96:19 131:22 133:13 195:10
sediments 22:22 195:19
see 12:22 18:18,24 19:6 21:7,8 22:7 27:6 30:6 42:1 48:7 49:8 55:9 55:10,17 61:9,16 63:4 64:8 68:2 74:8 77:20,21,22 78:8 79:14 80:4 83:5 87:9 112:22 113:4,10 113:17 114:9 115:21,21 130:4 134:22 138:13 153:12 155:18 157:13 163:7 164:6,9 165:4 166:20 167:16 167:17 171:23 184:17 187:10 200:6 201:22 202:6 206:1 208:5 215:3 216:11,11 220:6 222:18 223:10 224:10 225:24 226:7 227:20 228:7 233:21 236:20 251:7,9 251:10,23,24 254:10 256:12 256:16 257:10 257:15,21 260:14 266:24 267:3,14 268:2 271:7 277:20 278:21 279:2,5 284:10 286:12
seeing 12:14 13:17 14:17,19 15:9,11 26:2 29:5 55:21 249:6,20
seek 171:8
seen 62:8 84:19 154:6
seeps 40:10 83:5 84:20 113:5,6 154:2,7 237:6 238:5
select 59:11
selected 21:3 63:6 68:16 119:18 228:17,19
selenium 208:11 209:15,18 210:7 215:15
sense 90:14
sensitive 8:21
sent 273:17
sentence 98:2 113:20 114:15 114:21 164:13 166:17 251:7,9 251:10,17 257:7 257:18 270:9 274:16 275:9 280:1 288:10,24 289:6,7
sentences 275:13
separate 61:17 202:18
separately 207:14
separation 39:18
September 163:4
sequential 114:4
serve 98:7
serves 91:24
service 46:19 85:5 122:3 125:12 166:19 167:2
set 29:10 33:13 51:17,19 122:3 184:24 201:19 235:24 281:24 282:16
sets 86:4 282:11
setting 45:18 46:9 90:11,14 129:14 129:17 192:18 192:20 244:20
seven 19:9 37:16 37:16 259:7,9,9 259:12 260:17
sewage 142:5
Seymour 35:10,13 35:15,20 36:1,5

36:6,19 151:9 217:19 218:6 229:4 231:14
Seymour's 35:17
shallow 61:18,18 61:21 63:3 99:22 100:19 104:19 210:3
shed 159:22
shifted 274:17 276:22
shifting 199:16
Ship 91:3
shmoo 162:7
Shoot 219:15
shore 17:10 18:6 21:5 89:21 90:3
shoreline 17:17,19 19:2
short 10:15 52:1 84:9,13 87:1,10 121:6 128:12 180:17 219:22 256:3
shorthand 1:16 294:8,10,15
show 12:6 24:13 24:14 25:10 33:5 39:23 47:19 102:3 105:17 109:12 117:5,18 152:21 165:4 220:18 221:17 232:14
showed 53:11 74:3,3 123:14 136:20 149:9 251:12
showing 15:16 27:3 30:21 37:4 37:15 38:9 58:7 70:21 77:2 78:22 81:4 94:10 95:16,17 111:8 138:12 152:17 154:16 204:6,20,23 205:8 210:14,15 220:19 249:8
shown 19:7,9 25:1 37:8,20 46:16 47:24 48:21 51:4 52:21,23 55:12 61:22 76:14 90:2 91:6 96:21 100:6 103:1,12 130:11 140:19 147:15 157:1 221:22 222:4,8 226:23 252:13 271:22 274:5 279:7 281:15 283:8
shows 15:20 17:6 30:22 31:5 48:1 54:7 56:1,11 73:19 81:8 83:21 102:12 127:7 131:21 135:4 138:15 152:24 155:1,2 178:24 222:18 222:20 251:21 261:15 277:8
si 226:13
side 18:19 61:11 102:24 103:18 117:9,17 131:23 148:7 152:18 174:21 204:13 224:19 227:4,13 240:2,18 243:4 273:2
sides 24:4 91:1 100:16
Sierra 1:3 2:16 3:4,11
sign 121:15 178:3
signed 122:22,22 122:24
significance 108:11 133:20 209:7
significant 8:23 9:12 26:17,24 27:1 30:5,8,11 30:15 36:17 74:6,10,12 76:17 105:24 106:1,3,4 107:20,23 138:3 143:23 146:3,5 146:11 147:10 155:5 208:15,18 209:1,15 210:5 258:11
significantly 284:22
signified 14:3,4,24
signifies 13:3 226:2 283:1
signify 225:21
signifying 103:19
signs 29:24
silt 60:3
silts 19:17 137:5
silty 61:12 62:24 69:17
similar 35:21,21 45:14 48:9 58:10 73:13,20 74:4,19 78:13 86:23 90:10 99:12 101:3 104:11 105:16 106:7 120:4 145:11 146:10 153:7 157:6 169:12 197:2 208:4 250:2 257:5 273:4
similarities 263:20
similarly 44:19 119:23
simple 291:18
simply 68:3 76:9 76:15 155:4 198:23 286:9,17 292:13
single 9:9 64:13
singular 41:6
sir 191:6 204:21 206:21 278:1
sit 7:20 8:5 148:5 240:6,19
site 8:24 9:20 23:15,16,17 24:15,15,18,20 46:9,11 50:5 51:23 53:22 56:23 57:5 60:1 60:4 62:4,18 69:3 72:15 82:9 82:13 84:7,17,21 85:1 86:3 95:18 97:4 100:4 109:1 115:21 126:21,24 127:6 129:17,24 132:6 132:7,13,14,16 133:8,23 134:2 134:14,23 135:6 137:4 140:12,18 140:20 141:5,19 141:22,23 142:7 154:6 155:7 158:18 160:14 162:1,15 166:15 168:3 174:5,19 174:19 186:16 187:12 188:19 189:3,13,19 190:23 191:7 192:3 199:19 241:1,8 243:12 244:11 245:7,15 246:14,18,21 247:19 248:11 248:13,16 251:5 253:15,19 264:13 288:11 288:14 289:9 291:10 292:4
site's 130:18
site-wide 278:21
sites 9:5,8 45:17 45:21 70:14 86:23 119:21 127:18 134:23 142:1,2 145:22 149:11 157:7 169:5,20 170:9 172:3 174:16,17 176:6,23 177:12 177:22 179:24 186:2 194:9 195:1,7 198:12 206:7,24 216:14 243:21 245:1 249:17 267:21 273:4 288:23
sits 46:9
sitting 162:1 185:19
situation 30:10 107:21,24 108:10 160:3 191:23 198:8 214:22
situations 107:19 205:12 213:24
six 19:6,9,9 260:17
size 189:2
Skipping 169:15
slag 114:10 130:10 139:8 145:3 149:15 159:3 167:6 197:7 244:14 248:20 249:14 262:5,23 263:5 263:16 264:8 266:4 267:24
slash 287:13

slices 12:18
slide 22:24 23:3,4 23:6 24:13,13 25:1,20,20 32:24 34:24 35:9 37:2 37:3 38:8 39:21 40:21,21 45:13 55:20 56:18 58:6,19,19 60:23 61:23 70:19 71:18 93:18 96:3,17 98:21 99:24 100:21 102:11 103:2,15 103:19 104:7 105:15 106:20 107:16 109:22 116:23 118:6 130:5,5 133:4,5 135:13,22,22 136:23,23 138:7 138:7 140:6 141:17,17,20 149:21 152:12 155:24 156:20 169:7,7,8 175:7 178:4 199:17,19 245:17,19,20,23 246:7,16 247:11 271:6,18 278:22
slides 72:1 173:15 184:24 245:13 271:5 278:20
slideshow 271:5
slight 210:20
slightly 134:2 145:19 149:10 151:18 208:22 208:23 260:5 285:4
slope 113:10 154:6 202:11 204:19,22,24 205:3,4 208:21 209:19,20,24 210:3,20,23 211:1,11,15 214:9,11,15 215:5,6,11,15,17 215:22
slow 122:9
slowly 292:6
sluiced 163:13 165:7 166:9
sluicing 292:15
small 192:2 209:22,23
snapshot 59:12
sodium 101:14
software 33:15 150:4 157:10 193:1 204:10
soil 17:20 24:16 56:2 57:6,8 61:9 96:19 97:4,6 98:13,13,16,18 99:20 123:14 133:10,11 137:3 159:23 251:18 255:16 260:18 261:5,18 262:22 262:23
soils 97:1 99:19 270:2 271:1
sole 59:15
solid 162:3 187:1
solids 136:17 195:15
solution 124:17
Somebody 194:8
somewhat 145:16 146:6 266:1
soon 123:23
sorry 17:20 49:22 49:23 53:2 87:22 102:18 106:13 111:22 122:11,14,14 124:6 167:11 172:13 190:6 193:22 194:6 197:5 204:4,21 210:20 211:5,6 214:16,24 219:5 219:6,8,13 220:23 221:3,5 225:16 230:24 234:14 236:15 238:14 239:4 241:17 244:24 268:5 282:9 288:4 289:5
sort 12:19 28:3 35:19 94:7 116:7
sound 43:22
sounds 11:13
source 34:6 49:13 49:20 65:24 66:6,7,14,24 67:2,4,8 68:5,8 68:19 84:5 123:23 124:13 128:17 143:15 143:24 144:6,9 144:19,19 264:22 274:11 276:8 282:18 283:5
sourced 39:7
sources 67:10,12 67:15 68:13 71:14 98:7 122:17 123:10 123:19 135:3 160:10 161:2 263:18
south 4:7 46:3 49:15 51:3,14 52:17 73:5 90:20 91:5,6 130:2 134:21 142:6,6 174:23 230:6 273:2 282:1,4
southeast 94:17 94:17,21 96:24 97:15,20
southern 140:20
southwest 40:3 234:9,11 239:5 240:2,18 243:3 244:22
spaced 253:5
spacing 82:7 253:7
speak 7:19 125:15 193:20 206:10 248:3 264:13
speaking 114:17 173:3 186:14 196:15 264:11
specific 47:23 54:14 64:15 66:14 68:19 82:20 96:20 106:23 133:17 139:12 187:11 189:19 199:12 237:9,24 244:6 246:23 247:19 248:13,18,23 252:9 253:17 264:11 267:13 269:15
specifically 65:8 65:18 70:8 131:21 132:24 164:21 196:15 240:7 246:12 247:8,22 276:7
specified 25:15
specify 67:9
spell 8:4
spelled 8:7
spending 124:22
spent 40:7
spill 192:3
spills 124:15
split 53:21
spoils 20:6
spoken 103:15
square 222:20 238:10,16 239:18
squares 222:15
SRO 261:9,10,13 261:17 262:9 265:5
SRP 23:15,16 24:15 142:2 174:16,19,20
SS 294:2
stability 74:17
staff 2:5 7:13 193:18
Stamm 1:15,23 294:5
stand 120:24 259:3
standard 30:14,18 34:13,20 37:8,13 37:19 39:2 66:13 67:2 85:12 101:16 107:22 108:1 109:21 110:16 111:13,17 127:10 131:7 151:21 153:1 157:10 221:21 222:2,3,12,17,21 223:6,11,14 232:6,11,16 257:9 260:6 261:19 265:7 272:4,4
standards 9:13 13:22 14:16 15:22 34:12 38:21,23 40:7 57:13 59:10 60:20 73:7 76:7 76:19,22 80:23 84:3 86:12

100:15 101:21 102:5 105:10 110:5 118:2 136:12,15 139:2 139:4 147:12 150:19,20 152:10 157:20 178:12,24 259:18 260:1 269:24 270:4,12 270:20 271:3 272:3
standpoint 20:9
start 185:22 186:21 187:10 188:21 192:11 193:4 229:12 236:2,5 266:24
started 45:23 65:20,22 90:16 95:1 198:6 243:1 292:6
starting 45:17 96:8 98:3 169:13 187:7 197:2,22 198:4 240:14 251:6,12 268:2 284:21
starts 217:14 218:23 230:16 231:2,21 236:3 236:16 251:7,18 256:15 257:19 275:22 280:1 281:23 284:15 284:17 287:9 289:4,7
state 1:16 8:13 32:22 41:4,18 47:23 48:2,3 67:7 85:2,21 91:21 92:14,14 92:20 93:4 117:13 118:14 118:16,19,22 122:23 130:23 156:4,15 157:23 162:6 169:15 170:18 176:13 187:5 240:21 248:5 250:16 294:1
stated 62:22 164:18 202:23 227:13 233:3 248:12 258:20 277:5,12 285:23
statement 107:17 114:2 122:19,22 125:17,21 129:9 164:12 166:20 172:11 289:12
states 64:19 126:15 275:21 285:2
station 11:7 13:8 13:10,13 15:5,11 17:1 21:20,24 24:1 32:16,17 38:13 39:13 45:9,11,19 46:4 48:10 56:12 60:17 61:11 64:16 82:2,10 90:15,22 91:6,13 94:18 95:19 96:9 97:21 104:9 112:20 113:7 117:22 119:2,2 120:15 121:24 123:12 129:8 135:1,12 142:4,14 145:9 153:21 156:19 160:14 165:1 168:3,14,17,20 171:10 174:18 220:21 223:22
Station's 123:5 125:3
stations 35:6 46:13 47:15 50:13 55:23 56:1 58:10 70:8 79:20 85:4 95:1 100:1 104:12 105:17 106:8 116:10 129:13 131:19 132:2 135:15 137:24 145:7,10 146:17 148:12 149:24 151:5 152:13 153:2 156:3,14 161:5 168:24 169:9,12 170:20 172:2 174:1,9,11 174:13 175:3,13 179:2,5,6,19 181:4 249:7,24
statistical 101:17 143:21 204:10 204:14,18 209:3 209:3,7,9,13
statistically 26:16 26:23 27:1 30:4 30:8,11,15 74:6 74:10,12 76:17 105:23 106:1,3,4 107:20,23 143:23 146:2,5 146:10 147:10 155:5 208:14,18 209:1 210:4
statistics 29:10 201:19 212:18 213:3,13
status 9:22 47:10 47:11 60:22 91:16 94:20 130:16
stay 142:9
stayed 10:4
stays 178:13
steel 161:22
steelmaking 161:23
steep 26:20,21
steeper 209:4
steepness 208:21
step 121:13
steps 41:5 43:13 48:14 71:13 77:7 83:15 86:9 117:15 118:13 156:6 178:2,20
stipulate 264:14
stir-up 195:11
stomach 127:15
Stone 273:1
stop 32:18 277:16 292:19
stopping 165:16 290:4
storage 167:14 168:6 189:21 234:22 262:6 273:6,9,10
stored 84:8 245:11 246:8 247:22
storms 124:12
straight 48:22
strategy 71:20 155:20 170:2 175:19
stratigraphy 137:3
stream 14:14
streams 124:19
Street 1:17 3:5 4:7
stress 40:11
stretches 12:21
structures 122:6
studies 123:18
study 16:3 69:10 164:22 165:21 166:5 167:1 272:11 286:22 287:2 289:22 290:7
stuff 204:2 231:2
subject 32:21 48:3 49:2 82:4 111:12 139:21 162:2
subjected 258:7 261:5,16
subjecting 257:9
submit 125:1
submittal 50:8
submitted 48:16 49:5 50:2 62:6 68:1 93:10 131:11
submitting 50:15
subsequent 102:24 176:18 177:15 270:14
subsequently 92:22
substantial 102:18 117:21 179:16 186:23 213:6
substantially 37:19 111:16 181:24
subtract 217:1
successful 162:9
sufficiency 81:22 116:17 168:15
sufficient 39:4 82:7 97:21 115:4 116:21
sufficiently 36:10 36:16
suggest 179:14 229:24
suggested 57:21 253:22
suggests 210:16
Suite 3:6,16
sulfate 76:19 100:14 136:16

143:24 200:15 200:16,19,20 201:1
sulfite 39:6 127:12
sum 116:19 182:17,18 202:2
summarize 23:7 56:20 70:4 96:5 102:10 118:9 154:9
summarized 274:8 283:13
summarizes 15:17 33:6 76:15 77:7 96:17 102:12
summarizing 40:24
summary 20:15 20:19 25:23 26:5 38:11 47:7 83:8 91:12,13 109:22 130:14 130:16 132:9,11 169:11 201:10 201:16 204:11 204:17 210:2 212:18 213:2,12 213:16 214:2 217:13 267:5 268:11
summed 212:8
superfund 127:17 129:24 141:23 142:7 174:16
supply 60:16 123:17,20,22
support 22:10 24:7 38:15 53:8 55:14 123:2 131:11 155:19 164:22 193:18
supported 180:11
supporting 157:2
supports 98:4
supposed 163:24
sure 37:23 44:13 54:19 60:21 71:4 85:18 88:15,21 117:1 124:1 163:22 165:19 172:4 180:15 198:3 201:9 208:2 223:19 226:19 228:11,14 235:22 236:22 241:13 242:1 246:11 248:4 255:14,22,24 259:23 260:24 262:19 263:13 265:16 276:18 281:5 285:17 287:9 291:16,17
surface 31:1,4 33:1,7 34:12,20 36:12,15,23,24 37:7,12,19 38:1 57:8 60:3 63:5 64:21 65:1 77:3 77:6,8 78:16,21 79:4,16 80:22 81:1,13 82:22 84:3 85:2,13,19 90:17 91:1 92:6 93:19 94:13 95:6 96:19 99:23 106:24 107:6,12 109:16 109:21 110:5,9 110:16,17,21,23 111:13,16,17,21 111:23 112:1,2,3 112:5,12,15,17 118:2,17 126:13 128:12 133:13 137:8 138:19 147:19 148:23 149:3,14,22 150:10,18,19 151:3,6,11,21,24 152:9,10 153:1,4 153:7,10 156:4,6 156:11 159:22 169:21 171:12 171:24 178:24 179:1 226:24 251:13,21,22 290:22,24 292:3 292:13
surfaces 61:17 84:11
surge 46:15 47:17 49:17 50:1 172:8,15 251:14 252:2 274:17 276:10,16,21 277:10,19 278:5 279:8,23 280:9 280:16
surrounded 91:1
surrounding 8:23 9:2 23:9,13 46:1 71:24 72:1 90:13,24 104:13 104:17 123:3 129:20 175:4
suspect 52:18 53:9 54:1,3,10 54:15
suspected 52:5 139:12 179:23
suspended 195:15 195:18
sustained 27:21 79:11 108:17 163:21 172:21 217:10 251:2 254:4 263:9
switch 283:22
switches 268:1
sworn 10:20 11:3 45:6 294:5
synthetic 257:6
system 50:8 92:4 92:17 104:5 292:10
systems 33:9 135:21

T

T 4:3 6:1
table 15:16,17 20:15 93:20 159:8 160:1 165:13 197:10 201:16 202:1 205:19 206:3 207:14,18 210:2 252:18 260:13 261:4,17,21,21 261:23 264:6,20 267:5,17,23 268:4 273:24 274:1,5,9 276:15 277:17,21 278:8 280:17,23 282:7 283:8 285:10 288:13 291:9
tables 204:17 260:10 267:19 268:10
TACO 97:4 98:19 133:23 175:18
take 18:7 25:14 29:1 32:7 37:24 64:4 70:13 78:18 85:14 87:2 90:12 105:11,13 110:13 116:19 119:11 120:18 121:11 128:10 175:17 180:14 181:16 185:4 232:9 255:19,20 255:21 260:23 263:23 273:1
takeaways 147:7
taken 1:15 10:16 13:13 18:2,3 28:4 41:4 48:14 83:15 86:10 87:11 117:15 118:12 121:7 158:9 177:24 178:2,20 180:10 180:18 219:23 251:8 256:4 273:13 282:4,21 294:10
talk 65:20,22 88:19 91:10 95:2 190:7 251:4 259:19 275:17
talked 17:16 23:12 32:16 39:10 40:14 70:20 81:14 89:3 104:16 117:18 153:23 161:8 170:7 201:17 202:8 216:5 223:16 254:12 262:24 268:23 269:3 273:5
talking 33:2 40:7 56:9 90:5 97:14 149:18 165:15 165:16 196:21 197:6 198:16 200:17 216:4 220:23 224:15 226:7 227:8 228:16 233:24 251:1 253:14 256:19 257:13 266:6 271:8 276:5 282:13 287:3,19 288:17 290:4 291:4
talks 267:24 269:22 271:5

287:11,12
tally 204:15
tallying 207:16,21
tank 189:21
tannery 130:1 134:21 140:18 160:11
tasked 250:8,11
Taylor 4:16 125:9 125:10 128:21
TDS 76:19 100:14 206:13,14
team 239:6 240:16 254:16 254:19
TEC 13:23 14:3 15:21,22 21:1
technical 80:9 175:7 248:2
technically 44:20 44:21 45:2 86:19,20 119:19 119:23 120:2 175:15 176:9 180:11
tedious 218:12 253:11
tell 15:4 20:22 76:12 220:13
telling 27:3 28:2 146:8
tells 15:6 80:2
temporal 22:13
temporarily 84:9 246:7
temporary 51:17 105:9 273:6,10 273:12
ten 27:1 29:9 215:9
tend 195:18
tends 195:10
term 29:6 83:23 117:19 227:11 273:8
termed 58:8
terms 23:8 24:1 27:3 28:9,19 34:7 35:22 36:17 41:1 47:2 78:20 89:22 90:15,16,24 91:22,24 92:18 96:10 97:7 99:15 101:20 104:18 105:22 108:11 111:19 116:4 138:6 146:10 169:17 187:17 198:22 218:1 224:4 229:4 234:5,20 238:11 253:19 254:20
test 26:18 27:12 29:22 75:19 102:6 106:10 146:24 203:13 204:7,11 207:3 223:16 256:23 257:14,23 258:23,24 259:7 261:6 263:11,23 264:20,23 266:16,18 267:3 269:15,17,18 270:19 272:2 274:6 275:10 276:6,20 277:20 278:24 279:14 280:2,9,17
tested 60:18 73:6 99:19 207:23 274:6
testified 11:3 35:24 45:6 61:7 68:10 69:14 73:14 84:16,19 252:16 289:21
testify 185:3
testifying 162:17
testimony 17:13 21:11 31:11 54:21 62:10 63:10 67:13,14 78:14 82:13 87:18,19,20 110:20 113:2 120:24 129:7 154:4 175:11 194:12,19 206:13 213:5 216:10 217:22 237:2,17 245:16 249:5 264:2 265:11,14,23 278:18,19
testing 13:18 25:21,24 26:4 27:6 29:4 31:22 32:13 66:17 73:12,17 76:5 78:4 79:7 83:20 101:9,16 105:16 105:18 106:9 107:2 117:16 123:14 127:6 145:6,8 147:8 150:9 153:3 154:24 175:22 208:7 209:11 212:11 225:8 231:9,13,13 251:12 268:22 281:16 283:7,11 283:13,14
tests 33:14 73:20 75:4,4 201:21 202:10 203:3,6 204:16 207:8,16 216:4 217:13,16 218:4,7,13 229:1 229:4 230:11 231:4,10 233:1 257:3 267:1
text 201:20,20 274:13
thank 7:24 8:3,10 8:11,12 10:7,8 10:12,21,23 12:2 37:1 42:11 43:2 49:7 51:12 63:22 68:21 76:4 87:9,16 88:24 90:4 106:19 121:2,5 121:10 122:15 125:4,5,7,18 128:18,19,21 155:22 167:8 173:8 180:23 183:9 185:11,15 185:16,19 188:16 193:21 195:21 205:23 220:1 242:22 246:3 248:4 255:13 256:2,7 259:15 264:17 275:5 276:17 279:13 280:7,12 281:19 292:22
thanks 83:1 125:6 235:1 253:10 260:7 261:11 265:17 267:18 271:20 272:13
that'd 110:2
Theoretically 287:23
they'd 263:21
thickness 92:1 183:7 238:16
thing 28:23 55:8 84:13 108:8 172:5 179:13 230:13 238:21 253:6 263:17 285:13,23 290:12
things 27:6,19 38:18 176:21 181:2 196:9
think 17:4 18:7 19:19 22:2 26:13 27:2 28:2 31:9,17,21 33:23 35:23 36:9 44:21 47:13 54:17 55:8 56:11 60:9 62:2 65:13 68:2 71:24 72:22 73:18 79:16 95:1 108:10 113:1 115:1 121:16 138:5 143:11 148:15 154:3 155:5 158:7,16 159:2 160:10,16 161:20 163:23 164:12 165:2,18 166:7 181:20 184:21 186:6 192:8 194:18,19 195:7,7 196:6,12 196:14 197:17 210:14 212:6,21 213:20,22,23,24 216:9 218:22 220:11 227:17 227:17 228:13 231:5 234:3,6,11 234:12,15 235:14,15 238:21 242:15 245:3 261:24 262:6 264:4,18 266:1 268:19 270:5 273:5 274:1,2 275:4 277:5 279:4 280:13 281:21 282:21 284:11

285:3 287:6 292:18
thinking 189:10 255:23
third 49:18,22 170:21 210:16 215:23 232:19 256:14 274:15 275:9,22
thorough 124:20 207:4,7,24 208:8
thought 166:1 208:7 263:2 277:9,23
thousand 182:20 182:22 271:17
threat 78:23 98:8
threats 68:12
three 19:9 32:20 48:1 51:20 54:1 54:3 121:12,16 131:18 139:2 145:10,17,22 156:14 163:6 165:10 172:8 175:3 177:21 201:20 209:23 232:24 245:2 247:16 249:7 261:7,10,13,15 288:18,19,23 289:1
three-dimensio... 193:5
three-dimensio... 196:24
three-minute 10:5
three-month 179:12
threshold 13:23 34:3,3 181:17,23
Tier 97:4,6 98:18 133:23 261:10 261:17
time 7:19 22:13 40:7 41:17 48:9 50:6,17 52:2 57:22 58:9,11,17 59:12 60:21 74:18 76:10 79:4 80:5,16 83:22 87:1 93:15 99:11 109:5 116:15 117:6 119:9 120:16 133:9 134:12 149:2 152:10 153:10 153:12 159:18 159:19 164:2 178:19 192:19 196:13,16,19 197:4 198:21 199:10 219:12 220:5,10,21 221:17 222:8,19 225:8 228:10,11 230:7 231:11,19 231:23 232:9 281:18 283:9 289:15 292:19
timely 10:2
times 26:11 70:1 102:18 127:8,9 127:11,12 130:10 140:4 150:12 170:16 191:12 194:4 232:16 234:4 241:22 250:13 257:4 263:18
timing 50:5 143:2 143:4 158:2,5
tiny 274:1
Tipsord 2:4 7:10
title 18:22 163:5 267:6 284:16
titled 12:11 33:1 105:15 168:2 173:20
today 7:5 8:12,22 9:14 87:4,20 125:15,21 128:8 183:10,15 184:5 195:22 203:22 216:10 238:22 240:6,19 249:5 250:14 254:12 262:24 268:23 285:3 287:19
told 20:23
tomorrow 281:11 292:21
tons 271:17
tool 185:2
top 12:15 21:3 37:9,10 81:11 97:19 102:20 111:12 114:8,18 152:23 204:7,23 205:8 256:10 260:17 267:6 269:21,22 278:12 284:5 287:12
topic 85:20 194:1 272:14 289:21
topo 54:6
topographic 53:12 54:4
total 12:18 58:16 59:4 69:6 70:1 75:3,7 99:20 101:10 102:16 105:19 106:9 116:19 136:16 139:18 140:5 146:10 152:22 182:17,18,21 183:6 194:5,21 195:12 201:21 202:3,10 206:1,7 206:24 207:18 207:22 208:3 210:23 211:5,9 212:3,8 213:14 214:14,17 215:2 216:4,24
totality 169:2 180:8 253:8
touch 74:22
touched 26:13 82:17
toxic 124:5,7 126:12 127:5,13
track 44:24
tracks 55:12
trajectory 44:14
transcribing 122:12
transcript 18:15 185:7 240:5 243:19 294:10
transient 40:14
transport 78:18 192:13,15,22,23 287:18
travel 81:15,17 153:12
treat 120:13 128:13 202:18
treatment 126:6 130:3 142:5
trend 25:21,24 26:8,9,19,21,24 27:5,7,9,10,18 27:23 28:1,4,5,9 28:11,18,21 29:4 29:20,24 30:1,8 30:12,16,24 31:22 32:13 33:14 39:8 73:12,17,20,24 74:1,2,3,4,6,20 75:1,4,4,7 76:2 76:3 79:7 83:20 105:22 106:7,9 106:10,13 107:1 107:11,20 108:13 117:16 145:6,8,15 146:1 146:15,21,23 147:2,8,11 149:6 149:9 150:9 154:24 175:22 181:21 201:3 202:4,10,11,14 202:19,21 203:3 203:6,8,10,13,14 204:7,11,16 205:3,4 207:3,16 207:23 208:11 208:13,17,24 209:1,2,4,10,14 210:2,14,21 211:18,19 212:10,18,20 213:10 216:2 217:16 218:4,7 218:13 219:12 223:16,23 224:4 224:24 225:3,8 229:1,4 230:11 231:4,9,10,13,13 233:1
trending 202:13 202:13
trends 26:10,11 26:12 27:1 28:12 29:14 73:21 74:5,9,11 74:13 75:8 76:10,17 79:8,14 79:19 105:19,20 105:21,22,24 106:1,3,5,12 107:24 108:14 108:19 109:6 117:24 119:15 145:17,19,20,20 145:24 146:3,8 146:11,13 155:3 155:4,5 181:4 201:11 202:1,4,6 203:6,7 209:8

212:9 213:7 216:7,15 217:6 217:13 223:21
triangle 24:3,4 179:9
tried 28:17
trucking 9:19
trucks 271:16,18
true 38:6 184:14 194:14 294:9
try 28:7 33:11 46:10 71:21 90:14 101:5 115:23,24 116:3 116:12 121:3 187:15 188:12 188:14 255:5 275:3,7 281:10 286:23
trying 55:17 115:1 198:22 222:13 247:2 277:3
turn 15:13 18:17 19:8 34:23 38:8 45:10 47:6 56:19 59:20 73:11 89:9 96:13 106:20 111:3 113:14 116:23 129:4 131:16 134:15 139:14 145:4 156:20 167:22 169:7 199:20 201:3 202:24 203:23 208:9 209:16 218:21 219:4 221:9,10 221:16 224:6 227:18 229:10 229:18 230:23 231:22 233:10 235:22 245:19 255:18 257:12 260:8 269:19 279:13 281:20
turning 19:11 40:21 45:13 56:24 58:6,19 60:23 71:18 76:11 77:1 80:6 84:22 94:9 96:3 99:24 100:21 102:9 104:7 105:15 118:6 129:12 130:5 132:8 136:23 138:7 140:6 141:17 147:13 149:17 152:12 154:8 175:7 176:17 178:4 239:5 244:23 253:10 254:7 256:9 271:4 273:23 274:12
turnover 51:18
twelve 59:7 120:15
twice 102:17 123:15
two 7:15 14:16 19:8 26:11 27:18 28:24 39:20 49:13 51:20 52:4 53:24 54:1,24 55:5 60:16 61:1 61:6,8,16 62:14 63:7,12,14 65:11 69:15 72:23 73:2 76:16,21 83:2 91:1,18 92:19 93:5 94:11 95:3 96:23 102:23 104:11 106:8 115:18,18 121:18,24 122:18 130:17 130:22 134:17 140:8 144:22 167:4 172:10,18 172:24 173:5 174:9,10 180:14 184:19 207:10 207:12,13,21 210:22 222:2 232:18 242:7 252:1 264:21 266:5,8 276:9 278:4,6 282:17 282:23 285:12 288:12
two- 179:12
two-dimensional 193:3
two-dimensiona... 254:24
two-thirds 166:16
type 15:11 30:13 98:19 137:3 175:18,21 179:12 186:22 187:24 201:2 281:22 287:24
types 67:22 158:21 193:15 199:6 258:15 266:24 288:1
typically 66:8 188:8
typographical 42:6

U

U.S 16:4
ultimate 57:20 149:8
ultimately 16:8 25:18 29:21 35:21 36:9 43:24 58:15 69:19 99:21 101:21 110:15 142:10,18 149:11 159:24 177:13
unacceptable 9:24 39:14 83:24 97:23 118:3 127:4 151:6
unaddressed 128:5
uncapped 155:9
undergoing 32:22 84:6 93:1 117:11,23 120:1 143:7
underground 8:19 189:20
underlain 137:5
underlies 60:4
underneath 62:4 107:17 124:4 226:5
underscore 12:7
understand 37:23 48:6,17 51:21 71:5 73:1 129:6 143:1 154:12 161:6 244:12 277:3 290:10
understanding 20:1,4 45:21 46:8 58:12 60:1 69:11 73:5 94:4 95:22 113:23 116:4 129:16 133:7 144:7 159:14 172:18 172:24 173:22 177:6 225:9 241:18 267:19 270:18 272:24 273:16 282:3,22 291:1 292:7
understands 55:2
understood 137:19 193:24 226:19,19
undertake 249:15
undertaken 132:24
undertook 129:14 223:23
unexpected 109:13 155:6
unfiltered 194:5 195:4
unfounded 31:17
unique 46:12 145:16,23
unit 50:3 66:15,23 69:17,17,21 100:9 137:6 162:4 244:20
units 48:16 61:1,7 63:13,15 65:7 67:17 69:15 70:18 79:20 83:13,13 84:14 117:3,11 151:21 154:14,19 176:5 187:2,16
unlined 126:23 163:6 166:10,18
unquote 126:17
unrelated 22:5
unsaturated 157:11,17 285:21 291:8
upcoming 250:16
update 48:5 88:6 137:21
updated 16:2 137:17
upgrade 92:22
upgraded 48:9 92:22
upgrades 48:10 58:16 135:21
upgradient 59:10 59:16 66:15

83:12 117:2,9,10 136:15 154:12 154:18 161:2 168:13 187:20 188:2,7,10,12,14 223:22 249:7,10
upgradients 155:8
upper 34:5 37:20 64:24 65:7 69:17 126:8
uppermost 19:19 64:19 65:9 100:9 137:6
upstream 13:4,12 15:3,9,12 22:6,8
upward 26:9,10 26:12,17,19,21 26:24 30:8,12,15 74:4,11,12 75:20 75:20 76:17 105:20,22 106:1 106:5 107:20,23 145:17,19,21 146:3,12 147:10 155:3 202:3,6,13 208:13 209:3,4 210:21 211:22 212:1,8,20
urge 10:1
urgent 128:10
use 23:10,13,18 24:22 35:20 36:1,4,5,6 57:17 60:20 71:2,7,24 72:10,17 81:19 86:16 91:1,8 99:3 100:19 104:14,14,17,20 104:22 115:24 116:3,11 134:10 140:8 150:13,15 155:15 174:13 179:3 188:5 195:14 197:14 203:17 204:1 209:6 227:11 267:16 273:8 286:13,22 287:22
useful 19:21 28:3 28:8 59:22 107:18,18 197:19,21 198:10 224:4 229:6 249:3 250:23 252:6,7 257:24
USEPA 9:10 34:4 45:1
users 46:6,7
uses 46:1,4 72:2 90:13 129:21 175:4 259:7
UST 189:13,16,20
usually 212:22
utilized 30:23 33:14,15 36:11 106:24 117:2 227:12 270:13 270:24
utilizing 55:12

V

VADOSE 159:7 159:21 160:4,8 182:5 197:8 249:21 252:17 285:6,20
vague 188:22 250:24
vagueness 190:10
value 208:7 209:12
values 223:10
Vanessa 2:5 7:13
vantage 113:9
variability 194:21
variable 80:2 142:15 197:4
variables 174:6
varies 188:19
various 12:17,21 14:13 46:11 53:22 91:7 95:22 104:3 132:17 138:22 156:9 176:4 186:2 204:15 220:20 257:4
varying 138:19 258:13,13
vast 20:23
vegetated 82:22
vegetation 40:11
vegetative 55:4 157:2
venues 9:6
Vermont 3:15
versus 14:18 158:3 220:10 290:8
vertical 101:11
vertically 291:7
viability 101:2
viable 119:22 123:19
vicinity 13:13 17:1 95:11 103:11 270:15 271:11
view 28:20 36:16 151:14
village's 123:20
violation 178:14 179:11
violations 178:16 246:13
virtually 291:20
visit 84:17,21 112:19,23 153:20
visited 82:10
visits 82:13
visual 132:5
vital 128:16
voice 83:1 155:22
volume 76:20 82:7 238:17 239:9,16 239:17 240:17 240:21 243:22 255:6,8
volumes 244:7
voluntarily 136:4 140:14 158:9 176:23 177:2,9 177:16 178:8
voluntary 59:2 100:4 143:9 158:10
vs 1:8
vulnerable 124:11

W

wages 124:22
walked 70:15 154:5
WANNIER 3:3
want 7:9 18:8 29:16 30:6 37:23 41:8 87:3 116:12,14 125:17 128:13 138:11 158:18 172:4 176:19 187:6,8,10,13,20 188:13,20 198:9 199:14 201:8 207:5 216:3 217:7 226:17 227:15 231:18 233:7 236:2 241:13 243:19 255:17,21 260:24 263:23 275:6 276:18 279:13 281:13 283:18 285:22 291:17
wanted 55:23 72:21 90:12,13 104:12 129:15 142:10 172:12 173:22 174:8 202:5 207:4 249:17 282:10
wants 126:24
warehouse 23:17
warning 92:24
warrant 118:19
warranted 115:19 149:16 155:12 272:8,19
Washington 3:17
wasn't 34:13 54:13 115:9 144:14 172:15 198:21 203:10 207:6 210:4 235:7 238:16 246:2 247:1 248:18 252:8 253:22 264:18 292:13
waste 9:20,23 31:6,10,12,19 77:16,17 78:5 107:5 122:7 123:6 124:18 125:3 130:2 159:6,11 161:23 162:3,14 187:1 197:2 199:6
wasteful 44:1
watch 70:15
water 7:8 24:10 24:10 31:1 33:1 33:7 34:12,13,14 34:20 36:12,16 36:24 37:7,12,19 38:1,20,22 46:19 60:12,13,17 72:7 72:14,21 77:3,6 78:16 79:5 80:22 81:1,13 82:22 84:3 91:2

92:5,6 104:21 106:24 107:12 109:16,21 110:5 110:9,16,17,21 110:23 111:13 111:16,17,21,23 112:2,2,3,5,13 112:15,17 118:2 122:17 123:10 123:17,20,22,23 123:24 124:1,8 124:18 126:5 127:10 128:3,17 130:2 137:12,13 137:14,16,18,21 147:19 148:24 149:2,3,14,22 150:10,19,19 151:4,6,11,21,24 152:9,10 153:1,5 153:7,10 159:22 160:1 165:8,8,9 165:16 166:9 175:5 178:24 179:1 189:21 197:10 252:18 258:3 285:10 286:11 288:13 290:5,18,19 292:3,9,11,15

watering 165:14

waters 36:23 77:8 78:22

Waukegan 125:10 125:10,23 126:2 126:5,6 127:2,6 127:17,18 128:1 128:9,13 129:8 130:17 133:6 134:17 135:1,12 136:1 139:17 141:19 142:24 143:2,6,11,15 144:5,17 145:9 145:12 146:21 146:24 148:14 149:6,7,10 152:14 153:21 154:10 156:1 160:14 164:15 165:1 168:3,13 168:17,20 170:13 171:2,4 171:10 174:15 182:4 197:7 216:12 229:11 231:19,23 233:2 244:14 248:20 249:4,24 250:22 252:5,15 255:16 256:11 259:17 262:16 263:7,12 281:20 290:9 291:3,12,20

Waukegan's 149:21

Waukeganites 125:23 128:15

way 41:23 43:11 43:14,23 65:8 67:15,16 108:4 110:24 115:5 125:3 140:21 142:9 143:12 145:13,24 153:14 166:16 169:24 170:9 176:14 195:8,9 201:11 202:12 202:23 222:22 236:1 242:10 243:20 246:12 282:17 287:6 290:7

ways 192:16 285:14

WCG 113:21 164:18 167:15

WCG's 151:8 164:14

we'll 20:17 23:2 30:6,6 31:2 53:3 70:15 87:2 88:19 160:20 169:8

we're 7:1,14 10:17 12:14 28:5 29:5 41:17 53:17 54:12 65:5,13 78:22 87:12,19 95:1 111:2 116:5,10 142:11 155:20 157:4 158:14 161:3 164:2 167:5 169:11 170:12 174:2 176:1 179:8 180:19 192:8 198:3,3 212:22 216:3 219:24 220:16 222:13 233:8 234:18 238:8 242:1 244:5 249:20 251:1 253:14 256:5 261:12 266:6 272:14 280:23

we've 22:3 25:6 28:3,3 30:5 31:9 38:12,12 44:17 46:15 47:14 55:22 66:18 67:23 68:9,16 70:5,9,19 72:7 73:18 83:20 85:20 95:4 103:15 107:10 107:19 108:21 109:16 116:1,8 117:3,18 119:15 121:11 131:18 142:5 145:2 148:15 149:12 149:18 150:19 150:20 152:4 154:24 157:9 158:7 159:4 161:4,7,12 168:18,23 170:15 174:3,22 175:16,19 179:6 180:10,11 194:15 202:8 208:2 212:7,8 216:5 227:12 249:9 252:13 262:24

weather 124:16

Weaver 35:18 47:8 113:21 130:15 164:11 226:18

Webster 3:5

week 122:17

weeks 85:23

weight 146:11

well-defined 249:13

wells 23:24 24:23 29:4 30:23 31:3 31:19 32:5 34:18 36:5,6,11 37:16,17,18 40:4 53:23 56:3,15 57:7 59:4,6 60:13,16 61:3 62:15,23 63:2,3 63:6 64:12 67:18 68:11,16 69:6,7,9 71:7 72:10,14,23 73:2 77:10,14 78:3,15 78:21 79:3 81:9 81:19 82:3,4 83:12,21 84:2 92:16 96:19 100:6,8,10 102:16,23 104:23 106:24 107:6,7,14 110:20,22 111:1 111:11,21 117:2 117:9,17 122:8 127:8 131:22 132:1,22 133:12 134:9 136:3,7 137:13 138:6 139:19,20 140:5 140:15 141:7 142:13,16 143:22 144:16 147:14,16,17,20 147:24 148:3,9 148:16 150:1,1 151:19 152:19 152:23 153:16 154:12,18 155:1 160:23 177:3 187:21 188:20 188:21 190:5 191:17 200:1,3 204:12,14 217:21,23 218:17,19 220:20 222:14 223:16,20,21,23 223:24 224:14 224:18,18,21,22 224:22 225:2,3 225:13,18 226:16 227:3,9 227:12 228:1,2,7 228:17,18,20,24 229:6,22 230:1 230:19,20 231:11,14,16 232:1,14 233:2 249:10 251:19 251:20 252:24 255:3

went 65:22 67:20 130:24 162:12 183:5 184:5 197:19 241:5

weren't 54:16 57:18 142:13 223:20 225:4,5 239:22
west 1:17 23:15 46:3 56:8,16 60:18 69:18 72:9,23 73:4 91:4 100:16 102:24 103:13 103:14 105:4 117:8,9,17 129:24 130:12 130:12,21 131:1 131:5,13 133:19 133:19 134:18 138:14,15 139:8 139:9 142:1 148:17 155:9,10 166:17 170:13 170:13 174:19 224:17,19 249:8 264:23
westerly 69:21
western 61:11 140:11,21 174:21
wet 65:2 182:19 182:22 183:6 201:2
wetlands 124:19
wetted 160:4
white 12:23
wide 34:7
Wilmette 2:12
windscreen 267:11
winter 51:21 84:10 179:13 246:8
wishes 7:19
withdrawn 93:7,8
witness 5:2 10:19 11:2 42:20,23 45:5
witnesses 128:23
wondering 196:10 198:17 213:1,15 228:19 232:14 237:14 250:2 280:18
word 203:17
work 44:2 48:8 55:24 95:22 101:18 125:19 168:19 177:11 177:12,13 180:6 193:2 209:6
workable 180:12
worked 161:21
working 9:1 116:5
world 29:10
worry 128:4
worth 29:9
wouldn't 30:9 98:19 170:10 228:19 263:22 263:23 268:17
write 199:19 288:11
wrong 219:5 267:20,21 268:8 280:19 281:9,21
wrote 277:2 284:21

X

X 5:1 6:1 81:10 152:19

Y

Y 81:8 152:18
yard 46:20 57:10
yeah 21:4 23:1 28:1 43:1 76:14 88:18 97:12 100:3 110:2 118:9 119:20 181:10 184:19 199:21 202:8 207:17 209:12 211:8,24 212:17 214:17,18 217:2 219:6,9 221:1,4 221:6 222:14 223:5 224:12,13 225:23 226:10 226:12,21 227:6 229:14 232:10 241:11 250:1 263:9 266:21 268:6 269:2 270:18 271:6,20 273:12 274:8 275:4,7 277:4 279:10 281:5 282:7 283:1,20 284:9 289:3,23 292:20
year 70:1 102:17 102:18 126:2 127:22 129:19 140:4 157:14
years 9:18 29:9 51:16 128:6 159:13 162:1,11 174:10,11,24 175:1
yellow 14:4 89:20
yellowish 134:20
yep 18:20 204:8 215:4 261:8 274:15 280:24 290:2
yesterday 7:6,14 11:6 21:11 23:1 24:14 31:21 32:17 33:3 35:10 54:20 61:7 63:9 158:23 159:2 185:24 194:13 195:22
young 126:7

Z

zero 205:4 211:1 211:11,12,15 214:1,11,13,18 214:20 215:1,1,6 215:10,17
zeros 212:2
zone 61:13,16,18 61:18,19,19,21 61:21 62:24 71:16 72:11 111:1 155:13 159:7,21 160:4,8 171:9 182:5 197:8 249:22 252:17 285:6,20 285:21 291:8
zones 62:14 63:7 65:12,17 170:24 171:6

0

0.0003 157:14
0.4 157:13
03 230:22
04 230:22
05 230:22
07 230:22
08-1 14:20
08-2 14:20
08-3 14:20
08-4 14:20
084-004445 1:24

1

1 30:18 39:1 40:6 51:9 57:12 59:9 76:18 97:4,6 98:18 100:15 101:3,15,21 102:4 108:1 114:12 121:12 133:23 136:14 139:1 147:11 151:15,17 157:20 251:6 259:18 260:1,5 261:10,17 269:24 270:3,11 270:20 271:2 272:3
1,000-by-400-foot 138:17
1.2 127:22
10 4:7 16:15 18:5 26:8 59:4 87:3,9 99:22 100:6 102:16 208:10 232:2,15,21
100 1:17 21:3 75:5 108:8 181:11 194:18
1004 2:11
102 21:7,19
107873 12:7
107876 15:14
11 5:4 18:5 100:10 164:4 251:20 252:3
11:04 87:13
110 21:3
1100 3:16 11:23
1101 53:14 167:22
1102 53:1,4 63:16 63:23 113:11 164:3
1103 162:23 287:8
1110 11:21,24 12:10
1111 16:9 18:13 19:24 87:16 88:9 89:3 120:19
118 219:10
118138 227:19
118236 218:23 230:16
118241 230:17
118355 219:4,6
118383 224:8
118465 221:16
118489 229:12

231:21
118493 229:18
118603 231:22
12 7:7 57:8 69:6 100:12 139:19 139:20 140:5 209:16 251:20 252:3 271:6
120 101:10
125,000 125:13
127,000 125:13
12D 179:11
13 7:5 133:13 134:3 202:2 224:7 225:3 266:14 283:22
13-15 1:5 7:7
1300 3:6
1303 227:18
1307 218:22 219:8 230:14
1310 229:10 231:21
1314 221:10 224:7
1315 12:7
132 203:14
135 216:4
13th 1:18
14 96:19 134:1 199:17,19 225:1 225:3 230:14 251:13 292:21 293:2
148 75:4,4
14A 270:11,16,16 271:11
15 52:8 74:12 120:19 203:1 225:1,4 240:15
16 91:9 105:20 127:9
16-503 87:6
16-504 87:5
17 57:8 91:9 125:14 138:20
1701 6:4 34:22 66:3 104:8 173:10 183:21 183:24 184:2
1702 6:5 20:17 22:24 25:9 30:20 32:24 34:24 37:3 38:9 40:22 45:13 47:7 50:23 55:21 58:7,20 68:23 70:19 76:12 77:2 80:6 83:8 90:7 91:12 94:10 96:14 109:15 118:7 129:5 131:16 132:8 135:22 138:8 145:5 147:14 149:17 152:12 154:8 155:24 169:8 173:19 176:18 184:4 185:8,9
176 203:1
18 96:18 271:18
18355 220:15
184 6:4
185 6:5
186 5:5
19 45:23 125:14 145:21 240:14
192 5:9
1920s 45:23
1923 129:18
1955 90:16
1961 54:6 55:11
1967 54:6 55:9
1972 168:3
1977 90:21 91:24 130:23
1996 166:19,23 167:3
1998 40:4 57:1 58:1 94:23 96:8 96:14 115:8 132:13 134:6
1999 45:24 129:19
1N 90:19 91:18 92:8,10,17 102:24 104:5 115:13 282:14
1S 90:19 91:18 92:8,10,17 104:5

2

2 11:18 12:11 32:22 40:4 42:1 57:1 94:23 96:14 98:24 115:8 132:14 133:5,7 199:18 200:21,22 219:5 224:8,11 227:21 227:22 229:19 230:1 232:12 251:6,13 274:1 280:23 288:3,10 289:3
2,000 127:8
2.3.5 164:6
2.4.6 113:17
2:37 180:20
20 117:20 122:23 159:11 182:23 197:8,9,13 252:17
200 182:21,22
2000 17:9 163:15
20005 3:17
2001 163:4,10 166:23 167:2
2003 131:1
2004 131:2 278:24 280:1
2005 58:10 99:8 132:16 135:13 251:8
2007 280:22
2008 11:15,20 16:20 17:7 21:14,17 22:3,11 22:19 40:18
2010 23:22 29:7 33:13 48:11 58:22,23 60:24 69:10 72:13 100:1 117:20 132:21 135:24 136:24 251:19 282:1
2012 25:3 88:10 92:3 102:15 140:3,23 177:10
2013 48:11
2015 100:22
2019 94:12,19 233:10
202 3:18 69:6
2020 29:8 33:13 39:3 93:10 103:1,3 117:20 132:22 138:9 182:16 260:19
2021 11:18 218:24 230:15
2022 11:19 16:14 16:15,15 17:9 21:13,16 22:3 40:18 88:10 90:22 93:14 229:13 230:14
2023 1:18 7:6 122:24 292:21 293:2
21 145:20
2101 3:5
21A 179:11
22 133:11 137:7 243:1
23 75:14 96:19 137:8 236:3,17
24 24:13 25:9
24.5 251:22
25 22:24 23:3,4 39:19 74:9
2500 100:20
2500-foot 72:15 73:2
257 34:9
26 25:20 26:7 146:2 233:11,20 233:22
27 30:20 53:4 105:20 234:9,11 280:22
28 32:24 57:6 63:24 146:4 233:11 234:16
282-9119 2:13
29 11:7 13:8,10,13 15:3,5,11 17:1 21:19,24 22:6,21 23:4 25:21 26:3 32:12 34:24 35:9 37:2,3,17 38:13 45:14 48:10 73:13,20 74:4 78:14 90:10 99:13 101:5 167:10,12 167:13 174:18 208:12 217:14 217:17,18 218:5 218:14,24 227:23 267:3 268:21 272:15
296-8800 3:18
2S 90:20 92:19 93:6 104:6 282:21,24 283:2

3

3 25:15 34:9 40:16 74:11 80:20 99:22 139:22 150:17 201:10 201:10 230:1,17 241:16 242:24 251:7 282:1,4

284:21
3-1 166:13
3-10 287:11
30 38:8 39:19 66:2 66:19 74:2 113:14 257:12 257:12 281:8
302 34:12 80:23
31 16:15 40:21 66:2 114:8
312 2:13
32 143:13,17 215:20,23
33 45:13
33C 173:12,21
34 50:23 70:1 102:17 140:4 202:2 245:20 247:11
35 34:12 55:20 80:23 270:8 278:22,23
355 219:11
36 56:18,19 91:24 271:17
37 57:1
37.5 210:9,16
38 58:6,20
39 58:19 97:9,13
3D 287:13
3S 90:20 92:19 104:6 282:21,24 283:2

4

4 19:8,10 34:11 37:2 53:15 80:21 89:9,17 139:23 140:4 150:17 230:1 251:7 260:13 289:3,7
4.2.4 256:11
4.9 173:20
40 34:9 97:17 138:16 244:24 248:21 253:5 279:20
40-acre 186:17 190:2,16,23
41 60:23 61:23 138:10 244:24 244:24 245:8 246:17 248:10 251:4 255:17 256:9
415 3:8
42 68:22 201:4 245:10 256:22 259:16,20 260:22 261:2
42H 173:12,21
43 27:4 70:19
44 27:5 71:18 201:4
447 274:14
45 73:11 76:12 211:4
46 5:8 34:21 77:1 77:9 80:13 109:24
47 80:6 150:21,24 151:1,14 201:21 202:1,2,10
48 81:4
480 127:11
49 83:7

5

5 16:14 18:18 19:7 19:11,11 89:24 96:18 133:12 200:18 233:2 251:7 271:9 289:4
5:20-ish 255:23
50 14:9,11 84:22 174:10
505.46 228:6
51 14:12 40:23
52 90:8 271:16,18
53 93:16 173:10 283:23 284:5,20
54 44:5 94:9 173:10
55 95:15
56 96:3 254:7
57 96:13 98:21 106:7,8
58 28:13 99:7
582 226:9
582.62 226:13
59 99:24

6

6 57:7 74:3 133:13 146:4 167:16,20 167:23 168:1 232:22 233:2 251:7 279:11,12 288:2,8
6.5 151:22
60 100:21 102:9 103:7 145:15
60091 2:12
60603 4:8
61 103:7
62 103:19 106:10 226:11
620 59:9 76:7 100:15 136:11
63 104:7
64 27:7 28:9,11 29:14 75:3,8 105:15 107:16 125:13 203:7 236:3,16
64612 3:7
65 106:21 235:23 236:17
65921 287:9
66 109:14,22
67 111:4,8 146:24
68 28:13 29:13 75:6,9 113:21 116:23
69 118:6 239:24 243:1

7

7 18:18 19:11 89:9 89:24 95:24 122:24 138:19 232:22 233:2 251:7
7.7 37:9 81:12
70 74:10 129:4 241:16 242:24
700 152:4 153:6
700-foot 153:24
70s 48:9 91:23
71 129:12
72 130:5
73 131:16
74 132:8
75 33:19 34:3 133:5 150:6
76 134:15
77 135:13
78 106:12,13 135:22
79 136:23

8

8 100:10 240:1
8-0 106:10
8:00 87:8
80 106:9 138:7 159:5 182:5 197:7,13 252:16
81 139:14 146:23 146:24
814 260:8 281:20
81447 274:12
81453 269:20
81458 256:10
81483 266:22
81485 268:2 273:23 277:17 280:17 281:15
81486 281:21
81487 260:8
81505 217:14 229:2
81507 201:12 208:10
81508 231:1
81509 230:23
81511 223:19
81515 230:11
81517 203:23 205:24 210:23
81518 214:23
81519 209:16 215:14
818 281:21
82 140:6
82178 284:13,15
82179 284:16
83 141:17 147:2
84 145:4
85 28:13 147:13 203:14
85th 8:15
86 149:17
87 153:12
88 154:8
89 155:24

9

9 146:2 151:22 240:1
9.74 151:21
9:00 1:19 292:21 293:3
90 181:13,15,17 181:22,22 182:2
90,000 125:12
91 169:7
92 169:8
93 173:18
94 175:7 179:20 179:20
95 34:5 176:17,17 179:20,20
96 178:4 179:20

179:21
977-5646 3:8
99.9 157:15

Exhibit 33

Electronic Filing: Received, Clerk's Office 06/20/2023

ILLINOIS POLLUTION CONTROL BOARD

SIERRA CLUB,	)	
ENVIRONMENTAL LAW AND	)	
POLICY CENTER, PRAIRIE	)	
RIVERS NETWORK, and	)	
CITIZENS AGAINST RUINING	)	
THE ENVIRONMENT,	)	
Complainants,	)	
vs.	)	No. PCB 13-15
MIDWEST GENERATION,	)	
Defendant.	)	

TRANSCRIPT of the PROCEEDINGS taken before HEARING OFFICER BRADLEY HALLORAN at the James R. Thompson Center, 100 West Randolph Street, Room 503, Chicago, Illinois, on the 14th day of June, 2023, A.D., at 9:00 o'clock a.m.

Reported by: Kari Wiedenhaupt, CSR

License No.: 084-004725

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I N D E X

WITNESS	EXAMINATION
DOUGLAS DORGAN and MICHAEL MAXWELL	
MR. ABEL RUSS	7
MS. JENNIFER T. NIJMAN	67
MR. ABEL RUSS	106
SHARENE SHEALEY	
By MS. KRISTEN LAUGHRIDGE GALE	168
By MR. ABEL RUSS	287
By MS. KRISTEN LAUGHRIDGE GALE	327
By MR. ABEL RUSS	330

E X H I B I T S

NUMBER	MARKED FOR ID
RESPONDENT'S EXHIBIT	
No. 1601	123
No. 1602	128
No. 1603	137
No. 1604	139
No. 1605	179
No. 1606	213
No. 1607	132

ADMITTED INTO EVIDENCE

RESPONDENT'S EXHIBIT	
No. 1601	124
No. 1602	129
No. 1603	139
No. 1604	140
No. 1605	182
No. 1606	214
No. 1607	285
COMPLAINANTS' EXHIBIT	
No. 1518	285

HEARING OFFICER HALLORAN: Good morning. Today is June 14, 2023. We have continued this matter on record from yesterday, June 13th. My name is Bradley Halloran, a hearing officer at the Illinois Pollution Control Board. This is 13-15.

Right now we are in the middle of cross. Mr. Ross is crossing Respondent's experts, Mr. Dorgan and Mr. Maxwell.

Just to be on the safe side, gentlemen, could you please raise your hand, and Kari will swear you in?

(Whereupon, the witnesses, Mr. Dorgan and Mr. Maxwell, were duly sworn.)

HEARING OFFICER HALLORAN: Mr. Russ, you may proceed.

WHEREUPON:

D O U G L A S D O R G A N

and

M I C H A E L M A X W E L L

called as a witness herein, having been first duly sworn, deposeth and saith as follows:

C R O S S E X A M I N A T I O N (cont.)

MR. RUSS: Thank you. Good morning.

MR. DORGAN: Good morning.

MR. MAXWELL: Good morning.

MR. RUSS: I'm going to ask a couple of questions about the remedy -- remedies that you proposed at the four sites, and I'm going to start at Joliet 29.

In your proposed remedy, did you recommend any source control beyond what was contained in the compliance commitment agreements?

MR. MAXWELL: The source -- or the items recommended in the -- included in the compliance commitment agreements are certainly recommended to be followed. To the extent that there are sources that are beyond the -- those discussed in the compliance commitment agreement, we are recommending that the compliance commitment

agreement be followed.

MR. RUSS: So, just so I am clear for the record, you are not recommending anything beyond what is in the compliance commitment agreement?

MS. NIJMAN: Misstates testimony from yesterday.

HEARING OFFICER HALLORAN: You're going to have to speak up, people, because --

MS. NIJMAN: Misstates testimony from yesterday.

HEARING OFFICER HALLORAN: Okay. You know what? You can -- I am thinking of objections of that ilk, because this could go on and on, you can state your objections, and say why, and then Mr. Russ can respond, and then if that doesn't work out, we can clean it up on re-direct, if possible.

Because I really don't know what was said yesterday. I do, but I don't. So, Ms. Nijman, you have an objection, misstates the evidence from yesterday?

MS. NIJMAN: Yes. There was a specific slide of the presentation that described

the remedy for Joliet 29, and it included a series of factors that he testified to, which would include the new rules as a method of source control.

HEARING OFFICER HALLORAN: Okay. Mr. Russ?

MR. RUSS: Okay. So, I was referring to his testimony of 30 seconds ago, and not yesterday, but now I have an objection to the speaking objection that --

HEARING OFFICER HALLORAN: Well, I have asked her to give a speaking objection, because, you know, part of my job is to make a clear, concise, and a timely record. I think concise left the station a while ago. We've got to make it clear, and I've got to get the record on time, so -- the transcript.

So we can't keep doing this, and if, in fact, there is an objection, we can clean it up on re-direct, and we have to move forward on this.

So, Mr. Russ, you may proceed with your question of 30 seconds ago.

MR. RUSS: Yeah. I asked you first,

you know, is it your position that your remedy requires any source control beyond the compliance commitment agreements? And you talked about how the compliance commitment agreements include what you're proposing for a remedy.

So just to clarify for the record, is there anything outside of the compliance commitment agreements that you are proposing for a remedy?

MR. MAXWELL: We are also recommending that the CCR -- the state and the federal CCR rules continue to be followed. The closure of the ponds can certainly be interpreted as a measure of source control.

MR. RUSS: Okay. Can you please turn to your deposition at page 73? There is a question on line 14, "Did you recommend any additional source control beyond the measures contained in the CCA?"

And Mr. Dorgan replied, "I don't believe that we recommended any additional source controls. We recommended the continuing implementation of the groundwater monitoring program at that site and the continued inspection

regime that's in place. So that would be my answer."

HEARING OFFICER HALLORAN: Mr. Russ, could you slow down, please?

MR. RUSS: Yes.

HEARING OFFICER HALLORAN: Thank you.

MR. RUSS: Would you like me to start back with the question?

HEARING OFFICER HALLORAN: Kari, did you get all that?

THE COURT REPORTER: Yes, but if you could speak up as well.

MR. RUSS: Sure. Okay. Did you -- did you hear what I -- did you read along what I was saying?

MR. DORGAN: I believe you were on page 73, line 14 and 16.

MR. RUSS: 14 through 21, yeah.

MR. DORGAN: Okay. I see that.

MR. RUSS: Is that still your opinion?

MR. DORGAN: Well, I think we were responding specifically to the question about

additional source controls, so -- and the response there, referenced that we had the groundwater monitoring program in place. While it says that there were no additional source controls, that was in addition to the ones we were already considering. So I don't know that there is necessarily a conflict there.

MS. NIJMAN: I am going to -- I'm sorry. I have to object to the improper cross examination and misleading nature of the question. We saw a couple of these yesterday where later on, two questions later Mr. Maxwell says exactly what he just said now about closure of the ponds.

HEARING OFFICER HALLORAN: Yeah, Mr. Russ, I'm not getting this. It's not an impeachment. You're just reading from the dep, and, you know, it may or may not be a different answer.

MR. RUSS: I'm --

HEARING OFFICER HALLORAN: It sounds like more for a post-hearing brief. But your response?

MR. RUSS: Well, I mean, I'm referring to the remedy that they proposed in

their presentation yesterday, and I'm trying to understand whether there is any source control in that remedy outside of the CCAs, because it's not clear to me from the presentation whether there is.

MS. NIJMAN: And Mr. Maxwell -- you are being misleading in your questions, because five lines later he describes it, so --

HEARING OFFICER HALLORAN: Yeah, Mr. Russ, I pretty much agree with that. It's only 9:05, and we're at loggerheads already. So if you could rephrase your questions to try to make it not as misleading.

MR. RUSS: Could you give me a moment?

HEARING OFFICER HALLORAN: Yes.

MR. RUSS: Okay. So I'm going to ask about the remedy at Waukegan now.

Did you estimate how long your proposed remedy would take to achieve groundwater protection standards at Waukegan?

MR. DORGAN: We considered that there is a time element to the remedy when looking at MNA, and we acknowledged in our report that MNA

takes time, but we don't have a specific target end date for when the MNA process results in the restoration to below groundwater protection standards.

MR. RUSS: Okay. And aside from the cap you proposed for Waukegan, would your remedy require anything more than what Midwest Generation is already doing to comply with state and federal obligations at Waukegan?

MR. DORGAN: Well, certainly -- certainly that. We have also recommended that the stations comply with any new rules for the historic fill areas as they come out at the state and federal levels. And so that would be another element of the ongoing remedy.

MR. RUSS: And at Will County, similar question. Is it still your position that beyond what Midwest Generation is doing to comply with the CCAs and state and federal regulations, the remedy doesn't require any further -- propose any further source control?

MR. DORGAN: Well, I think the remedy that we proposed as we did at Waukegan and the other stations indicates that as these new

rules are promulgated, to the extent they will have application to the conditions at the stations, that whatever those rules end up being, that they should be followed.

MR. RUSS: Okay. I want to turn to page 32 -- 23 of your report in the heading to Section 3.2. Here it says, "The 2012 CCAs at each of the stations are key compliance mechanisms that have also resulted in collection of a substantial quantity of --"

MS. NIJMAN: I'm sorry. Where are you reading?

MS. RUSS: Heading 3.2. I will start again.

"The 2012 CCAs at each of the stations are key compliance mechanisms that have also resulted in collection of a substantial quantity of data useful for characterization of environmental conditions and implementation of measures to control potential contaminant sources at each station."

Did I read that correctly?

MR. DORGAN: That's what's stated in our report.

MR. RUSS: And where it says potential contaminant sources, what potential contaminant sources are you referring to there?

MR. DORGAN: May I have a moment just to review the rest of that section, if we could?

MR. RUSS: Sure.

MR. DORGAN: So, this is obviously a heading to the broader language that follows it on the next two pages, actually three pages, that describes some of the specific actions and information that's available for the site. We have acknowledged that there are areas outside of the regulated units that have both been documented to be presence -- present, are alleged to be present. Our evaluation has considered that, and that's why we have taken the approach of looking at the downgradient property boundary under the more TACO, traditional SRP approach.

We feel even that's a bit conservative. Because the wells aren't actually at the property boundary, all of the conditions that we are talking about, including any reference to a potential source here would be within the

GMZs that have been established at three of the four sites or are within the ELUC at the fourth one in the case of Waukegan.

So we continue to recommend and have proposed part of our strategy is this downgradient focus, which is consistent with what you would do with a traditional brownfield similar to this type of a site. So we -- yes, we have considered sources, and they are reflected in the way in which we have approached our remedy.

MR. RUSS: How would the CCAs control potential contaminant sources outside of the units that are named in the CCAs, the ash ponds?

MR. DORGAN: The CCAs don't specifically speak to areas outside of the regulated units, other than what is comprised of the regulated unit itself, and that has been documented in the record.

MR. RUSS: Okay. Thank you.

Now, turning to Will County, in your report at page 16, starting at the bottom and going over to 17, you talk about the bottom elevation of Ponds 2S and 3S and the highest

recorded groundwater elevations. Do you see that?

MR. MAXWELL: Yes.

MR. RUSS: And on the top of page 17, you note that the groundwater elevations have been as high as 584.1 feet MSL, which I believe is mean sea level; is that right?

MR. MAXWELL: Yes.

MR. RUSS: Is that higher than the bottom of the ash ponds that you describe on the bottom of page 16?

MR. MAXWELL: So the bottom of the pond is referenced in -- at the bottom of page 16, at 582.5, and there is a -- one monitoring point for May of 2019 that's noted at 584.1.

MR. RUSS: Okay. Thank you. Can you now look at what you should have in front of you as Exhibit 1332? Have you reviewed this document before today, I mean?

MR. MAXWELL: So this document is the operating permit application. It's dated March 31st of 2022.

MR. RUSS: Right.

MR. MAXWELL: As we had discussed yesterday, I believe, we are generally aware that

there has been documentation that has continued to be generated as the compliance with the CCR rules continues to take place. This document is one of those, and we obviously did not -- did not consider this document in our report, because it post-dates the document.

So am I generally aware of this document? I am. It's not our document, and I haven't necessarily reviewed it in detail here --

MR. RUSS: Okay. That's fine.

MR. MAXWELL: Prior to now.

MR. RUSS: That's fine. Understood.

I'm bringing this document up just as a point of reference with regard to the elevations that you just mentioned. Can you look at page 125661, which is also Figure 9-2 of this report?

MR. MAXWELL: I'm sorry. 66?

MR. RUSS: The Bates number is really hard to see, but it's Figure 9-2, and it -- the Bates page is 125661.

MR. MAXWELL: It's Figure 9-2?

MR. RUSS: Yep. It should be a cross section diagram.

MS. NIJMAN: I'm going to -- objection. This document relates to different surface impoundments than the previous discussions about elevation.

MR. RUSS: So, if you look at Figure 9-2, it shows all four of the surface impoundments at Will County.

HEARING OFFICER HALLORAN: He may answer if he's able. Overruled.

MR. MAXWELL: I'm not seeing Figure 9-2. I'm sorry.

MR. RUSS: Is it 125661? Can you find that Bates page?

MR. DORGAN: What's -- what's the Bates page number?

MR. RUSS: 125661.

MR. MAXWELL: Okay.

MR. RUSS: Okay. Great. Thanks.

Have you seen diagrams like this before in your professional experience?

MR. MAXWELL: Yeah. This appears to be a geologic cross section that lists the lithology, the bedrock that's shown through the section.

MR. RUSS: Okay. Great. Thank you.

Does this show the elevation of the bottom of Pond 3S?

MR. MAXWELL: It looks like Pond 3S is depicted on this, yes.

MR. RUSS: And where is the elevation of the bottom of Pond 3S, roughly?

MR. MAXWELL: So, the bottom of pond 3S on this cross section is depicted as "projected pond outline." I'm not quite sure exactly what that is in reference to. That's a little vague description.

MR. RUSS: I can ask this a different way. This is definitely not a trick question. I'm just trying to confirm what's in your report, which is shown here. In your report on page 16 you said that the bottom elevation of Pond 2S and 3S is 582.5 feet.

Does this figure appear to roughly correspond to that?

MS. NIJMAN: I'm going to object to the relevance of this line. He has never reviewed this document. You can't compare it to then what's in his report, and he just noted that the

projected pond outline is unclear and not related to necessarily the pond.

HEARING OFFICER HALLORAN: I think he is doing a swell job in answering. Overruled.

MR. MAXWELL: Well, if one assumes that the projected pond outline as shown on this cross section -- I can say that the projected pond outline as shown on this cross section, it looks like it is roughly 581.

MR. RUSS: Okay. Thank you.

Now, looking at the legend here, there is a box labeled A. Do you see that? The legend right below the cross section diagram.

MR. MAXWELL: Yes, I do.

MR. RUSS: And this says, "fill consisting of brown and black silty clay, and silty sand mixed with gravel and crushed limestone. The fill may include coal, black cinders, and slag."

Do you see that?

MR. MAXWELL: Yes.

MR. RUSS: What's the lowest elevation of that fill layer in this diagram?

MR. MAXWELL: In the vicinity of

Pond 3S or overall?

MR. RUSS: Sure. In the vicinity of Pond 3S.

MR. MAXWELL: It looks like it comes to an elevation of roughly 580.

MR. RUSS: Okay. Thank you.

And what's the elevation of the water in this diagram in about the same location, Pond 3S?

MR. MAXWELL: Again, it's difficult to decipher from a cross section, because it's approximate just because of the nature of the scale.

MR. RUSS: Yep.

MR. MAXWELL: But that monitoring well, MW-06, it shows a water level as of May of '21. That's depicted with a triangle there towards the top of the screen.

MR. RUSS: Yep. And is that elevation -- what's the elevation of that triangle?

MR. MAXWELL: It looks like it's roughly 581. Again, it's hard to tell just based on this cross section, but 581, plus or minus.

MR. RUSS: Okay. Great. Thank you.

Now, turning to page 125663. There is a similar diagram, but zoomed in on Pond 1N. What's the lowest elevation of the fill layer in this area?

MR. MAXWELL: It looks like it's a little bit below 580 elevation.

MR. RUSS: Okay. And does this diagram show contact between that fill layer and groundwater?

MR. MAXWELL: This diagram indicates groundwater in this particular -- for this particular monitoring event on November of '21, that it's slightly higher than the bottom of the fill layer that's noted here.

MR. RUSS: Okay. Thank you.

And what does it show with respect to the groundwater level on the bottom of the Pond 1N?

MR. MAXWELL: What they have done here is they have connected the two groundwater elevations from the two monitoring wells, assuming that the -- the groundwater elevation in between the two well locations is -- is directly

connected, and the line approximately is -- is similar with the -- the bottom of the -- the notation that's the -- is indicated on this figure is pond outline.

MR. RUSS: Right. Okay. Thank you.

And now turning to page -- the last page we are going to look at here is 125665, just a couple of pages down.

MR. MAXWELL: That's a trend graph?

MR. RUSS: Yep. And this shows a number of different groundwater monitoring wells. If you want to flip back to the one we were just looking at on page -- Figure 9-4 on page 125663, that shows Monitoring Wells 15 and 2, right?

MR. MAXWELL: MW-15 and MW-2 are shown on this graph.

MR. RUSS: Okay.

MR. MAXWELL: It's labeled Will County Station.

MR. RUSS: Okay. Great.

And then on -- back to page 125665 where the groundwater elevation versus time is plotted. Do you -- can you make out the line for MW-2?

MS. NIJMAN: For the record, I would like to show a continuing objection to this line of questioning. It's about a report that he has never seen before, he's looking at for the first time. The witness who prepared these documents was here and could have been asked these questions, and now we are being asked to, on the fly, determine what might be there.

HEARING OFFICER HALLORAN: Mr. Russ, any response?

MR. RUSS: Sure. I'm just trying to establish that what they said in their report a few years ago is still true by looking at some of the more recent data.

HEARING OFFICER HALLORAN: Yeah. I agree. He can continue. It's so noted on the record, Ms. Nijman, your continued objection. Thank you.

MS. NIJMAN: Thank you.

MR. RUSS: So looking at the groundwater elevation chart, can you make out the line for MW-02?

MR. MAXWELL: I can make out certain points for MW-02. You know, it overlaps with --

with other monitoring wells in certain locations, but there are -- there's portions of the graph where I can see the symbol for MW-2.

MR. RUSS: Great. And the groundwater fluctuates as you expect it to, but it gets as high as 584 or a little higher in MW-2; isn't that right?

MR. MAXWELL: There is one location during the roughly 10 years of monitoring where it looks like the elevation of MW-2 has gotten slightly higher than 584.

MR. RUSS: Right. Thank you.

And it -- just below 584 at some point, roughly, June of 2020; is that right?

MR. MAXWELL: That's correct.

MR. RUSS: And then for the rest of the period shown here, MW-2 fluctuates between 581 and 584; is that right?

MR. MAXWELL: It looks like that, the June point -- well, I guess there is a second point there in June of '19 as well, but those -- the June '19 and June '20 elevations seem to be a bit of an outlier in terms of them being unusually high. The -- it looks like really the majority of

the data other than those two points is between 583, 583 and a half, and in recent -- the last couple of years, the elevation has actually gone -- it's decreased from that, that relative high elevation that you mentioned from June of 2020.

MR. RUSS: Okay. Thank you.

Is it fair to say that most of the data on the chart here are above an elevation of 582?

MR. MAXWELL: It looks like there is only a few that are below 582, yeah.

MR. RUSS: Okay. So is this the kind of information that could be useful in doing a mass analysis, as we were discussing yesterday?

MS. NIJMAN: Objection to the reference of "mass analysis". The witness explained it.

Objection to the term "mass analysis." The witness explained yesterday what he meant by that.

HEARING OFFICER HALLORAN: Okay. He can answer, if he is able. Overruled.

MR. MAXWELL: When you are speaking

to mass analysis -- you want to give me a little more understanding of what -- what you understand that to be?

MR. RUSS: Well, I was trying to get to this yesterday when I was -- you were asked about the mass analysis by Ms. Nijman originally, and so then I was trying to ask yesterday what that looks like, what kind of information you need, and how you would perform one.

I didn't get to the end of -- you know, I didn't get a clear answer, so I'm still kind of wondering what you guys meant by it.

But we talked about how contact with groundwater is one of the factors you would consider. The age of the material in place, the current concentration, if it's been there for a long time, you can't know the original concentration, that kind of information.

And I believe the point is you want to estimate how much more weathering and leaching there's going to be from the material that's in the ground based on its history, but I don't want to speak for you, because I didn't -- I'm not totally sure what you mean by mass

analysis.

MR. DORGAN: I believe I fielded that question yesterday, so I'm going to follow up on this.

So, we were, I think, speaking directly to Waukegan and discussing the beneficial effects that we were anticipating from the cap, and I don't think we represented at any point that there had been a wide scale mass analysis. We were discussing the mass of the CCR that's at Waukegan in contact with the groundwater relative to our cap.

And so I don't necessarily see the relevance here. The questions about the wells you were just asking are different wells than what we discussed on our report on different dates. We interpreted the information for you as best we could.

But at -- at the end of the day, it doesn't change the fact that our focus -- you were referencing upgradient wells. Our focus has been on the downgradient wells. That was what we discussed in our trend testing that we did, in our averaging, and relative to our risk assessment.

So I'm not sure that I can answer your question with regard to mass analysis, other than the discussion we had yesterday with respect to Waukegan.

MR. RUSS: Okay. That's fine.

I guess what I'm getting at is, in your report, you talked about the relative elevations of the groundwater in the ponds, and we were just confirming that that's still true today with the more recent data, and I'm wondering what significance that has for your remedy.

MS. NIJMAN: I'd just note the objection to misstating what's in the report, his discussion of the rules.

HEARING OFFICER HALLORAN: Sustained.

MR. RUSS: I'm sorry. I don't understand the objection, because I don't see a discussion of the rules here.

MS. NIJMAN: In the following paragraph, they describe --

HEARING OFFICER HALLORAN: Could you -- could you rephrase, Mr. Russ, please?

MR. RUSS: Yeah. I mean, we can go

back to the --

HEARING OFFICER HALLORAN: Yeah, that'd be great. Thanks.

MR. RUSS: -- report at page 16.

HEARING OFFICER HALLORAN: That'd be great. Thank you.

MR. RUSS: So you look at --

HEARING OFFICER HALLORAN: You may proceed.

MR. RUSS: Thank you.

If you look at the bottom of page 16 of your report, you -- as we discussed earlier, you talk about the bottom elevation of Pond 2S and 3S, and we just confirmed from these more recent drawings that that's still accurate. And then you talked about the highest groundwater elevation since June 2011 in that vicinity, and we looked at the groundwater charts, and that still seems to be roughly accurate.

And I'm -- so you presented that information in your report, and I'm wondering how that information influenced your opinion as to the remedy for that site.

MR. DORGAN: Well, in the report

where this information is presented was part of the background about the stations themselves and which surface impoundments were considered either federal or state impoundments. So we were simply reflecting the information that was already in the record, relative to each of the individual ponds at the different stations and providing information about the general groundwater conditions with respect to the pond areas.

Certainly, groundwater elevations were considered as part of our analysis. We needed to know them with respect to assessing groundwater flow, which is why the emphasis was on the downgradient well conditions. Understanding the overall groundwater gradient was important to assessing the downgradient wells and supporting the risk analysis that we performed.

MR. RUSS: So, I mean, my question is about this -- this paragraph only talks about two things, the elevation of the pond and the elevation of the groundwater, which suggests that they have something to do with each other, and I'm wondering what that is and how that influences your remedy opinion.

MS. NIJMAN: Asked and answered.

HEARING OFFICER HALLORAN: Overruled. You may answer, if you are able.

MR. DORGAN: So, obviously, there is separation distance standards. There is -- we were looking at the analysis relative to what was considered a federal pond versus a state pond. This particular section had more to do with background on the stations.

Further evaluation of the groundwater occurred at later points in our report as we documented and supported the remedy approach that we were working with from a strategy perspective.

MR. RUSS: Okay. And were you aware of the overlap between the groundwater and the fill when you were constructing your remedy opinion?

MR. DORGAN: I don't recall exactly. Obviously, there is what Mr. Maxwell just testified to. They're all the groundwater and the fill and the surface water, and we reference here that there are some variations in the groundwater elevations. So exactly what -- how much

information we had in our possession at the time? We certainly recognized that there are instances where the groundwater elevation came up higher and came into the zone immediately at the base of the pond, but how much of that?

We were pointing out both the specific instance of what we knew at the time to be the highest, and more importantly, we referenced what was the average over that period of time that we had available to us as well. So that was the information we were considering.

MR. RUSS: Okay. So I'm going to move on to some different questions.

Staying on the topic of remedy, but thinking about more generally, yesterday or the day before Ms. Nijman asked you about how your proposed remedies might conflict with forthcoming state and federal regulations regarding historic ash.

Do you remember that?

MR. DORGAN: Yes, I do.

MR. RUSS: First of all, just to make clear for the record, have those regulations been finalized?

MR. DORGAN: My understanding, they have been published as proposed rules.

MR. RUSS: All right. Have you been --

MR. DORGAN: The CC -- the federal have been published as proposed rules.

MR. RUSS: Okay. Thank you.

Have you been keeping track of the state rulemaking docket related to historic ash?

MR. DORGAN: In general.

MR. RUSS: Are you aware of any movement in that docket in the past two years?

MR. DORGAN: I'm not aware that they have been finalized, but they are still under consideration.

MR. RUSS: And I think you said in your presentations yesterday that you anticipate that these will be finalized, but you don't know for sure, right?

MR. DORGAN: Well, we consider what's happened historically to be informative to what we might anticipate. There have been proposed CCR rules that came out as proposed rules

and were adopted within a relatively short period of time. I can't say how long it will take, but just from the history, the new rules have similarities to the existing CCR rules.

So I have no reason to believe that they won't advance and eventually be promulgated.

MR. RUSS: Are you familiar with the content of the current draft of the state?

MR. DORGAN: Generally.

MR. RUSS: And the -- are you familiar with the content of the proposed federal?

MR. DORGAN: Not looked at it in great detail, but just generally familiar with what's been proposed.

MR. RUSS: Okay. To the extent that you are able to answer this question, how would an investigation of site conditions at these sites conflict with the federal CCR rulemaking that has been proposed?

MR. DORGAN: That's a question I can't answer. I mean, we don't know what the federal rules are going to be and how they're going to end up coming out, and that's part of the

challenge that we have is in terms of why we have included compliance with those rules as part of our remedy is we will have to see what they look like when they finally are published, adopted.

MR. RUSS: Okay. We looked a number of times at -- I believe it was referred to as your cheat sheet at the end of your presentation, the second to last slide in your presentation, if I'm not mistaken.

Does this table list any of the historic ash areas identified by the Board?

MR. DORGAN: This table is detailing conditions related to the impoundments that had been identified at each of the four stations.

MR. RUSS: Okay. Thank you.

At one point Ms. Nijman was asking you about whether ash in the ground is a source of contamination, and I believe, Mr. Maxwell, you said that depends on the quantities of that mixture. Do you remember that?

MR. MAXWELL: Yes, I do.

MR. RUSS: Because the ash might be mixed with soil, and it depends on how much of each.

Did you evaluate the relative proportions of coal ash and soil in any of the areas at these four sites?

MR. MAXWELL: To the extent that there was boring log information available, I can speak to -- for example, there were borings at the southeast fill area from Waukegan -- or I'm sorry -- from Will County that described ash material, I believe mixed with soil, were -- we didn't, however, see any quantitative information in the record that would say that the soil is -- you know, that that particular sample is 60 percent one thing and 40 percent the other. That level of detail was not present in the record, but -- so what we focused on was the analytical data from historical soil sample locations that had -- that were characterized as CCR and/or ash.

And there were instances where those concentrations ultimately -- the soil concentrations that were noted were below the TACO Tier I numbers, which would suggest that that particular sample isn't -- isn't reflective of a source, and the logical explanation for that is

that -- that the CCR, it's mixed with soil, which would tend to drive towards that result, as opposed to a -- a large mass of CCR.

MR. RUSS: Okay. Thank you. I'm sorry that these questions are going to seem a little bit disjointed, but I'm trying to clean up here.

In your report at page 51 -- and I believe this was discussed in your presentation as well, and I don't remember exactly what slide we were on at that point, but in your report on page 51 there is a large paragraph at the top of the page there. Right in the middle there is a sentence that starts with "GMZs."

Do you see that?

MR. MAXWELL: I believe so. GMZs and ELUCs.

MR. RUSS: Yep. "GMZs and ELUCs are proven as effective, industry-accepted remedial approaches approved by the State of Illinois to adequately control exposure to impacted groundwater."

I just want to make clear for the record, because GMZs and ELUCs are approved

together in that sentence. Is there any -- did GMZs control exposure to impacted groundwater by themselves?

MR. DORGAN: I think I handled some of the questions on this yesterday, so I will take that.

So what we are saying here is that they are part of the remedial process that's ongoing. There had to be corrective measures taken in order to support obtaining the GMZ. The GMZ is an IEPA designation that acknowledges a corrective action is taking place, and that there may be concentrations of contaminants of concern above the groundwater protection standards.

The ELUC, which goes with the GMZ, is the mechanism by which there is a prohibition on the installation of wells and use of that groundwater as a potable resource. So the two of them combined is the point that we are making. They had been commonly used to address the types of conditions that exist at these stations, and as we have said previously, should continue to remain in place as part of the remedy that's occurring.

MR. RUSS: Okay. Thank you.

So yesterday when we were talking about the northwest area at Joliet 29, I apparently didn't get a clear answer on the record to one question, so I have to ask it again.

For that area, have you seen any information about contact between ash and groundwater?

MR. MAXWELL: You are speaking of the northwest area at Joliet?

MR. RUSS: Yeah.

MR. MAXWELL: I believe that -- so that area was investigated with a series of borings in 2005 by KPRG. That -- those borings were -- the source of the information -- the soil samples that were collected for the NLET testing that was done, those boring logs -- boring logs typically make reference to -- to groundwater.

I'm not recalling if groundwater was specifically encountered or not, but to the extent that it was or it was not, the remedy that we put forth with -- the information that we do have as it relates to the characteristics of those soils we do believe is protective of human health

and the environment based on the information that we do have relative to the northwest fill area.

MR. RUSS: Okay. And, again, this is a separate question, but for clarifying the record.

In our discussion of trend tests yesterday, we talked a lot about the no trend results and how some are associated with non-detects and some are not, as you recall. Just for the record so that it's clear, that's all new information that we talked about in this hearing that's not in any documents in the record at this point. So I want to look at your report at page -- starting at page 81505 where you have the summary of the trend tests.

MR. DORGAN: Could -- could I just ask real quick? I wasn't following your reference to what information is in the record, and I think you said something is not in or I didn't -- if you could just clarify that for us --

MR. RUSS: Yeah.

MR. DORGAN: -- to frame up the question.

MR. RUSS: Before today we hadn't

seen documentary evidence of this breakdown you're discussing between no trend tests that are -- you were giving us a bunch of numbers. You know, of the no trend tests, this number is primarily associated with non-detects. This number is not. We hadn't seen that breakdown before this hearing.

MS. NIJMAN: I'm going to object to the characterization. It's all in the appendix. You just have to count them. I'm not understanding the reference to not being in the record, and I think that's misleading.

HEARING OFFICER HALLORAN: Mr. Russ?

MR. RUSS: Had you tallied those prior to -- had you tallied those in a way that was in the record prior to the hearing this week?

MR. MAXWELL: The information was in our Appendix C. The total number of non-detects -- or I'm sorry -- the total number of no trends is summarized at the bottom of the tables.

MR. RUSS: That's exactly what I'm getting at. Thank you.

So in that summary on page 81507, you show 85 trend tests that have no trend;

is that right?

MR. MAXWELL: Correct.

MR. RUSS: But from this summary table, we wouldn't see the breakdown of those 85 trend tests between the ones that are primarily associated with non-detects?

MR. MAXWELL: That information could be gleaned from the supporting information after the summary tables. So it was there. It was in the record. It wasn't necessarily -- and the summation of the no trend results was presented in the summary table. The breakdown was not.

MR. RUSS: Okay. That's all I wanted to clarify for the record. Thank you.

So at this point I have some questions about the surrounding land use at the plants that we weren't anticipating that we would be talking about, so I'm going to do something that I'm sure will elicit an objection. We have some new demonstratives that we would like to use. These are website snapshots of maps surrounding the areas.

MS. NIJMAN: Yes, you can anticipate the objection.

MR. RUSS: Yeah, of course.
MS. NIJMAN: Never seen them. Didn't get them last night. Didn't get an e-mail. Didn't get advanced notice per our discussion and per this Hearing Board's order. The order and agreement says thee days for demonstratives. I understand that sometimes three days gets shortened, but at least give us some advanced notice of maybe yesterday.
HEARING OFFICER HALLORAN: Mr. Ross?
MS. NIJMAN: So, yes. I do object to there are plenty of maps in the record.
MR. RUSS: We just put these together yesterday.
MS. NIJMAN: And this is nothing new.
HEARING OFFICER HALLORAN: Yeah. You know what? This -- again, it -- five years ago. In any event, I will take them as an offer of proof. I haven't even seen them yet. The Board can take a look and see if they want to take a look at them, but this untimeliness is not acceptable. But you may refer to them.
MR. RUSS: Okay.

HEARING OFFICER HALLORAN: It will be an offer of proof, and I would assume any testimony regarding those demonstrative exhibits would be in the offer of proof as well.

MR. RUSS: Sure. I mean, can I just have a second to confer?

HEARING OFFICER HALLORAN: Sure.

MS. NIJMAN: And let me just point out. I'm getting three different exhibits, and I assume we are getting four, that we have never seen before. I under -- I appreciate that it's not admitted. It's an offer of proof, and I thank you for that.

But, again, this issue of where these areas are, where these facilities are located has been in every single report discussed by every single person. This is not new information where these facilities are located. So, again, the surprise issue and this last-minute --

HEARING OFFICER HALLORAN: Yeah. I agree, and I want to, you know, have the Board take a look at that, but I have to take them at the very minimum as an offer of proof, but this

being so untimely is not acceptable.

MS. NIJMAN: And I don't have an opportunity to respond to it. I don't know where this is from, what date it is, how I can respond at this point. I don't have access to a computer to print out my own. I mean, the whole thing. This is, like, four pages.

HEARING OFFICER HALLORAN: You have made your objection, Ms. Nijman. I can't do anything more. Everything is on the record.

MS. NIJMAN: Yeah. And it's --

HEARING OFFICER HALLORAN: You have made your objection. Mr. Russ?

MR. RUSS: Can we just have two minutes to take a break off the record for two minutes?

HEARING OFFICER HALLORAN: Sure. Off the record, Kari.

(Whereupon, a short break was taken.)

HEARING OFFICER HALLORAN: All right. We are back on the record. Thank you.

MR. RUSS: So, I might propose an alternative. To facilitate this, we are not going

to move to admit these. We don't want them in the record. We just wanted to use them as visual aids, if that's an option.

HEARING OFFICER HALLORAN: Well, that's kind of all what a demonstrative exhibit is.

MR. RUSS: Except that we won't have it in the record in any form. We just want to be able to orient the witness to the locations we are talking about.

MS. NIJMAN: There is plenty of maps that provide orientation.

HEARING OFFICER HALLORAN: Yeah, I don't understand this.

MR. RUSS: Well, the maps in the record don't actually include all the information that we are going to ask about.

HEARING OFFICER HALLORAN: So, why didn't we know that beforehand?

MR. RUSS: Well, we didn't anticipate that there was going to be this discussion of surrounding land uses, so --

MS. NIJMAN: That's a little misleading, again, because the surrounding land

uses have been discussed in every report by every witness and have been an issue in this case, and it's part of the considerations of the Board in the rules. It is well known that that's an issue.

MR. RUSS: Our understanding is that there was agreement about that. We didn't disagree with any of the depictions of the surrounding land use until this hearing. So it became a new issue for us.

That said, we will work from the slides in the presentation, and we won't use these as all.

HEARING OFFICER HALLORAN: All right. Thank you.

MR. RUSS: Can you turn to the Powerton part of your presentation, starting on slide 33?

MR. DORGAN: I'm there.

MR. RUSS: Do you see -- first of all, did you say you have visited the site, and you're familiar with the area?

MR. DORGAN: I have visited the site.

MR. RUSS: Does this image depict

the full extent of the Powerton power plant property?

MR. DORGAN: This particular image doesn't, but that wasn't the purpose of the inclusion of this image on this slide.

MR. RUSS: Okay. I just want to make clear for the record that there is more to the property than what's shown here.

So this area to the west of the plant that says Powerton Lake, are you familiar with that area?

MR. DORGAN: Generally.

MR. RUSS: Are you aware that it's located in the Powerton Lake State Fish and Wildlife Area?

MR. DORGAN: We reference on our slide that there is a wildlife area to the west.

MR. RUSS: Yep. Thank you.

And are you aware that that's a state park?

MR. DORGAN: I may have had exposure to that at some point. I -- you know, my understanding is that Powerton Lake is actually owned by Midwest Gen and is managed -- partially

managed by them. So was I familiar with it as being a state park? We certainly know that it's a wildlife area.

MR. RUSS: Okay. Turning to slide 39. Can you, for orientation, describe where you understand the power plant property boundary to be in this picture?

MR. DORGAN: I believe it's just to the east and runs roughly the other side of the roadway that's running in a southwest to northeast fashion.

MR. RUSS: Does it include the area -- so there are two roads or train tracks -- I can't really tell -- but they make an "X" in this picture, if you know what I'm talking about. Is that --

MR. DORGAN: I see the feature you are, I think, referring to.

MR. RUSS: There are kind of four quadrants around that intersection. The west quadrant is the Powerton property; is that right?

MR. DORGAN: I -- obviously, I -- we don't have the property boundaries superimposed on this figure. I'd need to maybe reference to one

of the figures on our report.

MR. RUSS: Well, let's look back at slide 33. This will help, I think.

There was an orange line on slide 33 that says "approximate property boundary." Do you see that?

MR. DORGAN: Yes, I do.

MR. RUSS: And as you were describing, it shows that part of Powerton Lake is in the property boundary and part of that is not, right?

MR. MAXWELL: That's how it's shown on this figure, yes.

MR. RUSS: And the property boundary shows that it goes from southwest to northeast and then comes back to the northwest, if you are going from south to north, is that right, on the eastern side?

MR. DORGAN: Yes. And we have got it labeled as the approximate property boundary on that figure.

MR. RUSS: So then flipping back to page 39, that would be the quadrant on the western side of that "X" that we were talking about,

right?

MR. DORGAN: If you are referring to the area of the property that -- where we are featuring the surface impoundments and the 2010 hydrogeologic investigation and the wells that were installed as part of that, that area of the property would be inside the property boundary to the west of the property line.

MR. RUSS: Thank. That's good enough.

So then if you move east from that point in the property boundary in the middle of the "X" there, what is directly east of that intersection?

MR. DORGAN: That appears to be some -- a residential area, which I mentioned in my testimony yesterday.

MR. RUSS: Right. Okay. Thank you.

So there is a residential area to the east. And then to the south I believe you said there is agricultural land, in your presentation; is that right?

MR. DORGAN: There is some agricultural land to the south.

MR. RUSS: Let's see if I can find it again. Right. So on slide 33 you have a bullet that says, bordered by north, south, east, west bullet list. The bullet for south says agricultural, right?

MR. DORGAN: That's what the bullet says, yes.

MR. RUSS: So there is the Illinois River to the north, the wildlife area to the west, agricultural land to the south, and a residential neighborhood to the east. But on slide 93 -- your last bullet on slide 93 states that Powerton is located in a primarily industrial area.

I'm wondering if that's still your opinion that this is a primarily industrial area?

MR. DORGAN: Well, I think we used the word "primarily," because we weren't suggesting it's exclusively industrial. I think when you look at the character in general of the types of land uses in the area, they are more industrial than they are weighted towards any other particular land use type.

MR. RUSS: Okay. I'm going to turn

to Will County, slide 55 of your presentation. Do you see that white box in the map on the upper left?

MR. DORGAN: Yes, I do.

MR. RUSS: You put this together. Do you know why there is a white box there?

MR. DORGAN: Well, when I look at the figures, this figure and others, I'm seeing that we were generally featuring and calling out the property itself, and there is a little notch in the property boundary at that area of the site, which is reflected through the white area that you are discussing.

MR. RUSS: Okay. Do you know what's in that area that's covered by the white box?

MR. DORGAN: I don't know specifically all of the features that are located in that white box. Mr. Maxwell points out to me that on our original figure on our report, that was where we had our legend, and the legend was called out and amplified for this demonstrative. So this is how we ended up calling out this particular image for this demonstrative.

MR. RUSS: Thank you. Yeah, that

does explain it.

So then if you look at slide 62, you can actually see that area. Are you familiar with that area there? I believe it's known as the Isle a la Cache, if I'm pronouncing that correctly. Is that right? Isle a la Cache? In Maine we say "isle." In some places -- in Vermont they say "isle." Isle a la Cache Preserve.

Are you familiar with that area?

MR. DORGAN: I know -- I have known of it. I live in the area, so I have heard about it, but specifically its location and boundaries, I'm not familiar with that.

MR. RUSS: Okay. And did you know that it was part of the forest preserve district for that area?

MR. DORGAN: I can't say that I had that specific knowledge.

MR. RUSS: Okay. Are you familiar with the Centennial Trail that runs just north of the plant property?

MS. NIJMAN: Vague as to just north.

HEARING OFFICER HALLORAN: Mr. Russ?

MR. RUSS: Well, it actually runs

directly across the north part of the property. I don't know how else to describe it.

HEARING OFFICER HALLORAN: You can answer, if you are able, sir.

MR. DORGAN: I don't have specific -- specifically -- specific familiarity with that trail system.

MR. RUSS: Okay. All right.

And as part of your research into the surrounding land uses, did you look into the public use of the trail or the forest park district -- forest preserve district?

MR. MAXWELL: Could I add that the location of these two features that we just discussed, they are to the north of the facility? Up river on the Des Plaines River when you look at the documented groundwater elevation contour maps for the site, they are not downgradient of any known ponds or historical fill areas.

So in terms of importance, in terms of impact to human health and the environment, for those reasons, they weren't necessarily -- they didn't receive -- they weren't necessarily called out. So I just want to make

that clear.

MR. DORGAN: And more specifically, on our demonstrative, we point out the Des Plaines River having -- being the adjacent land use to the station itself, and I'm not quite sure the boundaries that you are referring to, but it appears you are talking about locations west of the Des Plaines River.

MR. RUSS: The Centennial Trail is north of the site, but what I'm getting at is that the bullet on page 63 of your report has a heading that says, "Onsite and surrounding industrial land use," and I just want to clarify for the record that there are other land uses in the immediate vicinity, and this is one of them.

I don't have any more questions about Will County. I have just a couple of questions about Waukegan. If you turn to slide 71, and actually, I think slide 75 might be easier to look at.

Are you familiar with the area east of the ash ponds at Waukegan?

MR. DORGAN: Only to the extent that during the site visit I was able to observe that

area, but we -- I haven't specifically inspected it.

MR. RUSS: Are you aware that there are public beaches to the east of those ash ponds?

MR. DORGAN: Yes. We are aware of that, and I believe we mentioned that.

MR. RUSS: Okay. That's good enough for now on the surrounding land use. I just have two more questions, and then maybe we will take a break and see if I have any cleanup questions, but I'm almost done.

How does your proposed remedy cure the open dumping violations at Powerton?

MR. DORGAN: I believe the open dumping violation has already been cured. The ash was removed and disposed of, so --

MR. RUSS: So is it your opinion that the only open dumping violations at Powerton pertain to that area of cinders that were stored and removed?

MR. DORGAN: That was the area that we specifically referenced in our report that was identified in the Board order.

MR. RUSS: Okay. Let's look at the

Board order.

HEARING OFFICER HALLORAN: What date, Mr. Russ?

MR. RUSS: I'm still trying to find it.

HEARING OFFICER HALLORAN: What date? Is it 2019?

MR. RUSS: Oh, date. 2019. I'm sorry. I thought you said what page.

HEARING OFFICER HALLORAN: Thanks.

MR. RUSS: So if you turn to page 92, the third paragraph of page 92 talks about the cinders that you were just describing as a violation of Section 12(d) of the act. Do you see that?

MR. DORGAN: I see that reference.

MR. RUSS: And the open dumping violations are described in the next paragraph under Section 21(a) of the act. But it doesn't say open dumping at that point. If you look back at page 86 of the Board order, you will see Section 21(a) of the act, "Open Dumping."

Do you see that?

MR. DORGAN: Yes. And I believe

that's also the subject of a clarification we made in our document.

MR. RUSS: Well, that's what I'm confused about, because in the testimony you gave yesterday, you described the cinders on land as being a violation of 21(a), but I think in the document you clarified that you meant something -- there was another clarification related to where a parenthetical went in your report, but just so we are clear on the record, the cinders deposited directly upon the land described in the Board order that were a violation of Section 12(d), that has been removed.

There is also the open dumping violations at Powerton under Section 21(a), and if you look at the Board's description of the historic coal ash sites at Powerton, you will see that they mention, as we talked about yesterday, coal ash fill throughout the site. And that's on page 41 as one of the historic coal ash areas.

Do you see that?

MR. DORGAN: I'm sorry. What are you referring to specifically?

MR. RUSS: If you turn to page 41,

there is the description that we looked at yesterday of coal ash fill through the site.

MR. DORGAN: I see that.

MR. RUSS: So this is the subject of the open dumping violation. How does your proposed remedy cure the open dumping violations at Powerton?

MR. DORGAN: Well, I think we discussed this yesterday, which is this language that you are referring to is referencing locations, specific individual borings. It references some of the regulated units that we have discussed, and again, as we stated yesterday, we considered this information with respect to the presence of coal ash at the site, and again, relied on our evaluation of the groundwater conditions downgradient of these areas that were between these areas and potential offsite both ecological and human health receptors.

So we -- we do believe that the specific conditions referenced on this page of the Board order have been considered.

MR. RUSS: Right. I guess my question is, whether your proposed remedy is going

to affect the open dumping violations at all?

MS. NIJMAN: Asked and answered.

HEARING OFFICER HALLORAN: Sustained.

MR. RUSS: I believe --

HEARING OFFICER HALLORAN: He gave his answer. I know what he said, sir. Excuse me. You may move on.

MR. RUSS: Okay. How does your proposed remedy cure the open dumping violations at Joliet?

MS. NIJMAN: Same objection. Asked and answered.

HEARING OFFICER HALLORAN: Overruled for now.

MS. NIJMAN: I'm going to also just object to the extent they are asking for a legal assessment of open dumping.

HEARING OFFICER HALLORAN: You know I take that, and the Board takes it -- they are comprised of a technical unit and a legal unit, and they can parse it out and accept it or not. But you may proceed.

MR. MAXWELL: So our understanding

of what we were tasked to do by the Board was to focus on an appropriate remedy that's protective of human health and the environment. The remedy that we recommended, that we have opined is appropriate, is intended to be protective of human health and the environment, not necessarily cure each and every violation that the Board called out in the interim 2019 order. We were more focused more globally on what's protective of human health and the environment as it relates to risk.

MR. RUSS: Okay. Thank you. That's great.

So my last question -- I think this is going to be our last question. You said a couple of times that you were asked to work with the information you had, and you also referred to data gaps that might be filled later; am I right?

MR. DORGAN: We have referenced the data gaps on several occasions.

MR. RUSS: Did you at any point ask counsel for Midwest Generation for more field work, more analysis of soil or groundwater?

MS. NIJMAN: Object to asking counsel.

HEARING OFFICER HALLORAN: Yeah. He can answer if he is able.

MR. DORGAN: As we have stated previously, and Mr. Maxwell just restated it, we work with the information that we were provided. The information that we were provided we felt was sufficient, useful, and of sufficient quality to allow us to evaluate remedies and the relief that goes with that as prescribed by the Board.

So we, again, stated it many times. Our remedy is centered on the information that's available to us. There's obviously been some new information generated which has been discussed, and we continue to believe the sufficiency of the existing historic record at these sites to arrive at a remedy that's protective of human health and the environment, which is what we have done, and what we have outlined in our document.

MR. RUSS: Okay. Thank you. I have no further questions.

HEARING OFFICER HALLORAN: Thank you.

Ms. Nijman, re-direct?

MS. NIJMAN: Yes. Okay. We have a lot to clean up.

R E - D I R E C T E X A M I N A T I O N

MS. NIJMAN: Mr. Maxwell, I will start with you.

Mr. Russ asked you yesterday some very technical questions about your trend testing. Do you recall that?

MR. MAXWELL: Yes, I do.

MS. NIJMAN: And he asked you to look at the slopes of certain data based on a chart of numbers?

MR. MAXWELL: Yeah.

MS. NIJMAN: And he referred you to your report. Let's pull that out. I think he was looking at page Bates 81517.

MR. MAXWELL: Say that again, please?

MS. NIJMAN: Sure. 81517.

MR. MAXWELL: 815 --

MR. DORGAN: 517.

MR. MAXWELL: Okay. Got it. Sorry.

MS. NIJMAN: And one of the items he had you focusing on was arsenic total, MW-4. Do

you remember his questions about that?

MR. MAXWELL: Yes.

MS. NIJMAN: And the point there was that this data was not related to a non-detect. Is that a fair statement?

MR. MAXWELL: That's the context that we discussed it.

MS. NIJMAN: Okay. I would like to refer you to page Bates 81536.

MR. MAXWELL: Is that a graph for barium?

MS. NIJMAN: No. 81 -- I'm sorry. 81535.

MR. MAXWELL: Yeah, okay.

MS. NIJMAN: Okay. So, what is that document?

MR. MAXWELL: So, this is a graphical presentation of the total arsenic data at MW-4, and it shows the concentrations, the individual dots or the individual concentrations. The solid line through the middle of the dots is the slope, which in this particular case is a slope of 0.

MS. NIJMAN: Okay. Let me stop you

right there. I just want to ask you, what are each of these charts? I see many, many of them in your report.

MR. MAXWELL: So this, essentially, is the backup, that -- what the statistical software that we utilized produces in order to support the summary tables that we generated earlier in Appendix C.

MS. NIJMAN: And I have got it up on the screen for you to look at as well.

So if we are looking at this particular graph, this is for MW-4, the same well that Mr. Russ pointed out to you for arsenic; is that right?

MR. MAXWELL: Correct.

MS. NIJMAN: And you were mentioning this flat line at the bottom. That's the slope line for the results at that well?

MR. MAXWELL: Correct. And the slope equates to the trend. In this instance, there was 0 slope and 0 trend.

MS. NIJMAN: Are you the one who draws the lines in here and develops the slope analysis?

MR. MAXWELL: No. The reason we do -- we rely on the software to perform that. That's an automated function of the software as the analysis is performed by the software.

MS. NIJMAN: So the software concluded the flat line?

MR. MAXWELL: Correct, based on the data.

MS. NIJMAN: In looking at the top left axis, what is the standard for arsenic?

MR. MAXWELL: So the Class 1 groundwater quality standard for arsenic is 0.01, which is --

MR. RUSS: And what are we seeing at MW-4 for arsenic?

MR. MAXWELL: So the concentrations are substantially below that. There is just one instance that exceeds 0.002, but the concentrations are substantially lower than the Class 1 standard of 0.01 milligrams per liter.

And, again, the intention of the trend testing isn't necessarily -- it certainly is possible to have trends below the standard. The idea of the trend analysis is, what is the -- what

is the pattern in the data, not necessarily how does it compare to a standard. Two completely different things.

MS. NIJMAN: And when you said yesterday that you didn't think Mr. Russ pointing out certain wells impacted your conclusions, is this partly what you meant?

MR. RUSS: Objection to the leading question.

HEARING OFFICER HALLORAN: Can you rephrase, Ms. Nijman, please?

MS. NIJMAN: What did you mean yesterday when you said Mr. Russ' picking out certain wells didn't affect your conclusions?

MR. MAXWELL: Well, the wells that were discussed were -- weren't the most appropriate wells that we felt were most useful to make the judgment as to whether or not monitored natural attenuation is actually occurring. Those wells, in order to take -- in order to utilize the monitored natural attenuation, that's a natural process, and you want to have wells after that process has actually taken place.

And so the wells that are

towards the downgradient boundary of the stations are representative of information or of the groundwater after those mechanisms have occurred. And so that was the focus of our -- of our assessment, and I would add that that also is the basic framework that a site is analyzed under, TACO or the SRP, because in most instances there is the ability to control site use in some way with some type of an institutional control. So the point of emphasis becomes the downgradient property line.

MS. NIJMAN: I'm sorry. Does -- just to understand, are you saying that Illinois EPA would also look to the downgradient wells as you did here?

MR. RUSS: Object to the leading question.

HEARING OFFICER HALLORAN: Overruled. You may answer.

MR. MAXWELL: Under certain regulatory programs, yes, Illinois EPA would look at it that way, yes.

MS. NIJMAN: Under the TACO.

MR. MAXWELL: Under the TACO SRP

rules, yes.

MS. NIJMAN: Okay. You also recall your discussion with Mr. Russ yesterday about dissolved versus total sample results?

MR. MAXWELL: As it relates to the trend tests, yes.

MS. NIJMAN: And you stated that you included both dissolved and total where they existed to be comprehensive?

MR. MAXWELL: We wanted to be thorough and include a thorough analysis, and we thought that including as much data as we had made sense. So we included both.

MS. NIJMAN: And Mr. Russ had you review data tables that you used to see if some of your summary included those wells?

MR. MAXWELL: Yeah. We looked at some total and some dissolved data yesterday.

MS. NIJMAN: And I think we used or Mr. Russ used arsenic at Joliet 29 as an example. Did you look at --

MR. MAXWELL: Yes.

MS. NIJMAN: Okay. And if I'm understanding what we were talking about yesterday

correctly, was there some suggestion that you were including data twice, both total and dissolved? Do you understand what the point was?

MR. MAXWELL: I think the point was that -- or the concern was that we were in some way skewing or double counting because we were using both total and dissolved for certain constituents.

MS. NIJMAN: And did it make any difference -- when you look at the data, does it make any difference whether you use the total and -- whether you include both total and dissolved or not?

MR. MAXWELL: I actually reviewed it in response to the testimony yesterday, and I went through an exercise where I removed the total data in instances where we had corresponding dissolved data, and the analysis indicates that the conclusion is the same.

The numbers do change slightly, however, the percentages of the various different categories do not substantially change because some of those are upward trends. Some of them are downward trends in terms of the total versus the

dissolved. So eliminating one or the other, it did not skew the results. The conclusion is the same, whether you include collectively the total and dissolved or you take out one so as not to double count.

MS. NIJMAN: Do you recall Mr. Russ also had you reviewing certain wells that were not included in your trend testing?

MR. MAXWELL: Yes.

MS. NIJMAN: So let's look at the exhibit that he referenced you to, Exhibit 1314. And if you turn to Bates -- I believe it's 118355. No. I'm sorry.

Just look at the Figure 1 on this document.

MR. MAXWELL: Yes.

MS. NIJMAN: Okay. So you testified -- and that's -- for the record, I couldn't read the Bates number. I think it's 118382, for the record.

Now, Mr. Russ pointed you to Wells 2, 3, and 4 as not included in your trend testing. Do you recall that?

MR. MAXWELL: Yes.

MS. NIJMAN: Where are those wells located?

MR. MAXWELL: So those wells are located to -- MW-2 is southeast of Pond 1N, and MW-3 and MW-4 are both located to the east of Pond 1S.

MS. NIJMAN: And is east up or downgradient?

MR. MAXWELL: East is upgradient with respect to the ponds.

MS. NIJMAN: And you have already discussed a minute ago why your focus was on the downgradient?

MR. MAXWELL: Yes. The reason is that the -- the groundwater has more of an opportunity to utilize the monitored natural attenuation mechanisms as the groundwater flows from the upgradient portions of the station towards the downgradient portions of the station.

MS. NIJMAN: Is looking at downgradient a standard approach for assessing MNA?

MR. MAXWELL: I would say that it is. Again, it's -- part of it is based on risk

assessment. Part of it is just based on the technology of MNA. It's most useful and most appropriate to utilize the downgradient wells for that purpose.

MS. NIJMAN: And are all the wells that you used in the trend testing for Joliet, Will, and Powerton stations within the GMZs for those stations?

MR. MAXWELL: That is correct. And the monitored -- the monitored natural attenuation is taking place within the GMZ, yes.

MS. NIJMAN: Mr. Dorgan, Mr. Russ also asked you about wells that weren't included in your trend testing for the Waukegan station. Do you remember that?

MR. DORGAN: Yes.

MS. NIJMAN: And he referred you specifically to one well, MW-6, as a well that wasn't included?

MR. DORGAN: I believe that's correct, yes.

MS. NIJMAN: And if you could pull out Exhibit 1310. And do you recall, by the way, that Mr. Russ had you pointing out that MW-6 was

over 10 for boron?

MR. DORGAN: Yes.

MS. NIJMAN: So if we look at Figure 1 again. This is -- what is Figure 1? Figure 1 is at Bates No. 118492.

MR. DORGAN: Figure 1 is titled a site map for the Waukegan station.

MS. NIJMAN: Do you see MW-6 on this map?

MR. DORGAN: I do. It's to the -- towards the southwest corner of the station.

MS. NIJMAN: Is that upgradient from the station?

MR. DORGAN: It would be upgradient of the station operations.

MS. NIJMAN: And what does this location of MW-6 tell you about offsite impacts coming onto the station?

MR. DORGAN: Well, in my testimony yesterday, I made reference to a former tanning -- tannery operation that's located west of the site that's gone through a site remediation program process. The groundwater is known to be flowing from that site onto the Midwest Generation

station, and that -- part of the reason that well is there is because of the ELUC, the environmental land use control, that was created as part of that process that covers the western part of the station that we discussed yesterday.

MS. NIJMAN: I'm going to hand you an excerpt from Exhibit 1331.

What is this document?

MR. DORGAN: This is a log of MW-6, the well that we have been discussing.

MS. NIJMAN: And for the record, this is Midwest Gen 13-15_110872, excerpt from Exhibit 1331, that's admitted in this case.

What does this log tell you about whether there is ash located in MW-6?

MR. DORGAN: Ash is not described as having been encountered in the lithology, the geologic conditions that were encountered when the boring was advanced.

MS. NIJMAN: So where is the boron in MW-6 coming from?

MR. DORGAN: We believe it's coming from the west from the tanning operation, which has already been documented, and it's the reason

the ELUC is present on that part of the station.

MS. NIJMAN: Is boron associated with tanneries, to your knowledge?

MR. DORGAN: Boron is a component of various processes that are used in tanning.

MS. NIJMAN: Thank you. You were also present for the public comments yesterday, were you, Mr. Dorgan?

MR. DORGAN: Yes, I was.

MS. NIJMAN: Did you hear a comment about arsenic 2,000 times the standard being found at Waukegan?

MR. DORGAN: Yes. I believe that was mentioned by the mayor in her comments.

MS. NIJMAN: I would like to pull out Exhibit 1331 that we were just referencing to. I'm going to hand you a larger version of the table I want to reference you to, because this document itself has a very small table.

So we are looking at Table 9.4 of Exhibit 1331, and the Bates numbers are MWG13-15_110670 through 110671.

What does this table show?

MR. DORGAN: This table presents the

results of analytical testing on a series of monitoring wells that started in November of 2015 and is through, I believe, May of 2021.

MS. NIJMAN: And on the top of this chart, do you see the column for arsenic?

MR. DORGAN: Yes, I do. It's about the middle of the table.

MS. NIJMAN: And just so we are clear, if you look at both pages of this table, it covers the wells at Waukegan, each of the wells at Waukegan on the left side?

MR. DORGAN: Yes. I believe these are all wells located at the Waukegan Station.

MS. NIJMAN: If we look at the arsenic column, let me point you to MW-14.

Do you see that?

MR. DORGAN: Yes, I do.

MS. NIJMAN: And looking at the data for MW-14, what is the highest level of arsenic that's ever been located there?

MR. DORGAN: Of the data presented for MW-14 for this record period, the highest detected concentration was 21 milligrams per liter.

MS. NIJMAN: And that was in 2017?
MR. DORGAN: That was the November of 2017 sampling event.
MS. NIJMAN: Is this 21 roughly 2,000 times the standard?
MR. DORGAN: Yes, it would be, approximately.
MS. NIJMAN: And looking through, scanning through each of the other wells, do you see any level higher than 21?
MR. DORGAN: No. Of the data presented on the table, 21 is the highest recorded measurement for arsenic in any of the wells.
MS. NIJMAN: So one more thing on this chart. Looking to the left under the description of MW-14, what does it say under MW-14?
MR. DORGAN: Upgradient.
MS. NIJMAN: So let's look at where it's located. If you could go to your presentation at page 73, if we could put that up on the screen.
Can you see where MW-14 is located?

MR. DORGAN: It's on the far western part of the station. If you look at the callout, the approximate boundary -- it's a bit cut off. In the white callout, it's just to the north of that, just across the property boundary that's superimposed there.

MS. NIJMAN: To the far west of this drawing?

MR. DORGAN: Correct.

MS. NIJMAN: To your knowledge, what was the purpose of installing MW-14?

MR. DORGAN: My understanding, that there was a series of wells that were installed as part of approval of the environmental land use control that was agreed upon by the station to accept as part of the closure process that the tannery site was undergoing.

So it was basically designed to monitor the groundwater flowing from the tannery to Waukegan station under the terms of the ELUC and the closure that the tannery obtained from the IEPA.

MS. NIJMAN: So, are impacts at MW-14 from upgradient sources?

MR. DORGAN: Yes, that's correct.
MS. NIJMAN: And I would like to show you an excerpt again from Exhibit 1331. And for the record, this is Midwest Gen 13-15_110879.
What is this document, Mr. Dorgan?
MR. DORGAN: This is a geologic log for Monitoring Well 14 that we have been discussing.
MS. NIJMAN: Does Monitoring Well 14 have any ash in it?
MR. DORGAN: Ash is not referenced as being present in the soil boring.
MS. NIJMAN: What does this tell you about the cause of any finding of arsenic in MW-14?
MR. DORGAN: We understand that there was contamination migrating from the adjacent property to the west, that these wells were installed to monitor that migration. The wells were installed to support the ELUC that was established in recognition of that contamination plume, and that what we are seeing here is originating with the historic tanning operations

to the west and not related to any of the Midwest Gen operations.

MS. NIJMAN: And, unfortunately, will that groundwater contamination continue to flow onto the Midwest Gen property?

MR. DORGAN: Yes.

MS. NIJMAN: Mr. Maxwell, regarding the Joliet 29 area, the northeast area, do you recall Mr. Russ asked you about evaluating the area or volume in that northeast area?

MR. MAXWELL: Yes. That was part of the testimony yesterday.

MS. NIJMAN: And you, and I think Mr. Dorgan, during the deposition stated that you didn't find that information would be particularly relevant. Do you recall that?

MR. MAXWELL: Yes, I do.

MS. NIJMAN: I would like to show you slide 23 from your PowerPoint at Exhibit 1702. Are you there?

MR. MAXWELL: Yes.

MS. NIJMAN: We went through this on your direct. This is the slide regarding the northeast historic fill area lines of evidence

that you considered.

Is this why you concluded that volume or area wasn't particularly relevant?

MR. MAXWELL: That's correct. This listing that we reviewed yesterday is the lines of evidence that is -- we do believe is relevant and is available as it informed the remedial recommendation that we made.

MS. NIJMAN: And we had heard from Mr. Gnat about the location of where he saw ash in the northeast area.

Can you describe, or do you recall what he said?

MR. MAXWELL: Yeah. So that -- those were the areas that were identified near the slope that -- and I believe there was four or five of them. They were subsequently identified. They were subsequently -- the erosional features were subsequently repaired, and as I recall, the materials that -- that were covered were characterized as ash mixed with soil.

And like I said, that was subsequently covered with an -- in order to control erosion per the NPDES permit requirements.

MS. NIJMAN: And just to clarify, where in the northeast area did Mr. Gnat notice this ash mixed with soil?

MR. MAXWELL: Along -- near the slope to the Des Plaines River.

MS. NIJMAN: The southern part of the northeast area?

MR. RUSS: Object. Leading question.

HEARING OFFICER HALLORAN: Sustained.

MS. NIJMAN: Is that area closer to the southern part or where the facility is located?

MR. MAXWELL: Yes, it is.

MS. NIJMAN: And when you said -- you noted the composition of the ash materials that Mr. Gnat testified to. How is it relevant to you that this was not homogenous ash, that this was mixed with soil?

MR. MAXWELL: Right. We actually discussed this today as well. Ash mixed with soil is different than a mass of ash, homogenous ash, if you will. The -- the characteristics of the

native soil are different than the characteristics of the ash. The mixture is -- the percentages is ultimately what dictates the actual analytical concentrations within the -- within that soil matrix, and so that will ultimately inform what the ability is of that material to serve as a source.

MS. NIJMAN: And when you have a mixture, what is your expectation about that area as a source?

MR. MAXWELL: Well, the -- when you have a mixture, that area -- when CCR is noted as having been mixed with soil, it's less likely for it to serve as a specific source.

MS. NIJMAN: Mr. Russ also asked you about calculating area and volume in the northwest area.

Do you recall that?

MR. MAXWELL: Yes, I do.

MS. NIJMAN: And I think there was the same answer, about not particularly relevant, but you were never asked why it wasn't particularly relevant. So I'm going to ask you that. If you can refer to slide 17.

MR. MAXWELL: Okay.

MS. NIJMAN: So why wasn't volume or depth relevant, based on the information you put forth about the CCB investigation on slide 17?

MR. MAXWELL: Yeah. So slide 17 describes the CCB investigation. That was an investigation that was performed in order to evaluate the potential for beneficial reuse of the CCR materials there.

It was ultimately determined based on the natural leaching test, the NLET, that the concentrations of the -- the relevant constituents there that were analyzed were below the Class 1 number based upon that leach test, and so that information helped inform the -- the ultimate importance or relevance of looking at the specific -- the specific depth of ash there.

MS. NIJMAN: So the NLET testing for the ash that's in that area told you what about the leaching of that -- the potential for leaching in that area?

MR. MAXWELL: So based on the NLET testing, the potential for leaching of those constituents was low, the concentrations that were

noted in the NLET results were below the Class 1 groundwater quality standards.

MS. NIJMAN: Did that -- how did that inform your opinions on risk in this area?

MR. MAXWELL: Well, it's -- it made it less likely that the material that's there is going to serve -- going to present an unacceptable risk.

MS. NIJMAN: Mr. Dorgan, do you recall that Mr. Russ asked you about the grid sampling that was done at the FS area at Waukegan?

MR. DORGAN: Yes, I do.

MS. NIJMAN: And he asked you an interesting question. He asked you if it would be -- and he used the word -- "helpful" to have similar grid data in other areas like at Powerton.

Do you recall that?

MR. DORGAN: I do.

MS. NIJMAN: So I'm going to ask the question a different way.

Is it necessary to have grid data in any location where ash is located?

MR. DORGAN: No.

MS. NIJMAN: Why not?

MR. DORGAN: The -- first of all, it's not customary practice. It's not consistent with a brownfields-type of an investigation that we have done on all range of size properties in the past. It's not practical to collect that much data from a management perspective, from a cost perspective.

So I haven't seen an instance where a full site was gridded with that type of a grid for purposes of site investigation.

MS. NIJMAN: Does this refer back to the testimony you gave on direct about source identification at brownfield sites?

MR. RUSS: Object, leading.

MS. NIJMAN: How does this refer back to your testimony about source identification at brownfield sites?

MR. RUSS: Same objection.

HEARING OFFICER HALLORAN: Overruled. You may answer.

MR. DORGAN: Under a brownfield site strategy, you will -- it's usually a multi-phased approach. Early phases inform what happens in the subsequent -- subsequent phases. Subsequent

phases inform what happens as you go -- as you move forward. It's rare that you have the opportunity to design a remedy with 100 percent certainty concerning all of the sources that may be present at a site.

It's one of the reasons why under the SRP and TACO framework they place the emphasis on the downgradient property conditions. Excuse me. They recognize that there could be sources that haven't specifically been identified, but is -- are there conditions that are at the property boundary that are allowing contamination to migrate to a potential receptor at a concentration that's unacceptable to human health and the environment?

So the specific framework of that whole regulatory program is geared towards making sure we are protecting off-gradient receptors and not in trying to identify 100 percent of potential sources.

MS. NIJMAN: And do you recall that Mr. Russ referred you to the Board opinion about the ash areas at Powerton that the Board had identified?

MR. DORGAN: Yes, I do.
MS. NIJMAN: And all those -- are all those areas identified within the groundwater management zone, the GMZ, at Powerton?
MR. DORGAN: Yes, they are.
MS. NIJMAN: Is that relevant to you?
MR. DORGAN: Yes. Again, part of our risk evaluation in terms of there are documented occurrences of CCR material in certain of the locations that were identified by the Board, but it's within the GMZ. Our assessment of evaluation of risk utilized the downgradient monitoring wells that were protective of the offsite receptors. So they were considered, and have been reflected in the remedy that we have proposed.
MS. NIJMAN: At Will County, Mr. Russ asked you about trying to estimate the volume of ash around the ponds.
Are the ponds within the GMZ at Will County?
MR. DORGAN: Yes, they are.
MS. NIJMAN: And would your answer

about relevancy of that data be the same?

MR. DORGAN: Yes. It would be equally relevant.

MS. NIJMAN: There was also a discussion yesterday about NLET data versus LEAF data. Do you recall that?

MR. DORGAN: Yes, I do.

MS. NIJMAN: And Mr. Russ referred you to tables in your expert report and asked you which ones were leach -- LEAF data and which ones were NLET data.

Do you recall that?

MR. DORGAN: Yes, I do.

MS. NIJMAN: When did the LEAF test method become generally used in your field?

MR. DORGAN: I don't recall the specific date, but it has been roughly five years.

MS. NIJMAN: So what test was used for leaching analyses before five years ago?

MR. DORGAN: Well, there is several forms of leaching tests. The NLET is one, and it's one of the reasons that that was used. And NLET is a method that must be used for the CCB determinations, the beneficial reuse. So that's

why it appears relatively prominently in some of the historic record, but there were others that have been mentioned, like the synthetic precipitation leaching procedure, the TCLP, toxicity characteristic leaching procedure, but NLET would have been the predominant method that would have applied to CCR materials.

MS. NIJMAN: Is NLET data good data?

MR. DORGAN: Yes.

MS. NIJMAN: And how long -- well, can you estimate how long not only the State of Illinois, but others, have been using NLET data to assess leaching?

MR. DORGAN: Again, I don't recall the specific date that that method was approved, but it has been many years.

MS. NIJMAN: So should you ignore the NLET data because it's an older method?

MR. RUSS: I object. Leading.

MS. NIJMAN: How should you treat the NLET data at these sites?

MR. DORGAN: It's a data point that is an expression of the characteristics of the material that's being sampled and analyzed, and

it's useful and warranted to be included in an evaluation of the site and its environmental characteristics.

MS. NIJMAN: In your experience, does Illinois EPA accept NLET data for leaching review?

MR. DORGAN: Well, they require it. So, yes, they accept it.

MS. NIJMAN: Mr. Dorgan, Mr. Russ also asked you about the Limestone Ash Basin testing at Powerton that was done in 2004.

Do you remember that?

MR. DORGAN: Yes, I do.

MS. NIJMAN: And I think you identified the area on Figure 6 of your report.

MR. DORGAN: Yes, we did.

MS. NIJMAN: Could you refer to the chart of your ponds at the second to last page of your Exhibit 1702?

MR. DORGAN: I have that.

MS. NIJMAN: In looking at Powerton, is the Limestone Runoff Basin listed there?

MR. DORGAN: Yes. It's the second to last basin that's referenced for Powerton.

MS. NIJMAN: And what does it say in the comments?

MR. DORGAN: That that basin has not been used for CCR since 2013. And that it's currently unused and empty.

MS. NIJMAN: I also would like to read into the record the parties' jointly filed agreed stipulation in this matter, No. 13, which states, "The limestone basin at Powerton has been empty since 2013."

Mr. Dorgan, do you recall Mr. Russ asking you about models that might be used to analyze a cap at Waukegan?

MR. DORGAN: Yes, I do.

MS. NIJMAN: And you discussed the HELP Model, and Mr. Russ asked you about the MODFLOW Model. Do you recall that?

MR. DORGAN: There was a discussion about both, yes.

MS. NIJMAN: At Waukegan, what would be the reason for not conducting a MODFLOW Model at this time?

MR. DORGAN: As we have pointed out on a number of occasions, we have a pending

rulemaking, and any action we take is going to be judged against that rulemaking. So in order to comply, there may be a time when a modeling exercise is warranted, but as part of our evaluation of the risk, we didn't feel that it was going to be particularly useful with respect to our overall evaluation of the site conditions and the remedy that we are proposing given the conditions that we were -- that we were controlling for.

MS. NIJMAN: And as you said in your report, what do you want to do as far as timing with regards to the rule?

MR. DORGAN: We are proposing a cap. That would have to be designed. That would have to be constructed. We anticipate that as part of the rulemaking there may be both design and performance specifications that are included in those rules, and you would want to consider those relative to how that cap goes on so that we don't run the risk of having to redo the cap or adding to it later.

MS. NIJMAN: This morning Mr. Russ asked you about your report at page 22 in Section

3.2, which was the discussion of the CCAs.

MR. DORGAN: Which page?

MS. NIJMAN: I think he referred you to page 23. That's when he read the heading.

MR. DORGAN: Yes. For Section 3.2?

MS. NIJMAN: Yes. What data and institutional controls did the CCAs provide?

MR. DORGAN: The data that they provided was the groundwater monitoring that ended up being implemented to comply with the CCA requirements, and as a result of that and a number of other actions that the CCAs required, that eventually led to the approval of the GMZ for three of the four stations.

MS. NIJMAN: And as you've spoken about many times, why was the GMZ relevant to your remedy analysis?

MR. DORGAN: It -- the GMZ and the attendant ELUC, environmental land use control, that went with the GMZ, were one of the elements to help us assess risk. They prevent the use of groundwater as a potable resource, and therefore, mitigate potential exposures to receptors.

So they were an important

element of the conditions that existed at the site, and are supportive of the MNA strategy that we proposed.

MS. NIJMAN: If you could pull out Exhibit 1332, and Mr. Russ pointed you to this --

MR. DORGAN: I'm sorry. We haven't -- we haven't gotten there yet.

MS. NIJMAN: Sorry.

MR. DORGAN: Okay.

MS. NIJMAN: So Mr. Russ identified this document as the Will County permit application, and I believe, Mr. Maxwell, you said you hadn't reviewed it prior to this time; is that correct?

MR. MAXWELL: That's correct.

MS. NIJMAN: If you would go back to that Figure 9.2, which I believe was Bates 125661. Is that the figure you were talking to Mr. Russ about?

MR. MAXWELL: Yes.

MS. NIJMAN: So in this description of the fill area that Mr. Russ had you reading, the -- yeah, the fill.

Is this a homogenous ash area?

In other words, is it all ash?

MR. MAXWELL: No. To the contrary. There is -- there is quite a descriptive -- there is quite a description that's provided here that references not only coal, black cinders, slag, but also native or natural soils, brown and black silty clay, silty sand mixed with gravel, and crushed limestone.

Again, those are materials that -- separate from the coal and coal ash that also play a role in the degree to which materials like this are going to actually serve as a source or not.

MS. NIJMAN: So, and again, I am just going to ask you that same question.

Because it's mixed, how is that relevant to your analysis of risk? You may have just answered it.

MR. MAXWELL: I would say that it plays into whether or not the material -- it's relevant to whether or not the material serves as a source, because it impacts the chemical characteristics of the matrix as a whole.

MR. DORGAN: Can I add something to

this discussion quickly?

And this goes back, I believe, to Mr. Gnat's testimony in the earlier phase of the hearing, but the common practice when logging materials is you describe first the majority, the primary matrix that you are seeing, and then you add descriptors based upon other observations.

So when this is described as a fill consisting of brown and black silty clay and silty sand mixed with gravel and crushed limestone, that's the predominant matrix. Then, there is a mention of the fill "may" include coal, black cinder, and ash.

So this would tell me, based upon the way this has been described, that the matrix is this other fill, and occasionally, there is observations to these other CCR materials.

MS. NIJMAN: Thank you.

One of the first questions this morning from Mr. Russ was the estimated length for a potential MNA -- as MNA would continue, how long would that take. I'm paraphrasing. Is that -- do you recall that discussion?

MR. RUSS: I object. That's not the

testimony. That's not the question I asked.

HEARING OFFICER HALLORAN: That's not -- I'm sorry, Mr. Russ?

MR. RUSS: I object that that's not what I asked.

MS. NIJMAN: Do you recall Mr. Russ asking you if there was a target end date for MNA?

MR. DORGAN: Yes, I do.

MS. NIJMAN: And your response was that it takes time?

MR. DORGAN: It takes time.

MS. NIJMAN: And I would like to refer you to page 13 of the Board's decision in this matter in the second interim opinion dated February 6th of 2020, and on page 13, on the second -- or the first full paragraph, the second sentence states, "The Board is aware that the process of monitored natural attenuation can be by its nature a long one. Monitored natural attenuation, depending upon its efficacy and subject to the Agency's review, can conceivably last for many years."

Do you agree with that general statement?

MR. DORGAN: We do. And I believe that's consistent with the way in which we have described the time frames around MNA.

MS. NIJMAN: So you were asked a lot of questions by Mr. Russ about impacts of other -- of potential water areas around the stations today. Do you recall that?

MR. DORGAN: I believe Mr. Russ was attempting to have us identify other features in proximity of several of the stations.

MS. NIJMAN: And as to surface water located near any of the stations, did you address impacts, potential impact to surface water in your opinions?

MR. DORGAN: Yes. That was part of our risk evaluation, and we, I think, described that in a quite a bit of detail yesterday when we were talking about the evaluation of receptors in comparison to relevant groundwater and surface water standards.

MS. NIJMAN: And did you find any unacceptable or unreasonable risk to surface water due to any potential impact?

MR. DORGAN: No, we did not.

MS. NIJMAN: Mr. Russ asked you about resolving violations of open dumping. Do you recall that?

MR. DORGAN: Ah, yes, I do.

MS. NIJMAN: In your role as a consultant, are you looking at the legal violation, or are you looking at the impact?

MR. DORGAN: We are looking at the data that describes the environmental conditions at the site and how those environmental conditions may pose risk to the various receptors we have discussed. So we did not parse the Board ruling with respect to every violation noticed -- referenced. We focused on the environmental data that was available in the record for purposes of assessing remedy and relief as directed by the Board.

MS. NIJMAN: And why as a consultant would you focus on the groundwater data, the result, if you will?

MR. DORGAN: Well, the results are what informs our understanding of the current environmental conditions at the property with respect to the assessment we did for risk.

So that data was one of the features of our analysis. We did the trend testing that Mr. Maxwell has discussed and other evaluation to, in totality, consider what was the appropriate remedy strategies for each of the four sites.

MS. NIJMAN: Thank you. That's all I have.

HEARING OFFICER HALLORAN: Thank you.

Mr. Russ, do we need to take a short break before re-cross?

MR. RUSS: No. I only have one question.

HEARING OFFICER HALLORAN: Okay. Thanks.

MR. RUSS: Just to --

HEARING OFFICER HALLORAN: You may proceed.

R E - C R O S S E X A M I N A T I O N

MR. RUSS: Oh, sorry.

Just to clarify for the record, earlier in the re-direct you referred to the NLET test as the natural leaching test. Did you want

to clarify that?

MR. DORGAN: Well, the NLET is an acronym for neutral leaching extraction test. If I said something different, I -- that was an error on my part.

MR. RUSS: That's all I have.

HEARING OFFICER HALLORAN: Okay. Thank you, Mr. Russ.

Ms. Nijman, anything else?

MS. NIJMAN: That's it.

HEARING OFFICER HALLORAN: All right. Gentlemen, thank you. You are dismissed.

We can go off the record.

(Whereupon, a short break was taken.)

HEARING OFFICER HALLORAN: We're back on the record, Kari.

Call your next witness.

MS. GALE: Yes.

HEARING OFFICER HALLORAN: Sorry, Ms. Gale.

MS. GALE: And, Mr. Hearing Officer, we call Ms. Sharene Shealey.

HEARING OFFICER HALLORAN: Okay.

Thank you.

MS. GALE: And the spelling of Shealey -- of Sharene, is S-H-A-R-E-N-E, and Shealey is, S-H-E-A-L-E-Y.

HEARING OFFICER HALLORAN: Good morning, Ms. Shealey. If you raise your right hand, Kari will swear you in, please.

(Whereupon, the witness was duly sworn.)

HEARING OFFICER HALLORAN: You may proceed when ready, Ms. Gale.

WHEREUPON:

S H A R E N E S H E A L E Y

called as a witness herein, having been first duly sworn, deposeth and saith as follows:

D I R E C T E X A M I N A T I O N

by Ms. Gale

Q. Good morning.

A. Good morning.

Q. Ms. Shealey, let's start with your educational background.

Can you please describe for us your educational background?

A. Excuse me. Yes. I have both a

bachelor of science and a master's of science in chemical engineering. My BS is from Howard University. My master's is from Carnegie Mellon.

Q. And following your graduation, who did you work for?

A. Proctor & Gamble.

Q. And what did you do for Proctor & Gamble?

A. Product development, R & D.

Q. And then following Proctor & Gamble, who did you work for?

A. My next full-time employment I think was with the Pennsylvania Department of Environmental Protection, PADP.

Q. And what was your role there?

A. I was an air -- for most of the time I was with the state or with the commonwealth, I was an air quality specialist. For a short amount of time, I was a water quality specialist.

Q. And as part of being an air quality specialist, what did you do?

A. Generally, permits, either Title I permitting and/or construction -- what we call here in Illinois construction permits, and I don't

think it's the same term in Pennsylvania, but it's escaping me right now.

Q. And by permitting, what do you mean by permitting?

A. So, sources would apply for permits to operate or construct some air polluting or a potential air pollution source, and I was responsible for writing that permit, writing a review of that permit, writing a review to support -- a technical support document to support the permit and submitting that through the system for issuance to the source.

Q. And then at some point, did you leave the Pennsylvania Department of Environmental Protection?

A. Yes.

Q. And where did you go?

A. To a predecessor company. I think it was Reliant. So I joined the power industry directly from PADP.

Q. And what kind of power did they -- did they create? Or, I guess, what kind of material did they use to create power?

A. For my involvement, coal, gas, and

oil.

Q. And I think you said it was Reliant was the company?

A. Yes.

Q. And when you started at Reliant, and as you worked your way for them, what did you -- how -- what did you come to understand about power generation?

A. That's very general.

Q. High level.

A. Yeah. Basically how power plants operate, what -- the purpose of power plants, you know, and I have always been in environmental. So environmental regulations that are specific to power plants or that -- power plants would have specific -- that would impact power plants specifically.

Q. And so how power plants operate, does that include waste streams?

A. Yes.

Q. And when you were working for Reliant, where was this?

A. In Pennsylvania.

Q. What city?

A. My employment? My location was in Cannonsburg, PA, which is a suburb of Pittsburgh, PA.

Q. And when you were -- and you were in Pittsburgh?

A. I lived in Pittsburgh, yes.

Q. And when you were in Pittsburgh, did you hold a public office?

A. Yes.

Q. What was that?

A. A school director. I was an elected -- I was elected to a term as a school director, which most people would call a school board member, for Pittsburgh Public Schools, the second biggest school district in Pennsylvania.

Q. And how long were you a school board -- well, school director?

A. Four years.

Q. And at some point -- and I think you have said when -- in 2015, you came to Illinois?

A. Yes.

Q. And what -- where -- what company did you start working for?

A. Midwest Generation.

Q. Okay. And what do you do for Midwest Generation?

A. I am an environmental -- or pretty much the environmental director, and so I generally am concerned with compliance with environmental rules and laws, and help support the plants in their operations so that they maintain compliance.

Q. And I think you said, high level, your job responsibilities, but let's get a little bit more granular.

What sort of -- what sort of things do you do specifically in your job responsibilities?

A. So, I still kind of do permitting but from the opposite end, or the opposite side as what I described before for the state. I do reporting. I support reporting. I hire consultants and experts to guide our work. I think that is -- yeah, that kind of stuff.

Q. As part of your role, do you communicate with regulatory agencies?

A. Yes, I do.

Q. And does your environmental

compliance responsibilities include the ash ponds at the four stations that are subject here?

A. Yes.

Q. And specific to the ash ponds that are subject to the matter here, what are those, generally speaking, compliance responsibilities?

A. The thing that comes to mind first is permitting, because of the Part 845 rules. And we are in the process, or have over the past couple of years, worked towards applying for permits for CCR impoundments. Permitting, I review reports. And again, I -- I work to recommend or hire consultants for the plants to do all of the activities that are associated with compliance for the CCR ponds.

Q. And for -- and you mentioned the rules. We are talking about the federal CCR rule?

A. And -- yes, the federal CCR rules and state.

Q. And as part of those -- compliance with the federal CCR rule, do you communicate with USEPA?

A. Yes.

Q. Similar question. As part of

compliance for the Illinois CCR rule, who do you communicate -- what regulatory agency do you communicate with?

A. Illinois EPA.

Q. And as part of compliance for these rules, does that cost money?

A. Yes, significant money. Well, from my perspective, significant money, yes.

Q. And as part of your duties is -- related to money, what are your responsibilities?

A. So, I help the plants plan for budgeting for costs associated with compliance, whether that be the hiring of consultants or helping them become more aware of the amount of sampling they need. And I had another one that I -- just escaped me, but I do help with -- plants with budgeting and estimating their costs.

Q. And as part of your role as environmental director, does that include familiarity with this lawsuit?

A. Yes.

Q. And to get familiar with this lawsuit, what did you do?

A. A lot of things. I definitely read

the Board orders, the two orders. I have talked to people who have been around longer than me, read a lot of historical documents around operations in the ponds.

Q. Do you recall coming to the hearing previously?

A. Yes.

Q. Do you remember which -- what year it was?

A. I would say 2019.

Q. 2018 sound more accurate?

A. I -- yeah. It would seem, yeah. I'm sorry. The Board -- I think the Board order is 2019 -- the first order is 2019, and I was thinking it was -- yeah. So it was 2018.

Q. And as part of your familiarity, are you familiar with the groundwater conditions at the stations?

A. Generally, yes.

Q. And as part of your role as the environmental director, are you familiar with Midwest Generation's petitions for regulatory relief under the Illinois CCR rule?

A. Absolutely.

Q. And, Ms. Shealey, your time with Midwest Generation as environmental director, with regard to environmental compliance, what is Midwest Generation's policy?

A. Environment over production. It's a simple statement that empowers each of us to act to protect the environment before we would produce a megawatt.

Q. And, Ms. Shealey, in preparation for your testimony here, what did you do?

A. Re-read the Board's order, re-read a lot of documents, became even more familiar with the operations in the pond -- particularly at -- those of the ponds.

Q. Did you review any histories?

A. Yes. And I'm sorry. I included that in the review of the ponds, because the -- it's -- all of those documents are kind of mixed up; so, yes.

Q. Ms. Shealey, are you familiar with the operating capacity of the stations that are involved in this matter?

A. You mean, operating capacity? Yes, I think so.

Q. Am I using the wrong term? Are you familiar with the term "capacity market"?

A. Oh, yes.

Q. What's your understanding of a capacity market?

A. It's a mechanism of the ISOs. Which ISO escapes me right now. Please forgive me. ISOs. To ensure that there is always power available to the grid. Some units are what's called base loaded units, so they run all of the time. But the capacity market is for when base load units are not available, or there is more demand than base load units can provide.

Q. And I will read into the record 2022 Stipulation No. 1. "The Joliet 29 Station, Powerton Station, Waukegan Station and Will County Station generate electricity sold on the PJM energy market and offer generating capacity sold on PJM's capacity market."

Ms. Shealey, in the PJM capacity market that Midwest Generation stations are in, what is the PJM market's role?

A. They determine the general need, the area's electricity needs and essentially determine

who -- which units run and which don't, and I -- ISO is independent system operator. I had a blank. It came to me. Thank you.

Q. So the PJR -- excuse me. The PJM markets pass, you know, determinations on what runs. How -- why is that important?

A. Well, it generally tells us when we operate our units. Because we operate in the capacity market, we only operate when PJM essentially tells us that our electricity -- that electricity from a specific unit or specific units is needed.

Q. And when would PJM tell you that a unit is needed more so or less so?

A. It depends on the situation. It could be -- when is several -- there are several places/times when they could. They could tell us the day before. They tell us sometimes years in advance. So it ranges.

Q. What I'm getting at is, what sort of circumstances would they tell you to fire up?

A. Oh. If it's generally an outage, when other units are out. For example, nuclear units in Illinois are generally base load units,

and one or two of them at least operate in a PJM market. So when there is a nuclear outage, we would be more like- -- coal would be generally the next resource.

The other one is when there's a peak demand, which generally happens in very hot times or very cold times, so the electricity demand is greater than normal. And so PJM would, say, run these units to meet that demand so that we are not experiencing brownouts and blackouts as individual customers.

Q. And so today, what stations in this matter continue to provide power to the PJM capacity market?

A. Waukegan, Joliet 29, and Powerton.

Q. And starting with Waukegan, recently, what change to Waukegan's operations happened?

A. They ceased firing coal to produce electricity. Waukegan only operates -- well, they have always operated -- or in my time, have always operated peakers. The peakers still operate, which are oil-fired units. The coal-fired units were retired last year in '22.

Q. And what's a peaker?

A. A -- generally a smaller gas or oil-fired unit, generally smaller, but not always, that operates with peak demand. So peaker and peak demand, those things are tied together.

Q. And at Will County recently, what has happened to Will County's operations?

A. They ceased firing coal.

Q. But for Waukegan and Will County, are there future plans for those stations?

A. Yes. At Waukegan station -- or at both stations, we intend to install battery storage.

Q. What is battery storage?

A. A way to enhance renewable usage, sort of, in my -- in my simplification of it. What batteries do is they pull electricity off the grid and store it for placing it back onto the grid. Renewable resources can only operate when weather conditions allow. Like the sun has to be shining for solar. There has to be wind for wind.

So battery storage is great for those types of opportunities to pull that wind capacity or that solar capacity off the grid,

store it, and put it on, like, maybe at night. They pull -- it's sunny during the day. It's not sunny at night. So battery storage fills that gap.

Q. And these transitions at the Waukegan and Will County Stations, what will that entail? What will occur there?

A. Well, they will actually have to build the battery storage units.

Q. Does that mean construction?

A. Yes.

Q. I would like you to turn to the first tab.

A. I don't have a book.

MS. GALE: Yeah, there is no book. Mr. Hearing Officer, can we go off the record?

HEARING OFFICER HALLORAN: We can go off the record.

(Whereupon, a discussion was had off the record.)

HEARING OFFICER HALLORAN: Back on the record. Thank you.

BY MS. GALE:

Q. Ms. Shealey, you have a book in

front of you?

A. Yes.

(Whereupon, Respondent's Exhibit No. 1601 was marked for identification.)

BY MS. GALE:

Q. Can you turn to the first tab, please, which is marked for identification as Exhibit 1601, and has Bates No. MWG13-15_83856?

A. Got it.

Q. What is this document?

A. An e-mail from me to Dr. Brian Richard.

Q. And what is contained in the e-mail?

A. The employee -- the total costs of employees and the number of employees and essentially where we live for Midwest Gen.

Q. And when you say "essentially where we live," what are you looking at?

A. The ZIP codes.

Q. That are attached to the e-mail?

A. That are attached to the e-mail. Thank you. Yes.

Q. And where did you get this

information?

A. Human resources. Midwest Gen human resources.

Q. And for the date that this e-mail was provided, was this information accurate, to the best of your knowledge?

A. Yes.

MS. GALE: Mr. Hearing Officer, Midwest Generation moves for the admission of Exhibit 1601.

HEARING OFFICER HALLORAN: Mr. Russ?

MR. RUSS: No objection.

HEARING OFFICER HALLORAN: Thank you. Respondent's Exhibit 1601 is admitted. No objection.

(Whereupon, Respondent's Exhibit No. 1601 was admitted into evidence.)

BY MS. GALE:

Q. Ms. Shealey, it's a term we have used a lot, but do you have an understanding of the term "CCR surface impoundment"?

A. Yes.

Q. What is it?

A. Coal combustion residual surface impoundment. It's a -- I could almost quote the definition, but I can't exactly. Basically a depression -- in terms of Midwest Gen, it's a depression that contains -- that was built or designed to hold both CCR and water.

Q. And in your understanding, where is that definition?

A. Part 257 under the federal rules, 40 CFR Part 257. I think it's Subpart D, and that it's in 35 IAC Part 845.

Q. And when you joined Midwest Generation and began to learn about its stations, generally, what did you learn about the construction of the ash ponds or CCR surface impoundments at the Midwest Gen stations that are subject to this matter?

A. That they had what I would call just been re-lined. They were -- the majority of them were still operating at that point, and I probably learned about their NPDES permitting, initially.

Q. Did you learn anything about their original construction?

A. Eventually, yes.

Q. And for ash handling at the stations, generally speaking, where in location is this ash placed or stored?

A. In the -- surface impoundments.

Q. What about the fly ash?

A. It's not placed or stored on station property, and my understanding is that that's true of all of Midwest Gen's operations since 1999. Fly ash is sent offsite for beneficial reuse almost immediately.

Q. Other than the surface impoundments and then the fly ash being sent offsite, is ash placed in other locations at the stations?

A. Not generally, no. Will County had a -- as allowed by the federal rules, a concrete laydown area, but other than that -- which was cleaned up really quick -- well, frequently, as it was placed, essentially, but no.

Q. And as your role as an environmental director, did that include an understanding of the ash removal from the CCR surface impoundments at the stations?

A. Yes.

Q. And what is your understanding of

the ash removal at the four stations that are subject to this matter?

A. It had been done relatively frequently. The stations operate slightly differently, but each station pretty much can -- has one main ash pond. Is that true? Yes.

Each station has one main ash pond, so that -- when that would fill up, they would take it out of service, empty it, and put the other one in service, and so they alternated ash pond usage generally.

Q. And I believe you stated earlier that as part of your job as environmental director, you became familiar with the groundwater conditions at the four stations?

A. Yes.

Q. Does that include any potential impacts to drinking water from the stations?

A. Yes.

Q. And what is your understanding?

A. There is none.

Q. There is none, what?

A. Oh, no impact to drinking water from any Midwest Gen station.

Q. How do you know that?

A. Experts have told me.

Q. Are there any reports that you have looked at that said that?

A. "Report" is a strange word. I actually think the -- yes. The place that's coming to mind top of head is the operating permit application. We had to do a -- in that -- the consultant did. I said we, but -- I will say we had to do a potable well search, potable water well search -- potable water well search, and there were none within, I think, 2500 feet of any of our impoundments. So, essentially, more than a half a mile away.

Q. Can you turn to the next tab in your book, please, and it's exhibit -- marked for identification as Exhibit 1602?

(Whereupon, Respondent's Exhibit No. 1602 was marked for identification.)

MR. RUSS: For the record, we maintain the objection on reliability and hearsay, that we made in a motion in limine a few months ago.

HEARING OFFICER HALLORAN: Ms. Gale?

MS. GALE: Mr. Hearing Officer, this was briefed, and you held that this document was relevant and an admission by a party opponent, and so -- and you denied their motion in limine on this document.

HEARING OFFICER HALLORAN: That's my recollection, and I think the Board affirmed my ruling, so -- or excuse me. Your objection is noted, Mr. Russ, but it's admitted.

(Whereupon, Respondent's Exhibit No. 1602 was admitted into evidence.)

BY MS. GALE:

Q. Ms. Shealey, what is this?

A. An article from Energy News Network titled, "Historic Coal Ash Raises Concerns At Iconic Illinois Coal Plant Site."

Q. And have you read this?

A. Yes.

Q. What is its date?

A. December 21st, 2021.

Q. Okay. And can you please turn to page 3 of the article?

A. Yes.

Q. Looking up on the page, sixth paragraph down -- well, first I will ask, it starts with NRG. Is that an accurate description?

A. No.

Q. What -- who should it say?

A. Midwest Gen. Midwest Generation.

Q. So it states -- it should say, "A Midwest Generation official said state officials have surveyed any impact on drinking water and found no evidence of risk. Environmentalists' expert witnesses have also not found the immediate risk to drinking water, Bugel said."

Ms. Shealey, who is Bugel in the article?

A. Faith Bugel.

Q. And do you agree with Ms. Bugel's statement here on page 3?

A. Yes.

Q. I would like to turn to page 4. And I think it's the -- under the heading, "Historic Ash." It states, "Bugel explained that most of the coal ash repositories at Midwest Generation's coal plants are lined, and unlike many other

companies, Midwest Generation frequently emptied the ash and sold it for 'beneficial reuse' as construction materials and other uses. That means Midwest Generation's active coal ash ponds subject to the state and federal rules were probably less likely to be contaminating groundwater than at many other coal ash sites, she said."

Ms. Shealey, do you agree with Ms. Bugel's statements here?

A. Yes.

MS. GALE: Mr. Hearing Officer, just to make the record clear, we move for the admission of Exhibit 1602.

HEARING OFFICER HALLORAN: I think we did that, but, yeah, it was admitted. 1602 was admitted over objection. Thank you.

BY MS. GALE

Q. Thank you.

Ms. Shealey, are you familiar with the Joliet 29 Station?

A. Yes.

Q. Have you visited it?

A. Yes.

Q. What county is Joliet 29 Station in?

A. Will.

Q. Will County?

A. Will County, yes.

Q. Is it in Kendall County?

A. No, it is not. Joliet is -- it's in Rockdale, Will County, essentially Joliet, and Joliet is the county seat of Will County. It's in Will County.

Q. Are any of the Midwest Generation stations that are subject in this matter in Kendall County?

A. None of them, no.

Q. Ms. Shealey, are you familiar with the area in the vicinity -- excuse me.

Are you familiar with the area in the vicinity of the Joliet 29 Station?

A. Yes.

Q. Okay. Looking at your screen, we have a map. What does this map depict?

A. Joliet -- Joliet 29 and the surrounding area.

(Whereupon, Respondent's Exhibit No. 1607 was marked for identification.)

BY MS. GALE:

Q. And I should state for the record, that this map is from what has been marked for identification as Exhibit 1607. And I'm sorry. You said this depicts the Joliet 29 Station?

A. Yes.

Q. Can you please describe the area around the Joliet 29 Station?

A. So it abuts a major road. I think it might be Route 6, and the Des Plaines River. The Brandon Road Lock and Dam is shown on this map, and to the -- I hope I don't do this wrong -- west, okay, is what I understand to be an old Caterpillar manufacturing site.

Q. And do you know what's there now at the old Caterpillar site?

A. I think it's a FedEx or a transportation site, some kind of transportation hub. I'm not 100 percent certain of that, though.

Q. And today what does the Joliet 29 Station do?

A. Produces electricity via natural gas, combustion of natural gas.

Q. Ms. Shealey, are you familiar with zoning maps?

A. Yes.

Q. How are you familiar with zoning maps?

A. Just as a general course of my job.

Q. And as part of your job, are you familiar with the zoning of the Midwest Generation stations?

A. Yes.

Q. Ms. Shealey, on slide 5 of Exhibit 1607, what is depicted?

A. The zoning map of Joliet Station, it looks like, Joliet 29.

Q. And what is Joliet 29 zoned as?

A. And I -- sorry. I-3, an industrial classification.

Q. And just so you know, if you have a hard time reading the screen, this document is actually at the end of your book. You can pull it out, if you like.

A. Thank you.

Q. Okay. Ms. Shealey, I want to turn to the next slide, which is slide 6, and on the

screen, you will see something highlighted.

Where are the ponds on the Joliet 29 Station?

A. At the north -- center north in the station, essentially.

Q. And how many ponds are there?

A. Three.

Q. Let's turn to the next slide, slide 7.

A. I'm so sorry. Can I go back?

Q. Sure.

A. Three are depicted. There are additional ponds that are not -- that are at Joliet.

Q. These are the three ponds that are subject to this matter, right?

A. Correct.

Q. Thank you. The other ponds are related to other operations at the station?

A. Correct.

Q. Moving on to slide 7.

What is -- generally speaking, what are we seeing at slide 7?

A. The current status and the

description of the three ponds at Joliet that are subject to this matter.

Q. Starting with Pond 1, is Pond 1 a CCR surface impoundment?

A. It is not.

Q. Why not?

A. It was emptied of ash prior to the effective date of the federal CCR rules and has not received ash since.

Q. Okay. Same question for Pond 3.

A. It is not a CCR surface impoundment. It never was. It never received ash. It was a finishing pond.

Q. Did Midwest Generation evaluate the contents of Ponds 1 and 3 to support those conclusions?

A. Yes.

Q. Generally speaking, what did Midwest Generation do?

A. Basically took what I would consider muck from the -- sampled the muck at the bottom of the ponds and had it analyzed for what it was, really.

Q. And what did the analysis show?

A. It was muck. So biological, mostly. I think it was mostly biological.

Q. And did Midwest Generation present this information to Illinois EPA?

A. Yes, and the Board, too, I believe.

Q. Yeah. You anticipated my next question.

Turn in your book to what has been marked for identification as Exhibit 1603.

(Whereupon, Respondent's Exhibit No. 1603 was marked for identification.)

BY THE WITNESS:

A. I am there.

MS. GALE: And I will state for the record that Exhibit 1501 is Midwest Generation's Petition For Joliet 29 Adjusted Standard, which is located at MWG13-15_119367 and has already been admitted.

HEARING OFFICER HALLORAN: Great. Thank, Ms. Gale.

BY MS. GALE:

Q. Ms. Shealey -- and it might be easier if you turn to MWG13-15_120528.

What is this document?

A. The Agency's recommendation, Illinois EPA's recommendation for our adjusted standard for the Joliet 29 Station.

Q. And you can see at the top of that document, when was this filed?

A. September 22nd, 2021.

Q. And as part of your duties as the environmental director, did you review the Illinois EPA's recommendation?

A. Yes.

Q. And I think it will be easier if I just get you to the page. If you turn to 1 -- MWG13-15_120535. Under Recommendation, what was the Agency's recommendation?

A. Illinois EPA stipulates that Ponds 1 and Pond 3 are not CCR surface impoundments subject to Part 845.

MS. GALE: And Mr. Hearing Officer, Midwest Generation moves for the admission of Exhibit 1603.

HEARING OFFICER HALLORAN: Mr. Russ?

MR. RUSS: No objection.

HEARING OFFICER HALLORAN: Thank

you, Mr. Russ.

Respondent's Exhibit 1603 is admitted.

(Whereupon, Respondent's Exhibit No. 1603 was admitted into evidence.)

BY MS. GALE:

Q. Ms. Shealey, for -- related to Ponds 1 and 3, has the Board made a decision?

A. Yes.

Q. I would like you to turn to your next tab, which was labeled for identification purposes Exhibit 1604.

A. I'm there.

(Whereupon, Respondent's Exhibit No. 1604 was marked for identification.)

BY MS. GALE:

Q. What is this?

A. The Board's order in that matter with regard to Ponds 1 and 3 at Joliet 29.

Q. What is the date of this order?

A. May 18th, 2023.

Q. And turning to page 5 of the Board's

order under conclusion, what did the Board conclude?

A. Part -- Ponds 1 and 3 are not subject to the provisions of Part 845.

MS. GALE: Mr. Hearing Officer, Midwest Generation moves for the admission of Exhibit 1604.

HEARING OFFICER HALLORAN: Mr. Russ?

MR. RUSS: No objection.

HEARING OFFICER HALLORAN: Thank you. Exhibit 1604 is admitted.

(Whereupon, Respondent's Exhibit No. 1604 was admitted into evidence.)

BY MS. GALE:

Q. Okay. I will read 2022 Stipulation No. 3. "Pond 2 at Joliet 29 is a CCR surface impoundment as defined in 415 ILCS 5/3.143."

Ms. Shealey, for Pond 2, why is that a CCR surface impoundment?

A. We continued to use that pond after the effective date of the federal CCR rules. I believe until -- we continued to place ash in there until, I believe, 2016 when the units -- the

generating units were converted to gas.

Q. And I can refer you to slide 7 of Exhibit 1607, but what is in Pond 2 today?

A. Nothing. Well, yeah, there's no -- not ash.

Q. And when was the ash removed?

A. 2019.

Q. And for what purpose was it removed?

A. Sorry. I'm thinking back to the time when we did the -- give me a second.

Q. Was Pond 2 ever emptied before?

A. Yes, uh-huh.

Q. Okay.

A. So, yeah, I guess it was routine station operations.

MS. GALE: Mr. Hearing Officer, it is noon, and I'm at a pretty good stopping point.

HEARING OFFICER HALLORAN: Yeah, that sounds good. Does that sound good? Okay. Yeah. We're off the record. We'll come back at 1:10. Thank you.

(Whereupon, a lunch break was taken.)

HEARING OFFICER HALLORAN: All

right. We are back on the record. It's approximately 1:10. Thanks for being back promptly. We have Ms. Shealey on the stand, a witness for the Respondent, and Ms. Gale is in the middle of direct.

And you may proceed. Thank you.

BY MS. GALE:

Q. Thank you.

Ms. Shealey, we are still talking about the Joliet 29 Station. Since you began with Midwest Generation in 2015, have you become familiar with Midwest Generation's history related to the ash ponds at the Joliet 29 Station?

A. Yes.

MR. RUSS: Can I just -- I'm sorry.

Can I just object to the picture on that slide that was just up?

MR. NISHIOKA: The picture?

MR. RUSS: Yeah, the photograph.

So this same photograph appears on each of the sites, and it gives the impression that that's a sample of the liner at the site, but since it's the same photograph from each site, that can't be the case. So I just -- if there's

some way we can stipulate on the record that it's just an example or something like that and not meant to be representative.

HEARING OFFICER HALLORAN: Yeah, I think -- Ms. Gale?

MS. GALE: Well, I guess I should clarify. We hadn't gotten to the slide yet, but this -- this slide and the information in it up until 2017 was admitted as a part of Exhibit 663, and we are -- so I -- I took it, I looked at what's on the Board's website, and it's already there.

MR. RUSS: Okay. All right. Good enough.

HEARING OFFICER HALLORAN: All right. Thank you. That addresses that objection.

Thank you. You may proceed, Ms. Gale.

BY MS. GALE:

Q. Thank you. Okay. So I think you just said you became familiar with Midwest Generation's history of the ash ponds at the Joliet 29 Station?

A. Yes.

THE COURT REPORTER: Does the mic work?

(Whereupon, a discussion was had off the record.)

HEARING OFFICER HALLORAN: All right. We're back on the record.

BY MS. GALE:

Q. Now, you are familiar -- and you have become familiar with Midwest Generation's history of the ash ponds at the other three stations that we will be talking about?

A. Yes.

Q. How did you become familiar with the history of the ash ponds at the four stations we are discussing here?

A. Review of documents, just general conversation with Midwest Generation employees. I sat in on part of the hearing previous to this one. I talked with Maria Race, who testified last time. Just a lot of -- yeah, a lot.

Q. And for the Joliet 29 Station, during Joliet 29's operation using coal, where did most of the ash go?

A. To Lincoln Stone Quarry.

Q. What is Lincoln Stone Quarry?

A. A state permitted landfill.

Q. And where is that located?

A. Across the river from Joliet 29, the Des Plaines River.

Q. And so if it went to the landfill across the river, what was the purpose of the Joliet 29 ash ponds?

A. They were generally used -- when the station burned coal, they were generally used when ash could not be sluiced across the river. When it was extremely cold, for example, or there was some other type of outage, they would -- to continue to generate, they would place ash into the ponds.

Q. And Ms. Shealey, we have put on the screen, and I would like to turn -- if you could turn to your slides, Slide No. 8, which are entitled, "Joliet #29 Timeline of Events," and as I said earlier, this was admitted as 663. We have added to it as a further timeline and put it in one place for the Board's convenience.

Ms. Shealey, when did Joliet 29 Station begin operating?

A. In the mid-60's; '64, '65. Probably '64 and '65. There were two units.

Q. And the units, what did they use to make electricity?

A. They used coal from the time they began operation until February of 2016, I believe.

Q. Okay. And looking at the timeline, in 2002 to 2005, what did Midwest Generation do?

A. They initiated a review of its ash -- of the ash ponds at the stations, which included locating the drawings and planning, retaining consultants, and actually site visits by those consultants.

Q. And by the stations, what stations?

A. Joliet 29 -- sorry -- Will County Station, Waukegan Station, and Powerton Station.

Q. Did any regulatory agency ask Midwest Generation to do evaluate -- do this evaluation of the ash ponds?

A. No.

Q. Was Midwest Generation required by law to conduct this evaluation?

A. No.

Q. At the time of this assessment, were

there any Illinois or federal regulations related to the storage or use of coal ash?

A. No. Not that I am aware of, no.

Q. Okay. Well, then, what is your understanding of why Midwest Generation conducted this evaluation?

A. Good operating practice, environmental stewardship. They wanted to make sure that the ponds were in good condition.

Q. And, generally, what did Midwest Generation do -- and I think you started upon it, but for the systematic evaluation, what did they start with?

A. A review of the history of the ponds, the history of -- their usage history and construction.

Q. And did they engage anyone to do that?

A. Yes.

Q. Who did they engage?

A. NRT Consultants and KPRG.

Q. I wanted you to turn to the next tab of your binder, which has been a previously admitted exhibit, Comp Exhibit 34.

Mr. Hearing Officer, to be clear, this was admitted in the first stage of the hearing.

HEARING OFFICER HALLORAN: Okay. And this is what exhibit again, please?

MS. GALE: Complainants' Exhibit 34.

HEARING OFFICER HALLORAN: Oh, okay. Proceed. Thank you.

BY MS. GALE:

Q. And this is the 2005 -- December 21st, 2005 NRT Technical Memorandum No. 1.

Ms. Shealey, have you seen this before?

A. Yes.

Q. And what is this?

A. I think it's the outcome of NRT's evaluations of the ash ponds in the Midwest Gen fleet.

Q. And, to your knowledge, what did NRT do for those evaluations?

A. They visited stations, and they reviewed documents.

Q. They visited stations, and they

reviewed documents.

Did -- for when they visited stations, to your knowledge, what did they evaluate?

A. I actually don't know. They -- they did -- while this document may categorize liner states, they did not look at liners.

Q. And I want you to turn to MWG13-15_23614, 23615, 23616, 23617, and first, what do these charts state?

A. That they are an impoundment matrix.

Q. And take a look at all -- each of these, and then I will ask you a question. Tell me when you are ready.

A. I'm ready.

Q. And you said it's an impoundment matrix. Did NRT make conclusions in this matrix?

A. Yes.

Q. And have you considered their conclusions in this matrix before?

A. Yes.

Q. Do you agree with the conclusions that they made in this matrix?

A. No.

Q. Why not?

A. Because they did not look at the ponds -- or they looked at the ponds, but they didn't look at the liners.

For example -- well, here is on the first one. Will County, liner condition if known is poor for all four ponds. They couldn't have known that without emptying the ponds, and they did not empty the ponds. I -- no, they didn't.

Q. So, if they didn't do that, how would you characterize their conclusion?

A. False or not true, at least. Questionable. Questionable is the best way, I think, to say it.

Q. Do you think they made assumptions?

A. I absolutely think they made assumptions.

Q. Okay. But, to your knowledge, did Midwest Gen start to implement the plan for re-lining the ponds?

A. Yes.

Q. All right. So looking at the timeline on page 9 of Exhibit 1607, what happened

in '06?

A. They began the process of re-lining the ponds. They did the engineering, scheduling, and budgeting for the work to re-line the ponds.

Q. So, Ms. Shealey, you have worked at power stations for a long time. Scheduling, engineering, and budgeting, what does that mean?

A. In a context of a power plant, scheduling means that they have to account for when the units are needed or not needed, so the units could take outages. The ash ponds are -- well, yeah, generally necessary for the units to be able to run. So scheduling would take into account outages, equipment avail- -- like, material availability, contractor time, just everyone's schedule, particularly the unit's schedule.

Q. And what does engineering mean?

A. The design. So hopefully a licensed professional engineer in the State of Illinois would design the new liner system, whatever that would be.

Q. And for design, where are designs written? What do they look like?

A. Drawings. Engineering drawings, specifically.

Q. Okay. So moving ahead to 2008, what station did Midwest Generation start with for re-lining the ponds?

A. This Joliet 29, Pond 2, right? Am I right? Yeah.

Q. And so to re-line a pond, what's your understanding of the work required to do that?

A. You would have to empty the pond first. Well, okay. Go back. You have to precure the liner system -- procure the liner system, empty it, install the liner, certify that the liner is installed correctly, and then you could probably place the unit back in service.

Q. And for scheduling, can it happen in winter?

A. No.

Q. Why not?

A. Things freeze. Particularly -- we are in Illinois, so it's too cold to do that work in winter, because of frozen stuff.

Q. And now that you have worked in

Illinois for a while, what sort of permit is required to do that sort of project?

A. An NPDES construction permit at that time.

Q. From whom?

A. Illinois EPA.

Q. And when Midwest Generation emptied the ponds, what is your understanding of the condition of the Poz-O-Pac -- I'll rephrase.

When Midwest Gen emptied the ponds at Joliet 29, what is your understanding of the condition of the Poz-O-Pac that they found?

A. It was good, or if not better than good. Sufficient. More than sufficient.

Q. What do you mean by "good"?

A. There were no cracks. There were no holes. It was in tact, had its full integrity.

Q. Back to looking at the timeline. In December of 2008, what was reported in the press?

A. A Tennessee Valley Authority ash spill.

Q. And after that ash spill, what regulatory agency contacted Midwest Generation about its ash ponds?

A. Illinois EPA.

Q. Yeah. About what time?

A. Approximately, four months later, in April of the following year.

Q. And what did Illinois EPA ask Midwest Generation to do?

A. A hydro -- oh, my goodness.

A hydrogeological assessment.

Q. And what is a hydrogeological assessment?

A. I think it -- I think it determines the -- I don't want to say quality, but how groundwater behaves in relation to the ponds.

Q. Did it also conclude an evaluation of any nearby wells?

A. Yes.

Q. What was that?

A. The potable wells, any nearby potable wells that would be impacted by -- could be impacted by the ponds.

Q. And how did Midwest Generation respond to Illinois EPA's inquiry?

A. They complied. They agreed to do it. They did the hydro -- hydrogeological

assessment and installed groundwater monitoring wells.

Q. I promise this is the last time you have to say that word. Well, I don't know.

Ms. Shealey, to your knowledge, was there any regulatory requirement to conduct this hydrogeologic assessment?

A. No, not at all.

MS. GALE: And for the record, Mr. Hearing Officer, that assessment was previously admitted as Exhibit 621.

HEARING OFFICER HALLORAN: So noted. Thank you.

BY MS. GALE:

Q. And, Ms. Shealey, it's in your book, if you could flip to it.

And, Ms. Shealey, this was for the -- all four stations that are subject here, right?

A. Yes.

Q. And in this assessment, as it relates to potable wells, what were the conclusions?

A. That there were none within -- that

were within a distance that would be impacted by the ash ponds.

Q. I'm sorry. Did you say none?

A. None, zero.

Q. Thank you.

I want to flip to the next page of 10 of the exhibit. Around this same time, in January of 2010, what did USEPA do?

A. They announced that they were going to regulate coal ash, CCR. Coal ash -- coal combustion residuals as a hazardous waste.

Q. They didn't, though, did they?

A. No, they did not.

Q. Or I said -- I should be clear.

They did not regulate it as hazardous waste, right?

A. No. They did not regulate it as a hazardous waste.

Q. And in response to that announcement, what did Midwest Generation do?

A. Attempted to cease work in -- or they ceased the work of re-lining the ponds.

Q. Why did Midwest Gen do that?

A. I believe the initial announcement

included liner standards, and so to avoid unnecessary or inappropriate work, Midwest Gen wanted to wait until the final -- the rules were -- regulations were finalized.

Q. Okay. And then at the same time, did Illinois EPA ask Midwest Generation to install anything around the ash ponds?

A. Groundwater monitoring wells.

Q. And what was Midwest Generation's response?

A. The ground -- they installed groundwater monitoring wells.

Q. And, to your knowledge, was Illinois EPA's request based upon a court order?

A. No.

Q. Was it based upon an order from another governmental body?

A. No.

Q. So given that it was not based upon a court order or a government -- or an order from a governmental body, how would you characterize Midwest Generation's decision to say yes to the Agency's request?

A. Voluntary.

Q. Okay. So, generally, in -- starting in April of 2010 -- August. August. I meant August of 2010, what did Midwest Generation first do?

A. They got proposals for a hydrogeologic assessment. Oh, and then they submitted -- I'm sorry. And then they submitted their -- they accepted a proposal and submitted a plan -- their plans to the Agency, the Illinois EPA.

Q. And was that for each of the four stations that are subject here?

A. Yes.

MS. GALE: And, Mr. Hearing Officer, for the record, those plans were previously admitted as Exhibits 613 for Joliet 29, 614 for Powerton Station, 615 for Waukegan Station, and 616 for Will County Station.

HEARING OFFICER HALLORAN: So noted. Thank you.

BY MS. GALE:

Q. Ms. Shealey, did Illinois EPA approve those plans?

A. Yes.

Q. And upon approval, what did Midwest Generation do?

A. Began groundwater sampling.

Q. 2022 stipulation No. 4. "Midwest Gen began sampling the groundwater at Joliet 29 in December of 2010."

Ms. Shealey, upon collection of the groundwater results and the hydrogeologic assessment, what did Midwest Generation do? Where did those results go?

A. To the Illinois EPA.

Q. I'm going to turn to slide 11.

Ms. Shealey, did Midwest Generation following the initial groundwater collection continue to conduct the sampling of these groundwater wells?

A. Yes.

Q. How frequently?

A. Quarterly.

Q. Stipulation -- excuse me. 2022 Stipulation No. 7. "Midwest Generation has submitted the groundwater monitoring results for Joliet 29 to Illinois EPA from 2010 to present."

Ms. Shealey, did Illinois EPA

issue any type of order that required Midwest Generation to continue to conduct the quarterly monitoring at the Midwest Generation stations?

A. No.

Q. Is there a statutory requirement to conduct the quarterly groundwater monitoring in 2010?

A. No.

Q. Was there any regulatory requirement to conduct the groundwater monitoring in 2010?

A. No.

Q. Okay. So there is no order to do the work, or was there a permit requirement to do that groundwater monitoring in 2010?

A. No.

Q. So, there's no order to do the work. There's no permit required, no regulatory or statutory requirement. How would you call Midwest Generation's decision to continue to conduct the groundwater sampling in 2010?

A. Voluntary.

Q. Now, we have just been discussing Joliet 29. Is that true for the Powerton Station?

A. Yes.

Q. Is that also true for the Waukegan Station?

A. Yes.

Q. Finally, is that also true for the Will County Station?

A. Yes.

MS. GALE: Mr. Hearing Officer, I want to note for the record that Complainants' Exhibits 1A, 2A, 3A, and 4A are the Illinois EPA violation notices related to the ground wanter at Midwest Gen for all four stations.

HEARING OFFICER HALLORAN: So noted.

BY MS. GALE:

Q. Ms. Shealey, to your knowledge, did the proposed USEPA CCR regulations that were proposed in 2010 affect in any way Midwest Generation's response to the violation notices they received from Illinois EPA?

MR. RUSS: Object, leading.

HEARING OFFICER HALLORAN: Sustained.

BY MS. GALE:

Q. Ms. Shealey, I just stated that Illinois EPA violation notices were received to

Midwest Gen.

Are you aware of that?

A. Yes.

Q. And are you aware -- well, how did Midwest Generation respond?

A. Ultimately, they entered into compliance commitment agreements.

Q. And before they entered into the compliance commitment agreements, to your knowledge, did they have conversations with Illinois EPA?

A. Yes.

Q. And, to your knowledge, did -- what did those conversations entail?

A. Midwest Gen's preference to not re-line the ponds at that point because of the pending federal regulations.

Q. And yet despite the pending federal regulations, how did the Illinois EPA violation notices ultimately get resolved?

A. By -- with compliance commitment agreements, which included re-lining some ponds in the fleet.

Q. And re-lining some ponds with what?

A. HDPE liners.

Q. And what is -- high level, what is an HDPE liner?

A. High density polyethylene is a plastic liner. It's a -- it -- well, it comes in various thicknesses, but Midwest Gen chose 6 -- used -- which is industry standard, 60 mil liners -- 60 mil being their thickness.

Q. And we went earlier and discussed the re-lining projects and the efforts that it takes for a station to do that. Do you recall that discussion?

A. Yes.

Q. Here to do those re-lining projects, how much time, to your recollection, did Midwest Generation have?

A. I believe it was months. I believe it was months.

Q. Okay. And so in 2012, were there any liner requirements for CCR surface impoundments?

A. No, they were pending.

Q. And, approximately, what were the costs to re-line the Midwest Generation station

ponds for the CCAs?

A. I believe it was, like, $10 million in 2012, -- 2012 dollars. So 10 million back then.

Q. And I can refer you back to sheet 11. But, to your understanding, what was the timing of signing the CCAs -- Midwest Generation signing the CCAs with the Illinois EPA and the filing of this lawsuit?

A. They were almost simultaneous. This lawsuit was filed before the Agency had the opportunity to accept them.

Q. And then in the fall of 2012, was there any other court filing that Midwest Generation made at that time?

A. Well, yeah. They filed for bankruptcy.

Q. And, to your knowledge, did Midwest Generation's bankruptcy filing affect its compliance with the CCAs?

A. No.

Q. Okay. We discussed this in May, but we will revisit it.

Did Midwest Gen complete the CCA

requirements?

A. Yes.

Q. And was that for all four of the stations that are subject here?

A. Yes.

Q. And so at Joliet 29, what did Midwest Generation do?

A. They re-lined Pond 3. Well, they continued groundwater monitoring, and they re-lined Pond 3.

Q. Ms. Shealey, I want to take a step back. We have been talking about CCAs.

What is a CCA?

A. Compliance commitment agreement.

Q. And as an agreement, how would you describe it?

A. It's an agreement between a source and the Agency to resolve a potential or -- a potential compliance issue.

Q. Is it like a court order?

A. No.

Q. Looking at slide 12 of Exhibit 1607, in 2015 what happened related to USEPA?

A. They published the final CCR rules,

coal combustion residual rules, in the federal register.

Q. Thank you. And at Joliet 29 following published occasion of those rules, what did Midwest Generation do?

A. Remove the ash from Pond 1.

Q. And what did they do at Pond 3 --

A. Noth- --

Q. In July of 2015?

A. Oh, sorry. They -- yeah, sampled the influent water to assure that it didn't contain ash.

Q. I want to turn to the next slide, 13 of Exhibit 1607. So following enactment of the federal rule, what did Midwest Gen start doing?

A. Complying with the federal rule, which is a lot. So that's my simple statement. Sorry.

Q. High level, what's the "a lot"?

A. There are engineering certifications, like structural civility assessments. There was a groundwater -- hydro -- groundwater monitoring for -- under the federal rule, we had eight quarters of sampling to

establish our groundwater background, and continued monitoring since. Structural stability inspections, both by qualified persons on a weekly basis and by a professional engineer annually. Well, that's my list that comes to mind, top of head.

Q. Were there liner requirements in that rule?

A. Yes, there are.

Q. And referring to your earlier statement that Midwest Generation was concerned about re-lining the ponds in 2012 for the VNs because of the USEPA regulations, were Midwest Generation's concerns correct?

A. They were.

Q. How so?

A. The ponds are not -- or under the federal rule, the ponds are unlined.

Q. Can you explain that further, please?

A. Yeah. They don't have the composite liner system that the federal rules require, and so, generally, HDPE is a piece, a part of a composite system, but it's not the only part.

So our HDPE liners don't qualify as lined ponds under the federal rule.

Q. And what did that mean for Midwest Generation?

A. Well, it means that we have unlined ponds that may or may not have -- that have different dates where they may have seeps operating, and that they spend a lot of money to get to a place that's not compliant with the rules.

Q. And then looking at the timeline, in January of 2019, what was introduced in the Illinois General Assembly?

A. Senate Bill 9.

Q. What was Senate Bill 9?

A. It -- it was a -- well, yeah, it is. It is now, but it was an act to regulate coal ash impoundments in Illinois.

Q. And around that time, what was Midwest Generation preparing to do in relation to its CCR surface impoundments pursuant to the federal CCR rule?

A. We were intending to close several.

Q. And close them under the --

A. Under the federal rule, as the federal rule defines closure.

Q. And when Senate Bill 9 was proposed, what did Midwest Generation do?

A. Approached the Agency about a -- well, at least one specific pond so that we could close it under the federal rules. Then the Agency responded that they would probably find us in violation if we did so, because of Senate Bill 9's existence.

Q. And explain that further, because of Senate Bill 9's existence. What was required under Senate Bill 9?

A. Senate Bill 9 explicitly stated that you cannot close a CCR surface impoundment without a permit from the Agency.

Q. And under the -- when you were going to close under the federal rules, did you require something from the Agency?

A. We required a permit from the Agency, yes.

Q. What kind of permit was it at that time?

A. An NPDES permit.

Q. An NPDES construction permit?

A. Construction permit, yeah.

Q. Right. What did the Agency tell you about issuing that construction permit?

A. That they would not; not with Senate Bill 9, sort of, out there at that point.

Q. And what was your takeaway when the Agency told you they would not issue a permit?

A. That we could not close any impoundments.

Q. I'm going to turn to the next -- slide 14 of Exhibit 1607. 20 -- excuse me. 2021, what rule passed in front of the Board?

A. Part 845, which was the result of Senate -- the Senate Bill 9 law. I can't -- I can't name the act, exactly, that it came from, but the Board passed rules regarding CCR surface impoundments.

Q. And, generally -- well, following passage of the rule, what did Midwest Generation do?

A. Begin complying.

Q. High level, what does that mean?

A. It required a somewhat modified groundwater monitoring, engineering certifications again, like structural stability analyses, inspections, permit applications. That is my list, off the top of my head.

Q. Where is that information posted?

A. On our website.

Q. Is that pubically available?

A. Absolutely.

Q. 2022 Stipulation No. 6. "On November 1st of 2021, Midwest Generation submitted an operating permit application to Illinois EPA for Pond 2 at Joliet 29."

Ms. Shealey, you just mentioned the pubically available website. Is the Joliet 29 permit application on that website?

A. Yes, it is.

Q. And, generally speaking, what is in the permit application?

A. Demonstration that we meet location restrictions, hazard potential classifications, structural stability, as I said before, closure plans, groundwater monitoring network and preliminary groundwater monitoring results under

Part 845, which kind of brought in the historic results from federal CCR monitoring, and our proposed groundwater protection standards.

Q. Ms. Shealey, how big is the operating permit application?

A. Hundreds of pages.

Q. And who prepared it?

A. I think KPRG is the chief author, but there are sections that were prepared by other consultants.

Q. And, to your knowledge, how much effort was it to create this operating permit application?

A. A lot. We had about six months between April and November 1st. So it was mid-April to November 1st. We had about six months to compare -- prepare operating permit applications for all of our impoundments, and so it was several people's full-time job for that six months.

Q. And just to correct something, you said all of your impoundments. Do you mean all of the federal impoundments?

A. No. The federal impoundments plus

three -- yes, all of the federal impoundments, and there is an additional three that are state impoundments.

Q. And we will get into that later.

Ms. Shealey, to your knowledge, has Illinois EPA issued an operating permit for Pond 2 yet?

A. No.

Q. Ms. Shealey, are you aware that Illinois EPA -- are you aware of Illinois EPA's CCR surface impoundment website?

A. Yes.

Q. Have you visited it?

A. Yes.

Q. What is on that website?

A. Links to each of -- each owner/operator's websites, any public notices that would have been -- will be issued. Those are two things that come to top of mind first.

Q. Do they put notices of documents they receive?

A. I believe so.

Q. And as part of your role as environmental director, do you review that

website?

A. Yes.

Q. How often?

A. At least monthly, typically looking for permit notices.

Q. When you have looked, what have you found?

A. That there are no permit notices, or no draft permits issued.

Q. For Midwest Gen?

A. For Midwest Gen or anyone.

Q. 2022 Stipulation No. 7. "On February 1st, 2022, Midwest Generation submitted a construction permit application to the Illinois EPA for closure of Pond 2 at Joliet 29."

Ms. Shealey, for Pond 2 at Joliet 29, what is the proposed closure method?

A. Essentially, closure by removal and reuse of the liner system for a low-volume waste pond.

Q. Okay. But you told me earlier Pond 2 is empty. So what would be removed?

A. There is a warning layer system. It's a lime -- limestone and sand warning layer

that is still in the pond. All of the ash was removed.

Q. And to support Midwest Generation's proposed closure method, what was in the construction permit application?

A. A request for an adjusted standard. What was in the construction -- I don't -- there were lots of things. I'm sorry.

Q. Were there drawings?

A. Oh, absolutely, yes.

Q. And what did the drawings show?

A. The liner system as it stands. There were also descriptions of how engineer -- how we could or would be able to clean the liner and repurpose it so to ensure that there are no CCR constituents left in the pond.

Q. And for the construction permit application related to groundwater, what is required to be submitted?

A. I think it's the groundwater monitoring network, and I'm questioning it, because I know that that was in the operating permit, but the groundwater monitoring results probably are in there, too.

Q. And what -- and what else is in there related to groundwater that you use the results for?

A. Modeling. There is groundwater modeling done for construction permit applications as a requirement under Part 845.

Q. Ms. Shealey, the construction permit application for Pond 2, how big was it?

A. Hundreds of pages.

Q. And what was the kind of effort to prepare the Pond 2 construction permit application?

A. Equally as strenuous as the effort to prepare the operating permit application, because in addition to those things I have already said, we held public meetings with regard to the closure plans.

Q. So I think you touched upon it by closure by removal, and you said reuse of the liner.

What is Midwest Generation's plan for Pond 2?

A. To use it as a low-volume waste pond for general station operation of Joliet 29 on gas.

Q. What is a low-volume waste pond?

A. It collects processed water and stormwater. In the case of Joliet 29, it would be processed water -- the easiest example of processed water is boiler water. Boiler blowdown is what we call it; the -- discharge of water from the boiler as you process it to make steam.

Q. And that -- that water, that low-volume waste water, is it part of a permitting program?

A. Yes.

Q. Which program?

A. NPDES.

Q. And I'm not going to ask you what that stands for.

A. I can do that one.

Q. Okay.

A. National -- I think I can. National pollutant discharge elimination system permit.

Q. Nicely done.

So to reuse the HDPE liner in Pond 2, what does Midwest Generation need?

A. A permit. Oh, and an adjusted standard. Sorry.

MS. GALE: And for the record, Mr. Hearing Officer, Midwest Generation's -- again, I said this earlier, but just to reiterate it, Midwest Generation's Petition for Adjusted Standard for the Joliet 29 Station was previously admitted as Exhibit 1501.

HEARING OFFICER HALLORAN: So noted. Thank you.

BY MS. GALE:

Q. In Exhibit 1501, which was the petition, what did Midwest Gen state it can do with the HDPE liner to reuse it?

A. Decontaminate it. So essentially remove all CCR and CCR constituents and place it back into -- assure -- assure -- and assure its integrity to be able to place it back in service as a low-volume waste pond.

MS. GALE: And, Mr. Hearing Officer, for the record, Illinois EPA's second recommendation, which was related to Pond 2, was previously admitted as Exhibit 1409.

HEARING OFFICER HALLORAN: So noted. Thank you.

(Whereupon, Respondent's Exhibit No. 1605 was marked for identification.)

BY MS. GALE:

Q. Ms. Shealey, can you turn to the next tab in your binder, which has been previously marked as Exhibit 1605? And I want to ask you what it is. I would direct you to page MWG13-15_122675.

A. Oh, it's Midwest Generation's response to the Illinois Environmental Protection Agency's recommendation with regard to that adjusted standard.

Q. And as part of your duties as an environmental director, did you review it?

A. Yes.

Q. I would like you to turn to page -- oh, we are there.

HEARING OFFICER HALLORAN: Ms. Gale, did you point this out on the cover page? It's AS21-2, and then it's AS21-1.

MS. GALE: Well, that must have been a typo in the original filing, sir. So probably.

HEARING OFFICER HALLORAN: Yeah. I

just wanted to point it out.

MS. GALE: Yeah.

HEARING OFFICER HALLORAN: I don't remember the AS21-2.

MS. GALE: Well, for the record, that is a typo in the Notice of Filing for the wrong adjusted standard. It definitely should be AS21-1, sir.

HEARING OFFICER HALLORAN: Thank you.

BY MS. GALE:

Q. Turning to MWG13-15_122675. Generally speaking, what was Midwest Generation's response to Illinois EPA's recommendation related to Pond 2?

A. That there is no evidence of CCR in -- in that pond or in its liner system, and that we should be able to decontaminate the liner and reuse the pond for low-volume waste.

Q. Ms. Shealey, I would like -- and in support of Midwest Generation's response, what did Midwest Generation attach?

A. Expert opinions.

Q. Can you turn to MWG_122705? And

there is a tab. There should be a tab for each, everybody.

What is this?

A. Weaver Consultants Group Expert Opinion for Joliet 29 Pond 2.

Q. And to your recollection, generally speaking, what did Mr. Max- -- for Weaver -- what did Weaver Consultants Group -- and I believe it was Mr. Maxwell who testified earlier, what was his opinion related to Pond 2?

A. That it was not a source of any groundwater contamination.

Q. And the next tab in that exhibit, which is on MWG13-15_122897, what is this?

A. An expert report from Exponent.

Q. And if you look four pages in, it's by a Dr. Mateusz Redlinski. Do you see that?

A. Yes.

Q. And what did Dr. Radlinski opine upon?

A. The -- whether the liner system -- liner system was a CCR material, whether the Poz-O-Pac was -- whether Poz-O-Pac was CCR material, essentially.

Q. And Poz-O-Pac is spelled, P-O-Z, dash, O, dash, P-A-C.

And the third tab in this exhibit, which is at MWG13-15_122914, what is this?

A. Another expert -- expert opinion. This one by Sargent & Lundy.

Q. And at the top of that page you see it's by Mr. Dehlin?

A. Yes.

Q. What -- generally speaking, what was Mr. Dehlin's opinion?

A. That we could decontaminate the liner and reuse it.

MS. GALE: Mr. Hearing Officer, we move for the admission of Exhibit 1605.

MR. RUSS: No objection.

HEARING OFFICER HALLORAN: Thank you, Mr. Russ.

Respondent's Exhibit 1605 is admitted.

(Whereupon, Respondent's Exhibit No. 1605 was admitted into evidence.)

BY MS. GALE:

Q. Ms. Shealey, I'm going to turn back to the slides. We are going to turn to the map. We are on slide 15 of Exhibit 1607, and we have on the map the monitoring wells highlighted on the screen. Are you there?

A. Yes, I see it.

Q. Do you see Monitoring Well 9 on the map?

A. Yes.

Q. What pond is closest to Monitoring Well 9?

A. Pond 3.

Q. And you were here for Mr. Gnat's testimony?

A. Yes.

Q. Recalling his testimony, what is your understanding of the groundwater results at Monitoring Well 9?

A. They were anomalous.

Q. And by anomalous, you mean they were different?

A. Yeah, than what would be expected.

Q. And given that the groundwater

results were anomalous or different -- and I presume you mean than the other wells -- what did Midwest Generation do?

A. An investigation around that well. Can I go back?

Q. Sure.

A. I am sure I missed part of Mr. Gnat's testimony.

Q. Oh, that's right.

A. I just wanted to clear that up. Sorry.

Q. Well, even if you missed that part of his testimony -- about this part, that testimony was in May, Ms. Shealey?

A. Okay, yeah. Okay. Thank you. I just wanted to clear up that I have not seen all -- I did not see all of Mr. Gnat's testimony.

Q. But anyways, well, as your role as environmental director, were you aware of what -- the monitoring well results of Monitoring Well 9?

A. Yes.

Q. Okay. And given that they were different, what did Midwest Generation do?

A. An investigation around that well.

Q. And in part -- well, we discussed this earlier, but what is the class -- Pond 3 is not a CCR surface impoundment, right?

A. No, it is not.

Q. Were there any statutory or regulatory requirements to do that investigation?

A. No.

Q. And as environmental director, did you see the results of that investigation?

A. Yes.

Q. And to your recollection, what did soil borings show?

A. That there was not CCR around that well. So CCR was not the source of the anomaly was the conclusion.

Q. Excellent. Thank you.

I'm going to refer now to the map, and we are going to be highlighting three areas.

Referring to the map, do you see three areas sort of identified there?

A. Yes.

Q. Are you generally familiar with those three areas?

A. Yes.

Q. Okay. Let's start with the northeast area. To your knowledge, has Midwest Generation placed ash in the northeast area?

A. No.

Q. And to your knowledge, what was the status of the northeast area when Midwest Generation purchased the Joliet 29 Station?

A. It looks like a nature preserve. It's covered with grass and trees, and there is animals. You can -- or you can see evidence of many animals living over there or using that area.

Q. And I believe you are aware, as environmental director, of Mr. Gnat's investigations of that area?

A. Yes.

Q. And do you recall what those investigations are pursuant to?

A. The NPDES permit.

Q. Is it the stormwater permit?

A. Yes.

Q. And then other than the stormwater permit, has Illinois EPA or USEPA ever asked Midwest Gen to investigate the northeast area?

A. No.

Q. Ms. Shealey -- and I think you touched upon this in May, so we are going to revisit it. You have had conversations with other regulatory agencies about this area, right?

A. Yes.

Q. Which ones?

A. Army Corp of Engineer -- Engineers and Illinois Department of Natural Resources.

Q. And in your conversations with the Army Corp of Engineers and the Illinois Department of Natural Resources about the northeast area, what have you understood is in that area?

A. River spoils.

Q. Are you aware that -- of the 1999 ENSR reports?

A. I'm aware, yes.

Q. And are you aware that they describe that area as an ash landfill?

A. Yes.

Q. You said earlier that you worked at power stations for a long time. Do you recall that?

A. Yes.

Q. As a person that's worked at power stations, coal stations, does it make sense that that is an ash landfill?

A. None, whatsoever.

Q. Why not?

A. It makes no sense to me. As I stated before, most of the ash that was generated at Joliet 29 was sluiced across the river to Lincoln Stone Quarry. That -- that has to be -- I mean, I have worked that personally. It has to be more than a mile, two miles away. It doesn't make sense for them to drive -- it just doesn't make sense for them to place ash in -- that far away from the boilers.

Q. Which boilers?

A. Unit 7 and 8, the coal fire boilers.

Q. At what station?

A. Joliet 29. Particularly when they have other places. They have the quarry. It just makes no sense to me.

Q. Ms. Shealey, in your conversations with the Army Corp of Engineers and IDNR about the northeast area, what did you learn about the ownership of that property?

MR. RUSS: Object to hearsay.

HEARING OFFICER HALLORAN: I'm sorry. Object?

MR. RUSS: Hearsay. She's being asked what the Army Corp said.

MS. GALE: I asked her what she learned.

HEARING OFFICER HALLORAN: Yeah. No, I'll allow it. Go ahead.

BY THE WITNESS:

A. It wasn't the Army Corp, actually. It was IDNR. The state owns a piece of -- part of that land.

BY MS. GALE:

Q. In looking at that map, what do you see?

A. That's not identified on here?

Q. But it's -- I'm sorry.

Looking at the map, the borderline of the northeast area along the river, can you see there?

A. Oh, I think it does show that our property line does not go all the way to the river.

Q. Okay. And we have talked about your conversations with the Army Corp. To your knowledge, why is the Army Corp interested in the northeast area?

A. It is their singular solution to invasive species in the Great Lakes. Singular solution to stopping invasive species into the Great Lakes. The Brandon Road Lock and Dam system provides a -- well, the Brandon Road Dam provides a barrier for fish traveling upstream, because they can't get up the dam. So the lock is critical to them to be able to stop fish from getting through the lock.

Q. I now want to turn to the northwest area, and it's located on your map. He keeps on turning it off.

Do you see the area described as Former Ash Placement Sampled in 2005?

A. Yes.

Q. Are you familiar with those sampling results?

A. Yes.

Q. And what did those results indicate?

A. The majority of the material

qualified as CCB, coal combustion byproducts.

Q. Did Illinois -- to your knowledge, did Illinois EPA ask Midwest Generation to investigate this area?

A. No.

Q. Did USEPA ever ask Midwest Generation to investigate this area?

A. No.

Q. I now want to turn to north -- excuse me -- the southwest area.

To your knowledge, has Midwest Generation placed any CCR in the southwest area?

A. No.

Q. And to your knowledge, has Illinois EPA ever asked you to investigate the southwest area?

A. No.

Q. And by you, I mean Midwest Generation.

A. No.

Q. And to your knowledge, has USEPA ever asked Midwest Generation to investigate the southwest area?

A. No.

Q. You testified earlier that the neighbor to the west used to be a Caterpillar fac- -- excuse me -- facility. Do you recall that?

A. Yes.

Q. In looking at the scene, there is a hashmark on the western edge or western side of the Joliet 29 Station. What is that hashmark?

A. It's actually Caterpillar's ELUC that extends onto Joliet 29 property.

Q. And you said it's Caterpillar's ELUC. How did Caterpillar be -- was able to place an ELUC on Midwest Gen's property?

A. Midwest Gen agreed to it.

Q. Do you know why?

A. Other than being a good neighbor, no, I don't. But they were a good neighbor. We are a good neighbor.

Q. And to your knowledge, what does the ELUC require, or what restrictions are on the ELUC?

A. The groundwater in that area cannot be used for potable water sources.

Q. And to your knowledge, has Midwest

Generation disturbed or removed any soil in that area?

A. No, not to my knowledge.

Q. And to your knowledge, has Illinois EPA required Caterpillar to do anything additional for the contamination from its property onto Midwest Gen's property?

A. No.

Q. And I guess I'll ask it now, since it's no longer Caterpillar property.

To your knowledge, has Illinois EPA required the current owner of that property to do anything additional for contamination from that property onto Midwest Generation's property?

A. No.

Q. I'm going to turn to the next slide, which is slide 16 of Exhibit 1607.

Ms. Shealey, it's been brought up a few times this week, but recently what has Illinois -- excuse me.

Recently, what has USEPA introduced related to historic coal ash areas?

A. Proposed rules for legacy surface impoundments and what they call CCR management

units.

Q. As the environmental director of these plants, were these -- was USEPA's proposal for the rules a surprise to you?

A. No.

Q. Why not?

A. It was a settlement, and I'm not sure who the plaintiff was, but it was a -- there was a consent decree published in the federal register about several months ago, and I think actually when the settlement happened, I was aware of the settlement years ago. It's just general course of my job.

Q. Was there a decision years ago that also you were aware of?

MR. RUSS: Object to vague.

HEARING OFFICER HALLORAN: Could you rephrase? Thank you.

BY MS. GALE:

Q. Ms. Shealey, are you aware of the USWAG decision?

A. Yeah, and that's -- that's how -- I think that's one of my initial introductory points to knowing that the legacy impoundment rules were

coming. As it states on the screen, it was in August of 2020 -- 2018.

Q. And so because you were aware since 2018 about the possibility or pendency of these regulations, how did that inform your decisionmaking process as it relates to the historic ash areas at Joliet 29 Station?

A. We need -- generally regulatory certainty is necessary for us to be able to act. The changing regulatory environment sort of would put us in a position similar to Midwest Gen many years ago when they re-lined the ponds, and those liners are not qualified as -- those impoundments don't qualify as lined impoundments. So it gives us caution around our next steps.

Q. So, you mentioned the CCA. The re-lining of the ponds, was that pursuant -- you are talking about the CCA process?

A. Yes. Excuse me.

Q. And so why do you want to act cautiously or it gives you caution?

A. There are several reasons. One is Midwest Gen -- again, I don't know the exact number, but I'm pretty sure they spent $10 million

re-lining ponds for it not to be compliant with the final rules. There are a lot of people involved in -- and just in that re-lining project. There were engineers, consultants, station operations, involved in that, and it's -- sorry. It's a personal preference. I don't want to use people's time in a way that is not beneficial, does not move us forward, closer to compliance. So it gives me hesitancy.

Q. I will turn to the next screen, which is slide 17 of Exhibit 1607.

What is this showing?

A. The -- it's a -- the docket for the proposed rules, proposed legacy and CCR management unit rules.

Q. And I think you mentioned this earlier, but did they propose a new CCR unit?

A. Yeah, the CCR management unit.

Q. And have you had a chance to review the docket?

A. I have been able to poke through the docket. The docket is very large. I have not reviewed it in its entirety.

Q. Do you have an understanding of what

a CCR management unit is?

A. Yes, I do.

Q. What is it?

A. An area of ash at a power plant.

Q. So --

A. That is not an impoundment or a CCR landfill. Sorry.

Q. So, Ms. Shealey, as it relates to Joliet 29 Station and the three historic areas we just discussed and this USEPA rule, how do those two -- how do the USEPA's CCR management unit rules apply?

A. I'm not exactly sure, but I believe that we will have to determine whether the rules apply -- apply to those three areas.

Q. Could they?

A. They could, yeah, absolutely.

Q. And similarly, does the current Illinois CCR rule apply to the historic areas of Joliet 29?

A. No, but there is an open subdocket.

Q. And what is -- yeah. What is the open subdocket?

A. For -- forgive me. I don't remember

what it's exactly called, but it -- my simple recollection is that it would cover areas that -- of historic ash.

Q. Okay. So -- but we have these areas of historic ash; the northeast area, the northwest area, and the southwest area.

What, if anything, had Midwest Generation done with those areas, even with these regulations?

A. So, I think I already said -- and if I didn't, forgive me. The northeast area was investigated to determine whether that material qualified as CCB.

Q. Northwest area, you mean?

A. North -- I knew I was going to --

MR. RUSS: Object. Sorry.

THE WITNESS: Sorry.

HEARING OFFICER HALLORAN: I'm sorry. Mr. Russ?

MR. RUSS: I'm slow to object there, but there have been a series of leading questions. I just want to object to the leading questions.

HEARING OFFICER HALLORAN: Yeah. I agree with Mr. Russ.

MS. GALE: I'm simply correcting her direction.

HEARING OFFICER HALLORAN: I know, but it's been leading.

MS. GALE: Okay.

HEARING OFFICER HALLORAN: Thank you.

BY MS. GALE:

Q. What, if anything, has Midwest Generation done -- you mentioned the northwest area.

In addition to the northwest area, what has Midwest Generation done in relation to these historic areas?

A. So now it's -- northeast is inspected at least annually to ensure that there is nothing -- to ensure that it looks as I described, without any disturbance or ash or anything that can be seen by the eye.

Q. As an environmental director, are you aware -- generally aware of any issues that may arise at the stations?

A. Absolutely.

Q. Have you been made aware of any

issues that arise at the northwest area, northeast area, or southwest area?

A. Other than what I have discussed with the DNR wanting to purchase the piece of land, no. There are no issues that I have been made aware of.

Q. And so then today under current laws, is Midwest Generation required to do any more at these Joliet 29 stations -- historic areas?

A. No.

Q. Okay. But even if Midwest Generation were not required to do more, why hasn't it?

A. One of the reasons is this lawsuit.

Q. Okay.

A. Similar to the re-lining -- the CCAs and the re-lining of the ponds, if we would go -- get out ahead of any decisions here, we would run the risk of wasted work or having to redo work.

Q. So this lawsuit. What other reasons that we may have come up with?

A. Pending regulations.

Q. And, Ms. Shealey, in your

experience, what is the best way to conduct a corrective action for areas at a station?

A. You start with understanding what needs correcting. So an investigation, and then depending on what the investigation finds, you develop a plan and execute that plan.

Q. And for that plan, do you have -- is there some sort of requirement for that plan that you need?

A. Prudently, you would get the Agency's agreement to it.

Q. And you touched upon this, but how does Midwest Generation's experience with the 2012 CCAs inform Midwest Generation's decisionmaking here?

A. Again, I just would never want to get out ahead of the Agency at this point. It's sort of -- yeah. I just wouldn't want to get out in front of the Agency's decisions.

Q. Is it technically feasible to get ahead of those Agency decisions?

A. It's technically feasible, but I would not call it technically prudent.

Q. Ms. Shealey, moving on. Do you need

a break? Because we are going to move on to a different station.

A. I would like one.

MS. GALE: Mr. Hearing Officer, can we take a five or a ten-minute break?

HEARING OFFICER HALLORAN: Sure. We are off for ten. Thank you. No more.

(Whereupon, a short break was taken.)

HEARING OFFICER HALLORAN: Back on the record. Ms. Shealey is on the stand under oath.

Ms. Gale?

BY MS. GALE:

Q. Ms. Shealey, before we continue on to the next station, I wanted to back it up about your background. Well, where do you live?

A. In Will County, northern Will County.

Q. And you are going to have to take your hand off your face.

A. Oh, I'm so sorry. I'm sorry.

Q. So you said what county?

A. Will.

Q. Will County?

A. Yeah, close to Will County Station in Romeoville.

Q. Ms. Shealey, are you familiar with the Powerton Station?

A. Yes.

Q. I'm going to direct you to the next slide, which is slide 19 of Exhibit 1607.

What does slide 19 depict?

A. Powerton Station.

Q. Is that the entire station?

A. No.

Q. What's it missing?

A. The rest of the lake.

Q. What's the lake?

A. Oh, the -- on this map, it is labeled Powerton Fish and Wildlife Area.

Q. And the rest of the lake, who owns that lake?

A. We do. Midwest Gen.

Q. And it's called a --

A. In its entirety. Sorry.

Q. And it's called the Fish and Wildlife Area. Why is that?

A. My guess is that because we lease it to -- I'm bad with directions here. We lease a portion to IDNR for recreational fishing and water foul hunting.

Q. And, Ms. Shealey, okay. So we have the Powerton Lake to the west.

Can you please describe the area the Powerton Station is in?

A. Well, it's industrial, generally.

Q. How so?

A. There are industries along Manito Road, or Manito Blacktop, as they call it, in Pekin. There -- well, I guess that's not industrial, but there is a prison really nearby. There was other power plants in the area. It's a generally industrial area.

Q. And earlier you testified that you are familiar with the zoning of the Midwest Generation stations. Do you recall that testimony?

A. Yes.

Q. Is that true for Powerton Station?

A. Yes.

Q. And looking at slide 20 of

Exhibit 1607, what is depicted?

A. The zoning map for Powerton Station.

Q. And what is the zoning for the Powerton Station?

A. This is -- I think it's I-2, which is "I" for industrial.

Q. Next slide, which is slide 21 of Exhibit 1607, and looking at the map on slide 21, where are the ash ponds in Powerton Station?

A. Essentially, in the center of the plant proper, excluding the lake.

Q. Let's turn to the next slide, which is slide 22. What is depicted on this slide?

A. A list of the impoundments at Powerton Station.

Q. And starting with the top under the ash pond column, what's the first station?

A. You mean the first --

Q. I'm sorry. What's the first pond? Excuse me.

A. The Ash Surge Basin.

Q. And what is the Ash Surge Basin?

A. A CCR surface impoundment, the primary -- the primary ash collecting impoundment

at Powerton Station.

Q. Is it currently in use?

A. Yes, it is.

Q. And what is it used for?

A. Overflow from the Hydrobins. The majority of ash from Powerton is captured in -- or what some may call de-watering bins or Hydrobins and taken offsite for beneficial reuse. The small amount that is not contained within the Hydrobins is -- overflows to the ash pond.

Q. And what federal regulation is it covered by?

A. NPDES and the federal CCR rule.

Q. And under the federal CCR rule, for its current operation, what is Midwest Generation relying upon?

A. An alternative capacity demonstration.

Q. And what is that?

A. It's a demonstration allowed under -- oh, I was going to say Part 845. Forgive me -- Part 257 of 40 CFR where the owner or operator demonstrates that they cannot construct -- they could not construct alternative

capacity for their CCR prior to April -- April of 2021. So it gives you an extension of -- a longer time to use what's considered an unlined impoundment or some other type of -- or impoundments, yeah.

Q. And looking back at slide 22, what's the second impoundment in that?

A. The Bypass -- Ash Bypass Basin.

Q. And what -- I guess, what was the Bypass Basin used for?

A. Similar to the Surge Basin, it -- overflow from the Hydrobins. It was used -- it was placed into service when the Surge Basin was taken out of service.

Q. And you said the Bypass Basin was taken out of service; is that right?

A. It is out of service now, and it will be until it's retrofitted.

Q. Why is that?

A. Because -- well, federal -- it's an unlined impoundment under federal regulations, which required it to be closed or cease receiving waste by April 2021.

Q. Currently, what is in the Bypass

Basin?

A. Nothing. It was emptied of ash.

Q. And I think you said this, but what is the plan for the Bypass Basin?

A. To retrofit it with a compliant liner, and because we are in Illinois, we actually also have to install a leachate collection system.

Q. Turning to the next basin in this chart, what is the third basin down?

A. Metal Cleaning Basin.

Q. What is the purpose of the Metal Cleaning Basin?

A. It's for when they wash the boilers. It's for treatment of that -- the wash waters from boiler washes at Powerton.

Q. Now, I should have asked this, but to confirm, under the -- is the Ash Surge Basin a CCR surface impoundment?

A. Yes.

Q. Is the Bypass Basin a CCR surface impoundment?

A. Yes.

Q. For the Metal Cleaning Basin, is that a federal CCR surface impoundment?

A. No, it is not.

Q. Under the Illinois CCR surface impoundment rules, what is the status of the Metal Cleaning Basin?

A. It is a surface impoundment, a CCR surface impoundment.

Q. Why is there a different classification for the Metal Cleaning Basin?

A. Under -- I think because -- it doesn't impound ash under -- really, so there is a distinction in the federal rules and the state rules that I cannot recall at this time. I cannot recall the distinction.

Q. That's fine. I want to turn to the fourth impoundment in the chart. What is that impoundment?

A. Service Water Basin.

Q. So you call it the Service Water Basin. Have you heard it called something different?

A. Yes. Oh, I know what it was. Secondary Ash Basin.

Q. 2017 Stipulation No. 22. "Since before 1999, the Secondary Ash Basin had a Hypalon

liner."

Ms. Shealey, based upon that stipulation I just read, what does that mean to you?

A. It was lined.

Q. When?

A. Before the date you just named. Sorry.

Q. Can you turn in your book back to Exhibit 34, which is the NRT evaluation? And I would like you to turn to MWG13-15_23615.

A. I'm there.

Q. And on 23615, what is it showing here?

A. That the Secondary Ash Settling Basin, which I call the Service Water Basin, is -- has no liner.

Q. Ms. Shealey, is that accurate?

A. No, it is not.

Q. How do you know?

A. Well, the stipulations you just read. It has a Hypalon liner. Talking to station personnel is how I know.

Q. Ms. Shealey, I want to put on the

screen page 39 of the Board's 2019 opinion. First paragraph under Section (b)(1), second sentence, the Board states, "In 2005 and 2006, a Midwest Generation consultant investigated the liners at Powerton ponds and rated the condition of the Ash Surge and Metal Cleaning Basin as 'poor,' the Secondary Ash Settling Basin as 'no liner,' and the Bypass Basin as 'unknown,' relying upon Complainants' Exhibit 34 at 23615."

Do you see that there?

A. I do.

Q. Based upon the 2017 stipulation and your understanding, was the Board correct?

A. No. Well, I guess they were correct in reading the consultant's report, but the consultant was wrong.

Q. Ms. Shealey, is the Service Water Basin a CCR surface impoundment?

A. No.

Q. How do you know?

A. We sampled it. We -- similar to what I described we did at Joliet Ponds 1 and 3, we sampled the muck in the Service Water Basin and determined it was mostly biological material, not

ash.

Q. And following that determination, what did Midwest Generation file?

A. An adjusted standard, which I was corrected to, is a request for inapplicability or something of that sort.

(Whereupon, Respondent's Deposition Exhibit No. 1606 was marked for identification.)

BY MS. GALE:

Q. Ms. Shealey, I am sorry to do this, but can you now turn to Exhibit 1606 in your book?

A. Yes.

Q. And what is this?

A. A Board order regarding the adjusted standard for -- and finding of inapplicability for Powerton.

Q. And what's the date?

A. February 17th, 2022.

Q. Can you turn to page -- well, bottom of 6 carrying over to 7.

A. I'm there.

Q. And what was the Board's conclusion?

A. The Board found that the Service

Water Basin is not subject to Part 845, which means it's not a CCR surface impoundment.

MS. GALE: Mr. Hearing Officer, Midwest Gen moves for admission of Exhibit 16 -- excuse me -- of Exhibit 1606.

HEARING OFFICER HALLORAN: Mr. Russ?

MR. RUSS: No objection.

HEARING OFFICER HALLORAN: Thank you. Respondent's Exhibit 1606 is admitted.

(Whereupon, Respondent's Exhibit No. 1606 was admitted into evidence.)

BY MS. GALE:

Q. Ms. Shealey, I want to direct your attention back to the slides of 1607. I'm going to turn to slide 23.

A. Slide 23.

Q. And we are going to -- Ms. Shealey, what is the Former Ash Basin?

A. It's a CCR surface impoundment that is inactive.

Q. What regulations is it regulated under?

A. Both NPDES and the federal -- well,

the federal CCR rule and the state CCR rules.

Q. And, to your knowledge, when was the last time approximately the Former Ash Basin was used to collect CCR?

A. Prior to the 70s, I believe. The 1970s. Prior to that.

Q. I'm going to read Stipulation 2022, Stipulation No. 9. "The Former Ash Basin at Powerton is not lined." Then, if you'd turn back to what we put on the screen, the Board's order from 2019, page 39 again. The last sentence of the first paragraph, the Board states, "Some coal ash might have been left between the layers when re-lining the Former Ash Basin, citation."

Is that correct, Ms. Shealey?

A. No.

Q. Why not?

A. The Former Ash Basin was never re-lined, to my knowledge, ever.

Q. Ms. Shealey, I want to -- you recall testifying in May?

A. Yes.

Q. And you were asked questions about the Former Ash Basin?

A. Yes.

Q. Do you recall being asked if there was coal in the Former Ash Basin?

A. No. I do not recall that.

Q. Do you recall answering there was coal in the Former Ash Basin?

A. No. I do not recall that.

Q. Is there coal in the Former Ash Basin?

A. No. There is not coal. There is no coal, to the best of my knowledge, in the Former Ash Basin. It only contains ash.

Q. Ms. Shealey, are you familiar with an area called the Limestone Basin?

A. Yes.

Q. What do you know about that area?

A. It is not used currently. And has not been used in recent history.

Q. 2022 Stipulation No. 13. "The Limestone Basin at Powerton has been empty since 2013."

Ms. Shealey, is the Limestone Basin a federal impoundment?

A. No, it is not.

Q. Is it an Illinois CCR surface impoundment?

A. No, it is not.

Q. I want to turn back to the Board's 2019 order, page 40, which we will put on the screen for you. Ten lines down the Board states, "The basin was empty since 2013."

Do you see that there?

A. Yes.

Q. What is your opinion of that statement?

A. It is accurate.

Q. Turning to the next page, 41 of the Board's 2019 opinion, which is the same paragraph carrying over from page 40, last sentence.

The Board states, "It appears from the record that due to an easily cracked Poz-O-Pac liner, material from this basin may be leaking contaminants into groundwater."

Do you see that there?

A. Yes.

Q. Based on your understanding of the basin, including the stipulation entered here, is that correct?

A. No. There is no material in it.

Q. Ms. Shealey, I want to turn to the East Yard Runoff Basin.

2022 Stipulation No. 12. "East Yard Basin at Powerton receives precipitation runoff from the east half of the Powerton Station."

Ms. Shealey, to your knowledge, has the East Yard Runoff Basin or the East Yard Basin at Powerton ever received CCR?

A. No.

Q. And turn to the next slide of the screen, and this is actually also in your book, which is a previously admitted exhibit, 711.

Ms. Shealey, what is Exhibit 711?

A. It's a letter from Illinois EPA to Midwest Gen regarding the modification of the CCA at Powerton Station.

Q. And looking at the third paragraph down on Exhibit 711, and it's highlighted on your screen, Illinois EPA states, "Review of the data from the East Runoff Basin indicates elevated concentrations of chloride occur periodically in a

seasonal pattern. This pattern and lack of elevated concentrations of other ash indicator constituents suggests the chloride may result from de-icing agents within the area tributary to the East Yard Runoff Basin. Therefore, Midwest Generation may cease monitoring water from the East Yard Runoff Basin."

Do you see that there?

A. I do.

Q. What does "lack of elevated concentrations of other ash indicators" mean to you?

A. That there are no CCR constituents or components in that basin.

Q. And following receipt of this letter, what did Midwest Generation do?

A. Cease sampling the water at the East Yard Runoff Basin.

Q. And is the East Yard Runoff Basin a federal CCR surface impoundment?

A. No.

Q. Is it an Illinois CCR surface impoundment?

A. No.

MS. GALE: Ms. Shealey, I want to turn to the next slide in Exhibit 7 -- excuse me -- 1607, which is slide 25.

And, Mr. Hearing Officer, for the record, this timeline has the same information as Exhibit 664 that was previously admitted that we have been adding to for the convenience of the Board.

HEARING OFFICER HALLORAN: Thank you.

BY MS. GALE:

Q. Ms. Shealey, how old is the Powerton Station?

A. Around 100 years.

Q. And what did it do when it started operating?

A. Burned coal to produce electricity.

Q. Turning to the next slide, 26 of Exhibit 1607. Moving forward in time to 2008. Were the Powerton ash ponds a part of the ash pond evaluation and re-lining project we discussed with Joliet 29?

A. Yes.

Q. And so in 2008, what happened

related to that re-lining project?

A. They -- Midwest Gen issued a request for proposal for the re-lining of the surface impoundments across the fleet.

Q. And then in 2010 -- in 2017 Stipulation No. 29, "In 2010, Midwest Generation re-lined the Bypass Basin with a 60-milliliter HDPE liner."

2017 Stipulation No. 26, "In 2010, Midwest Generation re-lined the Metal Cleaning Basin with a 60-milliliter HDPE liner."

Ms. Shealey, what was the purpose of re-lining these two ponds?

A. Compliance with the CCAs, I believe.

Q. In 2010?

A. 2010. Oh, it was a result of their examination. They determined that they -- Midwest Gen determined that as a part of their environmental stewardship, they should re-line those ponds.

Q. And to your knowledge, when Midwest Generation emptied the Bypass Basin and the Metal Cleaning Basin to re-line the ponds, what was your understanding of the condition of the Poz-O-Pac

that they found?

A. It was in good condition.

Q. 2022 Stipulation No. 14, "Midwest Generation began sampling the groundwater at Powerton in December 2010."

Ms. Shealey, we did this discussion related to Joliet 29. Do you recall that?

A. Yes.

Q. Did Midwest Generation sample the groundwater in 2010 for the same reasons at Joliet 29?

A. Yes.

Q. Next slide, 28. 2022 Stipulation No. 15, "Midwest Generation has submitted the groundwater monitoring results for Powerton to Illinois EPA from 2010 to present."

Ms. Shealey, we discussed this for Joliet 29. Did Midwest Generation submit the groundwater results for Powerton for the same reasons as Joliet 29?

A. Yes.

Q. Ms. Shealey, we discussed this for Joliet 29. Did Midwest Generation receive a

violation notice for the Powerton groundwater results?

A. Yes.

Q. And how did Midwest Generation -- excuse me.

How did Midwest Generation respond to that violation notice?

A. Eventually, they entered into compliance commitment agreements, CCAs, or a CCA at Powerton Station.

Q. And in looking at the next slide, 29, what did Midwest Generation do in compliance with that CCA, compliance commitment agreement, for Powerton?

A. They re-lined the Surge Basin first, and then they re-lined the Service Water Basin.

Q. And we discussed the HDPE liners that were installed. Are you familiar with their installation and construction generally?

A. Generally, yes.

Q. And in your familiarity, to your knowledge, what, if anything, did the contractors leave to use as a cushion underneath the liner?

A. Nothing.

Q. And, Ms. Shealey, since you've worked at Midwest Generation, to your knowledge -- well, I will say this.

As environmental director, would you be aware of flaws in any of the liners?

A. Yes.

Q. What, if any, flaws have you been aware -- made aware of, of the HDPE liners at the Powerton ponds?

A. Flaws? None. I have been made aware of tears or repairs.

Q. And what are repairs?

A. If a tear is discovered, it is repaired. Essentially a patch.

Q. And how are tears discovered?

A. By inspections.

Q. And how are they repaired?

A. By patching, sort of, with HDPE.

Q. Who does those repairs?

A. A contractor at the station's direction.

Q. Any old contractor?

A. No. Sorry.

Q. What kind of contractor?

A. Somebody who is qualified and certified to install HDPE liners or repair HDPE liners, which are generally the same group of people, but, yeah.

Q. So I want to turn back to slide 29 of Exhibit 1607, the next slide, 29.

In 2015 when the federal CCR rule passed, what did Midwest Generation do in response at Powerton?

A. Began to comply, but specifically, posted a Notice of Intent to Close for the Former Ash Basin.

Q. And turning to the next slide, slide 30. When you say began to comply, what did you do?

A. Similar to Joliet 29; history of construction, hazard potentials, location restrictions, seismic -- structural stability, began inspecting on a weekly basis, and began annual PE, professional engineer, inspections, among other things.

Q. And then you said, posted a notice of the Former Ash Basin in the previous slide. What happened in 2019, in January of 2019?

A. Senate Bill 9.

Q. And what did that mean for the Former Ash Basin?

A. That we could not complete closure, or we cannot complete closure without a permit issued under Part 845 by the Illinois EPA.

Q. 20 -- excuse me -- 2022 Stipulation No. 8. "The Ash Surge Basin, Ash Bypass Basin, and the Metal Cleaning Basin at Powerton are CCR surface impoundments as defined in 415 ILCS 5/3.143."

Ms. Shealey, at the Powerton Station, how is Midwest Generation complying with the Illinois CCR rule?

A. Groundwater monitoring, continuing inspections. We have applied for operating permit applications for all four basins that are affected and construction permit applications for two of the four with plans to apply for the last two in the coming weeks.

Q. Where is that information posted?

A. On our website, public website.

Q. And pursuant the federal and CCR -- excuse me -- federal and Illinois CCR rule, what

must Midwest Generation do related to the berms of the ponds, including the Former Ash Basin, on a weekly basis?

A. Inspect.

Q. And each year pursuant to those rules, what must Midwest Generation prepare?

A. An inspection by a professional engineer, someone -- a licensed professional engineer.

Q. And as part of your role as environmental director, do you review that inspection by the professional engineer?

A. Yes.

Q. And is that called the annual inspection?

A. Yes.

Q. And during the annual inspections, in your review of those inspections, what have they found?

A. Generally, that the -- it's structurally -- structural -- they are structurally sound, used as intended. Occasionally, they will find some animal holes. I can't think of the right word. Bores? But

animal --

Q. Burrows?

A. Burrows -- thank you -- is the word I was looking for. And we will repair those.

Q. When they are doing their inspection, are they looking for any discharges?

A. Yes.

Q. What have they found related to that?

A. That there are no discharges, other than the permitted discharge points.

Q. And by permitted, what permit?

A. I'm sorry. NPDES permitted discharge points.

Q. 2022 Stipulation No. 16. "On November 1st, 2021, Midwest Generation submitted an operating permit application to the Illinois EPA for the Ash Surge Basin, Ash Bypass Basin, and the Former Ash Basin at Powerton."

Ms. Shealey, were you involved in preparations of the operating permit applications for the Powerton Station?

A. Yes.

Q. And, generally speaking, what was in

the operating permit applications for the Ash Surge Basin, Bypass Basin, and Former Ash Basin?

A. History of construction, certifications of structural stability, liner composition, location restrictions, ground -- proposed groundwater monitoring network, and proposed groundwater protection standards, among other things.

Q. And where is this permit application posted?

A. On our website.

Q. How big, to your recollection, approximately how many pages was the permit application?

A. Hundreds.

Q. And, Ms. Shealey, how much effort was it to prepare the operating permit application?

A. Substantial. Again, similar to Joliet 29, I believe KPRG was the lead consultant on that application, but there are several other consulting groups and a lot of internal resources that were used to prepare those applications.

Q. Ms. Shealey, I think we can look at

slide 30, and a stipulation was that they were due by November 1st, 2021.

How many months after the Illinois CCR rule became effective were these operating permit applications due?

A. Just over six.

Q. And so how was Midwest Generation able to collect all this information for the operating permit application within six months?

A. A lot of it was common to requirements we had to complete under federal CCR rules, so -- but we did have to add.

Q. Let's turn to the next slide, slide 31 of Exhibit 1607. The Metal Cleaning Basin, we stated earlier it's not a federal unit. Because it wasn't a federal unit, what information did it have?

A. It did not have, particularly groundwater monitoring, sufficient to meet the -- to meet the requirements of Part 845, but none of the documents have been completed. None of the analyses or engineering assessments have been completed for Metal Cleaning Basin prior to Illinois CCR rules.

Q. So to collect that data information that wasn't available to Midwest Generation, what did Midwest Generation require?

A. We requested and got a variance from the Board to allow for more time.

Q. And to your recollection, what was the Board's opinion on Midwest Generation's request for a variance for additional time?

A. It was granted.

Q. And so following the Board's order, what did Midwest Generation do?

A. Got to work on -- well, actually, while were waiting for the Board's order, we got to work on preparing the application and preparing the data we needed. For example, for metal cleaning, I think we had to install two additional groundwater monitoring wells to be able to establish groundwater protection standards. So those wells were installed, I'm pretty sure, before the Board's order.

Q. And then, to your recollection, and in looking at slide 31, when was the operating permit application for the Metal Cleaning Basin submitted?

A. March 31st of 2022.

Q. And how -- approximately how big is the Metal Cleaning Basin operating permit application?

A. Hundreds of pages. Similar to the others.

Q. And similar question as before, what kind of -- what was the effort to prepare the operating permit application for the Metal Cleaning Basin?

A. Again, substantial, and as I just stated, it was more than the others or than some of the others, because we needed to install additional groundwater monitoring wells for the Metal Cleaning Basin.

Q. Earlier you testified about Illinois EPA's website for the CCR surface impoundment permit applications. Do you recall that?

A. Yes.

Q. To your knowledge, has Illinois EPA issued a permit application -- operating permit application for the Powerton ponds?

A. If I could just correct you. Operating permit.

Q. Did I say -- what did I say? Yeah.

A. You said permit application.

No. They have not issued an operating permit for Powerton.

Q. Ms. Shealey --

A. Or Metal Cleaning or whichever basin, yes, none of them.

Q. Ms. Shealey, what are the future plans for the Powerton station?

A. We will continue to operate as a coal-fired power plant.

Q. And so what are Midwest Generation's plans to manage CCR?

A. We intend to apply for a retrofit of -- well, we intend to retrofit the Bypass Basin, Ash Surge Basin, and Metal Cleaning Basins.

Q. And so, to retrofit the Bypass Basin, what did Midwest Generation submit to the Illinois EPA?

A. A construction permit application.

Q. And for the Bypass Basin to support Midwest Generation's proposal to retrofit, generally speaking, what was in the construction permit application?

A. Engineering design around the new liner system. The retrofit involves a new liner system and a leachate collection system. So, the application contained the design drawings and information around those two systems and groundwater monitoring results.

Q. Ms. Shealey, how big was the retrofit application?

A. Again, hundreds of pages.

Q. And how much was the effort to prepare that operating -- excuse me -- construction permit application?

A. Significant; engineering design, similar to Joliet 29 closure application -- construction -- reuse of the pond application. We had public meetings for the Bypass Basin, yeah. So it was a significant effort.

Q. Ms. Shealey, what are the plans for the Ash Surge Basin and the Metal Cleaning Basin?

A. Both to retrofit.

Q. And what does Midwest Generation need to retrofit both ponds?

A. Construction permits from Illinois EPA.

Q. And I think you said, they have not been submitted yet?

A. No. We have had the public meetings, and we will submit the permit application in the coming weeks.

Q. Have you seen the permit application?

A. Not yet.

Q. How much effort has it been to prepare the permit application for the construction permit for the Ash Surge Basin and the Metal Cleaning Basin?

A. So far it's been significant, as with the others. Again, I -- I think I just said this. We had the public hearing -- public meetings for those permit applications and are in the process of getting the engineering designs and drawings completed and reviewed to be able to submit to the Agency.

Q. Former Ash Basin. What is the plan for the Former Ash Basin?

A. To close it, as we intended to do in many years -- well, before Senate Bill 9 was promulgated or even proposed.

Q. I can't remember, but what is the status of the construction permit application to close the pond?

A. The Former Ash Basin?

Q. Uh-huh.

A. It is submitted.

Q. To who?

A. Illinois EPA. Give me a second. Let me just make sure I've got it.

Yes. FAB, the Former Ash Basin, application has been submitted, yes.

Q. And I can refer you to slide 31 of Exhibit 1607 on the timeline of events.

A. Yes. It was submitted last year.

Q. And to your recollection, how big was the Former Ash Basin construction permit application?

A. Again, hundreds of pages.

Q. What was the effort to prepare that application?

A. Again, significant. It took all the other things that the other applications took, and public meetings -- public meetings, engineering design, and so on. So it was a significant

effort.

Q. And following submission of the construction permit application for the Bypass Basin and the Former Ash Basin, has the -- what has the Agency issued, if anything?

A. Nothing. Nothing. We haven't -- no. They have not issued a draft permit yet.

Q. Ms. Shealey, I want to turn to the next station, which is the Waukegan Station.

Ms. Shealey, on slide 33 of Exhibit 1607, what is -- what do you see?

A. The Waukegan Station.

Q. 2022 Stipulation No. 19, "Midwest Generation has pubically announced that the Waukegan station is scheduled to cease burning coal in June 2022."

Ms. Shealey, now that it's 2023, is -- what's Waukegan station doing with coal?

A. It is not burning coal, and, in fact, it stopped in May of 2022.

Q. Does that mean the station shut down?

A. No. Waukegan operates peaking units. My screen just went dark.

MS. GALE: Can we go off the record for a second, Mr. Hearing Officer?

HEARING OFFICER HALLORAN: Yes.

(Whereupon, a discussion was had off the record.)

HEARING OFFICER HALLORAN: All right. We are back on the record. Thank you.

BY MS. GALE:

Q. So, I'm sorry. It's not shut down. What are the Waukegan Station's operations?

A. They operate two peaking units for peak generation, oil fired.

Q. And, Ms. Shealey, similar to the Powerton and Joliet 29 Stations, are you familiar with the zoning of the Waukegan Station?

A. Yes.

Q. Let me turn to the next slide, slide 34 of Exhibit 1607. What does this show?

A. A zoning map.

Q. Of what?

A. Waukegan Station and beyond.

Q. And do you see that Midwest Generation Waukegan Station on the map?

A. Yes.

Q. What is the zoning of the Waukegan Station?

A. General industrial.

Q. And I will turn to the next slide, 35. Ms. Shealey, have you been to the Waukegan Station?

A. Yes.

Q. Highlighting on the map on the screen in front of you the industrial areas for neighbors -- neighboring.

Ms. Shealey, have you seen the property located in -- have you seen the property located immediately to the north of the Waukegan Station?

A. Yes.

Q. What is it?

A. Johns Manville asbestos site.

Q. You said asbestos site. What do you mean by that?

A. They have a Superfund asbestos landfill immediately to the north, and it is large with rolling hills of asbestos covered -- covered asbestos.

Q. And turning your attention to the

west of the Waukegan Station, to your knowledge, what was that property used for?

A. A tannery, and there is a general boiler, which I assume are manufacturing boilers.

Q. And as environmental director, are you aware of the -- how did you become aware of the tannery?

A. Because the tannery -- groundwater from the tannery is entering our site, and it is above groundwater -- it's above the Part 620 standards. So it was one of the first things I became aware of.

Q. Ms. Shealey, what is to the south of the Waukegan Station?

A. North Shore Sanitary District.

Q. What does the North Shore Sanitary District do?

A. Process the wastewater, or I'm not sure for how much area, but in the City of Waukegan. I mean, public, people waste water.

Q. And you said you visited the station. Have you visited the south side of the station -- of the Waukegan Station?

A. Yes.

Q. When you've visited the south side of the Waukegan Station, what have you observed?

A. Not 100 percent of the time, but there is a very pungent bad odor that wafts from the sanitary district.

Q. Can you see the sanitary district from the station?

A. Yes.

Q. Back on the map, bottom left corner of the southern end of the map, what is described?

A. Former North Shore Gas -- manufactured gas plant.

Q. To your knowledge, what is that location? What is that location?

A. I think it -- I'm going to say I think. Well, it's a former manufactured gas plant, and I think it's a Superfund site.

Q. So, Ms. Shealey, where are the ash ponds at the Waukegan Station?

A. South center of the property.

Q. And turn to slide 36 of Exhibit 1607. What does this show?

A. The two coal ash impoundments at Waukegan Station.

Q. And what are they called?

A. The East Pond and -- the East Ash Pond and West Ash Pond.

Q. And what regulations are the ash ponds covered under related to CCR?

A. Both the state and federal CCR rules. So Part 257 federally and Part 845 in the state.

Q. Turning to slide 37 of Exhibit 1607. Ms. Shealey, to your knowledge, when did the Waukegan Station begin operating?

A. In the 1920s, 1923.

Q. And what did it do when it -- in the 20s?

A. Produce electricity using coal or by burning coal.

MS. GALE: And turning to the next slide, 37 -- or excuse me -- 38 of Exhibit 1607.

And Mr. Hearing Officer, I should have said for the record that this timeline was previously admitted as 665, and this is an extension of that exhibit.

HEARING OFFICER HALLORAN: Thank you.

BY MS. GALE:

Q. Ms. Shealey, looking at the timeline, what happened in 1992?

A. There was an investigation of the tannery site and general boiler site that are to the west of Waukegan Station.

Q. Turning to the next slide, slide 39. Between 2002 and 2005, similarly just as with the other stations, what was Midwest Generation doing as it relates to the ash ponds?

A. Reviewing and evaluating them for their essential competency.

Q. And so in 2003 and 2004, at the Waukegan Station, what happened?

A. They re-lined the East and West Ponds with HDPE liners at Waukegan.

Q. Turning to the next slide, 40 of Exhibit 1607. I guess, related to the Midwest Generation ponds, what was Midwest Generation doing in 2005 through 2006?

A. Generally? I'm sorry.

Q. Generally.

A. Evaluating the ponds, and initiating the process of re-lining as needed.

Q. Turning to the next slide, 41 of Exhibit 1607. Moving ahead to 2009. Were the Waukegan ash ponds also the subject of EPA's request to Midwest Generation to do a hydrogeologic assessment?

A. Yes.

Q. And to your recollection, what was the conclusion of the hydrogeologic assessment for the Waukegan Station?

A. That there were no potable water wells or impacted drinking water from Waukegan Station.

Q. And turning to the next slide, slide 42.

Were -- did Illinois EPA's request that Midwest Generation install groundwater monitoring wells include the Waukegan Station?

A. Yes.

Q. 2022 Stipulation No. 20, "Midwest Generation began sampling the groundwater at Waukegan in October of 2010."

Next slide, slide 43. 2022 Stipulation No. 21. "Midwest Generation has

submitted the groundwater monitoring results for Waukegan to Illinois EPA from 2010 to present."

Ms. Shealey, to your knowledge, following submission of the groundwater monitoring results, did Midwest Gen also receive a violation notice for the Waukegan Station?

A. Yes.

Q. And in response to that violation notice, what did Midwest Generation do at the Waukegan Station?

A. Entered into a compliance commitment agreement with the Agency.

Q. Turning to the next slide, 44. Did Midwest Generation complete the tasks in the CCA for the Waukegan Station?

A. Yes.

Q. For the Waukegan Station CCA, was there a requirement to re-line the ponds?

A. No.

Q. Why not?

A. They had just been re-lined within the past ten years, I think. I think they started in 2003. Yes. They had been re-lined within the past ten years, and as -- I think I kind of

alluded to it earlier. HDPE liners were industry standard, and so there was not an improvement on them at that time.

Q. All right. Ms. Shealey, I want you to turn back to your book, and following previously admitted Exhibit 711, there should be previously admitted Exhibit 648.

A. Yes.

MS. GALE: And for the record, Mr. Hearing Officer, this was admitted in the first part of the hearing, 648.

HEARING OFFICER HALLORAN: Thank you.

BY MS. GALE:

Q. Ms. Shealey, what is this?

A. It looks like a transcript from an NPDES permit public hearing that probably was held by Illinois EPA.

Q. And on the first page, what was the date?

A. Oh, I'm sorry. July 31st, 2013.

Q. And I want to turn to the next page, and it's actually MWG13-15_29975, and it carries over to 29976.

And, Ms. Shealey, it's on the screen, but who was testifying here?

A. It said it's Mr. Dunaway.

Q. Who is Mr. Dunaway?

A. Lynn Dunaway of Illinois EPA.

Q. And you can read from there, but what did Mr. Dunaway state? And it's on your screen as well.

A. That the ponds at Waukegan Station are not a source of contamination, that there may be some other source, but it's not the ponds.

Q. Turning to the next slide, 46, and I want you to turn in your book to the next exhibit, which was previously admitted, Exhibit 649. Okay?

A. Yes.

Q. Ms. Shealey, previously admitted Exhibit 649, generally speaking, what is this?

A. It looks like e-mail -- well, it is an e-mail exchange between staff at Illinois EPA.

Q. And who is the e-mail from?

A. The most recent or top one is from Lynn Dunaway, the same Lynn Dunaway.

Q. And who is it to?

A. Jamie Rabins, who at that time was

an NPDES permit writer for Waukegan Station.

Q. And what's the date of this e-mail?

A. January 6, 2015.

Q. And it's highlighted on the screen, but what does Mr. Dunaway state in this e-mail?

A. That the ponds are not the likely -- are not the likely source of contaminants in groundwater.

Q. Okay. Ms. Shealey, I want you to turn to slide 47. Do you recognize this cover page?

A. I do.

Q. What is it?

A. It's a -- sorry. It's a presentation that the Agency gave to, I believe, the City of Waukegan sometime in 2021.

Q. Ms. Shealey, at the end of the slides, there is a document that was part of the demonstrative of Exhibit 1607 towards the end. Did you find it?

A. No. I don't know what you are talking about.

Q. The last page is in your binder.

MR. RUSS: I don't see it either.

THE WITNESS: Yes.

BY MS. GALE:

Q. It's at the end of the slides?

A. I have it.

Q. Okay. So if you turn -- so you will see at the end, what is that -- what is that document?

A. I know what it is, but I will read it to be sure. It's essentially a public -- a public comment in the matter of the adjusted standard we requested for Waukegan Station.

Q. And what's attached?

A. The presentation from the Agency.

Q. And turning back to the slide, slide 48, looking at slide 48, do you recognize this page?

A. Yes, I do.

Q. I just want to look at the top bullet of this page where it states, "Illinois EPA issued a violation notice (VN) NRG Waukegan."

Ms. Shealey, is that accurate?

A. No.

Q. What's wrong?

A. It's not at NRG Waukegan.

Q. Yeah, who should it be?

A. Midwest Gen.

Q. Is that the same violation notice as we have been discussing earlier?

A. Yes.

Q. And then, Ms. Shealey, the second para -- the sentence of the first bullet, what is -- please read, what does Illinois EPA state?

A. "Continued groundwater monitoring indicated a source other than the east or west ponds."

Q. So, Ms. Shealey, looking at previously admitted Exhibit 648, Exhibit 649, and now Illinois EPA's presentation in thereabouts 2021, what is your understanding of the Agency's conclusions about the Waukegan ponds?

A. That they are not a source of contamination.

Q. I want to turn back to the slide. Go to slide 49 of Exhibit 1607. So in 2015, when the federal CCR rule passed at Waukegan, generally speaking, what did Midwest Generation do?

A. Comply. Completed the certifi- -- the engineering -- professional engineer

certifications, reviewed the groundwater monitoring network. I don't specifically recall if additional wells were installed at Waukegan. I don't believe so, but it could have been, but the network was reviewed for compliance.

Engineering certifications, routine inspections. Weekly inspections began, annual inspections began, groundwater monitoring under Part 257 began, which is slightly different than the groundwater monitoring that we have been doing under the CCAs.

Q. Turning to the next slide, slide 50. 2022 Stipulation No. 17, "The East Ash Pond at Waukegan is a CCR surface impoundment as defined in 415 ILCS 5/3.143."

2022 Stipulation No. 18. "The West Ash Pond at Waukegan is a CCR surface impoundment as defined in 415 ILCS 5/3.13 -- 3.143."

Ms. Shealey, for the Waukegan ash ponds, how is Midwest Generation complying with the Illinois CCR rule?

A. We are continuing groundwater monitoring, continuing weekly inspections, and

annual inspections, and completing any certifications or recertifications that are required by the rules.

Q. Ms. Shealey, I just want to go back to slide 49. In January of 2019, you testified that the Senate Bill 9 was proposed. Do you recall that testimony?

A. Yes.

Q. And is your testimony related to Senate Bill 9 and Midwest Generation's ash ponds the same for the Waukegan Station?

A. Yes.

Q. So we are back on slide 50. Under the federal CCR rule and the Illinois CCR rule, what must Midwest Generation do specifically on the eastern berm of the East Pond on a weekly basis?

A. Inspect.

Q. And each year pursuant to those rules, what must Midwest Generation do?

A. Have the berms inspected by a professional engineer.

Q. And what's --

A. Certified -- licensed -- sorry --

professional engineer.

Q. And once the licensed professional engineer inspects the berm, what does he prepare?

A. A report.

Q. What do we call that report?

A. Annual report.

Q. And as the environmental director, do you review those reports?

A. Yeah, probably the -- I'm so sorry. Our nomenclature now, we probably changed to annual inspection report, because we have a different annual report. That's new.

Q. Fair enough.

A. Okay.

Q. Annual inspection report. Thank you.

A. Yeah. Thank you.

Q. And in your review of the annual inspection reports prepared by the professional engineer following their inspection, what and what not -- what have they found, and what have they not found?

A. They have not found any reason to believe that there are seeps or failures of -- in

that berm or of that berm. It's possible that there are -- animal burrows have been found at Waukegan. If that is true, those burrows are repaired as found.

Q. When you visited the Waukegan Station, have you been to the east side of the East Pond?

A. Yes.

Q. By the lake?

A. Yes.

Q. What do you see when you visited that -- when you visited the east side of the East Pond?

A. Vegetation.

Q. And where are you looking?

A. Down along the -- along the east side of the East Pond.

Q. Great. Can we -- so 2022 Stipulation No. 22. "On November 1st, 2021, Midwest Generation submitted an operating permit application to the Illinois EPA for the East Ash Pond and the West Ash Pond at Waukegan."

Ms. Shealey, were you as part of your -- as being the environmental director, are

you familiar with the Waukegan ash pond operating permit applications?

A. Yes.

Q. How big was the application?

A. Hundreds of pages.

Q. What was the effort to create that application?

A. Similar to the other stations, substantial. Again, KPRG was the lead author. There were several other consultants involved. And it included structural stability assessments, liner certifications, groundwater monitoring results, proposed groundwater protection standards, hazard potential classification, and so on. A lot of individual parts and pieces.

Q. Now, where is that application posted?

A. On our website, pubically available website.

Q. And this is getting repetitive, but following submission of that application, what is the status of the application as it relates to Illinois EPA?

A. It is pending. They have not issued

a -- the Agency has not issued a draft permit.

Q. 2022 Stipulation No. 23. "On February 1st, 2022, Midwest Generation submitted a construction permit application to the Illinois EPA for the closure of the East Ash Pond and the West Ash Pond at Waukegan."

Ms. Shealey, as a -- Ms. Shealey, as the environmental director, were you part of preparing that application?

A. Yes.

Q. Approximately, how big is it?

A. Hundreds of pages.

Q. What was the effort to prepare that application?

A. Substantial. In addition to the pieces from the operating permit application, it included groundwater modeling based on a closure alternatives analysis, and we had to conduct public meetings prior to submitting this application -- those applications.

Q. Ms. Shealey, what is the closure method proposed and applied for by Midwest Generation in the application for the East Pond?

A. I hope I do this right. Forgive me,

because I get them confused. East is closer to the lake, and that would be closure-in-place.

Q. And once the cap is installed, are there any post-closure care requirements?

A. Absolutely.

Q. What?

A. Thirty years of groundwater monitoring at least. It's -- I believe the regulations require 30 years of monitoring or until you meet either the groundwater protection standard or Part 620 standards. I can't remember which, but it's at least 30 years.

Q. And Ms. --

A. And I'm so sorry. But it includes continued inspections to make sure there are no failures of your cap, your berms, so on and so forth.

Q. And what is Midwest Generation's closure plan for the West Pond?

A. That would be similar to Joliet Pond 2, to close the pond as a CCR surface impoundment, and reuse the HDPE liner for a low-volume waste pond for the station.

Q. And to reuse that HDPE liner in the

West Pond, what did Midwest Generation apply for?

A. A construction -- oh, an adjusted standard. Yes, an adjusted standard.

Q. And to reuse that -- why does Midwest Generation want to reuse that liner?

A. To manage stormwater at the station going forward for general low-volume wastewater.

Q. Ms. Shealey, I want to turn to the next slide, which is slide 51.

Ms. Shealey, looking at the screen, in the north -- to the north, on the north side of the station, do you see where it says, "Alleged Former Slag Placement Area"?

A. Yes.

Q. Are you familiar with that area?

A. Yes.

Q. What is in that area?

A. A parking lot. It is concrete or cement. There is no evidence of ash in that area.

Q. And now I want to look --

A. I'm sorry. It's the guard gate, too, I'm pretty sure. It's where you enter the plant from the outside. So it's all -- it's a paved area.

Q. And what is stored there?

A. Cars? I'm sorry. I don't know. It's a parking lot.

Q. Now, looking at the map, what's located west of the West Pond?

A. Alleged Former Slag Fly Ash Placement Area.

Q. Ms. Shealey, to your knowledge, did Midwest Generation have any operations in that area?

A. Not at all.

Q. Has Midwest Generation placed ash in that area?

A. No.

Q. Does the ComEd tannery site ELUC cover any part of that area?

A. I think you misspoke.

Q. I'm sorry. Does the tannery site ELUC cover any part of that area?

A. Yes.

Q. And we can see it on the screen. Does the Midwest -- well, where is Midwest Generation's ELUC on that area?

A. It overlaps, or it begins where that

ends. I can't really tell. I think they overlap.
Oh, no. Thank you. It begins where the tannery's ELUC ends.

Q. Ms. Shealey, do you recall a soil investigation of that area?

A. Yes, I do.

Q. Are you familiar with the results?

A. Yes, I am.

Q. And to your recollection, what did the investigation show?

A. That there is ash in that area.

Q. I actually think you said this in May, but because of ash in that area, what was Midwest Generation proposing to do?

A. Cap it.

Q. And who did you propose that to?

A. Illinois EPA.

Q. And do you recall -- do you recall what that proposal was related to?

A. The adjusted standard. In the adjusted standard, we applied for a finding of inapplicability of Part 845 to that area. That area is not a CCR surface impoundment.

Q. So flipping to the next -- you said

it's not a CCR surface impoundment. Let's turn to slide 52.

Ms. Shealey, you said you had perused or looked at some of the docket of the USEPA proposed rule. Do you recall that?

A. Yes.

Q. What is on slide 52?

A. One of the documents that is in the docket, and it's USEPA's potential CCR management unit universe, and I think it's specifically the Illinois units.

Q. Yeah. I guess, expanding upon that, have you clicked on this document when you -- have you opened the document in the docket?

A. Yeah.

Q. What does it look like?

A. It's a spreadsheet.

Q. And what's on it, generally speaking?

A. A list of places. A list of USEPA's proposed CCR management units or areas that USEPA believes could qualify as CCR management units under their proposed rules.

Q. And looking at -- and you said it's

a -- limited to the Illinois. There is rows there, and if you look at rows 25 and 26, what are in rows 25 and 26?

A. Two potential CCR management units at Waukegan Station.

Q. And one -- under unit name, under row 25, what's the unit name?

A. Old Pond.

Q. And what do you -- do you know what the Old Pond is?

A. I have an understand -- I believe I do, yes.

Q. What do you believe?

A. It's the -- what are we calling it here? Alleged Former Slag Fly Ash Placement Area to the west of the West Pond, west of the West Pond at Waukegan Station.

Q. And then row 26 on slide 52, Exhibit 1607, what is the unit name?

A. Historic fill.

Q. And do you have an understanding of what the historic fill would be?

A. I believe I do.

Q. What is it?

A. Ash that's under the current ash ponds.

Q. And so based upon this spreadsheet, what is -- what do you think USEPA thinks the Former Ash Slag Area and historic fill is?

MR. RUSS: Object. Calls for speculation.

HEARING OFFICER HALLORAN: Could you please read the question back, Kari, please?

(Whereupon, the record was read as requested.)

HEARING OFFICER HALLORAN: All right. Sustained.

BY MS. GALE:

Q. What is your understanding of what the Former Slag Area and historic fill at Waukegan is under the spreadsheet?

A. USEPA believes that these are potential units that will qualify as CCR management units and so will be regulated under their currently proposed rules, which I believe under that USWAG decision, under that consent decree that I referenced earlier, have to be finalized by May of 2024.

MS. GALE: Mr. Hearing Officer, I'm moving on to the final station. If we could just have a ten-minute break?

HEARING OFFICER HALLORAN: Sure. Off the record.

(Whereupon, a short break was taken.)

HEARING OFFICER HALLORAN: Back on the record. You may proceed, Ms. Gale.

BY MS. GALE:

Q. Ms. Shealey, I want to move on to the Will County station. And looking at slide 54 of Exhibit 1607, what is depicted?

A. Will County Station.

Q. Excuse me. And have you visited the station?

A. Yes. It was actually my work location initially, yes. So many, many times.

Q. 2022 Stipulation No. 24. "Midwest Generation has pubically announced that the Will County Station is scheduled to cease burning coal in June 2022."

Ms. Shealey, since the 2022 stipulations were agreed, what has occurred at

Will County related to burning coal?

A. It has ceased burning coal in June of 20 -- and it did in June of '22.

Q. It ceased burning coal. What's going to happen at the Will County Station?

A. Right now the plan is to install battery storage for future operations.

Q. Are you familiar with the vicinity of the Will County station?

A. Yes.

Q. Looking at the map on slide 54, please describe the area around the Will County station.

A. Industrial. It is between the Des Plaines and the Chicago Sanitary Ship Canal. The other side of the canal is a refinery. Across the canal from us is a refinery, a relatively large one.

Q. Do you know who owns it?

A. Citgo.

Q. And to the south -- what is to the south of the station?

A. A quarry. And I cannot -- their name begins with an H. I'm sorry. It's escaped

me. It's escaping me.

Q. Hanson Materials?

A. Hanson Materials is quarrying to the south of us, yes.

Q. Same as before, ,are you familiar with the zoning of the Will County Station?

A. Yes.

Q. Next slide, slide 55. What does this map show?

A. That Will County Station is zoned industrial, I-3.

Q. Slide 56. Ms. Shealey, we have highlighted the ash ponds. Where are the ash ponds at the Will County Station?

A. On the western edge sort of center west of the property.

Q. And from top to bottom, so north to south, what are the ponds?

A. 1N, 1S, 2S, and 3S.

Q. Okay. Next slide, 57 of Exhibit 1607. What is depicted in slide 57?

A. The four ponds that I just named.

Q. So looking at Ponds 2S and 3S, are they federal CCR surface impoundments?

A. Yes, they are.

Q. What about Ponds 1N and 1S?

A. They are not.

Q. 2022 Stipulation No. 26. "Will County Ponds 2S and 3S are CCR surface impoundments as defined in 415 ILCS 5/3.143."

2022 Stipulation 24. "Will County Ponds 1N and 1S are inactive CCR surface impoundments, citation 35 Ill. Adm. Code 845.20 -- I'm sorry -- 845.120."

2017 Stipulation 50. "Ponds 1N and 1S were removed from service in 2010 and neither receive any ash or process water."

Ms. Shealey, turning to the next slide, 58 of Exhibit 1607. When did the Will County Station begin operating?

A. 1955.

Q. And what did it operate?

A. Two coal-fired units at that point. Two electric generating units.

Q. Turning to the next slide, 59. In 2002 we discussed the analysis of the ash ponds. Did that also occur at Will County?

A. Yes, it did.

Q. Next slide, 60. In 2008, what did Midwest Generation submit to Illinois EPA?

A. Construction permits for the re-lining of Ponds 2S and 3S.

Q. And then ending in September of 2009, what happened?

A. Pond 3S was re-lined with an HDPE liner.

Q. And similar question to the other stations, what is your understanding of the condition of the Poz-O-Pac found in Pond 3S when it was re-lined?

A. It was good and had integrity. It wasn't cracked or failing.

Q. And around the same time, in 2009, the preliminary hydrogeological assessments that Illinois EPA requested, was that also true of -- at the Will County Station?

A. Yes.

Q. And what were the results for the Will County Station?

A. There were no potable water receptors in the vicinity of the ash ponds that the ash ponds could impact.

Q. Turning to the next slide, 61 of Exhibit 1607. In 2010, what did Midwest Generation agree to install at the Will County station?

A. Groundwater monitoring wells.

Q. 2022, Stipulation No. 28. "Midwest Generation began sampling the groundwater at Will County in December of 2010."

Next slide, 62. 2022 Stipulation No. 29. "Midwest Generation has submitted the groundwater monitoring results for Will County to Illinois EPA from 2010 to present."

Ms. Shealey, did Midwest Generation receive a violation notice for the Will County Station for the groundwater results?

A. Yes.

Q. How did Midwest Generation resolve that violation notice?

A. Entered into a compliance commitment agreement with the Agency.

Q. Turning to the next slide, 63. Looking at the slide. In 2013, pursuant to the CCAs, what did Midwest Generation do at Will County?

A. I think that -- I think there is a letter missing, but it re-lined 2S with the HDPE liner. Sorry.

Q. And so we discussed Ponds 2S and 3S are federal CCR ponds. Do you recall that?

A. Yes.

Q. When the federal rule passed, what did Midwest Generation do at Will County?

A. It began complying. It did hazard assessments, safety factor assessments, liner certifications, groundwater monitoring, and so on.

Q. Next slide, 64. In January of 2019 you testified about SB-09 being proposed. Is your testimony about SB-09 the same for Will County as it was for the other stations?

A. Yes.

Q. We discussed earlier the four ponds are subject to the Illinois CCR rule, right?

A. Yes.

Q. And under the Illinois CCR rule, what is Midwest Generation doing to -- pursuant to the rule?

A. Similar to federal rule groundwater monitoring, we do weekly inspections, annual

impoundment inspections. Well, that is actually not similar to the CCR federal rules -- sorry -- for Will County Station.

Under federal rules, Will County impoundments are small, what would be considered small, and are not subject to the annual inspection requirement. State rules do not make that distinction, so we began doing -- having a licensed professional engineer inspect the ponds at Will County under the state rules, but groundwater monitoring -- I've lost track, if I'm repeating myself.

Q. No, that's fine. So you said a licensed professional engineer inspects. How often did they inspect the ponds?

A. Annually.

Q. Is that -- what do they prepare?

A. A report.

Q. What do you call that report?

A. The annual inspection report.

Q. And as the environmental director, do you review the annual inspection report?

A. Yes.

Q. And in those reports, what has the

professional engineer seen and not seen in relation to the berms?

A. He has seen -- or she has seen that they are structurally sound, that there is no indication of failure, and they have not seen any seeps or leakages from the pond.

Q. 2022 Stipulation No. 16. "On November 1st, 2021, Midwest Generation submitted an operating permit application to Illinois EPA for Ponds 2S and 3S at Will County."

Ms. Shealey, as the environmental director, were you a part of that preparation of the operating permit application for Ponds 2S and 3S?

A. Yes.

Q. How big was it?

A. Hundreds of pages.

Q. And what was the effort to prepare that operating permit application?

A. I would consider it similar to the other stations, substantial. Certifications, groundwater monitoring networks, proposed groundwater protection standards were included, evaluations by professional engineers, and so on

and so forth.

Q. And this is similar to our discussion about Powerton. If you recall, how many months was the operating permit application due after the effective date of the Illinois CCR rule?

A. Just over six. Actually, six months and ten days. I remember exactly.

Q. So how was Midwest Generation able to collect all the information within six months and ten days for Ponds 2S and 3S?

A. A lot of it had already existed, because they were requirements under federal rules. So instead of -- excuse me.

So these were more -- a lot of the documents were recertifications versus initial certifications, so -- which is somewhat -- slightly easier than the initial certification, and the groundwater monitoring had -- the groundwater monitoring had been going on at the same -- for most of the same standards under the federal rule. I'm reminded now that Illinois actually added a few more constituents to monitor. So we just did it.

Q. Okay. But Ponds 1N and 1S are not federal units, right?

A. Correct.

Q. So what, if any, information did Midwest Generation have for Ponds 1N and 1S for the operating permit application?

A. Well, none of it existed in it -- as -- in its final form. Of course we knew a lot about the ponds, we know a lot about the ponds, but we didn't have professional certifications and things such as that.

Q. So what did Midwest Generation need to collect that information?

A. A variance.

Q. And what was the variance for?

A. Additional time to collect the information, and particularly at Will County 1N and 1S for groundwater monitoring, if I remember correct -- I don't recall the number of wells we had to install, but we had to install additional monitoring wells under Part 845 for 1N and 1S.

Q. And who was the variance from?

A. The -- well, yeah, the Board.

Q. And what was the Board's opinion?

A. That they granted the variance so that we had additional time.

Q. And with that additional time, looking at slide 64, when was the operating permit application for Ponds 1N and 1S submitted to the Agency?

A. March 31st, 2022.

Q. And again, how big was it?

A. Hundreds of pages.

Q. What kind of effort did it take to prepare?

A. Again, substantial. And again, so slightly different than 2S and 3S, which had a baseline of information, we didn't have that documentation already collected for 1N and 1S. I mentioned we had to install additional groundwater monitoring wells, which meant that we had to accelerate our sampling. Generally under federal CCR, we sample quarterly, I think. In this accelerated timeline to get eight samples, we sampled more frequently than that, and so it was a pretty big effort.

Q. Has Illinois EPA issued an operating permit application for Ponds 1N, 1S, 2S and 3S --

A. No.

Q. -- yet?

Has Illinois EPA issued an operating permit?

A. No. I heard that question. No. They have not issued an operating permit for the Will County impoundments.

Q. Ms. Shealey, we have gone through -- you can turn off the screen.

We have discussed the work Midwest Generation has done related to the ash ponds for each of the four stations. As an environmental director, do you believe Midwest Generation has been diligent to comply with the environmental statutes?

A. Yes, absolutely.

Q. Please explain.

A. Oh, boy. It's a lot. It's -- we worked diligently to ensure compliance. As I mentioned before, our policy is environment over production, and our No. 1 goal is to comply with environmental laws and regulations. The federal CCR rules were first. And we moved in every way to comply with those, including ceased -- ceasing

placement of CCR, finding alternative capacity to keep the stations running to provide reliable electricity, the groundwater monitoring, and we -- in cases where necessary, we are working towards closure of surface impoundments.

It's years and years of work. It's nothing that can be done quickly or without thought, or it's been years of work. We have been working diligently since 2015 under the federal rules.

Q. And we touched upon this in your testimony, but when Midwest Generation agreed to install the groundwater monitoring wells in 2010, how would you describe Midwest Generation's actions?

A. It was voluntary. Again -- well, not again, but they were intended -- intending to cooperate with the Agency's request. I don't think that they had to, because it wasn't an order. It wasn't anything of that sort, but Midwest Generation did it. So it was a voluntary action.

Q. And when Midwest Generation agreed to submit the groundwater monitoring results and

then continue to submit those results on a quarterly basis, how would you describe Midwest Generation's disclosure of that information?

A. Voluntary. Again, there was no order, no regulation that required any of that information be submitted. Midwest Gen -- Midwest Generation's attempt was to be cooperative with the Agency.

Q. Ms. Shealey, we discussed the zoning of each of these stations and what was surrounding each of the stations.

Are these stations located in a suitable area to which they are located?

A. Yes, they are all in industrial areas.

Q. And I believe you testified as to the age of the stations, and for Waukegan Station and Powerton Station, you stated they have been operating for approximately 100 years, and so as it relates to their presence in these areas, how would you describe it?

A. They were there first, or -- yeah. The industrial sources were -- were there at 100 years ago. Those were industrial areas.

Q. And so even Joliet 29 and the Will County Stations, which were built in the 1960s, as it relates to the presence in these areas, how would you describe it?

A. Industrial. We -- or we mentioned the Caterpillar facility was next door to Joliet 29. Joliet 29 is on a major truck corridor for -- it's on Route 6, I think it is. That -- and Will County is -- has a refinery that is not new across the ship canal from it. And Hanson Materials has been there for -- I don't know how long, but for a long time, so it's an industrial area, too.

Q. And, Ms. Shealey, to your knowledge, has any of these four stations been subjected to any enforcement action by the Illinois Attorney General's Office for a groundwater violation?

A. No.

Q. And have any of these four stations been subjected to any enforcement action by the USEPA for a groundwater violation?

A. No.

Q. And because Powerton Station will continue to operate, will it continue to employ people at the station?

A. Yes, it will.

Q. And because the Waukegan -- excuse me.

And because the Waukegan Station will continue to have the peaker unit and continue to operate, will it continue to employ people at the station?

A. Yes, and I include the battery storage. So, yes, Waukegan will continue to employ people, the station.

Q. And same question for Will County. Because Will County will install the battery storage, will it continue to employ people at the station?

A. Yes. It currently employs and will continue to employ.

Q. And finally, with Joliet 29, will it continue to employ people at the station?

A. Yes, currently and will continue.

Q. Ms. Shealey, what, if anything, could deter Midwest Generation from causing or allowing alleged violations of the environmental statutes?

A. I'm sorry. It's -- it's how we

operate. What could deter us? I'm not sure that anything could. It's our goal. It's the way we operate. We intend to comply. We want to comply. We want to be good -- good, corporate citizens, good neighbors in our communities, and in my opinion, Midwest Generation has been a good neighbor in their communities.

They have supported a lot of things. Hundreds and thousands of people have worked at these stations. The electricity that they have generated has fueled Illinois. We just -- we want to participate in a -- yeah, there is nothing that could make us want to comply more than we already do.

MS. GALE: Thank you, Ms. Shealey. I have nothing further for now.

HEARING OFFICER HALLORAN: Thank you, Ms. Gale.

Mr. Russ, do you want to go off the record for a little bit, or --

MS. GALE: Oh, I'm sorry. Mr. Hearing Officer, I'm sorry to interrupt. I forgot.

Can I please move to admit

Exhibit 1607, which is the slides?

HEARING OFFICER HALLORAN: Mr. Russ?

MS. BUGEL: Mr. Hearing Officer, can we just have a moment?

HEARING OFFICER HALLORAN: We can go off the record.

(Whereupon, a discussion was had off the record.)

HEARING OFFICER HALLORAN: We'll go back on the record.

MR. RUSS: We are going to object just because our -- some of our demonstratives were not admitted, and because there is new information in here that is zoning maps that are not just a visual aide, but actually new evidence.

HEARING OFFICER HALLORAN: Well, your demonstratives weren't admitted because you just made them up last night, that timeliness thing. Which ones?

MR. RUSS: I'm not talking about those.

HEARING OFFICER HALLORAN: Okay. Well, this is a four-week hearing. So you've got to let me know what wasn't admitted and when.

MR. RUSS: There were demonstratives during the Gnat direct that were not admitted. Gnat cross.

MS. BUGEL: Well, we -- if I may?

HEARING OFFICER HALLORAN: You may.

MS. BUGEL: We are referring to the ones with the areas for -- different areas and the pinpoint drops on them.

HEARING OFFICER HALLORAN: I vaguely remember the pin -- pinpoint.

MS. BUGEL: Yeah. We presented them as demonstratives.

HEARING OFFICER HALLORAN: Okay, yeah. I do -- I do remember those.

MS. BUGEL: Yeah. So we are concerned that there is a -- just an inconsistency in how demonstratives are being treated, if we are admitting some, but not admitting --

HEARING OFFICER HALLORAN: Well, I mean, there could be different reasons, too.

MS. BUGEL: Yes.

HEARING OFFICER HALLORAN: My understanding is who made the pinpoints, or are they accurate? But, anyway, Ms. Gale?

MS. GALE: Well, Mr. Hearing Officer, in relation to the zoning, that's pubically available information. That's not new information. This is -- I mean, it's been zoned at least 100 years in part as industrial. As I said, much of this information was already admitted in the first hearing. This is just a tool for the -- that we added on to as information for the Board. These demonstratives -- similar demonstratives have previously been admitted, and well, also, we filed them a week ago, and this is the first we've heard of any objection.

HEARING OFFICER HALLORAN: All of them have been admitted already?

MS. GALE: Not all.

HEARING OFFICER HALLORAN: Okay.

MS. GALE: No, sir. This is an update. So the timelines were previously admitted, and the maps were previously admitted, and there are certainly pullouts of admitted documents; such as, Exhibit 711, 649, 648, so --

HEARING OFFICER HALLORAN: What exhibits are you talking about, Mr. Russ, as far as yours that I didn't --

MS. BUGEL: The -- the only exhibit -- if I may respond?

HEARING OFFICER HALLORAN: Sure, yeah. Oh, yeah, please.

MS. BUGEL: The only exhibit that we are concerned about is the demonstratives, the one used in the Gnat cross that had visuals for the different areas in the northwest area.

As to this exhibit today, our concern is that it's not purely a demonstrative. The zoning maps are evidentiary as to what areas are zoned. So that's not purely a demonstrative, so --

HEARING OFFICER HALLORAN: Okay. My question was, what exhibit did I not let in that you tried to get in during the Gnat hearing?

MS. NIJMAN: And it is in.

HEARING OFFICER HALLORAN: Or testimony?

Mr. Russ said I didn't let in some of your demonstratives during the Gnat hearing.

MS. BUGEL: Okay. I -- it's -- you need an exhibit number?

HEARING OFFICER HALLORAN: That's --

MS. BUGEL: Okay. I can look it up.

I -- my notes were that Exhibit 1518 was not admitted, that it was treated just as a demonstrative.

HEARING OFFICER HALLORAN: Okay. Here is what I'm going to do. Because there has been objections and reasons for objections spread all over the transcript, I would ask the Board to take note of that and weigh it accordingly. I will let in 1607, and I assume there is no objection, because I'm also going to let in Complainants' Exhibit 1518. I'm going to revise my ruling.

So Complainants' Exhibit 1518 is admitted. And Respondent's Exhibit 1607 is admitted, and the Board will weigh it accordingly.

(Whereupon, Complainants' Deposition Exhibit No. 1518 was admitted into evidence.)

(Whereupon, Respondent's Deposition Exhibit No. 1607 was admitted into evidence.)

MR. RUSS: Thank you.

HEARING OFFICER HALLORAN: Thank you.

We are still on the record. I have about 40, 45 minutes before I want to call it a day. I think everybody is getting tired, as I am, but I -- you know, I kind of -- you know, we can get this on record. I kind of want to know what is going to happen. I know Mr. Russ is going to cross Ms. Shealey, but -- and this will probably go over into tomorrow.

What's going on tomorrow? And -- and are Complainants -- are you able to say at this point you will have any rebuttal?

MS. BUGEL: We are able to say we will not be calling rebuttal witnesses.

HEARING OFFICER HALLORAN: Okay. Great. So we do have time. I was worried about Friday.

Okay. I don't really need to know any more then at this point. Thank you.

Mr. Russ, do you want to take a second before you start your cross, and I just want to --

MR. RUSS: I can start now.

HEARING OFFICER HALLORAN: Okay. Thank you. You may begin.

C R O S S E X A M I N A T I O N

by Mr. Russ

Q. Ms. Shealey, when you were asked about the NRT liner reviews that happened several years ago, do you remember that?

A. Yes.

Q. I think you said that NRT didn't look at the liners?

A. Yes.

Q. How do you know that?

A. Because the ponds had ash in them. You can't see the ponds if they are full of ash. You can't see the liners if the ponds are full of ash.

Q. You also testified that the ponds are sometimes cleaned out?

A. Yes.

Q. Is it possible that NRT looked at the ponds when they were cleaned out?

A. It is possible, but it is probably not -- it is not probable, because I don't think they -- they would not have cleaned down to the

Poz-O-Pac. So they -- they would not have been able to -- that wouldn't have been a part of routine operation. They would not have been able to see the Poz-O-Pac.

Q. Okay. Did you talk to anybody at NRT about the -- about their inspections of the liners or about their review of the liners?

A. No. I have not spoken to anyone at NRT. As I mentioned, my degrees are in chemical engineering. So I understand a little bit about engineering, so I don't want to talk to NRT, to be frank.

Q. Turning to the exhibit that we are talking about now, which is, I think it's -- it got smudged on my thing. Exhibit -- it's Complainants' Exhibit 34, but it's also got a different exhibit number on my tab here. Yeah, it's Exhibit -- okay. Exhibit 34.

Do you see that?

A. I do.

Q. It says on -- under ranking criteria, there is a line that says that the impoundments were ranked based on four criteria, and then it says, No. 1. Do you see that? And

then it says, "Existing liner; considering type, age, and known conditions based on the pond characterization document and Midwest's knowledge of the liners." Did I read that correctly?

A. Yes.

Q. Did you talk to anybody at Midwest Generation who may have worked with NRT on this technical memorandum?

A. This memorandum was in 2005. I have to get my head straight on days. Yes, I have.

Q. Who would they have been?

A. Maria Race.

Q. Well, but just to be clear for the record, at the time in 2005, you weren't working there yet?

A. No.

Q. All right. Okay. Thank you.

A. But I did talk to Maria Race about this.

Q. Got it. And she worked there at the time?

A. She did.

Q. And you overlapped with Maria Race?

A. By months or -- yeah. It was -- I

guess it was measured in months.

Q. Long enough to talk about that?

A. Yeah, yeah, exactly.

Q. We talked about Poz-O-Pac -- Poz-O-Pac liners at various stations and the fact that they were in good condition.

Just to be clear for the record, you didn't see the Poz-O-Pac liners?

A. No, but I have had professional engineers who have reviewed the construction documents of the HDPE re-lining projects, including photos, who have assured me that the Poz-O-Pac was in good condition.

Q. Okay. Now, there was a question Ms. Gale asked you about what the northeast area at Joliet looked like when Midwest Generation bought the -- or took over the plant, do you remember that?

A. I think she asked me what I have seen it to be. I don't know if she asked me what it looked like when Midwest Gen started, because I wasn't there.

Q. I guess -- right. That's what I wanted to clarify, because my recollection of that

exchange was that she was asking about the condition of that area when Midwest Generation took over the property.

A. I -- you know, I must have misunderstood. I -- my understanding was the condition of the area as I know it to be.

Q. Right. And that's what you said. I just want to clarify for the record. You didn't see it when Midwest Generation took over the property. You are talking about what it looks like now?

A. Well, from 2015 until now.

Q. Right.

A. So over the past eight years I know what it looks like or has looked like, yes.

Q. Okay. Thanks. Now, the northeast area, I think you testified that it wouldn't make sense to put coal ash in that area; is that right?

A. Yes.

Q. Do you think that there is no ash in that area?

A. No, I do not think that.

Q. Okay. So if there is ash in that

area, but it didn't make sense to put it there, do you have any idea why it would have happened?

A. I would suppose that it is very small quantities. That would be my guess, but I don't know. I do not know.

Q. Because --

A. Well, clearly, it does not make sense for them to have placed ash in that area. It's too far from the -- from the boilers.

Q. Right. So the ash has, at least recently for some time, been, when it's not temporarily stored in the ponds at the Joliet 29 site, sent across the river to Joliet 9 to the Lincoln Stone Quarry; is that right?

A. Could you start with -- what did you say at first?

Q. The ash at Joliet 29, at least in the recent period of time that I'm -- that you are familiar with, before the plant stopped burning coal, when it wasn't being temporarily stored in the ash ponds at the site, it was sent over to the Lincoln Stone Quarry; is that right?

A. Yes.

Q. And if it was periodically cleaned

out of the ponds at Joliet 29, that would go to the Lincoln Stone Quarry?

A. Correct.

Q. How did it get there?

A. It was sluiced across the river. Generally ash was placed in the quarry by sluicing. I would guess 99.9 percent of the ash in the quarry was sluiced.

Q. So there is a sluice line that goes across?

A. Not today. There was.

Q. Okay. Okay. Let me see.

You were asked about the 2018 USWAG decision. Do you remember that?

A. Yes.

Q. And I think your testimony was something to the effect that the legacy ash pond and the historic ash rulemakings were a reason to hesitate before taking a step, because you don't want to get out ahead of those rulemakings; is that right?

A. I'm sure I testified that I knew that rulemaking was coming, yes. I think you categorized it correctly, yes.

Q. Just to be clear for the record, did the 2018 USWAG decision say -- what did it say about CCR management units?

A. It did not address them.

Q. Okay.

A. But it did not clearly define legacy impoundments either or legacy units, and so it did not -- I knew it was -- I would presume -- I did not know what it would cover. Let's say it that way.

Q. Okay. Thank you.

Turning to a page or slide number in your -- in the PowerPoint presentation in the Will County section -- I think it's going to be Slide No. 65? 65, yeah.

A. I'm there.

Q. You were describing a refinery across the ship channel from the station. Can you identify that here?

A. I believe that's their impoundment that you can see.

Q. Okay. That dark blue/green polygon there?

A. Yeah, I believe that that belongs to

Citgo.

Q. Okay.

A. And if you can't see it, as I mentioned, I worked at Will County. I could see the refinery from my window.

Q. Okay.

A. From the boiler building, I could see it.

Q. I think the refinery is north of that pond; is that right?

A. I believe that -- I think that that pond belongs to the refinery. I could be wrong in that.

Q. Right. I guess the buildings -- the buildings associated with the refinery would be north of the pond?

A. Yes.

Q. Okay.

A. In fact, I'm pretty sure that that -- as you cross the 135th Street bridge, I'm pretty sure that when you get to the other side of the canal, that is Citgo property.

Q. Okay. Now, I guess I also wanted to ask you about some of the zoning maps that we were

just talking about a minute ago.

So the one for Will County, if I can find it, it's on slide 55. I'm not familiar with Illinois zoning, so I'm not sure how to interpret this, but that yellow line that's outlined here, is all of that the Will County power plant?

A. That it -- yeah. You've got to go in and out. The yellow -- the greater yellow outline is Will County property, Will County Station property, Midwest Generation property. Within that, there is a car valve that does not belong to us. It belongs to Commonwealth Edison.

Q. Okay. And then that little section that's on the west side of the Des Plaines River, that's also Will County property?

A. Yes, Midwest Generation property.

Q. Right, right. And so the red hatched area that's everywhere else on this map, what is that?

A. Not our property.

Q. Does that signify a zone of some kind, or is that just a generic?

A. No, no. It's -- it's the search.

Q. Okay.

A. Sort of we searched for -- this search is for our property, because I'm certain that the Hanson Materials is to the south of us, and that would be zoned industrial, too.

Q. Okay. So the zoning map for Waukegan is on -- there it is. That's on slide 34. Let me know when you get there.

A. I'm there.

Q. So east of the area -- east of the Waukegan power plant, there is a green strip. Am I interpreting this correctly, between the power plant and the lake?

A. Yes.

Q. What's that?

A. It is labeled a conservation -- I cannot read that word. Forgive me.

Q. No. It's very small font.

A. But it's a -- in simple terms, it's a wetland.

Q. Okay. And it's zoned for something having to do with conservation?

A. Yeah. I can't see what the second word is, though, to be honest. I left my glasses

at home.

Q. Could it be recreation? I honestly can't read it either, so --

A. I can't speculate to what that says. I cannot tell.

Q. Hold on just a second. Bear with me.

Can I approach the witness? I have a magnifying glass. It might help.

A. Yeah. I'm afraid it's a -- it's blurry. So that's part of my -- I think part of the problem, but thank you very much.

Q. You bet.

A. I cannot tell if that says recreation. I will admit it could be recreation, but I'm -- I actually am not certain what that word is still.

Q. Okay.

A. It looks like it has too many letters to be recreation to me.

Q. Okay. Fair enough.

Let's turn to the Powerton zoning map, which is slide 20.

A. Give me a second.

Q. Sure. Take your time. Take your time.

A. I got it.

Q. Okay. The area in green, darker green, in particular, do you know what that zone is from looking at this?

A. I would assume that means conservation. Oh, sorry. Conservation. It's a, C-O-N-S. C-O-N-S, zone that Midwest Generation owns.

Q. Right.

A. And operates, for the most part, with a lease to IDNR.

Q. Okay. Thank you.

And then over on the eastern side of the map, there is the bright yellow small area. It looks like it says Virginia Street. What's that zoned as?

A. A residential area, and it's a very small -- this map cuts it off, but it's a very small residential area that's abutted by other industry.

Q. Okay.

A. And I think Ameren owns a lot of

land over in that area.

Q. Okay. On the Powerton Lake that you were just describing a second ago, that's -- Midwest Generation owns it, but did you say Illinois Department of Natural Resources operates a state park in the same area?

A. I did not say that.

Q. Oh, okay. I thought -- I'm sorry. I misunderstood. I thought you said that Midwest Generation allows the state to use it for --

A. I said that Midwest Generation leases it to IDNR. That's what I said.

Q. That's right. Okay. Do you know what IDNR does with it?

A. They stock it for fish. They monitor it for fish. It's a fishing and water foul hunting area.

Q. Okay.

A. But we -- we spend -- I -- the operation part is -- I'm not clear on. We spend substantial money on operating the lake out in the recreation area.

Q. Okay.

A. So I think we are responsible for

maintaining berms, and so on and so forth.

Q. Okay. And this might seem like an obvious question because it's a fish and wildlife area, but is it open to the public?

A. Yes.

Q. Now, bear with me for a second. I just want to make sure --

A. Oh, I'm sorry. Let me correct myself just slightly. It's open to the public to a point, and I can't quantify that, off the top of my head. But our operations -- basically, we use the -- and I do directions wrong, so forgive me. We use the eastern portion of the lake for operations, and DNR -- the recreational area is the western portion.

Q. Okay.

A. It's less -- it's more than half of the lake is recreation, though.

Q. Okay. Thank you.

How does the public access the western side of the lake, do you know?

A. I don't know exactly where the entrance is, but I think there is an entrance from Manito Road, but it's somewhere. There -- I know

there is a boat dock somewhere on the western edge and a gate that DNR opens and closes.

Q. Okay. Is the gate on Midwest Generation property?

A. If it's -- if it's associated with the lake, yeah, it is.

Q. Looking at the Joliet 29 zoning map on slide 5. And I guess, if you can, look at the slide 4 picture as well, because I have a question sort of about both of these two things.

A. I have it.

Q. We have had testimony in this matter about a sliver of land that is owned by someone other than Midwest Generation along the northeast area that might be -- I can't remember if it's the Army Corp of Engineers or the state. Do you -- do you know where that is?

A. I think you just -- I'm sorry. You just described it. I'm not being facetious.

Q. I did describe it in general terms. The reason I'm asking is because in the zoning map, the zones go right to -- they appear to go right to the edge of the river.

A. Yeah, because the -- just because we

don't own it, doesn't mean it's not an industrial zoned area.

Q. Right. Sure. I guess -- you know, I'm looking at the zoning map, and I see a bunch of parcels, each with a different zoning number.

A. Uh-huh.

Q. I don't see the distinct parcel along the edge of the river. I'm not saying it's not there. I'm just curious about exactly where it starts and stops. So I -- if it starts -- you know, where is the eastern and the western extent of that strip of land?

A. If you are looking at slide 4?

Q. Yeah.

A. You can see that it juts north.

Q. Yeah.

A. And towards the middle of the -- that area.

Q. Yeah.

A. And it's that sliver along the lake. It's the easement -- so it may not show -- it may be an easement.

Q. Okay.

A. But I don't think it is. I think

DNR -- we discovered this because DNR told us that they owned it, and then we reviewed and found that they do.

Q. Okay.

A. The state owns it. Not DNR, but the State of Illinois owns that part, that piece of land.

Q. Right. Okay. Thank you.

So just to clarify. I think you just said this, but that easement or ownership starts at the road that goes across the Brandon Lock and Dam and goes west, and then it stops where the -- where the property line jags down to the south there?

MS. GALE: I would only object to the extent that this is an approximation, but there is an Exhibit 601 that is the survey that shows the exact description that he is describing.

HEARING OFFICER HALLORAN: Do you know that exhibit, Mr. Russ?

MR. RUSS: I don't have it in front of me, but I believe you. So that answers the question. Thank you.

Can I just have a second here?

HEARING OFFICER HALLORAN: Yes, you may.

BY MR. RUSS:

Q. Okay. At some point you discussed a prison, and I believe it was in the vicinity of Powerton, but it may have been Joliet. Do you recall that, Joliet?

A. No. It was Powerton.

Q. Powerton.

A. I know there is a prison in Joliet. It's kind of famous, because it was in a Blues Brothers movie, but the one I was referencing is in Powerton.

Q. Okay.

A. Or Pekin. I'm sorry. In Pekin.

Q. In Pekin near Powerton?

A. Yes.

Q. Is that an industrial use?

A. I don't know how a prison is zoned. It's a federal -- I -- the feds own it. I'm pretty sure it's a federal prison, not a state prison. So it's federal land.

Q. And then --

A. I'm sorry. I believe it to be

federal land. It could be state land.

Q. Now, just to be clear for the record, who owned the Joliet plant before Midwest Generation?

A. I know who operated it. I'm not certain who owned it.

Q. Sure. Who operated it?

A. Commonwealth Edison.

Q. Okay. And do you -- were you employed by Commonwealth Edison at any point?

A. No.

Q. Do you know what Commonwealth Edison did at the property?

A. They produce electricity.

Q. And do you know what Commonwealth Edison -- do you have any first-hand knowledge of what Commonwealth Edison did with the coal ash that it generated?

A. As I stated -- Joliet 29, as I stated, most of it went to Lincoln Stone Quarry.

Q. And just to be clear on the record, do you have personal knowledge of that from Commonwealth Edison, or is this from the records that you have reviewed and people you have talked

to?

A. Records I reviewed, people I talked to, and, yeah, the amount of generation and the amount of ash, I -- it went to Lincoln Stone Quarry.

Q. Right. Okay. And at Powerton, when Commonwealth -- did Commonwealth Edison operate Powerton?

THE COURT REPORTER: Sorry? Was there an answer?

MR. RUSS: Oh, I'm sorry. She nodded.

THE WITNESS: I was -- I was -- but I didn't answer. I was thinking.

BY MR. RUSS:

Q. Oh, I'm sorry. I thought you were nodding yes. Okay.

A. You said did Common -- I'm sorry. Repeat your question.

Q. Did Commonwealth Edison operate the Powerton plant before Midwest Generation?

A. I believe they were the immediate -- that's why I was nodding. I was just -- I believe they were the immediate -- immediately prior

operator.

Q. Okay. Same question. Do you have any first-hand knowledge of what Commonwealth Edison did with its ash?

A. Other than reviewing records, talking with people, yeah. I do not. Well, yeah, I do, because I have reviewed records, and I have talked with people.

Q. Sure. And same question for Waukegan.

Before Midwest Generation operated the plant, who operated it?

A. Immediately before was Commonwealth Edison.

Q. And do you have any first-hand knowledge of what Commonwealth Edison did with the ash that it generated?

A. From their recordkeeping, which they were required to do and reviewing those records, and from talking with people, yes.

Q. Okay. And then at Will County, same question. Who operated the Will County plant before Midwest Generation?

A. Commonwealth Edison.

Q. And do you have any first-hand knowledge of what Commonwealth Edison did with the coal ash that it generated?

A. From record reviews with records, which they were required to keep and pass along, and review of those records and talking -- talking to people, I guess that is not necessarily first-hand, but the records sort of put me in a first-hand knowledge basis. So I guess that's semantics, and I'm not intending to play semantics, but --

MR. RUSS: I understand. That's fine.

Could we have a five-minute break to confer?

HEARING OFFICER HALLORAN: Yeah. We will go off the record.

(Whereupon, a short break was taken.)

HEARING OFFICER HALLORAN: We are on the record. Go ahead, Mr. Russ.

BY MR. RUSS:

Q. Okay. Ms. Shealey, were you at Midwest Generation when the Bypass Basin at

Powerton was re-lined?

A. I don't believe so, no. I would have to -- well, I know I was not. I don't remember exactly when it was re-lined.

Q. Okay. So the timeline for Powerton, if you look at slide 27, I believe.

A. So -- I'm sorry.

Q. This might refresh your memory. Go ahead.

A. Yeah, I was not at Midwest Generation when the Bypass Basin was re-lined.

Q. And that happened in 2010, correct?

A. Correct.

Q. You testified about inspections of the liner at the Bypass Basin at Powerton. Do you remember that?

A. Not specifically.

Q. About ongoing inspections?

A. Of the ponds?

Q. Of the liner, visual inspections of the liner at the Ash Bypass Basin?

A. Oh, okay, yes. To the extent it can be seen, but I think I testified -- I don't recall using the word "inspections of the liner." I

recall saying inspections of the ponds. Weekly inspections of the ponds and annual inspections of the ponds.

Q. I'm sorry. Maybe it was another site, but I thought you were talking about if there is a tear that someone sees, you replace it with another piece of HDPE?

A. Correct.

Q. Okay.

A. That is true. I did state that.

Q. Okay. Now, in -- I believe in the Ash Bypass Basin there's a warning layer; is that right?

A. Today there is a warning layer, yes.

Q. Can you describe what that is?

A. Sand and limestone.

Q. And what's the purpose of a warning layer?

A. To prevent an operator, a heavy equipment machine operator -- excuse me -- from damaging the liner when they are removing ash.

Q. So you can't see the liner below it; is that right?

A. Below the warning layer, no, but you

can see the sides and up to the -- basically, the warning layer only goes up for -- but so high. So you can see the sides of the liners.

Q. Okay. Okay. Now, totally different question. Actually, I'm going to ask the same question about the Ash Surge Basin. Does that also have a warning layer?

A. Yes.

Q. And can you see the liner below the warning layer at the Ash Surge Basin?

A. No. Similarly, you can see the sides of the liners -- the liners of the sides of the ponds, but you can't see what's underneath the warning layer.

Q. Okay.

A. Which does not receive any contact, because the warning layer prohibits contact with it.

Q. Okay. Now, a different question entirely.

At the Will County station, you mentioned an area where there was -- I'm trying to remember the term you used, but a concrete pad that was used for temporary coal ash placement.

Where was that located?

A. At the station behind the boiler building.

Q. Okay.

A. It actually still exists. I'm sorry. Just to be clear, it's clear of ash, but the concrete pad still exists.

Q. Okay. Thank you.

And then at Waukegan, you were talking about a -- an area that was marked on a map as alleged ash area, and now it's a parking lot. Do you remember that area?

A. The parking lot?

Q. Yeah, I believe --

A. It is the parking lot.

Q. -- you were asked what's stored there, and you said cars; is that right?

A. Yes.

Q. Do you know what's under the asphalt?

A. I always assume sand, but, no, I do not.

Q. Okay. Thank you.

A. Because of where Waukegan is, it's

mostly sand underneath everything.

Q. Right. Now, with the compliance commitment agreements, there are terms in the CCAs about the ponds being used for temporary storage; is that right?

A. Yes.

Q. Are -- does Midwest Generation intend to comply with those terms of the CCAs?

A. We have already complied with those terms in the CCAs, which are agreements.

Q. And some of those ponds are going to be closed in place; is that right?

A. That is our intent. That's what we have applied for at several locations.

Q. And so then that wouldn't be temporary storage anymore, right?

A. The CCAs were an agreement by definition, compliance commitment agreement, and the Agency accepted the actions and considered the CCAs complete. Midwest Generation considered to monitor groundwater under the CCA monitoring programs, and those agreements were while the stations were operating. Additionally, regulations happened after those CCA -- CCAs were

signed. Federal CCR rules and state CCR rules allow for ponds to be closed in place.

Q. Okay. So, just to make clear what you are saying, the CCAs are no longer effective once the plants stop burning coal?

MS. GALE: Objection, misstates testimony.

HEARING OFFICER HALLORAN: Can you rephrase, Mr. Russ?

BY MR. RUSS:

Q. Sure. Did the CCAs ever stop being -- are they no -- are they still in effect at all four plants?

A. I believe that the Agency considered them completed within one year.

Q. Okay. So the terms of the CCAs no longer apply?

MS. GALE: Objection. Misstates testimony.

HEARING OFFICER HALLORAN: Can you rephrase that, Mr. Russ?

MR. RUSS: Sure.

HEARING OFFICER HALLORAN: Thanks.

BY MR. RUSS:

Q. Let me try to parse what you were saying about the terms.

So the temporary storage is what I'm wondering about. That was a term in the CCA, and I believe you said that doesn't -- that's not applicable anymore, because the coal -- the plant stopped operating?

A. I don't think that's what I said.

Q. Okay. Can you clarify what --

A. It -- I think the biggest reason it's not applicable is that -- are the new regulations that have been promulgated. Secondly, they are not orders. They are agreements, and the Agency considered them complete. They signed the -- they returned the signed compliance commitment agreements.

Q. Okay. So some of the ponds -- the closure plan was originally to -- closure by removal, and it's now -- your new plans or your new proposals are to close them in place, right?

MS. GALE: Objection, vague.

HEARING OFFICER HALLORAN: Agreed. Sustained.

BY MR. RUSS:

Q. Are there any -- are there any ponds at Joliet plant that were originally -- have you proposed to close any ponds at the Joliet plant by removal and then changed the plan to close by closure-in-place?

A. At Joliet 29, we proposed to close by removal and repurposed the liner. So I think we are still at closure by removal at Joliet 29.

Q. And at Powerton, were there any ponds that were once planned to be closed by removal and are now being planned to close in place?

MS. GALE: Objection. Misstates testimony about the plants for the Powerton ponds.

MR. RUSS: Just asking a question.

HEARING OFFICER HALLORAN: She can answer if she is able.

BY THE WITNESS:

A. I'm not sure that I'm able, because I'm more focused on our current plans for Powerton Station.

So the Former Ash Basin is the only basin at Powerton Station that we have

applied for closure -- we have applied for a closure permit for. I believe that it's always been an in-place closure, and, in fact, in response to public comment, we changed our plan. Our original plan, the FAB -- I'm sorry. I use the term "FAB" -- Former Ash Basin. When we went -- we originally planned to close -- the FAB is bisected by a rail line.

We originally planned to close both sections in place. I believe our application to the Agency is to remove ash from the northern portion and place it in the southern portion and cap the southern portion in place. The other basins at Powerton, I cannot tell you what the closure plans are, off the top of my head. I'm more focused on the retrofits of those other three basins.

BY MR. RUSS:

Q. Okay. At Waukegan, the West Ash Pond, what's the current closure plan? I know you already testified, but just to keep it clear on the record.

A. I hope I get it straight, because I'm confused which one. Closure-in-place.

Q. Okay. And was that -- was the closure plan for the West Ash Pond ever closure by removal?

MS. GALE: I'm sorry. Was your first question about what the plan was for the West Ash Pond?

MR. RUSS: Yes.

MS. GALE: Objection, mischaracterizes testimony for the West Ash Pond.

BY THE WITNESS:

A. I am sorry. I told you I do it wrong every time. I get those confused.

The West Ash Pond is closure by removal and repurposing of the liner.

BY MR. RUSS:

Q. Okay. And the East Ash Pond, what's the closure plan for the East Ash Pond?

A. Thank you. That one is closure-in-place.

Q. Has Midwest Generation planned to close that by removal at any point in the last several years?

A. Yeah. And I think we've changed the plan three or four times. So, there are -- just

generally, we have changed plans several times based on regulatory or -- regulatory requirements.

Q. Okay. What regulatory requirements have led you to change your closure plans?

A. Federal or state CCR rules. As those rules have morphed, we have chosen different compliance plans, but both rules still allow for closure-in-place or closure by removal. So closure-in-place is an acceptable method under both sets of regulations.

Q. And at Will County -- I'll just run through them quickly. I hope this is okay.

Starting with Pond 1N, do you know what the closure plan is for Pond 1N?

A. I'm -- oh, I'm sorry. I was going to jump ahead. It is closure-in-place.

Q. Has it ever been closure by removal?

A. No. Will County has only been -- we have only considered Will County's Pond 1N a regulated unit for the past -- since Part 845 was promulgated by -- the regulations under Part 845 were promulgated by the Board. I believe that it's always been closure-in-place, but I could be wrong, and it's been two years. That's a lot.

Q. And Pond 1S, same question. What's the current closure plan for Pond 1S?

A. In place.

Q. Has it ever been anything else, as far as you are aware?

A. Not that I -- well, I would -- I can't say that I'm not aware. I can say I cannot recall that it's been anything other than that.

Q. Okay. And Pond 2S, what's the current closure plan?

A. In place.

Q. Has Midwest Generation planned to close that by removal at any point in the last ten years?

A. Yes.

Q. Okay. So that closure plan changed. Do you remember when it changed?

A. I do not recall when it changed. I would have to go back through documents. I could be -- and I'm not hedging, but I could be on my third or fourth iteration of closure plans, and there are multiple units across our fleet.

Q. And the Pond 3S at Will County, what's the current closure plan for that?

A. In place.

Q. And was that closure plan ever closure by removal in the last ten years?

A. I believe so, but again, it could have been changed several times. And I have to say -- I'm so sorry -- with regard to Will County, we just had their public meetings last week. We will not submit those applications until August 1st, or they are not due until August 1st. We are evaluating.

Q. Okay. Now, can you just confirm for the record -- I think you said this, but the reason the closure plans changed at Will County were state and federal -- state or federal regulations; is that right?

A. Those are -- I'm sorry if I stated that unequivocally. Those are among the reasons.

Q. Okay. Are there -- what are the other reasons?

A. There could be an abundance of reasons. I can't quantify them all.

Q. Okay. And, now, I have a couple questions about employment. At Waukegan, was there a reduction in employment when the plant

stopped burning coal?

A. Yes.

Q. Do you know how many people?

A. That -- I think there is an exhibit with the population -- the employment in 2021. I don't know how many people are employed today, but I know it's less than that number.

Q. Okay. And I believe you testified that the plan for Waukegan is to turn it into a battery storage site?

A. Waukegan actually still operates two EGUs, and, yes, we intend -- well, not to turn it into a battery storage site. I would more characterize it as install battery storage.

Q. And the EGUs will continue to operate as well?

A. Until -- until 2030, I think is our current plan, and that's because of our CEJA, which I can't recall the acronym right now.

Q. Okay. And I know it's in the future. You don't know what the employment numbers will look like when the EGUs stop burning but the battery storage is still there, do you?

A. No, I do not.

Q. And at Will County, was -- there was a reduction in employment when that plant stopped burning coal, I assume?

A. Yes, there was.

Q. And the plan for that site is to install some battery storage, but you don't know what the employment is going to look like down the road once the battery storage is up and running?

A. I do not. I do know that those battery storage projects will bring construction jobs to Will County and same for Lake County.

Q. Do you know what the employment numbers at Will County are right now?

A. I do not.

Q. And at Powerton -- I mean, at -- I'm sorry -- Joliet, same question.

Employment dropped when they stopped burning coal, I assume?

A. I think that is true, yes.

Q. And there are currently -- that plant is currently burning gas?

A. It is.

Q. Do you know the employment numbers now for Joliet?

A. I would suggest it's pretty close to the number that was in the exhibit that was referenced earlier.

Q. Right.

A. Plus or minus. But I would -- yeah. It wouldn't be significantly less. It would -- it could be more.

MR. RUSS: Okay. I only have a few more questions, but I think I would prefer to wait until tomorrow morning, if that's okay.

HEARING OFFICER HALLORAN: Well, you know, I hate to bring Ms. Shealey back here for ten minutes, but I think I stated earlier -- let's go off the record for a minute.

(Whereupon, a discussion was had off the record.)

HEARING OFFICER HALLORAN: We are back on the record.

Mr. Russ?

BY MR. RUSS:

Q. I just have one more question.

Ms. Shealey, at the Powerton site, are you aware of any instances of ash being placed on the ground outside of the ash ponds?

A. In its current iteration, no. I think there are -- there are references to as such in the Board order or in the previous testimony.

Q. But not since you have started working at Midwest Generation?

A. No. I can't -- I was trying to think. By on the ground, I would exclude -- I cannot recall if Powerton has a concrete pad like I described at Will County. I will presume it does, but I -- I'm not sure that -- I would -- I don't know if that's what you mean by on the ground. If by on the concrete pad means on the ground, yes, there probably is a concrete pad at Powerton.

Q. Okay. And then not on a concrete pad, are there any places like that where ash is placed on the ground at Powerton?

A. No. It's all in surface impoundments.

MR. RUSS: That's it. I'm done.

HEARING OFFICER HALLORAN: All right. Thank you, Mr. Russ.

Ms. Gale, re-direct?

R E - D I R E C T E X A M I N A T I O N

by Ms. Gale

Q. Just two questions.

Ms. Shealey, can you turn to Exhibit 34, which is the NRT technical memorandum?

A. I got it.

Q. I want you to turn to the first page, MWG13-15_23608.

A. There.

Q. And you see under "ranking criteria", there is a Paragraph No. 1?

A. Uh-huh.

Q. And, Ms. Shealey, second sentence, NRT states, "In particular, the Poz-O-Pac liner systems were constructed more than 25 years ago, and are reportedly in poor condition."

Ms. Shealey, as your understanding of this document, what do you think reportedly in poor condition means?

A. Somebody said something that was out of turn, some -- who didn't know, and NRT took them at their word for it. Because, again, when the ponds were re-lined, the engineers have told me, professional engineers have told me, they

reviewed the construction documents and photographs. The Poz-O-Pac across the fleet was in good condition.

Q. Thank you. Ms. Shealey, you were asked about the closure plans for certain of the CCR surface impoundments, and you were asked about how those plans changed. Do you recall that?

A. Yes.

Q. Ms. Shealey, when the federal CCR rule was first passed, how would you describe the plans that were preliminary -- that were first proposed in response to that rule?

MR. RUSS: Object, vague.

HEARING OFFICER HALLORAN: Could you rephrase, Ms. Gale, please?

BY MS. GALE:

Q. Okay.

Ms. Shealey, when the federal rule was first passed, and let's say you were looking at the closure option for Will County Pond 2S. How would you describe the plan that was first proposed by Midwest Generation pursuant to that rule in 2015?

A. Yeah. 2015, yeah, particularly

since the date of closure at Will County -- I cannot remember whether the closure date was April of 2021 in 2015, or if that came -- that date was established in 2018, but the 2015 plans were preliminary. They were really far out in the future. We intended to keep operating the ponds, and so that was the first -- those were the first blush at it, so that as we learned more, our plans became refined.

And I would consider -- Will County has not been submitted yet, but the final closure plans are the ones that have been submitted to the Agency for permitting in the cases where they have been submitted.

BY MS. GALE:

Q. And we use that example as Will County 2S as an example, but is that analysis similar for the other ponds that you were asked about by Mr. Russ?

A. Yeah, absolutely.

MS. GALE: Mr. Hearing Officer, we have no further questions.

HEARING OFFICER HALLORAN: All right. Thank you.

Mr. Russ?

MR. RUSS: One re-redirect or re-cross.

R E - C R O S S E X A M I N A T I O N

by Mr. Russ

Q. When Ms. Gale was asking you about the NRG -- NRT technical memorandum, Exhibit 34, and the statement about the Poz-O-Pac liners being reportedly in poor condition, I think you already testified to this, but I just want to clarify for the record.

You don't -- you didn't talk to NRT about how they made that conclusion, right?

A. No, but it -- I can read. I'm sorry. But the plain language implies that they did not look at that. They talked to -- they talked to people, and then they reported out that the liners were in poor condition instead of doing the real engineering work to determine whether the liners were in good or bad condition.

MR. RUSS: Okay. That's good enough. Thank you. We are done.

MS. GALE: Nothing further for Ms. Shealey. Thank you very much.

HEARING OFFICER HALLORAN: All right. And before we go off the record, I want to acknowledge Vanessa Horton was here the whole day, staff attorney with the Board, and I keep forgetting that.

But we will adjourn to -- well, until tomorrow, June 15th. We're off the record. Thank you.

(END OF PROCEEDINGS.)

I, KARI WIEDENHAUPT, do hereby certify that the foregoing was reported by stenographic and mechanical means, which matter was held on the date, and at the time and place set out on the title page hereof and that the foregoing constitutes a true and accurate transcript of same.

I further certify that I am not related to any of the parties, nor am I an employee of or related to any of the attorneys representing the parties, and I have no financial interest in the outcome of this matter.

I have hereunder subscribed my hand on the ____ day of _____, 2023.

_____

KARI WIEDENHAUPT, CSR

A
A.D 1:18
a.m 1:18
ABEL 2:9 4:4,6 4:10,12
ability 72:8 88:6
able 20:9 28:23 34:3 37:17 49:9 58:4 59:24 66:2 151:13 175:14 178:16 180:18 190:12 192:12 195:9 196:21 229:8 230:17 234:18 272:9 286:12,14 288:2 288:3 317:18,20
absolutely 116:24 150:17 171:9 175:10 197:17 199:23 256:5 275:16 329:20
abundance 322:20
abuts 133:10
abutted 299:21
accelerate 274:18
accelerated 274:20
accept 64:22 83:16 96:5,8 164:12
acceptable 46:23 48:1 320:9
accepted 158:8 314:19
access 48:5 301:20
account 151:9,14
accurate 32:15,19 116:11 124:5 130:4 210:18 216:12 248:21 282:24 332:6
achieve 13:20
acknowledge 331:3
acknowledged 13:24 16:13
acknowledges 41:11
acronym 107:3 323:19
act 61:14,19,22 117:6 168:17 170:17 195:9,20
action 41:12 98:1 201:2 276:22 278:15,19
actions 16:11 99:12 276:15 314:19
active 131:4
activities 114:14
actual 88:3
add 58:13 72:5 101:24 102:7 229:12
added 145:21 272:23 283:8
adding 98:21 219:7
addition 12:5 176:15 199:12 255:15
additional 10:18 10:21 12:1,4 135:13 173:2 193:5,13 230:8 230:16 231:14 250:3 273:16,20 274:2,3,16
Additionally 314:23
address 41:20 104:12 294:4
addresses 143:16
adequately 40:21
adjacent 59:4 84:19
adjourn 331:6
adjusted 137:17 138:3 175:6 177:23 178:4 179:13 180:7 212:4,15 248:10 257:2,3 259:20 259:21
Adm 266:9
admission 124:9 129:4 131:13 138:20 140:6 182:16 213:4
admit 49:1 280:24 298:15
admitted 5:1 47:12 79:13 124:14,17 129:10,12 131:15,16 137:19 139:3,5 140:11,13 143:9 145:20 147:24 148:2 155:11 158:16 178:6,21 182:21,23 213:9 213:11 217:14 219:6 241:21 245:6,7,10 246:14,16 249:13 281:13 281:17,24 282:2 283:7,10,14,19 283:19,20 285:4 285:16,17,20,23
admitting 282:18 282:18
adopted 37:1 38:4
advance 37:6 119:19
advanced 46:4,8 79:19
affect 64:1 71:14 161:16 164:19
affirmed 129:8
afraid 298:10
age 29:15 277:17 289:2
agencies 113:22 187:5
agency 115:2 146:17 153:23 158:9 164:11 165:18 169:5,7 169:16,19,21 170:3,8 201:17 201:21 234:19 236:5 244:12 247:15 248:13 255:1 268:20 274:6 277:8 314:19 315:14 316:15 318:11 329:13
Agency's 103:21 138:2,15 157:23 179:12 201:11 201:19 249:15 276:18
agents 218:4
ago 9:8,15,23 26:13 46:19 76:12 94:19 128:24 194:10 194:12,14 195:12 277:24 283:11 287:7 296:1 300:3 327:15
agree 13:10 26:16 47:22 103:23 130:17 131:8 149:22 198:24 268:3
agreed 83:15 97:8 154:23 192:14 263:24 276:12 276:23 316:23
agreement 7:23 8:1,5 46:6 50:6 165:14,15,17 201:11 222:13 244:12 268:20 314:17,18
agreements 7:17 7:20 10:3,4,8 162:7,9,22 222:9 314:3,10,22 316:14,17
agricultural 54:21 54:24 55:5,10
Ah 105:4
ahead 152:3 189:9 200:19 201:17 201:21 243:2 293:20 309:21 310:9 320:16
aide 281:15
aids 49:3
air 109:16,18,20 110:6,7
alleged 16:15 257:13 258:6 261:15 279:22 313:11
allow 66:8 121:20 189:9 230:5 315:2 320:7
allowed 126:15 206:20
allowing 92:12 279:22
allows 300:10
alluded 245:1
alternated 127:10
alternative 48:24 206:17,24 276:1
alternatives 255:18
Ameren 299:24
amount 109:18 115:14 206:9 307:3,4
amplified 56:21
an@nijmanfra... 3:12

analyses 94:19 171:3 229:22
analysis 28:15,17 28:20 29:1,6 30:1,9 31:2 33:12,17 34:6 65:22 69:24 70:4,24 73:11 74:18 99:17 101:17 106:2 136:24 255:18 266:22 329:17
analytical 39:16 81:1 88:3
analyze 97:13
analyzed 72:6 89:13 95:24 136:22
and- 2:7
and/or 39:18 109:23
ANDREW 3:5
animal 226:23 227:1 253:2
animals 186:11,12
announced 156:9 236:14 263:20
announcement 156:20,24
annual 224:20 226:14,17 250:8 251:1 252:6,11 252:12,15,18 269:24 270:6,20 270:22 311:2
annually 167:4 199:16 270:16
anomalous 183:20 183:21 184:1
anomaly 185:14
answer 11:2 12:18 20:9 28:23 29:11 31:1 34:3 37:17,22 42:4 58:4 64:7 66:2 72:19 88:21 91:20 93:24 307:10,14 317:18
answered 34:1 64:2,13 101:18
answering 22:4 215:5
answers 304:22
anticipate 36:18 36:23 45:23 49:21 98:16
anticipated 137:6
anticipating 30:7 45:17
anybody 288:5 289:6
anymore 314:16 316:7
anyway 282:24
anyways 184:18
apparently 42:4
appear 21:19 302:22
APPEARANCES 2:1 3:1
appears 20:21 54:15 59:7 95:1 142:20 216:16
appendix 44:8,17 69:8
applicable 316:7 316:12
application 15:2 18:20 100:12 128:8 171:12,16 171:19 172:5,13 174:14 175:5,18 176:8,12,14 227:17 228:9,14 228:18,21 229:9 230:14,23 231:4 231:9,21,22 232:2,20,24 233:4,8,12,14,15 234:5,7,10 235:2 235:11,17,20 236:3 253:21 254:4,7,16,21,22 255:4,9,14,16,20 255:23 271:9,13 271:19 272:4 273:6 274:5,24 318:10
applications 171:4 172:18 176:5 225:17,18 227:22 228:1,23 229:5 231:18 234:16 235:22 254:2 255:20 322:8
applied 95:7 225:16 255:22 259:21 314:14 318:1,1
apply 110:5 197:12,15,15,19 225:19 232:14 257:1 315:17
applying 114:10
appreciate 47:11
approach 16:17 16:19 34:12 76:21 91:23 298:8
approached 17:10 169:5
approaches 40:20
appropriate 65:2 65:5 71:17 77:3 106:5
approval 83:14 99:13 159:1
approve 158:23
approved 40:20 40:24 95:15
approximate 23:12 53:5,20 83:3
approximately 25:1 82:7 142:2 154:3 163:23 214:3 228:13 231:2 255:11 277:19
approximation 304:16
April 154:4 158:2 172:15 207:1,1 207:23 329:2
area 24:5 39:7 42:3,6,10,13 43:2 50:21 51:9 51:11,15,17 52:3 52:13 54:3,6,16 54:19 55:9,13,16 55:21 56:11,12 56:15 57:3,4,9 57:11,16 59:21 60:1,19,21 85:8 85:8,10,10,24 86:3,11 87:2,7 87:12 88:9,12,16 88:17 89:19,21 90:4,11 96:15 100:22,24 126:16 132:14 132:15,21 133:8 186:3,4,7,12,15 186:24 187:5,12 187:13,19 188:23 189:20 190:4,15,17 191:4,7,10,12,16 191:23 192:22 193:2 197:4 198:5,6,6,11,14 199:11,13 200:1 200:2,2 203:17 203:24 204:7,15 204:16 215:14 215:16 218:4 239:19 257:13 257:15,17,19,24 258:7,10,13,16 258:19,23 259:5 259:11,13,22,23 261:15 262:5,16 264:12 277:13 278:12 284:8 290:15 291:2,6 291:17,19,22 292:1,8 296:19 297:10 299:4,17 299:19,21 300:1 300:6,17,22 301:4,14 302:15 303:2,18 312:22 313:10,11,12
area's 118:24
areas 14:13 16:13 17:16 33:9 38:11 39:3 45:22 47:15 58:19 62:20 63:17,18 86:15 90:16 92:23 93:3 104:6 185:19,21,24 193:22 195:7 197:9,15,19 198:2,4,8 199:14 200:10 201:2 238:9 260:21 277:15,20,24 278:3 282:7,7 284:8,11
Army 187:8,11 188:22 189:5,11 190:2,3 302:16
arrive 66:16
arsenic 67:24 68:18 69:13 70:10,12,15 73:20 80:11 81:5,15,19 82:13 84:15
article 129:16,24 130:15

AS21-1 179:21 180:8
AS21-2 179:21 180:4
asbestos 238:17 238:18,20,22,23
ash 17:13 18:9 35:19 36:10 38:11,17,22 39:2 39:8,18 42:7 59:22 60:4,15 62:17,19,20 63:2 63:15 79:15,16 84:11,12 86:10 86:21 87:3,17,19 87:22,23,23 88:2 89:17,19 90:22 92:23 93:20 96:10 100:24 101:1,10 102:13 114:1,4 125:15 126:1,3,5,9,12 126:12,21 127:1 127:6,7,11 129:17 130:22 130:23 131:2,4,7 136:7,9,12 140:23 141:5,6 142:13 143:22 144:10,14,23 145:8,11,14 146:10,10,19 147:2 148:18 151:11 153:20 153:22,24 156:2 156:10,10 157:7 166:6,12 168:17 175:1 186:4 187:19 188:3,7 188:13 190:18 193:22 195:7 197:4 198:3,5 199:18 205:9,17 205:21,22,24 206:6,10 207:8 208:2,17 209:10 209:22,24 210:15 211:5,7 212:1 213:19 214:3,8,13,14,18 214:24 215:3,6,8 215:12,12 218:2 218:11 219:20 219:20 224:12 224:23 225:3,8,8 226:2 227:18,18 227:19 228:1,2 232:16 233:19 234:11,20,21 235:4,10,16 236:4 240:18,23 241:2,3,4 242:10 243:3 250:13,17 250:21 251:10 253:21,22 254:1 255:5,6 257:19 258:6,12 259:11 259:13 261:15 262:1,1,5 265:13 265:13 266:13 266:22 267:23 267:24 275:11 287:13,14,16 291:19,21,24 292:8,10,17,21 293:6,7,17,18 306:17 307:4 308:4,17 309:3 310:21 311:12 311:21 312:6,10 312:24 313:6,11 317:23 318:6,11 318:19 319:2,6,9 319:13,16,17 325:23,24 326:16
aside 14:5
asked 9:12,24 26:6,7 29:5 34:1 35:16 64:2,12 65:15 67:6,10 77:13 85:9 88:15,22 90:10 90:13,14 93:19 94:9 96:10 97:16 98:24 103:1,5 104:4 105:1 186:23 189:5,6 191:15 191:22 208:16 214:23 215:2 287:5 290:15,19 290:20 293:13 313:16 328:5,6 329:18
asking 30:15 38:17 64:17 65:23 97:12 103:7 291:1 302:21 317:16 330:6
asphalt 313:20
Assembly 168:13
assess 95:13 99:21
assessing 33:13,16 76:21 105:16
assessment 30:24 64:18 72:5 77:1 93:12 105:24 146:24 154:8,10 155:1,7,10,21 158:6 159:9 243:5,8
assessments 166:22 229:22 254:11 267:16 269:10,10
associated 43:8 44:5 45:6 80:2 114:14 115:12 295:15 302:5
assume 47:2,10 239:4 285:11 299:7 313:21 324:3,18
assumes 22:5
assuming 24:22
assumptions 150:16,18
assure 166:11 178:15,15,15
assured 290:12
attach 180:22
attached 123:21 123:22 248:12
attempt 277:7
Attempted 156:21
attempting 104:9
attendant 99:19
attention 213:15 238:24
attenuation 71:19 71:21 76:17 77:10 103:18,20
attorney 278:15 331:4
attorneys 332:10
August 158:2,2,3 195:2 322:9,9
author 172:8 254:9
Authority 153:20
automated 70:3
avail- 151:14
availability 151:15
available 16:12 35:10 39:5 66:12 86:7 105:15 118:9,12 171:8,15 230:2 254:18 283:3
AVENUE 2:10
average 35:9
averaging 30:24
avoid 157:1
aware 18:24 19:7 34:15 36:12,14 51:13,19 60:3,5 103:17 115:14 147:3 162:2,4 173:9,10 184:19 186:13 187:15 187:17,18 194:11,15,20 195:3 199:21,21 199:24 200:6 223:5,8,8,11 239:6,6,12 321:5 321:7 325:23
axis 70:10

B

b 4:15 211:2
bachelor 109:1
back 11:9 25:12 25:21 32:1 48:22 53:2,16,22 61:20 91:11,16 100:16 102:2 107:17 121:18 122:21 135:10 141:9,20 142:1,2 144:6 152:12,16 153:18 164:3,5 165:12 178:15 178:16 183:2 184:5 202:10,16 207:6 210:9 213:15 214:9 216:4 224:5 237:7 240:9 245:5 248:14 249:19 251:4,13 262:9 263:8 281:10 321:19 325:12,18
background 33:2 34:9 108:21,23 167:1 202:17
backup 69:5
bad 204:2 240:4 330:20
bankruptcy 164:17,19

barium 68:11
barrier 190:10
base 35:4 118:10 118:11,13 119:24
based 23:23 29:22 43:1 67:11 70:7 76:24 77:1 89:3 89:11,14,22 102:7,14 157:14 157:16,19 210:2 211:12 216:22 255:17 262:3 288:23 289:2 320:2
baseline 274:14
basic 72:6
basically 83:18 111:11 125:3 136:20 301:11 312:1
basin 96:10,22,24 97:3,9 205:21,22 207:8,10,11,13 207:15 208:1,4,8 208:9,10,12,17 208:20,23 209:4 209:8,17,19,22 209:24 210:16 210:16 211:6,7,8 211:18,23 213:1 213:19 214:3,8 214:14,18,24 215:3,6,9,12,14 215:20,23 216:7 216:18,23 217:3 217:5,9,10,23 218:5,7,14,18,19 220:7,11,22,23 222:15,16 224:12,23 225:3 225:8,8,9 226:2 227:18,18,19 228:2,2,2 229:14 229:23 230:23 231:3,10,15 232:7,16,16,18 232:21 233:16 233:19,19 234:11,12,20,21 235:4,10,16 236:4,4 309:24 310:11,15,21 311:12 312:6,10 317:23,24 318:6
basins 225:17 232:16 318:14 318:17
basis 167:4 224:19 226:3 251:17 277:2 309:9
Bates 19:19,21 20:13,15 67:16 68:9 75:12,19 78:5 80:21 100:17 123:9
batteries 121:17
battery 121:12,14 121:22 122:3,9 264:7 279:8,12 323:10,13,14,23 324:6,8,10
beaches 60:4
bear 298:6 301:6
bedrock 20:23
began 125:13 142:11 146:6 151:2 159:3,5 221:4 224:10,14 224:19,19 243:21 250:7,8,9 268:7 269:9 270:8
begins 258:24 259:2 264:24
behaves 154:13
believe 10:21 11:17 18:5,24 29:19 30:2 37:5 38:6,18 39:9 40:9,16 42:12,24 52:8 54:20 57:4 60:6,14 61:24 63:20 64:5 66:14 75:12 77:20 79:22 80:13 81:3,12 86:6,16 100:12 100:17 102:2 104:1,8 127:12 137:5 140:23,24 146:6 156:24 163:17,17 164:2 173:22 181:8 186:13 197:13 214:5 220:14 228:20 247:15 250:4 252:24 256:8 261:11,13 261:23 262:21 275:13 277:16 294:20,24 295:11 304:22 305:5,24 307:22 307:23 310:2,6 311:11 313:14 315:14 316:6 318:2,10 320:22 322:4 323:8
believes 260:22 262:18
belong 296:13
belongs 294:24 295:12 296:13
beneficial 30:6 89:8 94:24 126:9 131:2 196:8 206:8
berm 251:16 252:3 253:1,1
berms 226:1 251:21 256:16 271:2 301:1
best 30:17 124:6 150:14 201:1 215:11
bet 298:13
better 153:13
beyond 7:16,22 8:4 10:2,18 14:18 237:21
big 172:4 176:8 228:12 231:2 233:7 235:15 254:4 255:11 271:16 274:8,22
biggest 112:15 316:11
Bill 168:14,15 169:3,9,12,13,14 170:6,16 225:1 234:23 251:6,10
binder 147:23 179:6 247:23
bins 206:7
biological 137:1,2 211:24
bisected 318:8
bit 16:20 24:7 27:23 40:6 83:3 104:17 113:11 280:20 288:10
black 22:16,18 101:5,6 102:9,13
blackouts 120:10
Blacktop 204:12
blank 119:3
blowdown 177:5
blue/green 294:22
Blues 305:11
blurry 298:11
blush 329:8
board 1:1 6:5 38:11 46:21 47:22 50:3 60:23 61:1,21 62:11 63:22 64:20 65:1,7 66:9 92:22,23 93:12 103:17 105:12,17 112:14,17 116:1 116:13,13 129:8 137:5 139:9 140:1 170:14,18 211:3,13 212:15 212:24 214:12 216:6,16 219:8 230:5 273:23 283:9 285:9,17 320:22 326:3 331:4
Board's 46:5 62:16 103:13 117:11 139:20 139:24 143:11 145:22 211:1 212:23 214:10 216:4,14 230:7 230:10,13,20 273:24
boat 302:1
body 157:17,21
boiler 177:5,5,7 208:15 239:4 242:5 295:7 313:2
boilers 188:14,15 188:16 208:13 239:4 292:9
book 122:14,15,24 128:16 134:20 137:8 155:15 210:9 212:12 217:13 245:5 246:13
bordered 55:3
borderline 189:20
Bores 226:24
boring 39:5 42:17 42:17 79:19 84:13
borings 39:6 42:14,14 63:11

185:12
boron 78:1 79:20 80:2,4
bottom 17:22,23 18:9,10,11,12 21:3,7,8,17 24:14,18 25:2 32:11,13 44:19 69:17 136:21 212:20 240:9 265:17
bought 290:17
boundaries 52:23 57:12 59:6
boundary 16:18 16:22 52:6 53:6 53:10,14,20 54:7 54:12 56:11 72:1 83:3,5 92:12
box 22:12 56:2,6 56:15,18
boy 275:18
Bradley 1:15 6:4
Brandon 133:12 190:8,9 304:11
break 48:15,19 60:10 106:12 107:14 141:22 202:1,5,8 263:3 263:6 309:15,18
breakdown 44:1,6 45:4,12
Brian 123:12
bridge 295:20
brief 12:21
briefed 129:3
bright 299:16
bring 324:10 325:12
bringing 19:13
broader 16:9
Brothers 305:12
brought 172:1 193:18
brown 22:16 101:6 102:9
brownfield 17:7 91:13,17,21
brownfields-type 91:3
brownouts 120:10
BS 109:2
budgeting 115:12 115:17 151:4,7
Bugel 2:2 130:13 130:14,16,22 281:3 282:4,6,11 282:15,21 284:1 284:5,23 285:2 286:14
Bugel's 130:17 131:9
build 122:9
building 295:7 313:3
buildings 295:14 295:15
built 125:5 278:2
bullet 55:3,4,4,6 55:12 59:11 248:19 249:7
bunch 44:3 303:4
burned 145:10 219:17
burning 236:15 236:19 241:16 263:21 264:1,2,4 292:19 315:5 323:1,22 324:3 324:18,21
burrows 227:2,3 253:2,3
Bypass 207:8,8,10 207:15,24 208:4 208:20 211:8 220:7,22 225:8 227:18 228:2 232:15,17,21 233:16 236:3 309:24 310:11 310:15,21 311:12
byproducts 191:1

C

C 7:4,7 44:17 67:3 69:8 106:20 108:16 287:3 327:1 330:4
C-O-N-S 299:9,9
Cache 57:5,6,8
calculating 88:16
call 107:18,23 109:23 112:13 125:18 160:18 177:6 193:24 201:23 204:12 206:7 209:18 210:16 252:5 270:19 286:4
called 7:5 56:21 58:24 65:7 108:14 118:10 198:1 203:21,23 209:19 215:14 226:14 241:1
calling 56:9,22 261:14 286:15
callout 83:2,4
Calls 262:6
canal 264:15,16 264:17 278:10 295:22
Cannonsburg 112:2
cap 14:6 30:7,12 97:13 98:14,20 98:21 256:3,16 259:15 318:13
capacity 117:21 117:23 118:2,5 118:11,18,19,20 119:9 120:14 121:24,24 206:17 207:1 276:1
captured 206:6
car 296:12
care 256:4
Carnegie 109:3
carries 245:23
carrying 212:21 216:15
cars 258:2 313:17
case 17:3 50:2 68:22 79:13 142:24 177:3
cases 276:4 329:14
categories 74:22
categorize 149:6
categorized 293:24
Caterpillar 133:15,17 192:2 192:12 193:5,10 278:6
Caterpillar's 192:9,11
cause 84:15
causing 279:21
caution 195:15,21
cautiously 195:21
CC 36:5
CCA 10:19 99:10 164:24 165:13 195:16,18 217:18 222:9,13 244:14,17 314:21,24 316:5
CCAs 13:3 14:19 15:7,15 17:11,13 17:15 99:1,7,12 164:1,7,8,20 165:12 200:17 201:14 220:14 222:9 250:11 268:23 314:3,8 314:10,17,20,24 315:4,11,16
CCB 89:4,6 94:23 191:1 198:13
CCR 10:11,12 19:2 30:10 36:24 37:4,19 39:18 40:1,3 88:12 89:9 93:10 95:7 97:4 102:17 114:11 114:15,17,18,21 115:1 116:23 124:22 125:6,15 126:21 136:4,8 136:11 138:17 140:17,20,22 156:10 161:15 163:20 165:24 168:21,22 169:15 170:18 172:2 173:11 175:16 178:14 178:14 180:16 181:22,23 185:3 185:13,14 191:12 193:24 196:14,17,18 197:1,6,11,19 205:23 206:13 206:14 207:1 208:18,20,24 209:2,5 211:18 213:2,20 214:1,1 214:4 216:1 217:10 218:13 218:20,22 224:7 225:9,14,23,24 229:4,11,24 231:17 232:13 241:5,6 249:21 250:14,17,22 251:14,14 256:21 259:23 260:1,9,21,22 261:4 262:19

265:24 266:5,8 269:5,18,20 270:2 272:5 274:19 275:23 276:1 294:3 315:1,1 320:5 328:6,9
cease 156:21 207:22 218:6,17 236:15 263:21
ceased 120:19 121:8 156:22 264:2,4 275:24
ceasing 275:24
CEJA 323:18
cement 257:19
Centennial 57:20 59:9
center 1:5,16 135:4 205:10 240:20 265:15
centered 66:11
certain 26:23 27:1 67:11 71:6,14 72:20 74:7 75:7 93:10 133:20 297:3 298:16 306:6 328:5
certainly 7:20 10:13 14:10,11 33:10 35:2 52:2 70:22 283:20
certainty 92:4 195:9
certifi- 249:23
certification 272:18
certifications 166:21 171:2 228:4 250:1,6 251:2 254:12 269:11 271:21 272:17 273:10
certified 224:2 251:24
certify 152:14 332:1,8
CFR 125:10 206:22
challenge 38:1
chance 196:19
change 30:20 74:20,22 120:17 320:4
changed 252:10 317:5 318:4 319:23 320:1 321:16,17,18 322:5,13 328:7
changing 195:10
channel 294:18
character 55:20
characteristic 95:5
characteristics 42:23 87:24 88:1 95:23 96:3 101:23
characterization 15:18 44:8 289:3
characterize 150:12 157:21 323:14
characterized 39:17 86:21
chart 26:21 28:9 67:12 81:5 82:15 96:18 208:9 209:15
charts 32:18 69:2 149:10
cheat 38:7
chemical 101:22 109:2 288:9
Chicago 1:17 3:8 264:15
chief 172:8
chloride 217:24 218:3
chose 163:6
chosen 320:6
cinder 102:13
cinders 22:19 60:19 61:13 62:5,10 101:5
circumstances 119:21
citation 214:14 266:9
Citgo 264:20 295:1,22
citizens 1:7 280:4
city 111:24 239:19 247:16
civility 166:21
clarification 62:1 62:8
clarified 62:7
clarify 10:6 43:20 45:14 59:13 87:1 106:22 107:1 143:7 290:24 291:8 304:9 316:10 330:10
clarifying 43:4
class 70:11,20 89:14 90:1 185:2
classification 134:17 209:8 254:14
classifications 171:21
clay 22:16 101:7 102:9
clean 8:17 9:19 40:6 67:2 175:14
cleaned 126:17 287:18,21,24 292:24
cleaning 208:10 208:12,23 209:4 209:8 211:6 220:11,23 225:9 229:14,23 230:16,23 231:3 231:10,15 232:6 232:16 233:19 234:12
cleanup 60:10
clear 8:2 9:14,16 13:4 29:11 35:23 40:23 42:4 43:10 51:7 59:1 62:10 81:9 131:12 148:2 156:14 184:10 184:16 289:13 290:7 294:1 300:20 306:2,21 313:6,6 315:3 318:21
clearly 292:7 294:6
clicked 260:13
close 168:23,24 169:7,15,18 170:9 203:2 224:11 234:22 235:3 256:21 316:21 317:4,5,7 317:12 318:7,9 319:21 321:13 325:1
closed 207:22 314:12 315:2 317:11
closer 87:12 196:8 256:1
closes 302:2
closest 183:11
closure 10:13 12:13 83:16,21 169:2 171:22 174:15,17,18 175:4 176:17,19 225:4,5 233:14 255:5,17,21 256:19 276:5 316:19,19 317:9 318:1,2,3,15,20 319:2,2,13,17 320:4,8,14,17 321:2,10,16,21 321:24 322:2,3 322:13 328:5,20 329:1,2,12
closure-in-place 256:2 317:6 318:24 319:19 320:8,9,16,23
CLUB 1:3
coal 22:18 39:2 62:17,19,20 63:2 63:15 101:5,10 101:10 102:12 110:24 120:3,19 121:8 125:1 129:17,18 130:23,24 131:4 131:7 144:22 145:10 146:5 147:2 156:10,10 156:10 166:1 168:17 188:2,16 191:1 193:22 214:12 215:3,6,8 215:10,11 219:17 236:16 236:18,19 240:23 241:15 241:16 263:21 264:1,2,4 291:19 292:20 306:17 309:3 312:24 315:5 316:7 323:1 324:3,18
coal-fired 120:23 232:11 266:19
Code 266:9
codes 123:20
cold 120:7 145:12

152:22
collect 91:5 214:4 229:8 230:1 272:10 273:13 273:16
collected 42:16 274:15
collecting 205:24
collection 15:9,17 159:7,15 208:7 233:3
collectively 75:3
collects 177:2
column 81:5,15 205:17
combined 41:19
combustion 125:1 133:24 156:11 166:1 191:1
come 14:13 111:7 141:20 173:19 200:22
ComEd 258:15
comes 23:4 53:16 114:7 163:5 167:5
coming 37:24 78:18 79:21,22 116:5 128:7 195:1 225:20 234:5 293:23
comment 80:10 248:10 318:4
comments 80:7,14 97:2
commitment 7:17 7:20,23,24 8:4 10:3,4,8 162:7,9 162:21 165:14 222:9,13 244:11 268:19 314:3,18 316:17
common 102:4 229:10 307:18
commonly 41:20
commonwealth 109:17 296:13 306:8,10,12,15 306:17,23 307:7 307:7,20 308:3 308:13,16,24 309:2
communicate 113:22 114:21 115:2,3
communities 280:5,7
Comp 147:24
companies 131:1
company 110:18 111:3 112:22
compare 21:23 71:2 172:17
comparison 104:19
competency 242:12
Complainants 1:9 2:13 286:12
Complainants' 5:10 148:6 161:8 211:9 285:13,15,18 288:16
complete 164:24 225:4,5 229:11 244:14 314:20 316:15
completed 229:21 229:23 234:18 249:23 315:15
completely 71:2
completing 251:1
compliance 7:17 7:20,23,24 8:4 10:2,4,8 15:8,16 19:2 38:2 113:5 113:8 114:1,6,15 114:20 115:1,5 115:12 117:3 162:7,9,21 164:20 165:14 165:19 196:9 220:14 222:9,12 222:13 244:11 250:5 268:19 275:19 314:2,18 316:16 320:7
compliant 168:9 196:1 208:5
complied 154:23 314:9
comply 14:8,12,18 98:3 99:10 224:10,14 249:23 275:14 275:21,24 280:3 280:3,13 314:8
complying 166:16 170:23 225:13 250:21 269:9
component 80:4
components 218:14
composite 167:21 167:24
composition 87:17 228:5
comprehensive 73:9
comprised 17:17 64:21
computer 48:5
conceivably 103:21
concentration 29:16,18 81:23 92:14
concentrations 39:20,21 41:13 68:19,20 70:16 70:19 88:4 89:12,24 217:24 218:2,11
concern 41:13 74:5 284:10
concerned 113:5 167:11 282:16 284:6
concerning 92:4
concerns 129:17 167:14
concise 9:14,15
conclude 140:2 154:14
concluded 70:6 86:2
conclusion 74:19 75:2 140:1 150:12 185:15 212:23 243:8 330:13
conclusions 71:6 71:14 136:16 149:17,20,22 155:23 249:16
concrete 126:15 257:18 312:23 313:7 326:8,12 326:13,15
condition 147:9 150:6 153:9,12 211:5 220:24 221:2 267:11 290:6,13 291:2,6 327:16,19 328:3 330:9,18,20
conditions 15:2 15:19 16:22 33:9,14 37:18 38:13 41:21 63:17,21 79:18 92:8,11 98:7,9 100:1 105:9,10 105:23 116:17 121:20 127:15 289:2
conduct 146:22 155:6 159:15 160:2,6,10,19 201:1 255:18
conducted 147:5
conducting 97:21
confer 47:6 309:15
confirm 21:15 208:17 322:11
confirmed 32:14
confirming 31:9
conflict 12:7 35:17 37:19
confused 62:4 256:1 318:24 319:12
connected 24:21 25:1
consent 194:9 262:22
conservation 297:16,22 299:8 299:8
conservative 16:21
consider 19:5 29:15 36:21 98:19 106:4 136:20 271:20 329:10
consideration 36:16
considerations 50:3
considered 13:22 16:16 17:9 33:3 33:11 34:7 63:14,22 86:1 93:15 149:19 207:3 270:5 314:19,20 315:14 316:15 320:19
considering 12:6 35:11 289:1
consistent 17:6 91:2 104:2

consisting 22:16 102:9
constituents 74:8 89:13,24 175:16 178:14 218:3,13 272:23
constitutes 332:6
construct 110:6 206:24,24
constructed 98:16 327:15
constructing 34:17
construction 109:23,24 122:10 125:15 125:23 131:3 147:16 153:3 170:1,2,4 174:14 175:5,7,17 176:5 176:7,11 222:19 224:17 225:18 228:3 232:20,23 233:12,15,23 234:11 235:2,16 236:3 255:4 257:2 267:3 290:10 324:10 328:1
consultant 105:6 105:18 128:9 211:4,16 228:20
consultant's 211:15
consultants 113:19 114:13 115:13 146:12 146:13 147:21 172:10 181:4,8 196:5 254:10
consulting 228:22
cont 7:7
contact 24:9 29:13 30:11 42:7 312:16,17
contacted 153:23
contain 166:12
contained 7:17 10:19 123:14 206:9 233:4
contains 125:5 215:12
contaminant 15:20 16:2,3 17:12
contaminants 41:13 216:19 247:7
contaminating 131:6
contamination 38:18 84:18,22 85:4 92:12 181:12 193:6,13 246:10 249:18
content 37:9,12
contents 136:15
context 68:6 151:8
continue 10:12 17:4 26:16 41:23 66:14 85:4 102:21 120:13 145:14 159:15 160:2,19 202:15 232:10 277:1 278:23,23 279:5,5,6,9,13 279:16,18,19 323:15
continued 3:1 6:3 10:24 19:1 26:17 140:21,23 165:9 167:2 249:9 256:15
continues 19:3
continuing 10:22 26:2 225:15 250:23,24
contour 58:17
contractor 151:15 223:20,22,24
contractors 222:22
contrary 101:2
control 1:1 6:5 7:16 9:4 10:2,14 10:18 13:2 14:21 15:20 17:12 40:21 41:2 72:8,9 79:3 83:15 86:24 99:19
controlling 98:10
controls 10:22 12:1,4 99:7
convenience 145:22 219:7
conversation 144:17
conversations 162:10,14 187:4 187:10 188:21 190:2
converted 141:1
cooperate 276:18
cooperative 277:7
corner 78:11 240:9
Corp 187:8,11 188:22 189:5,11 190:2,3 302:16
corporate 280:4
correct 27:15 45:2 69:15,19 70:7 77:9,21 83:9 84:1 86:4 100:14,15 135:17,20 167:14 172:21 211:13,14 214:15 216:24 231:23 273:3,19 293:3 301:8 310:12,13 311:8
corrected 212:5
correcting 199:1 201:4
corrective 41:9,12 201:2
correctly 15:22 57:6 74:1 152:15 289:4 293:24 297:12
correspond 21:20
corresponding 74:17
corridor 278:7
cost 91:6 115:6
costs 115:12,17 123:15 163:24
counsel 65:21,24
count 44:9 75:5
counting 74:6
county 14:16 17:21 20:7 25:19 39:8 56:1 59:17 93:18,22 100:11 118:16 121:6,9 122:6 126:14 131:24 132:2,3,4,6,7,7,8 132:11 146:15 150:6 158:18 161:5 202:18,19 202:23 203:1,2 263:12,14,21 264:1,5,9,12 265:6,10,14 266:5,8,16,23 267:18,21 268:3 268:8,12,15,24 269:8,14 270:3,4 270:10 271:10 273:17 275:7 278:2,9 279:11 279:12 294:14 295:4 296:2,6,10 296:10,16 308:21,22 312:21 320:11 320:18 321:23 322:6,13 324:1 324:11,11,13 326:9 328:20 329:1,11,17
County's 121:7 320:19
couple 7:11 12:11 25:8 28:3 59:17 65:15 114:10 322:22
course 46:1 134:6 194:13 273:8
court 11:12 144:1 157:14,20 164:14 165:20 307:9
cover 179:20 198:2 247:10 258:16,19 294:9
covered 56:15 86:20,23 186:10 206:12 238:22 238:22 241:5
covers 79:4 81:10
cracked 216:17 267:14
cracks 153:16
create 110:22,23 172:12 254:6
created 79:3
criteria 288:22,23 327:11
critical 190:12
cross 6:8 12:9 19:24 20:22 21:9 22:7,8,13 23:11,24 282:3 284:7 286:9,22 295:20
crossing 6:8
crushed 22:17 101:8 102:10
CSR 1:21 332:21

cure 60:13 63:6 64:10 65:6
cured 60:15
curious 303:9
current 29:16 37:9 105:22 135:24 193:12 197:18 200:7 206:15 262:1 317:21 318:20 321:2,10,24 323:18 326:1
currently 97:5 206:2 207:24 215:17 262:21 279:15,19 324:20,21
cushion 222:23
customary 91:2
customers 120:11
cut 83:3
cuts 299:20

D

D 4:1 7:2,2 67:3 108:16 109:9 125:10 327:1
dam 133:12 190:8 190:9,11 304:12
damaging 311:21
dark 236:24 294:22
darker 299:4
dash 182:2,2
data 15:18 26:14 28:1,9 31:10 39:16 65:17,19 67:11 68:4,18 70:8 71:1 73:12 73:15,18 74:2,10 74:16,18 81:18 81:21 82:11 90:16,22 91:6 94:1,5,6,10,11 95:8,8,12,18,21 95:22 96:5 99:6 99:8 105:9,14,19 106:1 217:22 230:1,15
date 14:2 48:4 61:3,7,8 94:17 95:15 103:7 124:4 129:21 136:8 139:22 140:22 210:7 212:18 245:20 247:2 272:5 329:1,2,3 332:4
dated 18:20 103:14
dates 30:16 168:7
day 1:17 30:19 35:16 119:18 122:2 286:5 331:3 332:14
days 46:6,7 272:8 272:11 289:10
DC 2:11
de-icing 218:4
de-watering 206:7
December 129:22 148:11 153:19 159:6 221:5 268:8
decipher 23:11
decision 103:13 139:9 157:22 160:19 194:14 194:21 262:22 293:14 294:2
decisionmaking 195:6 201:14
decisions 200:19 201:19,21
decontaminate 178:13 180:18 182:13
decreased 28:4
decree 194:9 262:23
Defendant 1:12
define 294:6
defined 140:18 225:10 250:14 250:18 266:6
defines 169:2
definitely 21:14 115:24 180:7
definition 125:3,8 314:18
degree 101:11
degrees 288:9
Dehlin 182:9
Dehlin's 182:12
demand 118:13 120:6,8,9 121:4 121:5
demonstrates 206:23
demonstration 171:20 206:18 206:20
demonstrative 47:3 49:5 56:21 56:23 59:3 247:19 284:10 284:12 285:5
demonstratives 45:20 46:6 281:12,17 282:1 282:12,17 283:9 283:10 284:6,21
denied 129:5
density 163:4
dep 12:16
Department 109:13 110:14 187:9,11 300:5
depending 103:20 201:5
depends 38:19,23 119:15
depict 50:24 132:19 203:9
depicted 21:5,9 23:17 134:12 135:12 205:1,13 263:13 265:21
depictions 50:7
depicts 133:5
deposeth 7:6 108:15
deposited 62:10
deposition 10:16 85:14 212:8 285:19,22
depression 125:4 125:5
depth 89:3,17
Des 58:16 59:3,8 87:5 133:11 145:5 264:14 296:15
describe 18:9 31:21 52:5 58:2 86:12 102:5 108:22 133:8 165:16 187:18 204:7 264:12 276:14 277:2,21 278:4 302:20 311:15 328:10 328:21
described 8:24 39:8 61:18 62:5 62:11 79:16 102:8,15 104:3 104:16 113:17 190:17 199:18 211:22 240:10 302:19 326:9
describes 13:8 16:11 89:6 105:9
describing 53:9 61:13 294:17 300:3 304:18
description 21:12 62:16 63:1 82:16 100:21 101:4 130:4 136:1 304:18
descriptions 175:13
descriptive 101:3
descriptors 102:7
design 92:3 98:17 151:19,21,23 233:1,4,13 235:24
designation 41:11
designed 83:18 98:15 125:6
designs 151:23 234:17
despite 162:18
detail 19:9 37:14 39:14 104:17
detailing 38:12
detected 81:23
deter 279:21 280:1
determination 212:2
determinations 94:24 119:5
determine 26:8 118:23,24 197:14 198:12 330:19
determined 89:10 211:24 220:17 220:18
determines 154:11
develop 201:6
development 109:9
develops 69:23
diagram 19:24 22:13,23 23:8 24:3,9,11
diagrams 20:19
dictates 88:3
difference 74:10

74:11
different 12:17 20:2 21:14 25:11 30:15,16 33:7 35:13 47:9 71:3 74:21 87:23 88:1 90:20 107:4 168:7 183:22 184:1,23 202:2 209:7,20 250:9 252:12 274:13 282:7,20 284:8 288:17 303:5 312:4,19 320:6
differently 127:5
difficult 23:10
diligent 275:14
diligently 275:19 276:9
direct 85:23 91:12 142:5 179:8 203:7 213:14 282:2
directed 105:16
direction 199:2 223:21
directions 204:2 301:12
directly 24:24 30:6 54:13 58:1 62:11 110:20
director 112:11 112:13,17 113:4 115:19 116:21 117:2 126:20 127:14 138:9 173:24 179:15 184:19 185:8 186:14 194:2 199:20 223:4 226:11 239:5 252:7 253:24 255:8 270:21 271:12 275:13
disagree 50:7
discharge 177:6 177:19 227:11 227:14
discharges 227:6 227:10
disclosure 277:3
discovered 223:13 223:15 304:1
discussed 7:23 18:23 30:16,23 32:12 40:9 47:16 50:1 58:15 63:9,13 66:14 68:7 71:16 76:12 79:5 87:22 97:15 105:12 106:3 163:9 164:22 185:1 197:10 200:3 219:21 221:18 221:23 222:17 266:22 269:4,17 275:10 277:9 305:4
discussing 28:15 30:6,10 44:2 56:13 79:10 84:9 144:15 160:22 249:4
discussion 31:3,14 31:19 43:6 46:4 49:22 73:3 94:5 97:18 99:1 102:1,23 122:19 144:3 163:12 221:7 237:4 272:3 281:7 325:15
discussions 20:3
disjointed 40:6
dismissed 107:12
disposed 60:16
dissolved 73:4,8 73:18 74:2,7,13 74:17 75:1,4
distance 34:5 156:1
distinct 303:7
distinction 209:11 209:13 270:8
district 57:15 58:12,12 112:15 239:15,17 240:5 240:6
disturbance 199:18
disturbed 193:1
DNR 200:4 301:14 302:2 304:1,1,5
dock 302:1
docket 36:9,13 196:13,20,22,22 260:4,9,14
document 18:18 18:19 19:3,5,6,8 19:8,13 20:2 21:23 62:2,7 66:19 68:16 75:15 79:8 80:19 84:5 100:11 110:10 123:11 129:3,6 134:19 138:1,6 149:6 247:18 248:7 260:13,14 289:3 327:18
documentary 44:1
documentation 19:1 274:15
documented 16:14 17:19 34:12 58:17 79:24 93:10
documents 26:5 43:12 116:3 117:12,18 144:16 148:23 149:1 173:20 229:21 260:8 272:16 283:21 290:11 321:19 328:1
doing 9:18 14:8 14:18 22:4 28:14 166:15 227:5 236:18 242:9,20 250:11 269:21 270:8 330:18
dollars 164:3
door 278:6
Dorgan 4:3 6:9,14 7:9 10:20 11:17 11:20,23 13:22 14:10,22 15:23 16:4,8 17:15 20:14 30:2 32:24 34:4,19 35:21 36:1,5,11 36:14,21 37:10 37:13,21 38:12 41:4 43:16,22 50:18,22 51:3,12 51:16,21 52:8,17 52:22 53:7,19 54:2,15,23 55:6 55:17 56:4,7,16 57:10,17 58:5 59:2,23 60:5,14 60:21 61:16,24 62:22 63:3,8 65:18 66:3 67:21 77:12,16 77:20 78:2,6,10 78:14,19 79:9,16 79:22 80:4,8,9 80:13,24 81:6,12 81:17,21 82:2,6 82:11,18 83:1,9 83:12 84:1,6,7 84:12,17 85:6,14 90:9,12,18,23 91:1,21 93:1,5,8 93:23 94:2,7,13 94:16,20 95:9,14 95:22 96:7,9,13 96:16,20,23 97:3 97:11,14,18,23 98:14 99:2,5,8 99:18 100:6,9 101:24 103:8,11 104:1,8,15,24 105:4,8,21 107:2
dots 68:20,21
double 74:6 75:5
DOUGLAS 4:3
downgradient 16:18 17:6 30:22 33:14,16 58:18 63:17 72:1,10,14 76:8 76:13,19,21 77:3 92:8 93:13
downward 74:24
Dr 123:12 181:17 181:19
draft 37:9 174:9 236:7 255:1
drawing 83:8
drawings 32:15 146:11 152:1,1 175:9,11 233:4 234:18
draws 69:23
drinking 127:18 127:23 130:10 130:13 243:11
drive 40:2 188:12
dropped 324:17
drops 282:8
due 104:23 216:17 229:1,5 272:5 322:9
duly 6:15 7:5 108:8,14
dumping 60:13,15

60:18 61:17,20 61:22 62:14 63:5,6 64:1,10 64:18 105:2
Dunaway 246:3,4 246:5,7,22,22 247:5
duties 115:9 138:8 179:14

E

E 2:2 4:1,15 7:4,4 7:7 67:3,3,3 106:20,20 108:13,13,13,13 108:16,16 287:3 327:1,1,1 330:4 330:4
e-mail 46:3 123:12,14,21,22 124:4 246:18,19 246:20 247:2,5
earlier 32:13 69:8 102:3 106:23 127:12 145:20 163:9 167:10 174:21 178:3 181:9 185:2 187:21 192:1 196:17 204:17 229:15 231:16 245:1 249:4 262:23 269:17 325:3,13
Early 91:23
easement 303:21 303:22 304:10
easier 59:19 137:24 138:12 272:18
easiest 177:4
easily 216:17
east 52:9 54:11,13 54:20 55:3,11 59:22 60:4 76:5 76:7,9 217:3,4,6 217:9,9,23 218:5 218:7,17,19 241:2,2 242:15 249:10 250:13 251:16 253:6,7 253:12,12,16,17 253:21 255:5,23 256:1 297:10,10 319:16,17
eastern 53:17 251:16 299:15 301:13 303:11
ecological 63:19
edge 192:7 265:15 302:1,23 303:8
Edison 296:13 306:8,10,12,16 306:17,23 307:7 307:20 308:4,14 308:16,24 309:2
educational 108:21,23
effect 293:17 315:12
effective 40:19 136:8 140:22 229:4 272:5 315:4
effects 30:7
efficacy 103:20
effort 172:12 176:10,13 228:16 231:8 233:10,17 234:9 235:19 236:1 254:6 255:13 271:18 274:10 274:22
efforts 163:10
EGUs 323:12,15 323:22
eight 166:24 274:20 291:14
either 33:3 109:22 247:24 256:10 294:7 298:3
elected 112:12,12
electric 266:20
electricity 118:17 118:24 119:10 119:11 120:7,20 121:17 133:23 146:4 219:17 241:15 276:3 280:10 306:14
element 13:23 14:15 100:1
elements 99:20
elevated 217:23 218:2,10
elevation 17:24 20:4 21:2,7,17 22:23 23:5,7,20 23:20 24:4,7,23 25:22 26:21 27:10 28:3,5,9 32:13,17 33:20 33:21 35:3 58:17
elevations 18:1,4 19:15 24:22 27:22 31:8 33:11 34:24
elicit 45:19
eliminating 75:1
elimination 177:19
ELUC 17:2 41:15 79:2 80:1 83:20 84:21 99:19 192:9,12,13,20 192:21 258:15 258:19,23 259:3
ELUCs 40:17,18 40:24
emphasis 33:14 72:10 92:8
employ 278:23 279:6,10,13,16 279:18
employed 306:10 323:6
employee 123:15 332:9
employees 123:16 123:16 144:17
employment 109:12 112:1 322:23,24 323:5 323:21 324:2,7 324:12,17,23
employs 279:15
empowers 117:6
emptied 131:1 136:7 141:11 153:7,10 208:2 220:22
empty 97:5,10 127:9 150:9 152:11,14 174:22 215:20 216:7
emptying 150:8
enactment 166:14
encountered 42:20 79:17,18
ended 56:22 99:9
ends 259:1,3
energy 118:18 129:16
enforcement 278:15,19
engage 147:17,20
engineer 151:20 167:4 175:13 187:8 224:20 226:8,9,12 249:24 251:22 252:1,3,20 270:9 270:14 271:1
engineering 109:2 151:3,7,18 152:1 166:20 171:2 229:22 233:1,13 234:17 235:23 249:24 250:6 288:10,11 330:19
engineers 187:8 187:11 188:22 196:4 271:24 290:10 302:16 327:23,24
enhance 121:15
ENSR 187:16
ensure 118:8 175:15 199:16 199:17 275:19
entail 122:7 162:14
enter 257:22
entered 162:6,8 216:23 222:8 244:11 268:19
entering 239:9
entire 203:11
entirely 312:20
entirety 196:23 203:22
entitled 145:19
entrance 301:23 301:23
ENVIRONEM... 2:8
environment 1:8 43:1 58:22 65:3 65:6,10 66:17 92:15 117:5,7 195:10 275:20
environmental 1:4 15:19 79:2 83:14 96:2 99:19 105:9,10 105:14,23 109:14 110:14 111:13,14 113:3 113:4,6,24 115:19 116:21 117:2,3 126:19

127:13 138:9 147:8 173:24 179:11,15 184:19 185:8 186:14 194:2 199:20 220:19 223:4 226:11 239:5 252:7 253:24 255:8 270:21 271:12 275:13,15,22 279:22
Environmentali... 130:11
EPA 72:14,21 96:5 115:4 137:4 138:16 153:6 154:1,5 157:6 158:10,22 159:11,23,24 161:9,18,24 162:11,19 164:8 171:12 173:6,10 174:15 186:23 191:3,15 193:5 193:12 217:17 217:22 221:17 225:6 227:18 231:20 232:19 233:24 235:8 244:2 245:18 246:5,19 248:19 249:8 253:21 254:23 255:5 259:17 267:2,17 268:12 271:9 274:23 275:3
EPA's 138:3,10 154:22 157:14 173:10 178:19 180:14 231:17 243:3,15 249:14
equally 94:3 176:13
equates 69:20
equipment 151:14 311:20
erosion 86:24
erosional 86:18
error 107:4
escaped 115:16 264:24
escapes 118:7
escaping 110:2 265:1
essential 242:12
essentially 69:4 118:24 119:10 123:17,18 126:18 128:13 132:6 135:5 174:18 178:13 181:24 205:10 223:14 248:9
establish 26:12 167:1 230:18
established 17:1 84:22 329:4
estimate 13:19 29:20 93:19 95:11
estimated 102:20
estimating 115:17
evaluate 39:1 66:8 89:8 136:14 146:18 149:4
evaluating 85:9 242:11,23 322:10
evaluation 16:16 34:10 63:16 93:9,13 96:2 98:5,7 104:16,18 106:4 146:19,22 147:6,12 154:14 210:10 219:21
evaluations 148:18,21 271:24
event 24:13 46:19 82:3
events 145:19 235:13
eventually 37:6 99:13 125:24 222:8
everybody 181:2 286:5
everyone's 151:16
evidence 5:1 8:22 44:1 85:24 86:6 124:18 129:13 130:11 139:6 140:14 180:16 182:24 186:11 213:12 257:19 281:15 285:20 285:23
evidentiary 284:11
exact 195:23 304:18
exactly 12:12 21:10 34:19,24 40:10 44:21 125:3 170:17 197:13 198:1 272:8 290:3 301:22 303:9 310:4
examination 4:2 12:10 220:17
example 39:6 73:20 119:23 143:2 145:12 150:5 177:4 230:15 329:16 329:17
exceeds 70:18
Excellent 185:16
excerpt 79:7,12 84:3
exchange 246:19 291:1
exclude 326:7
excluding 205:11
exclusively 55:19
excuse 64:7 92:9 108:24 119:4 129:9 132:14 159:20 170:12 191:10 192:3 193:20 195:19 205:20 213:5 219:2 222:5 225:7,24 233:11 241:18 263:15 272:14 279:2 311:20
execute 201:6
exercise 74:16 98:4
exhibit 4:17 5:2 5:10 18:17 49:5 75:11,11 77:23 79:7,13 80:16,21 84:3 85:19 96:19 100:5 123:3,9 124:10 124:14,16 128:16,17,18 129:11 131:13 132:22 133:4 134:12 137:9,10 137:16 138:21 139:2,4,13,15 140:7,11,12 141:3 143:9 147:24,24 148:5 148:6 150:24 155:11 156:7 165:22 166:14 170:12 178:6,10 178:21 179:1,7 181:13 182:4,16 182:20,22 183:4 193:17 196:11 203:8 205:1,8 210:10 211:9 212:8,12 213:4,5 213:9,10 217:14 217:16,21 219:2 219:6,19 224:6 229:14 235:13 236:11 237:18 240:22 241:9,18 241:22 242:18 243:2 245:6,7 246:13,14,17 247:19 249:13 249:13,20 261:19 263:13 265:21 266:15 268:2 281:1 283:21 284:2,5,9 284:15,24 285:4 285:13,15,16,19 285:22 288:13 288:15,16,17,18 288:18 304:17 304:20 323:4 325:2 327:5 330:7
exhibits 47:3,9 158:16 161:9 283:23
exist 41:21
existed 73:9 100:1 272:12 273:7
existence 169:10 169:12
existing 37:4 66:15 289:1
exists 313:5,7
expanding 260:12
expect 27:5
expectation 88:9
expected 183:23
experience 20:20 96:4 201:1,13
experiencing 120:10
expert 94:9 130:12 180:23 181:4,15 182:6,6

experts 6:9 113:19 128:2
explain 57:1 167:19 169:11 275:17
explained 28:18 28:20 130:22
explanation 39:24
explicitly 169:14
Exponent 181:15
exposure 40:21 41:2 51:21
exposures 99:23
expression 95:23
extends 192:10
extension 207:2 241:22
extent 7:21 15:1 37:16 39:4 42:21 51:1 59:23 64:17 303:11 304:16 310:22
extraction 107:3
extremely 145:12
eye 199:19

F

FAB 235:10 318:5 318:6,7
fac- 192:3
face 202:21
facetious 302:19
facilitate 48:24
facilities 47:15,18
facility 58:15 87:13 192:3 278:6
fact 9:19 30:20 236:20 290:5 295:19 318:3
factor 269:10
factors 9:2 29:14
failing 267:14
failure 271:5
failures 252:24 256:16
fair 28:8 68:5 252:13 298:21
Faith 2:2 130:16
fall 164:13
False 150:13
familiar 37:8,12 37:14 50:21 51:10 52:1 57:3 57:9,13,19 59:21 115:22 116:17 116:21 117:12 117:20 118:2 127:14 131:19 132:13,15 134:1 134:4,8 142:12 143:21 144:8,9 144:13 185:23 190:20 203:4 204:18 215:13 222:18 237:14 254:1 257:15 259:7 264:8 265:5 292:19 296:3
familiarity 58:6 115:20 116:16 222:21
famous 305:11
far 83:1,7 98:12 188:13 234:13 283:23 292:9 321:5 329:5
fashion 52:11
fbugel@gmail.c... 2:6
feasible 201:20,22
feature 52:17
features 56:17 58:14 86:18 104:9 106:2
featuring 54:4 56:9
February 103:15 146:6 174:13 212:19 255:3
federal 10:12 14:8 14:14,19 33:4 34:7 35:18 36:5 37:12,19,23 114:17,18,21 125:9 126:15 131:5 136:8 140:22 147:1 162:17,18 166:1 166:15,16,23 167:18,22 168:2 168:22 169:1,2,7 169:18 172:2,23 172:24 173:1 194:9 206:11,13 206:14 207:20 207:21 208:24 209:11 213:24 214:1 215:23 218:20 224:7 225:23,24 229:11,15,16 241:6 249:21 251:14 265:24 269:5,7,23 270:2 270:4 272:13,22 273:2 274:18 275:22 276:9 305:20,21,22 306:1 315:1 320:5 322:14,14 328:9,18
federally 241:7
FedEx 133:18
feds 305:20
feel 16:20 98:5
feet 18:5 21:18 128:12
felt 66:6 71:17
field 65:21 94:15
fielded 30:2
figure 19:16,20,22 20:5,10 21:19 25:3,13 52:24 53:13,21 56:8,19 75:14 78:3,4,4,6 96:15 100:17,18
figures 53:1 56:8
file 212:3
filed 97:7 138:6 164:11,16 283:11
filing 164:9,14,19 179:23 180:6
fill 14:13 22:15,18 22:23 24:4,9,15 34:17,22 39:7 43:2 58:19 62:19 63:2 85:24 100:22,23 102:9,12,16 127:8 261:20,22 262:5,16
filled 65:17
fills 122:3
final 157:3 165:24 196:2 263:2 273:8 329:11
finalized 35:24 36:15,19 157:4 262:24
finally 38:4 161:4 279:17
financial 332:11
find 20:13 55:1 61:4 85:15 104:21 169:8 226:23 247:20 296:3
finding 84:15 212:16 259:21 276:1
finds 201:5
fine 19:10,12 31:5 209:14 270:13 309:13
finishing 136:13
fire 119:21 188:16
fired 237:12
firing 120:19 121:8
first 7:5 9:24 26:4 35:22 50:19 91:1 102:5,19 103:16 108:14 114:7 116:14 122:13 123:7 130:3 148:2 149:9 150:6 152:12 158:3 173:19 205:17 205:18,19 211:1 214:12 222:15 239:11 245:11 245:19 249:7 275:23 277:22 283:7,12 292:16 319:5 327:7 328:10,11,19,22 329:7,7
first-hand 306:16 308:3,15 309:1,8 309:9
fish 51:14 190:10 190:12 203:17 203:23 300:15 300:16 301:3
fishing 204:3 300:16
five 13:8 46:18 86:16 94:17,19 202:5
five-minute 309:14
flat 69:17 70:6
flaws 223:5,7,10
fleet 148:19 162:23 220:4 321:22 328:2
flip 25:12 155:16 156:6
flipping 53:22 259:24

flow 33:13 85:5
flowing 78:23 83:19
flows 76:17
fluctuates 27:5,17
fly 26:8 126:5,9 126:12 258:6 261:15
focus 17:6 30:20 30:21 65:2 72:4 76:12 105:19
focused 39:15 65:8 105:14 317:21 318:16
focusing 67:24
follow 30:3
followed 7:21 8:1 10:12 15:4
following 31:20 43:17 109:4,10 154:4 159:14 166:4,14 170:20 212:2 218:15 230:10 236:2 244:4 245:5 252:20 254:21
follows 7:6 16:9 108:15
font 297:18
foregoing 332:2,5
forest 57:15 58:11 58:12
forgetting 331:5
forgive 118:7 197:24 198:11 206:21 255:24 297:17 301:12
forgot 280:23
form 49:8 273:8
former 78:20 190:18 213:19 214:3,8,14,18,24 215:3,6,8,11 224:11,23 225:3 226:2 227:19 228:2 234:20,21 235:4,10,16 236:4 240:11,16 257:13 258:6 261:15 262:5,16 317:23 318:6
forms 94:21
forth 42:22 89:4 256:17 272:1 301:1
forthcoming 35:17
forward 9:20 92:2 196:8 219:19 257:7
foul 204:4 300:17
found 80:11 130:11,12 153:12 174:7 212:24 221:1 226:19 227:8 252:21,22,23 253:2,4 267:11 304:2
four 7:13 17:2 20:6 38:14 39:3 47:10 48:7 52:19 86:16 99:14 106:5 112:18 114:2 127:1,15 144:14 150:7 154:3 155:18 158:11 161:11 165:3 181:16 225:17 225:19 265:22 269:17 275:12 278:14,18 288:23 315:13 319:24
four-week 281:23
fourth 17:2 209:15 321:21
frame 43:22
frames 104:3
framework 72:6 92:7,16
frank 288:12
FRANZETTI 3:2
freeze 152:21
frequently 126:17 127:4 131:1 159:18 274:21
Friday 286:18
front 18:16 123:1 170:13 201:19 238:9 304:21
frozen 152:23
FS 90:11
fueled 280:11
full 51:1 91:9 103:16 153:17 287:14,15
full-time 109:12 172:19
function 70:3
further 14:20,21 34:10 66:21 145:21 167:19 169:11 280:16 329:22 330:23 332:8
future 121:10 232:8 264:7 323:21 329:6

G

G 7:2,2
Gale 3:4 4:9,11 107:19,21,22 108:2,11,17 122:15,23 123:6 124:8,19 129:1,2 129:14 131:11 131:17 133:1 137:15,21,22 138:19 139:7,18 140:5,15 141:16 142:4,7 143:5,6 143:18,19 144:7 148:6,9 155:9,14 158:14,21 161:7 161:13,22 178:1 178:9,18 179:4 179:19,22 180:2 180:5,11 182:15 183:1 189:6,14 194:19 199:1,5,8 202:4,13,14 212:10 213:3,13 219:1,11 237:1,8 241:17 242:1 245:9,14 248:2 262:14 263:1,9 263:10 280:15 280:18,21 282:24 283:1,15 283:17 290:15 304:15 315:6,18 316:22 317:14 319:4,8 326:23 327:2 328:15,16 329:15,21 330:6 330:23
Gamble 109:6,8 109:10
gap 122:4
gaps 65:17,19
gas 110:24 121:2 133:24,24 141:1 176:24 240:11 240:12,16 324:21
gate 257:21 302:2 302:3
geared 92:17
Gen 51:24 79:12 84:4 85:2,5 123:17 124:2 125:4,16 127:24 130:7 148:18 150:20 153:10 156:23 157:2 159:5 161:11 162:1 163:6 164:24 166:15 174:10,11 178:11 186:24 192:14 195:11 195:23 203:20 213:4 217:18 220:2,18 244:5 249:2 277:6 290:21
Gen's 126:8 162:15 192:13 193:7
general 33:8 36:11 55:20 103:23 111:9 118:23 134:6 144:16 168:13 176:24 194:12 238:3 239:3 242:5 257:7 302:20
General's 278:16
generally 18:24 19:7 35:15 37:10,14 51:12 56:9 94:15 109:22 113:5 114:6 116:19 119:7,22,24 120:3,6 121:2,3 125:14 126:2,14 127:11 135:22 136:18 145:9,10 147:10 151:12 158:1 167:23 170:20 171:18 180:13 181:6 182:11 185:23 195:8 199:21 204:9,16 222:19 222:20 224:3 226:20 227:24 232:23 242:21 242:22 246:17 249:21 260:18

274:18 293:6 320:1
generate 118:17 145:14
generated 19:2 66:13 69:7 188:7 280:11 306:18 308:17 309:3
generating 118:18 141:1 266:20
generation 1:11 14:7,18 65:21 78:24 111:8 112:24 113:2 117:2 118:21 124:9 125:13 130:7,9 131:1 132:9 134:8 136:14,19 137:3 138:20 140:6 142:11 144:17 146:8,18,21 147:5,11 152:4 153:7,23 154:6 154:21 156:20 157:6 158:3 159:2,9,14,21 160:2,3 162:5 163:16,24 164:7 164:15 165:7 166:5 167:11 168:4,20 169:4 170:21 171:11 174:13 177:22 180:22 184:3,23 186:4,8 191:3,7 191:12,19,22 193:1 198:8 199:10,13 200:8 200:13 204:19 206:15 211:4 212:3 218:6,16 220:6,10,22 221:4,10,15,19 221:24 222:4,6 222:12 223:2 224:8 225:13 226:1,6 227:16 229:7 230:2,3,11 232:18 233:21 236:14 237:12 237:23 242:9,19 242:19 243:4,16 243:21,24 244:9 244:14 249:22 250:21 251:15 251:20 253:20 255:3,23 257:1,5 258:9,12 259:14 263:20 267:2 268:3,7,10,14,17 268:23 269:8,21 271:8 272:9 273:5,12 275:11 275:14 276:12 276:21,23 279:21 280:6 289:7 290:16 291:2,9 296:11 296:17 299:9 300:4,10,11 302:4,14 306:4 307:3,21 308:11 308:23 309:24 310:11 314:7,20 319:20 321:12 326:5 328:22
Generation's 116:22 117:4 130:23 131:4 137:16 142:12 143:22 144:9 157:9,22 160:19 161:17 164:19 167:14 175:3 176:21 178:2,4 179:10 180:14 180:21 193:14 201:13,14 230:7 232:12,22 251:10 256:18 258:23 276:14 277:3,7
generic 296:23
gentlemen 6:11 107:12
geologic 20:22 79:18 84:7
getting 12:15 31:6 44:22 47:9,10 59:10 119:20 190:13 234:17 254:20 286:5
give 9:12 13:14 29:1 46:8 141:10 235:8 298:24
given 98:8 157:19 183:24 184:22
gives 142:21 195:14,21 196:9 207:2
giving 44:3
glass 298:9
glasses 297:24
gleaned 45:8
globally 65:9
GMZ 41:10,11,16 77:11 93:4,12,21 99:13,16,18,20
GMZs 17:1 40:14 40:16,18,24 41:2 77:7
Gnat 86:10 87:2 87:18 282:2,3 284:7,16,21
Gnat's 102:3 183:14 184:8,17 186:14
go 8:14 31:24 82:20 92:1 100:16 107:13 110:17 122:16 122:17 135:10 144:23 152:12 159:10 184:5 189:9,23 200:18 237:1 249:20 251:4 280:19 281:5,9 286:10 293:1 296:8 302:22,22 309:17,21 310:8 321:19 325:14 331:2
goal 275:21 280:2
goes 41:15 53:15 66:9 98:20 102:2 293:9 304:11,12 312:2
going 7:11,13 8:9 12:8 13:17 17:23 20:1 21:21 25:7 29:21 30:3 35:12 37:23,24 40:5 44:7 45:18 48:24 49:17,21 53:16 55:24 63:24 64:16 65:14 79:6 80:17 88:23 90:7,7,19 98:1,6 101:12,15 156:9 159:12 169:17 170:11 177:14 183:2,3 185:17 185:18 187:3 193:16 198:15 202:1,20 203:7 206:21 213:15 213:18 214:7 240:15 257:7 264:5 272:20 281:11 285:7,12 285:13 286:8,8 286:11 294:14 312:5 314:11 320:15 324:7
good 6:1 7:8,9,10 54:9 60:7 95:8 108:5,18,19 141:17,19,19 143:13 147:7,9 153:13,14,15 192:16,17,18 221:2 267:13 280:4,4,5,6 290:6,13 328:3 330:20,21
goodness 154:7
gotten 27:10 100:7 143:7
government 157:20
governmental 157:17,21
gradient 33:15
graduation 109:4
granted 230:9 274:1
granular 113:11
graph 25:9,16 27:2 68:10 69:12
graphical 68:18
grass 186:10
gravel 22:17 101:7 102:10
great 20:18 21:1 24:1 25:20 27:4 32:3,6 37:14 65:12 121:22 137:20 190:6,8 253:18 286:17
greater 120:8 296:9
green 297:11 299:4,5
grid 90:10,16,21 91:10 118:9 121:18,19,24
gridded 91:9
ground 29:22

38:17 157:11 161:10 228:5 325:24 326:7,12 326:13,17
groundwater 10:23 12:2 13:20 14:3 18:1 18:4 24:10,12,18 24:21,23 25:11 25:22 26:21 27:5 29:14 30:11 31:8 32:16,18 33:8,10 33:13,15,21 34:11,16,21,23 35:3 40:22 41:2 41:14,18 42:8,18 42:19 58:17 63:16 65:22 70:12 72:3 76:15,17 78:23 83:19 85:4 90:2 93:3 99:9,22 104:19 105:19 116:17 127:14 131:6 154:13 155:1 157:8,12 159:3,5,8,14,16 159:22 160:6,10 160:14,20 165:9 166:22,23 167:1 171:2,23,24 172:3 175:18,20 175:23 176:2,4 181:12 183:18 183:24 192:22 216:19 221:4,11 221:16,20 222:1 225:15 228:6,7 229:19 230:17 230:18 231:14 233:6 239:8,10 243:17,21 244:1 244:4 247:8 249:9 250:1,8,10 250:23 254:12 254:13 255:17 256:7,10 268:5,7 268:11,15 269:11,23 270:11 271:22 271:23 272:19 272:20 273:18 274:16 276:3,13 276:24 278:16 278:20 314:21
group 181:4,8 224:3
groups 228:22
guard 257:21
guess 27:20 31:6 63:23 110:22 141:14 143:6 193:9 204:1,13 207:9 211:14 242:18 260:12 290:1,23 292:4 293:7 295:14,23 302:8 303:3 309:7,9
guide 113:19
guys 29:12

H

H 4:15 7:4 108:13 108:13 264:24
half 28:2 128:14 217:6 301:17
Halloran 1:15 6:1 6:4,16 8:8,12 9:5,11 11:3,6,10 12:14,20 13:9,16 20:8 22:3 26:9 26:15 28:22 31:15,22 32:2,5 32:8 34:2 44:12 46:10,17 47:1,7 47:21 48:8,12,17 48:21 49:4,13,18 50:13 57:23 58:3 61:2,6,10 64:3,6,14,19 66:1,22 71:10 72:18 87:10 91:19 103:2 106:9,15,18 107:7,11,16,20 107:24 108:5,10 122:17,21 124:11,13 129:1 129:7 131:14 137:20 138:22 138:24 140:8,10 141:18,24 143:4 143:15 144:5 148:4,7 155:12 158:19 161:12 161:20 178:7,22 179:19,24 180:3 180:9 182:18 189:2,8 194:17 198:18,23 199:3 199:6 202:6,10 213:6,8 219:9 237:3,6 241:23 245:12 262:8,12 263:4,8 280:17 281:2,5,9,16,22 282:5,9,13,19,22 283:13,16,22 284:3,14,18 285:1,6 286:1,16 287:1 304:19 305:1 309:16,20 315:8,20,23 316:23 317:17 325:11,17 326:21 328:14 329:23 331:1
hand 6:11 79:6 80:17 108:7 202:21 332:13
handled 41:4
handling 126:1
Hanson 265:2,3 278:10 297:4
happen 152:17 264:5 286:8
happened 36:22 120:18 121:7 150:24 165:23 194:11 219:24 224:24 242:3,14 267:6 287:6 292:2 310:12 314:24
happens 91:23 92:1 120:6
hard 19:20 23:23 134:19
hashmark 192:7,8
hatched 296:19
hate 325:12
hazard 171:21 224:17 254:14 269:9
hazardous 156:11 156:16,18
HDPE 163:1,3 167:23 168:1 177:21 178:12 220:8,11 222:17 223:8,18 224:2,2 242:16 245:1 256:22,24 267:7 269:2 290:11 311:7
head 128:7 167:6 171:5 289:10 301:11 318:15
heading 15:6,13 16:9 59:11 99:4 130:21
health 42:24 58:21 63:19 65:3,6,9 66:17 92:14
hear 11:15 80:10
heard 57:11 86:9 209:19 275:5 283:12
hearing 1:15 6:1,4 6:16 8:8,12 9:5 9:11 11:3,6,10 12:14,20 13:9,16 20:8 22:3 26:9 26:15 28:22 31:15,22 32:2,5 32:8 34:2 43:11 44:6,12,15 46:5 46:10,17 47:1,7 47:21 48:8,12,17 48:21 49:4,13,18 50:8,13 57:23 58:3 61:2,6,10 64:3,6,14,19 66:1,22 71:10 72:18 87:10 91:19 102:4 103:2 106:9,15 106:18 107:7,11 107:16,20,22,24 108:5,10 116:5 122:16,17,21 124:8,11,13 129:1,2,7 131:11 131:14 137:20 138:19,22,24 140:5,8,10 141:16,18,24 143:4,15 144:5 144:18 148:1,3,4 148:7 155:10,12 158:14,19 161:7 161:12,20 178:2 178:7,18,22 179:19,24 180:3 180:9 182:15,18 189:2,8 194:17 198:18,23 199:3 199:6 202:4,6,10 213:3,6,8 219:4 219:9 234:15 237:2,3,6 241:19 241:23 245:10

245:11,12,17 262:8,12 263:1,4 263:8 280:17,22 281:2,3,5,9,16 281:22,23 282:5 282:9,13,19,22 283:1,7,13,16,22 284:3,14,16,18 284:22 285:1,6 286:1,16 287:1 304:19 305:1 309:16,20 315:8 315:20,23 316:23 317:17 325:11,17 326:21 328:14 329:21,23 331:1
hearsay 128:22 189:1,4
heavy 311:19
hedging 321:20
held 129:3 176:16 245:17 332:3
help 53:3 97:16 99:21 113:6 115:11,16 298:9
helped 89:15
helpful 90:15
helping 115:14
hereof 332:5
hereunder 332:13
hesitancy 196:9
hesitate 293:19
high 18:5 27:6,24 28:5 111:10 113:9 163:2,4 166:19 170:24 312:2
higher 18:8 24:14 27:6,11 35:3 82:10
highest 17:24 32:16 35:8 81:19,22 82:12
highlighted 135:1 183:5 217:21 247:4 265:13
highlighting 185:18 238:8
hills 238:22
hire 113:18 114:13
hiring 115:13
historic 14:13 35:18 36:9 38:11 62:17,20 66:15 84:24 85:24 95:2 129:17 130:21 172:1 193:22 195:7 197:9,19 198:3,5 199:14 200:9 261:20,22 262:5,16 293:18
historical 39:16 58:19 116:3
historically 36:22
histories 117:15
history 29:22 37:3 142:12 143:22 144:10,14 147:14,15,15 215:18 224:16 228:3
hold 112:8 125:6 298:6
holes 153:17 226:23
home 298:1
homogenous 87:19,23 100:24
honest 297:24
honestly 298:2
hope 133:13 255:24 318:23 320:12
hopefully 151:19
Horton 331:3
hot 120:6
Howard 109:2
hub 133:20
human 42:24 58:21 63:19 65:3,5,9 66:17 92:14 124:2,2
hundreds 172:6 176:9 228:15 231:5 233:9 235:18 254:5 255:12 271:17 274:9 280:9
hunting 204:4 300:17
hydro 154:7,24 166:22
Hydrobins 206:5 206:7,9 207:12
hydrogeologic 54:5 155:7 158:6 159:8 243:5,8
hydrogeological 154:8,9,24 267:16
Hypalon 209:24 210:22

I

I-2 205:5
I-3 134:16 265:11
IAC 125:11
Iconic 129:18
ID 4:16
idea 70:24 292:2
identification 91:13,16 123:5,8 128:17,20 132:24 133:4 137:9,12 139:12 139:17 179:3 212:9
identified 38:11 38:14 60:23 86:15,17 92:10 92:24 93:3,11 96:15 100:10 185:21 189:17
identify 92:19 104:9 294:19
IDNR 188:22 189:12 204:3 299:13 300:12 300:14
IEPA 41:11 83:22
ignore 95:17
ILCS 140:18 225:10 250:15 250:18 266:6
ilk 8:14
Ill 266:9
Illinois 1:1,17 2:4 3:8 6:5 40:20 55:8 72:13,21 95:12 96:5 109:24 112:20 115:1,4 116:23 119:24 129:18 137:4 138:3,10 138:16 147:1 151:20 152:22 153:1,6 154:1,5 154:22 157:6,13 158:9,22 159:11 159:23,24 161:9 161:18,24 162:11,19 164:8 168:13,18 171:12 173:6,10 173:10 174:14 178:19 179:11 180:14 186:23 187:9,11 191:2,3 191:14 193:4,11 193:20 197:19 208:6 209:2 216:1 217:17,22 218:22 221:17 225:6,14,24 227:17 229:4,24 231:16,20 232:19 233:23 235:8 243:15 244:2 245:18 246:5,19 248:19 249:8,14 250:22 251:14 253:21 254:23 255:4 259:17 260:11 261:1 267:2,17 268:12 269:18 269:20 271:9 272:5,22 274:23 275:3 278:15 280:11 296:4 300:5 304:6
image 50:24 51:3 51:5 56:23
immediate 59:14 130:12 307:22 307:24
immediately 35:4 126:10 238:13 238:21 307:24 308:13
impact 58:21 104:13,23 105:7 111:16 127:23 130:10 267:24
impacted 40:21 41:2 71:6 154:19,20 156:1 243:11
impacts 78:17 83:23 101:22 104:5,13 127:18
impeachment 12:16
implement 150:20
implementation 10:23 15:19
implemented 99:10
implies 330:15
importance 58:20 89:16

important 33:16 99:24 119:6
importantly 35:8
impound 209:10
impoundment 124:22 125:2 136:4,11 140:18 140:20 149:11 149:16 169:15 173:11 185:3 194:24 197:6 205:23,24 207:4 207:7,21 208:18 208:21,24 209:3 209:5,6,15,16 211:18 213:2,20 215:23 216:2 218:20,23 231:17 250:14 250:18 256:21 259:23 260:1 270:1 294:20
impoundments 20:3,6 33:3,4 38:13 54:4 114:11 125:16 126:4,11,21 128:13 138:17 163:21 168:18 168:21 170:10 170:19 172:18 172:22,23,24 173:1,3 193:24 195:13,14 205:14 207:5 220:4 225:10 240:23 265:24 266:6,9 270:5 275:7 276:5 288:23 294:7 326:19 328:6
impression 142:21
improper 12:9
improvement 245:2
in-place 318:3
inactive 213:21 266:8
inapplicability 212:5,16 259:22
inappropriate 157:2
include 9:3 10:4 22:18 49:16 52:12 73:11 74:12 75:3 102:12 111:19 114:1 115:19 126:20 127:17 243:17 279:8
included 7:19 9:1 38:2 73:8,13,16 75:8,22 77:13,19 96:1 98:18 117:16 146:11 157:1 162:22 254:11 255:17 271:23
includes 256:14
including 16:23 73:12 74:2 216:23 226:2 275:24 290:12
inclusion 51:5
inconsistency 282:16
independent 119:2
indicate 190:23
indicated 25:3 249:10
indicates 14:24 24:11 74:18 217:23
indication 271:5
indicator 218:2
indicators 218:11
individual 33:6 63:11 68:20,20 120:11 254:15
industrial 55:13 55:15,19,22 59:12 134:16 204:9,14,16 205:6 238:3,9 264:14 265:11 277:14,23,24 278:5,12 283:5 297:5 303:1 305:18
industries 204:11
industry 110:19 163:7 245:1 299:22
industry-accept... 40:19
influenced 32:22
influences 33:23
influent 166:11
inform 88:5 89:15 90:4 91:23 92:1 195:5 201:14
information 16:12 28:14 29:8,18 30:17 32:21,22 33:1,5,8 35:1,11 39:5,10 42:7,15 42:22 43:1,11,18 44:16 45:7,8 47:18 49:16 63:14 65:16 66:5,6,11,13 72:2 85:15 89:3 89:15 124:1,5 137:4 143:8 171:6 219:5 225:21 229:8,16 230:1 233:5 272:10 273:4,13 273:17 274:14 277:3,6 281:14 283:3,4,6,8
informative 36:22
informed 86:7
informs 105:22
initial 156:24 159:14 194:23 272:16,18
initially 125:21 263:18
initiated 146:9
initiating 242:23
inquiry 154:22
inside 54:7
inspect 226:4 251:18 270:9,15
inspected 60:1 199:16 251:21
inspecting 224:19
inspection 10:24 226:7,12,15 227:6 252:11,15 252:19,20 270:7 270:20,22
inspections 167:3 171:4 223:16 224:20 225:16 226:17,18 250:7 250:7,8,24 251:1 256:15 269:24 270:1 288:6 310:14,18,20,24 311:1,2,2
inspects 252:3 270:14
install 121:12 152:14 157:6 208:7 224:2 230:16 231:13 243:16 264:6 268:3 273:20,20 274:16 276:13 279:12 323:14 324:6
installation 41:17 222:19
installed 54:6 83:13 84:20,21 152:15 155:1 157:11 222:18 230:19 250:3 256:3
installing 83:11
instance 35:7 69:20 70:18 91:8
instances 35:2 39:19 72:7 74:17 325:23
institutional 72:9 99:7
integrity 2:8 153:17 178:16 267:13
intend 121:12 232:14,15 280:3 314:8 323:12
intended 65:5 226:22 234:22 276:17 329:6
intending 168:23 276:17 309:10
intent 224:11 314:13
intention 70:21
interest 332:11
interested 190:3
interesting 90:14
interim 65:8 103:14
internal 228:22
interpret 296:5
interpreted 10:13 30:17
interpreting 297:12
interrupt 280:22
intersection 52:20 54:14
introduced 168:12 193:22
introductory 194:23
invasive 190:6,7
investigate 186:24

191:4,7,15,22
investigated 42:13 198:12 211:4
investigation 37:18 54:5 89:4 89:6,7 91:3,10 184:4,24 185:6,9 201:4,5 242:4 259:5,10
investigations 186:15,18
involved 117:22 196:3,5 227:20 254:10
involvement 110:24
involves 233:2
isle 57:5,6,7,8,8
ISO 118:7 119:2
ISOs 118:6,8
issuance 110:12
issue 47:14,19 50:2,4,9 160:1 165:19 170:8
issued 173:6,18 174:9 220:2 225:6 231:21 232:3 236:5,7 248:20 254:24 255:1 274:23 275:3,6
issues 199:21 200:1,5
issuing 170:4
items 7:19 67:23
iteration 321:21 326:1

J

jags 304:13
James 1:15
Jamie 246:24
January 156:8 168:12 224:24 247:3 251:5 269:12
JENNIFER 3:3 4:5
jn@nijmanfran... 3:10
job 9:13 22:4 113:10,13 127:13 134:6,7 172:19 194:13
jobs 324:11
Johns 238:17
joined 110:19 125:12
jointly 97:7
Joliet 7:14 9:1 42:3,10 64:11 73:20 77:6 85:8 118:15 120:15 131:20,24 132:5 132:6,7,16,20,20 133:5,9,21 134:13,14,15 135:3,14 136:1 137:17 138:4 139:21 140:17 142:10,13 143:23 144:21 144:22 145:4,8 145:19,23 146:15 152:6 153:11 158:16 159:5,23 160:23 165:6 166:3 171:13,15 174:15,17 176:24 177:3 178:5 181:5 186:8 188:8,18 192:8,10 195:7 197:9,20 200:9 211:22 219:22 221:7,11,19,21 221:24 224:16 228:20 233:14 237:14 256:20 278:1,6,7 279:17 290:16 292:12 292:13,17 293:1 302:7 305:6,7,10 306:3,19 317:3,4 317:7,9 324:16 324:24
judged 98:2
judgment 71:18
July 166:9 245:21
jump 320:16
June 1:17 6:2,4 27:14,20,21,22 27:22 28:5 32:17 236:16 263:22 264:3,3 331:7
juts 303:15

K

Kari 1:21 6:12 11:10 48:18 107:17 108:7 262:9 332:1,21
keep 9:18 276:2 309:5 318:21 329:6 331:4
keeping 36:8
keeps 190:15
Kendall 132:4,11
key 15:8,16
kg@nijmanfra... 3:11
kind 28:14 29:8 29:12,18 49:5 52:19 110:21,22 113:15,20 117:18 133:19 169:22 172:1 176:10 223:24 231:8 244:24 274:10 286:6,7 296:23 305:11
knew 35:7 198:15 273:8 293:22 294:8
know 8:13,19 9:13 10:1 12:6,17 26:24 29:11,17 33:12 36:19 37:22 39:12 44:3 46:18 47:22 48:3 49:19 51:22 52:2,15 56:6,14 56:16 57:10,14 58:2 64:7,19 111:13 119:5 128:1 133:16 134:18 149:5 155:4 175:22 192:15 195:23 199:3 209:21 210:20,23 211:20 215:16 247:21 248:8 258:2 261:9 264:19 273:9 278:11 281:24 286:6,6,7,8,20 287:12 290:20 291:4,6,14 292:5 292:5 294:9 297:8 299:5 300:13 301:21 301:22,24 302:17 303:3,11 304:20 305:10 305:19 306:5,12 306:15 310:3 313:19 318:20 320:14 323:3,6,7 323:20,21 324:6 324:9,12,23 325:12 326:11 327:21
knowing 194:24
knowledge 57:18 80:3 83:10 124:6 148:20 149:3 150:19 155:5 157:13 161:14 162:10 162:13 164:18 172:11 173:5 186:3,6 190:3 191:2,11,14,21 192:19,24 193:3 193:4,11 214:2 214:19 215:11 217:8 220:21 222:22 223:2 231:20 239:1 240:13 241:10 244:3 258:8 278:13 289:3 306:16,22 308:3 308:16 309:2,9
known 50:4 57:4 57:10 58:19 78:23 150:7,8 289:2
KPRG 42:14 147:21 172:8 228:20 254:9
KRISTEN 3:4 4:9 4:11

L

L 7:2,4,4,4 108:13
la 57:5,6,8
labeled 22:12 25:18 53:20 139:12 203:17 297:16
lack 218:1,10
lake 51:10,14,23 53:9 203:14,15 203:18,19 204:6 205:11 253:9 256:2 297:13 300:2,21 301:13 301:18,21 302:6 303:20 324:11
Lakes 190:6,8

land 45:16 49:22 49:24 50:8 54:21,24 55:10 55:21,23 58:10 59:4,12,14 60:8 62:5,11 79:3 83:14 99:19 189:13 200:5 300:1 302:13 303:12 304:7 305:22 306:1,1
landfill 145:2,6 187:19 188:3 197:7 238:21
language 16:9 63:9 330:15
large 40:3,12 196:22 238:21 264:17
larger 80:17
LASALLE 3:6
last-minute 47:20
LAUGHRIDGE 3:4 4:9,11
law 1:4 146:22 170:16
laws 113:6 200:8 275:22
lawsuit 115:20,23 164:9,11 200:15 200:21
laydown 126:16
layer 22:23 24:4,9 24:15 174:23,24 311:12,14,18,24 312:2,7,10,14,17
layers 214:13
leach 89:14 94:10
leachate 208:7 233:3
leaching 29:21 89:11,20,20,23 94:19,21 95:4,5 95:13 96:5 106:24 107:3
lead 228:20 254:9
leading 71:8 72:16 87:8 91:14 95:19 161:19 198:21 198:22 199:4
LEAF 94:5,10,14
leakages 271:6
leaking 216:19
learn 125:13,14 125:22 188:23
learned 125:21 189:7 329:8
lease 204:1,2 299:13
leases 300:12
leave 110:14 222:23
led 99:13 320:4
left 9:15 56:3 70:10 81:11 82:15 175:16 214:13 240:9 297:24
legacy 193:23 194:24 196:14 293:17 294:6,7
legal 64:17,21 105:6
legend 22:11,13 56:20,20
length 102:20
let's 53:2 55:1 60:24 67:15 75:10 82:19 108:20 113:10 135:8 186:2 205:12 229:13 260:1 294:9 298:22 325:13 328:19
letter 217:17 218:16 269:2
letters 298:20
level 18:6 23:16 24:18 39:14 81:19 82:10 111:10 113:9 163:2 166:19 170:24
levels 14:14
License 1:22
licensed 151:19 226:8 251:24 252:2 270:9,14
like- 120:3
lime 174:24
limestone 22:18 96:10,22 97:9 101:8 102:11 174:24 215:14 215:20,22 311:16
limine 128:23 129:5
limited 261:1
Lincoln 144:24 145:1 188:9 292:14,22 293:2 306:20 307:4
line 10:17 11:18 21:22 25:1,23 26:2,22 53:4 54:8 68:21 69:17,18 70:6 72:11 189:23 288:22 293:9 296:5 304:13 318:8
lined 130:24 168:2 195:14 210:5 214:9
liner 142:22 149:6 150:6 151:21 152:13,13,14,15 157:1 163:3,5,20 167:7,22 174:19 175:12,14 176:20 177:21 178:12 180:17 180:18 181:21 181:22 182:14 208:6 210:1,17 210:22 216:18 220:8,11 222:23 228:4 233:2,2 254:12 256:22 256:24 257:5 267:8 269:3,10 287:6 289:1 310:15,20,21,24 311:21,22 312:9 317:8 319:14 327:14
liner,' 211:7
liners 149:7 150:4 163:1,8 168:1 195:13 211:4 222:17 223:5,8 224:2,3 242:16 245:1 287:10,15 288:7,7 289:4 290:5,8 312:3,12 312:12 330:8,18 330:20
lines 13:8 69:23 85:24 86:5 216:6
Links 173:16
list 38:10 55:4 167:5 171:5 205:14 260:20 260:20
listed 96:22
listing 86:5
lists 20:22
liter 70:20 81:24
lithology 20:23 79:17
little 21:11 24:7 27:6 29:1 40:6 49:23 56:10 113:10 280:20 288:10 296:14
live 57:11 123:17 123:19 202:17
lived 112:6
living 186:12
LLP 3:2
load 118:12,13 119:24
loaded 118:10
located 47:16,18 51:14 55:13 56:17 76:2,4,5 78:21 79:15 81:13,20 82:20 82:24 87:14 90:22 104:12 137:18 145:3 190:15 238:12 238:13 258:5 277:12,13 313:1
locating 146:11
location 23:8 27:8 57:12 58:14 78:17 86:10 90:22 112:1 126:2 171:20 224:17 228:5 240:14,14 263:18
locations 24:24 27:1 39:17 49:9 59:7 63:11 93:11 126:13 314:14
lock 133:12 190:8 190:11,13 304:12
log 39:5 79:9,14 84:7
loggerheads 13:11
logging 102:4
logical 39:24
logs 42:17,17
long 13:19 29:17 37:2 95:10,11 102:21 103:19 112:16 151:6

187:22 278:11 278:12 290:2
longer 116:2 193:10 207:2 315:4,17
look 18:16 19:15 20:5 25:7 32:7 32:11 38:3 43:13 46:21,22 47:23 53:2 55:20 56:7 57:2 58:10,16 59:20 60:24 61:20 62:16 67:11 69:10 72:14,21 73:21 74:10 75:10,14 78:3 81:9,14 82:19 83:2 149:7,12 150:2,4 151:24 181:16 228:24 248:18 257:20 260:16 261:2 285:2 287:10 302:8 310:6 323:22 324:7 330:16
looked 32:18 37:13 38:5 63:1 73:17 128:4 143:10 150:3 174:6 260:4 287:20 290:16 290:21 291:15
looking 13:23 16:17 22:11 25:13 26:4,13,20 34:6 67:16 69:11 70:9 76:20 80:20 81:18 82:8,15 89:16 96:21 105:6,7,8 123:19 130:2 132:18 146:7 150:23 153:18 165:22 168:11 174:4 189:15,19 192:6 204:24 205:8 207:6 217:20 222:11 227:4,6 230:22 242:2 248:15 249:12 253:15 257:10 258:4 260:24 263:12 264:11 265:23 268:22 274:4 299:6 302:7 303:4,13 328:20
looks 21:4 22:8 23:4,22 24:6 27:10,19,24 28:11 29:8 134:14 186:9 199:17 245:16 246:18 291:11 291:15 298:19 299:17
lost 270:11
lot 43:7 67:2 104:4 115:24 116:3 117:12 124:21 144:20 144:20 166:17 166:19 168:8 172:14 196:2 228:22 229:10 254:15 257:18 258:3 272:12,15 273:8,9 275:18 280:8 299:24 313:12,13,15 320:24
lots 175:8
low 89:24
low-volume 174:19 176:23 177:1,9 178:17 180:19 256:22 257:7
lower 70:19
lowest 22:22 24:4
lunch 141:22
Lundy 182:7
Lynn 246:5,22,22

M

M 7:4,4,7 67:3 106:20 108:16 287:3 327:1 330:4
machine 311:20
magnifying 298:9
main 127:6,7
Maine 57:7
maintain 113:7 128:22
maintaining 301:1
major 133:10 278:7
majority 27:24 102:5 125:19 190:24 206:6
making 41:20 92:18
manage 232:13 257:6
managed 51:24 52:1
management 91:6 93:4 193:24 196:14,18 197:1 197:11 260:9,21 260:22 261:4 262:20 294:3
Manito 204:11,12 301:24
manufactured 240:12,16
manufacturing 133:15 239:4
Manville 238:17
map 56:2 78:7,9 132:19,19 133:3 133:13 134:13 183:3,5,9 185:18 185:20 189:15 189:19 190:15 203:16 205:2,8 237:19,23 238:8 240:9,10 258:4 264:11 265:9 296:19 297:6 298:23 299:16 299:20 302:7,22 303:4 313:11
maps 45:21 46:12 49:11,15 58:17 134:2,5 281:14 283:19 284:11 295:24
March 18:21 231:1 274:7
Maria 144:19 289:12,18,23
marked 4:16 123:4,8 128:16 128:19 132:23 133:3 137:9,11 139:16 179:2,7 212:9 313:10
market 118:2,5,11 118:18,19,21 119:9 120:2,14
market's 118:22
markets 119:5
mass 28:15,17,19 29:1,6,24 30:9 30:10 31:2 40:3 87:23
master's 109:1,3
material 29:15,21 39:9 88:6 90:6 93:10 95:24 101:20,21 110:23 151:15 181:22,24 190:24 198:12 211:24 216:18 217:1
materials 86:20 87:17 89:9 95:7 101:9,11 102:5 102:17 131:3 265:2,3 278:10 297:4
Mateusz 181:17
matrix 88:5 101:23 102:6,11 102:16 149:11 149:17,17,20,23
matter 6:3 97:8 103:14 114:5 117:22 120:13 125:17 127:2 132:10 135:16 136:2 139:20 248:10 302:12 332:3,12
Max- 181:7
Maxwell 4:3 6:9 6:14 7:10,18 10:10 12:12 13:6 18:2,7,11 18:19,23 19:11 19:18,22 20:10 20:17,21 21:4,8 22:5,14,21,24 23:4,10,15,22 24:6,11,20 25:9 25:15,18 26:23 27:8,15,19 28:11 28:24 34:20 38:19,21 39:4 40:16 42:9,12 44:16 45:2,7 53:12 56:18 58:13 64:24 66:4 67:4,9,13 67:17,20,22 68:2 68:6,10,14,17 69:4,15,19 70:1 70:7,11,16 71:15

72:20,24 73:5,10 73:17,22 74:4,14 75:9,16,24 76:3 76:9,14,23 77:9 85:7,11,17,21 86:4,14 87:4,15 87:21 88:11,19 89:1,5,22 90:5 100:12,15,20 101:2,19 106:3 181:9
mayor 80:14
mean 12:23 18:6 18:18 29:24 31:24 33:18 37:22 47:5 48:6 71:12 110:3 117:23 122:10 151:7,18 153:15 168:3 170:24 172:22 183:21 184:2 188:10 191:18 198:14 205:18 210:3 218:11 225:2 236:21 238:19 239:20 282:20 283:4 303:1 324:15 326:11
means 131:3 151:9 168:5 213:2 299:7 326:12 327:19 332:3
meant 28:21 29:12 62:7 71:7 143:3 158:2 274:17
measure 10:14
measured 290:1
measurement 82:13
measures 10:18 15:20 41:9
mechanical 332:3
mechanism 41:16 118:6
mechanisms 15:8 15:16 72:3 76:17
meet 120:9 171:20 229:19,20 256:10
meetings 176:16 233:16 234:4,16 235:23,23 255:19 322:7
megawatt 117:8
Mellon 109:3
member 112:14
memorandum 148:11 289:8,9 327:5 330:7
memory 310:8
mention 62:18 102:12
mentioned 19:15 28:5 54:16 60:6 80:14 95:3 114:16 171:14 195:16 196:16 199:10 274:16 275:20 278:5 288:9 295:4 312:22
mentioning 69:16
metal 208:10,11 208:23 209:3,8 211:6 220:10,22 225:9 229:14,23 230:15,23 231:3 231:9,15 232:6 232:16 233:19 234:12
method 9:3 94:15 94:23 95:6,15,18 174:17 175:4 255:22 320:9
mic 144:1
MICHAEL 4:3
mid-60's 146:1
mid-April 172:16
middle 6:7 40:13 54:12 68:21 81:7 142:5 303:17
Midwest 1:11 14:7,18 51:24 65:21 78:24 79:12 84:4 85:1 85:5 112:24 113:2 116:22 117:2,4 118:21 123:17 124:2,9 125:4,12,16 126:8 127:24 130:7,7,9,23 131:1,4 132:9 134:8 136:14,18 137:3,16 138:20 140:6 142:11,12 143:21 144:9,17 146:8,18,21 147:5,10 148:18 150:20 152:4 153:7,10,23 154:6,21 156:20 156:23 157:2,6,9 157:22 158:3 159:1,4,9,13,21 160:1,3,18 161:11,16 162:1 162:5,15 163:6 163:15,24 164:7 164:14,18,24 165:7 166:5,15 167:11,13 168:3 168:20 169:4 170:21 171:11 174:10,11,13 175:3 176:21 177:22 178:2,4 178:11 179:10 180:14,21,22 184:3,23 186:3,7 186:24 191:3,6 191:11,18,22 192:13,14,24 193:7,14 195:11 195:23 198:7 199:9,13 200:8 200:12 201:13 201:14 203:20 204:18 206:15 211:3 212:3 213:4 217:18 218:5,16 220:2,6 220:10,17,21 221:3,10,15,19 221:24 222:4,6 222:12 223:2 224:8 225:13 226:1,6 227:16 229:7 230:2,3,7 230:11 232:12 232:18,22 233:21 236:13 237:22 242:9,18 242:19 243:4,16 243:20,24 244:5 244:9,14 249:2 249:22 250:21 251:10,15,20 253:20 255:3,22 256:18 257:1,5 258:9,12,22,22 259:14 263:19 267:2 268:2,6,10 268:13,17,23 269:8,21 271:8 272:9 273:5,12 275:11,13 276:12,14,21,23 277:2,6,6 279:21 280:6 289:6 290:16,21 291:2 291:9 296:11,17 299:9 300:4,9,11 302:3,14 306:3 307:21 308:11 308:23 309:24 310:10 314:7,20 319:20 321:12 326:5 328:22
Midwest's 289:3
migrate 92:13
migrating 84:18
migration 84:20
mil 163:7,8
mile 128:14 188:11
miles 188:11
milligrams 70:20 81:23
million 164:2,3 195:24
mind 114:7 128:7 167:5 173:19
minimum 47:24
minus 23:24 325:5
minute 76:12 296:1 325:14
minutes 48:15,16 286:4 325:13
mischaracterizes 319:9
misleading 12:10 13:7,13 44:11 49:24
missed 184:7,12
missing 203:13 269:2
misspoke 258:17
misstates 8:6,10 8:21 315:6,18 317:14
misstating 31:13
mistaken 38:9
misunderstood 291:5 300:9
mitigate 99:23
mixed 22:17 38:23 39:9 40:1 86:21 87:3,20,22 88:13

101:7,16 102:10 117:18
mixture 38:20 88:2,9,12
MNA 13:24,24 14:2 76:22 77:2 100:2 102:21,21 103:7 104:3
Model 97:16,17 97:21
modeling 98:3 176:4,5 255:17
models 97:12
MODFLOW 97:17,21
modification 217:18
modified 171:1
MOHAWK 2:3
moment 13:15 16:4 281:4
money 115:6,7,8 115:10 168:8 300:21
monitor 83:19 84:20 272:23 300:16 314:21
monitored 71:18 71:21 76:16 77:10,10 103:18 103:19
monitoring 10:23 12:3 18:13 23:15 24:13,22 25:11,14 27:1,9 81:2 84:8,10 93:14 99:9 155:1 157:8,12 159:22 160:3,6 160:10,14 165:9 166:23 167:2 171:2,23,24 172:2 175:21,23 183:5,8,11,19 184:20,20 218:6 221:16 225:15 228:6 229:19 230:17 231:14 233:6 243:17 244:1,4 249:9 250:2,8,10,24 254:12 256:8,9 268:5,11 269:11 269:24 270:11 271:22 272:19 272:20 273:18 273:21 274:17 276:3,13,24 314:21
monthly 174:4
months 128:23 154:3 163:17,18 172:14,17,20 194:10 229:3,9 272:4,7,10 289:24 290:1
morning 6:2 7:8,9 7:10 98:23 102:20 108:6,18 108:19 325:10
morphed 320:6
motion 128:23 129:5
move 9:20 35:13 49:1 54:11 64:8 92:2 131:12 182:16 196:8 202:1 263:11 280:24
moved 275:23
movement 36:13
moves 124:9 138:20 140:6 213:4
movie 305:12
moving 135:21 152:3 201:24 219:19 243:2 263:2
MSL 18:5
muck 136:21,21 137:1 211:23
multi-phased 91:22
multiple 321:22
MW-02 26:22,24
MW-06 23:16
MW-14 81:15,19 81:22 82:16,17 82:23 83:11,24 84:16
MW-15 25:15
MW-2 25:15,24 27:3,6,10,17 76:4
MW-3 76:5
MW-4 67:24 68:19 69:12 70:15 76:5
MW-6 77:18,24 78:8,17 79:9,15 79:21
MWG_122705 180:24
MWG13-15_11... 80:22
MWG13-15_11... 137:18
MWG13-15_12... 137:24
MWG13-15_12... 138:14
MWG13-15_12... 179:9 180:12
MWG13-15_12... 181:14
MWG13-15_12... 182:4
MWG13-15_23... 327:8
MWG13-15_23... 149:9
MWG13-15_23... 210:11
MWG13-15_29... 245:23
MWG13-15_83... 123:9

N

N 4:1 7:2,7,7 67:3 67:3 106:20,20 108:13,16,16 287:3,3 327:1,1 330:4,4
name 6:4 170:17 261:6,7,19 264:24
named 17:13 210:7 265:22
National 177:18 177:18
native 88:1 101:6
natural 71:19,21 71:21 76:16 77:10 89:11 101:6 103:18,19 106:24 133:23 133:24 187:9,12 300:5
nature 12:10 23:12 103:19 186:9
near 86:15 87:4 104:12 305:16
nearby 154:15,18 204:14
necessarily 12:7 19:9 22:2 30:13 45:10 58:23,24 65:6 70:22 71:1 309:7
necessary 90:21 151:12 195:9 276:4
need 29:9 52:24 106:11 115:15 118:23 177:22 195:8 201:9,24 233:22 273:12 284:24 286:19
needed 33:12 119:12,14 151:10,10 230:15 231:13 242:24
needs 118:24 201:4
neighbor 192:2,16 192:17,18 280:7
neighborhood 55:11
neighboring 238:10
neighbors 238:10 280:5
neither 266:13
network 1:6 129:16 171:23 175:21 228:6 250:2,5
networks 271:22
neutral 107:3
never 21:22 26:4 46:2 47:10 88:22 136:12,12 201:16 214:18
new 9:3 14:12,24 37:3 43:10 45:20 46:16 47:17 50:9 66:13 151:21 196:17 233:1,2 252:12 278:9 281:13,15 283:3 316:12,20,21
News 129:16
Nicely 177:20
night 46:3 122:1,3 281:18
Nijman 3:2,3 4:5 8:6,10,21,23 12:8 13:6 15:11 20:1 21:21 26:1 26:17,19 28:16

29:6 31:12,20 34:1 35:16 38:16 44:7 45:23 46:2,11,15 47:8 48:2,9,11 49:11,23 57:22 64:2,12,16 65:23 66:24 67:1,4,10 67:14,19,23 68:3 68:8,12,15,24 69:9,16,22 70:5 70:9 71:4,11,12 72:12,23 73:2,7 73:14,19,23 74:9 75:6,10,17 76:1 76:7,11,20 77:5 77:12,17,22 78:3 78:8,12,16 79:6 79:11,20 80:2,6 80:10,15 81:4,8 81:14,18 82:1,4 82:8,14,19 83:7 83:10,23 84:2,10 84:14 85:3,7,13 85:18,22 86:9 87:1,6,12,16 88:8,15,20 89:2 89:18 90:3,9,13 90:19,24 91:11 91:15 92:21 93:2,6,18,24 94:4,8,14,18 95:8,10,17,20 96:4,9,14,17,21 97:1,6,15,20 98:11,23 99:3,6 99:15 100:4,8,10 100:16,21 101:14 102:18 103:6,9,12 104:4 104:11,21 105:1 105:5,18 106:7 107:9,10 284:17
NISHIOKA 3:5 142:18
NLET 42:16 89:11,18,22 90:1 94:5,11,21,23 95:6,8,12,18,21 96:5 106:23 107:2
nodded 307:12
nodding 307:17 307:23
nomenclature 252:10
non-detect 68:4
non-detects 43:9 44:5,18 45:6
noon 141:17
normal 120:8
north 53:17 55:3 55:9 57:20,22 58:1,15 59:10 83:4 135:4,4 191:9 198:15 238:13,21 239:15,16 240:11 257:11 257:11,11 265:17 295:9,16 303:15
northeast 52:10 53:15 85:8,10,24 86:11 87:2,7 186:3,4,7,24 187:12 188:23 189:20 190:4 198:5,11 199:15 200:1 290:15 291:17 302:14
northern 202:18 318:11
northwest 42:3,10 43:2 53:16 88:16 190:14 198:5,14 199:10 199:12 200:1 284:8
notation 25:3
notch 56:10
note 18:4 31:12 161:8 285:10
noted 18:14 21:24 24:15 26:16 39:21 87:17 88:12 90:1 129:10 155:12 158:19 161:12 178:7,22
notes 285:3
Noth- 166:8
notice 46:4,9 87:2 180:6 222:1,7 224:11,22 244:6 244:9 248:20 249:3 268:14,18
noticed 105:13
notices 161:10,17 161:24 162:20 173:17,20 174:5 174:8
November 24:13 81:2 82:2 171:11 172:15 172:16 227:16 229:2 253:19 271:8
NPDES 86:24 125:21 153:3 169:24 170:1 177:13 186:19 206:13 213:24 227:13 245:17 247:1
NRG 130:4 248:20,24 330:7
NRT 147:21 148:11,20 149:17 210:10 287:6,9,20 288:6 288:9,11 289:7 327:5,14,21 330:7,13
NRT's 148:17
nuclear 119:23 120:2
number 4:16 19:19 20:15 25:11 38:5 44:4 44:5,17,18 75:19 89:14 97:24 99:11 123:16 195:24 273:19 284:24 288:17 294:13 303:5 323:7 325:2
numbers 39:22 44:3 67:12 74:20 80:21 323:22 324:13 324:23
NW 2:10

O

O 7:2,2,7,7 67:3 106:20,20 108:16 182:2 287:3,3 327:1 330:4,4
o'clock 1:18
oath 202:12
object 12:9 21:21 44:7 46:11 64:17 65:23 72:16 87:8 91:14 95:19 102:24 103:4 142:16 161:19 189:1,3 194:16 198:16,20,22 262:6 281:11 304:15 328:13
objection 8:21 9:9 9:10,12,19 20:2 26:2,17 28:16,19 31:13,18 45:19 45:24 48:9,13 64:12 71:8 91:18 124:12,15 128:22 129:9 131:16 138:23 140:9 143:16 182:17 213:7 283:12 285:12 315:6,18 316:22 317:14 319:8
objections 8:14,15 285:8,8
obligations 14:9
observations 102:7,17
observe 59:24
observed 240:2
obtained 83:21
obtaining 41:10
obvious 301:3
obviously 16:8 19:4 34:4,20 52:22 66:12
occasion 166:4
occasionally 102:16 226:23
occasions 65:19 97:24
occur 122:7 217:24 266:23
occurred 34:11 72:3 263:24
occurrences 93:10
occurring 41:24 71:19
October 243:22
odor 240:4
off-gradient 92:18
offer 46:19 47:2,4 47:12,24 118:18
office 112:8 278:16
officer 1:15 6:1,5 6:16 8:8,12 9:5 9:11 11:3,6,10 12:14,20 13:9,16 20:8 22:3 26:9 26:15 28:22

31:15,22 32:2,5 32:8 34:2 44:12 46:10,17 47:1,7 47:21 48:8,12,17 48:21 49:4,13,18 50:13 57:23 58:3 61:2,6,10 64:3,6,14,19 66:1,22 71:10 72:18 87:10 91:19 103:2 106:9,15,18 107:7,11,16,20 107:22,24 108:5 108:10 122:16 122:17,21 124:8 124:11,13 129:1 129:2,7 131:11 131:14 137:20 138:19,22,24 140:5,8,10 141:16,18,24 143:4,15 144:5 148:1,4,7 155:10 155:12 158:14 158:19 161:7,12 161:20 178:2,7 178:18,22 179:19,24 180:3 180:9 182:15,18 189:2,8 194:17 198:18,23 199:3 199:6 202:4,6,10 213:3,6,8 219:4 219:9 237:2,3,6 241:19,23 245:10,12 262:8 262:12 263:1,4,8 280:17,22 281:2 281:3,5,9,16,22 282:5,9,13,19,22 283:2,13,16,22 284:3,14,18 285:1,6 286:1,16 287:1 304:19

305:1 309:16,20 315:8,20,23 316:23 317:17 325:11,17 326:21 328:14 329:21,23 331:1

official 130:9

officials 130:9

offsite 63:18 78:17 93:15 126:9,12 206:8

oh 61:8 106:21 118:3 119:22 127:23 148:7 154:7 158:6 166:10 175:10 177:23 179:10 179:18 184:9 189:22 202:22 203:16 206:21 209:21 220:16 245:21 257:2 259:2 275:18 280:21 284:4 299:8 300:8 301:8 307:11,16 310:22 320:15

oil 111:1 237:12

oil-fired 120:23 121:3

okay 8:12 9:5,7 10:15 11:14,20 13:17 14:5 15:5 17:20 18:15 19:10 20:17,18 21:1 22:10 23:6 24:1,8,16 25:5 25:17,20 28:7,13 28:22 31:5 34:15 35:12 36:7 37:16 38:5 38:15 40:4 42:1 43:3 45:13 46:24 51:6 52:4 54:18 55:24

56:14 57:14,19 58:8 60:7,24 64:9 65:11 66:20 67:1,22 68:8,14,15,24 73:2,23 75:17 89:1 100:9 106:15 107:7,24 113:1 129:23 132:18 133:14 134:23 136:10 140:16 141:13 141:19 143:13 143:20 146:7 147:4 148:4,7 150:19 152:3,12 157:5 158:1 160:12 163:19 164:22 174:21 177:17 184:15 184:15,22 186:2 190:1 198:4 199:5 200:12,16 204:5 246:14 247:9 248:5 252:14 265:20 273:1 281:22 282:13 283:16 284:14,23 285:2 285:6 286:16,19 287:1 288:5,18 289:17 290:14 291:16,24 293:12,12 294:5 294:11,22 295:2 295:6,18,23 296:14 297:1,6 297:21 298:18 298:21 299:4,14 299:23 300:2,8 300:13,18,23 301:2,16,19 302:3 303:23 304:4,8 305:4,14 306:9 307:6,17

308:2,21 309:23 310:5,22 311:9 311:11 312:4,4 312:15,19 313:4 313:8,23 315:3 315:16 316:10 316:18 318:19 319:1,16 320:3 320:12 321:9,16 322:11,18,22 323:8,20 325:8 325:10 326:15 328:17 330:21

old 133:14,17 219:12 223:22 261:8,10

older 95:18

once 252:2 256:3 315:5 317:11 324:8

ones 12:5 45:5 94:10,10 187:7 281:19 282:7 329:12

ongoing 14:15 41:9 310:18

Onsite 59:12

open 60:13,14,18 61:17,20,22 62:14 63:5,6 64:1,10,18 105:2 197:21,23 301:4 301:9

opened 260:14

opens 302:2

operate 110:6 111:12,18 119:8 119:8,9 120:1,22 121:19 127:4 232:10 237:11 266:18 278:23 279:6 280:1,3 307:7,20 323:16

operated 120:21 120:22 306:5,7

308:12,12,22

operates 120:20 121:4 236:23 299:12 300:5 323:11

operating 18:20 117:21,23 125:20 128:7 145:24 147:7 168:8 171:12 172:5,12,17 173:6 175:22 176:14 219:16 225:16 227:17 227:21 228:1,17 229:5,9 230:22 231:3,9,21,24 232:4 233:11 241:11 253:20 254:1 255:16 266:16 271:9,13 271:19 272:4 273:6 274:4,23 275:4,6 277:19 300:21 314:23 316:8 329:6

operation 78:21 79:23 144:22 146:6 176:24 206:15 288:3 300:20

operations 78:15 84:24 85:2 113:7 116:4 117:13 120:17 121:7 126:8 135:19 141:15 196:5 237:10 258:9 264:7 301:11,14

operator 119:2 206:23 308:1 311:19,20

opine 181:19

opined 65:4

opinion 11:22 32:22 33:24 34:18 55:15 60:17 92:22 103:14 181:5,10 182:6,12 211:1 216:10,14 230:7 273:24 280:6
opinions 90:4 104:14 180:23
opponent 129:4
opportunities 121:23
opportunity 48:3 76:16 92:3 164:12
opposed 40:3
opposite 113:16 113:16
option 49:3 328:20
orange 53:4
order 41:10 46:5 46:5 60:23 61:1 61:21 62:12 63:22 65:8 69:6 71:20,20 86:23 89:7 98:2 116:13,14 117:11 139:20 139:22 140:1 157:14,16,20,20 160:1,12,16 165:20 212:15 214:10 216:5 230:10,13,20 276:20 277:5 326:3
orders 116:1,1 316:14
orient 49:9
orientation 49:12 52:5
original 29:17 56:19 125:23 179:23 318:5
originally 29:6 316:19 317:3 318:7,9
originating 84:24
outage 119:22 120:2 145:13
outages 151:11,14
outcome 148:17 332:12
outlier 27:23
outline 21:10 22:1 22:6,8 25:4 296:10
outlined 66:19 296:6
outside 10:7 13:3 16:13 17:12,16 257:23 325:24
overall 23:1 33:15 98:7
overflow 206:5 207:12
overflows 206:10
overlap 34:16 259:1
overlapped 289:23
overlaps 26:24 258:24
Overruled 20:9 22:4 28:23 34:3 64:14 72:19 91:20
owned 51:24 302:13 304:2 306:3,6
owner 193:12 206:22
owner/operator's 173:17
ownership 188:24 304:10
owns 189:12 203:18 264:19 299:10,24 300:4 304:5,6

P

P-A-C 182:2
P-O-Z 182:1
PA 112:2,3
pad 312:23 313:7 326:8,12,13,16
PADP 109:14 110:20
page 10:16 11:18 15:6 17:22 18:3 18:10,12 19:16 19:21 20:13,15 21:17 24:2 25:6 25:7,13,13,21 32:4,12 40:8,12 40:13 43:14,14 44:23 53:23 59:11 61:9,11,12 61:21 62:20,24 63:21 67:16 68:9 82:21 96:18 98:24 99:2,4 103:13,15 129:24 130:2,18 130:20 138:13 139:24 150:24 156:6 179:8,17 179:20 182:8 211:1 212:20 214:11 216:5,13 216:15 245:19 245:22 247:11 247:23 248:16 248:19 294:12 327:8 332:5
pages 16:10,10 25:8 48:7 81:9 172:6 176:9 181:16 228:13 231:5 233:9 235:18 254:5 255:12 271:17 274:9
para 249:7
paragraph 31:21 33:19 40:12 61:12,18 103:16 130:3 211:2 214:12 216:14 217:20 327:11
paraphrasing 102:22
parcel 303:7
parcels 303:5
parenthetical 62:9
park 51:20 52:2 58:11 300:6
parking 257:18 258:3 313:11,13 313:15
parse 64:22 105:12 316:2
part 9:13 17:5 33:1,11 37:24 38:2 41:8,23 50:3,16 53:9,10 54:6 57:15 58:1 58:9 76:24 77:1 79:1,3,4 80:1 83:2,14,16 85:11 87:6,13 93:8 98:4,16 104:15 107:5 109:20 113:21 114:8,20 114:24 115:5,9 115:18 116:16 116:20 125:9,10 125:11 127:13 134:7 138:8,18 140:3,4 143:9 144:18 167:23 167:24 170:15 172:1 173:23 176:6 177:9 179:14 184:7,12 184:13 185:1 189:12 206:21 206:22 213:1 219:20 220:18 225:6 226:10 229:20 239:10 241:7,7 245:11 247:18 250:9 253:23 255:9 256:11 258:16 258:19 259:22 271:12 273:21 283:5 288:2 298:11,11 299:12 300:20 304:6 320:20,21
partially 51:24
participate 280:12
particular 24:12 24:13 34:8 39:12,23 51:3 55:23 56:23 68:22 69:12 299:5 327:14
particularly 85:15 86:3 88:21,23 98:6 117:13 151:16 152:21 188:18 229:18 273:17 328:24
parties 332:9,11
parties' 97:7
partly 71:7
parts 254:15
party 129:4
pass 119:5 309:5
passage 170:21
passed 170:13,18 224:8 249:21 269:7 328:10,19
patch 223:14
patching 223:18
pattern 71:1 218:1,1
paved 257:24

PCB 1:10
PE 224:20
peak 120:6 121:4 121:5 237:12
peaker 121:1,4 279:5
peakers 120:22,22
peaking 236:23 237:11
Pekin 204:13 305:15,15,16
pendency 195:4
pending 97:24 162:17,18 163:22 200:23 254:24
Pennsylvania 109:13 110:1,14 111:23 112:15
people 8:9 112:13 116:2 196:2 224:4 239:20 278:24 279:6,10 279:13,18 280:9 306:24 307:2 308:6,8,20 309:7 323:3,6 330:17
people's 172:19 196:7
percent 39:13,13 92:3,20 133:20 240:3 293:7
percentages 74:21 88:2
perform 29:9 70:2
performance 98:18
performed 33:17 70:4 89:7
period 27:17 35:9 37:1 81:22 292:18
periodically 217:24 292:24
permit 18:20 86:24 100:11 110:8,9,11 128:7 153:1,3 160:13 160:17 169:16 169:20,22,24 170:1,2,4,8 171:4,12,16,19 172:5,12,17 173:6 174:5,8,14 175:5,17,23 176:5,7,11,14 177:19,23 186:19,20,23 225:5,16,18 227:12,17,21 228:1,9,13,17 229:5,9 230:23 231:3,9,18,21,21 231:24 232:2,4 232:20,24 233:12 234:4,6 234:10,11,16 235:2,16 236:3,7 245:17 247:1 253:20 254:2 255:1,4,16 271:9 271:13,19 272:4 273:6 274:4,24 275:4,6 318:2
permits 109:22,24 110:5 114:11 174:9 233:23 267:3
permitted 145:2 227:11,12,13
permitting 109:23 110:3,4 113:15 114:8,11 125:21 177:9 329:13
person 47:17 188:1
personal 196:6 306:22
personally 188:10
personnel 210:23
persons 167:3
perspective 34:14 91:6,7 115:8
pertain 60:19
perused 260:4
petition 137:17 178:4,11
petitions 116:22
phase 102:3
phases 91:23,24 92:1
photograph 142:19,20,23
photographs 328:2
photos 290:12
picking 71:13
picture 52:7,15 142:16,18 302:9
piece 167:23 189:12 200:4 304:6 311:7
pieces 254:15 255:16
pin 282:10
pinpoint 282:8,10
pinpoints 282:23
Pittsburgh 112:2 112:5,6,7,14
PJM 118:17,20,22 119:4,9,13 120:1 120:8,13
PJM's 118:19
PJR 119:4
place 11:1 12:3 19:3 29:15 41:12,23 71:23 77:11 92:7 128:6 140:23 145:14,22 152:16 168:9 178:14,16 188:13 192:12 314:12 315:2 316:21 317:13 318:10,12,13 321:3,11 322:1 332:4
placed 126:3,6,13 126:18 186:4 191:12 207:13 258:12 292:8 293:6 325:24 326:17
placement 190:18 257:13 258:7 261:15 276:1 312:24
places 57:7 188:19 260:20 326:16
places/times 119:17
placing 121:18
plain 330:15
Plaines 58:16 59:3 59:8 87:5 133:11 145:5 264:15 296:15
plaintiff 194:8
plan 115:11 150:20 158:9 176:22 201:6,6,7 201:8 208:4 234:20 256:19 264:6 316:19 317:5 318:4,5,20 319:2,5,17,24 320:14 321:2,10 321:16,24 322:2 323:9,18 324:5 328:21
planned 317:11 317:12 318:7,9 319:20 321:12
planning 146:11
plans 121:10 158:9,15,23 171:23 176:17 225:19 232:9,13 233:18 316:20 317:21 318:15 320:1,4,7 321:21 322:13 328:5,7 328:11 329:4,8 329:12
plant 51:1,10 52:6 57:21 129:18 151:8 197:4 205:11 232:11 240:12,17 257:23 290:17 292:19 296:7 297:11,13 306:3 307:21 308:12 308:22 316:7 317:3,4 322:24 324:2,21
plants 45:17 111:11,12,15,15 111:16,18 113:7 114:13 115:11 115:16 130:24 194:3 204:15 315:5,13 317:15
plastic 163:5
play 101:11 309:10
plays 101:20
please 6:11 10:15 11:4 31:23 67:18 71:11 108:7,22 118:7 123:8 128:16 129:23 133:8 148:5 167:20 204:7 249:8 262:9,9 264:12 275:17 280:24 284:4 328:15
plenty 46:12 49:11
plotted 25:23
plume 84:23
plus 23:24 172:24 325:5

point 18:13 19:14 27:14,20,21 29:19 30:8 38:16 40:11 41:19 43:13 45:15 47:8 48:5 51:22 54:12 59:3 61:20 65:20 68:3 72:10 74:3,4 81:15 95:22 110:13 112:19 125:20 141:17 162:16 170:6 179:20 180:1 201:17 266:19 286:13,20 301:10 305:4 306:10 319:21 321:13
pointed 69:13 75:21 97:23 100:5
pointing 35:6 71:5 77:24
points 26:24 28:1 34:11 56:18 194:23 227:11 227:14
poke 196:21
policy 1:5 117:4 275:20
pollutant 177:19
polluting 110:6
pollution 1:1 6:5 110:7
polyethylene 163:4
polygon 294:22
pond 18:12 21:3,4 21:7,8,10,18 22:1,2,6,7 23:1 23:3,9 24:3,19 25:4 32:14 33:9 33:20 34:7,7 35:5 76:4,5 117:13 127:6,8 127:11 136:3,3 136:10,13 138:17 140:17 140:19,21 141:3 141:11 152:6,8 152:11 165:8,10 166:6,7 169:6 171:13 173:7 174:15,16,20,21 175:1,16 176:8 176:11,22,23 177:1,22 178:17 178:20 180:15 180:17,19 181:5 181:10 183:11 183:13 185:2 205:17,19 206:10 219:20 233:15 235:3 241:2,3,3 250:13 250:17 251:16 253:7,13,17,22 253:22 254:1 255:5,6,23 256:19,20,21,23 257:1 258:5 261:8,10,16,17 267:7,11 271:6 289:2 293:17 295:10,12,16 318:20 319:2,6,9 319:13,16,17 320:13,14,19 321:1,2,9,23 328:20
ponds 10:13 12:13 17:14,24 18:9 31:8 33:6 58:19 59:22 60:4 76:10 93:20,21 96:18 114:1,4,15 116:4 117:14,17 125:15 131:4 135:2,6,13,15,18 136:1,15,22 138:16 139:8,21 140:3 142:13 143:22 144:10 144:14 145:8,15 146:10,19 147:9 147:15 148:18 150:3,3,7,8,9,21 151:3,4,11 152:5 153:8,11,24 154:13,20 156:2 156:22 157:7 162:16,22,24 164:1 167:12,17 167:18 168:2,6 195:12,17 196:1 200:18 205:9 211:5,22 219:20 220:13,20,23 223:9 226:2 231:22 233:22 240:19 241:5 242:10,16,19,23 243:3 244:18 246:9,11 247:6 249:11,16 250:21 251:10 262:2 265:13,14 265:18,22,23 266:2,5,8,11,22 267:4,23,24 269:4,5,17 270:9 270:15 271:10 271:14 272:11 273:1,5,9,9 274:5,24 275:12 287:13,14,15,17 287:21 292:12 292:21 293:1 310:19 311:1,2,3 312:13 314:4,11 315:2 316:18 317:2,4,11,15 325:24 327:23 329:6,18
poor 150:7 327:16 327:19 330:9,18
poor,' 211:6
population 323:5
portion 204:3 301:13,15 318:12,12,13
portions 27:2 76:18,19
pose 105:11
position 10:1 14:17 195:11
possession 35:1
possibility 195:4
possible 8:18 70:23 253:1 287:20,22
post-closure 256:4
post-dates 19:6
post-hearing 12:21
posted 171:6 224:11,22 225:21 228:10 254:17
potable 41:18 99:22 128:10,10 128:11 154:18 154:19 155:22 192:23 243:10 267:22
potential 15:20 16:2,2,24 17:12 63:18 89:8,20,23 92:13,20 99:23 102:21 104:6,13 104:23 110:7 127:17 165:18 165:19 171:21 254:14 260:9 261:4 262:19
potentials 224:17
power 51:1 52:6 110:19,21,23 111:7,11,12,15 111:15,16,18 118:8 120:13 151:6,8 187:22 188:1 197:4 204:15 232:11 296:7 297:11,12
PowerPoint 85:19 294:13
Powerton 50:16 51:1,10,14,23 52:21 53:9 55:12 60:13,18 62:15,17 63:7 77:7 90:16 92:23 93:4 96:11,21,24 97:9 118:16 120:15 146:16 158:17 160:23 203:5,10 203:17 204:6,8 204:22 205:2,4,9 205:15 206:1,6 208:15 211:5 212:17 214:9 215:20 217:5,6 217:10,19 219:12,20 221:5 221:16,20 222:1 222:10,14 223:9 224:9 225:9,12 227:19,22 231:22 232:4,9 237:14 272:3 277:18 278:22 298:22 300:2 305:6,8,9,13,16 307:6,8,21 310:1 310:5,15 317:10 317:15,21,24 318:14 324:15 325:22 326:8,14 326:17
Poz-O-Pac 153:9 153:12 181:23

181:23 182:1 216:18 220:24 267:11 288:1,4 290:4,5,8,13 327:14 328:2 330:8
practical 91:5
practice 91:2 102:4 147:7
PRAIRIE 1:5
precipitation 95:4 217:5
precure 152:12
predecessor 110:18
predominant 95:6 102:11
prefer 325:9
preference 162:15 196:6
preliminary 171:24 267:16 328:11 329:5
preparation 117:9 271:13
preparations 227:21
prepare 172:17 176:11,14 226:6 228:17,23 231:8 233:11 234:10 235:19 252:3 255:13 270:17 271:18 274:11
prepared 26:5 172:7,9 252:19
preparing 168:20 230:14,14 255:9
prescribed 66:9
presence 16:15 63:15 277:20 278:3
present 16:15,16 39:14 80:1,7 84:13 90:7 92:5 137:3 159:23 221:17 244:2 268:12
presentation 8:24 13:1,4 38:7,8 40:9 50:11,16 54:22 56:1 68:18 82:21 247:15 248:13 249:14 294:13
presentations 36:18
presented 32:20 33:1 45:11 81:21 82:12 282:11
presents 80:24
preserve 57:8,15 58:12 186:9
press 153:19
presume 184:2 294:8 326:9
pretty 13:10 113:3 127:5 141:17 195:24 230:19 257:22 274:22 295:19 295:21 305:21 325:1
prevent 99:21 311:19
previous 20:3 144:18 224:23 326:3
previously 41:22 66:4 116:6 147:23 155:11 158:15 178:5,21 179:6 217:14 219:6 241:21 245:6,7 246:14 246:16 249:13 283:10,18,19
primarily 44:4 45:5 55:13,15,18
primary 102:6 205:24,24
print 48:6
prior 19:11 44:14 44:15 100:13 136:7 207:1 214:5,6 229:23 255:19 307:24
prison 204:14 305:5,10,19,21 305:22
probable 287:23
probably 125:20 131:5 146:1 152:16 169:8 175:24 179:23 245:17 252:9,10 286:10 287:22 326:13
problem 298:12
procedure 95:4,5
proceed 6:17 9:22 32:9 64:23 106:19 108:11 142:6 143:17 148:8 263:9
PROCEEDINGS 1:14 331:9
process 14:2 41:8 71:22,23 78:23 79:4 83:16 103:18 114:9 151:2 177:7 195:6,18 234:17 239:18 242:24 266:13
processed 177:2,4 177:5
processes 80:5
Proctor 109:6,7 109:10
procure 152:13
produce 117:7 120:19 219:17 241:15 306:14
produces 69:6 133:23
Product 109:9
production 117:5 275:21
professional 20:20 151:20 167:4 224:20 226:7,8 226:12 249:24 251:22 252:1,2 252:19 270:9,14 271:1,24 273:10 290:9 327:24
program 10:24 12:3 78:22 92:17 177:10,12
programs 72:21 314:22
prohibition 41:17
prohibits 312:17
project 2:8 153:2 196:3 219:21 220:1
projected 21:9 22:1,6,7
projects 163:10 163:14 290:11 324:10
prominently 95:1
promise 155:3
promptly 142:3
promulgated 15:1 37:7 234:24 316:13 320:21 320:22
pronouncing 57:5
proof 46:20 47:2,4 47:12,24
proper 205:11
properties 91:4
property 16:18,22 51:2,8 52:6,21 52:23 53:5,10,14 53:20 54:3,7,7,8 54:12 56:10,11 57:21 58:1 72:11 83:5 84:19 85:5 92:8 92:12 105:23 126:7 188:24 189:23 192:10 192:13 193:6,7 193:10,12,14,14 238:12,12 239:2 240:20 265:16 291:3,10 295:22 296:10,11,11,16 296:17,21 297:3 302:4 304:13 306:13
proportions 39:2
proposal 158:8 194:3 220:3 232:22 259:19
proposals 158:5 316:21
propose 14:20 48:23 196:17 259:16
proposed 7:13,15 12:24 13:20 14:6,23 17:5 35:17 36:2,6,24 36:24 37:12,15 37:20 60:12 63:6,24 64:10 93:17 100:3 161:15,16 169:3 172:3 174:17 175:4 193:23 196:14,14 228:6 228:7 234:24 251:6 254:13 255:22 260:5,21 260:23 262:21 269:13 271:22 317:4,7 328:12 328:22
proposing 10:5,9 98:8,14 259:14

protect 117:7
protecting 92:18
protection 13:21 14:3 41:14 109:14 110:15 172:3 179:11 228:7 230:18 254:13 256:10 271:23
protective 42:24 65:2,5,9 66:17 93:14
proven 40:19
provide 49:12 99:7 118:13 120:13 276:2
provided 66:5,6 99:9 101:4 124:5
provides 190:9,9
providing 33:7
provisions 140:4
proximity 104:10
prudent 201:23
Prudently 201:10
pubically 171:8 171:15 236:14 254:18 263:20 283:3
public 58:11 60:4 80:7 112:8,14 173:17 176:16 225:22 233:16 234:3,15,15 235:23,23 239:20 245:17 248:9,10 255:19 301:4,9,20 318:4 322:7
published 36:2,6 38:4 165:24 166:4 194:9
pull 67:15 77:22 80:15 100:4 121:17,23 122:2 134:20
pullouts 283:20
pungent 240:4
purchase 200:4
purchased 186:8
purely 284:10,12
purpose 51:4 77:4 83:11 111:12 141:8 145:7 208:11 220:13 311:17
purposes 91:10 105:15 139:13
pursuant 168:21 186:18 195:17 225:23 226:5 251:19 268:22 269:21 328:22
put 42:22 46:13 56:5 82:21 89:3 122:1 127:9 145:16,21 173:20 195:11 210:24 214:10 216:5 291:18 292:1 309:8

Q

quadrant 52:21 53:23
quadrants 52:20
qualified 167:3 191:1 195:13 198:13 224:1
qualify 168:1 195:14 260:22 262:19
quality 66:7 70:12 90:2 109:18,19 109:20 154:12
quantify 301:10 322:21
quantitative 39:10
quantities 38:20 292:4
quantity 15:10,18
quarry 144:24 145:1 188:9,19 264:23 292:14 292:22 293:2,6,8 306:20 307:5
quarrying 265:3
quarterly 159:19 160:2,6 274:19 277:2
quarters 166:24
question 9:23 10:17 11:9,24 12:10 14:17 21:15 30:3 31:1 33:18 37:17,21 42:5 43:4,23 63:24 65:13,14 71:9 72:17 87:9 90:14,20 101:15 103:1 106:14 114:24 136:10 137:7 149:13 231:7 262:9 267:9 275:5 279:11 284:15 290:14 301:3 302:9 304:23 307:19 308:2,9 308:22 312:5,6 312:19 317:16 319:5 321:1 324:16 325:21
Questionable 150:14,14
questioning 26:3 175:21
questions 7:12 12:12 13:7,12 26:7 30:14 35:13 40:5 41:5 45:16 59:16,18 60:9,10 66:21 67:7 68:1 102:19 104:5 198:21,22 214:23 322:23 325:9 327:3 329:22
quick 43:17 126:17
quickly 102:1 276:7 320:12
quite 21:10 59:5 101:3,4 104:17
quote 125:2

R

R 1:15 7:2,7 67:3 67:3 106:20,20 108:13,16 109:9 287:3 327:1,1 330:4,4
Rabins 246:24
Race 144:19 289:12,18,23
Radlinski 181:19
rail 318:8
raise 6:11 108:6
Raises 129:17
Randolph 1:16
range 91:4
ranges 119:19
ranked 288:23
ranking 288:21 327:10
rare 92:2
rated 211:5
re-cross 106:12 330:3
re-direct 8:18 9:20 66:24 106:23 326:23
re-line 151:4 152:8 162:16 163:24 220:19 220:23 244:18
re-lined 125:19 165:8,10 195:12 214:19 220:7,10 222:15,16 242:15 244:21 244:23 267:7,12 269:2 310:1,4,11 327:23
re-lining 150:21 151:2 152:5 156:22 162:22 162:24 163:10 163:14 167:12 195:17 196:1,3 200:17,18 214:14 219:21 220:1,3,13 242:24 267:4 290:11
re-read 117:11,11
re-redirect 330:2
read 11:15 15:22 75:19 97:7 99:4 115:24 116:3 118:14 129:19 140:16 210:3,22 214:7 246:6 248:8 249:8 262:9,10 289:4 297:17 298:3 330:14
reading 12:16 15:12 100:22 134:19 211:15
ready 108:11 149:14,15
real 43:17 330:19
really 8:19 19:20 27:24 52:14 126:17 136:23 204:14 209:10 259:1 286:19 329:5
reason 37:5 70:1 76:14 79:1,24 97:21 252:23 293:18 302:21

316:11 322:13
reasons 58:22 92:6 94:22 195:22 200:15 200:21 221:11 221:21 282:20 285:8 322:17,19 322:21
rebuttal 286:13 286:15
recall 34:19 43:9 67:8 73:2 75:6 75:23 77:23 85:9,16 86:13,19 88:18 90:10,17 92:21 94:6,12,16 95:14 97:11,17 102:23 103:6 104:7 105:3 116:5 163:11 186:17 187:22 192:3 204:19 209:12,13 214:20 215:2,4,5 215:7 221:7 231:18 250:2 251:7 259:4,18 259:18 260:5 269:5 272:3 273:19 305:7 310:23 311:1 321:8,18 323:19 326:8 328:7
recalling 42:19 183:17
receipt 218:15
receive 58:23 173:21 221:24 244:5 266:13 268:14 312:16
received 136:9,12 161:18,24 217:10
receives 217:5
receiving 207:22
receptor 92:13
receptors 63:19 92:19 93:15 99:23 104:18 105:11 267:23
recertifications 251:2 272:16
recognition 84:22
recognize 92:9 247:10 248:15
recognized 35:2
recollection 129:8 163:15 181:6 185:11 198:2 228:12 230:6,21 235:15 243:7 259:9 290:24
recommend 7:16 10:17 17:4 114:13
recommendation 86:8 138:2,3,10 138:14,15 178:20 179:12 180:15
recommended 7:19,21 10:21,22 14:11 65:4
recommending 7:24 8:3 10:11
record 6:3 8:3 9:14,16 10:7 17:19 26:1,17 33:6 35:23 39:11,15 40:24 42:4 43:5,10,12 43:18 44:11,15 45:10,14 46:12 48:10,15,18,22 49:2,8,16 51:7 59:13 62:10 66:15 75:18,20 79:11 81:22 84:4 95:2 97:7 105:15 106:22 107:13,17 118:14 122:16 122:18,20,22 128:21 131:12 133:2 137:16 141:20 142:1 143:1 144:4,6 155:9 158:15 161:8 178:1,19 180:5 202:11 216:17 219:5 237:1,5,7 241:20 245:9 262:10 263:5,9 280:20 281:6,8,10 286:3 286:7 289:14 290:7 291:9 294:1 306:3,21 309:4,17,21 318:22 322:12 325:14,16,18 330:11 331:2,7
recorded 18:1 82:12
recordkeeping 308:18
records 306:23 307:2 308:5,7,19 309:4,6,8
recreation 298:2 298:15,15,20 300:22 301:18
recreational 204:3 301:14
red 296:18
Redlinski 181:17
redo 98:21 200:20
reduction 322:24 324:2
refer 46:23 68:9 88:24 91:11,15 96:17 103:13 141:2 164:5 185:17 235:12
reference 16:23 19:14 21:11 28:17 34:22 42:18 43:17 44:10 51:16 52:24 61:16 78:20 80:18
referenced 12:2 18:12 35:9 60:22 63:21 65:18 75:11 84:12 96:24 105:14 262:23 325:3
references 63:12 101:5 326:2
referencing 30:21 63:10 80:16 305:12
referred 38:6 65:16 67:14 77:17 92:22 94:8 99:3 106:23
referring 9:8 12:24 16:3 52:18 54:2 59:6 62:23 63:10 167:10 185:20 282:6
refined 329:9
refinery 264:16 264:17 278:9 294:17 295:5,9 295:12,15
reflected 17:9 56:12 93:16
reflecting 33:5
reflective 39:23
refresh 310:8
regard 19:14 31:2 117:3 139:21 176:16 179:12 322:6
regarding 35:18 47:3 85:7,23 170:18 212:15 217:18
regards 98:13
regime 11:1
register 166:2 194:10
regulate 156:10 156:15,17 168:17
regulated 16:14 17:17,18 63:12 213:22 262:20 320:20
regulation 206:11 277:5
regulations 14:19 35:18,23 111:14 147:1 157:4 161:15 162:17 162:19 167:13 195:5 198:9 200:23 207:21 213:22 241:4 256:9 275:22 314:24 316:13 320:10,21 322:15
regulatory 72:21 92:17 113:22 115:2 116:22 146:17 153:23 155:6 160:9,17 185:6 187:5 195:8,10 320:2,2 320:3
reiterate 178:3
related 22:1 36:9 38:13 62:8 68:4 85:1 115:10 135:19 139:8 142:13 147:1 161:10 165:23 175:18 176:2 178:20 180:15 181:10 193:22

220:1 221:7 226:1 227:8 241:5 242:18 251:9 259:19 264:1 275:11 332:8,10
relates 20:2 42:23 65:10 73:5 155:22 195:6 197:8 242:10 254:22 277:20 278:3
relation 154:13 168:20 199:13 271:2 283:2
relative 28:4 30:11,24 31:7 33:6 34:6 39:1 43:2 98:20
relatively 37:1 95:1 127:3 264:17
relevance 21:22 30:14 89:16
relevancy 94:1
relevant 85:16 86:3,6 87:18 88:21,23 89:3,12 93:6 94:3 99:16 101:17,21 104:19 129:4
reliability 128:22
reliable 276:2
Reliant 110:19 111:2,5,22
relied 63:16
relief 66:8 105:16 116:23
rely 70:2
relying 206:16 211:8
remain 41:23
remedial 40:19 41:8 86:7
remediation 78:22
remedies 7:12 35:17 66:8
remedy 7:12,15 9:1 10:1,5,9 12:24 13:3,18,20 13:23 14:6,15,20 14:23 17:10 31:11 32:23 33:24 34:12,17 35:14 38:3 41:23 42:21 60:12 63:6,24 64:10 65:2,3 66:11,16 92:3 93:16 98:8 99:17 105:16 106:5
remember 35:20 38:20 40:10 68:1 77:15 96:12 116:8 180:4 197:24 235:1 256:11 272:8 273:18 282:10,14 287:7 290:18 293:14 302:15 310:4,16 312:23 313:12 321:17 329:2
reminded 272:22
removal 126:21 127:1 174:18 176:19 316:20 317:5,8,9,12 319:3,14,21 320:8,17 321:13 322:3
remove 166:6 178:14 318:11
removed 60:16,20 62:13 74:16 141:6,8 174:22 175:2 193:1 266:12
removing 311:21
renewable 121:15 121:19
repair 224:2 227:4
repaired 86:19 223:14,17 253:4
repairs 223:11,12 223:19
Repeat 307:19
repeating 270:12
repetitive 254:20
rephrase 13:12 31:23 71:11 153:9 194:18 315:9,21 328:15
replace 311:6
replied 10:20
report 13:24 15:6 15:24 17:22 19:5,17 21:16,16 21:24 26:3,12 30:16 31:7,13 32:4,12,21,24 34:11 40:8,11 43:13 47:16 50:1 53:1 56:19 59:11 60:22 62:9 67:15 69:3 94:9 96:15 98:12,24 128:5 181:15 211:15 252:4,5,6,11,12 252:15 270:18 270:19,20,22
reported 1:21 153:19 330:17 332:2
reportedly 327:16 327:19 330:9
REPORTER 11:12 144:1 307:9
reporting 113:18 113:18
reports 114:12 128:3 187:16 252:8,19 270:24
repositories 130:23
representative 72:2 143:3
represented 30:8
representing 2:13 3:13 332:10
repurpose 175:15
repurposed 317:8
repurposing 319:14
request 157:14,23 175:6 212:5 220:2 230:8 243:4,16 276:18
requested 230:4 248:11 262:11 267:17
require 14:7,20 96:7 167:22 169:18 192:20 230:3 256:9
required 99:12 146:21 152:9 153:2 160:1,17 169:12,20 171:1 175:19 193:5,12 200:8,13 207:22 251:3 277:5 308:19 309:5
requirement 155:6 160:5,9,13 160:18 176:6 201:8 244:18 270:7
requirements 86:24 99:11 163:20 165:1 167:7 185:6 229:11,20 256:4 272:13 320:2,3
requires 10:2
research 58:9
residential 54:16 54:19 55:10 299:19,21
residual 125:1 166:1
residuals 156:11
resolve 165:18 268:17
resolved 162:20
resolving 105:2
resource 41:18 99:22 120:4
resources 121:19 124:2,3 187:9,12 228:22 300:5
respect 24:18 31:3 33:9,12 63:14 76:10 98:6 105:13,24
respond 8:16 48:3 48:4 154:22 162:5 222:7 284:2
responded 169:8
Respondent 3:13 142:4
Respondent's 4:17 5:2 6:8 123:3 124:14,16 128:18 129:11 132:22 137:10 139:2,4,15 140:12 179:1 182:20,22 212:7 213:9,10 285:16 285:21
responding 11:24
response 12:1,22 26:10 74:15 103:9 156:19 157:10 161:17 179:11 180:14 180:21 224:9 244:8 318:4

328:12
responsibilities 113:10,14 114:1 114:6 115:10
responsible 110:8 300:24
rest 16:5 27:16 203:14,18
restated 66:4
restoration 14:3
restrictions 171:21 192:20 224:18 228:5
result 40:2 99:11 105:20 170:15 218:3 220:16
resulted 15:9,17
results 14:2 43:8 45:11 69:18 73:4 75:2 81:1 90:1 105:21 159:8,10,22 171:24 172:2 175:23 176:3 183:18 184:1,20 185:9 190:21,23 221:16,20 222:2 233:6 244:1,5 254:13 259:7 267:20 268:11 268:15 276:24 277:1
retaining 146:12
retired 120:24
retrofit 208:5 232:14,15,17,22 233:2,8,20,22
retrofits 318:16
retrofitted 207:18
returned 316:16
reuse 89:8 94:24 126:9 174:19 176:19 177:21 178:12 180:19 182:14 206:8 233:15 256:22 256:24 257:4,5
reuse' 131:2
review 16:5 73:15 96:6 103:21 110:9,9 114:12 117:15,17 138:9 144:16 146:9 147:14 173:24 179:15 196:19 217:22 226:11 226:18 252:8,18 270:22 288:7 309:6
reviewed 18:17 19:9 21:22 74:14 86:5 100:13 148:23 149:1 196:23 234:18 250:1,5 290:10 304:2 306:24 307:2 308:7 328:1
reviewing 75:7 242:11 308:5,19
reviews 287:6 309:4
revise 285:13
revisit 164:23 187:4
Richard 123:13
right 6:7 18:6,22 22:13 25:5,14 27:7,12,14,18 36:3,20 40:13 45:1 48:22 50:14 52:21 53:11,17 54:1,18 54:22 55:2,5 57:6 58:8 63:23 65:17 69:1,14 87:21 107:12 108:6 110:2 118:7 135:16 142:1 143:13,16 144:6 150:23 152:6,7 155:19 156:16 170:3 184:9 185:3 187:5 207:16 226:24 237:7 245:4 255:24 262:13 264:6 269:18 273:2 289:17 290:23 291:7,13,19 292:10,14,22 293:21 295:10 295:14 296:18 296:18 299:11 300:13 302:22 302:23 303:3 304:8 307:6 311:13,23 313:17 314:2,5 314:12,16 316:21 322:15 323:19 324:13 325:4 326:22 329:24 330:13 331:2
risk 30:24 33:17 65:10 76:24 90:4,8 93:9,13 98:5,21 99:21 101:17 104:16 104:22 105:11 105:24 130:11 130:13 200:20
river 55:9 58:16 58:16 59:4,8 87:5 133:11 145:4,5,7,11 187:14 188:8 189:20,24 292:13 293:5 296:15 302:23 303:8
RIVERS 1:6
road 2:3 133:10 133:12 190:8,9 204:12 301:24 304:11 324:8
roads 52:13
roadway 52:10
Rockdale 132:6
role 101:11 105:5 109:15 113:21 115:18 116:20 118:22 126:19 173:23 184:18 226:10
rolling 238:22
Romeoville 203:3
Room 1:16
Ross 6:8 46:10
roughly 21:7,20 22:9 23:5,23 27:9,14 32:19 52:9 82:4 94:17
Route 133:11 278:8
routine 141:14 250:7 288:3
row 261:7,18
rows 261:1,2,3
RUINING 1:7
rule 98:13 114:17 114:21 115:1 116:23 166:15 166:16,24 167:8 167:18 168:2,22 169:1,2 170:13 170:21 197:10 197:19 206:13 206:14 214:1 224:8 225:14,24 229:4 249:21 250:22 251:14 251:14 260:5 269:7,18,20,22 269:23 272:6,22 328:10,12,19,23
rulemaking 36:9 37:19 98:1,2,17 293:23
rulemakings 293:18,20
rules 9:3 10:12 14:12 15:1,3 19:2 31:14,19 36:2,6,24,24 37:3,4,23 38:2 50:4 73:1 98:19 113:6 114:8,17 114:18 115:6 125:9 126:15 131:5 136:8 140:22 157:3 165:24 166:1,4 167:22 168:10 169:7,18 170:18 193:23 194:4,24 196:2,14,15 197:12,14 209:3 209:11,12 214:1 226:6 229:12,24 241:7 251:3,20 260:23 262:21 270:2,4,7,10 272:14 275:23 276:10 315:1,1 320:5,6,7
ruling 105:12 129:9 285:14
run 98:21 118:10 119:1 120:9 151:13 200:19 320:11
running 52:10 276:2 324:8
runoff 96:22 217:3,6,9,23 218:5,7,18,19
runs 52:9 57:20 57:24 119:6
Russ 2:9 4:4,6,10 4:12 6:16 7:8,11 8:2,16 9:6,7,22 9:24 10:15 11:3

11:5,8,14,19,21 12:15,19,23 13:10,14,17 14:5 14:16 15:5,13 16:1,7 17:11,20 18:3,8,15,22 19:10,12,19,23 20:5,12,16,18 21:1,6,13 22:10 22:15,22 23:2,6 23:14,19 24:1,8 24:16 25:5,10,17 25:20 26:9,11,20 27:4,12,16 28:7 28:13 29:4 31:5 31:17,23,24 32:4 32:7,10 33:18 34:15 35:12,22 36:3,7,12,17 37:8,11,16 38:5 38:15,22 40:4,18 42:1,11 43:3,21 43:24 44:12,13 44:21 45:3,13 46:1,13,24 47:5 48:13,14,23 49:7 49:15,20 50:5,15 50:19,24 51:6,13 51:18 52:4,12,19 53:2,8,14,22 54:9,18 55:1,8 55:24 56:5,14,24 57:14,19,23,24 58:8 59:9 60:3,7 60:17,24 61:3,4 61:8,11,17 62:3 62:24 63:4,23 64:5,9 65:11,20 66:20 67:6 69:13 70:14 71:5,8 72:16 73:3,14,20 75:6 75:21 77:12,24 85:9 87:8 88:15 90:10 91:14,18 92:22 93:19 94:8 95:19 96:9 97:12,16 98:23 100:5,10,18,22 102:20,24 103:3 103:4,6 104:5,8 105:1 106:11,13 106:17,21 107:6 107:8 124:11,12 128:21 129:10 138:22,23 139:1 140:8,9 142:15 142:19 143:13 161:19 182:17 182:19 189:1,4 194:16 198:16 198:19,20,24 213:6,7 247:24 262:6 280:19 281:2,11,20 282:1 283:23 284:20 285:24 286:8,21,24 287:4 304:20,21 305:3 307:11,15 309:12,21,22 315:9,10,21,22 316:1 317:1,16 318:18 319:7,15 325:8,19,20 326:20,22 328:13 329:19 330:1,2,5,21

Russ' 71:13

S

S 4:15 7:2,7,7 106:20,20 108:13,13 287:3 287:3 330:4,4

S-H-A-R-E-N-E 108:3

S-H-E-A-L-E-Y 108:4

safe 6:10

safety 269:10

saith 7:6 108:15

sample 39:12,16 39:23 73:4 142:22 221:10 274:19

sampled 95:24 136:21 166:10 190:18 211:21 211:23 274:21

samples 42:16 274:20

sampling 82:3 90:11 115:15 159:3,5,15 160:20 166:24 190:20 218:17 221:4 243:21 268:7 274:18

sand 22:17 101:7 102:10 174:24 311:16 313:21 314:1

sanitary 239:15 239:16 240:5,6 264:15

Sargent 182:7

sat 144:18

saw 12:11 86:10

saying 11:16 41:7 72:13 303:8 311:1 315:4 316:3

says 12:3,12 15:7 16:1 22:15 46:6 51:10 53:5 55:3 55:4,7 59:12 257:12 288:21 288:22,24 289:1 298:4,14 299:17

SB-09 269:13,14

scale 23:13 30:9

scanning 82:9

scene 192:6

schedule 151:16 151:17

scheduled 236:15 263:21

scheduling 151:3 151:6,9,13 152:17

school 112:11,12 112:13,15,17,17

Schools 112:14

science 109:1,1

screen 23:18 69:10 82:22 132:18 134:19 135:1 145:17 183:6 195:1 196:10 211:1 214:10 216:6 217:13,22 236:24 238:9 246:2,8 247:4 257:11 258:21 275:9

sea 18:6

search 128:10,11 128:11 296:24 297:3

searched 297:2

seasonal 218:1

seat 132:7

second 27:20 38:8 47:6 96:18,23 103:14,16,16 112:15 141:10 178:19 207:7 211:2 235:8 237:2 249:6 286:22 297:23 298:6,24 300:3 301:6 304:24 327:13

Secondary 209:22 209:24 210:15 211:7

Secondly 316:13

seconds 9:8,23

section 15:7 16:5 19:24 20:22,24 21:9 22:7,8,13 23:11,24 34:8 61:14,19,22 62:12,15 98:24 99:5 211:2 294:14 296:14

sections 172:9 318:10

see 11:20 18:1 19:20 22:12,20 27:3 30:13 31:18 38:3 39:10 40:15 45:4 46:21 50:19 52:17 53:6 55:1 56:2 57:3 60:10 61:14,16,21,23 62:17,21 63:3 69:2 73:15 78:8 81:5,16 82:10,23 135:1 138:5 181:17 182:8 183:7,8 184:17 185:9,20 186:11 189:16,21 190:17 211:10 216:8,20 218:8 236:11 237:22 240:6 247:24 248:6 253:11 257:12 258:21 287:14,15 288:4 288:19,24 290:8 291:9 293:12 294:21 295:3,4,8 297:23 303:4,7 303:15 311:22 312:1,3,9,11,13 327:10

seeing 20:10 56:8 70:14 84:23 102:6 135:23

seen 20:19 26:4 42:6 44:1,6 46:2 46:20 47:11 91:8 148:13 184:16 199:19 234:6 238:11,12 271:1,1,3,3,5 290:20 310:23
seeps 168:7 252:24 271:6
sees 311:6
seismic 224:18
semantics 309:10 309:11
Senate 168:14,15 169:3,9,12,13,14 170:5,16,16 225:1 234:23 251:6,10
sense 73:13 188:2 188:6,12,13,20 291:18 292:1,8
sent 126:9,12 292:13,21
sentence 40:14 41:1 103:17 211:2 214:11 216:15 249:7 327:13
separate 43:4 101:10
separation 34:5
September 138:7 267:5
series 9:1 42:13 81:1 83:13 198:21
serve 88:6,14 90:7 101:12
serves 101:21
service 127:9,10 152:16 178:16 207:13,14,16,17 209:17,18 210:16 211:17 211:23 212:24 222:16 266:12
set 332:4
sets 320:10
settlement 194:7 194:11,12
Settling 210:15 211:7
Sharene 4:8 107:23 108:3
Shealey 4:8 107:23 108:3,4,6 108:20 117:1,9 117:20 118:20 122:24 124:20 129:15 130:14 131:8,19 132:13 134:1,11,23 137:23 139:8 140:19 142:3,9 145:16,23 148:13 151:5 155:5,15,17 158:22 159:7,13 159:24 161:14 161:23 165:11 171:14 172:4 173:5,9 174:16 176:7 179:5 180:20 183:2 184:14 187:2 188:21 193:18 194:20 197:8 200:24 201:24 202:11,15 203:4 204:5 210:2,18 210:24 211:17 212:11 213:14 213:18 214:15 214:20 215:13 215:22 217:2,8 217:15 219:1,12 220:12 221:6,18 221:23 223:1 225:12 227:20 228:16,24 232:5 232:8 233:7,18 236:8,10,17 237:13 238:5,11 239:13 240:18 241:10 242:2 244:3 245:4,15 246:1,16 247:9 247:17 248:21 249:6,12 250:20 251:4 253:23 255:7,8,21 257:8 257:10 258:8 259:4 260:3 263:11,23 265:12 266:14 268:13 271:11 275:8 277:9 278:13 279:20 280:15 286:9 287:5 309:23 325:12,22 327:4 327:13,17 328:4 328:9,18 330:24
sheet 38:7 164:5
shining 121:21
ship 264:15 278:10 294:18
Shore 239:15,16 240:11
short 37:1 48:19 106:12 107:14 109:18 202:8 263:6 309:18
shortened 46:8
show 21:2 24:9,17 26:2 44:24 80:23 84:3 85:18 136:24 175:11 185:12 189:22 237:18 240:22 259:10 265:9 303:21
showing 196:12 210:13
shown 20:23 21:16 22:6,8 25:16 27:17 51:8 53:12 133:12
shows 20:6 23:16 25:10,14 53:9,15 68:19 304:18
shut 236:21 237:9
side 6:10 52:9 53:18,24 81:11 113:16 192:7 239:22 240:1 253:6,12,17 257:12 264:16 295:21 296:15 299:16 301:21
sides 312:1,3,12 312:12
SIERRA 1:3
signed 315:1 316:15,16
significance 31:11
significant 115:7 115:8 233:13,17 234:13 235:21 235:24
significantly 325:6
signify 296:22
signing 164:7,8
silty 22:16,17 101:7,7 102:9,10
similar 14:17 17:7 24:3 25:2 90:16 114:24 195:11 200:17 207:11 211:21 224:16 228:19 231:5,7 233:14 237:13 254:8 256:20 267:9 269:23 270:2 271:20 272:2 283:9 329:18
similarities 37:4
similarly 197:18 242:8 312:11
simple 117:6 166:17 198:1 297:19
simplification 121:16
simply 33:4 199:1
simultaneous 164:10
single 47:16,17
singular 190:5,6
sir 58:4 64:7 179:23 180:8 283:17
site 10:24 16:12 17:8 32:23 37:18 50:20,23 56:11 58:18 59:10,24 62:19 63:2,15 72:6,8 78:7,21,22,24 83:17 91:9,10,21 92:5 96:2 98:7 100:2 105:10 129:18 133:15 133:17,19 142:22,23 146:12 238:17 238:18 239:9 240:17 242:5,5 258:15,18 292:13,21 311:5 323:10,13 324:5 325:23
sites 7:13 17:2 37:18 39:3 62:17 66:16 91:13,17 95:21 106:6 131:7 142:21
situation 119:15
six 172:14,16,19 229:6,9 272:7,7

272:10
sixth 130:2
size 91:4
skew 75:2
skewing 74:6
slag 22:19 101:5 257:13 258:6 261:15 262:5,16
slide 8:24 38:8 40:10 50:17 51:5,17 52:4 53:3,5 55:2,11 55:12 56:1 57:2 59:18,19 85:19 85:23 88:24 89:4,5 134:11,24 134:24 135:8,8 135:21,23 141:2 142:17 143:7,8 145:18 159:12 165:22 166:13 170:12 183:4 193:16,17 196:11 203:8,8,9 204:24 205:7,7,8 205:12,13,13 207:6 213:16,17 217:12 219:2,3 219:18 221:14 222:11 224:5,6 224:13,13,23 229:1,13,13 230:22 235:12 236:10 237:17 237:17 238:4 240:21 241:9,18 242:7,7,17 243:1 243:13,13,23,23 244:13 246:12 247:10 248:14 248:14,15 249:19,20 250:12,12 251:5 251:13 257:9,9 260:2,7 261:18 263:12 264:11 265:8,8,12,20,21 266:15,21 267:1 268:1,9,21,22 269:12 274:4 294:12,15 296:3 297:7 298:23 302:8,9 303:13 310:6
slides 50:11 145:18 183:3 213:15 247:18 248:3 281:1
slightly 24:14 27:11 74:20 127:4 250:9 272:18 274:13 301:9
sliver 302:13 303:20
slope 68:22,23 69:17,20,21,23 86:16 87:5
slopes 67:11
slow 11:4 198:20
sluice 293:9
sluiced 145:11 188:8 293:5,8
sluicing 293:7
small 80:19 206:8 270:5,6 292:4 297:18 299:16 299:20,21
smaller 121:2,3
smudged 288:15
snapshots 45:21
software 69:6 70:2,3,4,5
soil 38:23 39:2,9 39:11,16,20 40:1 42:15 65:22 84:13 86:21 87:3,20,22 88:1 88:4,13 185:12 193:1 259:4
soils 42:24 101:6
solar 121:21,24
sold 118:17,18 131:2
solid 68:21
solution 190:5,7
Somebody 224:1 327:20
somewhat 171:1 272:17
sorry 12:9 15:11 19:18 20:11 31:17 39:8 40:5 44:18 61:9 62:22 67:22 68:12 72:12 75:13 100:6,8 103:3 106:21 107:20 116:13 117:16 133:4 134:16 135:10 141:9 142:15 146:15 156:3 158:7 166:10,18 175:8 177:24 184:11 189:3,18 196:6 197:7 198:16,17,19 202:22,22 203:22 205:19 210:8 212:11 223:23 227:13 237:9 242:21 245:21 247:14 251:24 252:9 256:14 257:21 258:2,18 264:24 266:10 269:3 270:2 279:24 280:21,22 299:8 300:8 301:8 302:18 305:15 305:24 307:9,11 307:16,18 310:7 311:4 313:6 318:5 319:4,11 320:15 322:6,16 324:16 330:15
sort 113:12,12 119:20 121:16 153:1,2 170:6 185:21 195:10 201:8,18 212:6 223:18 265:15 276:20 297:2 302:10 309:8
sound 116:11 141:19 226:22 271:4
sounds 12:20 141:19
source 7:16,18 9:3 10:2,14,18,21 12:1,4 13:2 14:21 16:24 38:18 39:24 42:15 88:7,10,14 91:12,16 101:12 101:22 110:7,12 165:17 181:11 185:14 246:10 246:11 247:7 249:10,17
sources 7:22 15:20 16:2,3 17:9,12 83:24 92:4,10,20 110:5 192:23 277:23
south 3:6 53:17 54:20,24 55:3,4 55:10 239:13,22 240:1,20 264:21 264:22 265:4,18 297:4 304:14
southeast 39:7 76:4
southern 87:6,13 240:10 318:12 318:13
southwest 52:10 53:15 78:11 191:10,12,15,23 198:6 200:2
speak 8:9 11:13 17:16 29:23 39:6
speaking 9:10,12 28:24 30:5 42:9 114:6 126:2 135:22 136:18 171:18 180:13 181:7 182:11 227:24 232:23 246:17 249:22 260:19
specialist 109:18 109:19,21
species 190:6,7
specific 8:24 14:1 16:11 35:7 57:18 58:6,6 63:11,21 88:14 89:17,17 92:16 94:17 95:15 111:14,16 114:4 119:11,11 169:6
specifically 11:24 17:16 42:20 56:17 57:12 58:6 59:2 60:1 60:22 62:23 77:18 92:10 111:17 113:13 152:2 224:10 250:2 251:15 260:10 310:17
specifications 98:18
speculate 298:4
speculation 262:7
spelled 182:1
spelling 108:2
spend 168:8 300:19,20
spent 195:24

spill 153:21,22
spoils 187:14
spoken 99:15 288:8
spread 285:8
spreadsheet 260:17 262:3,17
SRP 16:19 72:7 72:24 92:7
stability 167:2 171:3,22 224:18 228:4 254:11
staff 246:19 331:4
stage 148:2
stand 142:3 202:11
standard 70:10,12 70:20,23 71:2 76:21 80:11 82:5 137:17 138:4 163:7 175:6 177:24 178:5 179:13 180:7 212:4,16 245:2 248:11 256:11 257:3,3 259:20,21
standards 13:21 14:4 34:5 41:14 90:2 104:20 157:1 172:3 228:7 230:18 239:11 254:14 256:11 271:23 272:21
stands 175:12 177:15
start 7:13 11:9 15:14 67:5 108:20 112:23 147:13 150:20 152:4 166:15 186:2 201:3 286:22,24 292:15
started 81:2 111:5 147:11 219:15 244:22 290:21 326:4
starting 17:22 43:14 50:16 120:16 136:3 158:1 205:16 320:13
starts 40:14 130:4 303:10,10 304:11
state 8:15 10:11 14:8,13,19 33:4 34:7 35:18 36:9 37:9 40:20 51:14,20 52:2 95:11 109:17 113:17 114:19 130:9 131:5 133:2 137:15 145:2 149:10 151:20 173:2 178:11 189:12 209:11 214:1 241:6,8 246:7 247:5 249:8 270:7,10 300:6 300:10 302:16 304:5,6 305:21 306:1 311:10 315:1 320:5 322:14,14
stated 15:23 63:13 66:3,10 73:7 85:14 127:12 161:23 169:14 188:7 229:15 231:12 277:18 306:19,20 322:16 325:13
statement 68:5 103:24 117:6 130:18 166:17 167:11 216:11 330:8
statements 131:9
states 55:12 97:9 103:17 130:8,22 149:7 195:1 211:3 214:12 216:6,16 217:22 248:19 327:14
station 9:15 15:21 25:19 59:5 76:18,19 77:14 78:7,11,13,15,18 79:1,5 80:1 81:13 83:2,15,20 118:15,16,16,17 121:11 126:6 127:5,7,24 131:20,24 132:16 133:6,9 133:22 134:13 135:3,5,19 138:4 141:15 142:10 142:13 143:23 144:21 145:10 145:24 146:16 146:16,16 152:4 158:17,17,18 160:23 161:2,5 163:11,24 176:24 178:5 186:8 188:17 192:8 195:7 196:5 197:9 201:2 202:2,16 203:2,5,10,11 204:8,22 205:2,4 205:9,15,17 206:1 210:22 217:7,19 219:13 222:10 225:13 227:22 232:9 236:9,9,12,15,18 236:21 237:15 237:21,23 238:2 238:6,14 239:1 239:14,22,23,23 240:2,7,19,24 241:11 242:6,14 243:9,12,18 244:6,10,15,17 246:9 247:1 248:11 251:11 253:6 256:23 257:6,12 261:5 261:17 263:2,12 263:14,16,21 264:5,9,13,22 265:6,10,14 266:16 267:18 267:21 268:4,15 270:3 277:17,18 278:22,24 279:4 279:7,10,14,18 294:18 296:11 312:21 313:2 317:22,24
station's 223:20 237:10
stations 14:12,24 15:3,8,16 33:2,7 34:9 38:14 41:22 72:1 77:7 77:8 99:14 104:6,10,12 114:2 116:18 117:21 118:21 120:12 121:10 121:12 122:6 125:13,16 126:2 126:13,22 127:1 127:4,15,18 132:10 134:9 144:11,14 146:10,14,14 148:22,24 149:3 151:6 155:18 158:12 160:3 161:11 165:4 187:22 188:2,2 199:22 200:9 204:19 237:14 242:9 254:8 267:10 269:15 271:21 275:12 276:2 277:10,11 277:12,17 278:2 278:14,18 280:10 290:5 314:23
statistical 69:5
status 135:24 186:7 209:3 235:2 254:22
statutes 275:15 279:23
statutory 160:5 160:18 185:5
Staying 35:14
steam 177:7
stenographic 332:2
step 165:11 293:19
steps 195:15
stewardship 147:8 220:19
stipulate 143:1
stipulates 138:16
stipulation 97:8 118:15 140:16 159:4,20,21 171:10 174:12 209:23 210:3 211:12 214:7,8 215:19 216:23 217:4 220:6,9 221:3,14 225:7 227:15 229:1 236:13 243:20 243:24 250:13 250:16 253:19 255:2 263:19 266:4,7,11 268:6 268:10 271:7
stipulations

210:21 263:24
stock 300:15
Stone 144:24 145:1 188:9 292:14,22 293:2 306:20 307:4
stop 68:24 190:12 315:5,11 323:22
stopped 236:20 292:19 316:8 323:1 324:2,18
stopping 141:17 190:7
stops 303:10 304:12
storage 121:13,14 121:22 122:3,9 147:2 264:7 279:9,13 314:4 314:16 316:4 323:10,13,14,23 324:6,8,10
store 121:18 122:1
stored 60:19 126:3,6 258:1 292:12,20 313:16
stormwater 177:3 186:20,22 257:6
straight 289:10 318:23
strange 128:5
strategies 106:5
strategy 17:5 34:13 91:22 100:2
streams 111:19
Street 1:16 3:6 295:20 299:17
strenuous 176:13
strip 297:11 303:12
structural 166:21 167:2 171:3,22 224:18 226:21 228:4 254:11
structurally 226:21,22 271:4
stuff 113:20 152:23
subdocket 197:21 197:23
subject 62:1 63:4 103:21 114:2,5 125:17 127:2 131:4 132:10 135:16 136:2 138:18 140:4 155:18 158:12 165:4 213:1 243:3 269:18 270:6
subjected 278:14 278:19
submission 236:2 244:4 254:21
submit 221:19 232:18 234:4,19 267:2 276:24 277:1 322:8
submitted 158:7,7 158:8 159:22 171:11 174:13 175:19 221:15 227:16 230:24 234:2 235:6,11 235:14 244:1 253:20 255:3 268:11 271:8 274:5 277:6 329:11,13,14
submitting 110:11 255:19
Subpart 125:10
subscribed 332:13
subsequent 91:24 91:24,24
subsequently 86:17,18,19,23
substantial 15:9 15:17 228:19 231:11 254:9 255:15 271:21 274:12 300:21
substantially 70:17,19 74:22
suburb 112:2
sufficiency 66:15
sufficient 66:7,7 153:14,14 229:19
suggest 39:22 325:1
suggesting 55:19
suggestion 74:1
suggests 33:21 218:3
suitable 277:13
SUITE 2:10 3:7
summarized 44:19
summary 43:15 44:23 45:3,9,12 69:7 73:16
summation 45:11
sun 121:20
sunny 122:2,3
Superfund 238:20 240:17
superimposed 52:23 83:6
support 41:10 69:7 84:21 110:10,10,10 113:6,18 136:15 175:3 180:21 232:21
supported 34:12 280:8
supporting 33:17 45:8
supportive 100:2
suppose 292:3
sure 11:14 16:7 21:10 23:2 26:11 29:24 31:1 36:20 45:19 47:5,7 48:17 59:5 67:19 92:18 135:11 147:9 184:6,7 194:8 195:24 197:13 202:6 230:19 235:9 239:19 248:9 256:15 257:22 263:4 280:1 284:3 293:22 295:19 295:21 296:4 299:1 301:7 303:3 305:21 306:7 308:9 315:11,22 317:20 326:10
surface 20:3,6 33:3 34:22 54:4 104:11,13,19,22 124:22 125:1,15 126:4,11,21 136:4,11 138:17 140:17,20 163:20 168:21 169:15 170:18 173:11 185:3 193:23 205:23 208:18,20,24 209:2,5,6 211:18 213:2,20 216:1 218:20,22 220:3 225:10 231:17 250:14,17 256:21 259:23 260:1 265:24 266:5,8 276:5 326:18 328:6
Surge 205:21,22 207:11,13 208:17 211:6 222:15 225:8 227:18 228:2 232:16 233:19 234:11 312:6,10
surprise 47:19 194:4
surrounding 45:16,21 49:22 49:24 50:8 58:10 59:12 60:8 132:21 277:10
survey 304:17
surveyed 130:10
Sustained 31:16 64:4 87:11 161:21 262:13 316:24
swear 6:12 108:7
swell 22:4
sworn 6:15 7:6 108:9,15
symbol 27:3
synthetic 95:3
system 58:7 110:11 119:2 151:21 152:13 152:13 167:22 167:24 174:19 174:23 175:12 177:19 180:17 181:21,22 190:8 208:7 233:2,3,3
systematic 147:12
systems 233:5 327:15

T

T 3:3 4:5,15 7:7 67:3,3 106:20 108:16,16 287:3 327:1,1 330:4
tab 122:13 123:7 128:15 139:12 147:22 179:6 181:1,1,13 182:3

288:17
table 38:10,12 45:4,12 80:18,19 80:20,23,24 81:7 81:9 82:12
tables 44:20 45:9 69:7 73:15 94:9
TACO 16:19 39:21 72:7,23,24 92:7
tact 153:17
take 13:20 19:3 37:2 41:5 46:19 46:21,21 47:23 47:23 48:15 60:9 64:20 71:20 75:4 98:1 102:22 106:11 127:9 149:12 151:11,13 165:11 202:5,20 274:10 285:10 286:21 299:1,1
takeaway 170:7
taken 1:14 16:17 41:10 48:20 71:23 107:15 141:23 202:9 206:8 207:14,16 263:7 309:19
takes 14:1 64:20 103:10,11 163:11
talk 17:23 32:13 288:5,11 289:6 289:18 290:2 330:12
talked 10:3 29:13 31:7 32:16 43:7 43:11 62:18 116:1 144:19 190:1 290:4 306:24 307:2 308:8 330:16,17
talking 16:23 42:3 45:18 49:10 52:15 53:24 59:7 73:24 100:18 104:18 114:17 142:10 144:11 165:12 195:18 210:22 247:22 281:20 283:23 288:14 291:10 296:1 308:6,20 309:6,6 311:5 313:10
talks 33:19 61:12
tallied 44:13,14
tanneries 80:3
tannery 78:21 83:17,19,21 239:3,7,8,9 242:5 258:15,18
tannery's 259:3
tanning 78:20 79:23 80:5 84:24
target 14:1 103:7
tasked 65:1
tasks 244:14
TCLP 95:4
tear 223:13 311:6
tears 223:11,15
technical 64:21 67:7 110:10 148:11 289:8 327:5 330:7
technically 201:20 201:22,23
technology 77:2
tell 23:23 52:14 78:17 79:14 84:14 102:14 119:13,17,18,21 149:13 170:3 259:1 298:5,14 318:14
tells 119:7,10
temporarily 292:12,20
temporary 312:24 314:4,16 316:4
ten 202:7 216:6 244:22,24 272:8 272:11 321:13 322:3 325:13
ten-minute 202:5 263:3
tend 40:2
Tennessee 153:20
term 28:19 110:1 112:12 118:1,2 124:20,22 312:23 316:5 318:6
terms 27:23 38:1 58:20,21 74:24 83:20 93:9 125:4 297:19 302:20 314:3,8 314:10 315:16 316:3
test 89:11,14 94:14,18 106:24 106:24 107:3
testified 9:2 34:21 75:18 87:18 144:19 181:9 192:1 204:17 231:16 251:5 269:13 277:16 287:17 291:18 293:22 310:14 310:23 318:21 323:8 330:10
testifying 214:21 246:2
testimony 8:6,10 9:8 47:3 54:17 62:4 74:15 78:19 85:12 91:12,16 102:3 103:1 117:10 183:15,17 184:8 184:13,14,17 204:20 251:7,9 269:14 276:12 284:19 293:16 302:12 315:7,19 317:15 319:9 326:3
testing 30:23 42:16 67:8 70:22 75:8,23 77:6,14 81:1 89:18,23 96:11 106:3
tests 43:6,15 44:2 44:4,24 45:5 73:6 94:21
thank 7:8 11:6 17:20 18:15 21:1 22:10 23:6 24:1,16 25:5 26:18,19 27:12 28:7 32:6,10 36:7 38:15 40:4 42:1 44:22 45:14 47:12 48:22 50:14 51:18 54:9,18 56:24 65:11 66:20,22 80:6 102:18 106:7,9 107:8,12 108:1 119:3 122:22 123:23 124:13 131:16,18 134:22 135:18 137:21 138:24 140:10 141:21 142:6,8 143:16 143:17,20 148:8 155:13 156:5 158:20 166:3 178:8,23 180:9 182:18 184:15 185:16 194:18 199:6 202:7 213:8 219:9 227:3 237:7 241:23 245:12 252:15,17 259:2 280:15,17 285:24 286:1,20 287:2 289:17 294:11 298:12 299:14 301:19 304:8,23 313:8 313:23 319:18 326:22 328:4 329:24 330:22 330:24 331:8
Thanks 20:18 32:3 61:10 106:16 142:2 291:16 315:23
that'd 32:3,5
thee 46:6
thereabouts 249:14
thickness 163:8
thicknesses 163:6
thing 39:13 48:6 82:14 114:7 281:19 288:15
things 33:20 71:3 113:13 115:24 121:5 152:21 173:19 175:8 176:15 224:21 228:8 235:22 239:11 273:11 280:9 302:10
think 9:14 11:23 14:22 22:3 30:5 30:8 36:17 41:4 43:18 44:11 52:18 53:3 55:17,19 59:19 62:6 63:8 65:13 67:15 71:5 73:19 74:4 75:19 85:13

88:20 96:14 99:3 104:16 109:12 110:1,18 111:2 112:19 113:9,20 116:13 117:24 125:10 128:6,12 129:8 130:21 131:14 133:10,18 137:2 138:12 143:5,20 147:11 148:17 150:15,16,17 154:11,11 172:8 175:20 176:18 177:18 187:2 189:22 194:10 194:23 196:16 198:10 205:5 208:3 209:9 226:24 228:24 230:16 234:1,14 240:15,16,17 244:22,22,24 258:17 259:1,12 260:10 262:4 269:1,1 274:19 276:19 278:8 286:5 287:9,23 288:14 290:19 291:17,21,23 293:16,23 294:14 295:9,11 298:11 299:24 300:24 301:23 302:18 303:24 303:24 304:9 310:23 316:9,11 317:8 319:23 322:12 323:4,17 324:19 325:9,13 326:2,7 327:18 330:9

thinking 8:13 35:15 116:15 141:9 307:14

thinks 262:4

third 61:12 182:3 208:9 217:20 321:21

Thirty 256:7

Thompson 1:16

thorough 73:11 73:11

thought 61:9 73:12 276:8 300:8,9 307:16 311:5

thousands 280:9

three 16:10 17:1 46:7 47:9 99:14 135:7,12,15 136:1 144:10 173:1,2 185:18 185:21,24 197:9 197:15 318:16 319:24

tied 121:5

Tier 39:22

time 9:17 13:23 14:1 25:22 26:5 29:17 35:1,7,10 37:2 97:22 98:3 100:13 103:10 103:11 104:3 109:16,19 117:1 118:11 120:21 134:19 141:10 144:20 146:5,24 151:6,15 153:4 154:2 155:3 156:7 157:5 163:15 164:15 168:19 169:23 187:22 196:7 207:3 209:12 214:3 219:19 230:5,8 240:3 245:3 246:24 267:15 273:16 274:2,3 278:12 286:17 289:14 289:21 292:11 292:18 299:1,2 319:12 332:4

timeline 145:19 145:21 146:7 150:24 153:18 168:11 219:5 235:13 241:20 242:3 274:20 310:5

timelines 283:18

timeliness 281:18

timely 9:14

times 38:6 65:15 66:11 80:11 82:5 99:16 120:7,7 193:19 263:18 319:24 320:1 322:5

timing 98:12 164:7

tired 286:5

title 109:22 332:5

titled 78:6 129:17

today 6:2 18:18 31:9 43:24 87:22 104:7 120:12 133:21 141:3 200:7 284:9 293:11 311:14 323:6

told 89:19 128:2 170:8 174:21 304:1 319:11 327:23,24

tomorrow 286:10 286:11 325:10 331:7

tool 283:8

top 18:3 23:18 40:12 70:9 81:4 128:7 138:5 167:5 171:5 173:19 182:8 205:16 246:21 248:18 265:17 301:10 318:15

topic 35:14

total 44:17,18 67:24 68:18 73:4,8,18 74:2,7 74:11,12,16,24 75:3 123:15

totality 106:4

totally 29:24 312:4

touched 176:18 187:3 201:12 276:11

toxicity 95:5

track 36:8 270:11

tracks 52:13

traditional 16:19 17:7

trail 57:20 58:7,11 59:9

train 52:13

transcript 1:14 9:17 245:16 285:9 332:6

transitions 122:5

transportation 133:19,19

traveling 190:10

treat 95:20

treated 282:17 285:4

treatment 208:14

trees 186:10

trend 25:9 30:23 43:6,7,15 44:2,4 44:24,24 45:5,11 67:7 69:20,21 70:22,24 73:6 75:8,22 77:6,14 106:2

trends 44:19 70:23 74:23,24

triangle 23:17,21

tributary 218:4

trick 21:14

tried 284:16

truck 278:7

true 26:13 31:9 126:7 127:6 150:13 160:23 161:1,4 204:22 253:3 267:17 311:10 324:19 332:6

try 13:12 316:2

trying 13:1 21:15 26:11 29:4,7 40:6 61:4 92:19 93:19 312:22 326:6

turn 10:16 15:5 50:15 55:24 59:18 61:11 62:24 75:12 122:12 123:7 128:15 129:23 130:20 134:23 135:8 137:8,24 138:13 139:11 145:17,18 147:22 149:8 159:12 166:13 170:11 179:5,17 180:24 183:2,3 190:14 191:9 193:16 196:10 205:12 209:14 210:9,11 212:12 212:20 213:16 214:9 216:4 217:2,12 219:2 224:5 229:13 236:8 237:17 238:4 240:21 245:5,22 246:13 247:10 248:5 249:19 257:8 260:1 275:9

298:22 323:9,12 327:4,7,21
turning 17:21 24:2 25:6 52:4 139:24 180:12 190:16 208:8 216:13 219:18 224:13 238:24 241:9,17 242:7 242:17 243:1,13 244:13 246:12 248:14 250:12 266:14,21 268:1 268:21 288:13 294:12
twice 74:2
two 12:12 16:10 24:21,22,24 28:1 33:20 36:13 41:19 48:14,16 52:13 58:14 60:9 71:2 116:1 120:1 146:2 173:18 188:11 197:11 220:13 225:18,19 230:16 233:5 237:11 240:23 261:4 266:19,20 302:10 320:24 323:11 327:3
type 17:8 55:23 72:9 91:9 145:13 160:1 207:4 289:1
types 41:21 55:21 121:23
typically 42:18 174:4
typo 179:23 180:6

U

U 7:2
uh-huh 141:12 235:5 303:6
327:12
ultimate 89:16
ultimately 39:20 88:3,5 89:10 162:6,20
unacceptable 90:7 92:14 104:22
unclear 22:1
undergoing 83:17
underneath 222:23 312:13 314:1
understand 13:2 29:2 31:18 46:7 49:14 52:6 72:13 74:3 84:17 111:7 133:14 261:11 288:10 309:12
understanding 29:2 33:15 36:1 44:10 50:5 51:23 64:24 73:24 83:12 105:22 118:4 124:21 125:7 126:7,20,24 127:20 147:5 152:9 153:8,11 164:6 183:18 196:24 201:3 211:13 216:22 220:24 249:15 261:21 262:15 267:10 282:23 291:5 327:18
understood 19:12 187:13
unequivocally 322:17
unfortunately 85:3
unit 17:18 64:21 64:21 119:11,14 121:3 152:16
188:16 196:15 196:17,18 197:1 197:11 229:15 229:16 260:10 261:6,7,19 279:5 320:20
unit's 151:16
units 16:14 17:13 17:17 63:12 118:9,10,12,13 119:1,8,11,23,24 119:24 120:9,23 120:23 122:9 140:24 141:1 146:2,3 151:10 151:11,12 194:1 236:24 237:11 260:11,21,22 261:4 262:19,20 266:19,20 273:2 294:3,7 321:22
universe 260:10
University 109:3
unknown,' 211:8
unlined 167:18 168:5 207:3,21
unnecessary 157:2
unreasonable 104:22
untimeliness 46:22
untimely 48:1
unused 97:5
unusually 27:23
update 283:18
upgradient 30:21 76:9,18 78:12,14 82:18 83:24
upper 56:2
upstream 190:10
upward 74:23
usage 121:15 127:11 147:15
use 41:17 45:16 45:20 49:2 50:8 50:11 55:23 58:11 59:4,13 60:8 72:8 74:11 79:3 83:14 99:19,21 110:23 140:21 146:3 147:2 176:2,23 196:7 206:2 207:3 222:23 300:10 301:11 301:13 305:18 318:5 329:16
useful 15:18 28:14 66:7 71:17 77:2 96:1 98:6
USEPA 114:22 156:8 161:15 165:23 167:13 186:23 191:6,21 193:21 197:10 260:5,21 262:4 262:18 278:20
USEPA's 194:3 197:11 260:9,20
uses 49:22 50:1 55:21 58:10 59:14 131:3
usually 91:22
USWAG 194:21 262:22 293:14 294:2
utilize 71:20 76:16 77:3
utilized 69:6 93:13

V

vague 21:11 57:22 194:16 316:22 328:13
vaguely 282:9
Valley 153:20
valve 296:12
Vanessa 331:3
variance 230:4,8 273:14,15,22 274:1
variations 34:23
various 74:21 80:5 105:11 163:6 290:5
Vegetation 253:14
Vermont 2:10 57:7
version 80:17
versus 25:22 34:7 73:4 74:24 94:5 272:16
vicinity 22:24 23:2 32:17 59:15 132:14,16 264:8 267:23 305:5
violation 60:15 61:14 62:6,12 63:5 65:7 105:7 105:13 161:10 161:17,24 162:19 169:9 222:1,7 244:5,8 248:20 249:3 268:14,18 278:16,20
violations 60:13 60:18 61:18 62:15 63:6 64:1 64:10 105:2 279:22
Virginia 299:17
visit 59:24
visited 50:20,22 131:22 148:22 148:24 149:2 173:13 239:21 239:22 240:1 253:5,11,12 263:15
visits 146:12
visual 49:2 281:15

310:20
visuals 284:7
VN 248:20
VNs 167:12
volume 85:10 86:3 88:16 89:2 93:20
voluntary 157:24 160:21 276:16 276:21 277:4
vs 1:10

W

W 7:4
wafts 240:4
wait 157:3 325:9
waiting 230:13
want 15:5 25:12 29:1,20,23 40:23 43:13 46:21 47:22 49:1,8 51:6 58:24 59:13 69:1 71:22 80:18 98:12,19 106:24 134:23 149:8 154:12 156:6 161:8 165:11 166:13 179:7 190:14 191:9 195:20 196:7 198:22 201:16 201:18 209:14 210:24 213:14 214:20 216:4 217:2 219:1 224:5 236:8 245:4,22 246:13 247:9 248:18 249:19 251:4 257:5,8,20 263:11 280:3,4 280:12,13,19 286:4,7,21,23 288:11 291:8 293:20 301:7 327:7 330:10 331:2
wanted 45:14 49:2 73:10 147:8,22 157:3 180:1 184:10,16 202:16 290:24 295:23
wanter 161:10
wanting 200:4
warning 174:23 174:24 311:12 311:14,17,24 312:2,7,10,14,17
warranted 96:1 98:4
wash 208:13,14
washes 208:15
WASHINGTON 2:11
wasn't 43:17 45:10 51:4 77:19 86:3 88:22 89:2 189:11 229:16 230:2 267:14 276:19,20 281:24 290:22 292:20
waste 111:19 156:11,16,18 174:19 176:23 177:1,9 178:17 180:19 207:23 239:20 256:22
wasted 200:20
wastewater 239:18 257:7
water 23:8,16 34:22 104:6,11 104:13,20,22 109:19 125:6 127:18,23 128:10,11 130:10,13 166:11 177:2,4,5 177:5,6,8,9 192:23 204:3 209:17,18 210:16 211:17 211:23 213:1 218:6,17 222:16 239:20 243:10 243:11 266:13 267:22 300:16
waters 208:14
Waukegan 13:18 13:21 14:6,9,23 17:3 30:6,11 31:4 39:7 59:18 59:22 77:14 78:7 80:12 81:10,11,13 83:20 90:11 97:13,20 118:16 120:15,16,20 121:9,11 122:6 146:16 158:17 161:1 236:9,12 236:15,18,23 237:10,15,21,23 238:1,5,13 239:1 239:14,20,23 240:2,19,24 241:11 242:6,14 242:16 243:3,9 243:11,17,22 244:2,6,10,15,17 246:9 247:1,16 248:11,20,24 249:16,21 250:3 250:14,17,20 251:11 253:3,5 253:22 254:1 255:6 261:5,17 262:16 277:17 279:2,4,9 297:7 297:11 308:10 313:9,24 318:19 322:23 323:9,11
Waukegan's 120:17
way 17:10 21:14 44:14 72:8,22 74:6 77:23 90:20 102:15 104:2 111:6 121:15 143:1 150:14 161:16 189:23 196:7 201:1 275:23 280:2 294:10
We'll 141:20 281:9
we're 13:11 107:16 141:20 144:6 331:7
we've 9:15 283:12 319:23
weather 121:20
weathering 29:20
Weaver 181:4,7,8
website 45:21 143:11 171:7,15 171:16 173:11 173:15 174:1 225:22,22 228:11 231:17 254:18,19
websites 173:17
week 44:15 193:19 283:11 322:7
weekly 167:3 224:19 226:3 250:7,24 251:16 269:24 311:1
weeks 225:20 234:5
weigh 285:10,17
weighted 55:22
wells 16:21 24:22 25:11,14 27:1 30:14,15,21,22 33:16 41:17 54:5 71:6,14,15 71:17,20,22,24 72:14 73:16 75:7,22 76:1,3 77:3,5,13 81:2 81:10,10,13 82:9 82:13 83:13 84:19,21 93:14 154:15,18,19 155:2,22 157:8 157:12 159:16 183:5 184:2 230:17,19 231:14 243:11 243:17 250:3 268:5 273:19,21 274:17 276:13
went 62:9 74:15 85:22 99:20 145:6 163:9 236:24 306:20 307:4 318:7
weren't 45:17 55:18 58:22,23 71:16 77:13 281:17 289:14
west 1:16 51:9,17 52:20 54:8 55:4 55:9 59:7 78:21 79:23 83:7 84:19 85:1 133:14 192:2 204:6 239:1 241:3 242:6,15 249:10 250:17 253:22 255:6 256:19 257:1 258:5,5 261:16 261:16,16,16 265:16 296:15 304:12 318:19 319:2,6,9,13
western 53:23 79:4 83:1 192:7

192:7 265:15 301:15,21 302:1 303:11
wetland 297:20
whatsoever 188:4
whichever 232:6
white 56:2,6,12,15 56:18 83:4
wide 30:9
Wiedenhaupt 1:21 332:1,21
wildlife 51:15,17 52:3 55:9 203:17,24 301:3
WILMETTE 2:4
wind 121:21,21 121:23
window 295:5
winter 152:18,23
witness 4:2 7:5 26:5 28:17,20 49:9 50:2 107:18 108:8,14 137:13 142:4 189:10 198:17 248:1 298:8 307:13 317:19 319:10
witnesses 6:13 130:12 286:15
wondering 29:12 31:10 32:21 33:23 55:14 316:5
word 55:18 90:15 128:5 155:4 226:24 227:3 297:17,24 298:17 310:24 327:22
words 101:1
work 8:17 50:10 65:15,22 66:5 109:5,11 113:19 114:12 144:2 151:4 152:9,22 156:21,22 157:2 160:13,16 200:20,20 230:12,14 263:17 275:10 276:6,8 330:19
worked 111:6 114:10 151:5 152:24 187:21 188:1,10 223:2 275:19 280:10 289:7,20 295:4
working 34:13 111:21 112:23 276:4,9 289:14 326:5
worried 286:17
wouldn't 45:4 201:18 288:2 291:18 314:15 325:6
writer 247:1
writing 110:8,8,9
written 151:24
wrong 118:1 133:13 180:7 211:16 248:23 295:12 301:12 319:12 320:24

X

X 4:1,15 7:4,7 52:14 53:24 54:13 67:3 106:20 108:16 287:3 327:1 330:4

Y

Y 108:13
Yard 217:3,5,9,9 218:5,7,18,19
yeah 9:24 11:19 12:14 13:9 20:21 26:15 28:12 31:24 32:2 42:11 43:21 46:1,17 47:21 48:11 49:13 56:24 66:1 67:13 68:14 73:17 86:14 89:5 100:23 111:11 113:20 116:12 116:12,15 122:15 131:15 137:6 141:4,14 141:18,20 142:19 143:4 144:20 151:12 152:7 154:2 164:16 166:10 167:21 168:16 170:2 179:24 180:2 183:23 184:15 189:8 194:22 196:18 197:17,22 198:23 201:18 203:2 207:5 224:4 232:1 233:16 249:1 252:9,17 260:12 260:15 273:23 277:22 280:12 282:11,14,15 284:4,4 288:17 289:24 290:3,3 294:15,24 296:8 297:23 298:10 302:6,24 303:14 303:16,19 307:3 308:6,6 309:16 310:10 313:14 319:23 325:5 328:24,24 329:20
year 116:8 120:24 154:4 226:5 235:14 251:19 315:15
years 26:13 27:9 28:3 36:13 46:18 94:17,19 95:16 103:22 112:18 114:10 119:18 194:12 194:14 195:12 219:14 234:23 244:22,24 256:7 256:9,12 276:6,6 276:8 277:19,24 283:5 287:7 291:14 319:22 320:24 321:14 322:3 327:15
yellow 296:5,9,9 299:16
Yep 19:23 23:14 23:19 25:10 40:18 51:18
yesterday 6:3 8:7 8:11,20,22 9:9 12:11 13:1 18:24 28:15,20 29:5,7 30:3 31:3 35:15 36:18 41:5 42:2 43:7 46:9,14 54:17 62:5,18 63:2,9 63:13 67:6 71:5 71:13 73:3,18,24 74:15 78:20 79:5 80:7 85:12 86:5 94:5 104:17

Z

zero 156:4
ZIP 123:20
zone 35:4 93:4 296:22 299:5,9
zoned 134:15 265:10 283:4 284:12 297:5,21 299:18 303:2 305:19
zones 302:22
zoning 134:2,4,8 134:13 204:18 205:2,3 237:15 237:19 238:1 265:6 277:9 281:14 283:2 284:11 295:24 296:4 297:6 298:23 302:7,21 303:4,5
zoomed 24:3

0

0 68:23 69:21,21
0.002 70:18
0.01 70:12,20
06 151:1
084-004725 1:22

1

1 70:11,20 75:14 78:4,4,4,6 89:14 90:1 118:15 136:3,3,15 138:13,16 139:9 139:21 140:3 148:12 166:6 211:2,22 275:21 288:24 327:11
1:10 141:21 142:2
10 3:6 27:9 78:1 156:7 164:2,3 195:24
100 1:16 92:3,20 133:20 219:14 240:3 277:19,24 283:5
1004 2:3
106 4:6
11 159:12 164:6
1100 2:10
110671 80:22

118355 75:12
118382 75:20
118492 78:5
12 165:22 217:4
12(d) 61:14 62:12
123 4:18
124 5:3
125661 19:16,21 20:12,16 100:17
125663 24:2 25:13
125665 25:7,22
128 4:19
129 5:4
13 97:8 103:13,15 166:13 215:19
13-15 1:10 6:6
13-15_110872 79:12
13-15_110879 84:4
1310 77:23
1314 75:11
132 4:24
1331 79:7,13 80:16,21 84:3
1332 18:17 100:5
135th 295:20
137 4:20
139 4:21 5:5
13th 6:4
14 6:2 10:17 11:18 11:19 84:8,10 170:12 221:3
140 5:6
1409 178:21
14th 1:17
15 25:14 183:4 221:15
1501 137:16 178:6 178:10
1518 5:11 285:4 285:13,15,19
15th 331:7
16 11:18 17:22 18:10,12 21:17 32:4,12 193:17 213:4 227:15 271:7
1601 4:18 5:3 123:4,9 124:10 124:14,17
1602 4:19 5:4 128:17,19 129:12 131:13 131:15
1603 4:20 5:5 137:9,11 138:21 139:2,5
1604 4:21 5:6 139:13,16 140:7 140:11,13
1605 4:22 5:7 179:2,7 182:16 182:20,23
1606 4:23 5:8 212:8,12 213:5,9 213:11
1607 4:24 5:9 132:23 133:4 134:12 141:3 150:24 165:22 166:14 170:12 183:4 193:17 196:11 203:8 205:1,8 213:15 219:3,19 224:6 229:14 235:13 236:11 237:18 240:22 241:9,18 242:18 243:2 247:19 249:20 261:19 263:13 265:21 266:15 268:2 281:1 285:11,16,22
168 4:9
17 17:23 18:4 88:24 89:4,5 196:11 250:13
1702 85:19 96:19
179 4:22
17th 212:19
18 250:16
182 5:7
18th 139:23
19 27:21,22 203:8 203:9 236:13
1920s 241:12
1923 241:12
1955 266:17
1960s 278:2
1970s 214:6
1992 242:3
1999 126:8 187:15 209:24
1A 161:9
1N 24:4,19 76:4 265:19 266:2,8 266:11 273:1,5 273:17,21 274:5 274:15,24 320:13,14,19
1S 76:6 265:19 266:2,8,12 273:1 273:5,18,21 274:5,15,24 321:1,2
1st 171:11 172:15 172:16 174:13 227:16 229:2 253:19 255:3 271:8 322:9,9

2

2 25:14 75:22 140:17,19 141:3 141:11 152:6 171:13 173:7 174:15,16,22 176:8,11,22 177:22 178:20 180:15 181:5,10 256:21
2,000 80:11 82:5
20 27:22 170:12 204:24 225:7 243:20 264:3 298:23
20005 2:11
2002 146:8 242:8 266:22
2003 242:13 244:23
2004 96:11 242:13
2005 42:14 146:8 148:10,11 190:18 211:3 242:8,20 289:9 289:14
2006 211:3 242:20
2008 152:3 153:19 219:19,24 267:1
2009 243:2 267:6 267:15
2010 54:4 156:8 158:2,3 159:6,23 160:7,10,14,20 161:16 220:5,6 220:10,15,16 221:5,11,17 243:22 244:2 266:12 268:2,8 268:12 276:13 310:12
2011 32:17
2012 15:7,15 163:19 164:3,3 164:13 167:12 201:13
2013 97:4,10 215:21 216:7 245:21 268:22
2015 81:2 112:20 142:11 165:23 166:9 224:7 247:3 249:20 276:9 291:12 328:23,24 329:3 329:4
2016 140:24 146:6
2017 82:1,3 143:9 209:23 211:12 220:5,9 266:11
2018 116:11,15 195:2,4 293:13 294:2 329:4
2019 18:14 61:7,8 65:8 116:10,14 116:14 141:7 168:12 211:1 214:11 216:5,14 224:24,24 251:5 269:12
202 2:12
2020 27:14 28:6 103:15 195:2
2021 81:3 129:22 138:7 170:13 171:11 207:2,23 227:16 229:2 247:16 249:15 253:19 271:8 323:5 329:3
2022 18:21 118:14 140:16 159:4,20 171:10 174:12 174:13 212:19 214:7 215:19 217:4 221:3,14 225:7 227:15 231:1 236:13,16 236:20 243:20 243:23 250:13 250:16 253:18 255:2,3 263:19 263:22,23 266:4 266:7 268:6,9 271:7 274:7
2023 1:18 6:2 139:23 236:17 332:14
2024 262:24
2030 323:17
20s 241:14
21 11:19 23:17

24:13 81:23 82:4,10,12 205:7 205:8 243:24
21(a) 61:19,22 62:6,15
213 4:23
214 5:8
21st 129:22 148:11
22 98:24 120:24 205:13 207:6 209:23 253:19 264:3
22nd 138:7
23 15:6 85:19 99:4 213:16,17 255:2
23615 149:9 210:13 211:9
23616 149:9
23617 149:9
24 263:19 266:7
25 219:3 261:2,3,7 327:15
2500 128:12
251-5250 3:9
257 125:9,10 206:22 241:7 250:9
26 219:18 220:9 261:2,3,18 266:4
27 310:6
28 221:14 268:6
282-9119 2:5
285 5:9,11
287 4:10
29 7:14 9:1 42:3 73:20 85:8 118:15 120:15 131:20,24 132:16,20 133:6 133:9,21 134:14 134:15 135:3 137:17 138:4 139:21 140:17 142:10,13 143:23 144:21 145:4,8,19,23 146:15 152:6 153:11 158:16 159:5,23 160:23 165:6 166:3 171:13,15 174:15,17 176:24 177:3 178:5 181:5 186:8 188:8,18 192:8,10 195:7 197:9,20 200:9 219:22 220:6 221:7,12,19,21 221:24 222:12 224:5,6,16 228:20 233:14 237:14 268:10 278:1,7,7 279:17 292:12,17 293:1 302:7 306:19 317:7,9
29's 144:22
296-8800 2:12
29976 245:24
2A 161:9
2S 17:24 21:18 32:14 265:19,23 266:5 267:4 269:2,4 271:10 271:14 272:11 274:13,24 321:9 328:21 329:17

3

3 75:22 129:24 130:18 136:10 136:15 138:17 139:9,21 140:3 140:17 165:8,10 166:7 183:13 185:2 211:22
3.143 250:19
3.2 15:7,13 99:1,5
30 9:8,23 224:14 229:1 256:9,12
31 229:14 230:22 235:12
312 2:5 3:9
31st 18:21 231:1 245:21 274:7
32 15:6
327 4:11
33 50:17 53:3,5 55:2 236:10
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34 147:24 148:6 210:10 211:9 237:18 288:16 288:18 297:8 327:5 330:7
35 125:11 238:5 266:9
36 240:21
3600 3:7
37 241:9,18
38 241:18
39 52:5 53:23 211:1 214:11 242:7
3A 161:9
3S 17:24 21:3,4,7 21:9,18 23:1,3,9 32:14 265:19,23 266:5 267:4,7,11 269:4 271:10,14 272:11 274:13 274:24 321:23

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4 75:22 130:20 159:4 302:9 303:13
40 39:13 125:9 206:22 216:5,15 242:17 286:4
41 62:20,24 216:13 243:1
415 140:18 225:10 250:15,18 266:6
42 243:14
43 243:23
44 244:13
45 286:4
46 246:12
47 247:10
48 248:15,15
49 249:20 251:5
4A 161:9

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5/3.13 250:18
5/3.143 140:18 225:11 250:15 266:6
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503 1:17
51 40:8,12 257:9
517 67:21
52 260:2,7 261:18
54 263:12 264:11
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57 265:20,21
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581 22:9 23:23,24 27:17
582 28:10,12
582.5 18:13 21:18
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584 27:6,11,13,18
584.1 18:5,14
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60 39:13 163:7,8 267:1
60-milliliter 220:7 220:11
60091 2:4
601 304:17
60603 3:8
61 268:1
613 158:16
614 158:16
615 158:17
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62 57:2 268:9
620 239:10 256:11
621 155:11
63 59:11 268:21
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648 245:7,11 249:13 283:21
649 246:14,17 249:13 283:21
65 146:1,2 294:15 294:15
66 19:18
663 143:9 145:20
664 219:6
665 241:21
67 4:5
6th 103:15

7

7 4:4 135:9,21,23 141:2 159:21 174:12 188:16 212:21 219:2
70s 214:5
71 59:19
711 217:14,16,21 245:6 283:21
73 10:16 11:18 82:21
75 59:19

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8 145:18 188:16 225:8

81 68:12
815 67:20
81505 43:14
81507 44:24
81517 67:16,19
81535 68:13
81536 68:9
845 114:8 125:11 138:18 140:4 170:15 172:1 176:6 206:21 213:1 225:6 229:20 241:7 259:22 273:21 320:20,21
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845.20 266:9
85 44:24 45:4
86 61:21

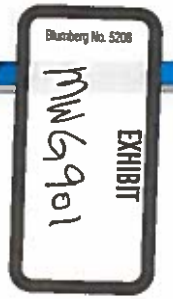
9

9 150:24 168:14 168:15 169:3,13 169:14 170:6,16 183:8,12,19 184:20 214:8 225:1 234:23 251:6,10 292:13
9's 169:9,12
9-2 19:16,20,22 20:6,11
9-4 25:13
9.2 100:17
9.4 80:20
9:00 1:18
9:05 13:11
92 61:12,12
93 55:11,12
99.9 293:7

Exhibit 34

Sierra Club Environmental, et al. v. Midwest Generation, LLC.

Respondent Expert John Seymour



John Seymour

Geosyntec consultants

engineers | scientists | innovators

- Geosyntec Consultants, Chicago, IL
- M.S. Civil (Geotechnical) Engineering
- B.S. Civil (Soils and Construction) Engineering
- Professional Engineer licensed in four states
- 40 years of experience
- 14+ years experience with CCRs
- Experience at dozens of CCR Ponds and Landfills
  - Siting
  - Site Investigations
  - Design
  - Construction
  - Closure
  - Remediation
- Qualified Professional Engineer under the CCR Rule

Resume 2018 Updates

- **CCR Surface Impoundment Closure Plan, Illinois:**
  Engineer and project manager to develop closure plan of CCR pond complex for submittal to Illinois EPA
- **CCR Surface Impoundment Closure Design, Illinois:**
  Engineer and leader for design of CCR pond complex including new closure concept
- **Groundwater monitoring system CCR Assessment, Ohio and Kentucky:**
  Assessing eight CCR units for compliance with US EPA CCR rule (40 CFR 257)
- **CCR sites, Ohio, West Virginia, Michigan:**
  Project manager to investigate various CCR landfilled areas
- **Site Remediation Program, Illinois:**
  Project manager for investigation of brownfield property under Illinois' SRP
- **Landfill site, Illinois:**
  Project manager to prepare application for groundwater management zone

Overview

- Common Factors
- Assessed site conditions for each facility
  - Site history and surroundings; ponds and how ash was handled
  - Groundwater elevations -> groundwater flow
  - Groundwater conditions and other ash data
  - Updated with additional data to 2017
- Compared bottom ash to groundwater conditions for each facility
- Risk Analysis

Overview

Common Factors

Common Factors

- Old sites = from 1920s/"youngest" is 1965
- 1978 Poz-o-Pac or other liners
- **MWG's actions 1999-2013**
  - Pond relining project
  - CCAs (GMZs, ELUCs)
- Wyoming Coal
- **On Site Data/MWG coal ash constituents**
  - Samples of bottom ash from ponds
  - Samples of historic ash areas
- No risk to potential receptors

Common Factors – MWG Actions 1999-2013

- Pond Relinings
  - Reviewed construction documents
    - Subgrade
    - Liner installation/60 M HDPE
    - Leak detection
  - Contractor dredging procedures
- 2013 CCAs
  - GMZs
  - ELUCs

Analyses of Bottom Ash From MWG Ponds

Generating Station:	Powerton		Waukegan		Will County
Sample Date:	May 2004	March 2007	July 2004	July 2004	December 2010
Sample ID:	Bottom Ash	Bottom Ash	Bottom Ash-1	Bottom Ash-2	3 South Bottom Ash
Methods 6010B/6020/7041A/7470A/7841 (mg/L)					
Antimony	<0.003	<0.0060	<0.0060	<0.0060	<0.0060
Arsenic	<0.010	<0.050	<0.050	<0.050	<0.050
Barium	0.39	0.27	0.19	0.12	<0.50
Beryllium	<0.004	<0.0040	<0.004	<0.004	<0.0040
Boron	0.087	<0.10	1.1	2	1.3
Cadmium	<0.002	<0.0050	<0.005	<0.005	<0.0050
Chromium	<0.010	<0.025	<0.050	<0.050	<0.025
Cobalt	<0.005	<0.025	<0.050	<0.050	<0.025
Copper	<0.010	<0.025	<0.050	<0.050	<0.025
Iron	<0.050	<0.10	<0.10	<0.10	<0.10
Lead	<0.005	<0.0075	<0.0075	<0.0075	<0.0075
Manganese	<0.010	<0.025	<0.050	<0.050	<0.025
Mercury	<0.0002	<0.0020	<0.0020	<0.0020	<0.0020
Nickel	<0.010	<0.025	<0.050	<0.050	<0.050
Selenium	<0.010	<0.050	Not Analyzed	Not Analyzed	<0.050
Silver	<0.005	<0.025	<0.050	<0.050	<0.025
Thallium	<0.002	<0.0020	<0.0020	<0.0020	<0.0020
Zinc	0.044	<0.10	<0.10	<0.10	<0.10
Method 9056 (mg/L)					
Sulfate	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	49
SM 2540C (mg/L)					
Total Dissolved Solid	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	200
Sources:	MWG13-15_11356	MWG13-15_10951	MWG13-15_12814	MWG13-15_12815	MWG13-15_14712-13

Potential Leaching Characteristics of Historical Ash in Fill Materials

Generating station:	Joliet #29	Powerton	Will County
Sample Date:	July 2005 KPRG	May 2004 Andrews Engineering	June/August 2015 KPRG
Sample location:	15 soil borings from former ash placement area	8 ash samples from test pits in the Limestone Runoff Basin	20 soil borings at the Will County site
Findings:	-high degree of statistical certainty that the criteria established in 415 ILCS 5/3.135 (formerly 415 ILCS 5/3.94) a-5(B) are met and that the material may be considered CCB for engineering/ beneficial reuse	Metals were less than the IEPA Class I groundwater standards except selenium and chromium (2 wells); no impacts of selenium or chromium above groundwater standards	High degree of statistical certainty that the criteria established in 415 ILCS 5/3.135 (formerly 415 ILCS 5/3.94) a-5(B) are met and that the material may be considered CCB for engineering/ beneficial reuse
Sources:	MWG13-15_19486-668	MWG13-15_11302-492	MWG13-15_49565-649

No Risk to Potential Receptors

- No potable water receptors
- The potential surface water risks were evaluated using a screening level approach that compared concentrations in groundwater to Illinois Water Quality Standards (WQS) or Water Quality Criteria (WQC).
- "An assessment of human and ecological receptors in surface water indicates that there is no risk to the surface water environment at each site based on regulatory risk standards and standards of practice for risk assessments."

Seymour Report, Pg. 5

Overview

- Common Factors
- Assessed site conditions for each facility
  - Site history and surroundings, ponds and how ash was handled
  - Groundwater elevation and groundwater flow
  - Groundwater conditions and other ash data
  - Updated with additional data to 2017
- **Compared bottom ash to groundwater conditions for each facility**
- PCE Analysis

Comparison With Groundwater Conditions

- Conducted a comparison of the occurrence of groundwater constituents detected in 2014 [and updated to 2017] compared to sets of indicators of leachate from ash stored in ponds and from EPRI research.
- The profiles of the constituents in the groundwater do not match the profiles of leachate constituent indicators in the ponds at the plant sites.
- Groundwater impacts are not the result of ash stored in the ponds at sites

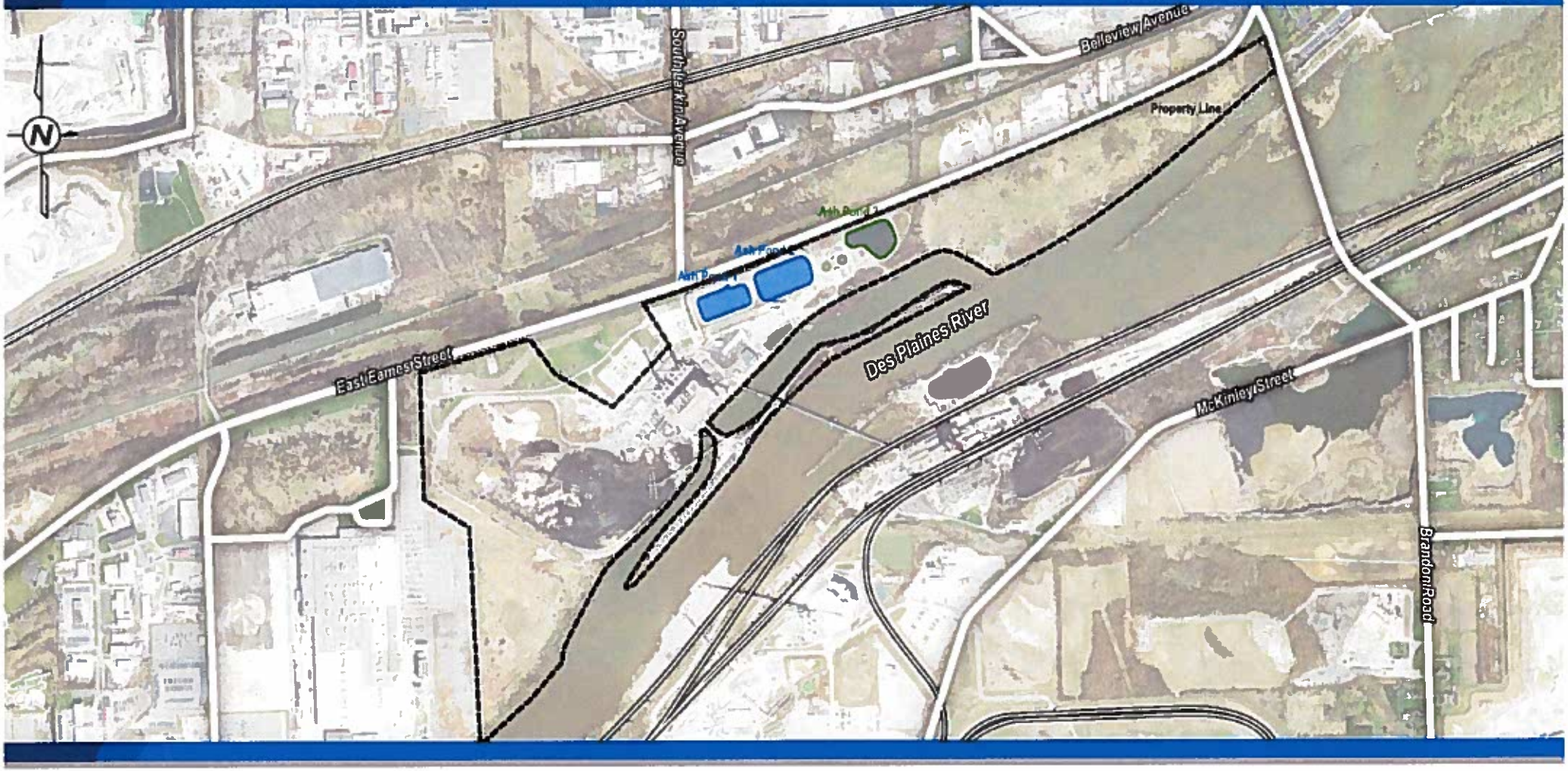
Overview

- **Assessed site conditions for each facility**
  - **Site history and surroundings; ponds and how ash was handled**
  - **Groundwater elevations -> groundwater flow**
  - **Groundwater conditions and other ash data**
  - **Updated with additional data to 2017**

Joliet #29 – Site History and Surroundings

- Operating for 30 years before MWG (1965)
- 2016 converted to natural gas – no ash
- When operating, most ash went off site - did not go to ponds
- **Review of Impoundments** (pre-2016)
  - Ponds 1 and 2 were used consecutively; Pond 3 was "finishing" – de minimis ash
  - Ponds lined and relined
- Historic ash / samples
- Administrative Controls/ GMZ and ELUC
- No potable water wells/no risk to receptors

Joliet #29

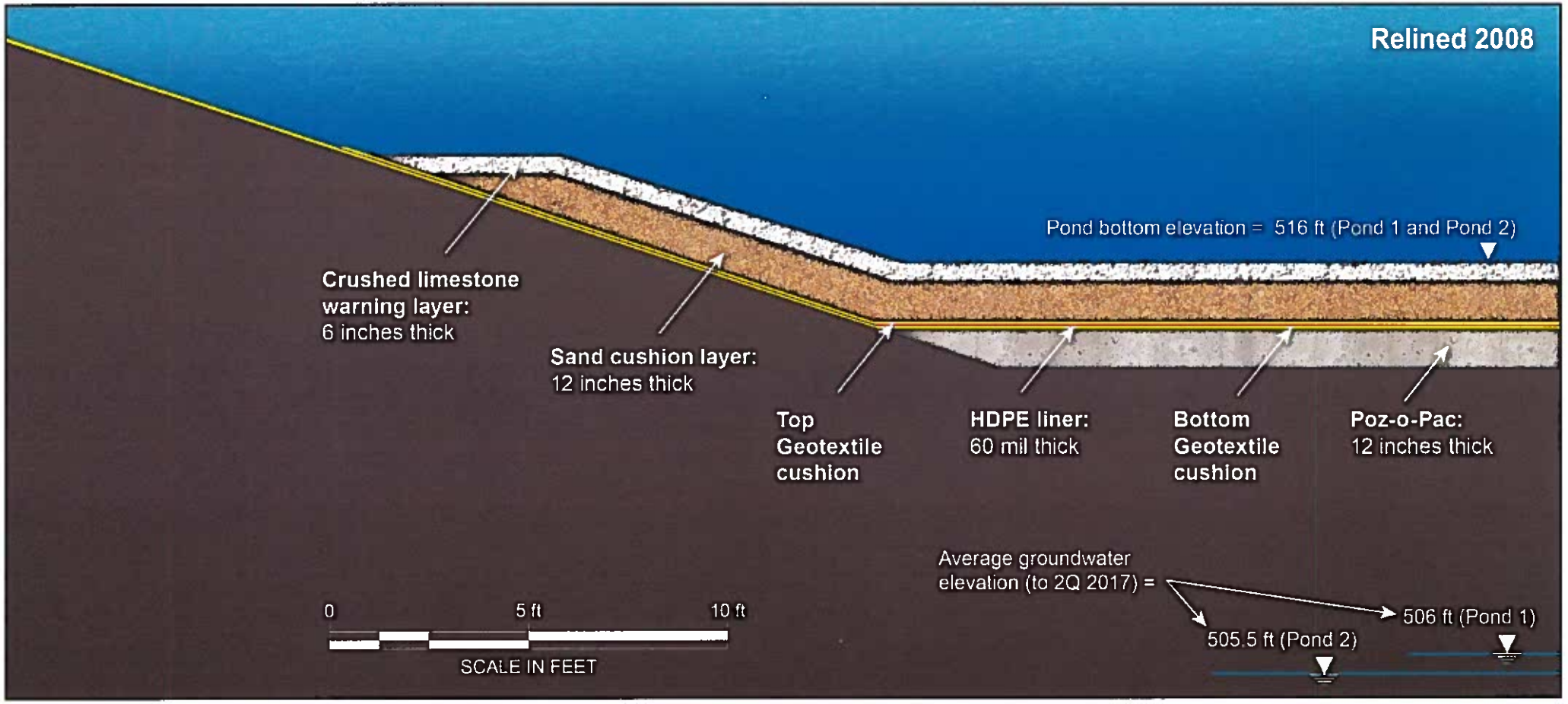

N
Belleview Avenue
Property Line
Ash Pond 2
Ash Pond 1
Ash Pond 3
Des Plaines River
East Eames Street
McKinley Street
Brandon Road

Joliet #29 – Impoundments

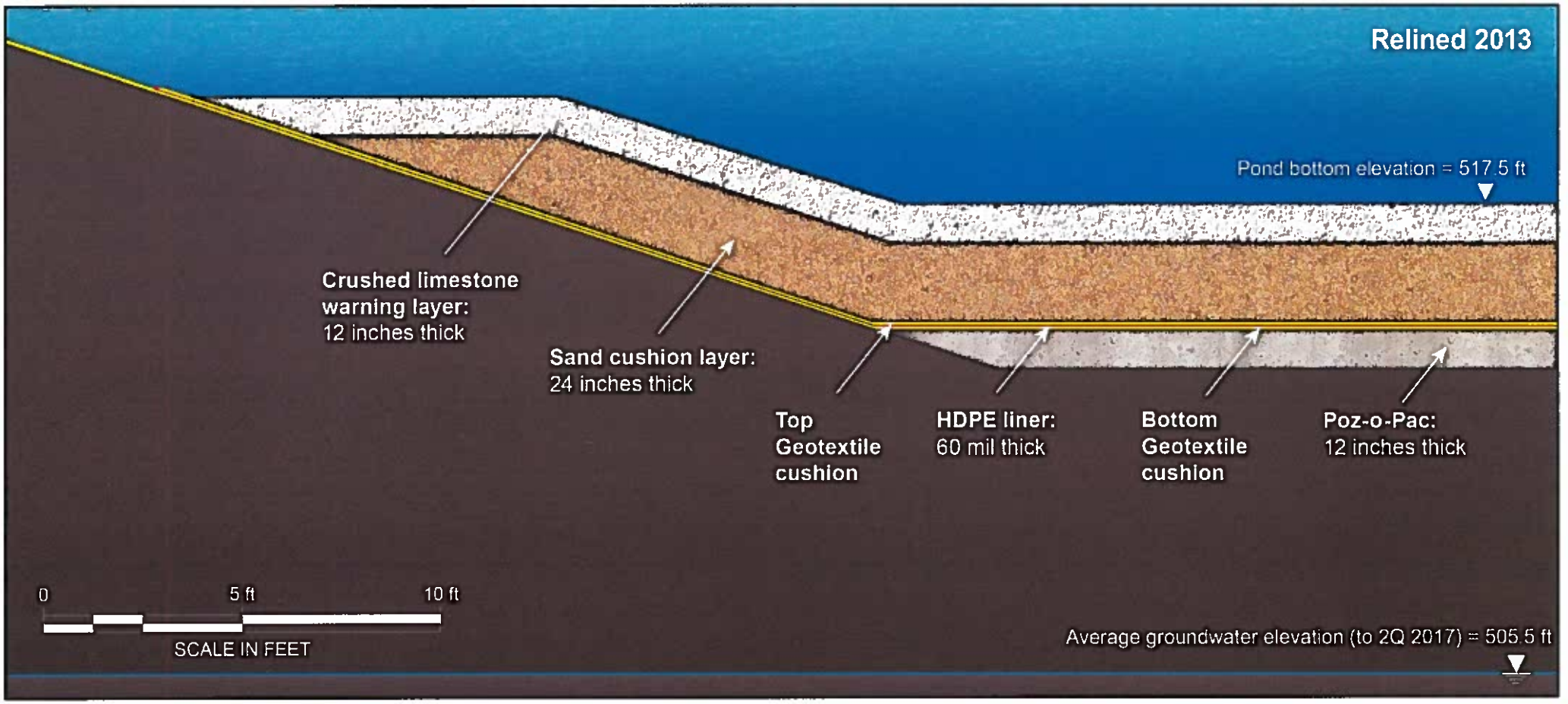
Station	Ash pond	Date Constructed/Liners	Date Relined With HDPE	Scheduled Ash Removal
Joliet #29 1964-65 Facility Operation Converted to gas in 2016	Ash Pond 1 Before 2015, used intermittently when the conveyer was not operating	1978 • Bituminous seal coat • Poz-o-Pac—12 inches thick • Compacted granular material—12 inches thick	2008 12" Poz-o-Pac; geotextile; HDPE; geotextile; sand; warning layer	**No ash as of 2015** Previously emptied every 2-4 years*
	Ash Pond 2 Used intermittently used when the conveyer is not operating	1978 • Bituminous seal coat • Poz-o-Pac—12 inches thick • Compacted granular material—12 inches thick	2008 12" Poz-o-Pac; geotextile; HDPE; geotextile; sand; warning layer	**No new ash**; to be emptied of ash in 2018. Previously emptied every 2-4 years
	Ash Pond 3 **Finishing pond**	1978 • Bituminous seal coat • Poz-o-Pac —12 inches thick • Compacted granular material—12 inches thick	2013 12" Poz-o-Pac; geotextile; HDPE; geotextile; sand; warning layer	**No ash** Emptied for relining

*Per DiCola testimony/ponds emptied in succession

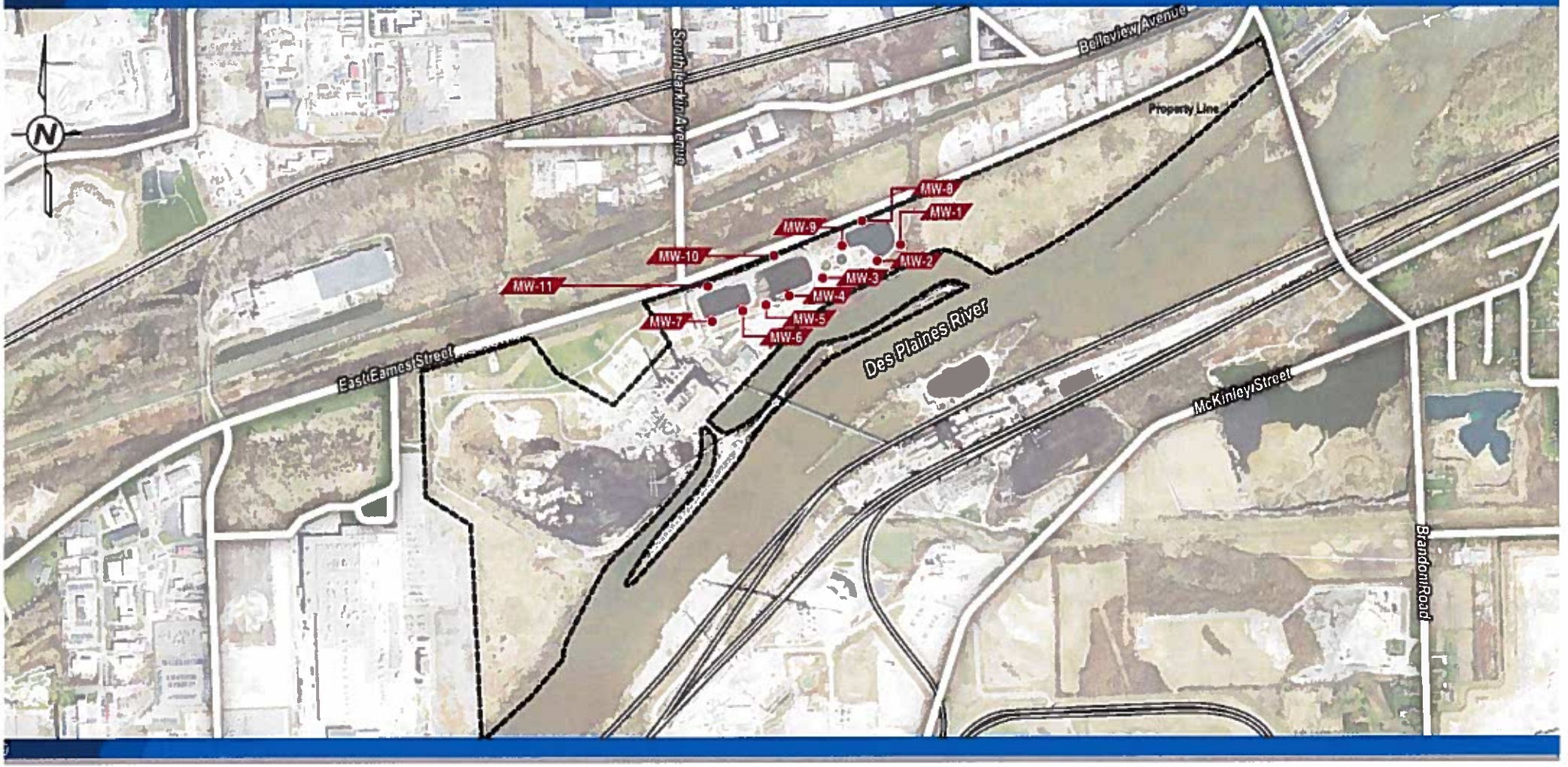
Joliet #29 – Ash Ponds 1 and 2



Joliet #29 – Ash Pond 3



Joliet #29


N
South Larkin Avenue
Belleview Avenue
Property Line
MW-8
MW-1
MW-9
MW-10
MW-2
MW-11
MW-3
MW-4
MW-7
MW-5
MW-6
East Eames Street
Des Plaines River
McKinley Street
Brandon Road

GROUNDWATER CONTOUR LINE
GROUNDWATER FLOW LINE
ASH POND 1
ASH POND 2
ASH POND 3
506.0
505.6
506.17
MW-11
505.80
MW-10
MW-08
505.74
MW-09
505.66
NM
MW-01
MW-02
505.69
MW-03
505.73
505.72
MW-04
MW-05
506.60
505.74
MW-08
MW-07
505.77
INTAKE CHANNEL
±505
DES PLAINES RIVER
±505
0
250'
APPROXIMATE SCALE
N
ENVIRONMENTAL CONSULTATION & REMEDIATION
K P R G
KPRG and Associates, Inc.
GROUNDWATER CONTOUR MAP 04/2017
JOLIET #29 GENERATING STATION
JOLIET, ILLINOIS
Scale: 1" = 250'
Date: June 22, 2017
KPRG Project No. 12313.0
FIGURE 2

Joliet #29 – Updated Table 5-5

Quarterly Groundwater Monitoring (2016-Q3 to 2017-Q2) Compared to Indicators in Impoundments/ponds (MWG site specific analyses)

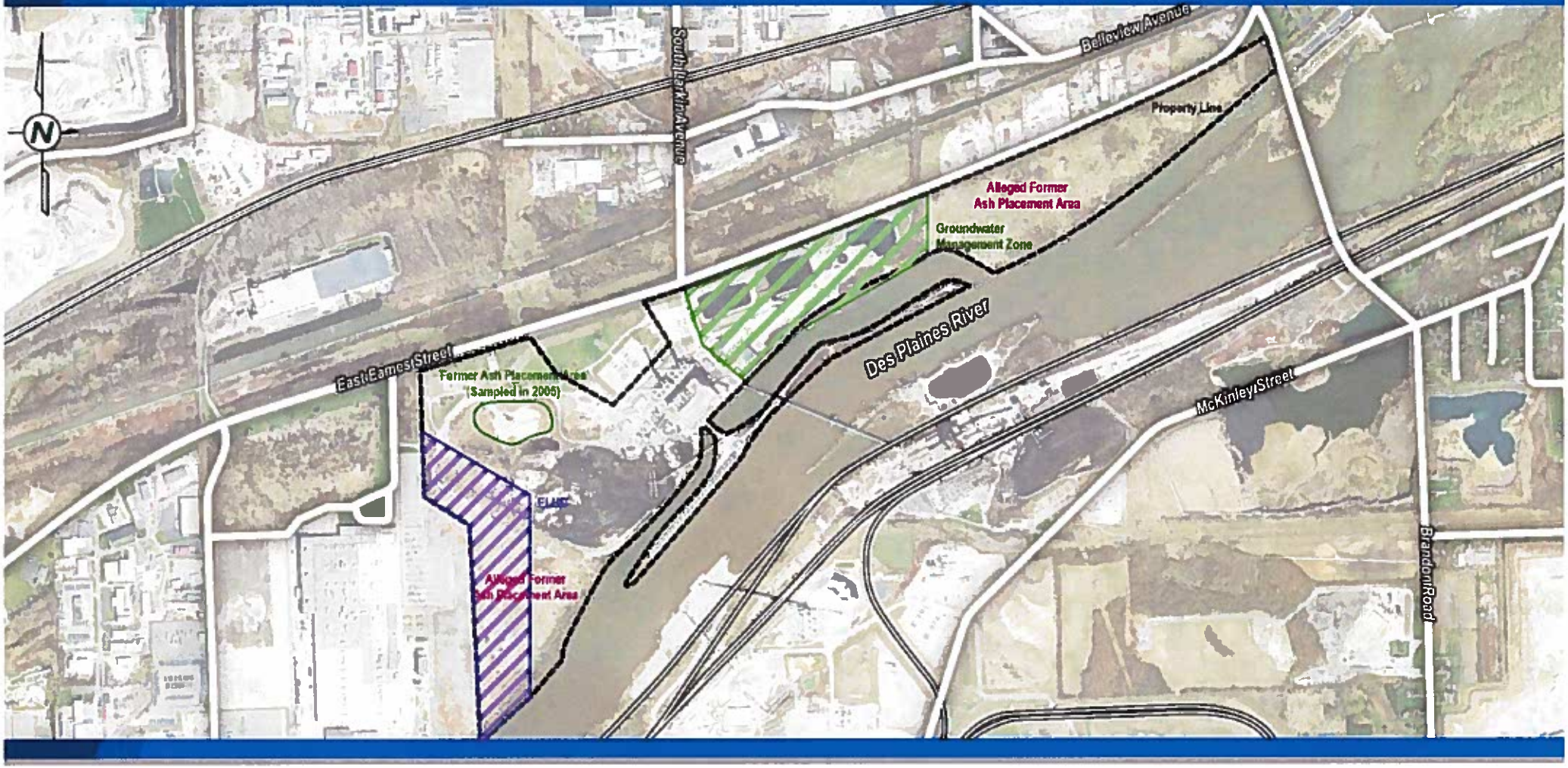
Constituent	Constituent is an Indicator of Leachate from Ash Currently Stored in Impoundments [1]	Constituents Detected During Most Recent Year (2016-Q3 to 2017-Q2) of Quarterly Groundwater Monitoring [2]										
		Joliet No. 29 Generating Station										
		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11
Arsenic				x	x		x	x		x		x
Barium	Yes (Table 5-1)	x	x	x	x	x	x	x	x	x	x	x
Boron	Yes (Table 5-1)	x	x	x	x	x	x	x	x	x	x	x
Cobalt					x					x		
Iron				x			x			x		
Manganese		x					x	x	x	x		
Mercury										x		
Nickel		x	x	x	x	x	x	x	x	x		x
Selenium		x		x		x	x					x
Sulfate	Yes (Table 5-1)	x	x	x	x	x	x	x	x	x	x	x
Number of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [3]		3	1	4	3	2	5	3	2	6	0	3
Percentage of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [4]		50%	25%	57%	50%	40%	63%	50%	40%	67%	0%	50%

Joliet #29 – Updated Table 5-4

Quarterly Groundwater Monitoring (2016-Q3 to 2017-Q2) Compared to Indicators in Impoundments/ponds (EPRI, 2006)

Constituent	Constituent is an Indicator of Leachate from Ash in Impoundments [1]	Constituents Detected during Most Recent Year (2016-Q3 to 2017-Q2) of Quarterly Groundwater Monitoring [2] — Joliet No. 29 Generating Station										
		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11
Antimony	Yes (Table 5-2)											
Arsenic	Yes (Table 5-2)			x	x		x	x		x		x
Barium	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x	x
Boron	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x	x
Cadmium	Yes (Table 5-2)											
Chromium	Yes (Table 5-2)											
Cobalt	Yes (Table 5-2)				x					x		
Copper	Yes (Table 5-2)											
Iron				x			x			x		
Lead	Yes (Table 5-2)											
Manganese	Yes (Table 5-2)	x					x	x	x	x		
Mercury	Yes (Table 5-2)									x		
Nickel	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x		x
Selenium	Yes (Table 5-2)	x		x		x	x					x
Sulfate	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x	x
Zinc	Yes (Table 5-2)											
Number of Observed Constituents that are not Consistent with Indicators of Leachate from Ash in Impoundments [3]		9	11	10	9	10	9	9	10	8	12	9
Percentage of Observed Constituents that are not Consistent with Indicators of Leachate from Ash in Impoundments [4]		56%	69%	63%	56%	63%	56%	56%	63%	50%	75%	56%

Joliet #29


N
South Larkin Avenue
Belleview Avenue
Property Line
Alleged Former
Ash Placement Area
Groundwater
Management Zone
Des Plaines River
East Eames Street
Former Ash Placement Area
(Sampled in 2005)
McKinley Street
Brandon Road
Alleged Former
Ash Placement Area

Joliet #29

Updated Groundwater Constituent Temporal Trend Testing Results

Monitoring Well	Barium		Boron		Manganese		Sulfate	
	Trend Direction [a]	Slope (mg/L/yr)	Trend Direction [a]	Slope (mg/L/yr)	Trend Direction [a]	Slope (mg/L/yr)	Trend Direction [a]	Slope (mg/L/yr)
MW-01	Decreasing	-0.005	Decreasing	-0.020	No conclusion	--	Decreasing	-13
MW-02	Decreasing	-0.0035	Decreasing	-0.046	Decreasing	-0.00023	Decreasing	-15
MW-03	Increasing	0.0011	Increasing	0.023	Decreasing	-0.0057	Decreasing	-9.7
MW-04	No conclusion	--	No conclusion	--	Decreasing	-0.018	Decreasing	-15
MW-05	No conclusion	--	Increasing	0.031	No conclusion	--	Increasing	8.7
MW-06	Increasing	0.0045	Decreasing	-0.022	Decreasing	-0.0074	No conclusion	--
MW-07	No conclusion	--	Decreasing	-0.034	Decreasing	-0.012	Decreasing	-8.1
MW-08	No conclusion	--	No conclusion	--	No conclusion	--	No conclusion	--
MW-09	Decreasing	-0.0025	No conclusion	--	Increasing	0.23	Increasing	680
MW-10	No conclusion	--	Decreasing	-0.022	Decreasing	-0.0042	Decreasing	-10
MW-11	No conclusion	--	No conclusion	--	No conclusion	--	No conclusion	--

Joliet #29

Updated Temporal Trend Testing of Groundwater Concentrations for Site-Specific Indicators of Ash in Ponds

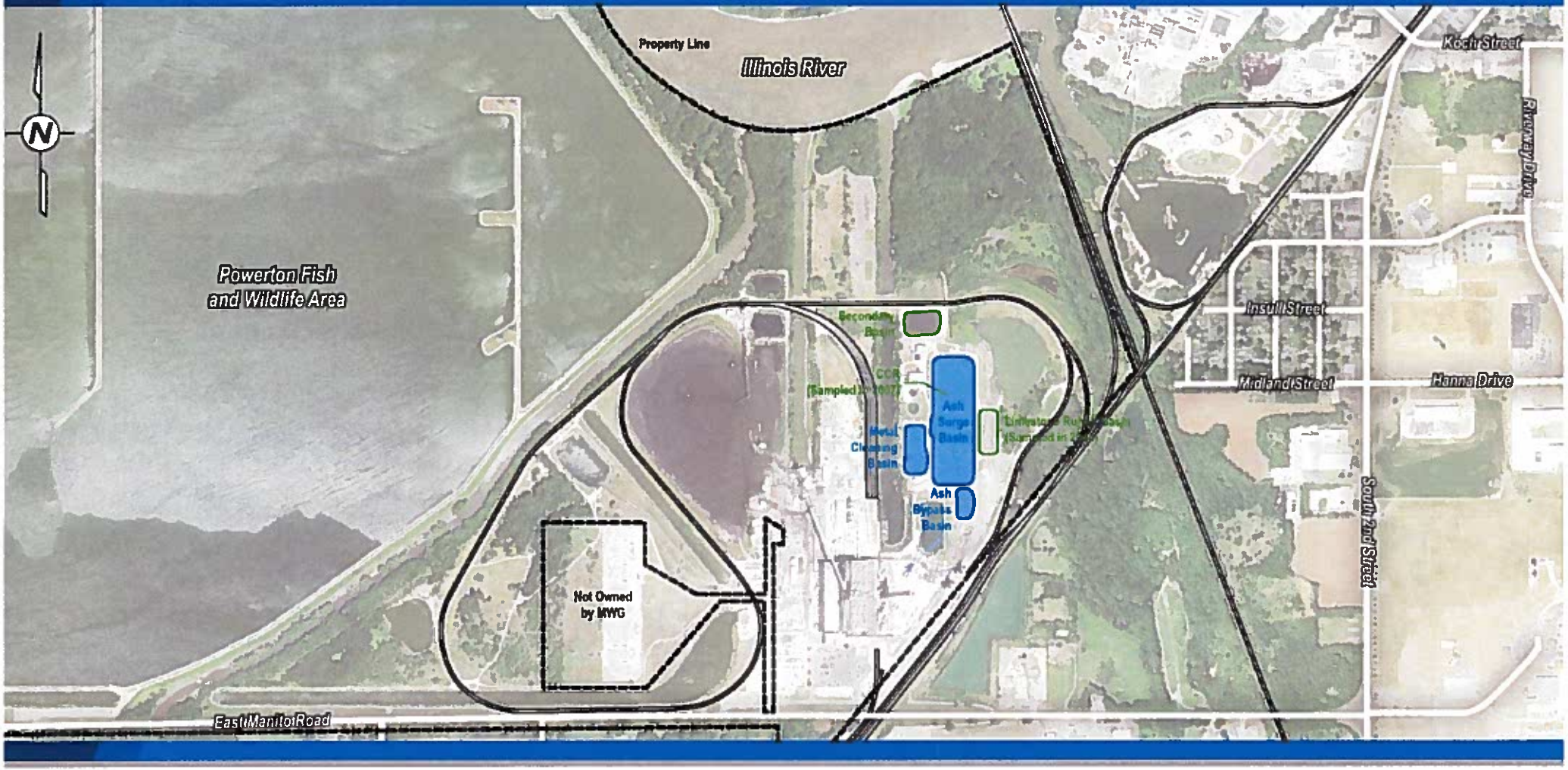
Trend	Barium	Boron	Manganese	Sulfate
Increasing	2 wells	2 wells	1 well	2 wells
Decreasing	3 wells	5 wells	6 wells	6 wells
No conclusion	6 wells	4 wells	4 wells	3 wells

- Overall, it appears that groundwater concentrations are slightly decreasing because:
  - The indicators are increasing at 1 to 2 wells out of 11 wells
  - The indicators are decreasing at 3 to 6 wells out of 11 wells
  - No conclusions could be made at 3 to 6 wells out of 11 wells

Powerton – Site History and Surroundings

- Operating since 1920s
- **Review of Impoundments/Ponds**
  - Ponds lined and relined
  - Secondary Basin underdrain system
- Pond ash sample results (2004 and 2007)
- Historic areas and samples (2004)
- Administrative controls/GMZ and ELUC
- No potable water wells/no risk to receptors

Powerton

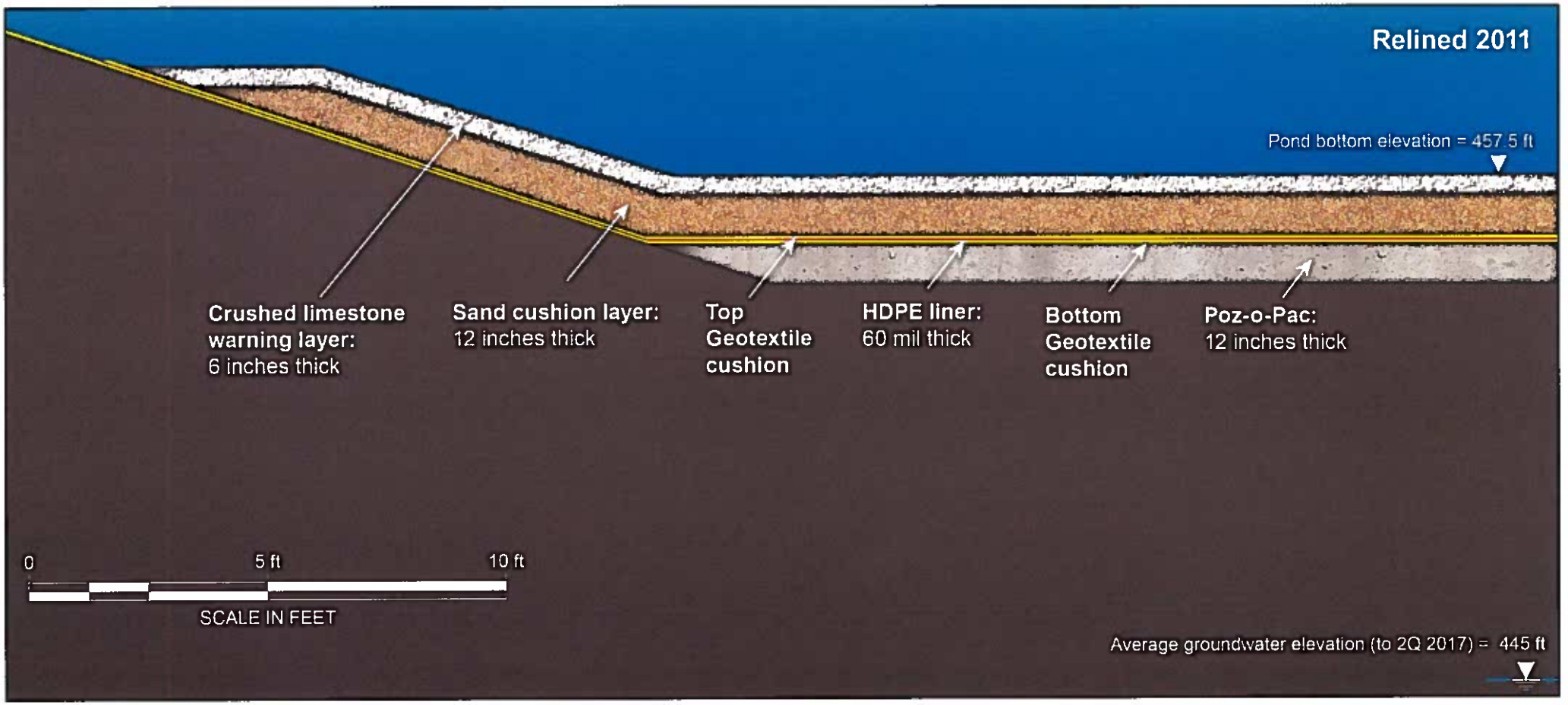

Property Line
Illinois River
Powerton Fish and Wildlife Area
Secondary Basin
CCR
Ash Surge Basin
Metal Cleaning Basin
Ash Bypass Basin
Not Owned by MWG
East Manito Road
Koch Street
Riverway Drive
Insull Street
Midland Street
Hanna Drive
South 2nd Street

Powerton – Impoundments

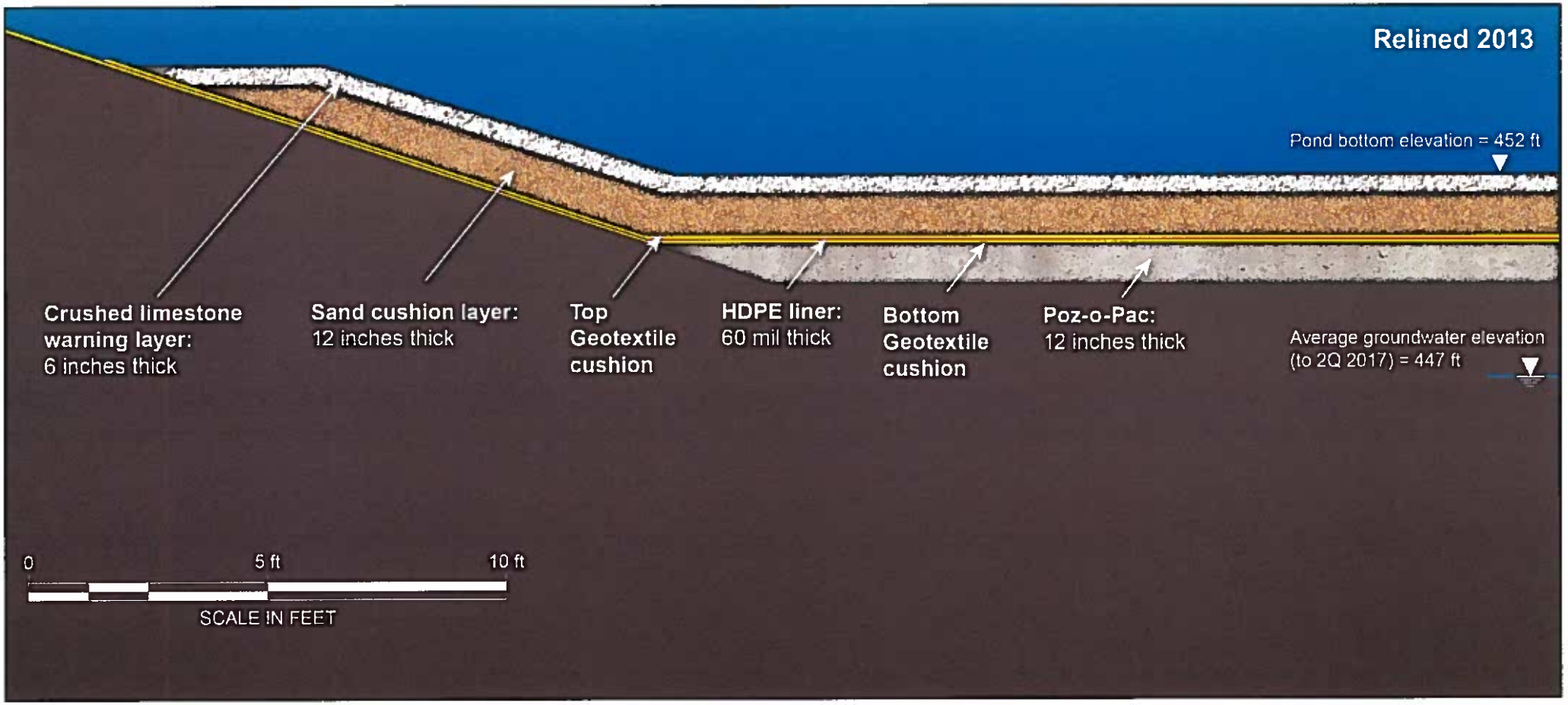
Station	Ash Pond	Date Constructed/Liners	Date Relined With HDPE	Scheduled Ash Removal
Powerton	**Ash Surge Basin**	1978 • Bituminous seal coat • Poz-o-Pac—12 inches thick on the bottom • Hypalon® liner on the sides • Compacted granular material	2013 12" Poz-o-Pac; geotextile; HDPE; geotextile; sand; warning layer	NONE since 2013 relining 6-8 years – as needed*
	Ash Bypass Basin Used only when emptying Ash Surge Basin	1978 12" Poz-o-Pac liner and Hypalon® sides	2010 Prepared subgrade; geotextile; HDPE; geotextile; sand; warning layer	6-8 years
	Metal Cleaning Basin	1978 • Bituminous seal coat • Poz-o-Pac—12 inches thick • Hypalon® liner along the sloped sides • Compacted granular material—12 inches thick	2010 12" Poz-o-Pac; geotextile; HDPE; geotextile; sand; warning layer	Temporary laydown area Ash removed annually, if needed
	Secondary Ash Basin/ Service Water Basin **Finishing Pond**	1978 Hypalon	2013 Prepared subgrade; geo-textile; under-drain system; geotextile; sand cushion; geo-textile; HDPE	De minimis ash/ Only emptied for relining

*Kelly Testimony

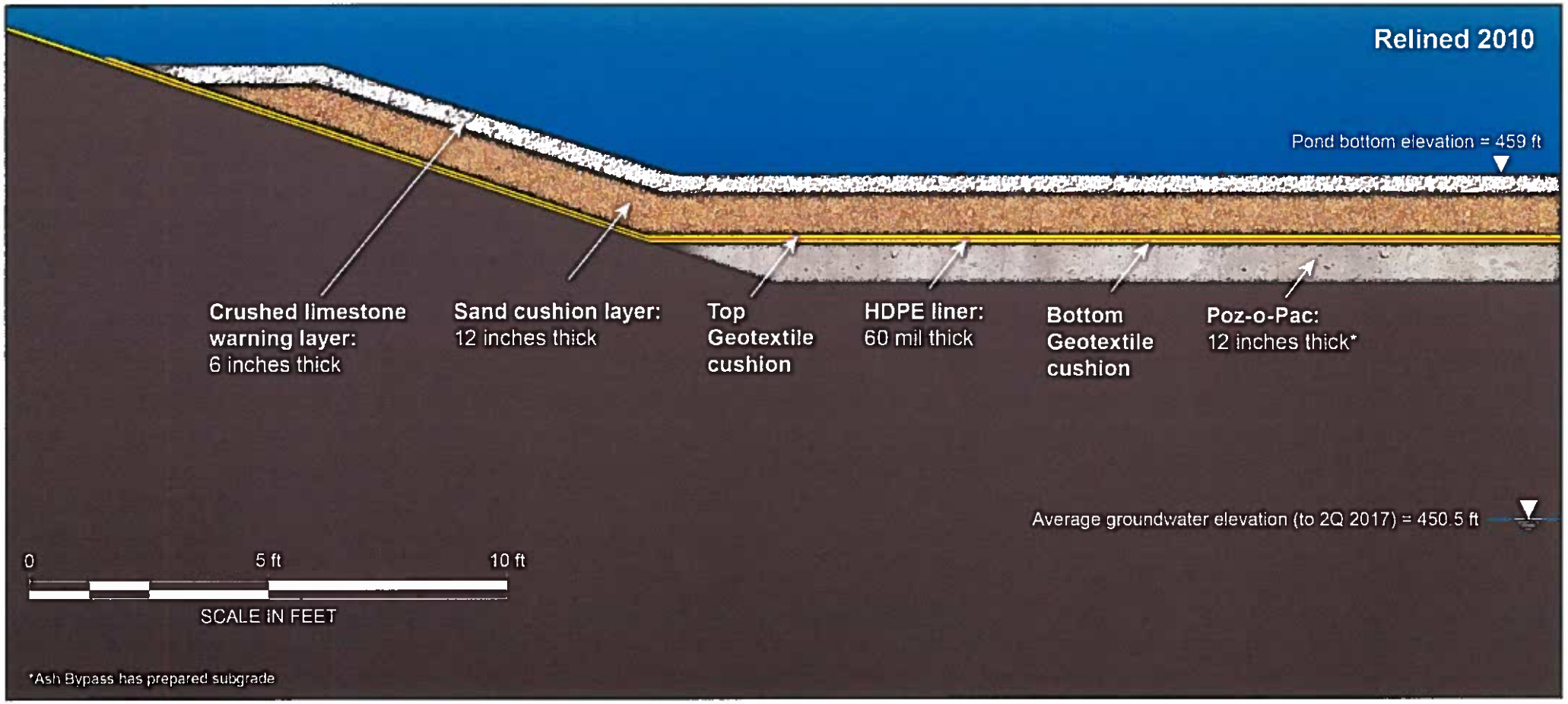
Powerton – Metal Cleaning Basin



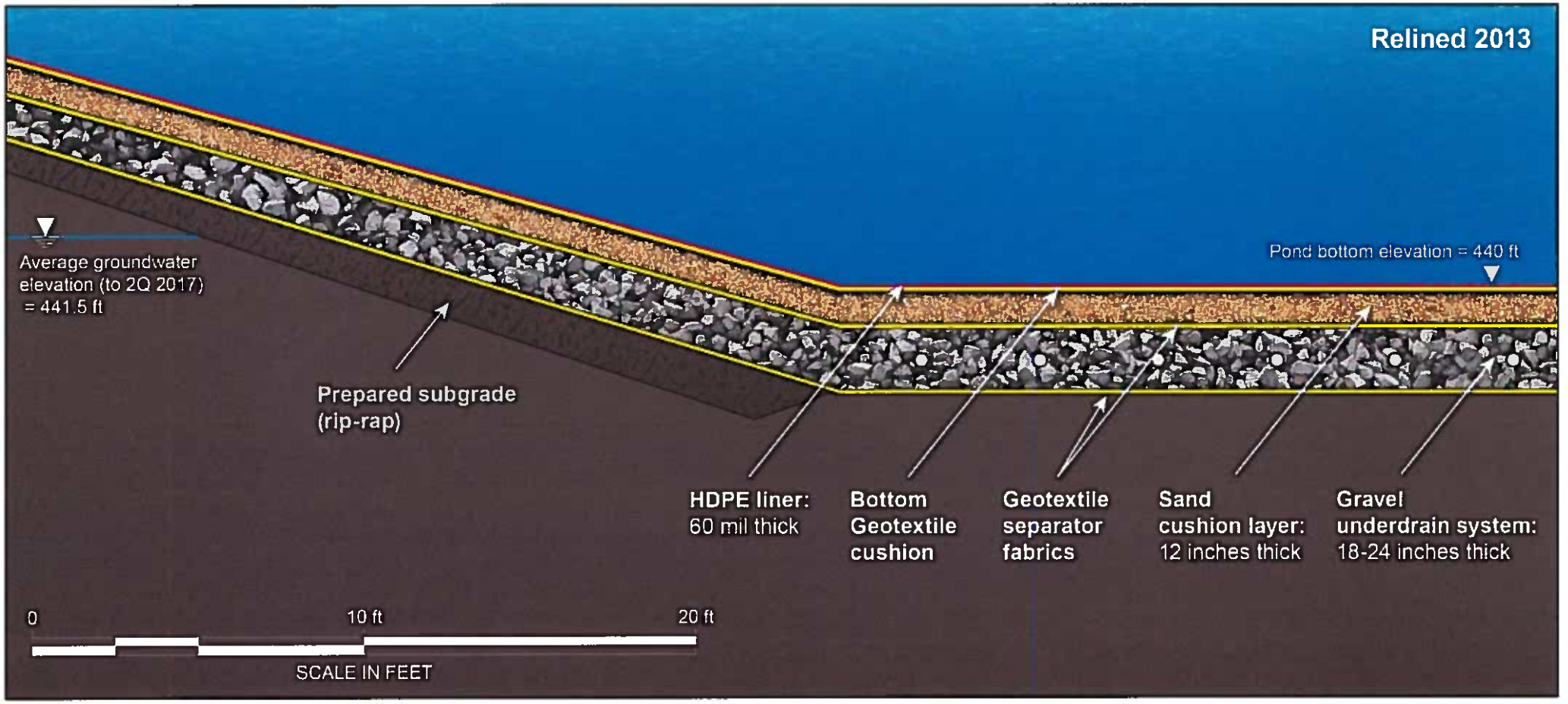
Powerton – Ash Surge Basin

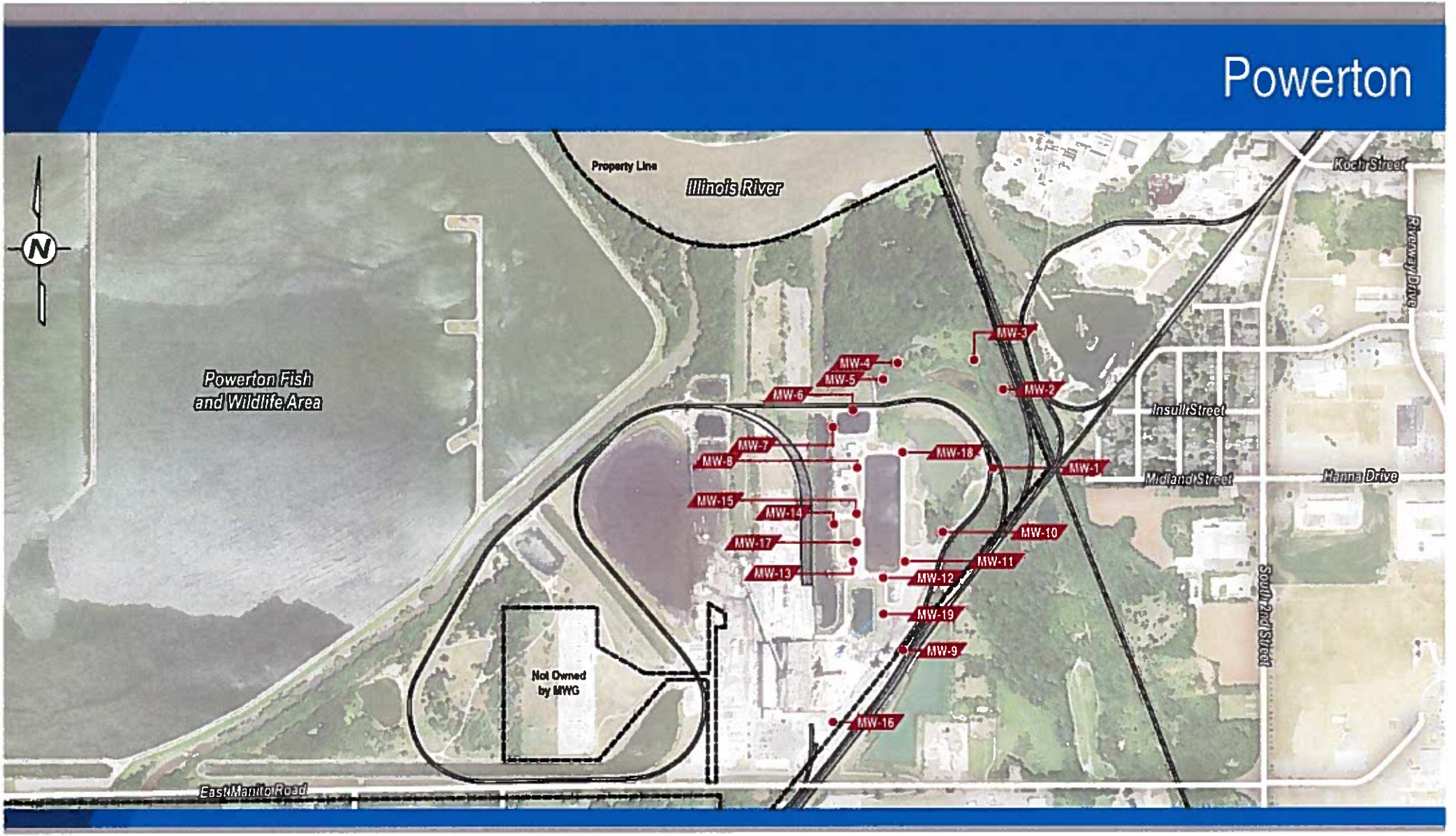


Powerton – Ash Bypass Basin

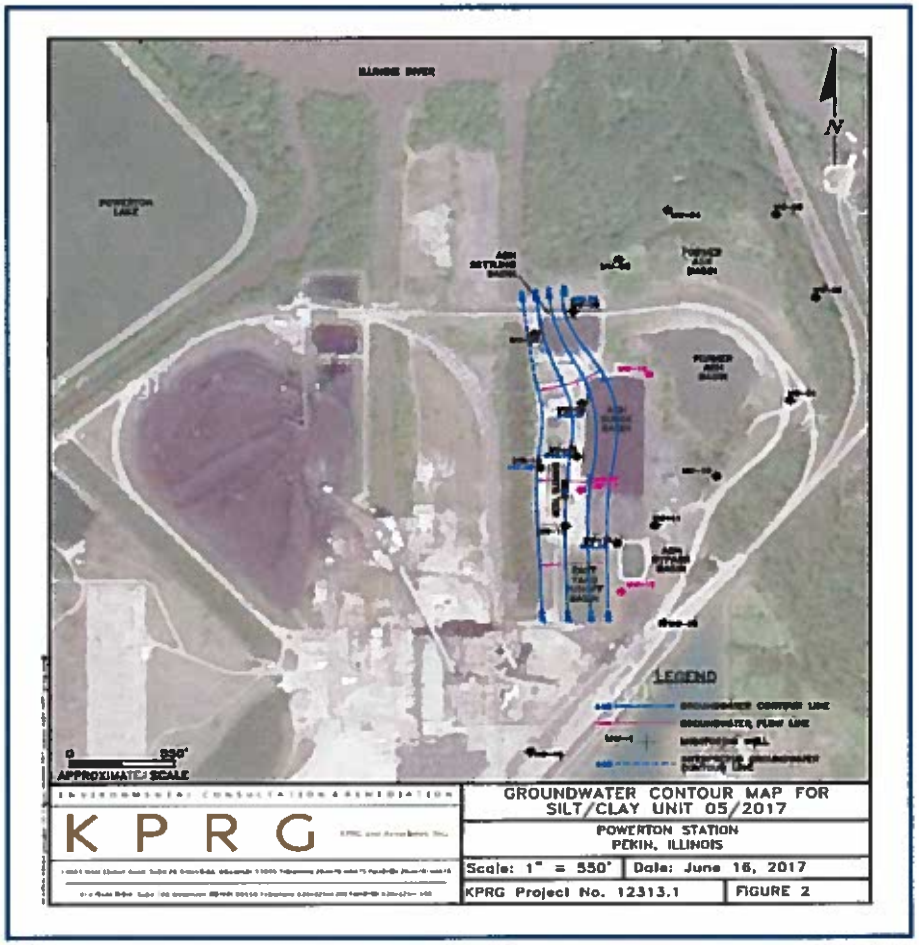


Powerton – Secondary Basin

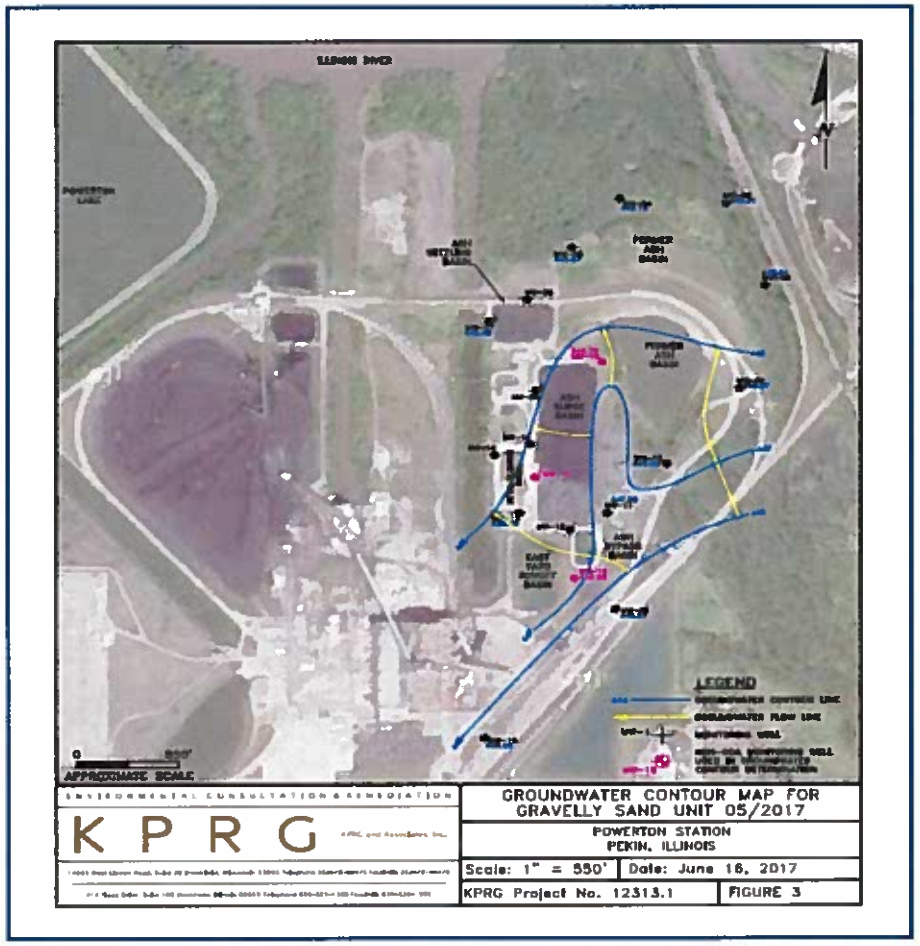



Powerton
Property Line
Illinois River
Powerton Fish and Wildlife Area
Not Owned by MWG
East Manito Road
Koch Street
Riverway Drive
Insull Street
Midland Street
Hanna Drive
South 2nd Street
MW-1
MW-2
MW-3
MW-4
MW-5
MW-6
MW-7
MW-8
MW-9
MW-10
MW-11
MW-12
MW-13
MW-14
MW-15
MW-16
MW-17
MW-18
MW-19

Shallow Silty Clay Unit GQ Flow – 2Q 2017



Deeper Gravelly Sand Unit – 2Q 2017



Powerton – Updated Table 5-5

Quarterly Groundwater Monitoring (2016-Q3 to 2017-Q2) Compared to Indicators in Impoundments/ponds (MWG site specific analyses)

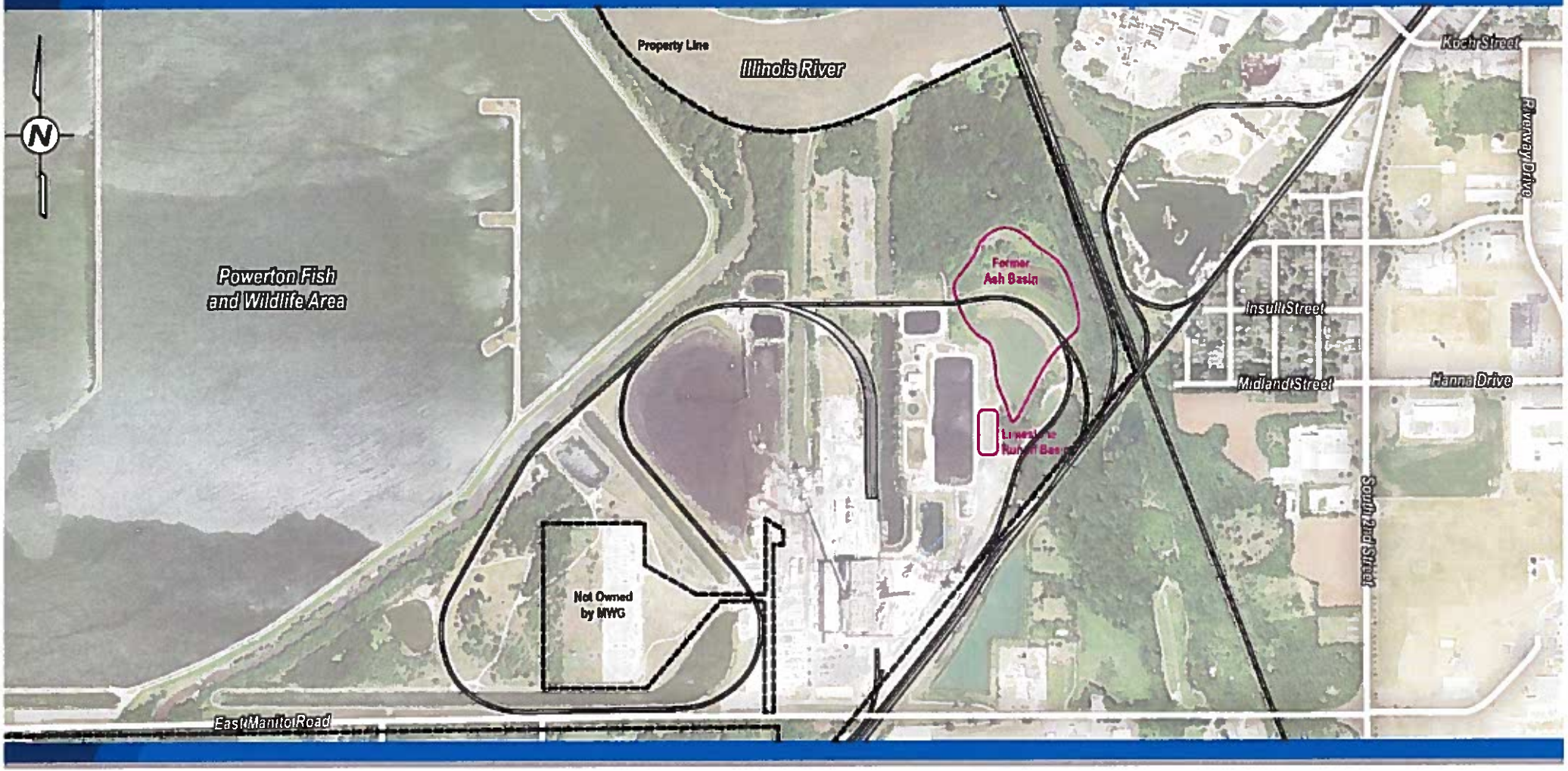
Constituent	Constituent is an Indicator of Leachate from Ash Currently Stored in Impoundments [1]	Constituents Detected during Most Recent Year (2016-Q3 to 2017-Q2) of Quarterly Groundwater Monitoring [2]														
		Powerton Generating Station														
		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-12	MW-13	MW-14	MW-15	MW-16
Arsenic			x				x	x	x			x	x	x	x	x	
Barium	Yes (Table 5-1)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Boron	Yes (Table 5-1)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Cadmium															x		
Cobalt								x			x	X			x		
Copper					x						x						
Iron							x	x	x		x	x	x	x	x	x	
Lead											x						
Manganese		x			x	x	x	x	x	x	x	x	x	x	x	x	x
Nickel					x			x	x		x	x	x		x	x	
Selenium				x	x					x	x			x	x	x	
Sulfate	Yes (Table 5-1)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Number of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [3]		1	1	1	3	2	3	5	4	2	7	5	4	4	8	5	1
Percentage of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [4]		25%	25%	25%	50%	40%	50%	63%	57%	40%	70%	63%	57%	57%	73%	63%	25%

Powerton – Updated Table 5-4

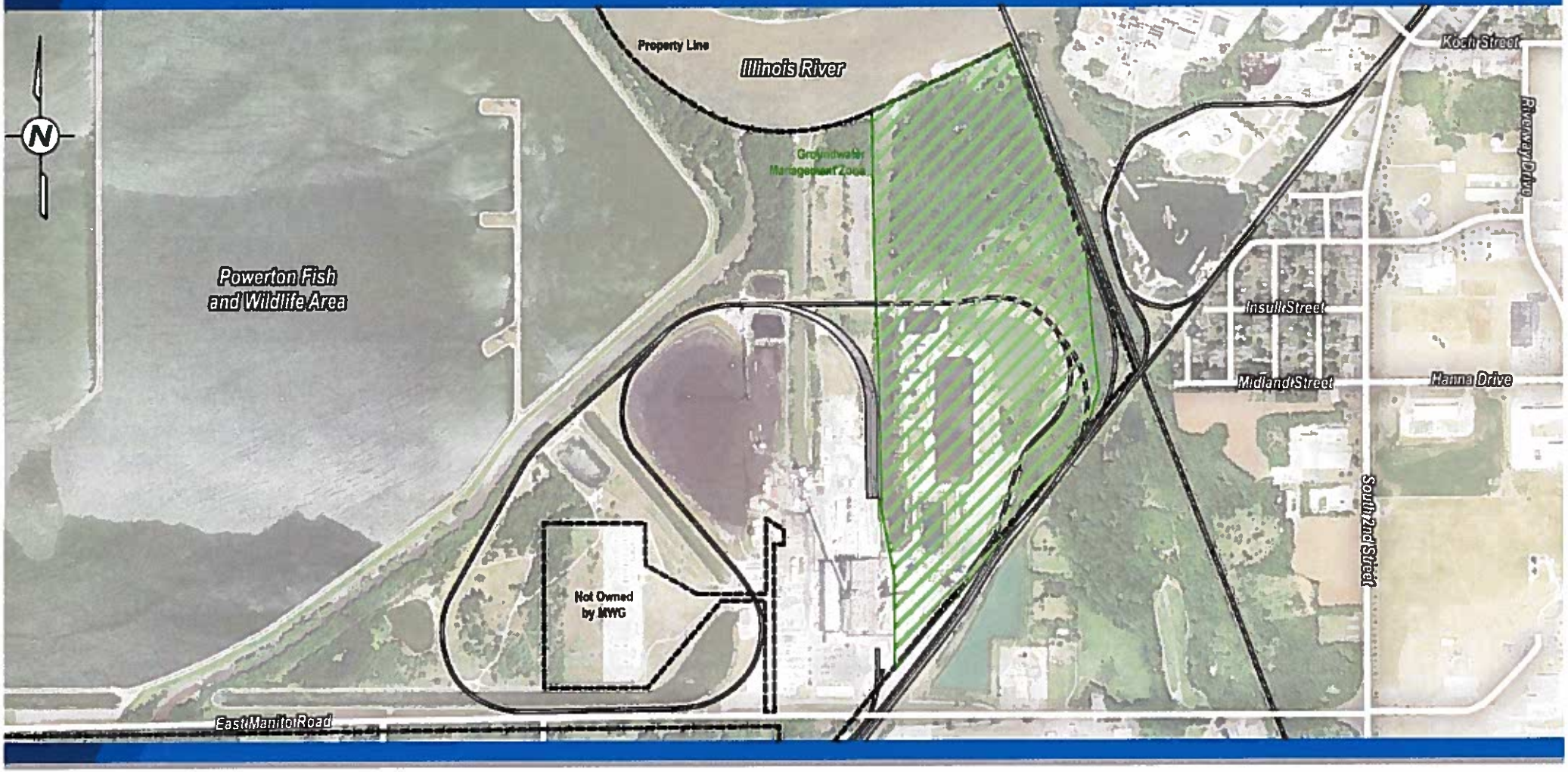
Quarterly Groundwater Monitoring (2016-Q3 to 2017-Q2) Compared to Indicators in Impoundments/ponds (EPRI, 2006)

Constituent	Constituent is an Indicator of Leachate from Ash in Impoundments [1]	Constituents Detected During Most Recent Year (2016-Q3 to 2017-Q2) of Quarterly Groundwater Monitoring [2] — Powerton Generating Station															
		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-12	MW-13	MW-14	MW-15	MW-16
Antimony	Yes (Table 5-2)																
Arsenic	Yes (Table 5-2)		x				x	x	x			x	x	x	x	x	
Barium	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Boron	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Cadmium	Yes (Table 5-2)														x		
Chromium	Yes (Table 5-2)																
Cobalt	Yes (Table 5-2)							x			x	x			x		
Copper	Yes (Table 5-2)				x						x						
Iron							x	x	x		x	x	x	x	x	x	
Lead	Yes (Table 5-2)										x						
Manganese	Yes (Table 5-2)	x			x	x	x	x	x	x	x	x	x	x	x	x	x
Mercury	Yes (Table 5-2)																
Nickel	Yes (Table 5-2)					x		x	x		x	x	x		x	x	
Selenium	Yes (Table 5-2)			x	x					x	x			x	x	x	
Sulfate	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Zinc	Yes (Table 5-2)																
Number of Observed Constituents that are not Consistent with Indicators of Leachate from Ash in Impoundments [3]		11	11	11	9	10	11	9	10	10	7	9	10	10	8	9	11
Percentage of Observed Constituents that are not Consistent with Indicators of Leachate from Ash in Impoundments [4]		69%	69%	69%	56%	63%	69%	56%	63%	63%	44%	56%	63%	63%	50%	56%	69%

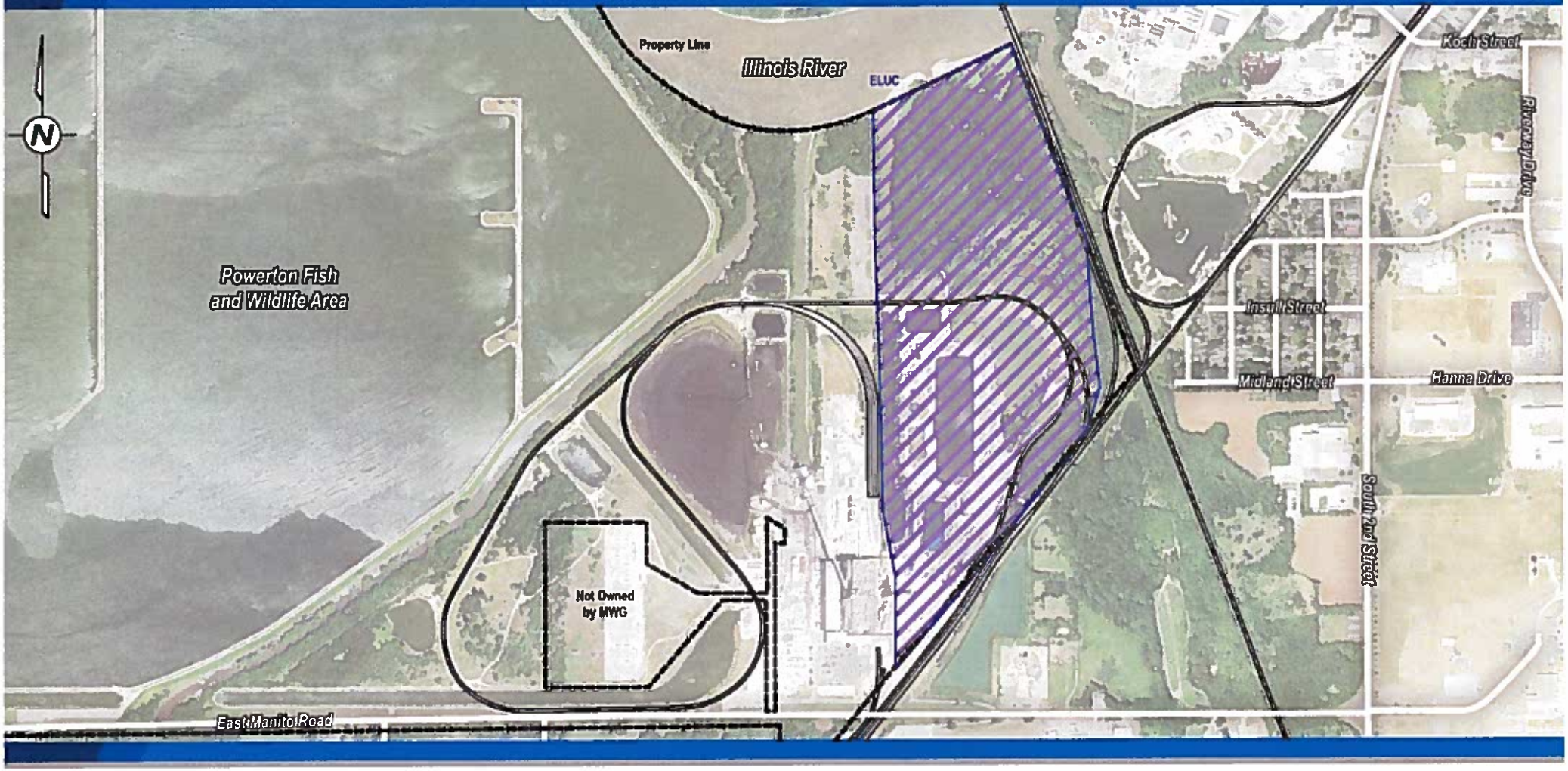
Powerton


Property Line
Illinois River
Powerton Fish and Wildlife Area
Former Ash Basin
Not Owned by MWG
East Manito Road
Koch Street
Powerway Drive
Insull Street
Midland Street
Hanna Drive
South 2nd Street

Powerton

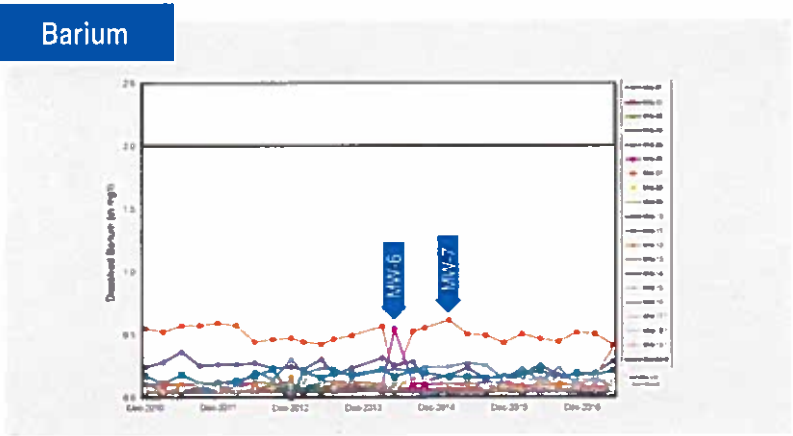

Property Line
Illinois River
Groundwater Management Zone
Powerton Fish and Wildlife Area
Not Owned by MWG
East Manito Road
Koch Street
Riverway Drive
Insull Street
Midland Street
Hanna Drive
South 2nd Street

Powerton

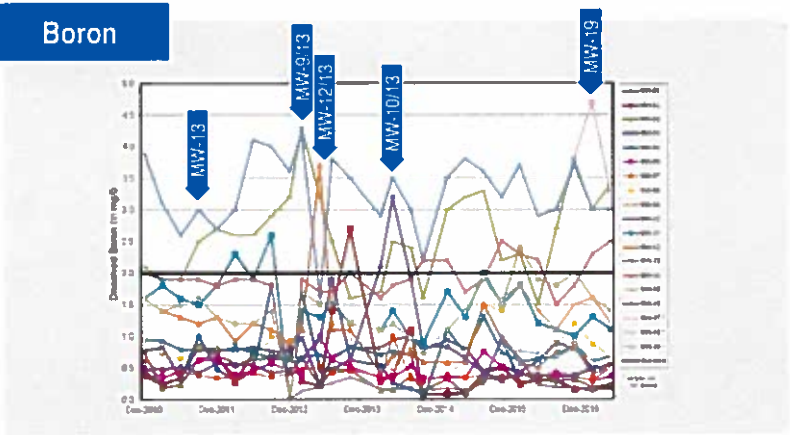

Property Line
Illinois River
ELUC
Koch Street
Riverway Drive
Powerton Fish
and Wildlife Area
Instill Street
Midland Street
Hanna Drive
South 2nd Street
Not Owned
by MWG
East Manito Road

Powerton

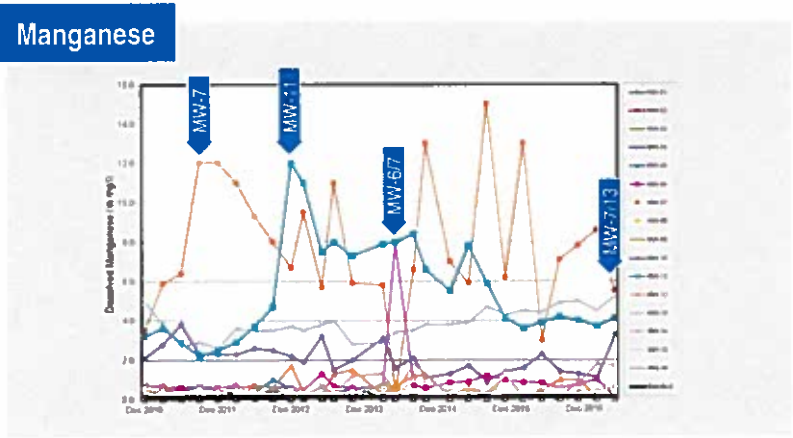
Barium



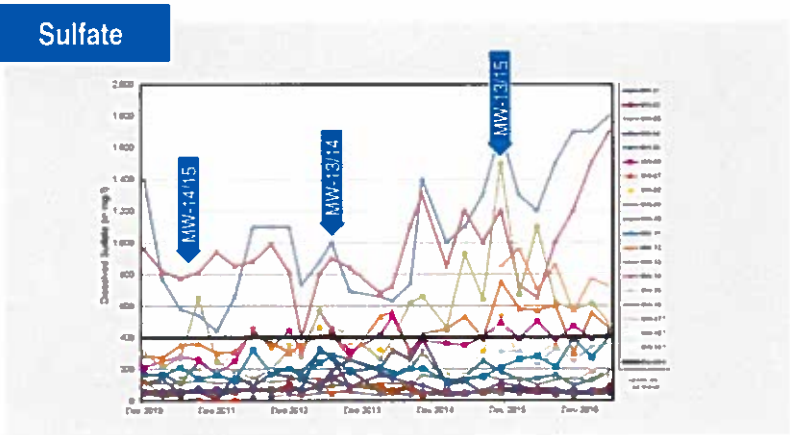
Boron



Manganese



Sulfate



Powerton

Updated Groundwater Constituent Temporal Trend Testing Results

Monitoring Well	Barium		Boron		Manganese		Sulfate	
	Trend Direction [a]	Slope (mg/L/yr)	Trend Direction [a]	Slope (mg/L/yr)	Trend Direction [a]	Slope (mg/L/yr)	Trend Direction [a]	Slope (mg/L/yr)
MW-01	No conclusion	--	Decreasing	-0.086	No conclusion	--	No conclusion	--
MW-02	No conclusion	--	Decreasing	-0.065	No conclusion	--	No conclusion	--
MW-03	No conclusion	--	Decreasing	-0.057	No conclusion	--	No conclusion	--
MW-04	Decreasing	-0.0049	No conclusion	--	Decreasing	-0.079	No conclusion	--
MW-05	Decreasing	-0.0018	No conclusion	--	Decreasing	-0.11	No conclusion	--
MW-06	No conclusion	--	Decreasing	-0.024	No conclusion	--	Increasing	29
MW-07	Decreasing	-0.011	No conclusion	--	No conclusion	--	Increasing	3.5
MW-08	Decreasing	-0.004	Increasing	0.062	Increasing	0.026	Increasing	12
MW-09	Decreasing	-0.0012	Increasing	0.076	Decreasing	-0.039	Increasing	4.2
MW-10	Decreasing	-0.015	No conclusion	--	Decreasing	-0.18	No conclusion	--
MW-11	Increasing	0.006	Decreasing	-0.094	No conclusion	--	Increasing	19
MW-12	Decreasing	0.00	Decreasing	-0.15	No conclusion	--	Increasing	40
MW-13	Increasing	0.012	No conclusion	--	Increasing	0.23	Increasing	140
MW-14	Increasing	0.004	Increasing	0.056	Increasing	0.073	Increasing	66
MW-15	No conclusion	--	Increasing	0.056	No conclusion	--	Increasing	92
MW-16	Decreasing	-0.340	No conclusion	--	Decreasing	-0.0013	No conclusion	--

Powerton

Updated Temporal Trend Testing of Groundwater Concentrations for Site-Specific Indicators of Ash in Ponds

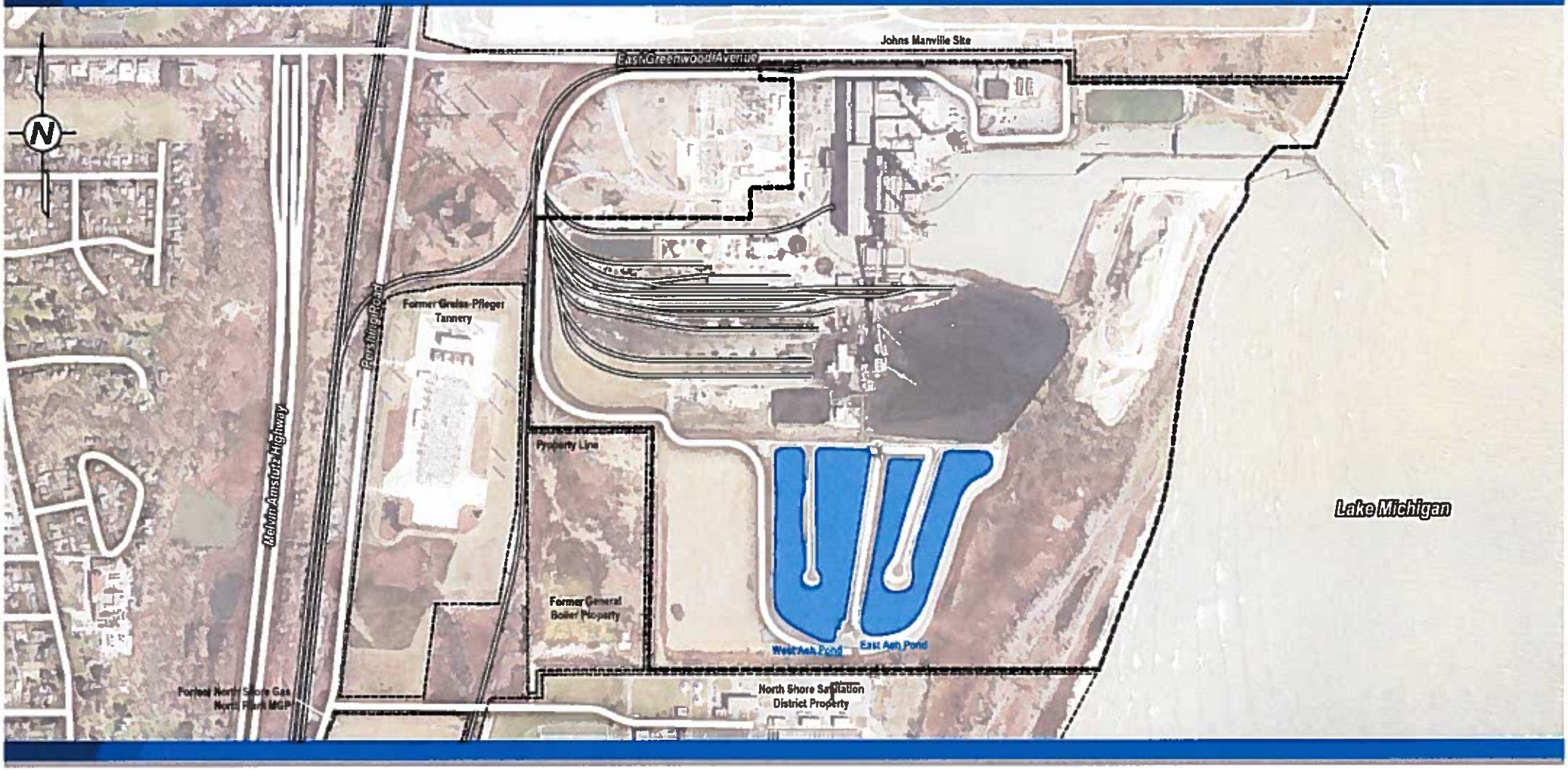
Trend	Barium	Boron	Manganese	Sulfate
Increasing	2 wells	4 wells	3 wells	9 wells
Decreasing	8 wells	6 wells	5 wells	No wells
No conclusion	5 wells	6 wells	8 wells	7 wells

- Overall, it appears that groundwater concentrations are neither increasing nor decreasing because:
  - The indicators are increasing at 3 to 9 wells out of 16 wells
  - Three indicators show decreasing trends at 5 to 8 wells out of 16 wells
  - No conclusions could be made at 5 to 7 wells out of 16 wells

Waukegan – Site History and Surroundings

- Operating for 75 years before MWG (1923)
- **Review of Impoundments/Ponds**
  - Ponds lined with Hypalon® in 1977
  - Relined by MWG (2003-2004)
- Pond ash sample results (2004 both ponds)
- Historic areas
- Off site impacts
- Administrative controls/ELUCs
- No potable water wells/no risk to receptors

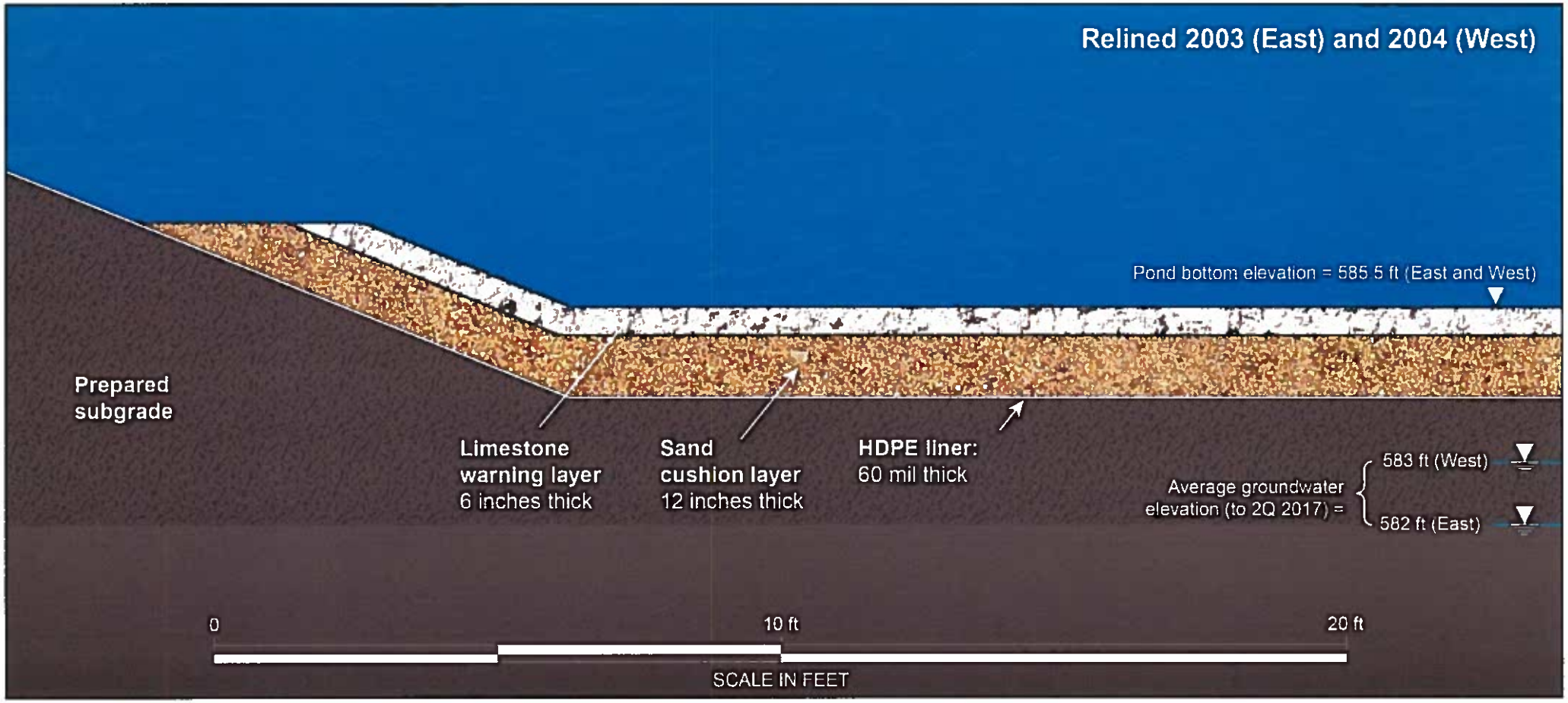
Waukegan


Johns Manville Site
East Greenwood Avenue
N
Former Greiss-Pfleger Tannery
Pershing Road
Melvin Amstutz Highway
Property Line
Former General Boiler Property
West Ash Pond
East Ash Pond
North Shore Sanitation District Property
Lake Michigan

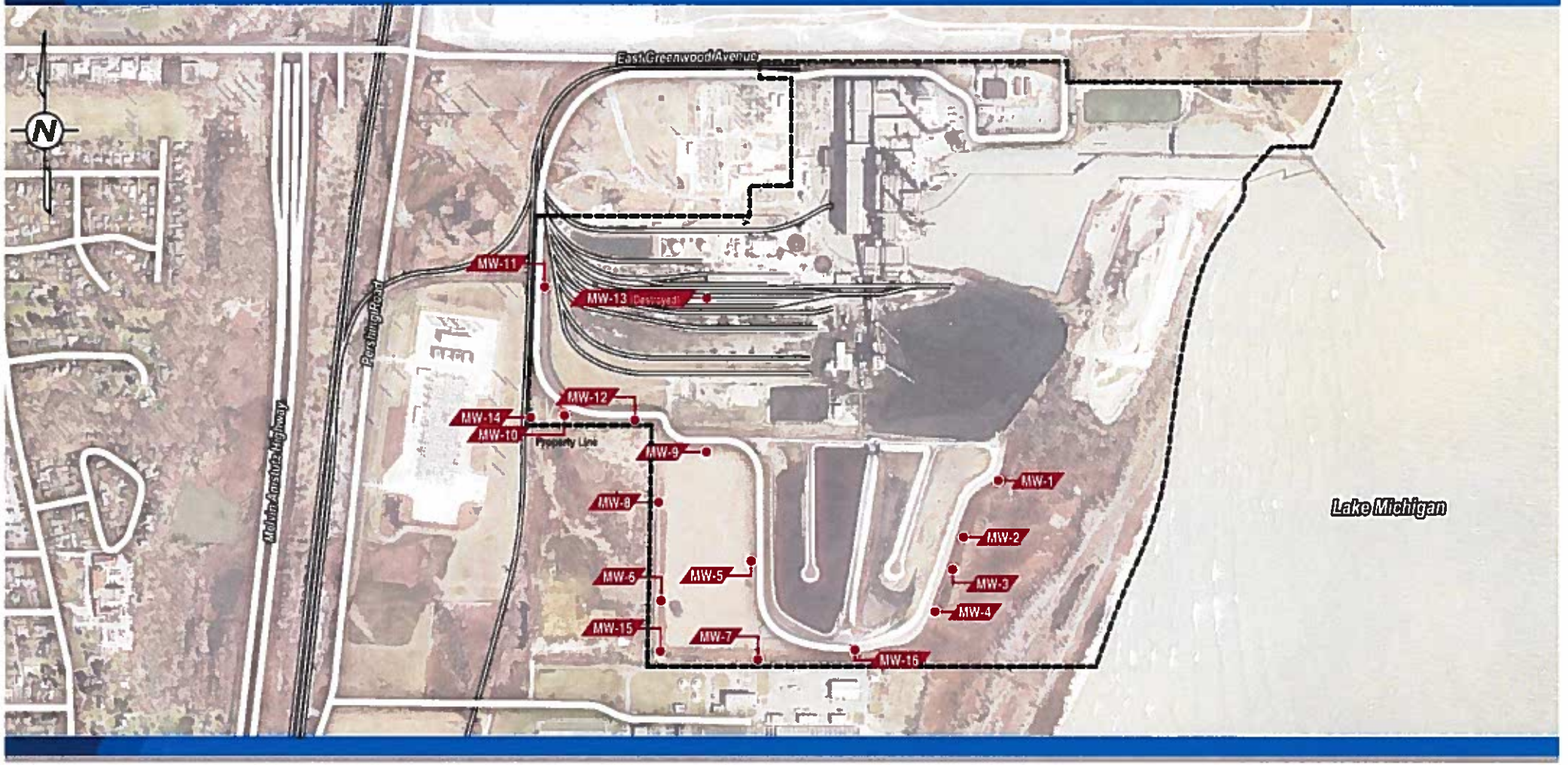
Waukegan – Impoundments

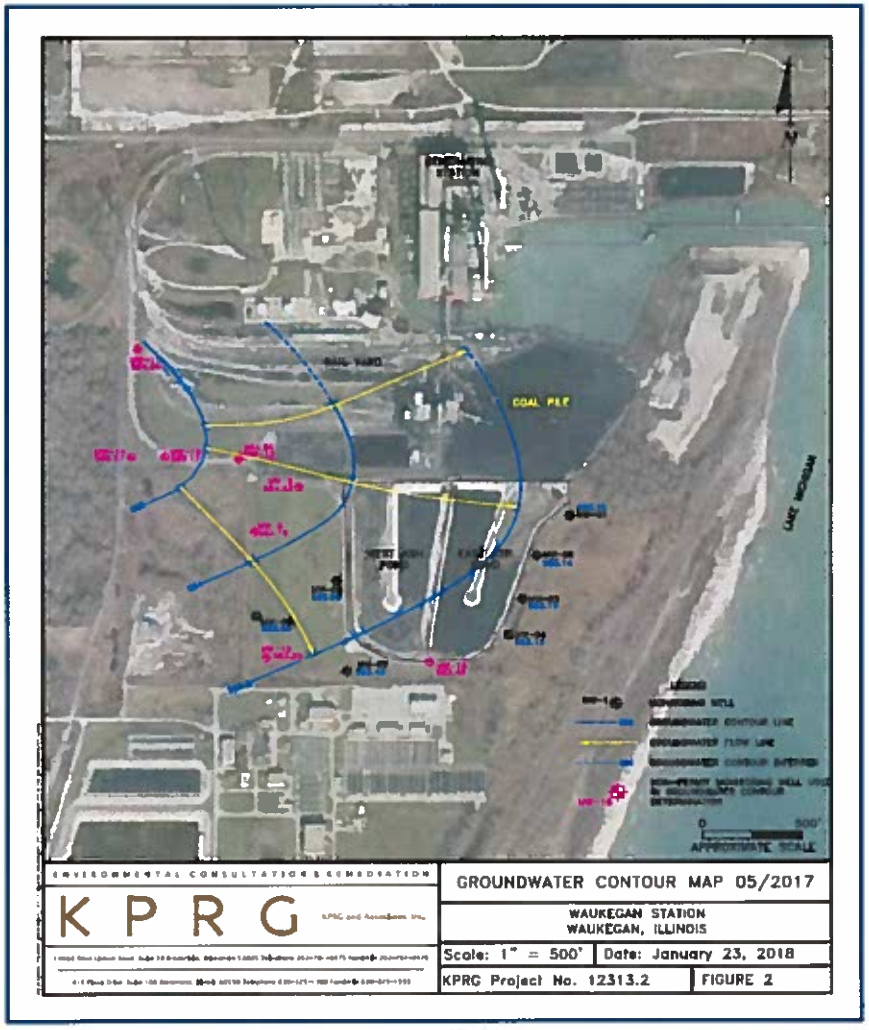
Station	Ash Pond	Date Constructed -Liners	Date Relined With HDPE	Scheduled Ash Removal
Waukegan	East Ash Pond	1977 Hypalon®	2003 Prepared subgrade; HDPE; sand cushion; warning layer	3-4 yrs (prev. 2 yrs)* Bottom area only; inlet side
	West Ash Pond	1977 Hypalon®	2004 Prepared subgrade; HDPE; sand cushion; warning layer	3-4 yrs (prev. 2 yrs)

Waukegan – East and West Ash Ponds



Waukegan


East Greenwood Avenue
MW-11
MW-13 (Destroyed)
Pershing Road
MW-12
MW-14
MW-10
Property Line
MW-9
MW-8
MW-6
MW-5
MW-15
MW-7
MW-16
MW-1
MW-2
MW-3
MW-4
Lake Michigan
Melvin A. Sykes Highway


COAL PILE
LAKE MICHIGAN
APPROXIMATE SCALE
ENVIRONMENTAL CONSULTATION & REMEDIATION
K P R G
GROUNDWATER CONTOUR MAP 05/2018
WAUKEGAN STATION
WAUKEGAN, ILLINOIS
Scale: 1" = 500'
Date: January 23, 2018
KPRG Project No. 12313.2
FIGURE 2

Waukegan – Updated Table 5-5

Quarterly Groundwater Monitoring (2016-Q3 to 2017-Q2) Compared to Indicators in Impoundments/ponds (MWG site specific analyses)

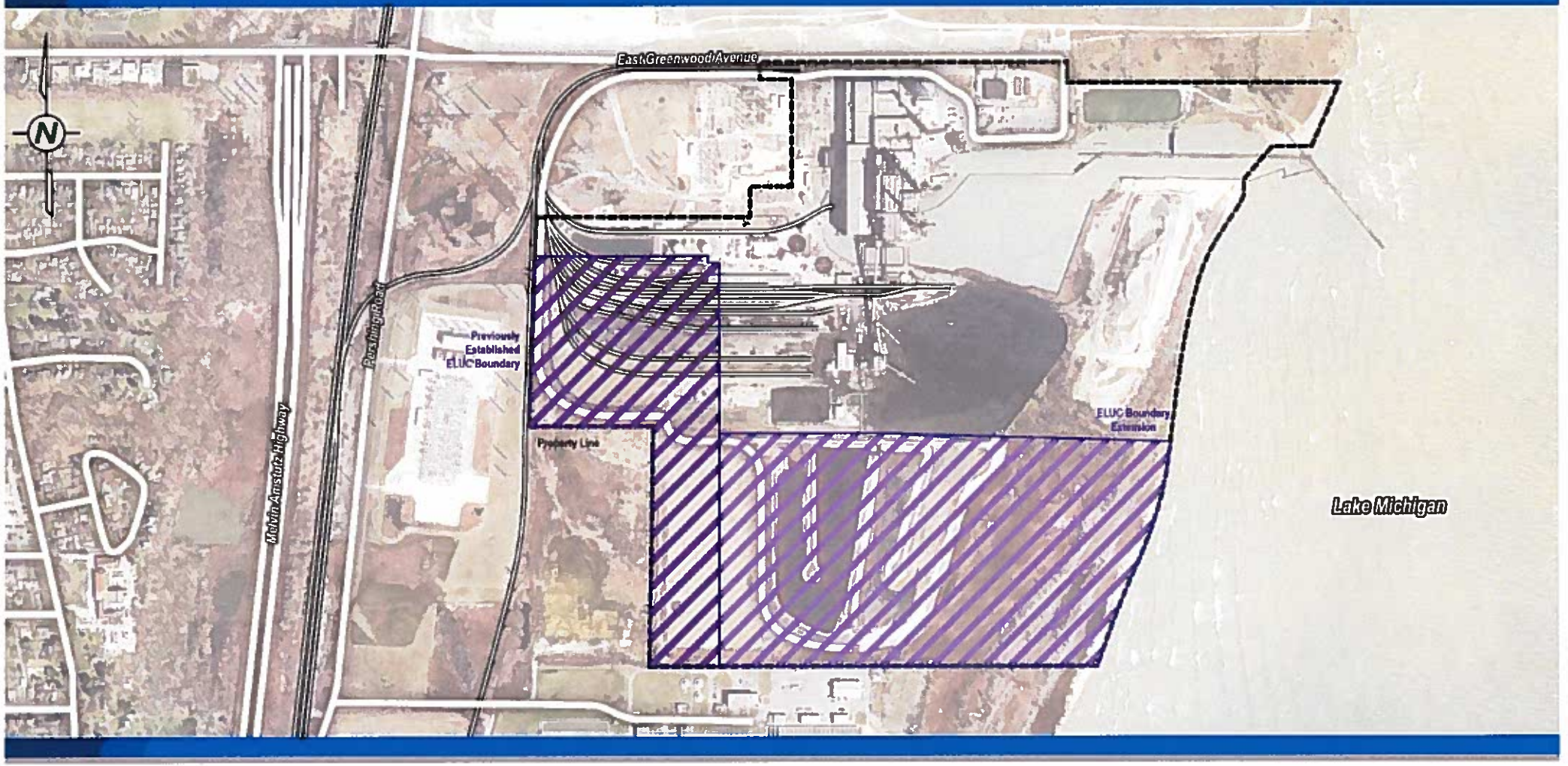
Constituent	Constituent is an Indicator of Leachate from Ash Currently Stored in Impoundments [1]	Constituents Detected During Most Recent Year (2016-Q3 to 2017-Q2) of Quarterly Groundwater Monitoring [2]						
		Waukegan Generating Station						
		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-07
Arsenic		x	x	x	x	x	x	x
Barium	Yes (Table 5-1)	x	x	x	x	x	x	x
Boron	Yes (Table 5-1)	x	x	x	x	x	x	x
Copper								x
Iron					x	x	x	x
Lead								x
Manganese			x	x	x	x	x	x
Nickel						x		
Selenium		x	x	x	x	x	x	
Sulfate	Yes (Table 5-1)	x	x	x	x	x	x	x
Number of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [3]		2	3	3	4	5	4	5
Percentage of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [4]		40%	50%	50%	57%	63%	57%	63%

Waukegan – Updated Table 5-4

Quarterly Groundwater Monitoring (2016-Q3 to 2017-Q2) Compared to Indicators in Impoundments/ponds (EPRI, 2006)

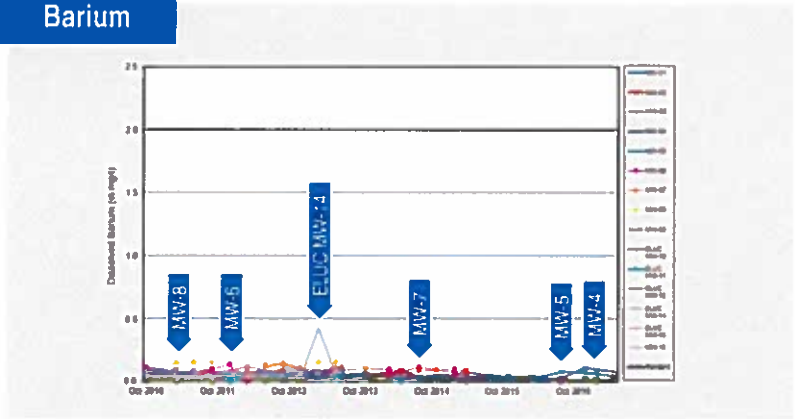
Constituent	Constituent is an Indicator of Leachate from Ash in Impoundments [1]	Constituents Detected during Most Recent Year (2016-Q3 to 2017-Q2) of Quarterly Groundwater Monitoring [2]						
		Waukegan Generating Station						
		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7
Antimony	Yes (Table 5-2)							
Arsenic	Yes (Table 5-2)	x	x	x	x	x	x	x
Barium	Yes (Table 5-2)	x	x	x	x	x	x	x
Boron	Yes (Table 5-2)	x	x	x	x	x	x	x
Cadmium	Yes (Table 5-2)							
Chromium	Yes (Table 5-2)							
Cobalt	Yes (Table 5-2)							
Copper	Yes (Table 5-2)							x
Iron					x	x	x	x
Lead	Yes (Table 5-2)							x
Manganese	Yes (Table 5-2)		x	x	x	x	x	x
Mercury	Yes (Table 5-2)							
Nickel	Yes (Table 5-2)					x		
Selenium	Yes (Table 5-2)	x	x	x	x	x	x	
Sulfate	Yes (Table 5-2)	x	x	x	x	x	x	x
Zinc	Yes (Table 5-2)							
Number of Observed Constituents that are not Consistent with Indicators of Leachate from Ash in Impoundments [3]		10	9	9	10	9	10	9
Percentage of Observed Constituents that are not Consistent with Indicators of Leachate from Ash in Impoundments [4]		63%	56%	56%	63%	56%	63%	56%

Waukegan

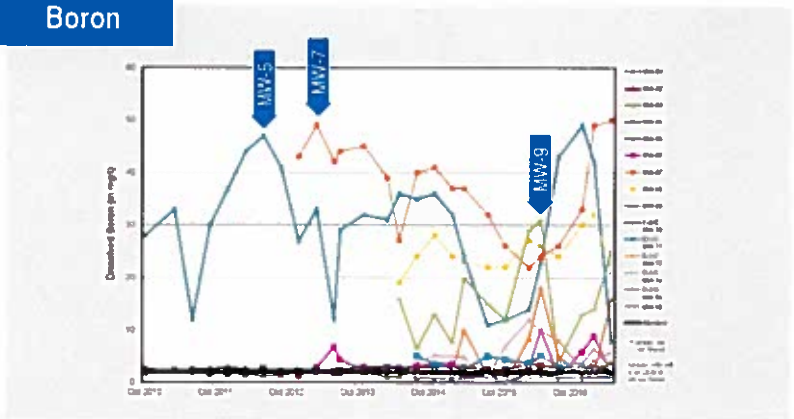

East Greenwood Avenue
Pershing Road
Melvin Arnstutz Highway
Previously Established ELUC Boundary
Property Line
ELUC Boundary Extension
Lake Michigan

Waukegan

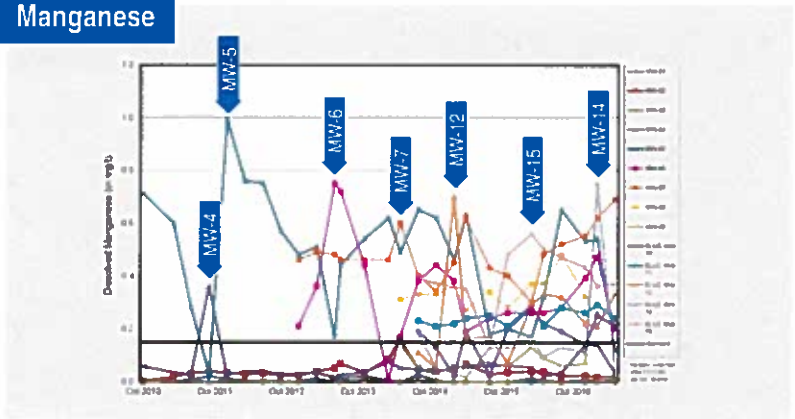
Barium



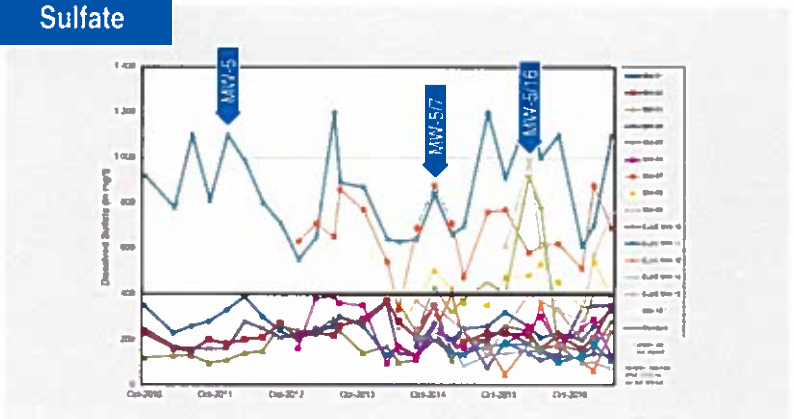
Boron



Manganese



Sulfate



Waukegan

Updated Groundwater Constituent Temporal Trend Testing Results

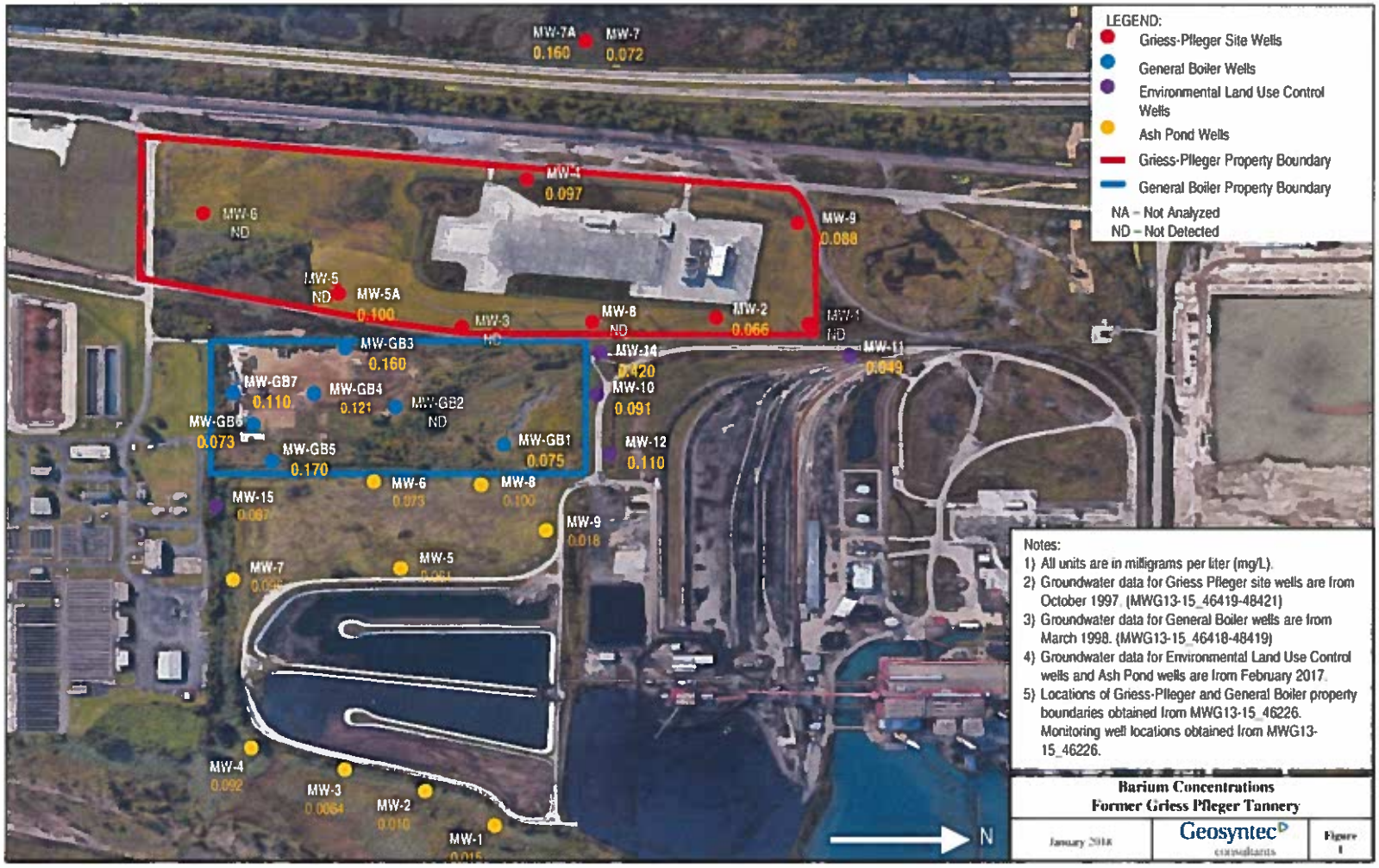
Monitoring Well	Barium		Boron		Manganese		Sulfate	
	Trend Direction [a]	Slope (mg/L/yr)	Trend Direction [a]	Slope (mg/L/yr)	Trend Direction [a]	Slope (mg/L/yr)	Trend Direction [a]	Slope (mg/L/yr)
MW-01	Decreasing	-0.0026	Decreasing	-0.093	Decreasing	-0.0010	Decreasing	-8.3
MW-02	No conclusion	--	Increasing	0.22	No conclusion	--	No conclusion	--
MW-03	No conclusion	--	Increasing	0.11	No conclusion	--	Increasing	10
MW-04	Increasing	0.0048	No conclusion	--	No conclusion	--	No conclusion	--
MW-05	Decreasing	-0.0019	No conclusion	--	Decreasing	-0.035	No conclusion	--
MW-06	No conclusion	--	Increasing	0.49	Decreasing	-0.033	Decreasing	-19
MW-07	No conclusion	--	Decreasing	-2.1	Increasing	0.022	No conclusion	--
MW-08	No conclusion	--	No conclusion	--	No conclusion	--	No conclusion	--
MW-09	No conclusion	--	No conclusion	--	No conclusion	--	No conclusion	--

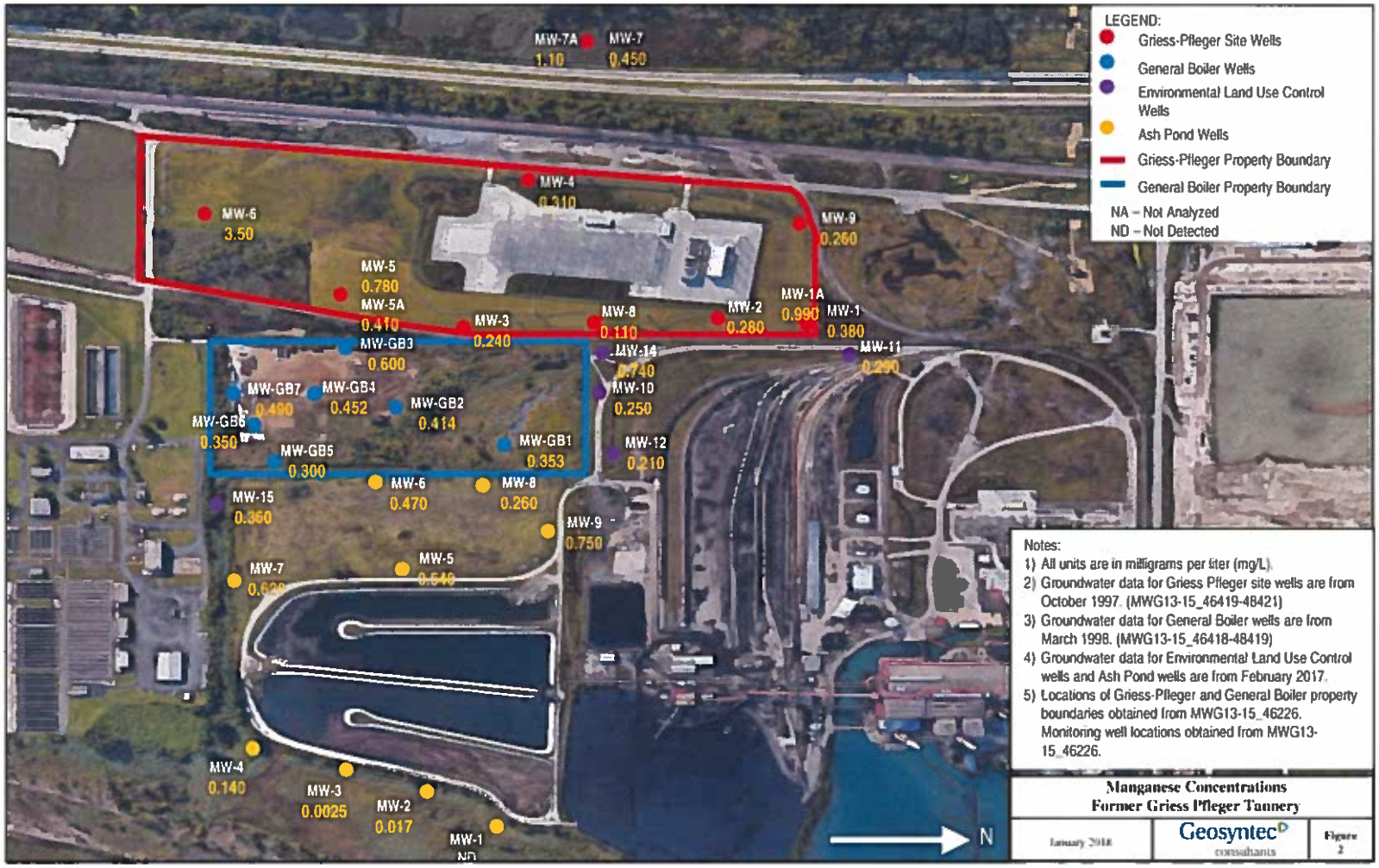
Waukegan

Updated Temporal Trend Testing of Groundwater Concentrations for Site-Specific Indicators of Ash in Ponds

Trend	Barium	Boron	Manganese	Sulfate
Increasing	1 well	3 wells	1 well	1 well
Decreasing	2 wells	2 wells	3 wells	2 wells
No conclusion	6 wells	4 wells	5 wells	6 wells

- Overall, it appears that groundwater concentrations are neither increasing nor decreasing because:
  - The indicators are increasing at 1 to 3 wells out of 9 wells
  - The indicators are decreasing at 2 to 3 wells out of 9 wells
  - No conclusions could be made at 4 to 6 wells out of 9 wells


MW-7A
0.160
MW-7
0.072
MW-4
0.097
MW-6
ND
MW-9
0.088
MW-5
ND
MW-5A
0.100
MW-3
ND
MW-8
ND
MW-2
0.066
MW-1
ND
MW-GB3
0.160
MW-14
0.420
MW-11
0.049
MW-GB7
0.110
MW-GB4
0.121
MW-GB2
ND
MW-10
0.091
MW-GB6
0.073
MW-GB5
0.170
MW-GB1
0.075
MW-12
0.110
MW-15
0.087
MW-6
0.073
MW-8
0.100
MW-9
0.018
MW-7
0.045
MW-5
0.051
MW-4
0.092
MW-3
0.0064
MW-2
0.010
MW-1
0.015
N
LEGEND:
Griess-Pfleger Site Wells
General Boiler Wells
Environmental Land Use Control Wells
Ash Pond Wells
Griess-Pfleger Property Boundary
General Boiler Property Boundary
NA – Not Analyzed
ND – Not Detected
Notes:
1) All units are in milligrams per liter (mg/L).
2) Groundwater data for Griess Pfleger site wells are from October 1997. (MWG13-15_46419-48421)
3) Groundwater data for General Boiler wells are from March 1998. (MWG13-15_46418-48419)
4) Groundwater data for Environmental Land Use Control wells and Ash Pond wells are from February 2017.
5) Locations of Griess-Pfleger and General Boiler property boundaries obtained from MWG13-15_46226. Monitoring well locations obtained from MWG13-15_46226.
Barium Concentrations
Former Griess Pfleger Tannery
January 2018
Geosyntec consultants
Figure 1


MW-7A
1.10
MW-7
0.450
MW-4
0.310
MW-6
3.50
MW-9
0.260
MW-5
0.780
MW-5A
0.410
MW-3
0.240
MW-8
0.110
MW-2
0.280
MW-1A
0.990
MW-1
0.380
MW-GB3
0.600
MW-14
0.740
MW-11
0.290
MW-GB7
0.490
MW-GB4
0.452
MW-GB2
0.414
MW-10
0.250
MW-GB6
0.350
MW-GB5
0.300
MW-GB1
0.353
MW-12
0.210
MW-15
0.360
MW-6
0.470
MW-8
0.260
MW-9
0.750
MW-7
0.620
MW-5
0.540
MW-4
0.140
MW-3
0.0025
MW-2
0.017
MW-1
ND
N
LEGEND:
Griess-Pfleger Site Wells
General Boiler Wells
Environmental Land Use Control Wells
Ash Pond Wells
Griess-Pfleger Property Boundary
General Boiler Property Boundary
NA – Not Analyzed
ND – Not Detected
Notes:
1) All units are in milligrams per liter (mg/L).
2) Groundwater data for Griess Pfleger site wells are from October 1997. (MWG13-15_46419-48421)
3) Groundwater data for General Boiler wells are from March 1998. (MWG13-15_46418-48419)
4) Groundwater data for Environmental Land Use Control wells and Ash Pond wells are from February 2017.
5) Locations of Griess-Pfleger and General Boiler property boundaries obtained from MWG13-15_46226. Monitoring well locations obtained from MWG13-15_46226.
Manganese Concentrations
Former Griess Pfleger Tannery
January 2018
Geosyntec consultants
Figure 2

Will County – Site History and Surroundings

- Operating for 40+ years before MWG (1955)
- Review of Impoundments/Ponds
  - IN and 1S removed from service/1'water
  - 2S and 3S lined and relined
- Pond ash sample results (2010)
- Historic areas and samples (2015)
- Administrative Controls/ GMZ and ELUC
- No potable water wells/no risk to receptors

Will County

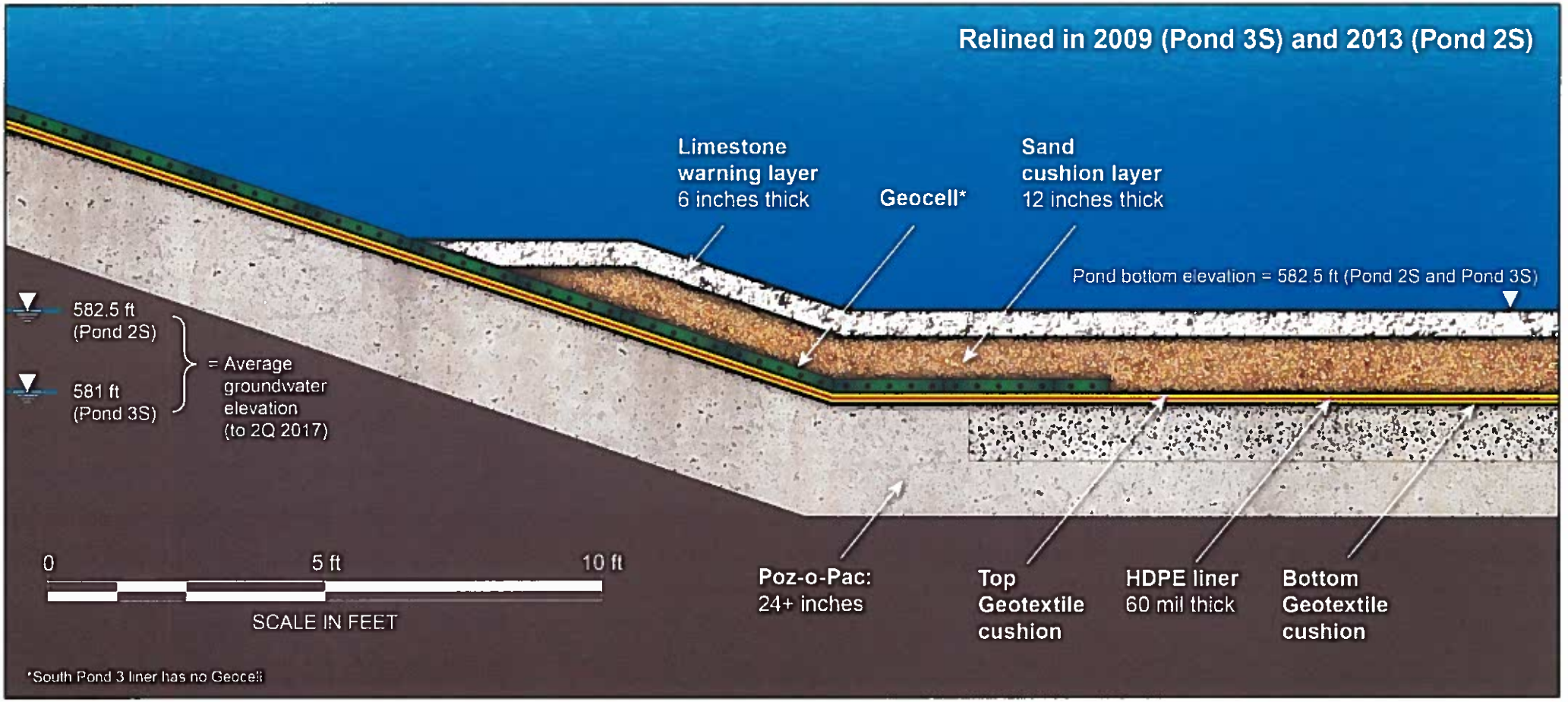
East Romeo Road
Rock Road
Des Plaines River
Pond 1N
CCR Placement Area
Sampled in 2019)
Pond 1S
Ash Pond 2S
Ash Pond 3S
Ash Pond 3S CCR
(Sampled in 2019)
Not Owned
By MWG
New Avenue
Alleged Slag and Bottom Ash
Placement Area
Property Line
Material Road

Will County – Impoundments

Station	Ash Pond	Date Constructed – Liners	Date Relined With HDPE	Scheduled Ash Removal
Will County Only Unit 4 operating Scheduled to close May 2020	Pond 1N and Pond 1S	1977 Poz-o-Pac—36 inches	Removed from service with dewatering systems	NONE 1' remaining water
	Pond 2S	1977 • Bituminous seal coat • Poz-o-Pac—36 inches thick	2013 Poz-o-Pac; geotextile; HDPE; geo-textile; geocell; sand cushion; warning layer	1-2 yrs*
	Pond 3S	1977 • Bituminous seal coat • Poz-o-Pac—36 inches thick	2009 Poz-o-Pac; geotextile; HDPE; geo-textile; sand cushion; warning layer	1-2 yrs

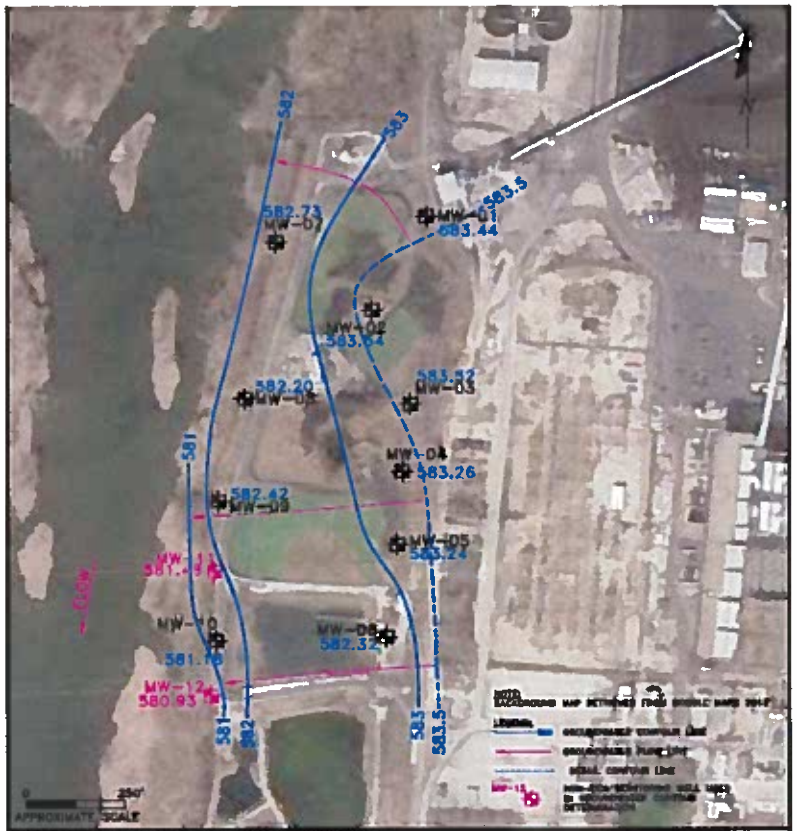
*Maddox testimony

Will County – South Ponds 2 and 3



Will County

East Romeo Road
Rock Road
Des Plaines River
MW-1
MW-2
MW-3
MW-4
MW-5
MW-6
MW-7
MW-8
MW-9
MW-10
MW-11
MW-12
Not Owned By MWG
Property Line
New Avenue
Material Road


582
583
582.73
MW-02
MW-01
583.44
583.5
MW-02
583.64
582.20
MW-08
583.32
MW-03
MW-04
583.26
581
582.42
MW-09
MW-05
583.24
MW-11
581.49
MW-10
581.76
MW-08
582.32
MW-12
580.93
581
582
583
583.5
APPROXIMATE SCALE
KPRG
GROUNDWATER CONTOUR MAP 05/2017
WILL COUNTY STATION
ROMEOVILLE, ILLINOIS
Scale: 1" = 250'
Date: June 22, 2017
KPRG Project No. 12313.3
FIGURE 2

Will County – Updated Table 5-5

Quarterly Groundwater Monitoring (2016-Q3 to 2017-Q2) Compared to Indicators in Impoundments/ponds (MWG site specific analyses)

Constituent	Constituent is an Indicator of Leachate from Ash Currently Stored in Impoundments [1]	Constituents Detected During Most Recent Year (2016-Q3 to 2017-Q2) of Quarterly Groundwater Monitoring [2]									
		Will County Generating Station									
		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10
Arsenic			x	x		x	x	x	x	x	x
Barium	Yes (Table 5-1)	x	x	x	x	x	x	x	x	x	x
Boron	Yes (Table 5-1)	x	x	x	x	x	x	x	x	x	x
Cobalt				x	x				x		
Iron		x	x		x		x	x	x		x
Lead			x								
Manganese		x	x	x	x	x	x	x	x	x	x
Mercury		x			x						
Nickel		x	x	x	x	x	x	x	x	x	x
Selenium		x			x	x	x	x	x	x	x
Sulfate	Yes (Table 5-1)	x	x	x	x	x	x	x	x	x	x
Number of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [3]		5	5	4	6	4	5	5	6	4	5
Percentage of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [4]		63%	63%	57%	67%	57%	63%	63%	67%	57%	63%

Will County – Updated Table 5-4

Quarterly Groundwater Monitoring (2016-Q3 to 2017-Q2) Compared to Indicators in Impoundments/ponds (EPRI, 2006)

Constituent	Constituent is an Indicator of Leachate from Ash in Impoundments [1]	Constituents Detected During Most Recent Year (2016-Q3 to 2017-Q2) of Quarterly Groundwater Monitoring [2]									
		Will County Generating Station									
		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10
Antimony	Yes (Table 5-2)										
Arsenic	Yes (Table 5-2)		x	x		x	x	x	x	x	x
Barium	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x
Boron	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x
Cadmium	Yes (Table 5-2)										
Chromium	Yes (Table 5-2)										
Cobalt	Yes (Table 5-2)			x	x				x		
Copper	Yes (Table 5-2)										
Iron		x	x		x		x	x	x		x
Lead	Yes (Table 5-2)		x								
Manganese	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x
Mercury	Yes (Table 5-2)	x			x						
Nickel	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x
Selenium	Yes (Table 5-2)	x			x	x	x	x	x	x	x
Sulfate	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x
Zinc	Yes (Table 5-2)										
Number of Observed Constituents that are not Consistent with Indicators of Leachate from Ash in Impoundments [3]		9	9	8	8	8	9	9	8	8	9
Percentage of Observed Constituents that are not Consistent with Indicators of Leachate from Ash in Impoundments [4]		56%	56%	50%	50%	50%	56%	56%	50%	50%	56%

Will County

East Romeoville Road
Rock Road
Des Plaines River
Pond 1N
Pond 1S
Ash Pond 2S
Ash Pond 3S
Ash Pond 3S CCR
(Sampled in 2019)
Not Owned
By MWG
Alleged Slag and Bottom Ash
Placement Area
Property Line
Materials Road
New Avenue

Will County

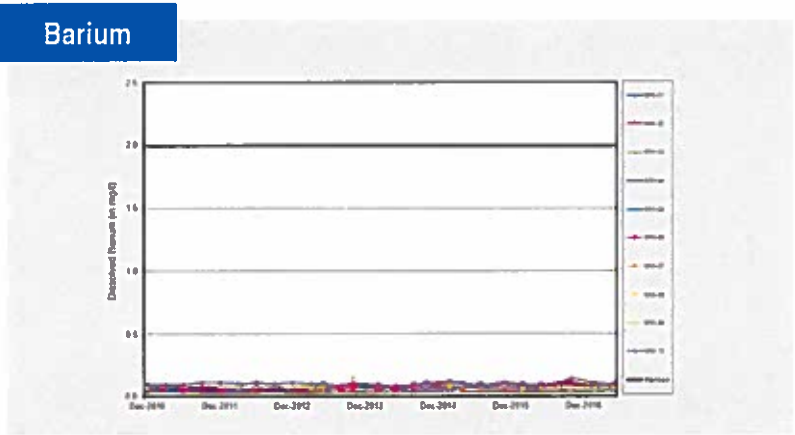
East Romeo Road
Rock Road
Des Plaines River
New Avenue
Property Line
Material Road

Will County

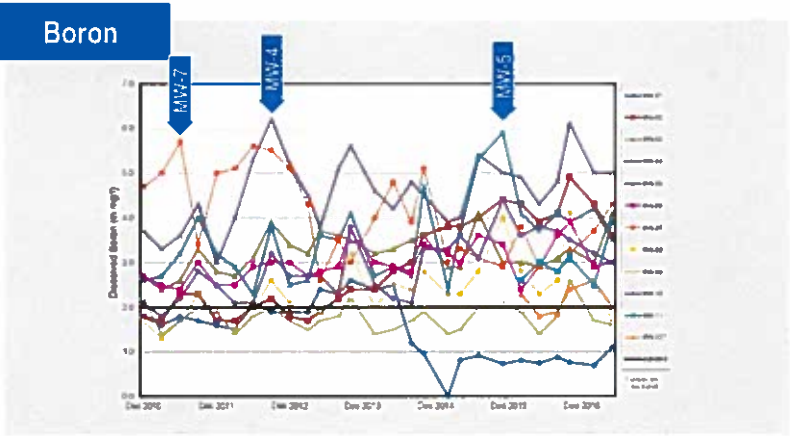
East Romeo Road
Rock Road
Des Plaines River
New Avenue
Not Owned By MWG
ELUC
Property Line
Material Road

Will County

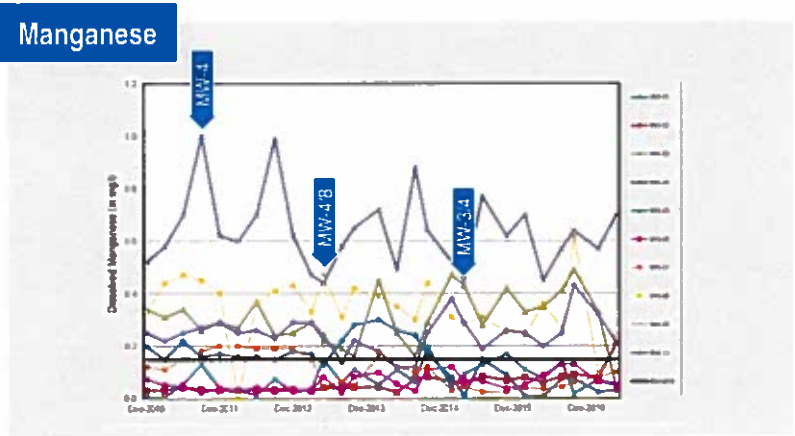
Barium



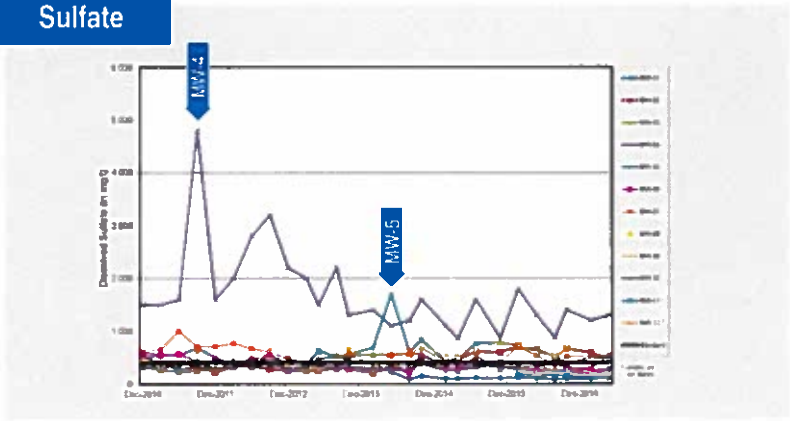
Boron



Manganese



Sulfate



Will County

Updated Groundwater Constituent Temporal Trend Testing Results

Monitoring Well	Barium		Boron		Manganese		Sulfate	
	Trend Direction [a]	Slope (mg/L/yr)	Trend Direction [a]	Slope (mg/L/yr)	Trend Direction [a]	Slope (mg/L/yr)	Trend Direction [a]	Slope (mg/L/yr)
MW-01	Increasing	0.0088	Decreasing	-0.22	Decreasing	-0.026	Decreasing	-61
MW-02	Increasing	0.0065	Increasing	0.49	Increasing	0.014	Increasing	55
MW-03	No conclusion	--	Increasing	0.076	No conclusion	--	No conclusion	--
MW-04	Decreasing	-0.0024	Increasing	0.18	No conclusion	--	Decreasing	-220
MW-05	No conclusion	--	Increasing	0.23	Increasing	0.0098	No conclusion	--
MW-06	Increasing	0.0042	No conclusion	--	Increasing	0.0079	Decreasing	-34
MW-07	Decreasing	-0.0039	Decreasing	-0.3	Decreasing	-0.022	Decreasing	-39
MW-08	Decreasing	-0.0036	Increasing	0.19	Decreasing	-0.016	Increasing	26
MW-09	Increasing	0.00091	No conclusion	--	Increasing	0.00034	Decreasing	-22
MW-10	No conclusion	--	Increasing	0.24	No conclusion	--	Decreasing	-20

Will County

Updated Temporal Trend Testing of Groundwater Concentrations for Site-Specific Indicators of Ash in Ponds

Trend	Barium	Boron	Manganese	Sulfate
Increasing	4 wells	6 wells	4 wells	2 wells
Decreasing	3 wells	2 wells	3 wells	6 wells
No conclusion	3 wells	2 wells	3 wells	2 wells

- Overall, it appears that groundwater concentrations are neither increasing nor decreasing because:
  - The indicators are increasing at 2 to 6 wells out of 10 wells
  - The indicators are decreasing at 2 to 6 wells out of 10 wells
  - No conclusions could be made at 2 to 3 wells out of 10 wells

Exhibit 35

Exhibit 35

Expert Report of John Seymour, P.E.

I have prepared this Expert Report on behalf of Midwest Generation, LLC (MWG) to present my opinions and to address the two expert reports issued by M. James R. Kunkel in the Matter of:

SIERRA CLUB, ENVIRONMENTAL LAW AND POLICY CENTER, PRAIRIE RIVERS NETWORK, and CITIZENS AGAINST RUINING THE ENVIRONMENT
Complainants,
v
MIDWEST GENERATION, LLC,
Respondent
PCB 2013-0015

Section 1: INTRODUCTION

1.1. Background

Since 1999, MWG has operated four electric generating stations at issue in this matter: the Joliet #29 Generating Station ("Joliet #29") located in Joliet, Will County, Illinois; the Powerton Generating Station ("Powerton") located in Pekin, Tazewell County, Illinois; the Waukegan Generating Station ("Waukegan") located in Waukegan, Lake County, Illinois; and the Will County Generating Station ("Will County") located in Romeoville, Will County, Illinois. Prior to 1999, the stations were operated by other entities and pre-1999 documents identify historic areas where ash was placed.[1]

Each of the generating stations includes active ash ponds as an integral part of the generating stations' wastewater treatment systems (MWG Facility NPDES Permits).[2] All of the ash ponds are permitted pursuant to MWG's NPDES permits (IL0064254, IL0002232, IL0002259, and IL0002208) and operate pursuant to the limits, terms, and conditions of the permits. All of the active ash ponds at the MWG facilities are fully lined with 60 mil-thick high density polyethylene (HDPE) liners.

In 2010, MWG voluntarily agreed to Illinois EPA's request to perform hydrogeological assessments around the ash ponds at its generating stations.[3] On June 11, 2012, based on the results of the hydrogeological assessments, Illinois EPA issued Violation Notices (VN) to MWG alleging violations of

[1] MWG13-15_8502-8536, MWG13-15_11966-12040, MWG13-15_29502-29532, MWG13-15_25139-25167

[2] MWG's Answer and Defenses to Second Complaint, Answers to Complaint ¶¶1, 3, 5, 7

[3] MWG13-15_364; MWG13-15_384; MWG13-15_407; MWG13-15_421

EXHIBIT
tabbies MWG 903

groundwater quality standards purportedly caused by the ash ponds.[4] The VNs listed exceedances of the groundwater quality standards for specific constituents at each station, such as chloride, antimony, and boron.[5]

MWG responded to the VNs, disputing that the ponds were the cause of groundwater exceedances.[6] MWG explained that the ash ponds are not disposal sites because the ash is routinely removed and that the alleged groundwater exceedances were inconsistent and did not show a connection to the ash ponds. Illinois EPA and MWG agreed on a Compliance Commitment Agreement (CCA) for each MWG station to resolve the VNs.[7]

As the CCAs were finalized,[8] Complainants filed a Complaint against MWG alleging open dumping violations, violations of Section 12 of the Illinois Environmental Protection Act, and violations of the Pollution Control Board groundwater regulations (35 Ill. Adm. Code 620.115, 620.301(a), and 620.405). Complainants later amended their Complaint to include historic filled areas on the sites. In support of their Complaint, Complainants presented two reports by James R. Kunkel.[9]

1.2. Contents of Opinion

I have reviewed the Kunkel reports and provide my assessment and opinions, below. In addition, I reviewed operational information, monitoring data, construction data and other documents for each of the stations to develop my opinions. Each of my opinions is supported by a reasonable degree of scientific certainty. The following outlines my approach to support my opinion:

- Section 2: Overview of Opinions
- Section 3: Credentials of John Seymour, P.E.
- Section 4: Summary of Current Conditions and Conceptual Site Models (CSM)
- Section 5: Opinion 1—MWG's Actions are Appropriate for the Sites and are Protective of Human Health and the Environment
- Section 6: Opinion 2—The Remedial Approach Provided in the Kunkel Remedy Report is Not Warranted

[4] MWG13-15_328-358
[5] MWG13-15_328-358
[6] MWG13-15_364-437
[7] MWG13-15_553-572, 553-575
[8] MWG13-15_795-806
[9] Kunkel, 2015a and 2015b

- Section 7: Opinion 3—Kunkel Underestimates the Costs to Implement the Unwarranted Cleanup
- Section 8: Reservation
- Section 9: Signature
- Section 10: Acronyms
- Section 11: Works Cited
- Figures and Tables
- Appendix A: John Seymour Curriculum Vitae
- Appendix B: Surface Water Risk Characterization

Section 2: Overview of Opinions

Opinion 1: MWG's Actions are Appropriate for the Sites and are Protective of Human Health and the Environment.

It is my opinion that MWG's actions at each plant site are appropriate for the measured groundwater impacts and are protective of human health and the environment. This opinion is based on the following:

- An approach that eliminates the exposure pathways to address the potential groundwater impacts is appropriate.
- Establishment of administrative controls such as Groundwater Management Zones (GMZ) and/or Environmental Land Use Controls (ELUC) are effective remedial approaches to reduce the exposure of potential groundwater impacts, are remediation industry-accepted approaches, and are approved State of Illinois methods.
    - GMZs are specified for sites undergoing corrective actions under Title 35, IAC Sections 620 (Bureau of Water) and 740 (Bureau of Land).
    - A minimum of 10 sites in Illinois currently have GMZs established by the IEPA Bureau of Water. IEPA Bureau of Water has not reported any groundwater violations for sites with GMZs.
    - The IEPA Bureau of Land has implemented on the order of 100 ELUCs.[10]
    - ELUCs and GMZs allow control of groundwater use along the exposure pathways by eliminating the ingestion pathway and dermal contact pathway while corrective action is underway.
        - The groundwater ingestion pathway is eliminated by restricting the installation of potable water wells in the area of the GMZs and ELUCs.
        - The dermal contact pathway is eliminated by restricting the access of the industrial properties to only trained workers.
- All of the active ponds were relined to eliminate a potential exposure pathway.
    - The relining of the CCR Ponds with 60-mil thick HDPE is an industry-accepted remediation approach to reduce the potential for groundwater impacts.

[10] The IEPA Bureau of Land also has approved GMZs for many sites.

- The relining of the CCR Ponds was completed and inspected by an independent third party under construction quality assurance protocols and documented to be completed in accordance with the design documents or subsequently inspected by a qualified third party.

- The lined ponds are properly operated and maintained, which is the industry-accepted standard approach to preclude groundwater impacts. The operation and maintenance is being completed under consistent protocols.
- Groundwater monitoring is an accepted method to assess a remedial approach.
- I reviewed recent groundwater monitoring data and literature on liners to identify if liner defects were likely and if leaks of leachate through alleged liner defects could be impacting groundwater at the subject sites. It is my opinion that groundwater concentrations are not the result of leaks of leachate from the ash currently stored in lined ponds, as outlined below.
    - The leachate from bottom ash currently stored in ash ponds contains constituents at levels that do not exceed IEPA Class I groundwater standards based on neutral leaching analyses of site-specific samples, indicating that the bottom ash in the ponds is not a source of impact to groundwater.
    - The characteristics of ash leachate were identified based on site-specific impounded ash data or on published leachate data from ponds of subbituminous CCR sourced from the Powder River Basin (PRB) in Wyoming that is the source of coal ash from the Plants.
    - The profiles of the constituents in the groundwater do not match the profiles of leachate constituent indicators in the ponds at all four plant sites. This is based on a comparison of the occurrence of groundwater constituents detected in 2014 compared to minimum and maximum sets of indicators of leachate from ash stored in ponds.
- Groundwater conditions do not pose risks to surface water based on Illinois Water Quality Standards and Illinois Water Quality Criteria that are issued by the State of Illinois to be protective of human health and the environment. An assessment of human and ecological receptors in surface water indicates that there is no risk to the surface water environment at each site based on regulatory risk standards and standards of practice for risk assessments. The potential surface water risks were evaluated using a screening level

approach that compared concentrations in groundwater to Illinois Water Quality Standards (WQS) or Water Quality Criteria (WQC).

- Historical ash in fill materials outside of the ponds is not a source and is not a risk to human health and the environment.
    - Ash generated by coal combustion may be classified as CCB when there is beneficial use determined by IEPA as established in 415 Illinois Compiled Statutes 5/3.135. It is analogous to compare the current condition of CCB to the current IEPA criteria. In my opinion, the presence of CCB outside of the pond areas is acceptable for engineering considerations when compared to Illinois requirements.
    - Data obtained from recent samples of ash used as fill from multiple sites show that leachate from the ash meets IEPA Class I standards based on leaching from a soil-like environment.

Opinion 2: The Remedial Approach Provided in the Kunkel Remedy Report is Not Warranted.

It is my opinion that the remedial approach in the Kunkel Remedy Report, which is removal of all CCRs and the ash ponds, is not warranted. In addition to Opinion 1, removal is unwarranted because:

1. based on the concentrations of COIs that have been observed in groundwater around the ponds, MWG's remedial approach is protective of human health and the environment;
2. the concentrations of bottom ash indicator constituents from leachate do not match the groundwater chemistry. This shows that the constituents in groundwater are not from the ponds, the ponds are functioning in accordance with the design, and the ponds do not need to be removed;
3. there is no evidence that historical coal ash outside of the ash ponds is a current source of groundwater impact that needs to be removed; and
4. Kunkel did not follow the Illinois procedures for investigations and remedial activities.

Further, there are many inaccuracies in the Kunkel Expert Report on Ground-Water Contamination that, in general, incorrectly imply that groundwater is more threatened than supported by the data.

The following is provided to demonstrate this opinion:

- The ash ponds do not need to be removed because they are for wastewater treatment purposes and are not landfills for permanent ash disposal.
- The ash ponds are not a source of groundwater impacts because they are lined with 60-mil high density polyethylene (HDPE), which was the accepted standard of the ash pond lining industry, and there is no evidence that the liners are leaking. The liner construction quality is consistent with the ash pond lining quality management standards for long-term use.
    - The liner subgrade was inspected for sharp surfaces prior to installation of the HDPE liner and a protective geotextile was installed below the HDPE liner to avoid the potential for puncture.
    - Available literature on liners concludes that tears usually occur upon placement of overlying cushion and warning materials. MWG avoided this issue by inspecting the HDPE liner for leaks typically after installation of a protective sand cushion layer using the state of the practice electronic leak detection survey technologies.
    - Warning and cushion layers are installed above the HDPE liners to protect them from accidental contact and damage during future dredging operations.
    - The quality of construction was documented by an independent engineering firm that attested that the construction met the project drawings and specifications and manufacturer's recommendations, or subsequently inspected by a qualified third party.
- Operation and maintenance (O&M) of the ash ponds will avoid future leaks because O&M are conducted in accordance with consistent operating procedures that include:
    - Periodic dredging of settled bottom ash is carefully performed using excavators. If the excavator bucket were to encounter the stone warning layer, which is located over the protective layer, which in turn is located over the HDPE liner, it would be obvious to the operator who is instructed to stop excavating. If the HDPE liner was encountered, white HDPE material would be visually observed in the bucket by the excavator operator who would stop work.
    - Previous tears observed in the ash pond liners have been above the impounded water surface with one exception. Tears above impounded water would not be expected to result in leaks. Only one tear was discovered in a pond liner that was below the level of impounded ash and water at the Will County Ash Pond 3S; this

tear occurred when no water was in Ash Pond 3S and was repaired prior to refilling water to the level of the tear in the ash pond. All observed tears were repaired.

- Kunkel incorrectly concludes that all of the former ash ponds leaked and the current ash ponds are leaking. He asserts that the groundwater elevations are above the bottom of the ponds or pond water surface and in turn causing bottom heave. He is incorrect on several bases. First, an uplift pressure argument is relative to the top of the bottom liner. Second, an uplift argument is an issue for soil liners, not geomembrane liners that are at all of the ponds. Third, groundwater levels are not often above the top of the bottom liners and when they are above the bottom liner there are other opposing forces or controls to eliminate uplift.
- Kunkel incorrectly asserts that hydrostatic uplift is causing liner failure for multiple ash ponds. Kunkel does not account for the fact that the hydrostatic uplift pressures at the two ponds where the groundwater levels are above the bottoms of the ponds are resisted by the weight of the sand and protective layers and the weight of overlying pond water.
- Kunkel is incorrect by alleging that there is groundwater mounding at Joliet #29. Kunkel alleges that mounding is occurring by selecting the single highest water level value at MW-9. Yet, the years of data shows the average water level in MW-9 is lower than MW-8, rebutting any notion of a groundwater mound.
- Kunkel is incorrect by alleging that there is groundwater mounding at Waukegan. Kunkel alleges that mounding is occurring based on high groundwater elevations below the pond. My analysis of groundwater contours indicates that the contours reflect the surrounding surface topography.
- Kunkel incorrectly portrays background concentrations by using state-wide data for groundwater at the Joliet #29, Waukegan, and Will County sites. It is my opinion that this approach is inappropriate and also fails to account for those sites where upgradient groundwater is impacted prior to migrating on-site.

Opinion 3: In Addition to Being an Unwarranted Remedy, Kunkel's Remedy Cost Opinion Underestimates the Costs to Implement the Unwarranted Cleanup.

Even if the unwarranted remedy recommended by Kunkel were to be implemented, the Kunkel Remedy Report significantly underestimates the cost of his proposed cleanup.

- Kunkel's proposed remedy fails to incorporate the costs of disposal at a permitted landfill. I estimated the disposal costs associated with Kunkel's proposed remedy to be on the order of $178,000,000 in total for all four sites. This increases the total estimated cost of the unwarranted remedy by 68 percent.
- Kunkel's proposed remedy, consisting of removal of ash-impacted soil and backfilling, results in significant disruptions of the electricity generation facilities. As examples:
    - Kunkel's estimates include areas below equipment such as switchyards, coal handling and transfer equipment, and cooling water conveyance and treatment equipment. Given Kunkel's estimates of the areas and thicknesses of coal ash in these areas, equipment would be down on the order of years at each plant, during which time the plants will experience significant outages and extensive costs to dismantle and reassemble equipment and underground utilities, roadways, etc. and would cause lost service to public and industrial users.
    - The cost to remove and replace the equipment is not included in the cost estimate.
- Kunkel's proposed remedy results in significant impacts to the surrounding communities, including dust, noise, and traffic. Of particular concern is the increased risk of vehicle crashes involving large trucks.
    - Based on Kunkel's estimates of volume of ash-impacted soils, off-site disposal is anticipated to create on the order of 17,000,000 miles of large truck traffic for the four sites.
    - The large amount of truck traffic would be a significant nuisance to the neighboring communities from:
        - The increased road dust and increased road traffic; and
        - The human health risk of large truck crashes (1.42 fatalities per 100,000,000 miles). Based on the above mileage estimate, the human health risk of Kunkel's proposed remedy is on the order of ¼ fatalities and 4.6 injuries based on large traffic crashes alone.

- Therefore, the risk of removal of all coal ash and trucking to an offsite facility is not supported by the risk of leaving the existing materials in place, which is essentially no risk to human health and the environment.

- Kunkel's proposed remedy also fails to consider the impact of vehicle carbon dioxide emissions on climate change. I estimate the carbon dioxide emissions from the large truck traffic and excavation equipment to be on the order of 30,000 tons.

Section 3: Credentials of John Seymour, P.E.

3.1. Introduction

I am a geotechnical engineer with nearly three decades of experience in the U.S., Canada, Spain, Guatemala and Korea in the areas of site remediation, high-rise building deep foundations, and construction management. I have focused on waste management and remediation (Superfund (CERCLA) and RCRA) projects for 25 years, with significant involvement in 17 sites providing professional services in the areas of project management, project coordination (client representative), site characterization, feasibility studies, bench/pilot studies, civil/geotechnical design, construction quality assurance (CQA), and operation and maintenance.

I have completed field studies including geologic and hydrogeologic studies, aquifer testing, seismic surveys, landfill settlement tests, and the characterization of volatile organic compounds (TCE and by-products), semi-volatile organic compounds, PCBs, metals, and saline groundwater intrusion. In addition, I have geotechnical engineering experience with the design and construction of deep foundations, including drilled piers, tie backs, foundation grouting and soil improvement programs, and diaphragm (slurry) walls.

My full curriculum vita is attached as Appendix A.

3.2. My relevant experience

I have provided coal combustion residuals (CCRs) engineering services, regarding management of fly ash, bottom ash and flue gas desulfurization (FGD) waste for ponds and landfills. These services have included geotechnical and environmental evaluations of waste disposal expansions, operations and closure, disposal permit application preparation, for eight U.S coal power generation clients. Overall I have provided relevant consulting engineering services for 7 CCRs ponds and 14 CCR landfills and provided records review, evaluation and engineering scope of work development for 4 additional CCR ponds. I have translated some of this experience into 11 technical papers and completed 2 research guidance documents on CCR ponds (co-investigator), and provided 10 technical presentations at conferences including at conferences focusing on CCR management. The specific types of services I have provided are: investigation of the subsurface soils and bedrock (geology) at CCR disposal sites; CCR waste characterizations in various settings; characterization of site hydrogeology through use of monitoring wells and piezometers and conducting aquifer hydraulic testing; engineering feasibility

studies of potential configurations of new ash disposal facilities and expansion of existing ash disposal facilities, including economic evaluations; design engineering management for geotechnical, stormwater, wastewater treatment, and remediation projects; characterization of the nature and extent of contamination and associated risks; construction quality assurance/quality control (QA/QC) plans and implementation; and project management and construction management.

3.3. Materials Reviewed

In order to develop my opinions in this matter, with the assistance of my staff, I reviewed site histories, analyzed facts, reviewed monitoring data, conducted assessments and calculations of risks, and assessed potential impacts. The documents I relied upon are cited within this report.

Section 4: Summary of Current Conditions and Conceptual Site Models

4.1. Joliet #29

4.1.1. Site Description, Site History, and Neighboring Properties

The Joliet #29 site is located along the Des Plaines River in Section 19, Township 35 North, Range 10 East, in the City of Joliet, Will County, Illinois.[11] The Joliet #29 site encompasses approximately 271 acres.[12] The current land use is for coal-fired steam electric power generation.[13] The facility has two generating units each consisting of two boilers and twin turbines that were installed in 1965 to 1966.[14] The Joliet #29 site is in an industrial area; the former Caterpillar, Inc. manufacturing facility is adjacent to the west and there are additional industrial facilities to the north and east.

4.1.2. Description of CCR Management

Fly ash generated by coal combustion is collected using electrostatic precipitators and then transported off-site for beneficial reuse.[15] Bottom ash from the boilers is mainly conveyed automatically by an enclosed pipe system across the Des Plaines River to a permitted landfill.[16] Prior to October 12, 2015, a small fraction of the bottom ash slurry (approximately 5 to 10 percent) was pumped to Ash Pond 1 or Ash Pond 2 for settling when the conveyor system is offline.[17] Subsequently, Ash Pond 1 has been taken out of service and all ash has been removed.[18] Ash Pond 3 is used as a finishing pond for the effluent and is considered to receive a *de minimus* amount of ash.[19] Bottom ash is collected from ash ponds and is transported off-site for disposal in a permitted landfill. Treated water is either recycled or discharged to the Des Plaines River under a National Pollutant Discharge Elimination System (NPDES) Permit.[20]

The following summarizes the approximate dimensions and capacities of Joliet #29 ash ponds[21]:

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[11] Patrick, 2010a
[12] MWG13-15_25147
[13] In addition, an industrial wastewater treatment plant formerly existed at the site.
[14] MWG13-15_25147
[15] MWG13-15_25154
[16] MWG13-15_25152; Deposition of Jim DiCola, p. 49
[17] Deposition of Jim DiCola, p. 49.
[18] Teleconference with Pete O'Day
[19] Teleconference with Harrison Estepp; MWG13-15_49742-MWG13-15_49753
[20] MWG13-15_18155; MWG13-15_44279
[21] MWG13-15_30-32

- Ash Pond 1: 168 feet by 419 feet with a depth of 19 feet; capacity is approximately 2,000,000 cubic feet (ft^3)
- Ash Pond 2: 168 feet by 419 feet with a depth of 19 feet; capacity is approximately 2,000,000 ft^3
- Ash Pond 3: Non-rectangular shape with length 340 feet and widths varying between 80 feet and 220 feet; capacity is approximately 1,100,000 ft^3

Construction history and information is provided in Section 5.3.2.1.

4.1.3. Geological Setting

The regional geology beneath the Joliet #29 site consists of approximately 5 to 30 feet of sandy loam, underlain by Silurian Dolomite to approximately 176 feet below ground surface, and Maquoketa shale from approximately 176 to 241 feet below ground surface based on water well logs. The Maquoketa shale is an aquitard that separates the shallow groundwater in the unconsolidated units and the Silurian dolomite from the underlying aquifers.[22]

MWG submitted the results of a potable water well investigation to the Illinois EPA by letter dated July 15, 2009 that identified 17 potable/industrial use wells located within a 2,500-foot radius of the Joliet #29 ash ponds.[23] Only two of the wells (Numbers 19 and 4) are located downgradient from the ash ponds. Both of these industrial use wells are owned by MWG, are drilled at 1,525 feet below ground surface, and are screened below the Maquoketa shale, the primary aquitard separating shallower aquifers from the screened interval of the MWG wells.[24] These wells have consistently been in compliance with the potable water regulations.[25]

Groundwater flow in the shallow, unconsolidated aquifer is mainly controlled by the Des Plaines River with groundwater flowing towards the river during most periods of the year.[26] Groundwater flow in the deeper aquifers is controlled by the regional hydraulic gradient in these aquifers, which is to the northeast.[27]

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[22] Patrick, 2011a
[23] Patrick, 2011a
[24] Patrick, 2011a; MWG13-15_293-305
[25] MWG13-15_293-305
[26] Patrick, 2011a
[27] Patrick, 2011a

4.1.4. Site-Specific Lithology

I reviewed boring logs and summarize the following lithology generally observed at Joliet #29: fill of varying soil materials was observed near the surface at most locations; at certain borings, ash or cinders were observed in fill materials. Within the vadose zone, unsaturated soils included fine to coarse sand and gravel, limestone fragments, clay, silty clay, and sandy silt. In the shallow aquifer, saturated soils included fine to coarse sand and gravel, limestone fragments, and silty clay. Limestone bedrock was recorded at one boring (B-MW-6) at a depth of 38.5 feet bgs.[28]

4.1.5. Site-Specific Groundwater Elevations

Groundwater elevations at the 11 monitoring wells at the Joliet #29 site (see Figure 4-1) during the period of record varied between 503.94 feet above MSL (at monitoring well MW-4 in May 2013) to 512.33 feet above MSL (at monitoring well MW-2 in September 2012) as summarized in Table 4-1. The highest groundwater elevation is typically found at monitoring well MW-11 during the period of record. The lowest groundwater elevation is typically found at either monitoring well MW-1 or MW-5.[29] Based on my review of the groundwater elevations, groundwater generally flows south to the Des Plaines River.

4.1.6. Site-Specific Groundwater Conditions

I reviewed groundwater concentrations at monitoring wells at the Joliet #29 site, and it is my opinion that there is no groundwater plume. Constituents of interest (COI) that were observed at concentrations exceeding IEPA Class I groundwater standards are listed in Table 4-2. The data shows that there is no spatial trend in COI concentrations in the direction of the groundwater flow. Furthermore, the observed COI concentrations intermittently exceed IEPA Class I groundwater standards. Without evidence that there is spatial or temporal consistency in groundwater impacts, it is my opinion that there is no plume at the Joliet #29 site. Without the existence of a plume, there is no support that there is a source area remaining at the site that could be remediated to reduce groundwater concentrations.

Groundwater conditions at Joliet #29 are impacted by upgradient off-site sources; for example, chloride was found upgradient away from the Joliet ash pond area. See Section 6.5.7.

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[28] Patrick, 2011a

[29] MWG13-15_48653-55

4.2. Powerton

4.2.1. Site Description, Site History, and Neighboring Properties

The Powerton site is located along the Illinois River in Section 9, Township 24 North, Range 5 West in the City of Pekin, Tazewell County, Illinois.[30] The Powerton site encompasses approximately 1,710 acres, which includes 1,440 acres of Powerton Lake.[31] The current land use is for coal-fired steam electric power generation. The facility has two active electric generating units (Units 5 and 6) that were installed in 1971 to 1973.[32]

Neighboring properties include a cabinetry manufacturer and railroad to the east and wooded and agricultural areas to the north, west, and south.[33]

4.2.2. Description of CCR Management

Fly ash generated by coal combustion is collected using electrostatic precipitators and then transported off-site for mine reclamation.[34] Bottom ash from the boilers is mixed with water to form a slurry that is pumped to dewatering bins where the water is decanted and sent to the Ash Surge Basin for settling.[35] Bottom ash is collected from ash ponds and is sold and transported off-site by a third-party.[36] Treated wastewater is either recycled or discharged under an NPDES permit.

The following summarizes the approximate dimensions and capacities of Powerton ash ponds[37]:

- Ash Surge Basin: 960 feet by 250 feet with a depth of 14 feet; capacity is approximately 4,100,000 ft^3
- Secondary Ash Settling Basin: approximately 320 feet by 220 feet with an estimated depth of 10 feet; capacity is approximately 590,000 ft^3
- Ash Bypass Basin: approximately 256.5 feet by 135 feet; capacity is approximately 264,900 ft^3

[30] Patrick, 2011b
[31] MWG13-15_8509
[32] MWG13-15_8516
[33] MWG13-15_8517
[34] MWG13-15_49655
[35] MWG13-15_7401
[36] Deposition of Mark Kelly, p. 41
[37] MWG13-15_20-23; MWG13-15_10983

- Metal Cleaning Basin: 350 feet by 120 feet with a depth of 12 feet; capacity is approximately 720,000 ft^3

Construction history and information is provided in Section 5.3.2.2.

4.2.3. Geological Setting

The regional geology beneath the Powerton site consists of approximately 100 to 125 feet of unconsolidated deposits (mainly alluvial sands and gravels with some minor clay), underlain by the Carbondale Formation, which consists of alternating layers of limestone, shale, coal, and underclay. Groundwater flow in the shallow, unconsolidated aquifer is largely controlled by the Illinois River with groundwater flowing towards the river during most periods of the year.[38]

MWG submitted the results of a potable water well investigation to the Illinois EPA by letter dated July 15, 2009 that identified six wells located within a 2,500-foot radius of the Powerton ash ponds. None of these wells are located downgradient from the ash ponds. Two of these wells supply Powerton with water, which have consistently been in compliance with the potable water regulations.[39]

4.2.4. Site-Specific Lithology

I reviewed boring logs and summarize the following lithology generally observed at Powerton: fill materials consisting of fine to coarse sand, gravel, silty clay, and topsoil were observed near the surface; in certain borings, coal cinders were also observed in fill materials. Within the vadose zone, unsaturated soils included the fill materials previously described, fine to coarse sand and gravel, clayey silt, silty clay, silt, and clay. In the shallow aquifer, saturated soils included fine to coarse sand and gravel, trace silt, and clay.[40]

4.2.5. Site-Specific Groundwater Elevations

Groundwater elevations at the 16 monitoring wells at Powerton (see Figure 4-2) during the period of record have varied between 429.94 feet above MSL (at monitoring well MW-3 in December 2012) to 451.84 feet above MSL (at monitoring well MW-12 in May 2013) as summarized in Table 4-3. The highest groundwater elevations are typically found at either monitoring well MW-6 or MW-12 in a shallow, localized saturated clay/silt unit during the period of record. The lowest groundwater elevations are typically found at either monitoring well MW-3 or MW-4 in a more

[38] Patrick, 2011b
[39] Patrick, 2011b; MWG13-15_293-305
[40] Patrick, 2011b

extensive sand unit underlying the clay/silt unit.[41] Based on my review of the groundwater elevations, there are two groundwater units at the site that are hydraulically connected: 1) groundwater in the sand unit generally flows north to the Illinois River, and 2) groundwater in the clay/silt unit flows west toward Powerton Lake.

4.2.6. Site-Specific Groundwater Conditions

I reviewed groundwater concentrations at monitoring wells at the Powerton site, and it is my opinion that there is no groundwater plume. COI that were observed at concentrations exceeding IEPA Class I groundwater standards are listed in Table 4-4. The data show that there is no spatial trend in COI concentrations in the direction of the groundwater flow in either the sand unit or the clay/silt unit. Furthermore, the observed COI concentrations intermittently exceed IEPA Class I groundwater standards. Without evidence that there is spatial or temporal consistency in groundwater impacts, it is my opinion that there is no plume at the Powerton site. Without the existence of a plume, there is no support that there is a source area remaining at the site that could be remediated to reduce groundwater concentrations.

Groundwater conditions at Powerton are impacted by upgradient off-site sources; for example, nitrate is found upgradient, which is not related to COIs found on the Powerton site. See Section 6.5.7.

4.3. Waukegan

4.3.1. Site Description, Site History, and Neighboring Properties

The Waukegan site is located in Section 15, Township 45 North, Range 12 East in the City of Waukegan, Lake County, Illinois. The Waukegan site encompasses approximately 194 acres. The current land use is for coal-fired steam electric power generation. The facility has two active electric generating units (Units 7 and 8) constructed in 1958, and 1962, respectively.[42]

Neighboring properties include the Johns Mansville Company, which is an active Superfund site, to the north, the former site of the General Boiler Company, and the former site of the

[41] MWG13-15_48722-25
[42] MWG13-15_12003-12018

Greiss-Pfleger Leather Tanning Facility to the west, and the North Shore Water Reclamation District publicly owned treatment works to the south.[43]

The Greiss-Pfleger Leather Tanning Facility operated on land hydraulically upgradient of the Waukegan Generation Station. In 2003, at the neighboring property owner's request, MWG established an Environmental Land Use Control (ELUC) on the western side of its property as an institutional control to prevent against exposure to historically contaminated soil and groundwater that has migrated onto MWG's Waukegan site as the result of past industrial activities on the former Greiss-Pfleger Tannery Site.[44] The Greiss-Pfleger Tannery utilized the chromium tanning process, which consisted of nine steps and involved numerous chemicals including sodium sulfate, diethylamine, sulfhydrate, cyanide salts, sulfuric acid, and borax.[45] Analytical results of the groundwater at/from the tannery indicate that certain inorganic constituents, including arsenic, boron, chromium, lead, and mercury, have migrated onto the Waukegan property.[46] Presently there is a switchyard and substation at the former Greiss-Pfleger Tannery site.

4.3.2. Description of CCR Management

Fly ash generated by coal combustion is collected using electrostatic precipitators and then transported off-site for beneficial reuse.[47] Bottom ash from the boilers is mixed with water to form a slurry that is pumped to ash ponds to be treated by settling.[48] Bottom ash is collected from ash ponds and is transported off-site for beneficial reuse.[49] Treated water is either recycled or discharged to a wastewater treatment plant.[50]

The following summarizes the approximate dimensions and capacities of Waukegan ash ponds[51]:

- West Ash Pond: Non-rectangular with length of 972.5 feet and width up to 437.5 feet with a depth of 22.5 feet; capacity is approximately 7,700,000 ft^3

[43] MWG13-15_12003-12018, MWG13-15_48644
[44] MWG13-15_12713–12738
[45] MWG13-15_47089
[46] MWG13-15_217-222, MWG13-15_46600, MWG13-15_45512 and MWG13-15_50086-50092
[47] MWG13-15_12017
[48] MWG13-15_12017
[49] MWG13-15_49679-49700
[50] MWG13-15_7392
[51] MWG13-15_13-15

- East Ash Pond: Non-rectangular with length of 972.5 feet and width up to 437.5 feet with a depth of 22.5 feet; capacity is approximately 6,500,000 ft^3

Construction history and information is provided in Section 5.3.2.3.

4.3.3. Geological Setting

The regional geology beneath the Waukegan consists of approximately 100 feet of sand deposits, underlain by Silurian Dolomite to approximately 360 feet below ground surface, underlain by the Maquoketa shale. The Maquoketa shale is an aquitard that separates the shallow groundwater in the unconsolidated units and the Silurian dolomite from the underlying aquifers. Groundwater in the shallow, unconsolidated aquifer flows towards Lake Michigan, located primarily to the east. Groundwater flow in the deeper aquifers is controlled by the regional hydraulic gradient in these aquifers, which is to the northeast.[52]

MWG submitted the results of a potable water well investigation to the Illinois EPA by letter dated July 15, 2009 that identified eight potable/industrial use wells located within a 2,500-foot radius of the Waukegan ash ponds. There are no potable use wells downgradient of the ash ponds.[53]

4.3.4. Site-Specific Lithology

I reviewed boring logs and summarize the following lithology generally observed at Waukegan. Fill materials consisting of silty clay, clayey silt, gravely clay, silt, sand, fine to coarse gravel, crushed rock, crushed limestone, and cobbles were observed near the surface; in certain borings, coal cinders and ash was observed in fill materials. Within the vadose zone, unsaturated soils included the fill materials previously noted, and fine to coarse sand. In the shallow aquifer, saturated soils included fine to coarse sand and gravel.[54]

4.3.5. Site-Specific Groundwater Elevations

Groundwater elevations at the seven monitoring wells at Waukegan (see Figure 4-3) varied between 579.27 feet above MSL (at monitoring well MW-2 in December 2012) to 584.56 feet above MSL (at monitoring well MW-6 in May 2014) as summarized in Table 4-5. The highest groundwater elevation is typically found at either monitoring well MW-5 or MW-6 during the period of record. The lowest groundwater elevation during each quarterly monitoring event varied between the

[52] Patrick, 2011c
[53] Patrick, 2011c; MWG13-15_293-305
[54] Patrick, 2011c

following monitoring wells: MW-1, MW-2, MW-4, or MW-7.[55] Additional upgradient monitoring wells have been installed and monitored at the Waukegan Site in response to the migration of inorganic constituents from the former Greiss-Pfleger Tannery site. Based on my review of the groundwater elevations, groundwater generally flows east to Lake Michigan. Site-wide groundwater contours for the Waukegan site are provided on Figure 4-4. See Section 6.5.7.

4.3.6. Site-Specific Groundwater Conditions

I reviewed groundwater concentrations at monitoring wells at the Waukegan site, and it is my opinion that there is no groundwater plume. COI that were observed at concentrations exceeding IEPA Class I groundwater standards are listed in Table 4-6. Furthermore, the observed COI concentrations intermittently exceed IEPA Class I groundwater standards.

Groundwater conditions at Waukegan are impacted by upgradient and off-site sources; for example, boron was detected exceeding IEPA Class I groundwater standards in upgradient wells from the former Greiss-Pfleger Tannery site. See Section 6.5.7.

4.4. Will County

4.4.1. Site Description, Site History, and Neighboring Properties

The Will County site is located between the Chicago Sanitary and Ship Canal and the Des Plaines River in Section 2, Township 36 North, Range 10 East, in the City of Romeoville, Will County, Illinois. The Will County site encompasses approximately 215 acres and is used for coal-fired steam electric power generation.[56] The facility has one active electric generating unit (Unit 4) constructed in 1963. Neighboring properties include a former drum restoration operation to the northwest,[57] the Citgo Lemont Refinery to the northeast, Hanson Materials (f/k/a Material Service Corp.) to the south, and a ComEd switchyard to the west. [58]

4.4.2. Description of CCR Management

Fly ash generated by coal combustion is collected using electrostatic precipitators and then transported off-site for beneficial reuse.[59] Bottom ash from the boilers is mixed with water to form

[55] MWG13-15_48908-09
[56] MWG13-15_29509
[57] MWG13-15_13242- 13421
[58] MWG13-15_29509
[59] MWG13-15_29516

a slurry that is pumped to Ash Ponds 2S or 3S for settling.[60] Bottom ash is collected from ash ponds and is transported off-site for beneficial reuse. The slurry water is recycled back into the Station for treatment. In 2010, Midwest Generation ceased using Ash Ponds 1N and 1S, and no additional ash or ash slurry is deposited in those ponds; furthermore, the water levels of Ash Ponds 1N and 1S are not allowed to exceed one foot above the base.

The following summarizes the approximate dimensions and capacities of Will County ash ponds:[61]

- Ash Pond 2S: 350 feet by 178 feet with a depth of 7 feet; capacity is 510,000 ft^3; and
- Ash Pond 3S: 322 feet by 234 feet with a depth of 7 feet; capacity is 530,000 ft^3.

Construction history and information is provided in Section 5.3.2.4.

4.4.3. Geological Setting

The regional geology beneath the Will County site consists of approximately 1 to 5 feet of unconsolidated deposits or fill, underlain by Silurian Dolomite to approximately 140 feet below ground surface; the Silurian Dolomite is underlain by the Maquoketa shale. The Maquoketa shale is an aquitard that separates the shallow groundwater in the unconsolidated units and the Silurian dolomite from the underlying aquifers. Groundwater flow in the shallow aquifer is largely controlled by the Des Plaines River and the Chicago Sanitary and Ship Canal with groundwater flowing towards either of the surface water channels during most periods of the year. Groundwater flow in the deeper aquifers is controlled by the regional hydraulic gradient in these aquifers, which is to the southeast.[62]

MWG submitted the results of a potable water well investigation to the Illinois EPA by letter dated July 15, 2009 that identified nine potable wells within a 2,500-foot radius of the Will County Station ash ponds, seven of which are upgradient of the Station. Two of these wells are located between the Des Plaines River and the Chicago Sanitary and Ship Canal. Both of these wells are drilled more than 1,500 feet below ground surface and are screened below the Maquoketa shale, the primary aquitard separating shallower aquifers from the screened interval of the wells.[63]

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[60] MWG13-15_29516
[61] Schwartz, 2005
[62] Patrick, 2011d
[63] Patrick, 2011d; MWG13-15_293-305

4.4.4. Site-Specific Lithology

I reviewed boring logs and summarize the following lithology generally observed at Will County. Fill materials consisting of fine to coarse sand, gravel, silt, and silty sand were observed near the surface; in certain borings, coal cinders and ash were also observed in fill materials. Within the vadose zone, unsaturated soils included the fill materials previously noted, coarse sand, fine to coarse gravel, clayey gravel, clay, silty clay, and silt. In the shallow aquifer, saturated soils included fine to coarse gravel, coal cinders, coal dust, weathered limestone, sand, silt, silty clay, and clay. Weathered limestone bedrock was encountered between 7 and 12 feet bgs.[64]

4.4.5. Site-Specific Groundwater Elevations

Groundwater elevations at the 10 monitoring wells at Will County (see Figure 4-5) have varied between 579.13 feet above MSL (at monitoring well MW-10 in August 2013) to 583.87 feet above MSL (at monitoring well MW-2 in June 2011) as summarized in Table 4-7. The highest groundwater elevation during each quarterly monitoring event varied between the following monitoring wells: MW-1, MW-2, MW-3, MW-5, and MW-9. The lowest groundwater elevation during each quarterly monitoring event for the period of record was found at monitoring well MW-10.[65]

Based on a review of the groundwater elevations, groundwater generally flows west to the Des Plaines River on the western portion of the site and is understood to flow east to the Chicago Sanitary and Ship Canal on the eastern portion of the site.

4.4.6. Site-Specific Groundwater Conditions

I reviewed groundwater concentrations at monitoring wells at the Will County site, and it is my opinion that there is no groundwater plume. COI that were observed at concentrations exceeding IEPA Class I groundwater standards are listed in Table 4-8. The data show there is no spatial trend in COI concentrations in the direction of the groundwater flow. Furthermore, the observed COI concentrations intermittently exceed IEPA Class I groundwater standards. Without evidence that there is spatial or temporal consistency in groundwater impacts, it is my opinion that there is no plume at the Will County site. Without the existence of a plume, there is no support that there is a source area remaining at the site that could be remediated to reduce groundwater concentrations.

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[64] Patrick, 2011d
[65] MWG13-15_48850-2

Shallow groundwater conditions at the Will County site are impacted by surface water elevation fluctuations of the Des Plaines River and the Chicago Sanitary and Ship Canal. See Section 6.5.7.

Section 5: Opinion 1—MWG's Actions are Appropriate for the Sites and are Protective of Human Health and the Environment

It is my opinion that MWG's actions for the sites are appropriate for the measured groundwater impacts and are protective of human health and the environment.

5.1. An Elimination of Exposure Pathways is Appropriate

A standard approach that accounts for receptors to address the potential groundwater impacts at the sites is appropriate. An approach that eliminates the exposure pathways has been implemented by completion of a site characterization, comparison of groundwater analytes with State of Illinois water quality standards, and evaluation of the potential exposure routes. This resulted in a decision to reline the ash ponds and implement administrative controls of groundwater use to preclude the exposure to groundwater. Groundwater monitoring is conducted to assess changes in groundwater quality.

The following sections elaborate on the key points associated with the exposure pathways approach:

Section 5.2: Establishment of Administrative Controls is an Effective Remedial Approach

Section 5.3: Active Ponds are Lined to Eliminate a Potential Exposure Pathway

Section 5.4: Groundwater Monitoring is Appropriate to Demonstrate that Groundwater Exposure Pathways are Mitigated

Section 5.5: Recent Groundwater Concentrations are Not the Result of Ash Stored in Lined Ponds

Section 5.6: Groundwater Conditions Do Not Pose Risks to Surface Water Receptors Based on a Risk Screening Assessment

Section 5.7: Historical Ash in Fill Materials Outside of the Ponds is Not Adversely Impacting Groundwater

Section 5.8: Bottom Ash in Inactive Ponds is Not a Source of Groundwater Concentrations

5.2. Establishment of Administrative Controls is an Effective Remedial Approach

5.2.1. Summary of Implementation of Administrative Controls at the Four Sites

A remedial approach has been implemented that includes administrative controls to eliminate the groundwater exposure pathway for ingestion and dermal contact for specific areas. MWG has completed establishing GMZs and/or ELUCs at the four sites as summarized below.

- At Joliet #29, a GMZ has been established over the portion of the site containing the ash ponds extending from the north to the limit of a road and south to the intake canal. Additionally, there is an ELUC on the western side of the property, which MWG installed at the request of Caterpillar to address soil and groundwater contamination originating on Caterpillar property.[66]
- At Powerton, a GMZ has been established over the portion of the site containing the ash ponds extending to the east and south to the limits of a railroad, west to a canal and north to the Illinois River. Furthermore, an ELUC has been implemented to cover the area of the Powerton property that is contained by the GMZ.
- At Waukegan, the Former Tannery Site ELUC was established in a portion of the property, and an additional ELUC has been implemented to cover the remaining Waukegan property to the east that includes the ash ponds.
- At Will County, a GMZ has been established over the portion of the site containing the ash ponds extending west to the Des Plaines River and east to the Chicago Sanitary and Ship Canal. Furthermore, an ELUC has been implemented to cover the area of the Will County Station property that is contained within the GMZ, except for that portion of the GMZ area which is owned by the former property owner.

5.2.2. Demonstration that Administrative Controls are Effective

ELUCs and GMZs are used to eliminate groundwater exposure pathways by eliminating groundwater ingestion pathway and dermal contact pathways while corrective actions are underway. The groundwater ingestion pathway is eliminated by restricting the installation of potable water wells near the ash ponds. The dermal contact pathway is eliminated by restricting the access of the industrial properties to qualified workers.

[66] Carlson, 2010

Administrative controls, including GMZs and ELUCs, are remediation-industry accepted approaches. IEPA has the authority for establishing GMZs as specified in Title 35, Illinois Administrative Code (IAC) Sections 620 and 740.

IEPA has the authority for establishing ELUCs as specified in Title 35, IAC Section 742. The significance of the GMZ with respect to groundwater quality standards is described in 35 IAC Section 620.450 Alternative Groundwater Quality Standards: "Prior to completion of a corrective action described in Section 620.250(a), the standards as specified in Sections 620.410, 620.420, 620.430, and 620.440 are not applicable to such released chemical constituent, provided that the initiated action proceeds in a timely and appropriate manner." In other words, the concentrations of COIs constituents of interest can be higher than the groundwater quality standards within the GMZ.

Within Illinois, a minimum of 10 sites currently have GMZs established by the IEPA Bureau of Water.[67] IEPA Bureau of Water has not reported any groundwater violations for sites with GMZs.[68] Within Illinois, a minimum of 100 sites currently have ELUCs established by the IEPA Bureau of Land.[69]

Thus, it is my opinion that establishment of a GMZ or an ELUC is an effective method to reduce the potential risk for groundwater impacts, are remediation-industry-accepted approaches, and are approved by State of Illinois environmental protection procedures.

5.3. Active Ponds are Lined to Eliminate a Potential Exposure Pathway

A remedial approach has been implemented to address the ponds as a potential source of groundwater impacts that includes the installation of HDPE liners, decommissioning some ash ponds and properly operating and maintaining active ponds.

5.3.1. Summary of Pond Relining and Pond Decommissioning Actions

Midwest Generation has completed remedial actions that include liner installation or pond decommissioning at the four sites as summarized below. It is my opinion that MWG's actions are a reasonable and appropriate remedial approach for addressing groundwater conditions.

[67] Telecommunication with IEPA Groundwater Protection Program Hydrogeology Unit Manager
[68] Telecommunication with IEPA Groundwater Protection Program Hydrogeology Unit Manager
[69] Telecommunication with IEPA Site Remediation Program staff member

- At Joliet #29, construction permits were obtained to reline Ash Ponds 1, 2, and 3 with 60-mil thick, high density polyethylene ("HDPE") liners, and the work has been completed. Ash Pond 1 was taken out of service on October 12, 2015.
- At Powerton, construction permits were obtained to reline the Ash Surge Basin, the Secondary Ash Settling Basin, Metal Cleaning Basin, and Bypass Basin, with 60-mil thick, HDPE liners, and the work has been completed.
- The Powerton East Yard Run-off Basin is not part of the ash sluicing flow system and is not used for ash storage.[70]
- At Waukegan, the East Ash Pond and West Ash Pond were relined with HDPE liners in 2003 and 2004, respectively.
- At Will County, Ash Ponds 1 North (1N) and 1 South (1S) were removed from service in 2010.[71] All process water has been diverted from ponds 1N and 1S to existing Ash Ponds 2 South (2S) and 3 South (3S). A dewatering system was implemented in 2013 that is designed to not allow water to exceed a depth of one foot above the bottom of Ponds 1N and 1S.[72]
- Construction permits were obtained to reline Will County Station Ash Ponds 2S and 3S with 60 mil thick, HDPE liners, and the work has been completed.

5.3.2. Pond Liners are Effective at Precluding Groundwater Impacts

I reviewed the design specifications and construction documentation for current pond liners used for active ash ponds at the sites, as summarized in Sections 5.3.2.1 through 5.3.2.4. The current pond liners are consistent with remediation-industry-accepted approaches, which are further described in Section 5.3.2.5. I reviewed the construction quality assurance and quality control (QA/QC) documentation in Section 5.3.2.6. Properly operating and maintaining lined ponds are the industry-accepted approach to preclude groundwater impacts; based on my review of site-specific records in Section 5.3.2.7, operation and maintenance is being conducted under appropriate and consistent protocols. It is my opinion that the current pond liners are effective to preclude quantifiable groundwater impacts, as described further below.

[70] Mark Kelly Deposition pp 113-4
[71] Fredrick Veenbaas Deposition p. 33-34
[72] MWG13-15_29339; MWG13-15_560-563

5.3.2.1. *Joliet #29 Active Ash Pond Liners*

The following summarizes information regarding ash pond history and construction elements:

- Ash Pond 1 (see Figure 5-1 for a typical construction cross-section)[73]
  - Originally constructed in 1978 with the following layers (from top to bottom):[74]
    - Bituminous seal coat
    - Poz-o-Pac[75]—12 inches thick
    - Compacted granular material—12 inches thick
  - Relined in 2007 under IEPA Water Pollution Control Permit (WPCP) No. 2007-EB-4091 with following layers (from top to bottom):[76]
    - New crushed limestone warning layer—6 inches thick
    - New sand cushion layer—12 inches thick
    - New geotextile cushion—12 ounces per square yard
    - New HDPE liner—60 mil thick
    - New geotextile cushion—16 ounces per square yard
    - Existing Poz-o-Pac—12 inches thick
- Ash Pond 2 (see Figure 5-2 for a typical construction cross-section)
  - Originally constructed in 1978 with the following layers (from top to bottom)[77]
    - Bituminous seal coat
    - Poz-o-Pac—12 inches thick
    - Compacted granular material—12 inches thick
  - Relined in 2008 under IEPA WPCP No. 2007-EB-4091 with following layers (from top to bottom):[78]
    - New crushed limestone warning layer—6 inches thick
    - New sand cushion layer—12 inches thick
    - New geotextile—12 ounces per square yard
    - New HDPE liner—60 mil thick
    - New geotextile cushion—16 ounces per square yard

[73] "Typical" is a term of engineering practice that identifies the construction features that are most commonly observed; in this case, throughout the pond.

[74] Schwartz, 2005

[75] The density of Poz-o-Pac is 136.9 pounds per cubic foot. (MWG13-15_30-32)

[76] MWG13-15_18053; MWG13-15_18133-18189; MWG13-15_49362-49507

[77] Schwartz, 2005

[78] MWG13-15_18053; MWG13-15_18133-18189; MWG13-15_49362-49507

        - Existing Poz-o-Pac—12 inches thick
- Ash Pond 3 (see Figure 5-3 for a typical construction cross-section)
    - Originally constructed in 1978 with the following layers (from top to bottom):[79]
        - Bituminous seal coat
        - Poz-o-Pac—12 inches thick
        - Compacted granular material—12 inches thick
    - Relined in 2013 under IEPA WPCP No. 2013-EB-1191 with following layers (from top to bottom):[80]
        - New crushed limestone warning layer—12 inches thick
        - New sand cushion layer—24 inches thick
        - New geotextile cushion—16 ounces per square yard
        - New HDPE liner—60 mil thick
        - New geotextile cushion—16 ounces per square yard
        - Existing Poz-o-Pac—12 inches thick
- Generally, bottom ash is conveyed across the Des Plaines River to a permitted landfill on the south side of the Des Plaines River.[81] Prior to October 12, 2015, a small fraction of the bottom ash (approximately 5 to 10 percent) was pumped into Ash Pond 1 or 2 for settling when the conveyor system requires maintenance.[82] Ash Ponds 1 and 2 were dredged every one to two years, and the ash is disposed off-site.[83] Ash Pond 1 was taken out of service as of October 12, 2015; Ash Pond 2 is still in service.[84] Ash Pond 3 is used as a finishing pond for the effluent and is considered to receive a *de minimus* amount of ash.[85] (See Section 4.1.2.)
- Joliet #29 is planned to be converted to natural gas fuel combustion. Ash Pond 1 has been emptied of ash as of October 12, 2015 and is no longer in service.[86] Ash Pond 2 will remain

[79] Schwartz, 2005
[80] MWG13-15_44275-44278; MWG13-15_33867-33997
[81] Deposition of Jim DiCola, p. 49
[82] Deposition of Jim DiCola, p. 49
[83] Jim DiCola Deposition, pp. 103-106
[84] Teleconference with Pete O'Day
[85] MWG13-15_49742-49753
[86] Teleconference with Harrison Estepp; Teleconference with Pete O'Day

in service until the station is converted to natural gas fuel combustion in Spring 2016.[87] Thereafter, it is anticipated that Ash Pond 2 will be decommissioned.[88]

5.3.2.2. Powerton Active Ash Pond Liners

The following summarizes information regarding ash pond history and construction elements:

- Ash Surge Basin (see Figure 5-4 for a typical construction cross-section)
  - Originally constructed in 1978 with the following layers (from top to bottom)[89]
    - Bituminous seal coat
    - Poz-o-Pac—12 inches thick on the bottom
    - Compacted granular material—thickness not specified
    - Additionally, a Hypalon® liner was installed on the sides[90]
  - Relined in 2013 under IEPA WPCP No. 2013-EB-1213 with following layers (from top to bottom):[91]
    - New crushed limestone warning layer—6 inches thick
    - New sand cushion layer—12 inches thick
    - New geotextile—16 ounces per square yard
    - New HDPE liner—60 mil thick
    - New geotextile cushion—16 ounces per square yard
    - Existing Poz-o-Pac—12 inches thick
  - The Ash Surge Basin is the primary ash basin for Powerton. Ash is removed from the basin every six to eight years.[92]
- Secondary Ash Settling Basin (see Figure 5-5 for a typical construction cross-section)
  - Prior to the 2013 relining, the Secondary Ash Settling Basin had a Hypalon® liner.[93]
  - Relined in 2013 under IEPA WPCP No. 2013-EB-1065 with following layers (from top to bottom):[94]

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[87] Teleconference with Harrison Estepp
[88] Teleconference with Harrison Estepp
[89] Schwartz, 2005
[90] Mark Kelly Deposition, p. 40
[91] MWG13-15_9583-9643; MWG13-15_10812-10815; MWG13-15_33998-34157
[92] Mark Kelly Deposition, p. 41
[93] Mark Kelly Deposition, p. 26-27
[94] MWG13-15_34158-34267

        - New crushed limestone warning layer—6 inches thick
        - New sand cushion layer—12 inches thick
        - New HDPE liner—60 mil thick
        - New geotextile—16 ounces per square yard
        - New sand layer—12 inches thick
        - Underdrain system that removed groundwater during construction and can be used during pond cleanout.
    - The Secondary Ash Settling Basin is considered a low volume ash pond because historically it received approximately 3 feet of ash in approximately 30 years.[95]
- Metal Cleaning Basin (see Figure 5-6 for a typical construction cross-section)
    - Originally constructed in 1978 with the following layers (from top to bottom):[96]
        - Bituminous seal coat
        - Poz-o-Pac—12 inches thick
        - Hypalon® liner along the sloped sides[97]
        - Compacted granular material—12 inches thick
    - Relined in 2010 under IEPA WPCP No. 2009-EB-2748 with following layers (from top to bottom):[98]
        - New crushed limestone warning layer—6 inches thick
        - New sand cushion layer—12 inches thick
        - New geotextile—12 ounces per square yard
        - New HDPE liner—60 mil thick
        - New geotextile—16 ounces per square yard
        - Existing Poz-o-Pac—12 inches thick
    - The Metal Cleaning Basin is not a part of the ash sluice system. It is used during outages for collection of fly ash from high-pressure blasting on the external part of tubes, and as a temporary lay-down area during cleanouts at Powerton. The ash is removed annually.[99]
- Bypass Basin (see Figure 5-7 for a typical construction cross-section)

[95] Teleconference with Mark Kelly
[96] Schwartz, 2005
[97] Mark Kelly Deposition, p. 53
[98] MWG13-15_49099-49256; MWG13-15_10209-10212
[99] Mark Kelly Deposition pp. 54-6

- Prior to the 2010 relining, the Bypass Basin was lined on the sides with Hypalon® and lined on the bottom with Poz-o-Pac.[100]
- Relined in 2010 under IEPA WPCP No. 2010-EB-0664 with following layers (from top to bottom):[101]
  - New crushed limestone warning layer—6 inches thick
  - New sand cushion layer—12 inches thick
  - New geotextile—12 ounces per square yard
  - New HDPE liner—60 mil thick
  - New geotextile—16 ounces per square yard
  - Prepared subgrade—thickness not specified
- The Bypass Basin only receives ash when Powerton is emptying the Ash Surge Basin.[102] The Bypass Basin is emptied every six to eight years. [103]

5.3.2.3. Waukegan Active Ash Pond Liners

The following summarizes information regarding ash pond history and construction elements:

- West Ash Pond (see Figure 5-9 for a typical construction cross-section)
  - Originally constructed in 1977 with a Hypalon® liner.[104]
  - Relined in 2004 with following layers (from top to bottom):[105]
    - New crushed limestone warning layer—6 inches thick
    - New sand cushion layer—12 inches thick
    - New HDPE liner—60 mil thick
    - Prepared subgrade—thickness not specified
- East Ash Pond (see Figure 5-8 for a typical construction cross-section)
  - Originally constructed in 1977 with a Hypalon® liner.[106]
  - Relined in 2003 with following layers (from top to bottom):[107]

[100] Mark Kelly Deposition p. 58; MWG13-15_9783
[101] MWG13-15_49099-49256; MWG13-15_30421-30424
[102] Mark Kelly Deposition p. 57
[103] Mark Kelly Deposition. pp. 59 & 61
[104] Schwartz, 2005; Christopher Lux Deposition p. 14
[105] MWG13-15_12827-12845; MWG13-15_411
[106] Schwartz, 2005; Christopher Lux Deposition p. 18
[107] MWG13-15_12827-12; MWG13-15_411

- New crushed limestone warning layer—6 inches thick
- New sand cushion layer—12 inches thick
- New HDPE liner—60 mil thick
- Prepared subgrade—thickness not specified

5.3.2.4. Will County Active Ash Pond Liners

The following summarizes information regarding ash pond history and construction elements:

- Ash Pond 2S (see Figure 5-10 for a typical construction cross-section)
  - Originally constructed in 1977 with the following layers (from top to bottom):[108]
    - Bituminous seal coat
    - Poz-o-Pac—36 inches thick
  - Relined in 2013 under IEPA WPCP 2008-EB-1166 with following layers (from top to bottom):[109]
    - New crushed limestone warning layer—6 inches thick
    - New sand cushion layer—12 inches thick
    - New geotextile—12 ounces per square yard
    - New HDPE liner—60 mil thick
    - New geotextile cushion—16 ounces per square yard
    - Existing Poz-o-Pac—30 inches thick
    - Additionally, the sides of the basin have a concrete geocell to further protect the liner.
- Ash Pond 3S (see Figure 5-11 for a typical construction cross-section)
  - Originally constructed in 1977 with the following layers (from top to bottom):[110]
    - Bituminous seal coat
    - Poz-o-Pac—36 inches thick
  - Relined in 2009 under IEPA WPCP 2008-EB-1166 with following layers (from top to bottom):[111]
    - New crushed limestone warning layer—6 inches thick

[108] Schwartz, 2005
[109] MWG13-15_34268-34433; MWG13-15_48604-48605
[110] Schwartz, 2005
[111] MWG13-15_33867-33997; MWG13-15_48604-48605

- New sand cushion layer—12 inches thick
- New geotextile—12 ounces per square yard
- New HDPE liner—60 mil thick
- New geotextile cushion—16 ounces per square yard
- Existing Poz-o-Pac—30 inches thick

- Ash Pond 2S and 3S alternate receiving bottom ash (only one pond is in ash service at a time).[112]

5.3.2.5. The Pond Liners are Consistent with Remediation-Industry-Accepted Approaches

I reviewed the pond construction information and compared it to remediation-industry guidance documents for liners. It is my opinion that the current pond liners are consistent with remediation-industry-accepted approaches.

USEPA's Guide for Industrial Waste Management (2012) provides technical considerations for employing liner systems where needed to protect groundwater from contamination and includes the selection of geomembranes, such as HDPE liners, to ensure that the liner system will function as designed. Liners have been studied extensively for purposes of designing landfills and ponds and evaluating leaching rates through the liners. Use of numerical models is common practice for estimating the rates of infiltration through soils, waste and liners, and a 60-mil thick HDPE is appropriate for the design of ash ponds (USEPA, 2012).

Overlying fill layers are typically a material that drains like sand, such that placement of materials over the liner avoids puncturing or tearing (USEPA, 2012). Cushion geotextiles are also often used to protect geomembranes against puncture (NAS, 2007). Thus, for purposes of potentially coarser subgrade materials where a composite liner is not constructed, my opinion is that a subgrade cushion, as used by MWG, is an appropriate method to protect against subgrade punctures.

Basin maintenance activities are anticipated to have potential loads and stresses associated with heavy construction equipment above the HDPE liners. Evaluation of the overburden stress on a geomembrane can be calculated using the methods and equations of Narejo and Corcoran

[112] Rebecca Maddox Deposition p. 18

(1996). NRT calculated the overburden stresses on behalf of MWG and found that the resulting stress on HDPE with 18 inches of soil cover would be within the range of conservative design standards.[113]

5.3.2.6. Construction Quality Assurance and Quality Control

Construction quality assurance (CQA) for HDPE geomembrane liners follows two classes of protocols: (1) material testing, installation quality control, and finished product destructive testing; and (2) non-destructive electrical leak location surveys after liners have been installed and covered with a protective material (Darilek and Laine, 2001). Electrical leak location surveys at the completion of liner installation discover more leaks than testing-based protocols because they are conducted after all potential construction damage has occurred but also prior to placement of overlying materials such as protective materials or waste layers. When the electrical leak location survey is conducted after liner installation, the density of leaks discovered in 2.0 millimeter (approximately 79 mil) HDPE was 0.2 leaks per hectare (approximately 0.08 leaks per acre, or 1 leak per 12 acres) based on 170,190 square meters (approximately 42 acres) of liners that had CQA with electrical leak location surveys (Forget et al., 2005). The electrical leak location surveys identify leaks prior to the completion of all liner construction project, so identified leaks are repaired prior to completion of the liner construction project. In summary, when HDPE liners are installed with CQA, the numbers of liner defects or tears are significantly reduced from values cited by Kunkel. Furthermore, there was no correlation between the number of leaks and geomembrane thickness for liner systems (Forget, et al., 2005).

I reviewed the CQA documentation or a third party inspection report for the installation of HDPE liners for the following ash ponds:

- Joliet #29 Ash Ponds No. 1[114], No. 2[115], and No. 3[116]
- Powerton Ash Surge Basin[117], Secondary Ash Settling Basin[118], Metal Cleaning Basin[119], and Bypass Basin[120]
- Waukegan East and West Ash Ponds[121]

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[113] MWG13-15_49296-49298
[114] MWG13-15_49362-49507
[115] MWG13-15_49362-49507
[116] MWG13-15_33867-33997
[117] MWG13-15_33998-34157
[118] MWG13-15_34158-34267
[119] MWG13-15_49099-49256
[120] MWG13-15_49099-49256
[121] MWG13-15_12827-12845

- Will County Ash Ponds 2S[122] ; additionally, I reviewed the specifications and construction notes for the Will County Ash Pond 3S relining project.[123]

The CQA for the above liner installations demonstrate a high level of quality because of the following reasons:

- The pond linings were designed by Natural Resource Technology, Inc., and inspected by Natural Resource Technology, Inc. for Joliet #29, Powerton, and Will County Stations, and inspected by KPRG for Waukegan.
- All relining construction was completed under a construction quality assurance protocol that included inspections by an independent third party.
- The liner installer inspected the subgrade and certified that it was acceptable for installation of the HDPE liner as discussed below.
- The inspections included traditional leak detection tests of welds and seams as the liner was installed.
- After completion of seaming and covering the liner with a sand cushion layer, the liner had an additional electronic leak detection survey of the surface conducted by a third party (Leak Location Services, Inc.).[124]
- Any defects that were discovered were repaired before ponds were placed in service.
- Each relining construction project was certified by the installer (CAAW Systems, LLC) as complying with the project drawings and specifications and manufacturer recommendations.
- At the Waukegan East and West Ash Ponds, an independent review of the liner quality assurance documentation was performed and found no evidence that leaks would be present below the surface water line of the pond. [125]

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[122] MWG13-15_34268-34427

[123] MWG13-15_29165-29259; MWG13-15_34517-34550; MWG13-15_29023-29081; MWG13-15_29102-29104

[124] At the Powerton Secondary Settling Basin, an electronic leak detection survey was conducted prior to the placement of the sand cushion layer. At the Waukegan East and West Ash Ponds, an independent review of the liner quality assurance documentation was performed and found no evidence that leaks would be present below the surface water line of the pond.

[125] MWG13-15_12827-12845

5.3.2.7. Operation and Maintenance is Being Conducted under Appropriate and Consistent Protocols

I reviewed operation and maintenance activities for MWG's ash ponds and noted the following that demonstrate that these activities are being conducted under appropriate and consistent protocols.

- The operation of the ponds primarily includes maintaining water level controls in the ponds, daily inspections, groundwater monitoring, discharge monitoring, and removal of bottom ash. Weekly inspections of the ash ponds are now recorded by personnel.[126]
- Protocols are in place to conduct the daily operations that include utilization of experienced plant and corporate operations, engineering, and environmental management personnel. Depositions of Mr. Lux[127], Mr. Kelly[128], Ms. Maddox[129], Mr. DiCola,[130] and Mr. Veenbaas[131] indicated that, in summary, daily inspections of the ponds are completed and if any unusual conditions are observed, the shift supervisor is notified and the repairs are implemented.
- Protocols are in place with the ash cleanout contractors.
    - LaFarge North America, Inc. removes the ash from the Will County and Waukegan ash ponds. Pursuant to the contract, LaFarge must perform all services in a competent manner, in compliance with all standards for the services, and comply with all rules, policies, and procedures.[132] Moreover, in the recently executed contract, LaFarge employees and subcontractors must comply with all policies, procedures, and directives, to remove ash using methods to avoid damage to the liner and to make timely repairs when damage is observed. Thus, before every removal, LaFarge meets with its employees and subcontractors to discuss the best practices to remove the ash, identify all of the markers for the bottoms and edges of the basins, and describe the color of the warning layer. Moreover, equipment is used to remove ash primarily on and near the bottom where the liner is protected by the crushed stone and sand cushion layers and not on the side slopes where the geomembrane liner is exposed. Operators are instructed to stop excavating should

[126] MWG13-15_49756-49760; MWG13-15_50095-50148
[127] Christopher Lux Deposition, p. 41
[128] Mark Kelly Deposition, p. 87
[129] Rebecca Maddox Deposition, pp. 73, 145
[130] James DiCola Deposition, p. 114
[131] Frederick Veenbaas Deposition, p. 81
[132] MWG13-15_13032; MWG13-15_49679-49700

a hard layer be encountered that would indicate the protective layer. Additionally, LaFarge managers are onsite continuously during the removal to supervise work to avoid any damage to the liner systems. The protocol for managing incidents includes reporting to LaFarge supervisors followed by reporting to a supervisor at the station and to the station administration.[133]

- The Powerton personnel remove the ash from its ponds with its equipment and deposits the ash into trucks owned and operated by Capital Sales.[134] Prior to ash removal, the Powerton shift supervisor has a pre-work meeting to discuss the proper process of removing ash. In the meeting, the personnel supervisor reminds the personnel of the locations of the warning posts, the warning layer below the ash, and a description of the liner. Additionally, the personnel supervisor reminds each operator not to tear or damage the liner during removal. The protocol for managing incidents includes reporting to the personnel supervisor and to the Powerton Chemical Specialist who is responsible for conducting liner repairs.[135]
- The Joliet #29 contracts with an ash removal contractor on an as-needed basis using a competitive bidding process. The Joliet #29 ash removal project manager holds a kick-off meeting prior to starting work to discuss protocols for proper removal of ash. The meeting includes a description of the ponds, identification of the warning posts, the warning layer, and a description of the liner. The Station project manager inspects work throughout the ash removal process to confirm the work is acceptable. The protocol for managing incidents includes reporting to the Station project manager who would stop work that could cause damage to the liner. Ash would be removed from the vicinity of the damaged location. The Station project manager is responsible for conducting liner repairs.[136]

A demonstration of the effectiveness of the operations protocols is the fact that tears or damages to the HDPE liners have been detected based on inspections and promptly repaired as soon as weather conditions allowed. I reviewed tears or damages that have occurred as of September 2015, and observed that all tears were above the water line of the pond or occurred when the water had been

[133] Teleconference with Mitch Nowicki
[134] Deposition of Mark Kelly, p. 61
[135] Teleconference with Mark Kelly; MWG13-15_48636-48639
[136] Teleconference with Harrison Estepp

drained from the pond.[137] Tears above the water line occurred more frequently because of exposure to mechanical equipment at the facilities. Tears below the water line were not observed are not likely given the documented longevity of HDPE liners and because the areas are protected from exposure to equipment. There is no evidence that the liners are deficient or that infrequent liner tears are a source of groundwater impacts.

5.4. Groundwater Monitoring is Appropriate to Demonstrate that Groundwater Exposure Pathways are Mitigated

Groundwater monitoring is appropriate to demonstrate that groundwater exposure pathways are mitigated and to assess the remedial approach. MWG has specified groundwater monitoring programs for each facility. Groundwater monitoring consulting professionals at KPRG are regularly tracking groundwater conditions, and the results are reported to the IEPA. The results during the period of record show that the groundwater exposure pathways are consistently mitigated, and there is no evidence that further remedial action is required.

5.5. Recent Groundwater Concentrations are Not the Result of Ash Stored in Lined Ponds

I reviewed recent groundwater monitoring data to identify if theoretical leaks of leachate through possible liner defects (as posited by Mr. Kunkel) could be impacting groundwater at the subject sites. It is my opinion that the groundwater concentrations are not the result of leakage from the HDPE-lined ponds.

5.5.1. Typical Characteristics of Leachate for the Ash Stored in Ponds at the Sites

I reviewed the characteristics of leachate that are typical for the ash currently stored in ponds at the sites and selected appropriate constituent indicators. The characteristics of ash leachate are based on site-specific impounded ash data (Section 5.5.1.1) or on published leachate data from ponds of subbituminous CCR sourced from the Powder River Basin (PRB) in Wyoming that is the source of coal for the Plants (Section 5.5.1.2). I reviewed the data, and constituent indicators for leachate from ash currently stored in ponds include at a minimum: barium, boron, and sulfate, and at a maximum: antimony, arsenic, barium, boron, cadmium, chromium, cobalt, copper, manganese, nickel, selenium, silver, sulfate, and zinc (Section 5.5.1.3).

[137] MWG13-15_48563, KPRG 2005c, MWG13-15_11574, 11581, Veenbaas Deposition, p. 78-79,87-90, MWG13-15_14177, Maddox Deposition, p. 94-95, MWG13-15_48636-48639

5.5.1.1. Site-Specific Data and Discussion of Leachate Characteristics for Ash Stored in Site Ponds

Four samples of bottom ash from ponds at Powerton, Waukegan, and Will County were collected between 2004 and 2010 and characterized for leaching under neutral pH conditions (see Table 5-1). ASTM D3987-85 provides a standard test method for the leaching of materials to obtain an aqueous solution under specified testing conditions, including neutral pH of 7 (ASTM, 1985). Analytical neutral leachable procedure (NLET) results for these four bottom ash ponds show metals, sulfate, and total dissolved solids. The following analytes have been detected in bottom ash neutral leaching samples from the ponds:

- barium at concentrations up to 0.27 mg/L, which are less than the IEPA Class I groundwater standard of 2.0 mg/L;
- boron at concentrations up to 2.0 mg/L, which are equal to or less than the IEPA Class I groundwater standard of 2.0 mg/L;
- sulfate at a concentration of 49 mg/L, which is less than the IEPA Class I groundwater standard of 400 mg/L; and
- total dissolved solids at a concentration of 200 mg/L, which is less than the IEPA Class I groundwater standard of 1,200 mg/L.

The analytical results for bottom ash neutral leaching samples from the ponds can be extended to all the site ponds because all bottom ash at all of the four MWG generating stations is from the combustion of coal sourced from the PRB in Wyoming. The analytical results for bottom ash neutral leaching samples show that the leachate in ponds does not have the potential to cause groundwater impacts above IEPA Class I groundwater standards.

5.5.1.2. Published Leachate Data from CCR Ponds for Subbituminous Coal

I identified a report that published leachate data from CCR ponds for subbituminous coal, which is characteristic of coal sourced from the PRB in Wyoming that is the source of coal for the Plants.[138] Analyses for leachate samples from existing CCR facilities were characterized in an Electric Power Research Institute (EPRI) report (EPRI, 2006). The EPRI leachate results for leachate from other facility ponds containing CCR from subbituminous/lignite coal sources are summarized in Table 5-2.

[138] MWG13-15_12847

5.5.1.3. Constituent Indicators for Leachate from Ash Stored in Ponds

Because there are differences between the set of constituents that leach based on site-specific data and published leachate data, I developed two sets of constituent indicators for leachate from ash currently stored in ponds. The first set is the minimum set of constituent indicators that would be expected under neutral conditions. This minimum set of constituent indicators is defined as the constituents that were observed in NLET analyses of bottom ash stored in site ponds. The second set is the maximum set of constituent indicators that may be expected based on other facility leachate data published by EPRI (2006). This maximum set of constituent indicators is defined as all constituents observed in analyses of leachate samples from other facility ponds containing CCR from subbituminous/lignite coal sources (see Table 5-2).

I reviewed the summary of leachate data in Table 5-3, and constituent indicators for leachate from ash currently stored in ponds include at a minimum: barium, boron, and sulfate, and at a maximum: antimony, arsenic, barium, boron, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, selenium, sulfate, and zinc.

5.5.2. Recent Groundwater Concentrations do Not Match Constituent Indicators for Leachate from Ash Stored in Ponds

I compared the occurrence of constituents during groundwater monitoring events in the most recent year, 2014, to the minimum and maximum sets of constituent indicators of leachate from ash currently stored in ponds. Conceptually, if all the constituents detected in groundwater samples from a monitoring well match the constituents detected in leachate from ash currently stored in ponds, and if constituents *not* detected in groundwater samples match the constituents *not* detected in leachate from ash currently stored in ponds, then it would be probable that leachate from ash currently stored in ponds is impacting groundwater. To evaluate whether or not groundwater concentrations match leachate constituent indicators, I calculated the percentage of constituents detected at each groundwater monitoring well that match constituent indicators of leachate from ash currently stored in the ponds ("matching percentages"). I restricted my analysis to the most recent full year of groundwater monitoring, 2014, to account for seasonal variations in constituent concentrations and to reflect groundwater concentrations after MWG's pond relining and pond decommissioning had been completed.

In summary, if the constituents match then it is likely that the leachate from the ash is impacting the groundwater. If the constituents *do not* match then it is likely that the leachate *is not* impacting the groundwater.

My results are tabulated in Tables 5-4 and 5-5 and are summarized as follows:

- At Joliet #29, the percentage of constituents at groundwater monitoring wells that match constituent indicators of leachate from ash currently stored in the ponds ranges from
  - 11 percent to 37 percent based on the minimum set of indicators, and
  - 37 percent to 53 percent based on the maximum set of indicators.
- At Powerton, the percentage of constituents at groundwater monitoring wells that match constituent indicators of leachate from ash currently stored in the ponds ranges from
  - 5 percent to 37 percent based on the minimum set of indicators, and
  - 32 percent to 58 percent based on the maximum set of indicators.
- At Waukegan, the percentage of constituents at groundwater monitoring wells that match constituent indicators of leachate from ash currently stored in the ponds ranges from
  - 16 percent to 26 percent based on the minimum set of indicators, and
  - 42 percent to 58 percent based on the maximum set of indicators.
- At Will County, the percentage of constituents at groundwater monitoring wells that match constituent indicators of leachate from ash currently stored in the ponds ranges from
  - 21 percent to 37 percent based on the minimum set of indicators, and
  - 37 percent to 53 percent based on the maximum set of indicators.

The low matching percentages demonstrate that there are substantial and widespread mismatches between the characteristics of recent groundwater analyzed near the ash ponds and the characteristics of leachate from ash currently stored in the ash basins. Thus, it is my opinion that the recent groundwater impacts are not a result of the ash currently stored in ponds at the sites, but instead are more likely than not a result of historical uses at the sites and the surrounding industrial companies and conditions.[139]

[139] IEPA, 2015 and MWG13-15_29975-29776.

5.6. Groundwater Conditions Do Not Pose Risks to Surface Water Receptors Based on a Risk Screening Assessment

5.6.1. Overview

I worked with my staff to develop an appropriate methodology to assess the exposure to surface waters from groundwater impacts at the sites. We assessed the potential for human health and ecological risks from an assumed exposure to constituents of interest (COIs) in groundwater associated with each of the four sites that may migrate to surface water. These evaluations are conservative as they assume a complete exposure pathway exists between groundwater COIs and receptors in the adjacent surface water bodies, and do not fully analyze attenuation or dilution mechanisms. The screening assessment also considers background and upgradient source COIs that are not from the ponds, thereby overestimating the risk from the pond operations. It is my opinion that groundwater conditions do not pose risks to surface water receptors based on the risk characterization included in Appendix B and described below.

5.6.2. Definition of Risk

"No unacceptable risks" means that the site-specific groundwater concentrations are less than Illinois Water Quality Standards (WQS) or Water Quality Criteria (WQC), which are considered to be protective of human health and the environment in surface water.[140] These WQS/WQC incorporate toxicological (i.e., cause-and-effect) data as well policy-based assumptions, including the state-determined acceptable risk level.

This evaluation includes a refinement step that considers the exceedance location (relative to other wells and receiving water bodies), magnitude, and frequency. If these lines of evidence support that "no unacceptable risks" are likely at the point-of-exposure (i.e., the lake or river), then it is concluded that there is an unlikely potential for risk.

5.6.3. Results of Risk Evaluation

The following summarizes the results of the evaluation. A complete evaluation is in Appendix B attached to this opinion.

Joliet #29: antimony, boron, manganese, and TDS do not pose unacceptable risks because concentrations are lower than WQS/WQC. Concentrations of chloride, sulfate, and iron

[140] WQS are defined in 35 IAC 302, Subpart B (Joliet #29, Powerton, and Will County) and E (Waukegan). WQC are derived by the IEPA under authority of 35 IAC 302, Subpart B.

exceeded WQS/WQC on occasion; however, further evaluation of site-specific conditions indicated an unlikely potential for risk from these COIs.

Powerton: boron, chloride, nitrate, selenium, sulfate, and TDS do not pose unacceptable risks because concentrations are lower than WQS/WQC. Concentrations of arsenic, iron, lead, manganese, thallium, and pH exceeded WQS/WQC on occasion; however, further evaluation of site-specific conditions indicated an unlikely potential for risk from these COIs.

Waukegan: the results of the risk evaluation are complicated by groundwater impacts at the Waukegan site, including groundwater impacts resulting from the migration of inorganic constituents from upgradient and offsite sources. Antimony and manganese do not pose unacceptable risks because concentrations are lower than WQS/WQC. Concentrations of arsenic, chloride, and pH exceeded WQS/WQC on occasion; however, further evaluation of site-specific conditions indicated an unlikely potential for risk from these COIs. Concentrations of boron, iron, sulfate, and TDS exceeded WQS/WQC in wells to the west and southwest of the ponds (MW-05 through MW-09). Importantly, there are no unacceptable risks for boron, iron, sulfate, and TDS in wells MW-01 through MW-04, which represent the most downgradient wells at the site (see Figure 4-4). MW-01 through MW-04 appear to be downgradient of MW-05, MW-06, MW-08, and MW-09, indicating attenuation is occurring. Although no wells are directly downgradient of MW-07, there is no data to indicate that similar attenuation is not occurring in this area.

Will County: antimony, boron, chloride, manganese, and TDS do not pose unacceptable risks because concentrations are lower than WQS/WQC. Concentrations of sulfate and pH exceeded WQS/WQC on occasion; however, further evaluation of site-specific conditions indicated an unlikely potential for risk from these COIs.

5.7. Historical Ash in Fill Materials Outside of the Ponds is Not Adversely Impacting Groundwater

Ash generated by coal combustion may be classified as coal combustion by-product (CCB) and used for purposes of fill material when there is beneficial use determined by IEPA (see Section 5.7.1). Current data obtained from recent ash samples and groundwater collected from multiple sites show that leachate from the historical ash in fill materials meets IEPA Class I groundwater standards based on leaching from a soil- like environment (see Section 5.7.2). It is my opinion that the current

conditions of the existing weathered ash are not contributing to groundwater exceedances at the four sites based on leaching analyses of actual ash fill at the sites.

5.7.1. Coal Ash may be Classified as Coal Combustion Byproducts to Allow Beneficial Use

Structural fill and import fill ("fill") at the sites was placed historically, as long as 38 years ago. Ash generated by coal combustion may be classified as CCB when there is beneficial use determined by IEPA as established in 415 Illinois Compiled Statutes 5/3.135. Although the current IEPA criteria were not applicable when the CCB was placed, it is analogous to compare the current condition of CCB to the current IEPA criteria. Additionally, the design and construction of coal ash structural fills is a standard practice, and procedures for using coal combustion products, including fly ash, bottom ash, and boiler slag, to achieve desired geotechnical properties are described in ASTM E2277-14 (2014). In my opinion, the presence of CCB outside of the pond areas is considered an acceptable use when compared to Illinois requirements and the standard ASTM practice.

5.7.2. Investigations of Potential Leaching Characteristics of Historical Ash in Fill Materials at Sites

Data obtained from recent samples of ash used as fill from multiple sites show that leachate from the ash in its current condition meets IEPA Class I standards based on leaching from a soil-like environment (NLET method). These data were obtained during a 2004 investigation at Powerton, a 2005 investigation at Joliet #29, and a 2015 investigation at Will County, as discussed further below. Based on these data, it is reasonable to conclude that historical ash areas at all four MWG sites are not a source of groundwater impacts. Significantly, there is no evidence to conclude, as Kunkel does, that the ash areas are a source.

5.7.2.1. Joliet #29 Investigation

On behalf of Midwest Generation, in June 2005 KPRG performed an investigation of historical ash in fill materials at the Joliet #29 site. This investigation included the collection of historical ash samples from 15 soil borings at the Joliet #29 site. Historical ash samples were analyzed using a neutral leachable procedure (NLET) for metals. KPRG's report found the following conclusions:[141]

- "The ash deposits are consistent and homogenous consisting of interlayered fly ash and bottom ash/slag from the coal combustion process."

[141] KPRG, 2005a

- "The NLET metals data from sample location GP-14A displayed elevated levels of lead and copper at concentrations at least two times higher than the Class I groundwater standard." This area was later further delineated and excavated (see below).
- "The NLET metals data from the remaining 16 sample locations indicate with a high degree of statistical certainty that the criteria established in 415 ILCS 5/3.135 (formerly 415 ILCS 5/3.94) a-5(B) are met and that the material may be considered CCB relative to this criterion...."[142]

A supplemental investigation was performed in the vicinity of GP-14A in November 2005. Eight additional historical ash samples were collected from soil borings and analyzed using NLET for metals. The June 2005 and November 2005 samples were used to delineate the extent of excavation in the vicinity of GP-14A. Approximately 1,062.88 tons of fill material containing historical ash was excavated and disposed off-site at a landfill during the week of November 21, 2005. The excavation was backfilled using surficial materials near the excavation area. Following the excavation, the historic ash in the area met the CCB criteria under 415 ILCS 5/3.135.[143]

Thus, it is my opinion that leachate from historical ash in fill materials at Joliet #29 is not adversely impacting the groundwater.

5.7.2.2. Powerton Investigation

On behalf of MWG, Andrews Environmental Engineering, Inc. (AEEI) performed an investigation in May 2004 of historical ash in fill materials at Powerton[144]. A total of eight historical ash samples were collected from test pits in the Limestone Runoff Basin. Samples were analyzed for NLET metals using ASTM D3987-85. Selenium was detected in two NLET samples and chromium was detected in one NLET sample at concentrations greater than the IEPA Class I groundwater standards. All other metals in the NLET results from the eight ash samples were less than the IEPA Class I groundwater standards.

I reviewed selenium and chromium concentrations in groundwater at Powerton, and only selenium was detected at one location (MW-14) above IEPA Class I groundwater standards during the period of record.[145] Groundwater concentrations measured during the most recent full year of

[142] Of the remaining 16 sample locations, 14 sample locations were located at Joliet #29.
[143] KPRG, 2005c
[144] AEEI, 2004
[145] MWG13-15_48711-48843

quarterly groundwater monitoring in 2014 were all below IEPA Class I groundwater standards, indicating no impacts of selenium or chromium. Thus, it is my opinion based on this analysis, that leachate from historical ash in fill materials at Powerton is not adversely impacting the groundwater.

5.7.2.3. Will County Investigation

On behalf of MWG, KPRG performed an investigation in June and August 2015 of historical ash in fill materials at Will County.[146] This investigation included the collection of 20 historical ash samples from 20 soil borings at the Will County site. Historical ash samples were analyzed using a neutral leachable procedure (NLET) for metals. KPRG's report documented the following conclusions:

- "The ash deposits are consistent and homogenous consisting bottom ash/slag from the coal combustion process."
- "There were no outlier samples, and all samples collected were used in the calculations."
- "The NLET metals data from the 20 sample locations indicate with a high degree of statistical certainty that the criteria established in 415 ILCS 5/3.135 (formerly 415 ILCS 5/3.94) a-5(B) are met and that the material may be considered CCB relative to this criterion for engineering/beneficial reuse."
- "The data set is sufficiently large to support the statistical evaluations based on the variance and specific regulatory threshold relationships."

Thus, it is my opinion that leachate from historical ash in fill materials at Will County is not adversely impacting the groundwater.

5.8. Bottom Ash in Inactive Ponds is Not a Source of Groundwater Concentrations

Data obtained from recent samples of bottom ash accumulated in ash ponds from multiple sites show that leachate from the bottom ash meets IEPA Class I standards based on leaching from the pond environment (NLET) (see Section 5.5.1.1). Based on these data, it is reasonable to conclude that bottom ash accumulated in inactive ash ponds are not a source of groundwater concentrations.[147]

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[146] KPRG, 2015

[147] The Will County inactive ash ponds 1N and 1S have been modified to prevent more than one foot of standing water. This pond modification will reduce the volume of potential leachate at the Will County inactive ash ponds.

Section 6: Opinion 2—The Remedial Approach Provided in the Kunkel Remedy Report is Not Warranted

It is my opinion that the remedial approach in the Kunkel Remedy Report, which is removal of all CCRs and the ash ponds, is not warranted because:

1. the concentrations of COIs that have been observed in groundwater around the ponds are low, such that MWG's remedial approach to protect human health and the environment is in accordance with Illinois standards (Section 6.1);
2. the bottom ash indicator constituents from leachate do not match the groundwater chemistry, indicating that the constituents in groundwater are not from the ponds, the ponds are functioning in accordance with the design, and the ponds do not need to be removed (Section 6.2), and
3. there is no evidence that coal ash currently outside of the ash ponds is a source of groundwater impacts (Section 6.3).

Further, Kunkel did not follow the Illinois procedures his opinions concerning remedial activities. After the completion of a site investigation, groundwater and soil remediation objectives would need to be developed that consider exposure routes and would be protective of human health and the environment. The selection of remedial technologies needs to consider the feasibility of implementation, whether the technologies will perform satisfactorily and reliably, and whether remediation objectives will be achieved within a reasonable period of time (Section 6.4).

I also found many inaccuracies in the Kunkel Report on Ground-Water Contamination that, in general, portray conditions that imply that groundwater is more threatened than is actually supported by the data.

The following is provided in support of Opinion 2:

- Ash ponds are for wastewater treatment purposes and are not landfills for permanent ash disposal (Section 6.5.1).
- Ash ponds are lined with 60-mil HDPE, which is the accepted standard of the ash pond lining industry. Further, the liner construction quality is consistent with the ash pond lining quality management standards for long-term use based on available construction documentation. (Section 6.5.2)

- O&M of the ash ponds are conducted in accordance with consistent operating protocols. (Section 6.5.3)
- Kunkel incorrectly concludes that all of the former ash ponds leaked and the current ash ponds are leaking. He asserts that the groundwater elevations are above the bottom of the ponds or pond water surface and in turn causing bottom heave. His analysis is incorrect on several bases. First, an uplift pressure argument is relative to the top of the bottom liner. Second, an uplift argument is an issue for soil liners, not geomembrane liners that are at all of the ponds. Third, groundwater levels are rarely above the top of the bottom liners and when they are above the bottom liner there are other opposing forces or controls to eliminate uplift. (Section 6.5.4)
- In addition to errors in Kunkel's groundwater elevation analysis, Kunkel fails to consider the weight of the Poz-o-Pac liner (where present), sand cushion, and limestone warning layers. An appropriate hydrostatic uplift calculation should include at a minimum the weight of sand cushion layers and limestone warning layers that provide downward forces that counteract the upward hydrostatic uplift force. The presence of bottom ash and pond water provide further downward forces that counteract the upward hydrostatic uplift force. (Section 6.5.5)
- Groundwater mounding that the Kunkel Groundwater Contamination Report concluded was an indication of an ongoing leak has not been observed at Joliet #29 monitoring well MW-9. Kunkel alleges that mounding is occurring at Joliet 29 because the groundwater elevation in downgradient MW-9 is higher than upgradient MW-8. However, the majority of the data show that the average water level in MW-9 is lower than MW-8. (Section 6.5.6)
- Kunkel incorrectly portrays background concentrations by using state-wide data for groundwater at the Joliet #29, Waukegan, and Will County sites. It is my opinion that this approach is inappropriate and fails to account for those sites where upgradient groundwater is impacted prior to migrating on-site. (Section 6.5.7)

6.1. MWG's Remedial Approach to Protect Human Health and the Environment is in Accordance with Illinois Standards

Kunkel states that his professional analyses and opinions have an "emphasis on remedy options which, if implemented, would stop or minimize the continuing ground-water contamination

from MWG's ash ponds and/or other coal ash disposal areas at the four power plant sites."[148] Kunkel alleges that "[t]he remedy for continued long-term ground-water contamination at the four power plant sites is removal of the leaking ash ponds as well as all or a portion of the coal ash which has been deposited outside the ash ponds. The conclusions in my previous report ([Kunkel Groundwater Contamination Report]) form the bases for this remedy report."[149]

I conclude that further source remediation is not warranted. Observed COI concentrations in groundwater around the ponds are low, such that MWG's remedial approach to protect human health and the environment is in accordance with Illinois standards.

- Bottom ash indicator constituents from leachate do not match the groundwater chemistry (see Section 5.5).
- There is no evidence that historical ash in fill materials outside of the ash ponds is a source of groundwater impacts based on leaching analyses of the existing weathered ash in fill materials and observed groundwater concentrations (see Section 5.7.2).
- Administrative controls eliminate the completion of the groundwater ingestion pathway and dermal exposure pathway (see Section 5.2).
- Groundwater conditions do not pose unacceptable risks to surface water receptors (see Section 5.6).

6.2. Bottom Ash Indicator Constituents from Leachate Do Not Match the Groundwater Chemistry

Kunkel alleges that boron, sulfate, and manganese are valid indicators of groundwater contamination because "EPRI and IEPA deem them to be of concern at all four of the power plant sites and they are typically present in high concentrations in coal ash leachate...." However, the sources cited by Kunkel (EPRI, 2012; Kosson, 2009; and IEPA, 2010) are not specific to the four MWG sites. As demonstrated in Section 5.5.1.3, constituent indicators for leachate from ash currently stored in ponds include at a minimum: barium, boron, and sulfate, and at a maximum: antimony, arsenic, barium, boron, cadmium, chromium, cobalt, copper, manganese, nickel, selenium, silver, sulfate, and zinc. In order to compare the constituents in the ponds with the groundwater conditions, a more complete selection of constituent indicators should be used.

[148] Kunkel Remediation Report, Page 2
[149] Kunkel Remediation Report, Page 2

Kunkel includes removal of the ash ponds as part of his remedy and alleges that "[p]oor liner construction is an initial cause of liner defects which results in leaking ponds and release of contaminated fluids into the underlying ground water."[150] This allegation would imply that recent groundwater concentrations would be substantially impacted by the leachate from bottom ash currently stored in ash ponds. If this were true, constituents that are indicator chemicals for the ash currently stored in ash ponds would match the constituents actually observed in groundwater near the ponds. However, bottom ash indicator constituents from leachate do not match the groundwater chemistry (see Section 5.5). Thus, constituents in groundwater are not from the ponds and the ponds are functioning in accordance with the design.

I conclude that the ponds do not need to be removed.

6.3. There is No Evidence That Historical Coal Ash Outside of the Ash Ponds is a Source of Groundwater Impacts

Kunkel's proposed remedy includes removal of coal ash historically deposited outside the ash ponds, which includes coal ash "utilized in the construction of roadways, pond dikes and also for general land leveling at all four power plants."[151] He further states, without supporting data, that "[t]his coal ash is subject to leaching by rainfall and snowmelt, rising and falling ground-water levels, and this leachate is transported downward causing contamination of the ground water."[152] However, Kunkel's remediation approach is inconsistent with construction practices in Illinois and ASTM standards. The appropriate approach in Illinois for the evaluation of ash used beneficially as fill is to conduct leaching evaluations on actual fill at the sites (see Section 5.7.1). There is no evidence that historical ash in fill materials outside of the ash ponds is a source of groundwater impacts based on leaching analyses of the existing weathered ash in fill materials and observed groundwater concentrations (see Section 5.7.2). I conclude that there is no evidence supporting Kunkel's allegation that leachate from ash used as fill is causing groundwater contamination.

[150] Kunkel Remediation Report, Page 2
[151] Kunkel Remediation Report, Page 2
[152] Kunkel Remediation Report, Page 2

6.4. Kunkel did Not Follow the Illinois Procedures for Investigative and Remedial Activities

Kunkel alleges that "adequately addressing the contamination at the four sites requires the complete removal of the existing ash ponds and selected areas of coal ash deposited outside the ash ponds as the remedy. Coal ash from the ash ponds, coal ash used in construction activities at each site and the coal ash deposited on the ground surface outside the existing ash ponds must be placed in an appropriate landfill for the four MWG power plant sites."[153] However, Kunkel did not follow the Illinois procedures for the investigative and remedial activities. After the completion of a site investigation, groundwater and soil remediation objectives would need to be developed that consider exposure pathways and would be protective of human health and the environment. The selection of remedial technologies needs to consider the feasibility of implementation, whether the technologies will perform satisfactorily and reliably, and whether remediation objectives will be achieved within a reasonable period of time. Kunkel did not demonstrate that any of these steps were followed when he alleged that his proposed remedy is required.

- Removal of all ash from the sites is not feasible when all costs and site disruptions are considered (Section 7), and
- Ponds and historical ash are not sources of groundwater impacts (see Sections 5.3 and 5.5); thus removal of all ash will not achieve groundwater remediation objectives.

It is my opinion that Kunkel's remedy is inappropriate based on the Illinois procedures for investigative and remedial activities.

6.5. Responses to Specific Inaccuracies in Kunkel's report on Groundwater Contamination

I noted various inaccuracies in Kunkel's report on Ground-Water Contamination that imply that groundwater is more threatened than supported by the data. The following presents my responses to specific inaccuracies.

[153] Kunkel Remediation Report, Page 3

6.5.1. Ash Ponds are for Wastewater Treatment Purposes and are not Landfills for Permanent Ash Disposal

Kunkel alleges that there "has been and continues to be ground-water contamination from MWG's ash ponds and/or other coal ash disposal areas at the four power plant sites."[154] However, the ash ponds are not coal ash disposal areas as implied by Kunkel. The ash ponds are integral components of the wastewater treatment process for the generating facilities.[155] Furthermore, ash is routinely excavated and beneficially used off-site as evidenced in billing records from waste removal contractors, such as Lafarge.[156] It is my opinion that the vast majority of the potential for leachate from ash generated by the generating stations is appropriately managed by wastewater treatment using lined ash ponds and off-site disposal or beneficial reuse of the separated ash.

6.5.2. Ash Ponds are not Leaking and Construction Quality is Consistent with the Ash Pond Lining Quality Management Standards for Long-Term Use

Kunkel broadly alleges that at all four generating stations have "ash ponds whose liners have leaked and continue to leak due to poor liner construction techniques...."[157] However, Kunkel fails to provide evidence of the leaking for any of the ash ponds at any of the sites. Instead, Kunkel relies on an inapplicable study of other sites to assume leaks are occurring at the MWG ponds.[158] It is my opinion that the MWG ash ponds are not leaking because they are lined with 60-mil HDPE, which is the accepted standard of the ash pond industry. Further, the liner construction quality is consistent with the ash pond lining quality management standards for long-term use based on my review of construction quality assurance documentation. Specifically:

- The liner subgrades were inspected for sharp surfaces prior to installation of the HDPE liner and protective geotextile was installed below the HDPE liners to avoid the potential for puncture (see Section 5.3.2.5 and 5.3.2.6).
- The HDPE liners were inspected for leaks after installation of a protective sand cushion layer using the state of the practice electronic leak detection survey technologies (see Section 5.3.2.5 and 5.3.2.6).

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[154] Kunkel Ground-Water Contamination Report, page 2.

[155] MWG13-15_16907-63; MWG13-15_18115-31; MWG13-15_24935-54; MWG13-15_10926-10947

[156] MWG13-15_36-65

[157] Kunkel Ground-Water Contamination Report, page 2.

[158] Kunkel cites Schroeder (1994), which does not consider the frequency of leaks when certain construction quality assurance protocols are followed. See Section 5.3.2.6 for applicable studies.

- Warning and cushion layers are installed above the HDPE liners to protect them from accidental contact and damage during future dredging operations (see Sections 5.3.2.1 through 5.3.2.5).
- The quality of construction was documented by an independent engineering firm that attested that the construction met the project drawings and specifications and manufacturer's recommendations (see Section 5.3.2.6).

Thus, I conclude that it is inaccurate to portray ash ponds as "continuing to leak" when there is no evidence that the current HDPE liners are leaking. Additionally, in my opinion, the CQA documentation indicates the HDPE liner construction is of high quality.

6.5.3. O&M of the Ash Ponds are Not Expected to Cause Leaks and O&M are Conducted in Accordance with Consistent Operating Procedures

Kunkel alleges that at all of the generating stations, ash pond have liners that "have leaked and continued to leak due to ... poor coal ash removal/maintenance practices...."[159] Furthermore, Kunkel alleges that "[r]elining the ash ponds will not reduce the potential for liner damage and subsequent liner leakage as long as dredging of coal ash continues as in the past."[160] However, I conclude that ash removal and maintenance practices are good, and O&M of the ash ponds are not expected to cause leaks based on my review of O&M documentation and practices. Specifically:

- Periodic dredging of settled bottom ash is carefully performed using excavators. If the excavator bucket were to encounter the stone warning layer, which is located over the protective layer, which in turn is located over the HDPE liner, it would be obvious to the operator who is expected to stop excavating. If the HDPE liner were encountered, white HDPE material would be visually observed in the bucket by the excavator operator who would stop work. Based on my review of the O&M documentation, damage of the HDPE liner below the water level during dredging has not been observed at any ash pond (see Section 5.3.2.7).
- Kunkel specifically alleges that "[a]sh pond dredging using heavy equipment likely will damage the plastic liners given the thin (1 ft thick) protective sand layer and 6-in thick warning layer on top of the liners. Typically, at least two feet or more of protective layer is

[159] Kunkel Ground-Water Contamination Report, page 2
[160] Kunkel Ground-Water Contamination Report, page 2

required on top HDPE if heavy equipment is utilized." However, Kunkel did not provide any load bearing analysis that the protective and warning layers would be insufficient for heavy equipment traffic loads. It is my opinion that the protective and warning layers are sufficient based on my review of the overburden stress analysis conducted by NRT for 18 inches of soil cover over the liner (see Section 5.3.2.5).

- Most tears observed in the ash pond liners have been above the impounded water surface (see Section 5.3.2.7). All tears were promptly repaired as allowed by favorable weather conditions. Tears above impounded water would not be expected to result in leaks. The only tear that was potentially below the water line occurred when no water was in the ash pond and was repaired prior to refilling water to the level of the tear in the ash pond.

6.5.4. Groundwater Elevations above the Bottoms of Ash Ponds are Temporary or Seasonal Conditions

Kunkel alleges that at Powerton, "...ash pond water surface elevations are periodically below ground-water table elevations..."[161]; at Waukegan, "...ash pond bottom liners are always below the surface-water elevations in Lake Michigan and also the ground-water table..."[162]; and at Will County, "Ground-water and Des Plaines River surface-water elevations are always above the bottom of the liners..."[163] These statements are misleading and inaccurate. First, an uplift pressure argument is relative to the top of the bottom liner. Second, an uplift argument is a potential issue for soil liners, not geomembrane liners that are at all of the ponds. Third, groundwater levels are not often above the top of the bottom liners and when they are above the bottom liner there are other opposing forces or controls to eliminate uplift.

Uplift pressure under a geomembrane liner is not an indication of failure. In the event that uplift pressures were to occur, the geomembrane would lift vertically out of position and would have to be inspected and repaired prior to service. This would only occur absent weight and pressure from pond materials (section 6.5.5), and has never been reported at any of the ponds.

To demonstrate the inaccuracy of Kunkel's uplift proposition, I evaluated the groundwater elevation and pond bottom data. The data show the following:

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[161] Kunkel Ground-Water Contamination Report, page 3
[162] Kunkel Ground-Water Contamination Report, page 3
[163] Kunkel Ground-Water Contamination Report, page 4

- Joliet #29 Ash Ponds 1, 2, and 3—groundwater elevations in nearby monitoring wells have always been below the ash pond bottom elevations during the period of record.
- Powerton Ash Surge Basin: The groundwater elevations during the entire period of record at nearby monitoring wells MW-8, MW-11, MW-12, and MW-15 have been below the bottom liner elevation of 452.0 feet above MSL (see Figure 5-2).
- Powerton Secondary Ash Settling Basin: The groundwater elevations during the entire period of record at nearby monitoring well MW-6 have been below the bottom liner elevation of 440.0 feet above MSL (see Figure 5-3). The groundwater elevations at nearby monitoring well MW-7 have been above the bottom of the pond during only 2 of 16 quarterly groundwater monitoring events. However, the groundwater in this area can be controlled by the underdrain system that can relieve uplift pressures when the pond is dewatered and groundwater elevations are high.
- Powerton Metal Cleaning Basin: Groundwater elevations during the entire period of record at nearby monitoring wells MW-13, MW-14, and MW-15 have been below the bottom liner elevation is 457.5 feet above MSL (see Figure 5-4).
- Powerton Ash Bypass Basin: The groundwater elevations during the entire period of record at nearby monitoring wells MW-9 and MW-12 have been below the bottom liner elevation of 459.0 feet above MSL (see Figure 5-5)..
- Waukegan West and East Ash Ponds: Design documentation[164] has demonstrated that the bottom of the ponds is at approximately elevation 585.5 feet above MSL (see Figure 5-6). Groundwater elevations during the entire period of record at nearby downgradient monitoring wells MW-1 through MW- 4 and in upgradient monitoring well MW-5 were a minimum of 579.3 up to a maximum of 584.5 ft MSL which are all below the bottom of the ponds.
- Will County Ash Ponds 2 South and 3 South: The bottom liner elevation is 580.5 feet above MSL (see Figure 5-7). Groundwater elevations have been above the bottom of the pond during the period of record at nearby monitoring wells MW-5, MW-6, and MW-9, and monitoring well MW-10 during 6 of 16 quarterly groundwater monitoring events.

Therefore, groundwater levels are above the bottom liner at only three of the eight ponds which Kunkel claims have uplift pressures. However, for all ponds, the uplift pressures are offset

[164] MWG13-15_49285

by the weight of water in the ponds when they are full. For two ponds, uplift pressures are offset by the weight of overlying cushion and protective layers (See Section 6.5.5), and one pond has a groundwater underdrain to offset uplift pressures.

6.5.5. An Appropriate Analysis of Hydrostatic Uplift Involves Consideration of Counteracting Downward Forces

Kunkel alleges that at Powerton, "[a]sh pond water surface elevations are periodically below ground-water table elevations which likely has resulted, and will likely result in the future, in hydrostatic uplift and liner failure...."[165] Similarly, Kunkel alleges that at Waukegan, "ash pond bottom liners are always below ... the ground-water table which results in hydrostatic uplift pressures which likely has caused, and will likely cause in the future, liner leaks..."[166] Additionally, Kunkel alleges at Will County, "[g]round-water ... elevations are always above the bottom of the liners which likely has caused, and likely will cause in the future, hydrostatic uplift and liner failure." However, Kunkel does not support his allegations with any site-specific calculations or analysis.

In addition to errors in Kunkel's analysis (see Section 6.5.4), Kunkel fails to consider the weight of the Poz-O-Pac, sand cushion, and limestone warning layers. An appropriate hydrostatic uplift calculation should include at a minimum the weight of Poz-O-Pac, sand cushion layers, and limestone warning layers that provide downward forces that counteract the upward hydrostatic uplift force. The presence of bottom ash and wastewater provide further downward forces that counteract the upward hydrostatic uplift force. I calculated the following net resultant hydrostatic uplift forces present when only the pond liner system is present and nearby groundwater elevations are at a maximum. These calculations are for the three ash ponds where groundwater elevations are temporarily or seasonally higher than the bottom elevations and are summarized as follows:

- Powerton Secondary Ash Settling Basin: There is a net resultant uplift force when the pond is empty. This was demonstrated during pond relining when the Illinois River was at an unusually high level causing groundwater levels to rise, and in turn causing inflow into the excavations. The inflow was controlled by a drainage system. During cleanout, the drainage system is available to eliminate hydrostatic uplift. While the ponds are full, however, there

[165] Kunkel Ground-Water Contamination Report, page 3
[166] Kunkel Ground-Water Contamination Report, page 3

is no hydrostatic uplift because of the downward force of water which is 180 to 700 pounds per square foot (psf)[167], depending on the groundwater level.

- Will County Ash Pond 2S: Uplift force is entirely counteracted by the weight of the Poz-O-Pac, sand cushion, and limestone warning layers, with a net resultant downward force of 195 psf.
- Will County Ash Pond 3S: Uplift force is entirely counteracted by the weight of the Poz-O-Pac, sand cushion, and limestone warning layers, with a net resultant downward force of 195 psf.

6.5.6. Kunkel's Conclusion of Groundwater Mounding at Joliet #29 Monitoring Misrepresents Actual Groundwater Elevations

Kunkel alleges that at Joliet #29 "ash Pond 3 must have been leaking because the ground-water elevation in MW-9 was higher (505.66) than that in MW-8 (505.22) which is generally up-gradient from MW-9." However, I reviewed groundwater elevations measured at Joliet #29 monitoring wells MW-8 and MW-9 during the period of record between 2010 and 2014. Groundwater elevations at MW-8 were higher than groundwater elevations at MW-9 during 11 of 16 quarterly groundwater monitoring events (69 percent). Furthermore, the average groundwater elevation at MW-8, 505.67 feet above MSL, was higher than the average groundwater elevation at MW-9, 505.65 feet above MSL, during the period of record. Kunkel selected the largest value for the difference in groundwater elevations between MW-9 and MW-8 to prove a conclusion, yet the overall data do not support the conclusion.

The groundwater elevations across the approximately 18 acres of the site covered by the monitoring well network vary by 0.5 ft on average (see Table 4-1). The measurement accuracy of a typical groundwater level monitor is approximately 0.05 ft. It is my opinion that the accuracy of the readings combined with the narrow differences and variations of groundwater elevations indicate that any mounding would be too subtle to detect.

Therefore, it is my conclusion that the data do not show any mounding.

[167] Calculated based on normal pool elevation of 453 ft, average groundwater elevation of 441.5 ft and maximum groundwater elevation of 450 ft.

6.5.7. Kunkel's Conclusion of a Liner Leak at Waukegan is Actually an Expression of Surface Topography

Kunkel prepared groundwater contour maps and concluded that "The "ridge" in the ground-water contours at the ash ponds may indicate a liner leak in the west ash pond,...". I prepared a groundwater contour map (Figure 4-4) of data from May and June 2014 using the information from the Waukegan monitoring wells and ELUC wells. I conclude that the area where a "ridge" was shown in Kunkel's maps is more muted and simply a reflection of the ground surface topography which dips to the north, east and south from the area of the ash ponds. This groundwater "mirroring" of ground surface topography would be expected in an aquifer that is primarily granular (more permeable) material that responds relatively quickly to infiltration and lateral migration. The groundwater mirroring is consistent with the additional information that the ponds are not leaking.[168] (See 5.5.2).

6.5.8. Background Constituent Concentrations Should be Based on Contemporary Data from Upgradient Wells

Kunkel alleges that he compared measured groundwater quality concentrations to "site background water quality."[169] However, Kunkel instead relies on "specific Illinois ground-water quality data which are representative of background on a state-wide level" for Joliet #29, Waukegan, and Will County. It is my opinion that this approach is inappropriate and misrepresentative for sites where upgradient groundwater is impacted prior to migrating on-site (see Sections 4.2.1 and 4.3.1). In particular, Kunkel claims that "indicator pollutants in [Powerton] MW-16 are similar to the IEPA (2013) background network wells for sand and gravel aquifers." However, Kunkel limits his assessment to boron, manganese, and sulfate as the "indicator pollutants" and does not consider other constituents that also comprise background concentrations. It is my opinion that it is inaccurate to portray background concentrations at a state-wide level as representative of background at the sites where there are upgradient monitoring data.

An appropriate approach would be to evaluate background concentrations based on site specific data such as monitoring wells installed at the upgradient site boundaries in locations without the presence of ash materials in fill.

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[168] IEPA, 2015 and MWG13-15_29775-29776

[169] Kunkel Ground-Water Contamination Report, page 7.

- Joliet #29—monitoring wells MW-8, MW-10, and MW-11 are near the upgradient site boundary, and the boring logs show that these three wells are not installed in ash fill. Groundwater quality at these three locations are not consistent:
    - MW-8 has historical exceedances of chloride and sulfate above IEPA Class I groundwater standards.[170]
    - MW-10 has historical exceedances of chloride above the IEPA Class I groundwater goal. [171]
    - MW-11 has historical exceedances of boron and chloride above IEPA Class I groundwater standards. [172]

  Thus, background groundwater concentrations at Joliet #29 reflect sources other than the ponds and historical ash fill based on site-specific data because monitoring wells near the upgradient site boundary exceed IEPA Class I groundwater standards prior to migrating below the ponds.

- Powerton—monitoring wells MW-1, MW-9, and MW-16 are near the upgradient site boundary, and the boring logs show that MW-1 and MW-16 are not installed within ash fill. The groundwater concentrations at MW-1 and MW-16 have historical exceedances for nitrate above the IEPA Class I goal and pH has historical exceedances that are both above and below the acceptable IEPA Class I range of goals. [173] MW-16 groundwater also detected barium, boron, chloride, and sulfate. MW-1 groundwater also detected barium, boron, chloride, fluoride, manganese, nitrate, and sulfate. MW-9 groundwater also detected barium, boron, chloride, fluoride, manganese, selenium, and sulfate. Thus, background concentrations at Powerton reflect sources other than the ponds and historical fill areas based on site-specific data because monitoring wells near the upgradient site boundary detect or exceed IEPA Class I groundwater standards prior to migrating below the ponds.
- Waukegan—monitoring wells MW-6 and MW-8 are near the upgradient site boundary, and the boring logs show that MW-6 is not installed within ash fill. An estimate of site-wide groundwater contours for the Waukegan site are provided on Figure 4-4. Groundwater concentrations at MW-6 have several historical exceedances for boron and manganese

[170] MWG13-15_48647-48710
[171] MWG13-15_48647-48710
[172] MWG13-15_48647-48710
[173] MWG13-15_48711-48843

above IEPA Class I groundwater standards.[174] Additionally, wells installed for the neighboring and upgradient ELUC, including ELUC MW-10, ELUC MW-11, ELUC MW-12, ELUC MW-14, and ELUC MW-15, show elevated levels for boron and manganese above IEPA Class I groundwater standards.[175] Thus, background concentrations at Waukegan reflect sources other than the ponds and historical fill areas based on site-specific data because monitoring wells near the upgradient site boundary exceed IEPA Class I groundwater standards prior to migrating below the ponds.

- Will County—shallow groundwater conditions at the Will County site are impacted by the Des Plaines River and the Chicago Sanitary and Ship Canal. Groundwater hydraulic gradients are confounded by surface water influences with some groundwater migrating toward the Des Plaines River and some groundwater understood to be migrating toward the Chicago Sanitary and Ship Canal. Thus, background concentrations at Will County cannot be established based on site-specific data. Additionally, due to the unique groundwater conditions at the Will County site, it is not appropriate to use background groundwater quality based on a state-wide level for the Will County site.

[174] MWG13-15_48902-48958
[175] MWG13-15_50086-50092

Section 7: Opinion 3—Kunkel Underestimates the Costs to Implement the Unwarranted Cleanup

It is my opinion that the Kunkel Remedy Report significantly underestimates the cost of Kunkel's proposed cleanup to remove all ash ponds and all CCRs in fill at the plants.

- Kunkel's proposed remedy fails to incorporate the costs of disposal at a permitted landfill (see Section 7.1).
- Kunkel's proposed remedy does not account for significant and costly disruption at the generating plants (see Section 7.2).
- Kunkel's proposed remedy results in significant impacts to the surrounding communities, including dust, noise, and traffic (see Section 7.3). Of particular concern is the increased risk of vehicle crashes involving large trucks.
- Kunkel's proposed remedy fails to consider the impact of vehicle carbon dioxide emissions. I estimate the emissions from the large truck traffic to be on the order of 203,840,000 kilograms of carbon dioxide (see Section 7.4).

7.1. Costs of Soil Disposal at a Permitted Landfill

Kunkel's cost estimate for his proposed remedy includes the costs associated with excavation, hauling, and backfill. However, Kunkel fails to include the cost of soil disposal at a permitted landfill, which is essential to his proposed remedy. In my experience, the disposal cost for impacted soil has a unit price of approximately $20 per ton. Assuming a disposal cost of $20 per ton, and using the unit tonnage estimates provided by Kunkel, I estimated the disposal costs associated with Kunkel's proposed remedy as follows:

- Joliet #29—$14,000,000 (708,657 tons)
- Powerton—$93,000,000 (4,645,190 tons)
- Waukegan—$53,000,000 (2,661,395 tons)
- Will County—$18,000,000 (910,525 tons)
- Total Disposal Costs: $178,000,000

Thus, the disposal costs for his proposed remedy increases his estimated cost for excavation, hauling, and backfilling (approximately $260,000,000 total of all four sites site-wide) by 68 percent.

7.2. Kunkel's Proposed Remedy Results in Significant and Costly Disruptions of the Electricity Generation Plants

Kunkel includes estimates of the areas and volumes of ash-impacted soils that he asserts should be removed from the four sites (see Kunkel's Table 6 and Figures 1 through 4 in the Remedy Report). The data are summarized as follows:

- Joliet #29—Top 1.4 feet of soil over 251 acres (566,925 cubic yards of ash-impacted soil)
- Powerton—Top 6.6 feet of soil over 349 acres (3,716,152 cubic yards of ash-impacted soil)
- Waukegan—Top 5.3 feet of soil over 249 acres (2,129,116 cubic yards of ash-impacted soil)
- Will County—Top 2.1 feet of soil over 215 acres (728,420 cubic yards of ash-impacted soil)

As shown on figures within Kunkel' report, the cost estimates include areas below equipment such as switchyards and coal handling and transfer equipment. Removing soil from these areas of the sites would cause substantial operational disruptions, including extended temporary shutdowns, of the generating stations. Before any excavation could occur, MWG would need to decommission and remove or bypass all of the overlying equipment. Power generating stations are fixed structures, and it is not simple to remove and replace equipment.

Following disassembly of equipment, excavation of the soil would require additional time. I identified the allegedly impacted areas with critical generating equipment, and I estimated the acreages so that I could in turn estimate the duration of excavation activities in those areas. The estimates of the durations of excavation activities are as follows:

- Joliet #29 (see Figure 7-1):
    - Electrical switchyard—approximately 3.2 acres
    - Coal handling and transfer equipment—approximately 2.8 acres
    - Depth of soil excavation proposed by Kunkel—1.4 feet
    - I estimate once the equipment are decommissioned or removed or bypassed, that each of these areas could be excavated within one week based on a typical soil excavation production rate of 5,000 cubic yards per day for large projects.

- Powerton (see Figure 7-2):
    - Electrical switchyard—approximately 11.2 acres
    - Coal handling and transfer equipment—approximately 2.2 acres
    - Depth of soil excavation proposed by Kunkel—6.6 feet
    - I estimate that once the equipment are decommissioned or removed or bypassed, the electrical switchyard area and coal handling and transfer equipment area could be excavated within four weeks and one week, respectively, based on a typical soil excavation production rate of 5,000 cubic yards per day for large projects.
- Waukegan (see Figure 7-3):
    - Electrical switchyard—approximately 6.8 acres
    - Coal handling and transfer equipment—approximately 3.9 acres
    - Depth of soil excavation proposed by Kunkel—5.3 feet
    - I estimate that once the equipment are decommissioned or removed or bypassed, the electrical switchyard area and coal handling and transfer equipment area could be excavated within two weeks and one week, respectively, based on a typical soil excavation production rate of 5,000 cubic yards per day for large projects.
- Will County (see Figure 7-4):
    - Electrical switchyard—approximately 9.6 acres
    - Coal handling and transfer equipment—approximately 13.3 acres
    - Depth of soil excavation proposed by Kunkel—5.3 feet
    - I estimate that once the equipment are decommissioned or removed or bypassed, the electrical switchyard area and coal handling and transfer equipment area could be excavated within three weeks and four weeks, respectively, based on a typical soil excavation production rate of 5,000 cubic yards per day for large projects.

Following excavation, the equipment would also need to be reassembled and tested. In some cases, disassembled equipment may not be of sufficient quality to reassemble. For these parts, disassembled parts would need to be demolished and disposed or recycled off-site, and the parts would need to be replaced.

Importantly, Kunkel fails to account for the additional and significant costs to disassemble, reassemble, and test the switchyards and coal handling and transfer equipment. Those

costs include the additional personnel and contractors to safely disassemble and reassemble the equipment and additional material costs to safely store the equipment during excavation.

Moreover, the generating units cannot be operated without being supplied coal, and the electrical switchyard is necessary for distributing power. The generating stations would be offline for an extended period of time and would in turn incur significant costs associated with the loss of revenue from the offline generation units. These equipment cannot be practicably bypassed to continue to operate the generating units; furthermore, there is not sufficient space at the sites to disassemble electrical switchyard equipment and the coal handling and transfer equipment simultaneously. Fully disassembling, reassembling, and testing the electrical switchyard equipment and the coal handling and transfer equipment would be on the order of two to five years for each site.[176]

Kunkel's estimation entirely fails to consider the outage costs and loss of revenue during the extended period required to conduct his proposed remediation. During this time, many people, such as plant workers and coal producers, will be out of employment suffering a loss of income that has a trickle-down effect on the local communities.

7.3. Additional Impacts to the Surrounding Communities

In addition to the substantial disruptions to operations of the generating units, the surrounding community would be adversely impacted by the increased risk of vehicle crashes involving large trucks, increased travel times, reduced air quality from diesel exhaust, increased noise, and increased dust.

Protection of the community from adverse effects during implementation of the alternative is a factor that bears upon assessing the reasonableness of Kunkel's proposed remedy. Of particular relevance for these subject sites and the remedy proposed by Kunkel is the increased risk of vehicle accidents involving large trucks.

The U.S. Department of Transportation, National Highway Traffic Safety Administration (NHTSA) reports traffic data for large trucks that are involved in crashes resulting in fatalities or injuries. Based on traffic data for 2013, which is the most recent year of data reported by NHTSA, large trucks accounted for 4 percent of all registered vehicles but accounted for 9 percent of all vehicles involved in fatal crashes (NHTSA, 2015). In 2013, 3,964 people were killed and 95,000 people were injured in

[176] Teleconference with Mark Kelly and Rachel Maddox; teleconference with Fred Veenbaas; teleconference with Pete O'Day

crashes involving large trucks; 71 percent of these fatalities were occupants of other vehicles involved in the crash (NHTSA, 2015). The Insurance Institute for Highway Safety (IIHS) identified the main problem of large truck fatalities as the vulnerability of people traveling in smaller vehicles (IIHS, 2015).

In 2013, 0.73 percent (36.86 fatalities and 690 injuries per 100,000) of registered trucks were involved in a crash resulting in fatalities or injuries (NHTSA, 2015). The involvement rate in 2013 based on the mileage traveled by large trucks was 1.42 fatalities and 27 injuries per 100,000,000 miles (NHTSA, 2015).

I estimated the transportation requirements for hauling ash-impacted soil and import fill based on typical remediation practices for transportation and disposal.

- Trucks for hauling soil and fill have 20-cubic yard capacities;
- One truckload of clean import fill is needed for each truckload of ash-impacted soil disposal;
- Trucks used for disposing ash-impacted soil should not be used for importing clean fill, so trucks return empty after disposing or importing fill;[177]
- Assuming a disposal site for ash-impacted soil is 15 miles away from each site, the round-trip distance is 30 miles per trip;
- Assuming the source of clean import fill to replace the removed soil is 10 miles away from each site, the round-trip distance is 20 miles per trip; and
- For each cubic yard of ash-impacted soil to be excavated, the resulting transportation requirements for the project work is on the order of 2.5 miles per cubic yard ([30 miles per round-trip of ash-impacted soil disposal + [20 miles per round-trip of fill imported] / [20 cubic yards per round trip].

Based on the number of weeks for soil hauling activities developed for the hypothetical scenario, this results in the following total mileage:

- Joliet #29—More than 1,400,000 miles of large truck travel
- Powerton—More than 9,300,000 miles of large truck travel
- Waukegan—More than 5,300,000 miles of large truck travel
- Will County—More than 1,800,000 miles of large truck travel

[177] If trucks were lined with disposal plastic liners or were decontaminated at disposal facilities, trucks could transport soil for disposal and import fill in a single round trip. If these additional costs to the project were incurred to eliminate one leg of the truck route, the mileage may be reduced by approximately 30 percent.

Using Kunkel's proposed remedial approach results in more than 17,000,000 miles of large truck travel for the four sites in total. Using the 2013 mileage-based probability of a fatality involving a large truck based (1.42 fatalities and 27 injuries per 100,000,000 miles), a risk of 0.25 traffic fatalities and 4.6 injuries would be expected for the large truck traffic generated by Kunkel's proposed remedial approach under the hypothetical scenario.

Therefore, I conclude the risk of removal of all coal ash and trucking to an offsite facility is not supported by the risk of leaving the existing materials in place, which is essentially no risk to human health and the environment.

7.4. Estimate of Carbon Dioxide Emissions Associated with Kunkel's Proposed Remedy

Large trucks and heavy construction equipment generate emissions of carbon dioxide from the combustion of fossil fuels (typically diesel for large trucks and heavy construction equipment). Kunkel's assessment of his proposed remedy fails to include this significant impact of vehicle carbon dioxide emissions. The mass of carbon dioxide emitted from large trucks can be easily estimated using emissions factors and the total miles of large trucks as demonstrated below.

USEPA recently developed emissions factors based on Table 2-15 from the *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2012*, and based on vehicle-miles data for highway vehicles from Table VM-1 of the Federal Highway Administration Highway Statistics 2012 (USEPA, 2014). The transportation emissions factor for medium- and heavy-duty trucks is 1.456 kilograms per vehicle-mile. Based on the estimated large truck mileage in Section 7.2 (17,000,000 miles), the resulting carbon dioxide emissions are approximately 24,800,000 kilograms (equivalent to approximately 27,000 tons).

USEPA estimated the rate of carbon dioxide emissions from a large excavator at 440 pounds per hour. Kunkel estimated the total volume of excavated soil site-wide for the four sites as 7,140,613 cubic yards. Assuming a typical soil excavation production rate of 500 cubic yards per hour for large projects, the total hours of excavation is approximately 14,000 hours of operation for an excavator. This resulting carbon dioxide emissions are approximately 6,160,000 pounds (equivalent to approximately 3,080 tons).

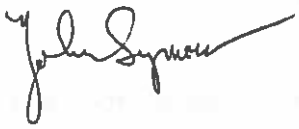
The total carbon dioxide emissions for Kunkel's proposed remedy is approximately 30,000 tons, which is conservative because it does not include emissions from other heavy construction equipment used at the sites, disposal facilities, and import fill sources.

Section 8: Reservation

Due to the delay in the production of documents relied upon by Dr. Kunkel, I am reserving the ability to supplement my opinions in response to any documents or bases for Dr. Kunkel's reports that are presented by the Complainants. In addition, my opinions may be supplemented based on future changes in the construction or operation of the generating stations and in response to any future changes in groundwater conditions observed at the sites.

Section 9: Signature

This report contains 165 pages, including figures, tables, and appendices.



John Seymour, P.E.

2 November 2015

DATE

Section 10: Acronyms

Acronym	Definition
AEEI	Andrews Environmental Engineering, Inc.
CCA	Compliance Commitment Agreement
CCB	Coal combustion by-product
CCR	Coal combustion residual
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended
COI	Constituent of Interest
CQA	Construction quality assurance
CSM	Conceptual Site Model
ELUC	Environmental Land Use Control
EPA	Environmental Protection Agency
EPRI	Electric Power Research Institute
FGD	Flue gas desulfurization
GMZ	Groundwater Management Zone
HDPE	High density polyethylene
IAC	Illinois Administrative Code
IEPA	Illinois Environmental Protection Agency
IIHS	Insurance Institute for Highway Safety
ILCS	Illinois Compiled Statutes
MSL	Mean Sea Level
MWG	Midwest Generation, LLC
NHTSA	National Highway Traffic Safety Administration
NLET	Neutral Leaching Extraction Test
NPDES	National Pollutant Discharge Elimination System
PRB	Powder River Basin
RCRA	Resource Conservation and Recovery Act of 1976, as amended
TCE	Trichloroethylene
TDS	Total dissolved solids
USEPA	United States Environmental Protection Agency
VN	Violation Notice
WPCP	Water Pollution Control Permit
WQC	Illinois Water Quality Criteria
WQS	Illinois Water Quality Standard

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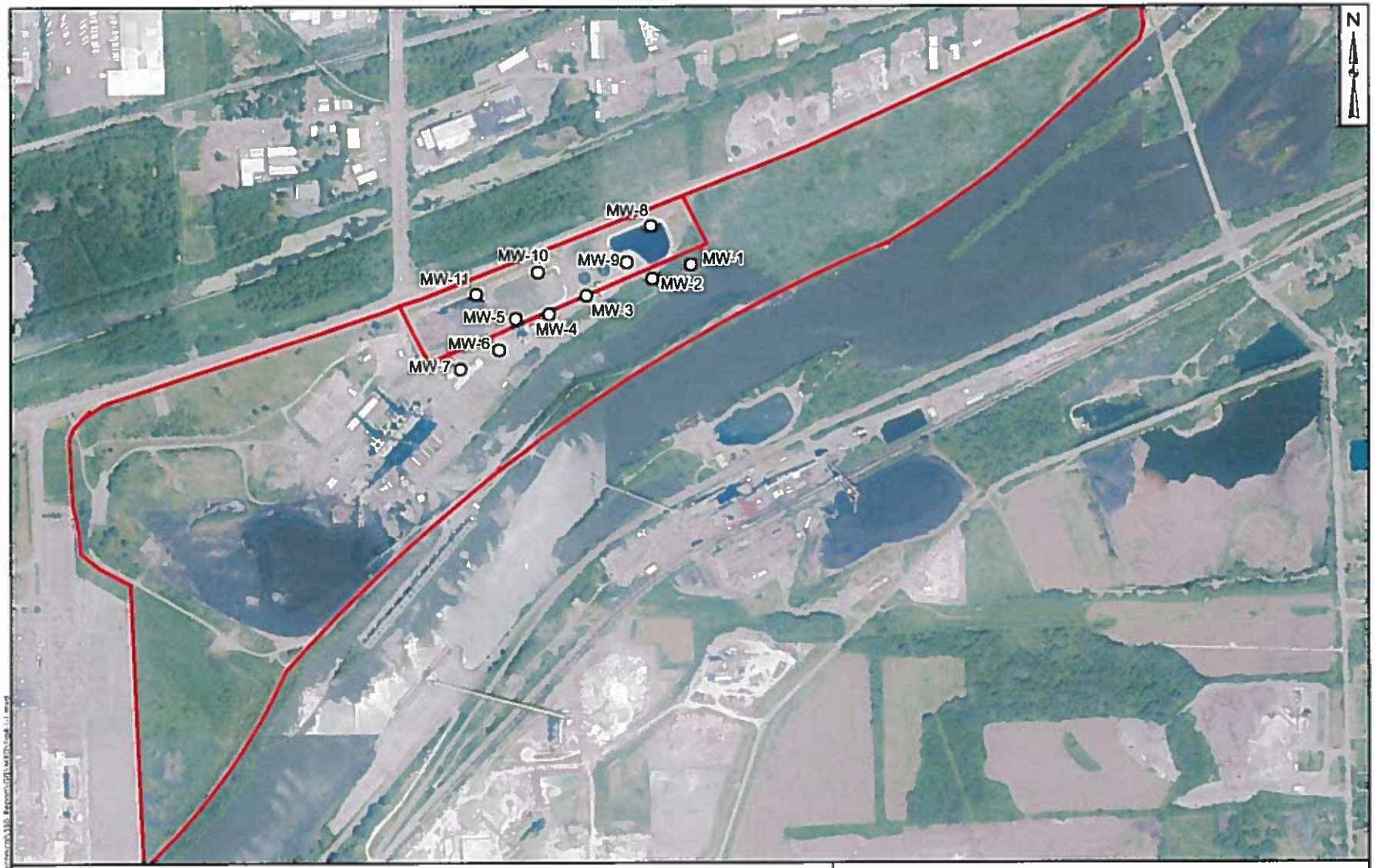
J.SEYMOUR EXPERT REPORT

FIGURES



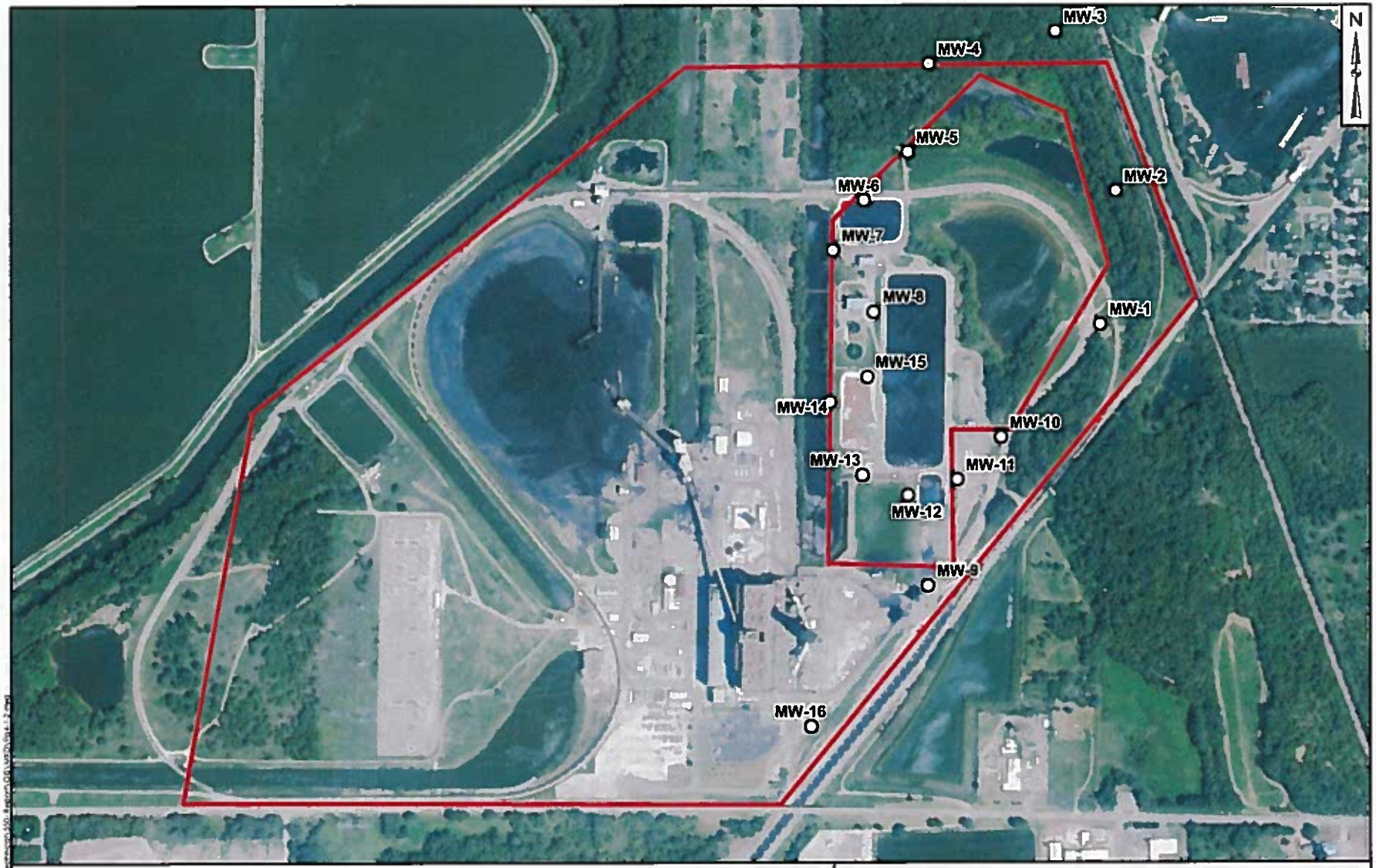
Legend

O Monitoring Well

Note: Locations are approximate and based on MWG, 2015a.

1,000 500 0 1,000 Feet

Joliet #29 Station Monitoring Wells **Joliet, Illinois**	Geosyntec consultants	Figure **4-1**
October 2015	Chicago	



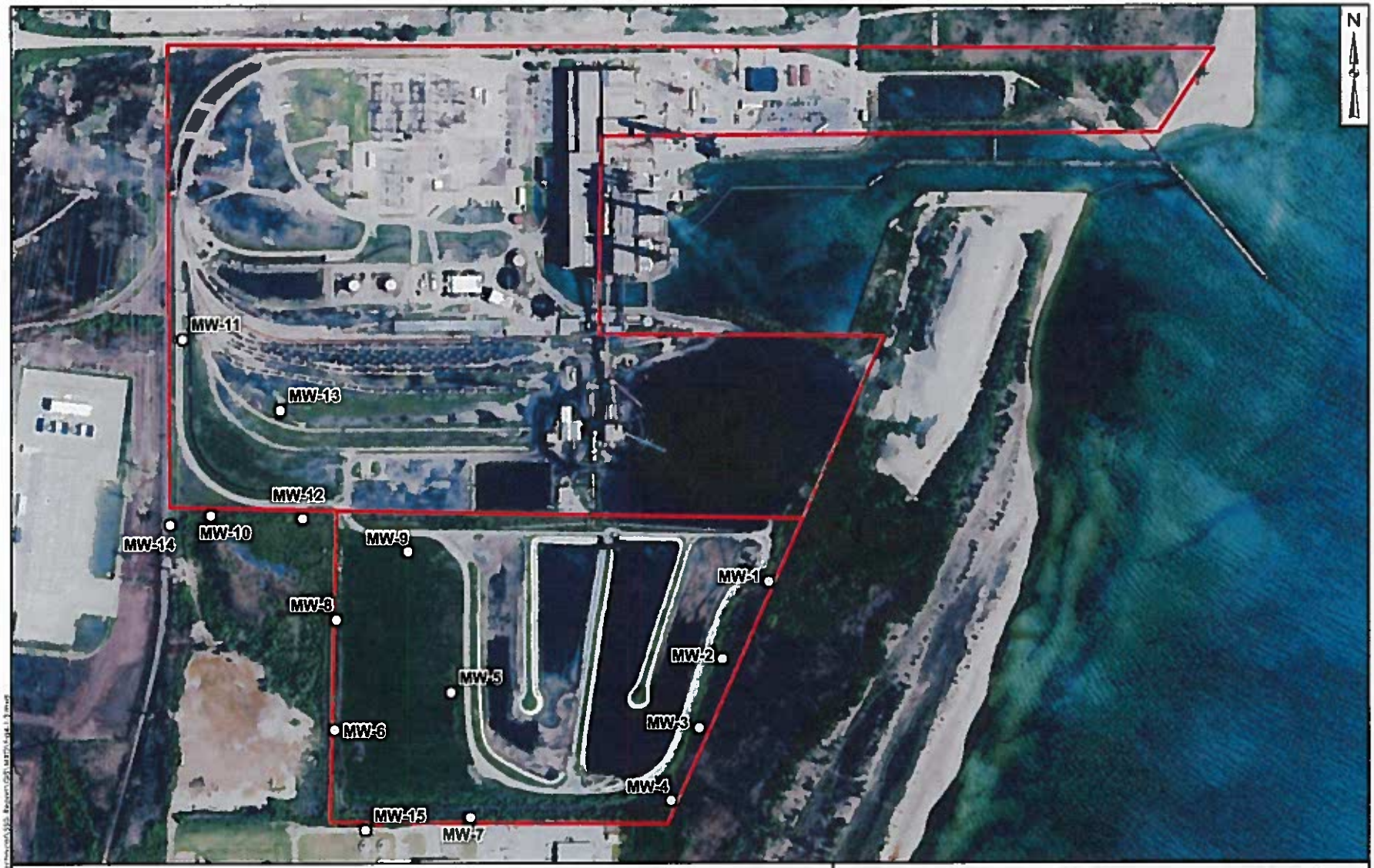
Legend

- Approx. Site Area and Ponds
- Monitoring Well

Note: Locations are approximate and based on MWG, 2015b.

1,000 500 0 1,000 Feet

Powerton Station Monitoring Wells **Pekin, Illinois**	Geosyntec consultants	Figure **4-2**
October 2015	Chicago	



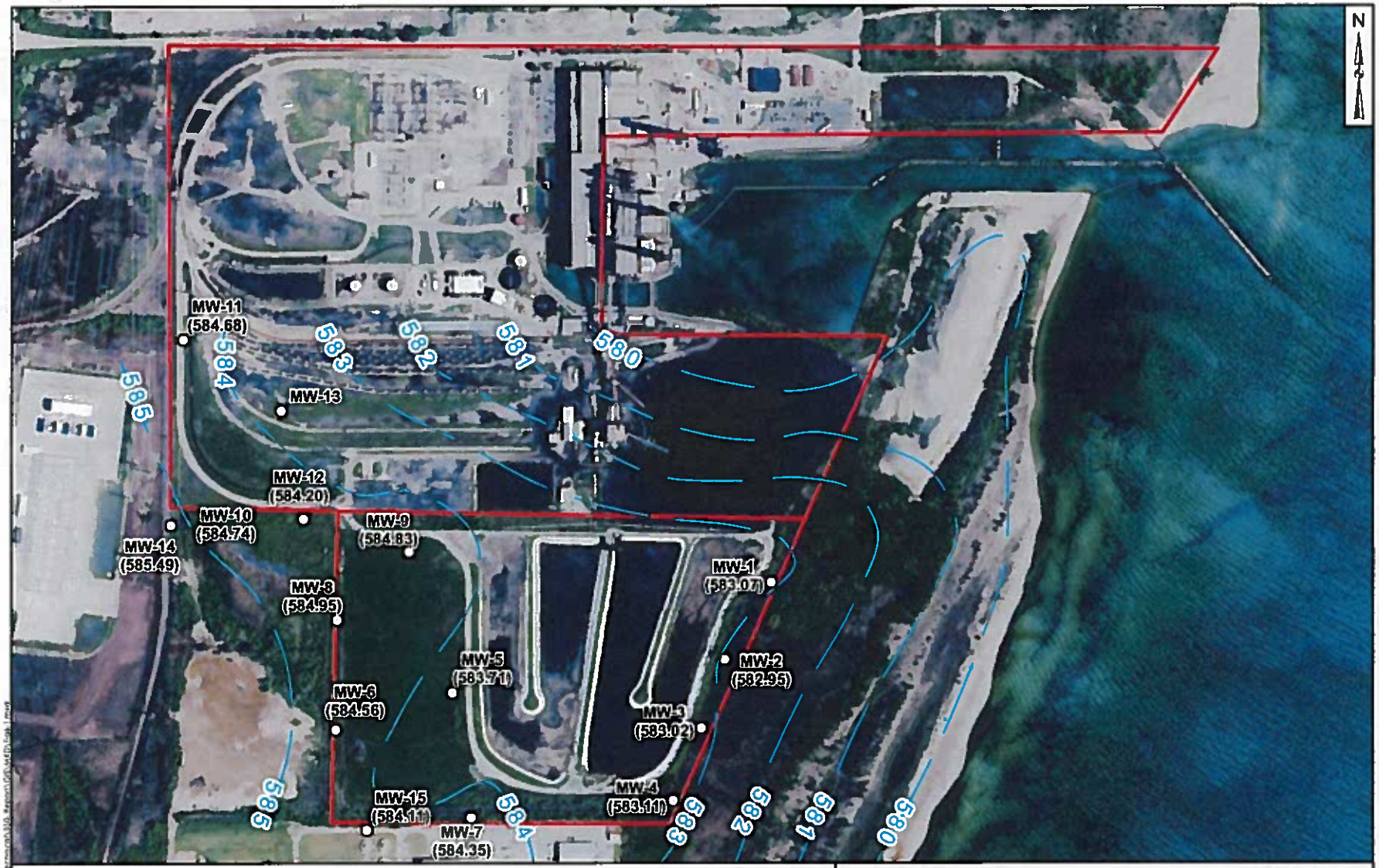
Legend

- Monitoring Wells
- Approx. Site Area and Ponds

Notes: Locations are approximate and based on MWG, 2015c and MWG13-15_44135.

800 400 0 800 Feet

Waukegan Station Monitoring Wells **Waukegan, Illinois**	Geosyntec consultants	Figure **4-3**
October 2015	Chicago	



Legend

- Monitoring Well (May or June 2014 Groundwater Elevation in Feet Mean Sea Level)
- Approx. Site Area and Ponds
- Approximate Groundwater Elevation Contours for May and June 2014 (feet Mean Sea Level)

Notes: Locations are approximate and based on MWG, 2015c and MWG13-15_44135.

Groundwater elevation contours are based on June 2014 and May 2014 groundwater elevations reported in MWG, 2015c and MWG13-15_44128.

800 400 0 800 Feet

Waukegan Station Groundwater Elevation Contours

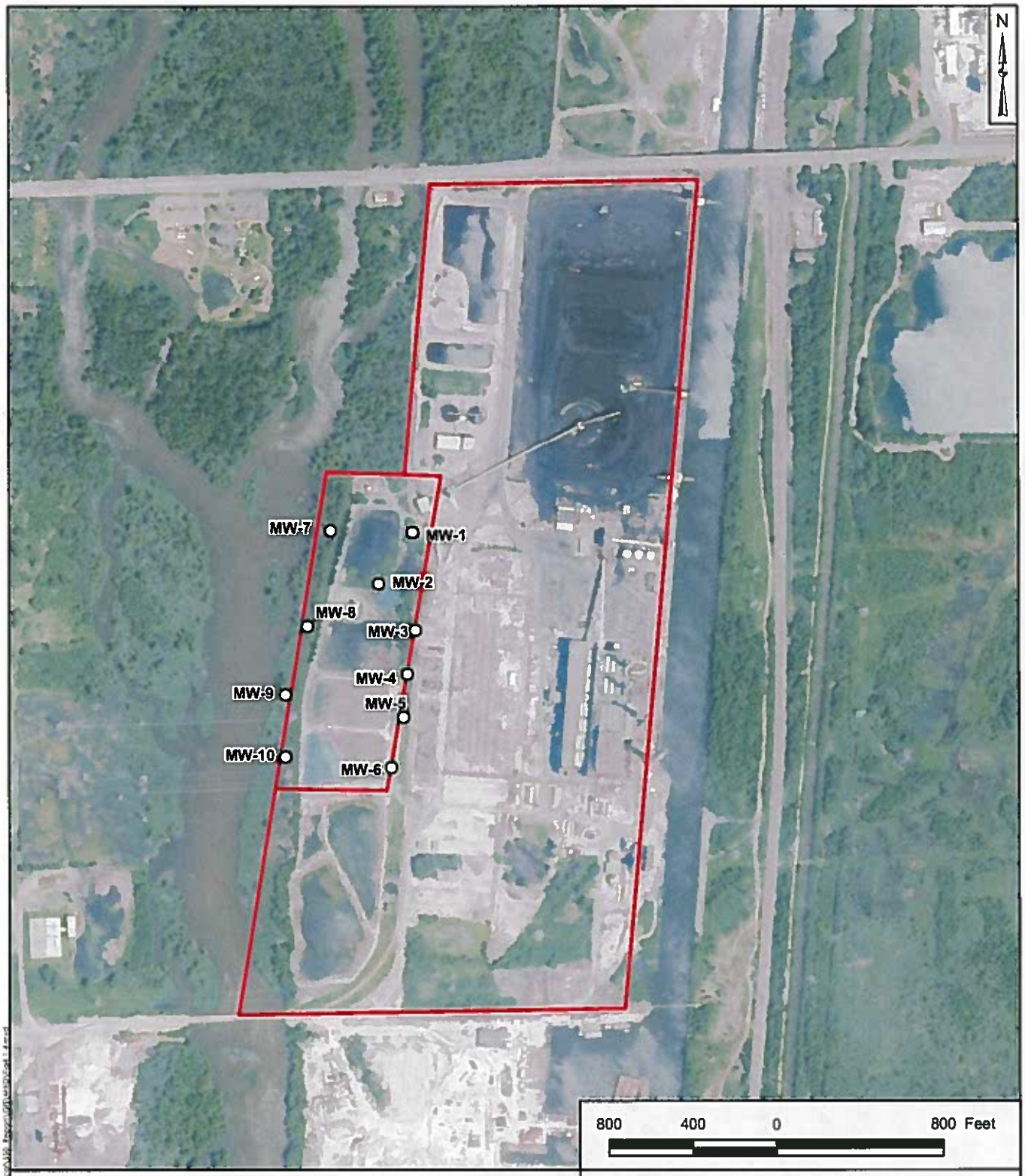
Waukegan, Illinois

October 2015

Geosyntec consultants

Chicago

Figure **4-4**



Legend

- Monitoring Wells
- Approx. Site and Ponds

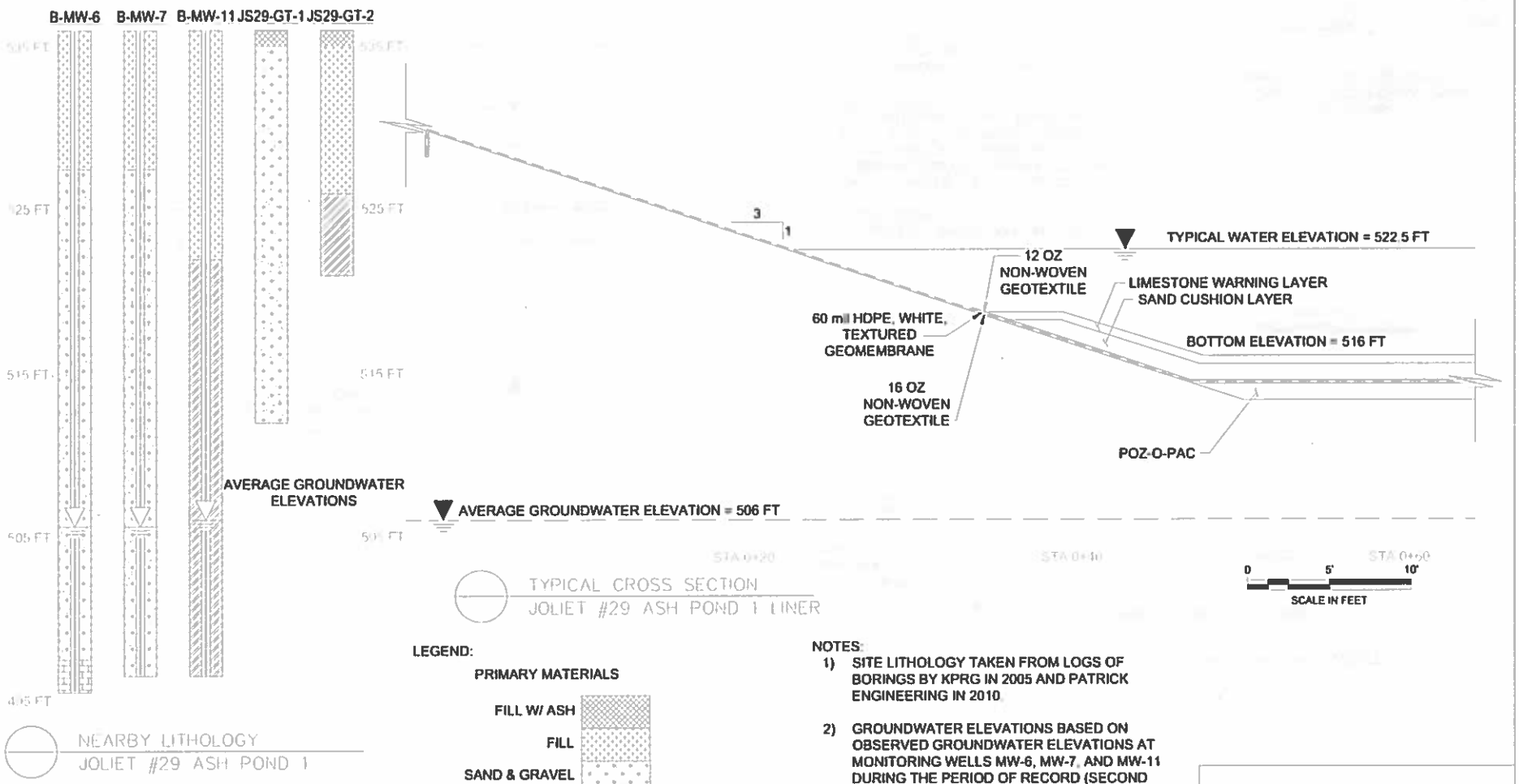
Note: Locations are approximate and based on MWG, 2015d.

Will County Station
Monitoring Wells
Romeoville, Illinois

Geosyntec consultants

Chicago | October 2015

Figure 4-5



NOTES:

1) SITE LITHOLOGY TAKEN FROM LOGS OF BORINGS BY KPRG IN 2005 AND PATRICK ENGINEERING IN 2010.

2) GROUNDWATER ELEVATIONS BASED ON OBSERVED GROUNDWATER ELEVATIONS AT MONITORING WELLS MW-6, MW-7, AND MW-11 DURING THE PERIOD OF RECORD (SECOND QUARTER 2011 THROUGH FIRST QUARTER 2015).

3) THE MAXIMUM GROUNDWATER ELEVATION WAS 509.3 FT MSL AT MONITORING WELL MW-11 DURING SECOND QUARTER 2011.

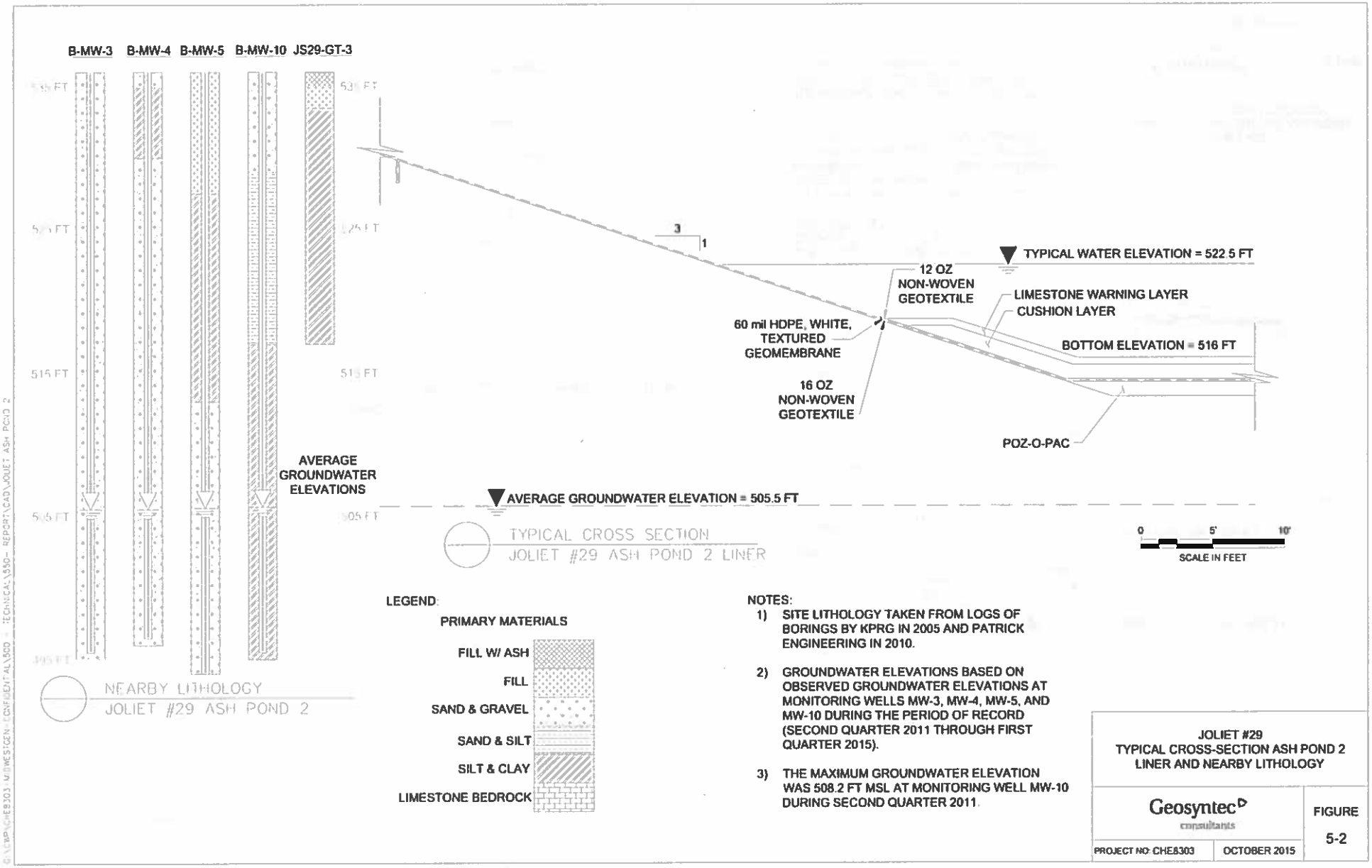
JOLIET #29
TYPICAL CROSS-SECTION OF ASH POND 1 LINER AND NEARBY LITHOLOGY

Geosyntec consultants

PROJECT NO: CHE8303 | OCTOBER 2015

FIGURE 5-1

G:\CMP\CHE8303-MIDWESTGEN-CONFIDENTIAL\300 - TECHNICAL\350- REPORT\CAD\JOLIET ASH POND 1



NOTES:

1) SITE LITHOLOGY TAKEN FROM LOGS OF BORINGS BY KPRG IN 2005 AND PATRICK ENGINEERING IN 2010.
2) GROUNDWATER ELEVATIONS BASED ON OBSERVED GROUNDWATER ELEVATIONS AT MONITORING WELLS MW-3, MW-4, MW-5, AND MW-10 DURING THE PERIOD OF RECORD (SECOND QUARTER 2011 THROUGH FIRST QUARTER 2015).
3) THE MAXIMUM GROUNDWATER ELEVATION WAS 508.2 FT MSL AT MONITORING WELL MW-10 DURING SECOND QUARTER 2011.

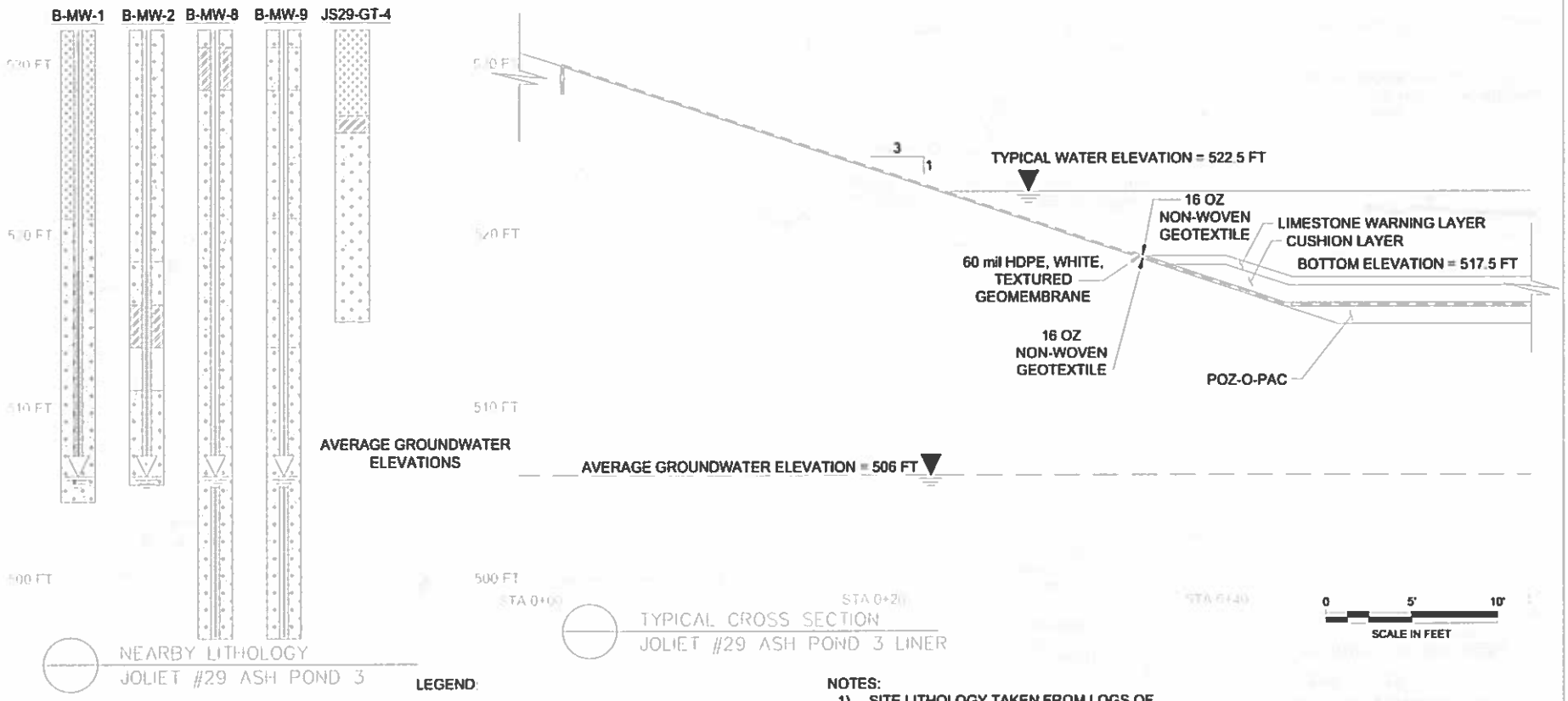
JOLIET #29
TYPICAL CROSS-SECTION ASH POND 2 LINER AND NEARBY LITHOLOGY

Geosyntec consultants

PROJECT NO: CHE8303 | OCTOBER 2015

FIGURE 5-2

G:\CHE8303 MW\WESTGEN - CONFIDENTIAL\SOD - TECHNICAL\SOD - REPORT\CAD\JOLIET ASH POND 2



LEGEND:

PRIMARY MATERIALS

- FILL W/ ASH
- FILL
- SAND
- SAND & GRAVEL
- SAND & SILT
- SILT & CLAY
- LIMESTONE BEDROCK

NOTES:

1) SITE LITHOLOGY TAKEN FROM LOGS OF BORINGS BY KPRG IN 2005 AND PATRICK ENGINEERING IN 2010.
2) GROUNDWATER ELEVATIONS BASED ON OBSERVED GROUNDWATER ELEVATIONS AT MONITORING WELLS MW-1, MW-2, MW-8, AND MW-9 DURING THE PERIOD OF RECORD (SECOND QUARTER 2011 THROUGH FIRST QUARTER 2015).
3) THE MAXIMUM GROUNDWATER ELEVATION WAS 512.3 FT MSL AT MONITORING WELL MW-2 DURING THIRD QUARTER 2012.

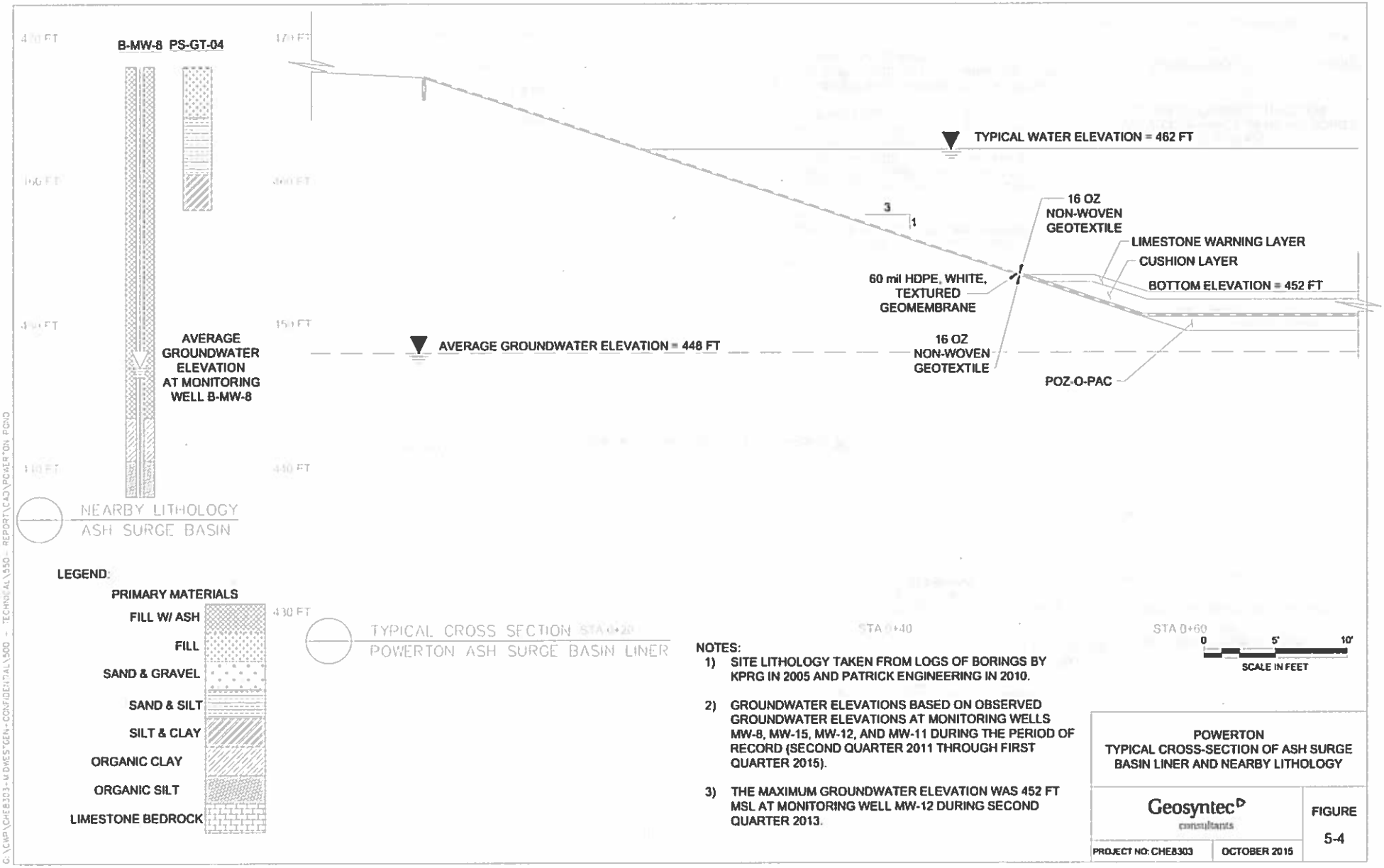
JOLIET #29
TYPICAL CROSS-SECTION OF ASH POND 3 LINER AND NEARBY LITHOLOGY

Geosyntec consultants

FIGURE 5-3

PROJECT NO: CHE8303 | OCTOBER 2015

G:\CAD\CHE8303-W.DWESTGEN-CONFIDENTIAL\500 - TECHNICAL\550 - REPORT\CAD\JOLIET ASH POND 3



NOTES:

1) SITE LITHOLOGY TAKEN FROM LOGS OF BORINGS BY KPRG IN 2005 AND PATRICK ENGINEERING IN 2010.
2) GROUNDWATER ELEVATIONS BASED ON OBSERVED GROUNDWATER ELEVATIONS AT MONITORING WELLS MW-8, MW-15, MW-12, AND MW-11 DURING THE PERIOD OF RECORD (SECOND QUARTER 2011 THROUGH FIRST QUARTER 2015).
3) THE MAXIMUM GROUNDWATER ELEVATION WAS 452 FT MSL AT MONITORING WELL MW-12 DURING SECOND QUARTER 2013.

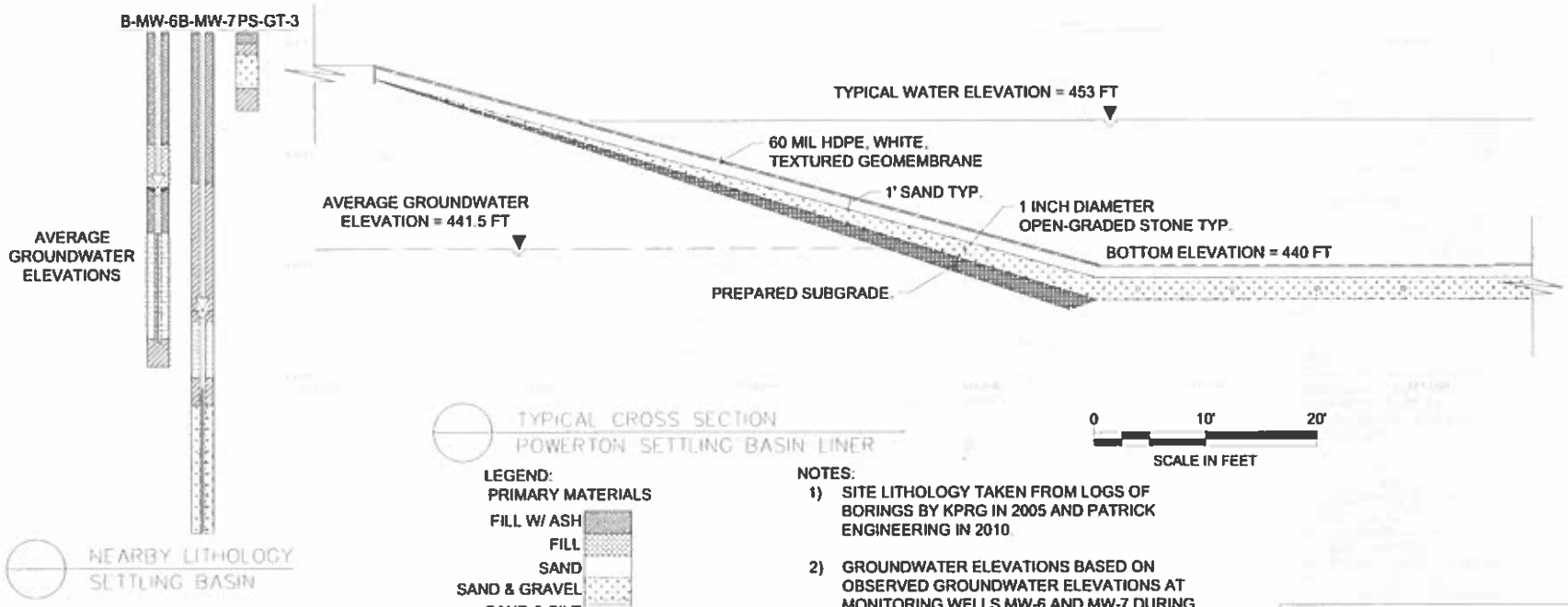
POWERTON
TYPICAL CROSS-SECTION OF ASH SURGE BASIN LINER AND NEARBY LITHOLOGY

Geosyntec consultants

PROJECT NO: CHE8303 | OCTOBER 2015

FIGURE 5-4

G:\CAD\CHE8303-MDWESTGEN-CONFIDENTIAL\500 - TECHNICAL\550 - REPORT\CAD\POWERTON POND



NOTES:

1) SITE LITHOLOGY TAKEN FROM LOGS OF BORINGS BY KPRG IN 2005 AND PATRICK ENGINEERING IN 2010.

2) GROUNDWATER ELEVATIONS BASED ON OBSERVED GROUNDWATER ELEVATIONS AT MONITORING WELLS MW-6 AND MW-7 DURING THE PERIOD OF RECORD (SECOND QUARTER 2011 THROUGH FIRST QUARTER 2015).

3) THE MAXIMUM GROUNDWATER ELEVATION WAS 450 FT MSL AT MONITORING WELL MW-6 DURING FIRST QUARTER 2014.

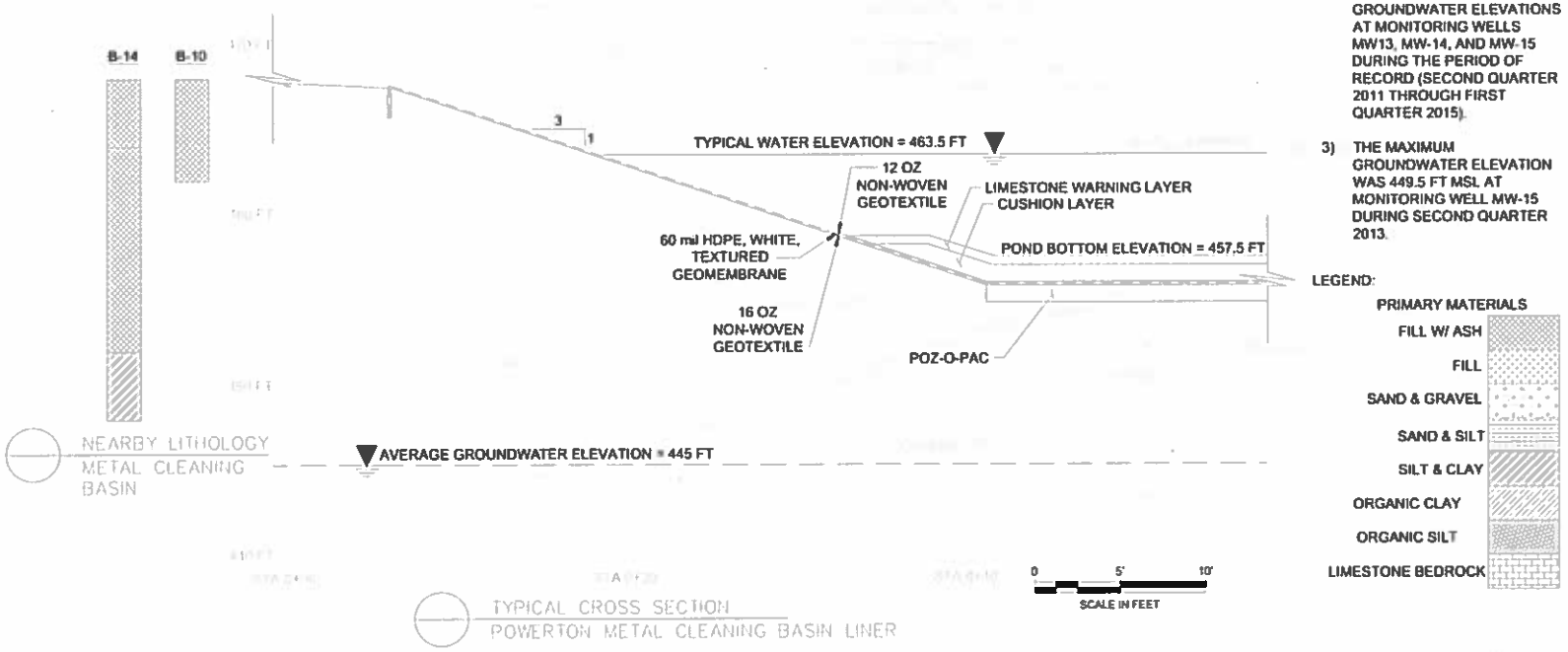
POWERTON
TYPICAL CROSS-SECTION SECONDARY ASH SETTLING BASIN LINER AND NEARBY LITHOLOGY

Geosyntec consultants

FIGURE 5-5

PROJECT NO: CHE8303 | OCTOBER 2015

G:\CAP\CHE8303 - MIDWEST\6 - CONFIDENTIAL\550 - TECHNICAL\550 - REPORT\CAD\SECONDARY ASH SURGE



TYPICAL CROSS SECTION
POWERTON METAL CLEANING BASIN LINER

NOTES:

1) SITE LITHOLOGY TAKEN FROM LOGS OF BORINGS BY ENSR IN 1998
2) GROUNDWATER ELEVATIONS BASED ON OBSERVED GROUNDWATER ELEVATIONS AT MONITORING WELLS MW13, MW-14, AND MW-15 DURING THE PERIOD OF RECORD (SECOND QUARTER 2011 THROUGH FIRST QUARTER 2015).
3) THE MAXIMUM GROUNDWATER ELEVATION WAS 449.5 FT MSL AT MONITORING WELL MW-15 DURING SECOND QUARTER 2013.

LEGEND:

PRIMARY MATERIALS

- FILL W/ ASH
- FILL
- SAND & GRAVEL
- SAND & SILT
- SILT & CLAY
- ORGANIC CLAY
- ORGANIC SILT
- LIMESTONE BEDROCK

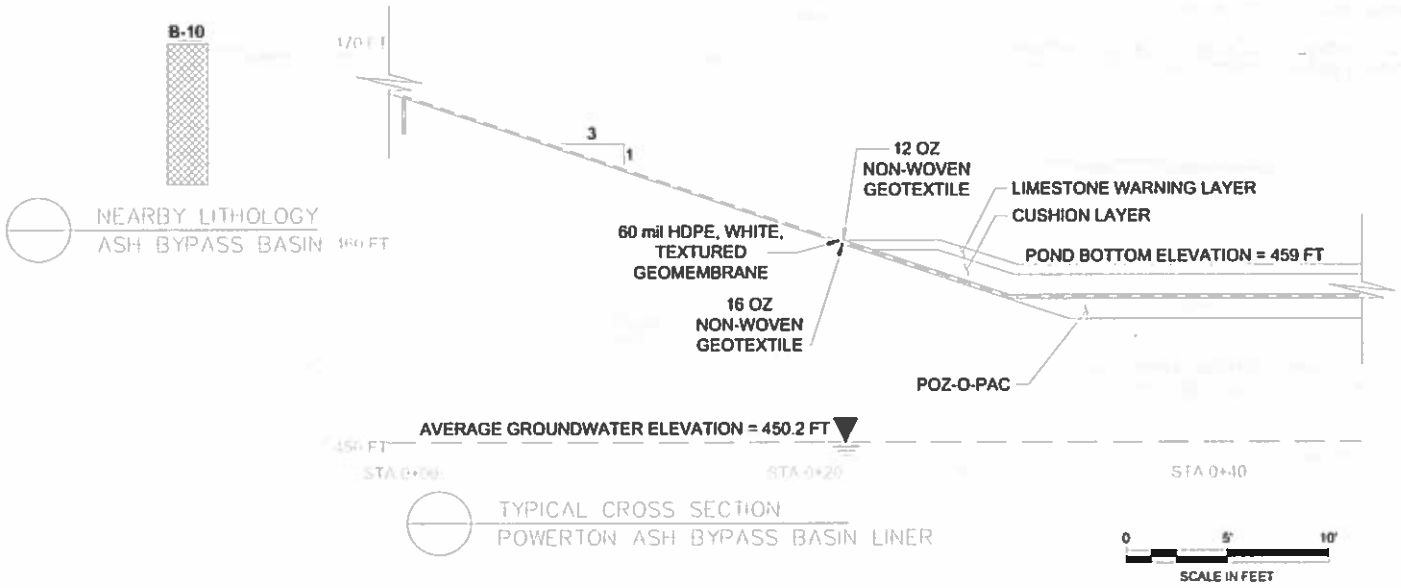
POWERTON
TYPICAL CROSS-SECTION OF METAL CLEANING BASIN LINER AND NEARBY LITHOLOGY

Geosyntec consultants

FIGURE 5-6

PROJECT NO. CHE8303 | OCTOBER 2015

G:\CAD\CHE8303-MIDWESTGEN-CONFIDENTIAL\500 - TECHNICAL\550 - REPORT\CAD\METAL CLEANING BASIN



NOTES:

1) SITE LITHOLOGY TAKEN FROM LOGS OF BORINGS BY ENSR IN 1998.
2) GROUNDWATER ELEVATION BASED ON OBSERVED GROUNDWATER ELEVATIONS AT MONITORING WELL MW-12 DURING THE PERIOD OF RECORD (SECOND QUARTER 2011 THROUGH FIRST QUARTER 2015).
3) THE MAXIMUM GROUNDWATER ELEVATION WAS 452 FT MSL AT MONITORING WELL MW-12 DURING SECOND QUARTER 2013.

LEGEND:

PRIMARY MATERIALS

- FILL W/ ASH
- FILL
- SAND & GRAVEL
- SAND & SILT
- SILT & CLAY
- ORGANIC CLAY
- ORGANIC SILT
- LIMESTONE BEDROCK

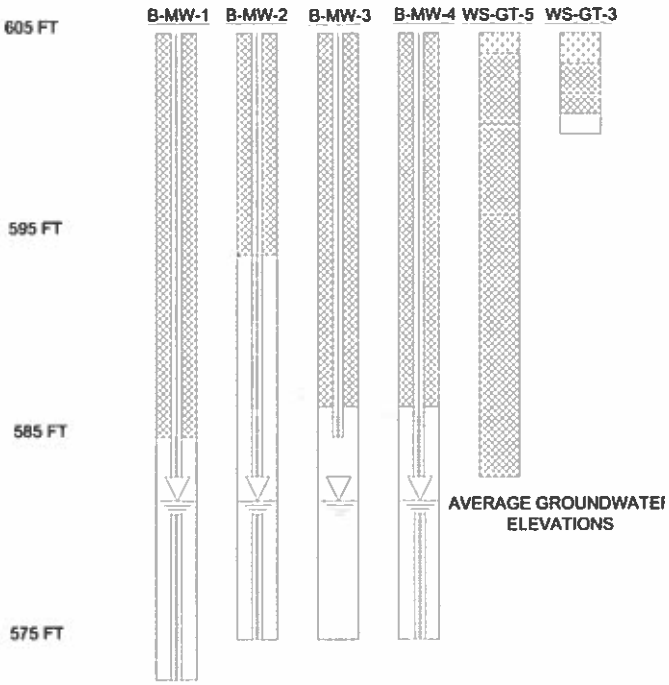
POWERTON
TYPICAL CROSS-SECTION OF ASH BYPASS BASIN LINER AND NEARBY LITHOLOGY

Geosyntec consultants

FIGURE 5-7

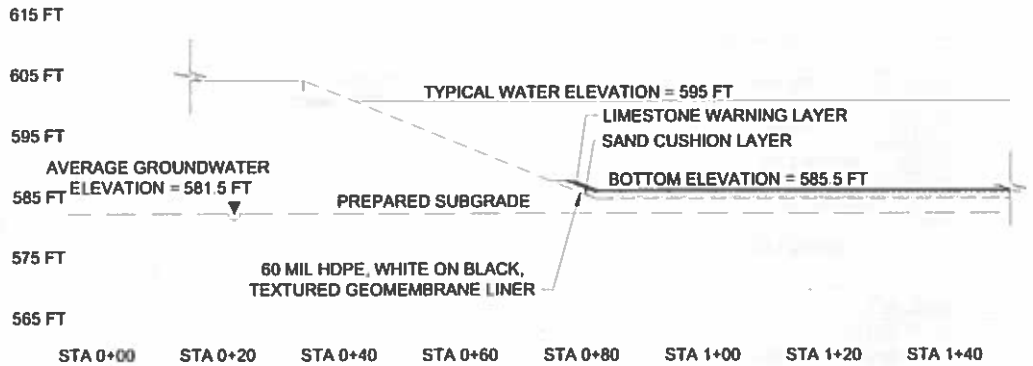
PROJECT NO: CHE8303 | OCTOBER 2015

G:\CMP\CHE8303-MIDWESTGEN-CONFIDENTIAL\500 - TECHNICAL\550 - REPORT\CAD\ASH BYPASS BASIN



NEARBY LITHOLOGY
WAUKEGAN EAST ASH POND

0 5' 10'
SCALE IN FEET

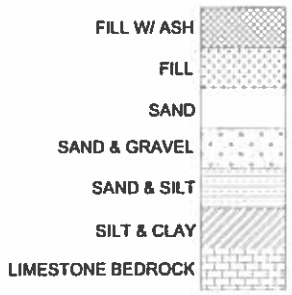


TYPICAL CROSS SECTION
WAUKEGAN EAST ASH POND LINER

0 20' 40'
SCALE IN FEET

LEGEND:

PRIMARY MATERIALS



NOTES:

1) SITE LITHOLOGY TAKEN FROM LOGS OF BORINGS BY KPRG IN 2005 AND PATRICK ENGINEERING IN 2010.

2) GROUNDWATER ELEVATIONS BASED ON OBSERVED GROUNDWATER ELEVATIONS AT MONITORING WELLS MW-1, MW-2, MW-3, AND MW-4 DURING THE PERIOD OF RECORD (SECOND QUARTER 2011 THROUGH FIRST QUARTER 2015).

3) THE MAXIMUM GROUNDWATER ELEVATION WAS 583.4 FT MSL AT MONITORING WELL MW-4 DURING SECOND QUARTER 2011.

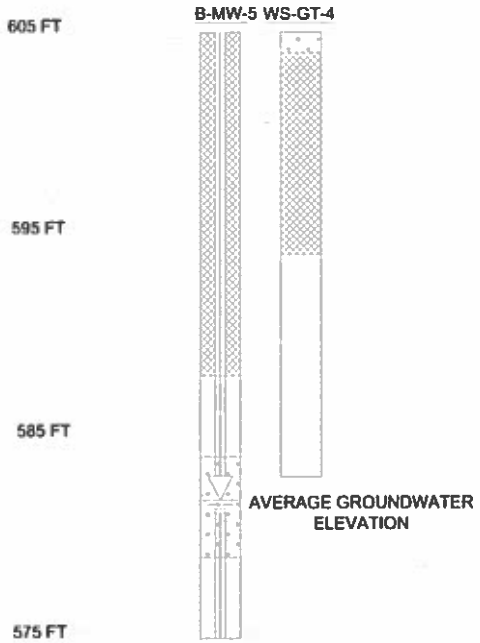
WAUKEGAN
TYPICAL CROSS SECTION OF EAST ASH POND LINER AND NEARBY LITHOLOGY

Geosyntec consultants

FIGURE 5-8

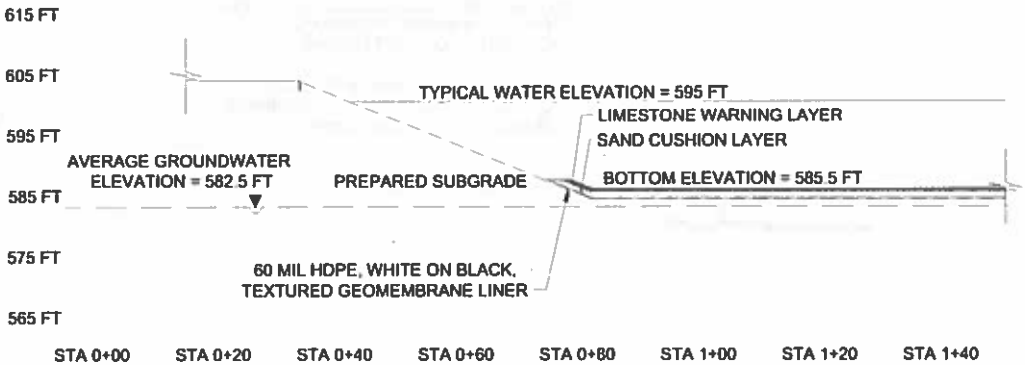
PROJECT NO: CHE8303 | OCTOBER 2015

G:\CMP\CHE8303-MDIMESTGEN-CONFIDENTIAL\800 - TECHNICAL\850 - REPORT\CAD\WAUKEGAN EAST



NEARBY LITHOLOGY
WAUKEGAN WEST ASH POND

0 5' 10'
SCALE IN FEET

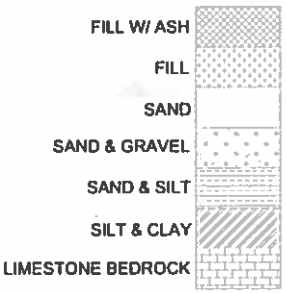


TYPICAL CROSS SECTION
WAUKEGAN WEST ASH POND LINER

0 20' 40'
SCALE IN FEET

LEGEND:

PRIMARY MATERIALS



NOTES:

1) SITE LITHOLOGY TAKEN FROM LOGS OF BORINGS BY KPRG IN 2005 AND PATRICK ENGINEERING IN 2010.
2) GROUNDWATER ELEVATIONS BASED ON OBSERVED GROUNDWATER ELEVATIONS AT MONITORING WELL MW-5 DURING THE PERIOD OF RECORD (SECOND QUARTER 2011 THROUGH FIRST QUARTER 2015).
3) THE MAXIMUM GROUNDWATER ELEVATION WAS 584.5 FT MSL AT MONITORING WELL MW-5 DURING SECOND QUARTER 2011.

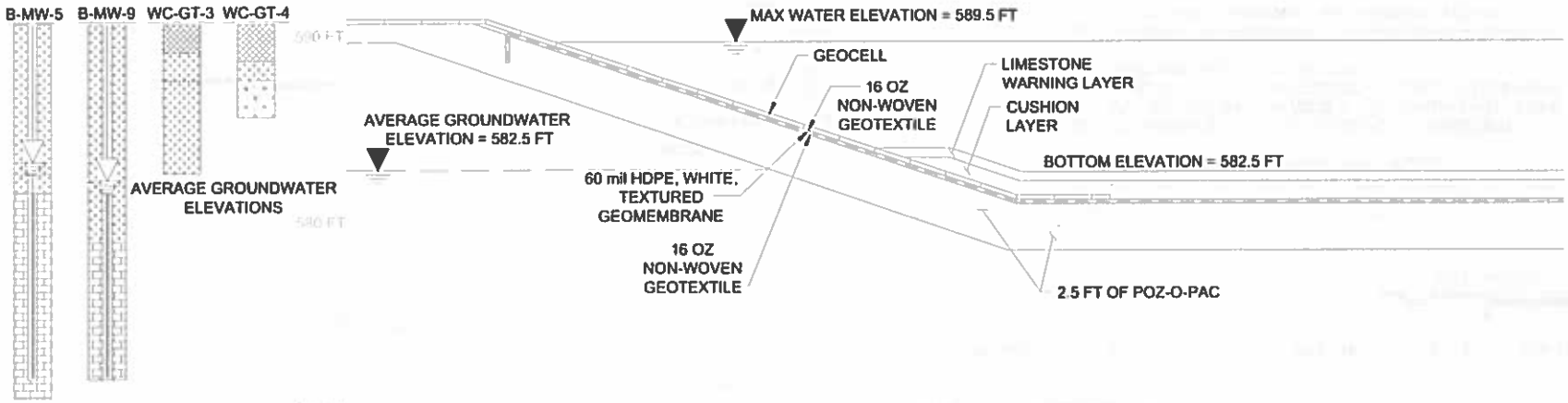
WAUKEGAN
TYPICAL CROSS SECTION OF WEST ASH POND LINER AND NEARBY LITHOLOGY

Geosyntec consultants

FIGURE 5-9

PROJECT NO: CHE8303 | OCTOBER 2015

G:\CMP\CHE8303-MIDWESTGEN-CONFIDENTIAL\500 - TECHNICAL\550 - REPORT\CAD\WAUKEGAN WEST



NEARBY LITHOLOGY
WILL COUNTY SOUTH POND 2 LINER

TYPICAL CROSS SECTION
WILL COUNTY SOUTH POND 2 LINER

0 5' 10'
SCALE IN FEET

LEGEND:

PRIMARY MATERIALS

- FILL W/ ASH
- FILL
- SAND & GRAVEL
- SAND & SILT
- SILT & CLAY
- ORGANIC CLAY
- ORGANIC SILT
- LIMESTONE BEDROCK

NOTES:

1) SITE LITHOLOGY TAKEN FROM LOGS OF BORINGS BY KPRG IN 2005 AND PATRICK ENGINEERING IN 2010.
2) GROUNDWATER ELEVATIONS BASED ON OBSERVED GROUNDWATER ELEVATIONS AT MONITORING WELLS MW-4, MW-5, AND MW-9 DURING THE PERIOD OF RECORD (SECOND QUARTER 2011 THROUGH FIRST QUARTER 2015).
3) THE MAXIMUM GROUNDWATER ELEVATION WAS 583.5 FT MSL AT MONITORING WELL MW-9 DURING FIRST QUARTER 2012.

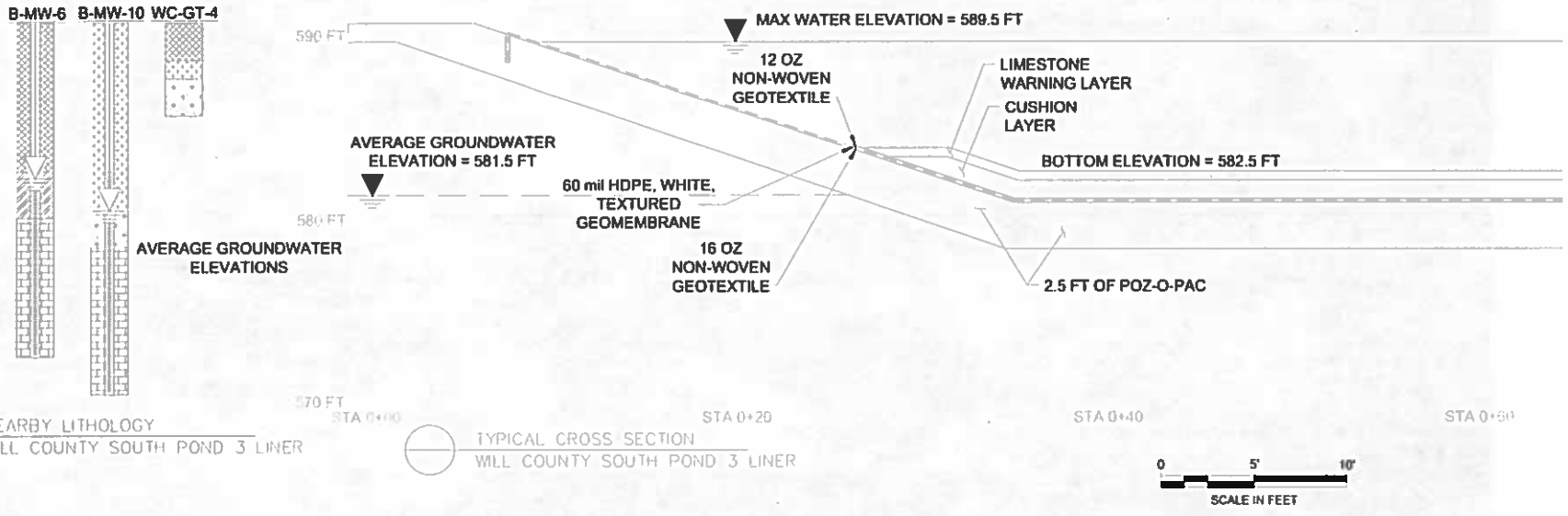
WILL COUNTY
TYPICAL CROSS-SECTION OF SOUTH ASH POND NO. 2 AND NEARBY LITHOLOGY

Geosyntec consultants

FIGURE 5-10

PROJECT NO: CHE8303 | OCTOBER 2015

G:\CAD\CHE8303-MDWESTGEN-CONFIDENTIAL\300 - TECHNICAL\350 - REPORT\CAD\WILL COUNTY POND 2



LEGEND:

PRIMARY MATERIALS

- FILL W/ ASH
- FILL
- SAND & GRAVEL
- SAND & SILT
- SILT & CLAY
- ORGANIC CLAY
- ORGANIC SILT
- LIMESTONE BEDROCK

NOTES:

1) SITE LITHOLOGY TAKEN FROM LOGS OF BORINGS BY KPRG IN 2005 AND PATRICK ENGINEERING IN 2010.
2) GROUNDWATER ELEVATIONS BASED ON OBSERVED GROUNDWATER ELEVATIONS AT MONITORING WELLS MW-6 AND MW-10 DURING THE PERIOD OF RECORD (SECOND QUARTER 2011 THROUGH FIRST QUARTER 2015).
3) THE MAXIMUM GROUNDWATER ELEVATION WAS 582.5 FT MSL AT MONITORING WELL MW-6 DURING SECOND QUARTER 2011.

WILL COUNTY
TYPICAL CROSS-SECTION OF SOUTH ASH POND NO. 3 AND NEARBY LITHOLOGY

Geosyntec consultants

FIGURE 5-11

PROJECT NO: CHE8303 | OCTOBER 2015

G:\CAD\CHE8303-WDNESTGEN-CONFIDENTIAL\500 - TECHNICAL\550- REPORT\CAD\WILL COUNTY POND 3

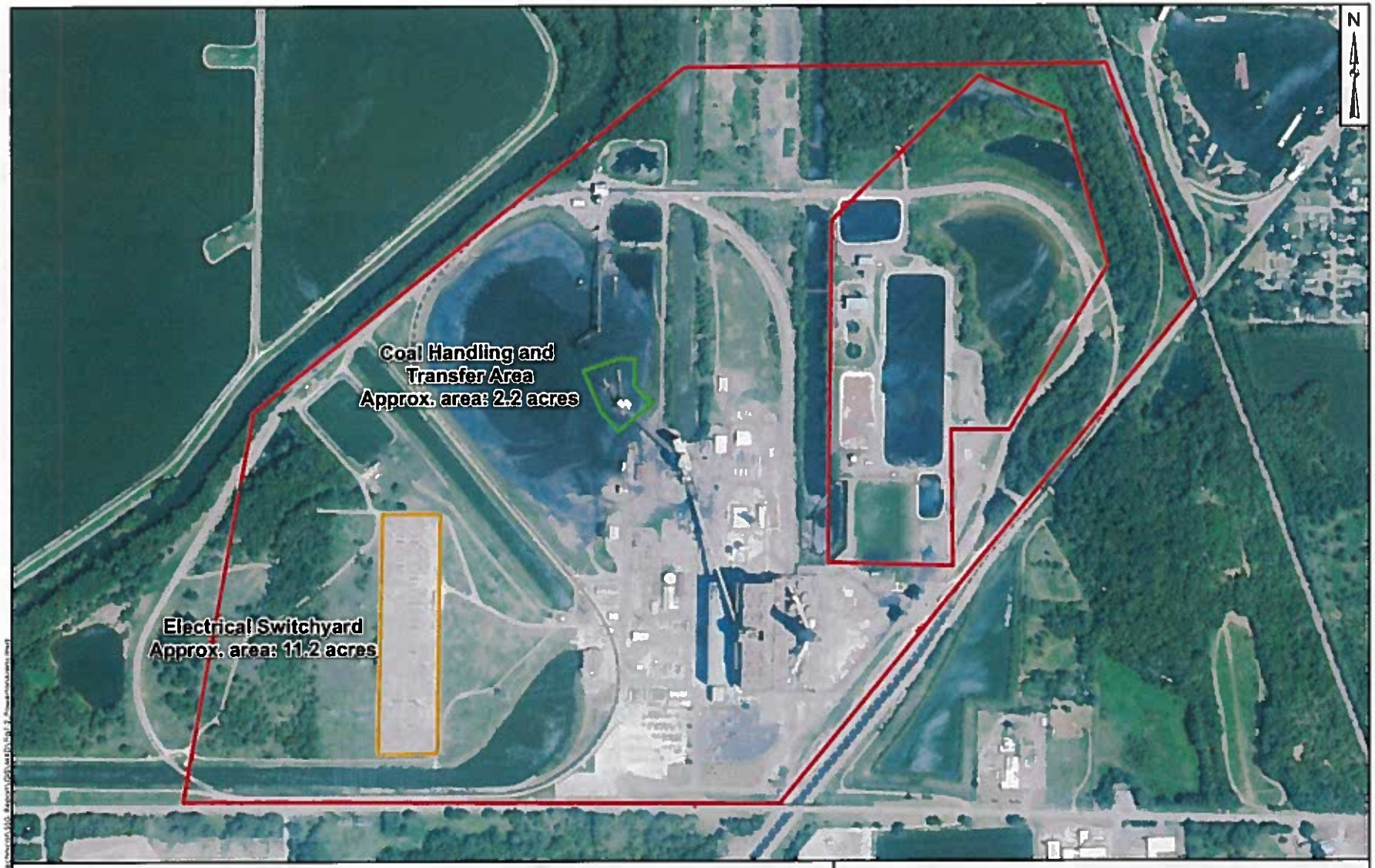
Legend

- Coal Handling and Transfer Area
- Electrical Switchyard
- Approx. Site Area and Ponds

Note: Locations are approximate and based on aerial photographs.

1,000 500 0 1,000 Feet

Joliet #29 Station Equipment Areas **Joliet, Illinois**	Geosyntec consultants	Figure **7-1**
October 2015	Chicago	



Legend

- Coal Handling and Transfer Area
- Electrical Switchyard
- Approx. Site Area and Ponds

Note: Locations are approximate and based on aerial photographs.

1,000 500 0 1,000 Feet

Powerton Station Equipment Areas **Pekin, Illinois**	Geosyntec consultants	Figure **7-2**
October 2015	Chicago	

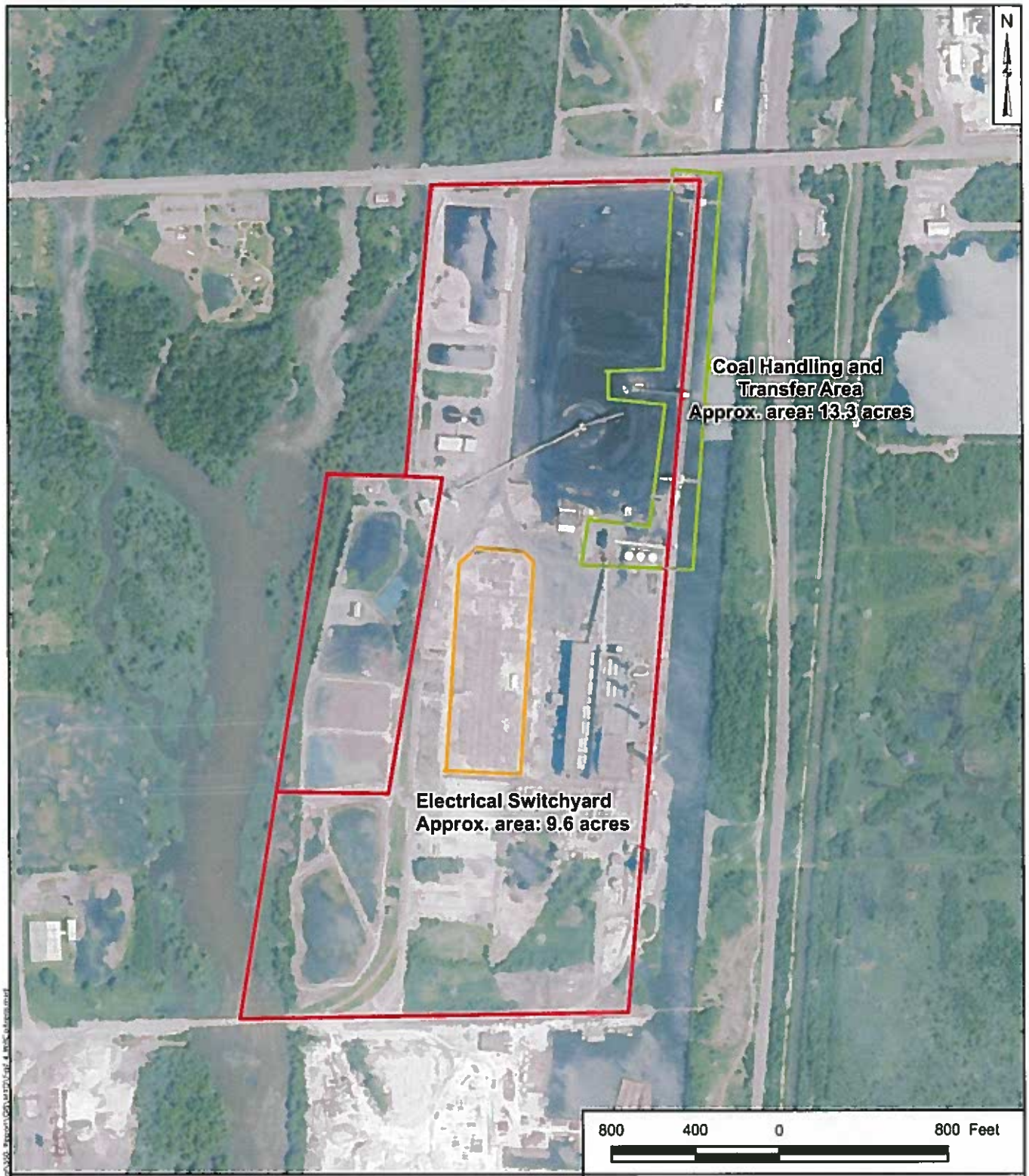
Legend

- Coal Handling and Transfer Area
- Electrical Switchyard
- Approx. Site Area and Ponds

Note: Locations are approximate and based on aerial photographs.

800 400 0 800 Feet

Waukegan Station Equipment Areas **Waukegan, Illinois**	Geosyntec consultants	Figure **7-3**
October 2015	Chicago	



Legend

- Coal Handling and Transfer Area
- Electrical Switchyard
- Approx. Site and Ponds

Note: Locations are approximate and based on aerial photographs.

Will County Station
Equipment Areas

Romeoville, Illinois

Geosyntec consultants

Chicago | October 2015

Figure 7-4

J.SEYMOUR EXPERT REPORT

TABLES

Table 4-1
Groundwater Elevations at Joliet No. 29 Generating Station

Date	Groundwater Elevations [1] (feet above MSL)											Statistics (feet above MSL)			
	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	Site-Wide Average	Minimum	Maximum	Range
6/14/2011	507.69	507.62	507.97	507.93	507.87	507.83	507.83	507.91	507.88	508.19	509.29	508.00	507.62	509.29	1.67
9/14/2011	505.21	505.13	505.17	505.15	505.05	505.19	505.21	505.25	505.22	505.23	505.49	505.21	505.05	505.49	0.44
12/7/2011	505.39	505.36	505.38	505.34	505.23	505.36	505.37	505.49	505.46	505.43	505.77	505.42	505.23	505.77	0.54
3/15/2012	505.47	505.43	505.45	505.43	505.32	505.45	505.46	505.57	505.53	505.51	505.80	505.49	505.32	505.80	0.48
6/19/2012	505.23	505.18	505.23	505.21	505.11	505.26	505.28	505.32	505.29	505.28	505.51	505.26	505.11	505.51	0.40
9/19/2012	510.52	512.33	505.12	505.11	505.06	505.26	505.26	505.22	505.66	505.16	505.35	506.37	505.06	512.33	7.27
12/20/2012	505.42	505.33	505.25	505.25	505.22	505.25	505.24	505.40	505.36	505.30	505.44	505.31	505.22	505.44	0.22
3/5/2013	505.30	505.31	505.38	505.39	505.24	505.37	505.40	505.45	505.50	505.41	505.66	505.40	505.24	505.66	0.42
5/23/2013	505.81	505.82	505.87	503.94	506.03	506.06	506.17	505.91	505.91	505.99	506.46	505.82	503.94	506.46	2.52
7/22/2013	504.94	505.10	505.16	505.13	505.09	505.28	505.27	505.17	505.22	505.28	505.44	505.19	504.94	505.44	0.50
10/15/2013	504.93	505.05	505.04	505.07	504.99	505.12	505.13	505.13	505.10	505.10	505.32	505.09	504.93	505.32	0.39
2/21/2014	NM	505.99	505.29	505.99	505.97	506.10	506.16	505.94	505.30	505.35	506.19	505.83	505.29	506.19	0.90
5/1/2014	505.73	505.73	505.70	505.71	505.56	505.71	505.71	505.84	505.82	505.80	506.20	505.77	505.56	506.20	0.64
8/18/2014	506.75	506.05	506.26	506.28	506.10	506.22	506.27	506.19	506.18	506.41	507.14	506.35	506.05	507.14	1.09
10/23/2014	505.80	505.79	505.82	505.86	505.65	505.75	505.79	505.78	505.82	505.89	506.28	505.84	505.65	506.28	0.63
2/10/2015	NM	505.17	505.19	505.19	505.12	505.23	505.24	505.18	505.22	505.27	505.49	505.23	505.12	505.49	0.37

Abbreviations:
"MSL" = mean sea level
"NM" = not measured

Notes:
1. Groundwater elevations were reported in the First Quarter 2015 groundwater monitoring reports submitted by MWG to IEPA (MWG, 2015a).

Table 4-2
Summary of Joliet #29 Constituents of Interest

Constituent of Interest
Antimony
Boron
Chloride
Iron
Manganese
pH
Sulfate
TDS

Note:

1. Constituents of Interest are based on concentrations reported in the First Quarter 2015 groundwater monitoring reports submitted by MWG to IEPA (MWG, 2015a).

Table 4-3
Groundwater Elevations at Powerton Generating Station

Date	Groundwater Elevations [1] (feet above MSL)																Statistics (feet above MSL)			
	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-12	MW-13	MW-14	MW-15	MW-16	Site-Wide Average	Minimum	Maximum	Range
9/19/2011	439.95	433.27	432.73	431.63	432.77	445.71	433.40	446.76	443.64	439.99	440.49	449.88	446.06	448.13	448.29	NA	440.85	431.63	449.88	18.25
12/12/2011	439.78	434.78	433.88	433.28	434.13	446.30	434.64	446.85	443.08	440.01	440.51	450.03	447.39	448.28	449.16	NA	441.47	433.28	450.03	16.75
3/19/2012	442.40	437.48	436.94	434.93	435.71	446.17	436.04	447.66	443.78	442.03	441.63	451.18	437.72	448.11	447.82	NA	441.97	434.93	451.18	16.25
4/4/2012	441.39	436.92	435.67	434.15	434.93	445.81	435.10	447.27	443.49	441.06	441.03	450.83	436.84	445.28	446.73	NA	441.10	434.15	450.83	16.68
6/25/2012	437.84	433.69	432.86	432.38	433.23	445.99	433.77	447.06	442.55	438.39	439.54	450.38	437.79	443.71	446.78	NA	439.73	432.38	450.38	18.00
9/18/2012	435.37	431.30	430.71	430.34	430.99	445.63	431.39	446.70	440.29	436.06	437.31	449.95	437.73	446.80	447.49	NA	438.54	430.34	449.95	19.61
12/12/2012	435.06	431.12	429.94	430.28	430.98	447.37	431.38	447.23	439.77	435.79	437.09	449.18	437.40	444.89	446.71	441.16	438.46	429.94	449.18	19.24
2/27/2013	439.56	436.02	436.39	434.36	434.93	448.45	435.30	448.53	441.69	439.50	439.79	451.07	437.99	447.29	448.48	442.56	441.37	434.36	451.07	16.71
5/29/2013	446.35	444.38	444.87	443.93	444.11	443.12	449.93	447.82	449.35	446.90	447.35	451.84	445.45	448.37	449.36	449.74	447.05	443.12	451.84	8.72
7/29/2013	441.71	434.84	434.87	432.86	433.63	449.46	433.88	448.53	444.99	441.21	441.49	449.45	437.59	447.59	448.70	446.17	441.69	432.86	449.46	16.60
10/21/2013	435.98	431.64	430.91	430.60	431.41	448.12	432.19	447.12	441.05	436.73	437.95	447.83	437.56	444.92	447.70	442.54	439.02	430.60	448.12	17.52
3/6/2014	442.20	442.74	442.23	442.09	442.36	449.65	442.61	447.89	444.36	442.64	443.65	451.45	443.96	446.32	447.52	444.36	444.75	442.09	451.45	9.36
5/27/2014	442.00	440.91	440.70	439.49	439.99	447.32	439.81	446.86	444.82	442.23	443.02	450.22	442.19	446.55	447.14	445.54	443.67	439.49	450.22	10.73
8/28/2014	439.33	436.20	434.72	435.10	436.01	447.00	438.63	446.35	443.42	440.07	441.27	449.49	440.82	445.81	446.52	443.83	441.54	434.72	449.49	14.77
10/29/2014	441.92	439.27	439.45	436.01	436.33	446.49	435.75	446.16	444.08	441.45	441.37	449.21	438.47	445.55	446.22	444.76	442.03	435.75	449.21	13.46
2/23/2015	441.45	435.54	436.26	432.09	432.97	447.80	433.66	446.67	443.11	440.88	440.57	451.43	437.57	441.69	446.41	443.74	440.74	432.09	451.43	19.34

Abbreviations:
"MSL" = mean sea level
"NA" = not available because monitoring event is before the well construction

Notes:
1. Groundwater elevations were reported in the First Quarter 2015 groundwater monitoring reports submitted by MWG to IEPA (MWG, 2015b).

Table 4-4
Summary of Powerton Constituents of Interest

Constituent of Interest
Arsenic
Boron
Chloride
Iron
Lead
manganese
Nitrogen/Nitrate
pH
Selenium
Sulfate
TDS
Thallium

Note:

1. Constituents of Interest are based on concentrations reported in the First Quarter 2015 groundwater monitoring reports submitted by MWG to IEPA (MWG, 2015b).

Table 4-5
Groundwater Elevations at Waukegan Generating Station

Date	Groundwater Elevations [1] (feet above MSL)							Statistics (feet above MSL)			
	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	Site-Wide Average	Minimum	Maximum	Range
6/13/2011	583.34	583.31	583.34	583.35	584.55	NA	NA	583.58	583.31	584.55	1.24
9/13/2011	581.14	581.19	581.18	581.19	582.66	NA	NA	581.47	581.14	582.66	1.52
12/6/2011	581.15	581.22	581.22	581.23	582.82	NA	NA	581.53	581.15	582.82	1.67
3/14/2012	581.18	581.23	581.22	581.20	582.98	NA	NA	581.56	581.18	582.98	1.80
6/18/2012	580.86	580.89	580.92	580.88	582.22	NA	NA	581.15	580.86	582.22	1.36
9/28/2012	579.65	579.73	579.68	579.55	581.13	NA	NA	579.95	579.55	581.13	1.58
12/19/2012	579.42	579.27	579.45	579.34	580.65	580.89	579.57	579.80	579.27	580.89	1.62
3/7/2013	580.35	580.50	580.49	580.36	582.18	582.63	580.83	581.05	580.35	582.63	2.28
6/6/2013	582.38	582.34	582.38	582.38	583.44	583.58	582.61	582.73	582.34	583.58	1.24
7/25/2013	581.40	581.34	581.41	581.33	582.60	582.71	581.28	581.72	581.28	582.71	1.43
11/4/2013	581.32	581.23	581.29	581.13	582.03	582.71	580.80	581.50	580.80	582.71	1.91
3/10/2014	581.94	581.84	581.88	581.87	582.88	583.83	582.04	582.33	581.84	583.83	1.99
5/16/2014	583.07	582.95	583.02	583.11	583.71	584.56	584.35	583.54	582.95	584.56	1.61
8/21/2014	581.81	581.76	581.87	581.69	582.36	582.70	581.13	581.90	581.13	582.70	1.57
11/6/2014	582.01	581.91	581.97	581.86	582.54	582.92	581.39	582.09	581.39	582.92	1.53
2/17/2015	582.42	582.21	582.22	582.14	582.38	583.39	581.14	582.27	581.14	583.39	2.25

Abbreviations:
"MSL" = mean sea level
"NA" = not available because monitoring event is before the well construction

Notes:
1. Groundwater elevations were reported in the First Quarter 2015 groundwater monitoring reports submitted by MWG to IEPA (MWG, 2015c).

Table 4-6
Summary of Waukegan Constituents of Interest

Constituent of Interest
Antimony
Arsenic
Boron
Chloride
Iron
Manganese
pH
Selenium
Sulfate
TDS
Vanadium

Note:

1. Constituents of Interest are based on concentrations reported in the First Quarter 2015 groundwater monitoring reports submitted by MWG to IEPA (MWG, 2015c).

Table 4-7
Groundwater Elevations at Will County Generating Station

Date	Groundwater Elevations [1] (feet above MSL)										Statistics (feet above MSL)			
	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	Site-Wide Average	Minimum	Maximum	Range
6/15/2011	583.67	583.87	583.76	583.49	583.47	582.52	582.96	582.24	582.81	580.90	582.97	580.90	583.87	2.97
9/15/2011	583.25	583.29	582.85	581.47	582.47	581.95	582.41	581.28	581.28	580.04	582.03	580.04	583.29	3.25
12/8/2011	583.44	583.56	583.36	582.07	583.17	582.16	582.82	582.38	583.36	580.59	582.69	580.59	583.56	2.97
3/16/2012	583.41	583.54	583.45	582.08	583.14	582.10	582.76	582.41	583.52	580.73	582.71	580.73	583.54	2.81
6/20/2012	583.20	583.31	582.95	581.60	582.60	581.76	582.24	581.54	581.51	579.70	582.04	579.70	583.31	3.61
6/24/2012	583.25	583.34	582.93	581.45	582.37	581.71	582.59	581.36	580.88	579.69	581.96	579.69	583.34	3.65
12/18/2012	583.27	583.39	583.10	581.71	582.79	581.75	582.67	582.22	583.10	579.92	582.39	579.92	583.39	3.47
3/6/2013	583.47	583.60	583.42	582.07	583.16	582.10	582.76	582.04	583.13	580.74	582.65	580.74	583.60	2.86
6/3/2013	583.37	583.35	583.53	582.00	583.22	582.24	582.46	582.06	582.46	580.43	582.51	580.43	583.53	3.10
8/14/2013	582.18	581.97	581.79	581.89	581.70	581.29	581.04	580.95	580.56	579.13	581.25	579.13	582.18	3.05
10/29/2013	581.87	581.76	581.86	582.07	582.16	581.21	580.99	581.05	581.87	579.37	581.42	579.37	582.16	2.79
2/20/2014	582.59	582.64	582.66	582.15	582.31	581.20	581.80	581.62	581.23	580.32	581.85	580.32	582.66	2.34
5/20/2014	583.31	583.22	583.37	583.14	583.09	582.02	582.29	581.69	582.76	580.79	582.57	580.79	583.37	2.58
8/13/2014	583.33	583.25	583.35	583.32	583.26	582.45	581.97	581.53	582.02	580.57	582.51	580.57	583.35	2.78
10/21/2014	583.21	583.11	583.30	583.04	583.01	581.77	582.20	581.51	581.40	580.50	582.31	580.50	583.30	2.80
2/4/2015	583.12	582.89	583.17	582.93	582.96	581.66	581.79	581.25	581.97	580.12	582.19	580.12	583.17	3.05

Abbreviations:
"MSL" = mean sea level

Notes:
1. Groundwater elevations were reported in the First Quarter 2015 groundwater monitoring reports submitted by MWG to IEPA (MWG, 2015d).

Table 4-8
Summary of Will County Constituents of Interest

Constituent of Interest
Antimony
Arsenic
Boron
Chloride
Manganese
pH
Selenium
Sulfate
TDS

Note:

1. Constituents of Interest are based on concentrations reported in the First Quarter 2015 groundwater monitoring reports submitted by MWG to IEPA (MWG, 2015d).

Table 5-1
Summary of Neutral Leachate Extraction Test (NLET) Analyses of Bottom Ash at MWG Generating Stations

	Analytical Results for Leachate Analyses Performed on Settled Coal Combustion Residuals as Reported in MWG Documents			
Generating Station:	Powerton	Waukegan		Will County
Sample Date:	March 2007	July 2004	July 2004	December 2010
Sample ID:	Powerton Bottom Ash	Bottom Ash-1	Bottom Ash-2	3 South Bottom Ash
Methods 6010B/6020/7041A/7470A/7841 (mg/L)				
Antimony	<0.0060	<0.0060	<0.0060	<0.0060
Arsenic	<0.050	<0.050	<0.050	<0.050
Barium	0.27	0.19	0.12	<0.50
Beryllium	<0.0040	<0.004	<0.004	<0.0040
Boron	<0.10	1.1	2	1.3
Cadmium	<0.0050	<0.005	<0.005	<0.0050
Chromium	<0.025	<0.050	<0.050	<0.025
Cobalt	<0.025	<0.050	<0.050	<0.025
Copper	<0.025	<0.050	<0.050	<0.025
Iron	<0.10	<0.10	<0.10	<0.10
Lead	<0.0075	<0.0075	<0.0075	<0.0075
Manganese	<0.025	<0.050	<0.050	<0.025
Mercury	<0.0020	<0.0020	<0.0020	<0.0020
Nickel	<0.025	<0.050	<0.050	<0.050
Selenium	<0.050	NA	NA	<0.050
Silver	<0.025	<0.050	<0.050	<0.025
Thallium	<0.0020	<0.0020	<0.0020	<0.0020
Zinc	<0.10	<0.10	<0.10	<0.10
Methods 8260B and 8270C				
VOCs and SVOCs	NA	NA	NA	NA
Methods 8081A and 8151A				
Pesticides	NA	NA	NA	NA
Method 9056 (mg/L)				
Sulfate	NA	NA	NA	49
SM 2540C (mg/L)				
Total dissolved solid	NA	NA	NA	200
Sources	MWG13-15_10948	MWG13-15_12809	MWG13-15_12809	MWG13-15_14713

Abbreviations:

"mg/L" = milligrams per liter
"NA" = not analyzed by the laboratory
"<" = less than the indicated analytical detection limit
"MWG" = Midwest Generation
"NLET" = Neutral Leaching Extraction Test (ASTM D3987-85)

Table 5-2

Summary of Ash Leachate Samples by Management Method and Coal Type (Source: EPRI, 2006)

Analytical Constituent or Parameter	Analytical Results for Samples of Leachate Collected from Landfills and Impoundments as Reported by EPRI, 2006				
	Facility Type:	Landfill		Impoundment	
	Coal Source Type:	Bituminous	Subbituminous/ Lignite	Bituminous	Subbituminous/ Lignite
Leachate pH (SU)	Minimum value	6.5	8.8	4.3	**8.0**
	Median value	6.9	10.0	7.6	**8.9**
	Maximum value	7.4	11.0	11.0	**12.0**
Aluminum Leachate Concentration (mg/L)[1]	Minimum value	<0.002	0.1	<0.0059	**0.7**
	Median value	0.0	2.9	0.1	**4.2**
	Maximum value	0.1	17.5	15.1	**5.9**
Antimony Leachate Concentration (mg/L)[1]	Minimum value	0.00014	0.00067	0.00029	**0.00024**
	Median value	0.00250	0.00090	0.00610	**0.00048**
	Maximum value	0.00910	0.00520	0.05900	**0.00062**
Arsenic Leachate Concentration (mg/L)[1]	Minimum value	0.0014	0.0041	0.0051	**0.0041**
	Median value	0.0062	0.0450	0.0580	**0.0051**
	Maximum value	0.0110	0.0840	1.3800	**0.0064**
Boron Leachate Concentration (mg/L)[1]	Minimum value	11.10	6.08	0.21	**0.47**
	Median value	23.05	18.40	1.09	**0.86**
	Maximum value	89.50	41.50	112.00	**3.89**
Barium Leachate Concentration (mg/L)[1]	Minimum value	0.023	<0.018	<0.030	**0.036**
	Median value	0.045	0.018	0.141	**0.140**
	Maximum value	0.050	0.063	0.545	**0.350**
Beryllium Leachate Concentration (mg/L)[1]	Minimum value	<0.0002	<0.0002	<0.0002	**<0.0002**
	Median value	<0.0002	<0.001	<0.0004	**<0.001**
	Maximum value	<0.0008	<0.001	0.0	**<0.001**
Calcium Leachate Concentration (mg/L)	Minimum value	235.0	6.3	12.0	**<2.5**
	Median value	405.0	19.0	51.0	**43.0**
	Maximum value	431.0	596.0	681.0	**81.0**

Table 5-2

Summary of Ash Leachate Samples by Management Method and Coal Type (Source: EPRI, 2006)

Analytical Constituent or Parameter	Analytical Results for Samples of Leachate Collected from Landfills and Impoundments as Reported by EPRI, 2006				
	Facility Type:	Landfill		Impoundment	
	Coal Source Type:	Bituminous	Subbituminous/ Lignite	Bituminous	Subbituminous/ Lignite
Cadmium Leachate Concentration (mg/L)[1]	Minimum value	0.0	0.0	<0.0002	**<0.0003**
	Median value	0.0	0.0	0.0	**<0.0003**
	Maximum value	0.0	0.1	0.0	**0.0**
Chloride Leachate Concentration (mg/L)	Minimum value	15.0	11.0	4.5	**31.0**
	Median value	29.0	28.0	15.0	**72.0**
	Maximum value	73.0	92.0	87.0	**85.0**
Cobalt Leachate Concentration (mg/L)[1]	Minimum value	0.0	<0.00042	<0.0002	**<0.00004**
	Median value	0.0	0.0	0.0	**<0.001**
	Maximum value	0.1	0.1	0.0	**0.0011**
Carbonate Leachate Concentration (mg/L)	Minimum value	0.0	2.5	<0.01	**1.1**
	Median value	0.1	50.0	0.1	**4.4**
	Maximum value	0.2	152.0	16.0	**36.0**
Chromium Leachate Concentration (mg/L)[1]	Minimum value	<0.0002	0.0005	<0.0002	**0.00066**
	Median value	0.0002	2.0000	<0.0005	**0.0028**
	Maximum value	0.0200	5.1000	0.0290	**0.1080**
Copper Leachate Concentration (mg/L)[1]	Minimum value	<0.00091	0.0016	<0.00038	**0.0024**
	Median value	0.0011	0.0430	0.0019	**0.0071**
	Maximum value	0.0028	0.4940	0.4520	**0.0120**
Iron Leachate Concentration (mg/L)[1]	Minimum value	<0.008	<0.003	<0.005	**<0.025**
	Median value	0.0	<0.050	0.0	**<0.050**
	Maximum value	0.1	0.0	14.7	**<0.050**
Lead Leachate Concentration (mg/L)[1]	Minimum value	<0.00012	<0.0002	<0.0001	**<0.00014**
	Median value	<0.00014	0.0	<0.00015	**<0.0002**
	Maximum value	0.00012	0.00029	0.00800	**0.00021**

Table 5-2

Summary of Ash Leachate Samples by Management Method and Coal Type (Source: EPRI, 2006)

Analytical Constituent or Parameter	Analytical Results for Samples of Leachate Collected from Landfills and Impoundments as Reported by EPRI, 2006				
	Facility Type:	Landfill		Impoundment	
	Coal Source Type:	Bituminous	Subbituminous/ Lignite	Bituminous	Subbituminous/ Lignite
Lithium Leachate Concentration (mg/L)[1]	Minimum value	0.4	<0.0044	0.0	**<0.007**
	Median value	5.7	<0.020	0.2	**<0.020**
	Maximum value	23.600	0.027	1.060	**0.016**
Magnesium Leachate Concentration (mg/L)	Minimum value	69.0	0.5	0.1	**<0.05**
	Median value	188.0	6.7	6.8	**21.0**
	Maximum value	236.0	57.0	72.0	**28.0**
Manganese Leachate Concentration (mg/L)[1]	Minimum value	0.1	<0.0015	<0.0002	**<0.0002**
	Median value	2.1	0.0	0.1	**<0.004**
	Maximum value	4.110	0.008	4.170	**0.014**
Mercury Leachate Concentration (mg/L)[2]	Minimum value	0.0000021	0.0000140	0.0000004	**0.0000054**
	Median value	0.0000030	0.0000180	0.0000014	**0.0000074**
	Maximum value	0.0000038	0.0000370	0.0000052	**0.0000094**
Molybdenum Leachate Concentration (mg/L)[1]	Minimum value	0.8	2.7	0.0	**<0.030**
	Median value	3.28	5.72	0.21	**0.08**
	Maximum value	9.63	25.40	6.03	**0.52**
Nickel Leachate Concentration (mg/L)[1]	Minimum value	0.0	0.0	<0.0006	**<0.0006**
	Median value	0.0180	0.0080	0.0071	**0.0037**
	Maximum value	0.1890	0.0750	0.0720	**0.0071**
Potassium Leachate Concentration (mg/L)	Minimum value	23.0	73.0	<2.2	**5.5**
	Median value	170.0	80.0	9.2	**7.7**
	Maximum value	219.0	120.0	277.0	**40.0**
Selenium Leachate Concentration (mg/L)[1]	Minimum value	0.0007	0.0066	0.0001	**0.0018**
	Median value	0.0490	0.4130	0.0130	**0.0025**
	Maximum value	0.0910	1.7600	0.2830	**0.1810**

Table 5-2

Summary of Ash Leachate Samples by Management Method and Coal Type (Source: EPRI, 2006)

Analytical Constituent or Parameter	Analytical Results for Samples of Leachate Collected from Landfills and Impoundments as Reported by EPRI, 2006				
	Facility Type:	Landfill		Impoundment	
	Coal Source Type:	Bituminous	Subbituminous/ Lignite	Bituminous	Subbituminous/ Lignite
Silicon Leachate Concentration (mg/L)[1]	Minimum value	2.3	0.2	0.7	**2.2**
	Median value	6.1	1.5	4.7	**3.4**
	Maximum value	9.4	9.9	18.5	**10.3**
Silver Leachate Concentration (mg/L)[1]	Minimum value	<0.0002	<0.0002	<0.0002	**<0.0002**
	Median value	<0.0002	<0.0002	<0.0002	**<0.0002**
	Maximum value	<0.0002	0.0	0.0	**<0.0002**
Sodium Leachate Concentration (mg/L)	Minimum value	80.0	840.0	3.8	**53.0**
	Median value	188.0	1700.0	19.0	**56.0**
	Maximum value	455.0	3410.0	72.0	**653.0**
Strontium Leachate Concentration (mg/L)[1]	Minimum value	1.3	<0.030	0.2	**0.5**
	Median value	4.6	0.3	0.7	**0.6**
	Maximum value	10.3	12.0	5.6	**1.8**
Thallium Leachate Concentration (mg/L)[1]	Minimum value	<0.0001	<0.0001	<0.0001	**<0.0001**
	Median value	0.0	<0.0001	0.0	**<0.0001**
	Maximum value	0.0	<0.0005	0.0	**<0.0001**
Uranium Leachate Concentration (mg/L)[1]	Minimum value	0.0	0.0	<0.0001	**<0.00002**
	Median value	0.0190	0.0057	0.0007	**0.0011**
	Maximum value	0.0370	0.0210	0.0610	**0.0012**
Vanadium Leachate Concentration (mg/L)[1]	Minimum value	<0.00083	0.004	0.003	**0.010**
	Median value	0.003	0.635	0.039	**0.017**
	Maximum value	0.044	5.020	0.754	**0.236**
Zinc Leachate Concentration (mg/L)[1]	Minimum value	<0.002	<0.002	0.0	**<0.002**
	Median value	0.0450	<0.005	0.0087	**0.0084**
	Maximum value	0.2890	0.0120	0.0900	**0.0110**

Table 5-2

Summary of Ash Leachate Samples by Management Method and Coal Type (Source: EPRI, 2006)

Analytical Constituent or Parameter	Analytical Results for Samples of Leachate Collected from Landfills and Impoundments as Reported by EPRI, 2006				
	Facility Type:	Landfill		Impoundment	
	Coal Source Type:	Bituminous	Subbituminous/ Lignite	Bituminous	Subbituminous/ Lignite
Bicarbonate Leachate Concentration (mg/L)	Minimum value	100.0	1.0	0.0	**1.1**
	Median value	229.0	108.0	28.0	**110.0**
	Maximum value	265.0	481.0	535.0	**241.0**
Carbonic Acid Leachate Concentration (mg/L)	Minimum value	<0.01	<0.01	<0.01	**<0.01**
	Median value	<0.01	<0.01	<0.01	**<0.01**
	Maximum value	0.0	<0.01	3.4	**<0.01**
Sulfate Leachate Concentration (mg/L)	Minimum value	845.0	2870.0	45.0	**91.0**
	Median value	2350.0	3830.0	171.0	**131.0**
	Maximum value	2440.0	6690.0	1830.0	**1120.0**
Total Inorganic Carbon Leachate Concentration (mg/L)	Minimum value	24.0	1.7	0.8	**5.9**
	Median value	55.0	32.0	5.5	**22.0**
	Maximum value	80.0	105.0	115.0	**49.0**
Total Organic Carbon Leachate Concentration (mg/L)	Minimum value	1.3	5.3	<0.09	**0.4**
	Median value	4.1	49.0	0.6	**6.0**
	Maximum value	4.6	55.0	22.0	**7.9**
Dissolved Oxygen Leachate Concentration (%)	Minimum value	16.0	0.2	2.9	**1.6**
	Median value	53.0	14.0	40.0	**4.5**
	Maximum value	95.0	87.0	165.0	**35.0**
Leachate Oxidation-Reduction Potential (mV)	Minimum value	213.0	111.0	41.0	**225.0**
	Median value	247.0	240.0	240.0	**289.0**
	Maximum value	280.0	276.0	409.0	**303.0**
Leachate Electrical Conductivity (umho/cm)	Minimum value	2000.0	6174.0	174.0	**680.0**
	Median value	3682.0	7690.0	578.0	**990.0**
	Maximum value	4915.0	12760.0	2980.0	**4020.0**

Table 5-2

Summary of Ash Leachate Samples by Management Method and Coal Type (Source: EPRI, 2006)

Analytical Constituent or Parameter	Analytical Results for Samples of Leachate Collected from Landfills and Impoundments as Reported by EPRI, 2006				
	Facility Type:	Landfill		Impoundment	
	Coal Source Type:	Bituminous	Subbituminous/ Lignite	Bituminous	Subbituminous/ Lignite
Leachate Temperature (°C)	Minimum value	14.0	11.0	10.0	**16.0**
	Median value	15.0	17.0	22.0	**30.0**
	Maximum value	17.0	22.0	32.0	**36.0**

1. Leachate concentration was reported in micrograms per liter (µg/L) in EPRI, 2006. The reported concentrations were converted to milligrams per liter (mg/L) by dividing the reported concentration by 1,000 µg/mg.

Table 5-3
Comparison of Ash Leachate Characteristic Values to IEPA Class I Groundwater Standards

	MWG Bottom Ash Samples		Impoundments from PRB-Sourced Coal by EPRI			IEPA Class I Groundwater Standards
	NLET		Samples of leachate			
Constituent	Min	Max	Min	Median	Max	
Antimony	<0.0060	<0.0060	0.00024	0.00048	0.00062	0.006
Arsenic	<0.050	<0.050	0.0041	0.0051	0.0064	0.01
Barium	<0.50	0.27	0.036	0.14	0.35	2
Beryllium	<0.0040	<0.0040	<0.0002	<0.001	<0.001	0.004
Boron	<0.10	2	0.47	0.86	**3.89**	2
Cadmium	<0.0050	<0.0050	<0.0003	<0.0003	0.0021	0.005
Chromium	<0.025	<0.050	0.00066	0.0028	**0.108**	0.1
Cobalt	<0.025	<0.050	<0.00004	<0.001	0.0011	1
Copper	<0.025	<0.050	0.0024	0.0071	0.012	0.65
Iron	<0.10	<0.10	<0.025	<0.05	<0.05	5
Lead	<0.0075	<0.0075	<0.00014	<0.0002	0.00021	0.0075
Manganese	<0.025	<0.050	<0.0002	<0.004	0.014	0.15
Mercury	<0.0020	<0.0020	0.0000054	0.0000074	0.0000094	0.002
Nickel	<0.050	<0.050	<0.0006	0.0037	0.0071	0.1
Selenium	<0.050	<0.050	0.0018	0.0025	**0.18**	0.05
Silver	<0.025	<0.050	<0.0002	<0.0002	<0.0002	0.05
Sulfate	49	49	91	131	**1120**	400
Thallium	<0.0020	<0.0020	<0.0001	<0.0001	<0.0001	0.002
Zinc	<0.10	<0.10	<0.002	0.0084	0.011	5

Abbreviations:

"mg/L" = milligrams per liter
"NA" = not analyzed by the laboratory
"<" = less than the indicated analytical detection limit
"MWG" = Midwest Generation
"NLET" = Neutral Leaching Extraction Test (ASTM D3987-85)
"PRB" = Powder River Basin

Notes:

Bold font indicates a detection above IEPA Class I Groundwater Standards.
Underlined values indicate detections relevant to Section 5.5.1.3 of the report text.

Table 5-4
Summary of Constituents Detected during Most Recent Year (2014) of Quarterly Groundwater Monitoring Compared to Indicators of Leachate from Ash Currently Stored in Impoundments
Based on Site-Specific NLET Results for Bottom Ash and Actual Leachate Sample Results for Bituminous Ash Stored in Impoundments

Constituent	Constituent is an Indicator of Leachate from Ash Currently Stored in Impoundments [1]	Constituents Detected during Most Recent Year (2014) of Quarterly Groundwater Monitoring [2]										
		Joliet No. 29 Generating Station										
		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11
Antimony	Yes (Table 5-2)											
Arsenic	Yes (Table 5-2)			x	x		x	x				x
Barium	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x	x
Beryllium												
Boron	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x	x
Cadmium	Yes (Table 5-2)					x			x			
Chromium	Yes (Table 5-2)											
Cobalt	Yes (Table 5-2)				x		x			x		
Copper	Yes (Table 5-2)					x	x	x	x			
Iron					x				x	x		
Lead	Yes (Table 5-2)								x			
Manganese	Yes (Table 5-2)	x				x		x	x	x		
Mercury	Yes (Table 5-2)											
Nickel	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x	x
Selenium	Yes (Table 5-2)		x	x		x	x	x			x	x
Silver												
Sulfate	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x	x
Thallium												
Zinc	Yes (Table 5-2)								x			
Number of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [3]		10	10	9	10	7	7	7	7	10	10	9
Percentage of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [3]		53%	53%	47%	53%	37%	37%	37%	37%	53%	53%	47%

Table 5-4
Summary of Constituents Detected during Most Recent Year (2014) of Quarterly Groundwater Monitoring Compared to Indicators of Leachate from Ash Currently Stored in Impoundments
Based on Site-Specific NLET Results for Bottom Ash and Actual Leachate Sample Results for Bituminous Ash Stored in Impoundments

Constituent	Constituent is an Indicator of Leachate from Ash Currently Stored in Impoundments [1]	Constituents Detected during Most Recent Year (2014) of Quarterly Groundwater Monitoring [2] — Powerton Generating Station															
		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-12	MW-13	MW-14	MW-15	MW-16
Antimony	Yes (Table 5-2)																
Arsenic	Yes (Table 5-2)						x	x	x	x		x	x	x	x	x	
Barium	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Beryllium																	
Boron	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Cadmium	Yes (Table 5-2)														x		
Chromium	Yes (Table 5-2)																
Cobalt	Yes (Table 5-2)						x	x		x	x	x					
Copper	Yes (Table 5-2)			x	x	x					x						
Iron							x	x	x		x	x	x	x	x	x	
Lead	Yes (Table 5-2)		x	x				x		x	x						
Manganese	Yes (Table 5-2)				x	x	x	x	x	x	x	x	x	x	x	x	x
Mercury	Yes (Table 5-2)																
Nickel	Yes (Table 5-2)			x	x	x	x	x		x	x	x	x		x	x	
Selenium	Yes (Table 5-2)	x				x				x	x			x	x	x	
Silver																	
Sulfate	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Thallium															x		
Zinc	Yes (Table 5-2)			x													
Number of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [3]		11	11	8	9	8	9	8	11	6	7	9	10	10	9	9	11
Percentage of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [3]		58%	58%	42%	47%	42%	47%	42%	58%	32%	37%	47%	53%	53%	47%	47%	58%

Table 5-4
Summary of Constituents Detected during Most Recent Year (2014) of Quarterly Groundwater Monitoring Compared to Indicators of Leachate from Ash Currently Stored in Impoundments
Based on Site-Specific NLET Results for Bottom Ash and Actual Leachate Sample Results for Bituminous Ash Stored in Impoundments

Constituent	Constituent is an Indicator of Leachate from Ash Currently Stored in Impoundments [1]	Constituents Detected during Most Recent Year (2014) of Quarterly Groundwater Monitoring [2]						
		Waukegan Generating Station						
		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7
Antimony	Yes (Table 5-2)							
Arsenic	Yes (Table 5-2)	x	x	x	x	x	x	x
Barium	Yes (Table 5-2)	x	x	x	x	x	x	x
Beryllium								
Boron	Yes (Table 5-2)	x	x	x	x	x	x	x
Cadmium	Yes (Table 5-2)							
Chromium	Yes (Table 5-2)							
Cobalt	Yes (Table 5-2)							
Copper	Yes (Table 5-2)	x					x	
Iron			x			x	x	x
Lead	Yes (Table 5-2)			x				
Manganese	Yes (Table 5-2)	x	x	x	x	x	x	x
Mercury	Yes (Table 5-2)							
Nickel	Yes (Table 5-2)					x		
Selenium	Yes (Table 5-2)	x	x	x	x		x	
Silver								
Sulfate	Yes (Table 5-2)	x	x	x	x	x	x	x
Thallium								
Zinc	Yes (Table 5-2)							
Number of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [3]		8	10	8	9	10	9	11
Percentage of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [3]		42%	53%	42%	47%	53%	47%	58%

Table 5-4
Summary of Constituents Detected during Most Recent Year (2014) of Quarterly Groundwater Monitoring Compared to Indicators of Leachate from Ash Currently Stored in Impoundments
Based on Site-Specific NLET Results for Bottom Ash and Actual Leachate Sample Results for Bituminous Ash Stored in Impoundments

Constituent	Constituent is an Indicator of Leachate from Ash Currently Stored in Impoundments [1]	Constituents Detected during Most Recent Year (2014) of Quarterly Groundwater Monitoring [2]									
		Will County Generating Station									
		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10
Antimony	Yes (Table 5-2)										
Arsenic	Yes (Table 5-2)		x	x	x	x	x	x	x	x	x
Barium	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x
Beryllium											
Boron	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x
Cadmium	Yes (Table 5-2)										
Chromium	Yes (Table 5-2)										
Cobalt	Yes (Table 5-2)	x		x	x						
Copper	Yes (Table 5-2)										
Iron		x	x	x	x		x	x	x		x
Lead	Yes (Table 5-2)										
Manganese	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x
Mercury	Yes (Table 5-2)				x						
Nickel	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x
Selenium	Yes (Table 5-2)	x		x	x	x	x	x	x	x	
Silver											
Sulfate	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x
Thallium											
Zinc	Yes (Table 5-2)										
Number of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [3]		9	10	8	7	8	9	9	9	8	10
Percentage of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [3]		47%	53%	42%	37%	42%	47%	47%	47%	42%	53%

Abbreviations:
"TCLP" = Toxicity Characteristic Leaching Procedure (USEPA Method 1311)
"x" = constituent was detected above analytical detection limits during at least one quarterly groundwater monitoring event in 2014

Table 5-4
Summary of Constituents Detected during Most Recent Year (2014) of Quarterly Groundwater Monitoring Compared to Indicators of Leachate from Ash Currently Stored in Impoundments
Based on Site-Specific NLET Results for Bottom Ash and Actual Leachate Sample Results for Bituminous Ash Stored in Impoundments

Notes:

1. Indicators of leachate from ash currently stored in impoundments are based on leachate sample results for bituminous ash stored in impoundments (Table 5-2) as denoted in this table as "Y TCLP)", and actual leachate sample results for bituminous ash stored in imp
2. Shading of cells is described below.
   - Green shading indicates that a constituent that is an indicator of leachate from ash currently stored in the impoundments was not detected during quarterly groundwater monitoring in 2014.
   - Blue shading indicates that a constituent that is not an indicator of leachate from ash currently stored in the impoundments was detected during at least one quarterly groundwater monitoring event in 2014.
   - No shading indicates that either (1) a constituent that is an indicator of leachate from ash currently stored in the impoundments was detected during at least one quarterly groundwater monitoring event in 2014, or (2) a constituent that is not an indicator of leachate from ash currently stored in the impoundments was not detected during quarterly groundwater monitoring in 2014.
3. Green and blue shading (see Note 2) demonstrate observed constituents that are not consistent with indicators of leachate from ash currently stored in impoundments.

Table 5-5
Summary of Constituents Detected during Most Recent Year (2014) of Quarterly Groundwater Monitoring Compared to Indicators of Leachate from Ash Currently Stored in Impoundments
Based on Site-Specific NLET Results for Bottom Ash

Constituent	Constituent is an Indicator of Leachate from Ash Currently Stored in Impoundments [1]	Constituents Detected during Most Recent Year (2014) of Quarterly Groundwater Monitoring [2]										
		Joliet No. 29 Generating Station										
		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11
Antimony												
Arsenic				x	x		x	x				x
Barium	Yes (Table 5-1)	x	x	x	x	x	x	x	x	x	x	x
Beryllium												
Boron	Yes (Table 5-1)	x	x	x	x	x	x	x	x	x	x	x
Cadmium						x			x			
Chromium												
Cobalt					x		x			x		
Copper						x	x	x	x			
Iron					x				x	x		
Lead									x			
Manganese		x				x		x	x	x		
Mercury												
Nickel		x	x	x	x	x	x	x	x	x	x	x
Selenium			x	x		x	x	x			x	x
Silver												
Sulfate	Yes (Table 5-1)	x	x	x	x	x	x	x	x	x	x	x
Thallium												
Zinc									x			
Number of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [3]		2	2	3	4	5	5	5	7	4	2	3
Percentage of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [3]		11%	11%	16%	21%	26%	26%	26%	37%	21%	11%	16%

Table 5-5
Summary of Constituents Detected during Most Recent Year (2014) of Quarterly Groundwater Monitoring Compared to Indicators of Leachate from Ash Currently Stored in Impoundments
Based on Site-Specific NLET Results for Bottom Ash

Constituent	Constituent is an Indicator of Leachate from Ash Currently Stored in Impoundments [1]	Constituents Detected during Most Recent Year (2014) of Quarterly Groundwater Monitoring [2] — Powerton Generating Station															
		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-12	MW-13	MW-14	MW-15	MW-16
Antimony																	
Arsenic							x	x	x	x		x	x	x	x	x	
Barium	Yes (Table 5-1)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Beryllium																	
Boron	Yes (Table 5-1)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Cadmium															x		
Chromium																	
Cobalt							x	x		x	x	x					
Copper				x	x	x					x						
Iron							x	x	x		x	x	x	x	x	x	
Lead			x	x				x		x	x						
Manganese					x	x	x	x	x	x	x	x	x	x	x	x	x
Mercury																	
Nickel				x	x	x	x	x		x	x	x	x		x	x	
Selenium		x				x				x	x			x	x	x	
Silver																	
Sulfate	Yes (Table 5-1)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Thallium															x		
Zinc				x													
Number of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [3]		1	1	4	3	4	5	6	3	6	7	5	4	4	7	5	1
Percentage of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [3]		5%	5%	21%	16%	21%	26%	32%	16%	32%	37%	26%	21%	21%	37%	26%	5%

Table 5-5
Summary of Constituents Detected during Most Recent Year (2014) of Quarterly Groundwater Monitoring Compared to Indicators of Leachate from Ash Currently Stored in Impoundments
Based on Site-Specific NLET Results for Bottom Ash

Constituent	Constituent is an Indicator of Leachate from Ash Currently Stored in Impoundments [1]	Constituents Detected during Most Recent Year (2014) of Quarterly Groundwater Monitoring [2]						
		Waukegan Generating Station						
		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7
Antimony								
Arsenic		x	x	x	x	x	x	x
Barium	Yes (Table 5-1)	x	x	x	x	x	x	x
Beryllium								
Boron	Yes (Table 5-1)	x	x	x	x	x	x	x
Cadmium								
Chromium								
Cobalt								
Copper		x					x	
Iron			x			x	x	x
Lead				x				
Manganese		x	x	x	x	x	x	x
Mercury								
Nickel						x		
Selenium		x	x	x	x		x	
Silver								
Sulfate	Yes (Table 5-1)	x	x	x	x	x	x	x
Thallium								
Zinc								
Number of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [3]		4	4	4	3	4	5	3
Percentage of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [3]		21%	21%	21%	16%	21%	26%	16%

Table 5-5
Summary of Constituents Detected during Most Recent Year (2014) of Quarterly Groundwater Monitoring Compared to Indicators of Leachate from Ash Currently Stored in Impoundments
Based on Site-Specific NLET Results for Bottom Ash

Constituent	Constituent is an Indicator of Leachate from Ash Currently Stored in Impoundments [1]	Constituents Detected during Most Recent Year (2014) of Quarterly Groundwater Monitoring [2]									
		Will County Generating Station									
		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10
Antimony											
Arsenic			x	x	x	x	x	x	x	x	x
Barium	Yes (Table 5-1)	x	x	x	x	x	x	x	x	x	x
Beryllium											
Boron	Yes (Table 5-1)	x	x	x	x	x	x	x	x	x	x
Cadmium											
Chromium											
Cobalt		x		x	x						
Copper											
Iron		x	x	x	x		x	x	x		x
Lead											
Manganese		x	x	x	x	x	x	x	x	x	x
Mercury					x						
Nickel		x	x	x	x	x	x	x	x	x	x
Selenium		x		x	x	x	x	x	x	x	
Silver											
Sulfate	Yes (Table 5-1)	x	x	x	x	x	x	x	x	x	x
Thallium											
Zinc											
Number of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [3]		5	4	6	7	4	5	5	5	4	4
Percentage of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [3]		26%	21%	32%	37%	21%	26%	26%	26%	21%	21%

Abbreviations:
"NLET" = neutral leaching extraction test (ASTM D3987-85)
"x" = constituent was detected above analytical detection limits during at least one quarterly groundwater monitoring event in 2014

Table 5-5
Summary of Constituents Detected during Most Recent Year (2014) of Quarterly Groundwater Monitoring Compared to Indicators of Leachate from Ash Currently Stored in Impoundments
Based on Site-Specific NLET Results for Bottom Ash

Notes:

1. Indicators of leachate from ash currently stored in impoundments is based on site-specific NLET results for bottom ash (Table 5-1).
2. Shading of cells is described below.

   Green shading, which is not applicable ot this Table 2-6, would indicate that a constituent that is an indicator of leachate from ash currently stored in the impoundments was not detected during quarterly groundwater monitoring in 2014.

   Blue shading indicates that a constituent that is not an indicator of leachate from ash currently stored in the impoundments was detected during at least one quarterly groundwater monitoring event in 2014.

   No shading indicates that either (1) a constituent that is an indicator of leachate from ash currently stored in the impoundments was detected during at least one quarterly groundwater monitoring event in 2014, or (2) a constituent that is not an indicator of leachate from ash currently stored in the impoundments was not detected during quarterly groundwater monitoring in 2014.
3. Green and blue shading (see Note 2) demonstrate observed constituents that are not consistent with indicators of leachate from ash currently stored in impoundments.

J.SEYMOUR EXPERT REPORT

APPENDIX A
JOHN SEYMOUR CURRICULUM VITAE

Geosyntec
consultants

JOHN SEYMOUR, P.E.

remediation
geoenvironmental engineering
geotechnical engineering
coal combustion residuals management

EDUCATION

M.S., Geotechnical Engineering, University of Michigan, Ann Arbor, Michigan, 1980
B.S., Civil Engineering, Michigan Technological University, Houghton, Michigan, 1976

PROFESSIONAL REGISTRATIONS

Illinois P.E. Number 062-040562
Michigan P.E. Number 6201033056
West Virginia P.E. Number 017091
Wisconsin P.E. Number 26727

CAREER SUMMARY

Mr. Seymour is a geotechnical engineer with nearly three decades of experience in the U.S., Canada, Spain, Guatemala and Korea in the areas of site remediation, deep foundations, and construction management. He has focused on waste management and remediation (Superfund (CERCLA) and RCRA) projects for 25 years, having had significant involvement in 17 sites providing professional services in the areas of project management, project coordination (client representative), site characterization, feasibility studies, bench/pilot studies, civil/geotechnical design, construction quality assurance (CQA), and operation and maintenance.

He has completed field studies including geologic and hydrogeologic studies, aquifer testing, seismic surveys, landfill settlement tests, and the characterization of volatile organic compounds (TCE and by-products), semivolatile organic compounds, PCBs, lead, and saline groundwater intrusion.

He has provided coal combustion residuals (CCRs) engineering services, regarding waste management of fly ash, bottom ash and flue gas desulfurization (FGD) waste for impoundments and landfills. These services have included geotechnical and environmental evaluations of waste disposal expansions, operations and closure, disposal permit application preparation for eight U.S coal power generation clients. Overall he has provided relevant consulting engineering services for 7 CCRs impoundments and 14 CCR landfills and provided records review, evaluation and engineering scope of work development for 4 additional CCR impoundments. He has

translated some of his experience into 11 technical papers and recently submitted two final draft research guidance documents on CCR impoundments (co-investigator), and provided 10 technical presentations at conferences including at conferences focusing on CCR management.

His clients have primarily included major industrial manufacturers (utilities, automotive, tools, appliances) and waste management/disposal companies. He has been the lead in the design of 11 landfills. He has been the project lead for several major (multi-million dollar) remediation sites. He also has assisted in remedy negotiations with state and federal agencies at many sites.

In addition, he has geotechnical engineering experience with the design and construction of deep foundations, including drilled piers, tie backs, foundation grouting and soil improvement programs, and diaphragm (slurry) walls.

Highlights of Mr. Seymour's representative experience include:

Geoenvironmental

J. C. Weadock Plant CCR Facility Engineering Study, Consumers Energy Company, *Michigan.* Mr. Seymour is the project director and senior technical reviewer for a study of the existing CCR facility. The study is to assess the future use and closure of the facility considering current regulations and future proposed federal regulations regarding CCRs under RCRA and the effluent limitation guidelines and standards for the steam electric power generating industry under the Clean Water Act.

Rivesville and Albright Power Plants, *FirstEnergy, West Virginia.* Engineer of Record for the design of the closure of two CCR landfills.

Coal Combustion Residuals Pond Closure Guidance Documents, Electric Power Research Institute, *Nationwide.* Mr. Seymour is a co-investigator/author and project manager for the completion of two guidance documents relating to CCR pond closures. They include: (i) "Coal Combustion Residuals Pond Closure- Dewatering and Capping Guidance", and (ii) "Coal Combustion Residuals Pond Closure- Construction over Closed Ponds".

Confidential Power Plant, *Southern Ohio.* Mr. Seymour is the project manager for the conceptual design of a 300-acre fly ash disposal pond closure.

General James M. Gavin Power Plant, *American Electric Power, Cheshire, Ohio.* He managed the design of and the Permit to Install (PTI) application for a 50,000,000 cuyd residual waste landfill for the solid waste permit application under existing OEPA rules which incorporated relevant portions of the U.S. EPA proposed RCRA Subtitle D regulations.

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***General James M. Gavin Power Plant**, American Electric Power, Cheshire, Ohio.* Mr. Seymour was the project manager for the focused feasibility evaluation (FFE) for a coal combustion residuals (CCR) landfill expansion and the resulting design and permit application for a landfill expansion.

***Monroe Power Plant,** DTE Energy, Monroe, MI.* Mr. Seymour managed the FGD Gypsum Disposal Facility Preliminary Engineering Study and was the project manager to assess disposal options for new flue gas desulphurization (FGD) gypsum that will be generated at this coal fired electrical generating station. Mr. Seymour is the project director and engineer of record to conduct an evaluation of the earthen containment dike around the ash basin and to assess the potential for a failure due to operating issues.

***Planta Las Palmas CCB Landfill Development Studies,** Duke Energy International Guatemala, Guatemala.* Mr. Seymour completed studies to optimize the development of a new coal ash landfill and prepare site investigation bid specifications. He was the project manager to prepare the detailed design and construction bid documents for the coal storage area, ash landfill, leachate treatment pond with discharge structure, and the power plant water intake structure.

***Wauconda Landfill Superfund Site Cover Evaluation,** Wauconda Task Force, Wauconda, IL.* Mr. Seymour was the project manager for the evaluation of the existing soil cover over Superfund site.

***R. Paul Smith CCB Landfill Expansion,** Allegheny Energy Supply, Berkeley County, WV.* Mr. Seymour was the project manager for the design and construction quality assurance of a coal combustion byproducts landfill at a coal-fired power plant in Maryland with the landfill located in adjacent West Virginia.

***MIG/DeWane Landfill Superfund Site Remedial Design,** Allied Waste Industries, Belvidere, IL.* Assisted the client with negotiations of a Statement of Work with the Illinois EPA for this CERCLA site. He is conducting a remedial design of a new cover system and gas collection system over the 50 acre landfill.

***Confidential Landfill Remedial Action Support Services,** Republic Services, north-central IL.* Providing technical support to legal counsel for the remedy selection process at a 40-acre solid waste facility closed in the 1970s and developed into a park.

***Planta Arizona, CCB Landfill Design Consulting,** Duke Energy International Guatemala, Guatemala.* Mr. Seymour provided consulting to DEIG to layout a new coal ash disposal facility for a coal-fired electrical generating station.

***Cardinal Plant Landfill Studies,** American Electric Power, Brilliant, OH.* Completed a feasibility study to assess the potential to develop a new flue gas desulphurization (FGD) waste landfill over an existing fly ash disposal area at a coal-fired power plant.

Yeoman Creek Landfill Superfund Site, *PRP Group, Waukegan, IL.* Mr. Seymour was the project manager and Project Coordinator for this CERCLA site closure.

Utility Company, *Multiple Sites, WI.* Contaminated site consulting services and ash landfill design, construction inspection/management services. Mr. Seymour was the Contract Manager and project manager for multiple sites, including evaluation of existing groundwater remediation system to improve performance and evaluate alternate technologies in Wisconsin, and development of an approach to address existing environmental impacts at an MGP site along the Fox River in Wisconsin

Albion-Sheridan Township Landfill, *Cooper Industries and Corning, Inc., Albion, MI.* Project Coordinator, at CERCLA site. Provided solid and hazardous waste closure, construction management, remedial design, QA officer, closure certification, solid and hazardous waste remediation.

McGraw-Edison Facility, *Cooper Industries, Centerville, IA.* Project manager for CERCLA Site that was a manufacturing facility in Iowa to remediate TCE in soil and groundwater. Provided design review and engineering oversight for the installation of an iron reactive permeable barrier wall for treatment of TCE in groundwater and a hydro-fracture enhanced vapor extraction system, including over one year of performance monitoring and evaluation, and fate and transport modeling of the TCE.

J&L Landfill, *LTV Steel Company, Rochester Hills, MI.* Project Coordinator at this CERCLA site. Provided solid and hazardous waste landfill closure, construction management, remedy negotiation, closure design, QA officer, closure P.E. certification, solid and hazardous waste.

Monroe Stamping Plant Lagoon Closure, *Ford Motor Company, Monroe, MI.* Project manager for the resident engineering services for this facility where 55 acres of lagoons were closed as a hazardous waste landfill under a RCRA corrective action.

Rasmussen Landfill, *PRP Group, Green Oak Township, MI.* Project coordinator at CERCLA solid and hazardous waste site. Provided work plans, pre-design and remedial design, construction management for a hazardous waste landfill cover and groundwater pump and treat system, and closure P.E. certification. The project included: removal of hazardous waste drums; preload program to estimate waste consolidation; groundwater aquifer testing; and groundwater modeling.

Motor Wheel Disposal Site, *WR Grace, Inc., Lansing, MI.* Project manager for cost allocation arbitration case among potentially responsible parties at CERCLA landfill.

Brownfield Redevelopment Site, *WEPCo, Racine, WI.* Project manager and remediation design engineer for brownfield development with manufactured gas plant wastes (organic and inorganic compounds) in groundwater and soil, and VOCs in soil gas;

included groundwater aquifer testing, site investigation, aquifer modeling, remedial design, construction engineering/resident engineering, operation monitoring for a groundwater extraction system, and soil gas collection system for commercial and residential development at a former manufactured gas plant site.

Janesville Disposal Facility, *City of Janesville, Janesville, WI.* Groundwater design task manager for this CERCLA site. The site had several landfills that required RCRA cap design and a groundwater extraction system design to prevent groundwater discharge to the Rock River. Based upon the reports, aquifer testing and groundwater modeling, developed the concept to eliminate the groundwater extraction and treatment system because the surface water discharge criteria would not be exceeded and there were no receptors between the landfill and the river.

National Industrial Environmental Services, *Chemical Waste Management, Inc., near Wichita, KS.* Project engineering, design and project management for CERCLA/RCRA facility corrective action. The project included remediation of VOC groundwater contamination, treatment of sludges containing acids and metals and organics (SVOCs and VOCs) and sludge disposal into two new hazardous waste landfill cells and litigation support. The project also included aquifer tests, groundwater modeling, air monitoring, geophysical surveys, agency reporting, two RCRA Part B permit applications, and technical support for two trials.

Equilon (Shell Oil) Wood River Facility, *Shell Oil Company, Roxana, IL.* RCRA Corrective Action project management for a refinery along the Mississippi River that had numerous disposal areas. This project included: i) preparation of a RCRA Facility Investigation (RFI) investigation work plan; ii) conduct of the RFI; iii) certification of closure of one RCRA management unit; and iv) RCRA Part B submittal.

Berlin & Farro Liquid Incineration Site, *PRP Group, Swartz Creek, MI.* Conducted a CERCLA RI/FS, baseline risk assessment, negotiations with Region V EPA and MDEQ for cleanup, and litigation support. The RI included investigation of soil, soil gas, groundwater, surface water and sediment, and included seismic reflection and resistivity geophysical investigations.

Butterworth Landfill, *PRP Group, Grand Rapids, MI.* Completion of a remedial design work plan that included predesign sampling of soil, groundwater, river sediment, and fish in the Grand River at this 180 acre solid and hazardous waste landfill under CERCLA.

Bailey Dump Superfund Site, *Texas Water Commission, Bridge City, TX.* Site manager to perform a remedial investigation over a two-month period to characterize uncontrolled hazardous waste landfill under CERCLA.

Salt Intrusion Groundwater Modeling and Feasibility Study, *Morton Salt/Rohm & Haas, Inc., Manistee, MI.* Project manager for conduct of a feasibility study and groundwater transport model to assess methods to mitigate salt intrusion into an unconfined aquifer in Manistee.

Hartley & Hartley Landfill, *Joint Defense Group, Bay City, MI.* Project manager for site regulated by the NRC as an SDMP site regarding licensing, leachate management system design, and MDEQ/MDNR interface. The site contained low-level radiological thorium-bearing slag and hazardous and solid waste.

LUST Sites. Management and/or director for over 10 leaking underground storage tank projects in Michigan and Illinois.

Litigation Assignments

Confidential Client, 2014. Mr. Seymour was retained as an expert in the field of CCR landfill design over a closed coal ash pond.

Confidential Client, 2013. Mr. Seymour was retained as an expert in the field of CCR ponds for the arbitration of a major insurance claim.

AmForge Site Expert Witness, *Arvin-Meritor, Chicago, IL, 2006.* Provided engineering support in the areas of contaminant fate and transport, risk assessment, and site characterization in cost recovery case. The cost recovery was undertaken by private parties brought under CERCLA.

Geotechnical

Baby Creek Overflow Treatment Facility, *Detroit Water and Sewerage Department, Detroit, MI.* Project manager for the geotechnical investigation and foundation design for a combined sewer treatment system.

Co-generation Power Facility, *Sarnia, Canada.* Project manager for geotechnical site investigation for a co-generation (steam and electricity) facility.

Vila Olympica Building, *Bovis International, Barcelona, Spain.* Project manager to provide deep foundation geotechnical engineering at this 50 story high rise building along the Mediterranean coast.

Lucky-Goldstar Building, *Lucky Development Company, Seoul, South Korea.* Resident engineer and quality control manager for construction of the deep foundation and foundation grouting program.

Phase I Dam Safety Inspections, *U.S. Army Corps of Engineers, Multiple Sites, MO.* Field inspection of five dams and reporting writing for approximately 15 dams undergoing Phase I (non-intrusive) safety inspections.

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***Ann Arbor Wastewater Treatment Plant**, City of Ann Arbor, MI.* Field resident engineering support for construction of this new facility. His responsibilities included oversight of groundwater dewatering to avoid "bottom heave" of the excavation, compaction control and QC inspection of civil construction.

***Beaver Valley Power Station,** Duquesne Light, Shippingport, PA.* Field resident engineering for foundation construction of an 888 megawatt nuclear fuel power plant.

PROFESSIONAL EXPERIENCE

Geosyntec Consultants, Chicago, IL, 2001-present
URS Corporation, Detroit, MI, 1997 – 2001
Woodward-Clyde Consultants (later URS), Chicago, IL and Detroit, MI, 1980-1997
Townsend and Bottum, Ann Arbor, MI, 1978-1979
Stone & Webster, Shippingport, PA, 1976-1978

AFFILIATIONS

American Society of Civil Engineers

Midwest Coal Ash Association

Society of American Military Engineer

REPRESENTATIVE PUBLICATIONS

15-05 "Reliability Analysis of an Existing Ash Basin Embankment" at the World of Coal Ash Conference, Nashville, TN, Omer Bozok, Burak F. Tanyu, Paul Sabatini, and John Seymour

15-01 "Conditions of Coal Ash Embankments", at the U.S. Society on Dams Conference, April 2015 I Louisville, KY, John Seymour, P.E., Omer Bozok, Amanda Hughes, Ph.D., Brad Bodine, P.E; & World of Coal Ash Conference, Nashville, TN, May 2015.

13-04 "Challenges of Closing Large Fly Ash Ponds", World of Coal Ash Conference, Lexington, Kentucky, April 2013.

11-05 "Advances in Design of Landfills over CCR Ponds and CCR Landfills", Proceedings from the World of Coal Ash conference, Denver, CO, John Seymour, P.E. and Michael F. Houlihan, P.E. BCEE, May 2011.

11-06 "Case Study: Stability of Two Horizontal to One Vertical Embankment", Proceedings from ASCE Geo-Frontiers 2011, Advances in Geotechnical

Geosyntec consultants

Engineering, Burak Tanyu, PhD, W. Neal, P.E., J Seymour, P.E., M ASCE, D. Bodine, P.E. M ASCE, and O. Bozok.

08-04 "Use of Tire Chips in the Final Cover System of a Superfund Site Landfill", ACSE Proceedings from GeoCongress 2008 titled: "The Challenge of Sustainability in the Geoenvironment", Majdi A. Othman, M. ASCE, Ph.D., P.E., and John Seymour, P.E.

INVITED PRESENTATIONS

15-06 "Slope Stability, Inspections, and Monitoring Considerations under the CCR Rule", Technical Short Course Teacher at the EPRI CCR Program Summer Meeting, June 2015, Bar Harbor, ME.

13-12 "CCR Pond Closures: Major Difficulties and Solutions", presentation to the Utility Solid Waste Activities Group, Washington, D.C., December, 2013.

13-04 Presentation of: "Challenges of Closing Large Fly Ash Ponds", at the World of Coal Ash Conference, Lexington, Kentucky, April 2013.

13-04 "Hot Topics Regarding Coal Combustion Residuals Management, presentation to Winston & Strawn Environmental Group, Chicago, Illinois, April 2013.

11-05 Presentation of: "Advances in Design of Landfills over CCR Ponds and CCR Landfills", at the World of Coal Ash conference, Denver, CO, May 2011.

09-04 "Geotechnical Design Considerations for Landfill Construction Over an Ash Pond", World of Coal Ash, Lexington, KY, May 2009

J.SEYMOUR EXPERT REPORT

APPENDIX B
SURFACE WATER RISK CHARACTERIZATION

Appendix B to Expert Report of John Seymour, P.E.
Surface Water Risk Characterization

Section 1: Introduction

This focused risk characterization evaluates the potential for human health and ecological risks from an assumed exposure to constituents of interest (COIs) in groundwater associated with each of the four sites that may migrate to surface water. COIs are defined as described in Sections 4.1.6, 4.2.6, 4.3.6, and 4.4.6 of the Expert Report of John Seymour. These evaluations are conservative as they assume a complete exposure pathway exists between groundwater COIs and receptors in the adjacent surface water bodies, and do not fully analyze attenuation or dilution mechanisms. The screening assessment also considers background and upgradient source COIs that are not from the ponds, thereby overestimating the risk from the ponds.

Section 2: Risk Evaluation Methods

2.1. Methods Overview

For this evaluation, potential risks to human health and the environment from COIs that could possibly migrate to surface water were evaluated using a screening-level approach that compared estimates of exposure to estimates of effect. This approach is commonly used to screen for the potential for risk and determine if additional assessment is required.

2.2. Definition of Risk

It is assumed that there are "no unacceptable risks" if site-specific groundwater concentrations are less than Illinois Water Quality Standards (WQS) or Water Quality Criteria (WQC) for surface water, which are considered to be protective of human health and the environment. These WQS/WQC incorporate toxicological (i.e., does-response) data as well policy-based assumptions, including the state-determined acceptable risk level. Therefore, a conclusion of "no unacceptable risk" is a conclusion based upon regulatory processes. If a site concentration is greater than a WQS/WQC, it cannot be concluded that a risk exists, only that further evaluation may be warranted or necessary. At this step, site-specific conditions are typically evaluated in a quantitative and/or qualitative manner to refine preliminary conclusions of the screening step. For this evaluation, the refinement step considers the exceedance location (relative to other wells and receiving water bodies), magnitude, and frequency. If these lines of evidence support that "no unacceptable risks" are likely at the point-of-exposure (i.e., the lake or river), then it is concluded that there is an unlikely potential for risk.

2.3. Risk Evaluation Inputs

Exposure and effect estimates used in this screening-level approach are discussed below.

Exposure: COI concentrations reported for onsite groundwater monitoring wells were conservatively assumed to represent exposure point concentrations (EPCs) for human and ecological receptors. This overestimates risk as human and ecological exposure to groundwater within these sites represents an incomplete exposure pathway. In other words, there are no onsite exposures and, therefore, no onsite risks. Human and ecological receptors may be present in the adjacent surface water bodies; however, groundwater is expected to undergo dilution and attenuation as it migrates through the subsurface and

then mixes with surface water. Thus, this assumption overestimates risks to potential off-site receptors by overestimating the exposure concentration.

Effect: Effects values for this evaluation were Illinois chronic WQS or, if a WQS was not available, Illinois chronic WQC. Surface water effects values and their sources are provided in Table B-1. The Illinois Environmental Protection Agency (IEPA) specifies that acute WQS "*...shall not be exceeded at any time except for those waters for which a zone of initial dilution (ZID) has been approved by the Agency...*" For this evaluation, it was assumed that a ZID has not been approved and, thus, chronic values would be applicable. However, given the conservative assumptions about exposure, acute values could provide a secondary line of evidence for evaluating risk.

Section 3: Site-Specific Risk Evaluations

3.1. Risk Evaluation – Joliet #29 Generating Station

3.1.1. Estimates of Exposure and Effect

Groundwater in the vicinity of the Joliet #29 Power Generating Station ash ponds discharges south to the Des Plaines River via the adjoining intake channel. Based on groundwater data collected between December 2010 and February 2015 from onsite monitoring wells (MW-01 through MW-11), COIs for this site are: antimony, boron, chloride, iron, manganese, sulfate, and total dissolved solids (TDS).

Analytical data used in this evaluation is provided in Table B-2-1. Well-specific summary statistics calculated for COIs are provided in Table B-2-2 (average concentrations) and Table B-2-3 (maximum concentrations). Additionally, the mean of averages and the mean of maximums are calculated to provide a preliminary estimate of area-wide EPCs. Monitoring well locations are shown in Figure 4-1.

3.1.2. Results of Risk Evaluation

Based on comparisons of maximum detected concentrations at the site to WQS/WQC, there are no unacceptable risks from antimony, boron, manganese, and TDS.

Maximum detected concentrations of chloride and sulfate exceeded chronic WQS in one well each (MW-08 and MW-09, respectively); however, the magnitude of exceedance was low and average concentrations within these wells were below chronic WQS. Therefore, there is an unlikely potential for risk from chloride and sulfate.

Maximum and average iron concentrations in well MW-09 exceeded the WQS. Maximum iron concentrations in MW-07 and MW-08 also exceeded the WQS; however, iron was infrequently detected (1 detection in 18 samples) in these wells and average iron concentrations were less than the WQS. Notably, in wells nearer to the river and downgradient of MW-09 (e.g., MW-03 and MW-04), iron has not been detected. Therefore there is an unlikely potential for risk from iron.

3.2. Risk Evaluation – Powerton Generating Station

3.2.1. Estimates of Exposure and Effect

The site area has two groundwater flow regimes. Groundwater in the vicinity of the Powerton Generating Station ash ponds that is within the silt/clay unit discharges in a westerly direction to the adjoining intake channel; groundwater that is within the gravelly sand unit discharges in a northerly direction to the Illinois River. Based on groundwater analytical data collected between December 2010 and February 2015 from onsite monitoring wells (MW0-01 through MW-16), COIs for this site are: arsenic, boron, chloride, iron, lead, manganese, nitrate, selenium, sulfate, thallium, pH, and TDS.

Analytical data used in this evaluation is provided in Table B-3-1. Well-specific summary statistics calculated for each COI are from this data are provided in Table B-3-2 (average concentrations) and Table B-3-3 (maximum concentrations). Additionally, the mean of averages and the mean of maximums are calculated to provide a preliminary estimate of area-wide EPCs. Monitoring well locations are shown in Figure 4-2.

3.2.2. Results of Risk Evaluation

Based on comparisons of maximum detected concentrations at the site to WQS/WQC, there are no unacceptable risks from boron, chloride, nitrate, selenium, sulfate, and TDS.

Maximum detected concentrations of arsenic exceeded the chronic WQS in wells MW-07 and MW-06; however, the magnitude of exceedance was low (<2x) and average concentrations within these wells were below the chronic WQS. The maximum detected concentration of lead exceeded the chronic WQS in well MW-12; however, the magnitude of exceedance was low (<4x) and the average concentration within this well was below the chronic WQS. The maximum detected concentration of thallium exceed the chronic WQC in well MW-14; however, the magnitude of exceedance was low (<2x) and the average concentration within this well was below the chronic WQC. Field-measured pH levels were periodically less than or greater than the WQS range; however, on average, pH levels were well within the range. Therefore, based on the screening-level comparisons and site-specific conditions, there is an unlikely potential for risk form arsenic, lead, thallium, and pH.

Maximum and average manganese concentrations in in wells MW-07, MW-11, and MW-13 exceeded the WQS. These wells are reported to be screened within the gravelly-sand unit where

groundwater flows in a northerly direction toward the Illinois River (i.e., the receiving water body). However, maximum and average manganese concentrations reported in several downgradient wells located nearer to the river (MW-03, MW-04, and MW-05) were below the chronic WQS, indicating attenuation is occurring. Maximum manganese concentrations in wells MW-06 and MW-10 also exceeded the WQS at least once. MW-10 is reported to be screened within the gravelly-sand unit and is also upgradient of wells MW-03, MW-04, and MW-05. Exceedances within this well were of low magnitude (<2x) and the well-specific average concentration was less than the WQS. MW-06 exceedances were infrequent (1 in 18 samples), of low magnitude (<3x), and occurred in a monitoring well located adjacent to the intake channel, which conveys water from the river to the Site. Therefore, the transport of manganese via the channel to the river is not probable and there is an unlikely potential for risk from manganese.

Within the northerly-flowing gravelly-sand unit, maximum iron concentrations in wells MW-07, MW-10, MW-11, and MW-13 exceeded the chronic WQS. Importantly, however, maximum and average iron concentrations reported in several downgradient wells located nearer to the river (MW-03, MW-04, and MW-05) were below the chronic WQS. Within each of the five wells within the westerly-flowing silt-clay later, average and maximum iron concentrations exceeded the chronic WQS. These wells with exceedances are located adjacent to and flow westerly toward the intake channel, which conveys water from the river to the site. Thus, transport of iron via the channel to the river is not probable. Therefore, there is an unlikely potential for risk from iron.

3.3. Risk Evaluation – Waukegan Generating Station

3.3.1. Estimates of Exposure and Effect

Groundwater in the vicinity of the Waukegan Generating Station ash ponds discharges in an easterly direction to adjacent Lake Michigan. Based on the groundwater data collected between October 2010 and February 2015 from onsite monitoring wells (MW-01 through MW-09), COIs for this site are: antimony, arsenic, boron, chloride, iron, manganese, sulfate, pH, and TDS. Note that these COIs include inorganic constituents from upgradient and offsite sources, such as boron, which is migrating on to the Waukegan site from the former Greiss-Pfleger Tannery site.

Analytical data used in this evaluation is provided in Table B-4-1. Well-specific summary statistics calculated for COIs are provided in Table B-4-2 (average concentrations) and Table B-4-3 (maximum concentrations). Additionally, the mean of averages and the mean of maximums are

calculated to provide a preliminary estimate of area-wide EPCs. Monitoring well locations are shown in Figure 4-3.

3.3.2. Results of Risk Evaluation

Based on comparisons of maximum detected concentrations to WQS/WQC, there are no unacceptable risks from antimony and manganese.

Maximum detected concentrations of the remaining COIs exceeded WQS/WQC in at least one well. Arsenic exceedances were limited to two samples from MW-01, are of low magnitude (<2x), and the average concentration in MW-01 was less than the WQS. Chloride exceedances were limited to two samples from MW-05, are of low magnitude (<2x), and the average concentration was less than the WQS. Elevated pH levels were limited to wells MW-01, MW-02, and MW-03; however, on average, pH levels were within the WQS range. Therefore, there is an unlikely potential for risk form arsenic, chloride, and pH.

In individual wells MW-05 through MW-09, which are west and southwest of the ponds, average concentrations of boron, iron, sulfate, and TDS exceeded chronic WQS on one or more occasions. Importantly, there are no unacceptable risks for boron, iron, sulfate, and TDS in wells MW-01 through MW-04, which represent the most downgradient wells at the site. MW-01 through MW-04 appear to be downgradient of MW-05, MW-06, MW-08, and MW-09, indicating attenuation is occurring. Although no wells are directly downgradient of MW-07, there is no data to indicate that similar attenuation is not occurring in this area.

3.4. Risk Evaluation – Will County Generating Station

3.4.1. Estimates of Exposure and Effect

Groundwater in the vicinity of the Will County Generating Station ash ponds discharges in a westerly direction to the adjacent Des Plaines River. Based on the groundwater data collected between December 2010 and February 2015 from onsite monitoring wells (MW-01 through MW-10), COIs for this site are: antimony, boron, chloride, manganese, sulfate, pH, and TDS.

Analytical data used in this evaluation is provided in Table B-5-1. Well-specific summary statistics calculated for COIs are provided in Table B-5-2 (average concentrations) and Table B-5-3 (maximum concentrations). Additionally, the mean of averages and the mean of maximums are

calculated to provide a preliminary estimate of area-wide EPCs. Monitoring well locations are shown in Figure 4-5.

3.4.2. Results of Risk Evaluation

Based on comparisons of maximum detected concentrations to WQS/WQC, there are no unacceptable risks from antimony, boron, chloride, manganese, and TDS.

Maximum detected concentrations of sulfate exceeded the chronic WQS in two wells (MW-04 and MW-05). These two wells are located east (upgradient) of the ponds and are not adjacent to the river; no sulfate exceedances have occurred in those wells that are adjacent to the river (MW-07, MW-08, MW-09, and MW-10). Therefore, there is an unlikely potential for risk from sulfate.

Field-measured pH levels in individual wells were variable and periodically were less than or greater than the WQS range; however, with the exception of one well (MW-09), average pH levels were well within the range. For MW-09, pH levels exceeded the range in the majority of samples evaluated herein. MW-09 is located adjacent to the Des Plaines River; however, given that average pH concentrations in the remaining nine wells, including wells adjacent to the river, were within the acceptable range, there is an unlikely potential for risk from pH.

Table B-1
Surface Water Effects Values
Midwest Generation

Constituent	CAS	Units	Surface Water Effects Values [1]							
			General Use [2]				Lake Michigan Basin [3]			
			Chronic		Acute [4]		Chronic		Acute [4]	
Antimony	7440-36-0	mg/L	0.32	(2e)	1.2	(2e)	0.32	(3d)	1.2	(3d)
Arsenic	7440-38-2	mg/L	0.19	(2a)	0.36	(2a)	0.148	(3a)	0.34	(3a)
Boron	7440-42-8	mg/L	7.6	(2a)	40.1	(2a)	7.6	(3a)	40.1	(3a)
Chloride	16887-00-6	mg/L	500	(2b)	--		500	(3b)	--	
Iron	7439-89-6	mg/L	1.0	(2b)	--		1.0	(3b)	--	
Lead	7439-92-1	mg/L	0.0485	(2a,i)	0.231	(2a,i)	n/a		n/a	
Manganese	7439-96-5	mg/L	3.04	(2a,ii)	7.15	(2a,ii)	3.04	(3a)	7.15	(3a)
Nitrate	14797-55-8	mg/L	--		--		n/a		n/a	
pH	--	s.u.	6.5 - 9.0	(2d)	--		6.5 - 9.0	(3c)	--	
Selenium	7782-49-2	mg/L	1.0	(2b)	--		n/a		n/a	
Sulfate	18785-72-3	mg/L	site-specific	(2c)	--		500	(3b)	--	
Joliet #29	18785-72-3	mg/L	1350	(2c)	--		500	(3b)	--	
Powerton	18785-72-3	mg/L	1430	(2c)	--		500	(3b)	--	
Waukegan	18785-72-3	mg/L	1410	(2c)	--		500	(3b)	--	
Will County	18785-72-3	mg/L	1480	(2c)	--		500	(3b)	--	
Thallium	7440-28-0	mg/L	0.0037	(2f)	0.086	(2e)	n/a		n/a	
Total Dissolved Solids	--	mg/L	--		--		1,000	(3c)	--	

Notes

(1) Illinois Water Quality Standards (WQS) are used as surface water effects values for evaluating hypothetical human and ecological exposure scenarios. In the absence of a WQS, Illinois Water Quality Criteria (WQC) are used. Values are applicable to total (rather than dissolved) concentrations.

(2) Concentration represents an Illinois General Use WQS as defined in 35 IAC 302, Subpart B or an Illinois WQC (lower of aquatic life and human health WQC):

(a) 35 IAC 302.208(e), Numerical Water Quality Standards for the Protection of Aquatic Life
(i) Standard for total lead is a hardness (H)-dependent value, calculated as follows (see also footnote 5):
Chronic = exp[-2.863+1.273*ln(H)]*1E-3 mg/µg
Acute = exp[-1.301+1.273*ln(H)]*1E-3 mg/µg
(ii) Standard for total manganese is a hardness (H)-dependent value, calculated as follows (see also footnote 5):
Chronic = exp[4.0635+0.7467*ln(H)]*1E-3 mg/µg
Acute = exp[4.9187+0.7467*ln(H)]*1E-3 mg/µg
(b) 35 IAC 302.208(g), Single-Value Standards
(c) 35 IAC 302.208(h)(2)(A), Water Quality Standard for Sulfate; standard is hardness (H) and chloride (Cl) dependent, and calculated as follows (see also footnotes 5 and 6):
Chronic = exp[1276.7+5.508*(H)-1.457(Cl)]*0.65
(d) 35 IAC 302.204, pH
(e) Illinois WQC for the protection of aquatic life.
(f) Illinois WQC for the protection of human health (applicable to chronic values only).

(3) Concentration represents an Illinois Lake Michigan Basin WQS as defined in 35 IAC 302, Subpart E. Note that of the four subject sites, Lake Michigan Basin WQS are only applicable to the Waukegan Power Generating Station. "n/a" indicates a constituent is not of interest at the Waukegan Power Generating Station.

(a) 35 IAC 302.504(a), Lake Michigan Basin Water Quality Standards for Chemical Constituents. WQS for manganese and lead are calculated using the hardness-dependent GU equations.
(b) 35 IAC 302.504(b)
(c) IAC 302.503, pH
(d) If a Lake Michigan Basin WQS was not available, the General Use WQS was assumed to be applicable.

(4) Chronic values are used as the primary effects values for this evaluation; however, acute values are also presented for discussion purposes.

(5) Site-specific hardness data is not available. However, based on data from the Illinois Water Quality Database (http://ilrdss.isws.illinois.edu/WQ/), a value of 200 mg/L is considered a conservative estimate for the Site.

(6) Sulfate WQS calculated using the average chloride concentration for available data, which are as follows:
Joliet #29 212
Powerton 121
Waukegan 141
Will Count 72.3

Definitions

"--" = value not available
n/a = not applicable
mg/L = milligram per liter
s.u. = standard unit

Table B-2-1
Groundwater Analytical Results for Constituents of Interest: December 2010 to February 2015
Midwest Generation – Joliet 29 Generating Station - Joliet, Will County, Illinois

Well	Constituent	Effects Values [1]	Units	Groundwater Analytical Results (Year [Month])																	
				2010 [12]	2011 [03]	2011 [06]	2011 [09]	2011 [12]	2012 [03] [2]	2012 [06]	2012 [09] [3]	2012 [12]	2013 [03]	2013 [05/06] [4]	2013 [07]	2013 [10]	2014 [02]	2014 [05]	2014 [08]	2014 [10]	2015 [02]
MW-01	Antimony	0.32	mg/L	0.0043	NS	<0.003	NS	NS	NS	NS	<0.003	NS	NS	0.0052	NS	NS	NS	NS	<0.003	<0.003	NS
MW-01	Boron	7.6	mg/L	0.31	NS	0.29	NS	NS	NS	NS	0.38	NS	NS	0.33	NS	NS	NS	NS	0.22	0.21	NS
MW-01	Chloride	500	mg/L	140	NS	170	NS	NS	NS	NS	120	NS	NS	210	NS	NS	NS	NS	120	79	NS
MW-01	Iron	1	mg/L	<0.1	NS	<0.1	NS	NS	NS	NS	<0.1	NS	NS	<0.1	NS	NS	NS	NS	<0.1	<0.1	NS
MW-01	Manganese	3.0	mg/L	<0.0025	NS	<0.0025	NS	NS	NS	NS	<0.0025	NS	NS	<0.0025	NS	NS	NS	NS	0.012	0.015	NS
MW-01	Sulfate	1350	mg/L	180	NS	81	NS	NS	NS	NS	240	NS	NS	140	NS	NS	NS	NS	59	65	NS
MW-01	Total Dissolved Solids	--		590	NS	670	NS	NS	NS	NS	630	NS	NS	700	NS	NS	NS	NS	550	570	NS
MW-02	Antimony	0.32	mg/L	0.012	NS	0.0042	0.0032	<0.003	<0.003	NS	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-02	Boron	7.6	mg/L	0.31	NS	0.35	0.44	0.74	0.22	NS	0.35	0.42	0.41	0.35	0.29	0.41	0.34	0.25	0.22	0.22	0.23
MW-02	Chloride	500	mg/L	140	NS	230	140	140	280	NS	120	150	260	250	310	180	240	350	280	240	190
MW-02	Iron	1	mg/L	<0.1	NS	<0.5	<0.1	<0.1	<0.1	NS	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-02	Manganese	3.0	mg/L	<0.0025	NS	<0.013	0.0025	<0.0025	<0.0025	NS	<0.0025	<0.0025	<0.0025	<0.0025	0.0036	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
MW-02	Sulfate	1350	mg/L	190	NS	67	110	150	110	NS	190	140	130	150	140	130	61	68	85	92	67
MW-02	Total Dissolved Solids	--		600	NS	720	690	750	800	NS	580	720	840	860	980	660	830	1100	850	810	730
MW-03	Antimony	0.32	mg/L	0.004	<0.003	<0.003	0.0065	0.016	0.013	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-03	Boron	7.6	mg/L	0.24	0.36	0.46	0.24	0.23	0.26	0.31	0.22	0.28	0.29	0.74	0.67	0.27	0.45	0.27	0.37	0.45	0.52
MW-03	Chloride	500	mg/L	260	240	300	160	260	250	260	330	290	260	380	210	250	200	300	220	180	160
MW-03	Iron	1	mg/L	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-03	Manganese	3.0	mg/L	0.1	0.048	<0.013	0.0076	0.008	0.0095	0.014	0.011	0.0076	0.0068	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
MW-03	Sulfate	1350	mg/L	120	160	120	120	160	190	160	150	110	140	250	260	210	89	110	84	130	58
MW-03	Total Dissolved Solids	--		930	1100	1000	930	1100	1000	1100	1000	1100	950	1300	1000	910	890	1100	810	760	700
MW-04	Antimony	0.32	mg/L	<0.003	<0.003	<0.003	<0.003	0.0067	0.0057	<0.003	<0.003	<0.003	<0.003	0.012	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-04	Boron	7.6	mg/L	0.46	0.37	0.38	0.25	0.34	0.29	0.48	0.34	0.38	0.4	0.4	0.5	0.45	0.35	0.32	0.35	0.41	0.44
MW-04	Chloride	500	mg/L	270	270	250	150	200	210	270	260	250	230	270	200	210	220	270	210	160	180
MW-04	Iron	1	mg/L	<0.1	<0.1	<0.5	0.22	<0.1	<0.1	<0.1	<0.1	<0.1	0.46	0.17	<0.1	<0.1	<0.1	0.18	<0.1	<0.1	0.14
MW-04	Manganese	3.0	mg/L	0.33	0.048	0.018	0.066	0.029	0.018	0.082	0.043	0.029	0.067	0.0081	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	0.0044
MW-04	Sulfate	1350	mg/L	300	140	84	74	170	210	110	180	130	110	120	170	230	110	140	89	160	65
MW-04	Total Dissolved Solids	--		1100	1000	890	770	970	930	1100	980	1000	880	900	840	860	870	860	760	720	730
MW-05	Antimony	0.32	mg/L	<0.003	<0.003	<0.003	<0.003	0.004	0.0035	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-05	Boron	7.6	mg/L	0.42	0.52	0.47	0.57	0.49	0.54	0.44	0.55	0.65	0.59	0.69	0.81	0.55	0.34	0.36	0.95	0.57	0.69
MW-05	Chloride	500	mg/L	150	240	220	120	190	210	220	240	210	230	180	110	140	240	370	120	120	220
MW-05	Iron	1	mg/L	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-05	Manganese	3.0	mg/L	0.0065	<0.0025	<0.013	<0.0025	<0.0025	<0.0025	0.004	0.001	<0.0025	0.0037	<0.0025	<0.0025	<0.0025	<0.0025	0.035	0.0062	<0.0025	0.0076
MW-05	Sulfate	1350	mg/L	110	160	100	140	140	190	130	210	210	150	200	290	180	130	160	360	240	230
MW-05	Total Dissolved Solids	--		750	990	850	800	900	930	1000	990	1000	960	1100	910	680	840	1100	1000	730	1000
MW-06	Antimony	0.32	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0045	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-06	Boron	7.6	mg/L	0.32	0.44	0.32	0.27	0.3	0.25	0.26	0.25	0.31	0.33	0.23	0.23	0.22	0.26	0.17	0.26	0.19	0.22
MW-06	Chloride	500	mg/L	130	270	140	140	130	240	210	190	150	160	170	120	120	370	340	120	100	150
MW-06	Iron	1	mg/L	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-06	Manganese	3.0	mg/L	0.14	0.033	<0.013	0.036	0.024	0.015	0.008	0.0087	0.0076	0.0047	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
MW-06	Sulfate	1350	mg/L	140	140	87	100	130	110	91	85	120	120	96	110	150	100	120	91	140	140
MW-06	Total Dissolved Solids	--		650	1000	650	620	710	800	860	760	710	690	690	350	570	930	990	600	530	710
MW-07	Antimony	0.32	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-07	Boron	7.6	mg/L	0.51	0.39	0.25	0.29	0.35	0.3	0.25	0.31	0.41	0.39	0.21	0.21	0.24	0.3	0.15	0.22	0.17	0.21
MW-07	Chloride	500	mg/L	430	320	140	99	140	300	170	170	140	190	170	95	130	470	350	110	98	210
MW-07	Iron	1	mg/L	<0.1	<0.1	<0.5	3.8	<0.1	<0.1	0.13	<0.1	<0.1	<0.1	0.41	<0.1	<0.1	<0.1	<0.1	<0.1	0.13	0.13
MW-07	Manganese	3.0	mg/L	0.29	0.014	<0.013	0.08	0.0073	0.015	0.069	0.0041	0.0063	0.0044	0.012	<0.0025	<0.0025	<0.0025	<0.0025	0.0033	0.0091	0.0048
MW-07	Sulfate	1350	mg/L	250	120	85	110	160	140	190	130	90	150	150	74	190	170	110	82	120	260
MW-07	Total Dissolved Solids	--		1200	970	580	650	780	870	760	760	760	720	740	540	650	1200	860	570	520	1000

Table B-2.1
Groundwater Analytical Results for Constituents of Interest: December 2010 to February 2015
Midwest Generation – Joliet #29 Generating Station - Joliet, Will County, Illinois

Well	Constituent	Effects Values [1]	Units	Groundwater Analytical Results (Year [Month])																	
				2010 [12]	2011 [03]	2011 [06]	2011 [09]	2011 [12]	2012 [03] [2]	2012 [06]	2012 [09] [3,4]	2012 [12]	2013 [03]	2013 [05/06] [4]	2013 [07]	2013 [10]	2014 [02]	2014 [05]	2014 [08]	2014 [10]	2015 [02]
MW-08	Antimony	0.32	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-08	Boron	7.6	mg/L	0.29	0.16	0.12	0.2	0.16	0.13	0.2	0.46	0.33	0.25	y	0.18	0.19	0.16	0.15	0.19	0.16	0.64
MW-08	Chloride	500	mg/L	130	350	150	79	120	410	190	130	130	200	300	210	110	270	700	170	140	470
MW-08	Iron	1	mg/L	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	0.24	<0.1	<0.1	0.23	<0.1	<0.1	0.11	<0.1	<0.1	<0.1	10
MW-08	Manganese	3.0	mg/L	0.0051	0.0026	0.017	<0.0025	<0.0025	0.0042	0.016	0.023	0.0044	<0.0025	0.0065	<0.0025	<0.0025	0.0039	<0.0025	0.017	0.0069	1.1
MW-08	Sulfate	1350	mg/L	210	87	52	120	170	130	110	180	130	150	99	72	74	54	460	59	73	600
MW-08	Total Dissolved Solids	--		670	990	580	690	800	1000	740	710	730	830	860	740	560	740	2100	610	560	2000
MW-09	Antimony	0.32	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-09	Boron	7.6	mg/L	0.36	0.32	0.29	0.35	0.31	0.38	0.34	0.59	0.44	0.36	0.3	0.29	0.29	0.3	0.27	0.29	0.24	0.3
MW-09	Chloride	500	mg/L	140	230	290	190	190	170	250	160	150	190	290	280	280	270	340	270	230	390
MW-09	Iron	1	mg/L	<0.1	0.18	7.3	3.8	1.8	5.5	8	4.7	13	15	160	50	25	12	64	130	45	23
MW-09	Manganese	3.0	mg/L	1.1	1.6	0.95	0.82	0.66	1.3	1.2	0.68	0.44	0.43	1.6	0.81	0.52	0.34	0.3	0.72	0.38	0.54
MW-09	Sulfate	1350	mg/L	1400	1100	580	750	130	1400	1500	1600	1100	700	1300	1000	680	560	560	880	960	820
MW-09	Total Dissolved Solids	--		2600	2400	1500	1700	2400	2600	2800	2900	2000	1700	3000	2300	1700	1600	1700	2100	1700	2400
MW-10	Antimony	0.32	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-10	Boron	7.6	mg/L	0.5	0.54	0.54	0.41	0.52	0.52	0.53	0.43	0.49	0.49	0.25	0.3	0.42	0.4	0.39	0.48	0.56	0.52
MW-10	Chloride	500	mg/L	200	300	7.1	170	180	180	290	230	200	210	240	210	220	240	300	200	170	210
MW-10	Iron	1	mg/L	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.32	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-10	Manganese	3.0	mg/L	0.12	0.0076	<0.013	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	0.01	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	0.0049
MW-10	Sulfate	1350	mg/L	130	130	89	100	190	250	170	110	120	84	120	130	140	55	120	73	110	93
MW-10	Total Dissolved Solids	--		860	1100	980	730	890	890	1100	870	860	830	850	910	880	870	890	910	740	810
MW-11	Antimony	0.32	mg/L	<0.003	<0.003	<0.015	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-11	Boron	7.6	mg/L	0.47	2.6	2.2	1.1	1.2	1.4	0.85	0.68	0.57	1.1	0.34	0.88	0.49	1.2	1.3	1.6	2	1.1
MW-11	Chloride	500	mg/L	160	270	280	86	140	240	150	150	140	190	160	91	140	430	340	120	84	270
MW-11	Iron	1	mg/L	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	0.23	<0.1	0.42	0.15	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.17
MW-11	Manganese	3.0	mg/L	0.052	0.0047	<0.013	0.0053	0.0047	<0.0025	0.014	<0.0025	0.042	0.016	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	0.27
MW-11	Sulfate	1350	mg/L	140	150	110	110	160	140	150	100	150	110	100	100	110	130	100	91	120	290
MW-11	Total Dissolved Solids	--		770	1000	710	590	790	850	760	740	730	770	670	570	690	1100	850	720	580	1300

Notes
(1) Illinois General Use Water Quality Standards (WQS) and Illinois Water Quality Criteria (WQC) are used as surface water effects values.
(2) Manganese results for March 2012 for wells MW-02, MW-03, and MW-04 were qualified as "*" by the laboratory, which denotes instrument-related QC exceeds the control limits.
(3) Boron results for September 2012 were qualified as "*" by the laboratory, which denotes instrument-related QC exceeds the control limits.
(4) Boron results for May 2013 for well MW-03 were qualified as "V" by the laboratory. A qualifier definition was not identified.

mg/L = milligrams per liter
"--" = value not available
"<" = constituent was not detected; the reporting limit is presented
bold/shading = concentration exceeds effects value

Table B-2-2
Comparison Of Average Groundwater Analytical Results To Surface Water Effects Values
Midwest Generation -- Joliet #29 Generating Station - Joliet, Will County, Illinois

Constituent	Units	Effects Value [1]	Groundwater Analytical Results - Average Concentrations [2]											Average [3]
			MW-01	MW-02	MW-03	MW-04	MW-05	MW-06	MW-07	MW-08	MW-09	MW-10	MW-11	
Antimony	mg/L	0.32	0.00258	0.00243	0.00336	0.00261	0.00175	0.00167	0.003 U	0.003 U	0.003 U	0.003 U	0.00367 U	0.00202
Boron	mg/L	7.6	0.29	0.347	0.368	0.384	0.567	0.268	0.287	0.234	0.334	0.461	1.17	0.428
Chloride	mg/L	500	140	219	251	227	196	181	207	241	239	209	191	209
Iron	mg/L	1.0	0.1 U	0.125 U	0.122 U	0.112	0.122 U	0.122 U	0.303	0.638	**28.5**	0.0761	0.104	**2.73**
Manganese	mg/L	3.04	0.00533	0.0018	0.0127	0.0428	0.00906	0.0163	0.0295	0.0675	0.799	0.00918	0.0237	0.0924
Sulfate	mg/L	1350	128	118	146	144	185	115	143	157	968	123	131	214
Total Dissolved Solids	mg/L	--	618	783	982	898	918	712	785	884	2170	887	788	948

Notes
(1) Illinois General Use Water Quality Standards (WQS) and Illinois Water Quality Criteria (WQC) are used as surface water effects values.
(2) Average of concentrations reported between December 2010 and February 2015. If a constituent was not detected during this timeframe, the average reporting limit is presented in the table, indicated with a "U" qualifier. Otherwise, non-detect results were included in the average calculation assuming one-half the reporting limit.
(3) Average of concentrations (averages) presented in the table, assuming one-half the reporting limit for non-detect results.

mg/L = milligram per liter
s.u. = standard units
"--" = value not available
U = constituent not detected above its reporting limit; reporting limit presented
bold/shading = concentration exceeds effects value

Table B-2-3
Comparison Of Maximum Groundwater Analytical Results To Surface Water Effects Values
Midwest Generation -- Joliet #29 Generating Station - Joliet, Will County, Illinois

Constituent	Units	Effects Value [1]	Groundwater Analytical Results - Maximum Concentrations [2]											Average [3]
			MW-01	MW-02	MW-03	MW-04	MW-05	MW-06	MW-07	MW-08	MW-09	MW-10	MW-11	
Antimony	mg/L	0.32	0.0052	0.012	0.016	0.012	0.004	0.0045	0.003 U	0.003 U	0.003 U	0.003 U	0.015 U	0.00611
Boron	mg/L	7.6	0.38	0.74	0.74	0.5	0.95	0.44	0.51	0.64	0.59	0.56	2.6	0.786
Chloride	mg/L	500	210	350	380	270	370	370	470	**780**	390	300	430	393
Iron	mg/L	1.0	0.1 U	0.5 U	0.5 U	0.46	0.5 U	0.5 U	**3.8**	**10**	**160**	0.32	0.42	**16**
Manganese	mg/L	3.04	0.015	0.0036	0.1	0.33	0.081	0.14	0.29	1.1	1.6	0.12	0.27	0.368
Sulfate	mg/L	1350	240	190	260	300	360	150	260	600	**1600**	250	290	409
Total Dissolved Solids	mg/L	--	700	1100	1300	1100	1100	1000	1200	2100	3000	1100	1300	1360

Notes
(1) Illinois General Use Water Quality Standards (WQS) and Illinois Water Quality Criteria (WQC) are used as surface water effects values.
(2) Maximum detected concentrations reported between December 2010 and February 2015. If a constituent was not detected during this timeframe, the maximum reporting limit is presented in the table, indicated with a "U" qualific
(3) Average of concentrations (maximums) presented in the table, assuming one-half the reporting limit for non-detect results.

mg/L = milligram per liter
s.u. = standard units
"--" = value not available
U = constituent not detected above its reporting limit; reporting limit presented
bold/shading = concentration exceeds effects value

Table B-3-1
Groundwater Analytical Results for Constituents of Interest: December 2010 to February 2015
Midwest Generation -- Powerton Generating Station - Pekin, Tazewell County, Illinois

Well	Constituent	Effects Value [1]	Units	Groundwater Analytical Results (Year (Month))																			
				2010 [12]	2011 [02/03]	2011 [04]	2011 [06]	2011 [08]	2011 [09/10]	2012 [02]	2012 [03/04]	2012 [06]	2012 [09]	2012 [12]	2013 [02]	2013 [05]	2013 [07]	2013 [10]	2014 [02] [2]	2014 [05] [3]	2014 [08] [4]	2014 [10]	2015 [02]
MW-01	Arsenic	0.19	mg/L	<NP	<0.001	--	<0.001	--	<0.001	<0.001	<0.001	0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-01	Boron	7.6	mg/L	0.45	0.26	--	0.33	--	1	0.48	0.29	0.46	1.8	<2	1.7	0.47	0.48	0.62	0.53	0.26	0.16	0.075	0.059
MW-01	Chloride	500	mg/L	46	37	--	40	--	41	26	53	42	43	41	38	160	140	46	48	73	58	42	37
MW-01	Iron	1	mg/L	<NP	<0.01	--	<0.01	--	<0.01	<0.01	<0.01	<0.01	<0.01	0.17	<0.01	0.43	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-01	Lead	0.0485	mg/L	<NP	<0.001	--	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	0.0008	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MW-01	Manganese	3.04	mg/L	<NP	<0.001	--	<0.001	--	<0.001	<0.001	<0.001	<0.001	0.0027	0.018	<0.001	0.027	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	0.0043
MW-01	Nitrogen/Nitrate	--	mg/L	7.2	4.3	--	5.7	--	11	4.1	7.3	6.5	5.4	7.2	7.4	0.25	0.42	4.5	4.7	2.2	1.5	4.4	4.1
MW-01	Nitrogen/Nitrate, Nitrite	--	mg/L	NR	NR	--	NR	--	NR	NR	NR	NR	NR	NR	NR	0.23	0.42	4.5	4.7	2.2	1.5	4.4	4.1
MW-01	pH	6.5 - 9.0	s.u.	7.46	7.43	--	7.58	--	7.37	6.39	7.59	7.45	7.06	6.98	9.53	7.00	6.75	7.12	7.65	7.15	7.25	7.25	6.93
MW-01	Selenium	1	mg/L	0.0016	0.0022	--	0.0016	--	0.0016	0.0027	0.0025	0.0042	0.005	<0.005	0.0045	<0.0025	<0.0025	0.0042	0.004	<0.0025	<0.0025	<0.0025	<0.0025
MW-01	Sulfate	1430	mg/L	50	30	--	39	--	83	31	61	68	72	91	77	330	270	85	99	51	36	54	43
MW-01	Thallium	0.0037	mg/L	<NP	<0.001	--	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
MW-01	Total Dissolved Solids	--	mg/L	490	340	--	410	--	510	440	470	580	710	640	640	840	870	660	590	440	350	410	470
MW-02	Arsenic	0.19	mg/L	0.0018	0.0015	--	0.0017	--	<0.001	<0.001	<0.001	0.0011	0.0012	<0.005	0.0011	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0015
MW-02	Boron	7.6	mg/L	0.38	0.23	--	0.35	--	0.85	0.69	0.27	0.74	0.65	0.8	0.29	0.21	1.4	2.7	0.28	0.38	1.1	0.078	0.082
MW-02	Chloride	500	mg/L	45	43	--	44	--	46	40	53	51	45	48	52	53	48	90	88	91	58	44	54
MW-02	Iron	1	mg/L	<NP	<0.01	--	<0.01	--	<0.01	<0.01	<0.01	<0.01	<0.01	0.046	0.026	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-02	Lead	0.0485	mg/L	<NP	<0.001	--	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0013	<0.0005
MW-02	Manganese	3.04	mg/L	<NP	0.0012	--	0.0022	--	<0.001	<0.001	<0.001	<0.001	0.0019	0.0063	<0.001	<0.0025	0.006	0.006	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
MW-02	Nitrogen/Nitrate	--	mg/L	7.5	4.5	--	4.7	--	4.3	6.9	5.1	4.4	2.9	2.4	5.7	0.44	0.59	1.1	2.4	4	0.28	4.3	5.9
MW-02	Nitrogen/Nitrate, Nitrite	--	mg/L	NR	NR	--	NR	--	NR	NR	NR	NR	NR	NR	NR	0.48	0.59	1.1	2.4	4	0.28	4.3	5.9
MW-02	pH	6.5 - 9.0	s.u.	7.91	7.78	--	7.20	--	7.52	6.41	7.92	7.35	7.32	7.38	7.53	7.39	7.03	7.20	8.21	7.19	7.01	7.37	8.13
MW-02	Selenium	1	mg/L	0.0017	0.0012	--	0.0014	--	0.0032	0.0037	<0.001	0.0039	0.0016	<0.005	0.0032	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
MW-02	Sulfate	1430	mg/L	52	42	--	53	--	70	69	55	73	69	95	53	96	140	190	53	63	76	49	57
MW-02	Thallium	0.0037	mg/L	<NP	<0.001	--	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
MW-02	Total Dissolved Solids	--	mg/L	480	420	--	470	--	460	490	440	500	510	520	440	340	560	770	430	440	460	440	510
MW-03	Arsenic	0.19	mg/L	0.0017	<0.001	--	0.0011	--	0.0012	0.0012	0.0012	<0.001	0.0015	<0.005	0.0013	0.0012	0.0013	0.0011	<0.001	<0.001	<0.001	<0.001	<0.001
MW-03	Boron	7.6	mg/L	0.75	0.18	--	0.24	--	0.64	0.7	0.56	0.63	0.64	0.63	0.65	0.21	0.47	0.46	0.14	0.15	0.37	0.14	0.32
MW-03	Chloride	500	mg/L	39	52	--	59	--	62	39	54	57	54	58	53	55	60	57	120	100	79	47	47
MW-03	Iron	1	mg/L	<NP	<0.01	--	<0.01	--	0.042	<0.01	<0.01	<0.01	<0.01	0.036	0.019	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-03	Lead	0.0485	mg/L	<NP	<0.001	--	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	0.00097	<0.0005	<0.0005	<0.0005
MW-03	Manganese	3.04	mg/L	0.0047	0.0023	--	<0.001	--	0.0037	0.0014	<0.001	0.0033	0.002	0.034	0.011	<0.0025	<0.0025	0.0039	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
MW-03	Nitrogen/Nitrate	--	mg/L	9.4	5.2	--	5.4	--	0.2	0.2	2.1	0.37	0.08	0.13	2	0.15	<0.1	<0.1	2.6	5.3	<0.1	2.4	2
MW-03	Nitrogen/Nitrate, Nitrite	--	mg/L	NR	NR	--	NR	--	NR	NR	NR	NR	NR	NR	NR	0.15	<0.1	<0.1	2.6	5.3	<0.1	2.4	2
MW-03	pH	6.5 - 9.0	s.u.	7.43	7.55	--	7.33	--	7.30	6.58	7.38	7.36	7.46	7.41	7.46	7.31	7.22	7.25	8.34	7.27	6.97	7.43	7.75
MW-03	Selenium	1	mg/L	<NP	0.0036	--	0.0015	--	0.0036	0.0021	0.0067	0.0018	0.0033	<0.005	0.0048	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
MW-03	Sulfate	1430	mg/L	64	42	--	47	--	66	45	72	84	74	74	64	82	99	96	65	65	100	40	46
MW-03	Thallium	0.0037	mg/L	<NP	<0.001	--	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
MW-03	Total Dissolved Solids	--	mg/L	480	410	--	440	--	460	480	450	520	520	460	500	310	460	430	490	440	490	440	400
MW-04	Arsenic	0.19	mg/L	<NP	<0.001	--	<0.001	--	<0.001	<0.001	<0.001	<0.001	0.0012	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-04	Boron	7.6	mg/L	0.77	0.83	--	0.33	--	0.84	0.79	0.78	0.83	0.76	0.74	0.97	0.23	0.67	0.81	0.81	0.94	1	0.77	0.94
MW-04	Chloride	500	mg/L	150	77	--	43	--	86	81	58	75	110	130	90	54	70	350	130	92	95	96	74
MW-04	Iron	1	mg/L	<NP	0.017	--	<0.01	--	<0.01	<0.01	<0.01	<0.01	<0.01	0.14	0.059	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-04	Lead	0.0485	mg/L	<NP	<0.001	--	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MW-04	Manganese	3.04	mg/L	0.77	0.68	--	0.41	--	0.69	0.35	0.089	0.26	0.5	0.027	0.007	<0.0025	0.13	0.27	0.026	0.029	0.24	0.075	1.018
MW-04	Nitrogen/Nitrate	--	mg/L	0.34	0.73	--	2.7	--	0.06	0.07	0.65	1.1	0.46	1	1.8	<0.1	<0.1	0.5	<0.1	<0.1	<0.1	0.14	0.3
MW-04	Nitrogen/Nitrate, Nitrite	--	mg/L	NR	NR	--	NR	--	NR	NR	NR	NR	NR	NR	NR	<0.1	<0.1	0.5	<0.1	<0.1	<0.1	0.14	0.3
MW-04	pH	6.5 - 9.0	s.u.	7.27	7.48	--	7.26	--	7.22	6.37	7.24	7.04	7.13	7.14	7.37	7.30	7.02	7.00	8.00	7.04	7.06	7.20	7.63
MW-04	Selenium	1	mg/L	0.0022	0.0037	--	0.0022	--	0.0039	0.002	0.0045	0.0035	0.0012	<0.005	0.013	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
MW-04	Sulfate	1430	mg/L	110	140	--	48	--	61	6.7	160	94	170	150	130	92	190	260	200	320	260	390	100
MW-04	Thallium	0.0037	mg/L	<NP	<0.001	--	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
MW-04	Total Dissolved Solids	--	mg/L	680	620	--	470	--	580	520	660	600	880	720	640	350	670	980	780	980	880	1100	580

Table B-3-1
Groundwater Analytical Results for Constituents of Interest: December 2010 to February 2015
Midwest Generation – Powerton Generating Station – Pekin, Tazewell County, Illinois

Well	Constituent	Effects Value [1]	Units	Groundwater Analytical Results (Year [Month])																			
				2010 [12]	2011 [02/03]	2011 [04]	2011 [06]	2011 [08]	2011 [09/10]	2011 [12]	2012 [03/04]	2012 [06]	2012 [09]	2012 [12]	2013 [02]	2013 [05]	2013 [07]	2013 [10]	2014 [01] [2]	2014 [05] [3]	2014 [08] [4]	2014 [10]	2015 [02]
MW-05	Arsenic	0.19	mg/L	0.0011	<0.001	--	<0.001	--	<0.001	0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-05	Boron	7.6	mg/L	0.95	0.93	--	0.79	--	0.79	0.77	0.82	0.74	0.65	0.66	0.66	0.7	0.64	0.83	0.7	0.76	0.71	<0.05	1.1
MW-05	Chloride	500	mg/L	150	120	--	89	--	160	140	82	100	150	170	110	92	150	170	120	80	140	120	79
MW-05	Iron	1	mg/L	0.13	0.05	--	0.046	--	0.082	0.036	<0.01	<0.01	<0.01	0.43	0.052	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-05	Lead	0.0485	mg/L	<NP	<0.001	--	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MW-05	Manganese	3.04	mg/L	0.51	0.49	--	0.48	--	0.64	0.5	0.26	0.41	1	0.59	0.21	0.67	0.29	0.62	0.077	0.043	0.016	<0.0025	0.058
MW-05	Nitrogen/Nitrate	--	mg/L	<NP	<0.02	--	0.08	--	<0.02	<0.02	1.6	0.04	0.04	0.04	0.19	<0.1	<0.1	0.34	0.74	2.2	0.11	0.2	0.74
MW-05	Nitrogen/Nitrate, Nitrite	--	mg/L	NR	NR	--	NR	--	NR	NR	NR	NR	NR	NR	NR	<0.1	<0.1	0.34	0.77	2.2	0.11	0.2	0.74
MW-05	pH	6.5 - 9.0	s.u.	7.24	7.36	--	7.29	--	7.05	6.34	7.14	7.00	6.94	6.94	8.01	6.87	6.82	6.89	7.69	7.01	6.86	7.30	7.52
MW-05	Selenium	1	mg/L	0.0019	0.003	--	<0.001	--	0.0045	0.0023	0.0028	0.0033	0.0031	<0.005	0.0029	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	0.0028	<0.0025	<0.0025
MW-05	Sulfate	1430	mg/L	160	170	--	110	--	250	170	120	130	200	200	180	310	290	260	180	150	200	310	110
MW-05	Thallium	0.0037	mg/L	<NP	<0.001	--	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
MW-05	Total Dissolved Solids	--	mg/L	740	680	--	640	--	890	820	590	700	890	840	790	990	1000	1100	840	640	870	910	570
MW-06	Arsenic	0.19	mg/L	0.0042	0.0024	--	0.0029	--	0.0031	0.0036	0.002	0.0021	0.0022	<0.005	0.0017	0.0027	0.0017	0.0039	0.001	0.3	0.0024	0.0016	0.0011
MW-06	Boron	7.6	mg/L	0.5	0.35	--	0.43	--	0.61	0.63	0.39	0.46	0.57	0.45	0.39	1	0.62	0.51	0.34	0.35	0.52	0.34	0.34
MW-06	Chloride	500	mg/L	180	200	--	160	--	210	150	150	200	190	240	200	99	200	210	230	230	230	240	110
MW-06	Iron	1	mg/L	1.6	1.6	--	1.7	--	1.8	1.9	1.7	1.9	1.9	1.6	1.1	1.8	2.2	1.8	1.9	32	1	0.81	1
MW-06	Lead	0.0485	mg/L	<NP	<0.001	--	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00082	<0.0005
MW-06	Manganese	3.04	mg/L	0.68	0.68	--	0.63	--	0.66	0.63	0.61	0.71	0.64	0.61	0.5	1.3	0.7	0.58	0.68	8	0.71	0.57	0.86
MW-06	Nitrogen/Nitrate	--	mg/L	0.037	<0.02	--	<0.02	--	0.04	0.06	<0.02	<0.02	0.04	0.06	0.02	<0.1	<0.1	0.16	<0.1	<0.1	<0.1	0.11	<0.1
MW-06	Nitrogen/Nitrate, Nitrite	--	mg/L	NR	NR	--	NR	--	NR	NR	NR	NR	NR	NR	NR	<0.1	<0.1	0.16	<0.1	<0.1	<0.1	0.11	<0.1
MW-06	pH	6.5 - 9.0	s.u.	7.67	7.97	--	7.62	--	7.61	7.35	7.68	7.59	7.73	7.68	9.38	7.23	7.37	7.55	8.21	7.45	7.73	7.60	8.05
MW-06	Selenium	1	mg/L	0.0034	<0.001	--	<0.001	--	0.0025	0.0033	<0.001	0.0013	0.0023	<0.005	0.001	0.003	<0.0025	0.0065	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
MW-06	Sulfate	1430	mg/L	210	250	--	280	--	260	170	250	450	340	440	320	560	440	310	410	530	300	380	360
MW-06	Thallium	0.0037	mg/L	<NP	<0.001	--	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
MW-06	Total Dissolved Solids	--	mg/L	950	990	--	1100	--	970	1000	1100	1100	1200	1200	1100	1400	1200	1100	1100	1400	1300	1100	1100
MW-07	Arsenic	0.19	mg/L	0.026	0.085	--	0.12	--	0.18	0.23	0.22	0.15	0.18	0.26	0.17	0.12	0.22	0.2	0.15	<0.001	0.19	0.21	0.18
MW-07	Boron	7.6	mg/L	0.61	0.44	--	0.43	--	0.38	0.34	0.35	0.41	0.36	0.41	0.47	0.52	0.41	0.46	0.37	1	0.33	0.27	0.39
MW-07	Chloride	500	mg/L	170	200	--	140	--	170	81	99	130	130	150	160	180	150	160	170	150	160	150	130
MW-07	Iron	1	mg/L	8	7.5	--	10	--	22	24	21	10	21	18	17	15	30	30	17	0.15	14	16	23
MW-07	Lead	0.0485	mg/L	0.039	<0.001	--	0.0014	--	<0.001	<0.001	<0.001	0.0013	<0.001	<0.005	<0.001	<0.0005	<0.0005	<0.0005	0.0011	<0.0005	<0.0005	<0.0005	0.0066
MW-07	Manganese	3.04	mg/L	3.5	5.9	--	6.4	--	11	11	11	9.3	8	6.7	9.5	5.7	11	5.9	5.8	0.33	6.6	13	7
MW-07	Nitrogen/Nitrate	--	mg/L	0.043	0.05	--	<0.02	--	0.31	0.03	<0.02	0.02	<0.02	0.03	0.06	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-07	Nitrogen/Nitrate, Nitrite	--	mg/L	NR	NR	--	NR	--	NR	NR	NR	NR	NR	NR	NR	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-07	pH	6.5 - 9.0	s.u.	NM	7.04	--	6.78	--	6.83	6.45	6.79	6.91	6.93	6.97	6.87	6.69	6.68	6.82	7.20	6.67	7.00	6.94	6.90
MW-07	Selenium	1	mg/L	0.0043	0.0026	--	0.0025	--	0.0073	0.0054	0.0013	0.006	0.0047	<0.005	0.0031	0.0028	<0.0025	0.0056	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
MW-07	Sulfate	1430	mg/L	120	49	--	25	--	9.1	3.3	3	18	25	43	36	120	42	80	95	52	71	16	50
MW-07	Thallium	0.0037	mg/L	<NP	<0.001	--	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002	<0.002	<0.002
MW-07	Total Dissolved Solids	--	mg/L	860	1100	--	1300	--	1300	1300	1400	1300	1300	1100	1200	1000	1100	1200	1200	1200	1300	1300	1100
MW-08	Arsenic	0.19	mg/L	0.0052	0.0039	--	0.0044	--	0.0036	0.0052	0.0038	0.004	0.0041	0.0062	0.005	0.0036	0.0041	0.0037	0.003	<0.001	0.0023	0.0022	0.0026
MW-08	Boron	7.6	mg/L	0.93	0.72	--	0.64	--	0.82	0.82	0.57	0.57	1	0.93	1.1	0.91	1.2	0.93	0.83	0.44	0.8	0.72	0.81
MW-08	Chloride	500	mg/L	180	210	--	140	--	210	190	170	200	210	220	200	230	220	260	230	340	380	340	260
MW-08	Iron	1	mg/L	0.56	2.1	--	1.7	--	0.97	0.94	2.3	1.2	1.3	2.1	6.5	2.3	6.6	1.3	0.89	0.24	0.62	0.53	0.17
MW-08	Lead	0.0485	mg/L	<NP	<0.001	--	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MW-08	Manganese	3.04	mg/L	0.15	0.27	--	0.29	--	0.18	0.2	0.27	0.2	0.2	0.23	0.43	0.25	0.48	0.16	0.2	0.7	0.17	0.13	0.11
MW-08	Nitrogen/Nitrate	--	mg/L	<NP	<0.02	--	0.1	--	1.6	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-08	Nitrogen/Nitrate, Nitrite	--	mg/L	NR	NR	--	NR	--	NR	NR	NR	NR	NR	NR	NR	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-08	pH	6.5 - 9.0	s.u.	8.24	8.17	--	7.66	--	8.24	7.87	7.97	8.20	8.23	8.09	7.72	7.81	7.39	8.16	8.46	7.72	8.12	7.89	8.62
MW-08	Selenium	1	mg/L	0.0036	0.0013	--	<0.001	--	0.0031	0.0036	0.0018	0.0018	<0.001	<0.005	0.002	0.0029	<0.0025	0.0048	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
MW-08	Sulfate	1430	mg/L	160	240	--	140	--	200	200	300	440	330	360	330	460	380	350	320	300	240	290	160
MW-08	Thallium	0.0037	mg/L	<NP	<0.001	--	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
MW-08	Total Dissolved Solids	--	mg/L	890	990	--	970	--	940	990	1200	1200	1200	1200	1100	1300	1300	1300	1200	1400	1400	1200	1100

Table B-3-1
Groundwater Analytical Results for Constituents of Interest: December 2010 to February 2015
Midwest Generation – Powerton Generating Station - Pekin, Tazewell County, Illinois

Well	Constituent	Effects Value [1]	Units	Groundwater Analytical Results (Year [Month])																		
				2010 [12]	2011 [02/03]	2011 [04]	2011 [06]	2011 [08]	2011 [09/10]	2011 [12]	2012 [03/04]	2012 [06]	2012 [09]	2012 [12]	2013 [02]	2013 [05]	2013 [07]	2013 [10]	2014 [01] [17]	2014 [05] [18]	2014 [08] [18]	2014 [10]	2015 [02]
MW-09	Arsenic	0.19	mg/L	<NP	0.0018	--	0.0017	--	<0.001	0.0012	<0.001	0.0017	<0.001	<0.005	0.0013	<0.001	<0.001	<0.001	0.0021	<0.001	<0.001	<0.001	<0.001
MW-09	Boron	7.6	mg/L	2.1	1.9	--	1.9	--	2.5	2.7	2.6	2.6	2.9	3.2	4.3	3.2	2.5	1.6	1.7	2.5	2.4	1.6	3
MW-09	Chloride	500	mg/L	25	28	--	28	--	30	30	30	27	28	31	27	29	33	42	25	34	33	32	34
MW-09	Iron	1	mg/L	<NP	0.066	--	<0.01	--	<0.01	<0.01	0.014	<0.01	<0.01	<0.01	0.024	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-09	Lead	0.0485	mg/L	<NP	<0.001	--	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.0005	<0.0005	<0.0005	0.00051	<0.0005	<0.0005	<0.0005	<0.0005
MW-09	Manganese	3.04	mg/L	0.23	0.45	--	0.48	--	0.14	0.28	0.22	0.34	0.11	0.1	0.19	0.053	0.038	0.019	0.84	0.36	0.031	0.022	0.024
MW-09	Nitrogen/Nitrate	--	mg/L	2.9	5.6	--	5.6	--	3.7	2.6	5	2.8	6.3	10	12	11	7.9	4.6	3.2	11	1.6	5.9	13
MW-09	Nitrogen/Nitrate, Nitrite	--	mg/L	NR	NR	--	NR	--	NR	NR	NR	NR	NR	NR	NR	11	7.9	4.6	3.2	11	1.6	5.9	13
MW-09	pH	6.5 - 9.0	s.u.	7.22	7.34	--	7.10	--	7.32	6.31	7.28	7.30	7.18	7.10	8.00	7.21	6.63	7.19	7.53	6.99	7.09	7.29	7.53
MW-09	Selenium	1	mg/L	0.0024	0.0072	--	0.0017	--	0.0043	0.0041	0.0072	0.0047	0.0044	0.009	0.015	0.016	0.014	0.0047	0.003	0.0074	0.0061	0.0084	0.0091
MW-09	Sulfate	1430	mg/L	110	110	--	110	--	130	110	120	130	120	130	140	140	130	90	110	110	100	160	130
MW-09	Thallium	0.0037	mg/L	<NP	<0.001	--	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
MW-09	Total Dissolved Solids	--	mg/L	500	510	--	540	--	500	520	530	520	580	560	520	600	610	430	560	540	490	630	570
MW-10	Arsenic	0.19	mg/L	<NP	<0.001	--	0.0015	--	<0.001	<0.001	<0.001	0.0015	0.0014	<0.005	0.001	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-10	Boron	7.6	mg/L	0.48	0.48	--	0.52	--	0.42	0.57	0.54	0.54	0.42	0.46	0.64	0.98	1.9	0.61	2.1	3.2	1.9	0.84	0.83
MW-10	Chloride	500	mg/L	40	43	--	43	--	49	42	45	46	45	45	37	41	40	54	40	37	57	62	22
MW-10	Iron	1	mg/L	<NP	<0.01	--	0.044	--	<0.01	<0.01	<0.01	0.015	0.012	0.016	<0.01	2.7	<0.1	0.18	0.19	0.11	0.34	<0.1	0.22
MW-10	Lead	0.0485	mg/L	<NP	<0.001	--	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	0.012	<0.0005	<0.0005	0.0008	<0.0005	<0.0005	<0.0005	<0.0005
MW-10	Manganese	3.04	mg/L	2.1	2.8	--	3.8	--	2.3	2.3	2.3	2.6	2.5	2.2	1.9	3.4	1.5	2	2.1	1.6	2.1	1.1	1.3
MW-10	Nitrogen/Nitrate	--	mg/L	3	4	--	2.1	--	4.5	4.9	6	2.9	5.2	4.8	3.3	1.9	1.5	1.2	2	2.1	0.41	0.67	0.9
MW-10	Nitrogen/Nitrate, Nitrite	--	mg/L	NR	NR	--	NR	--	NR	NR	NR	NR	NR	NR	NR	1.9	1.6	1.2	2	2.1	0.43	0.71	0.94
MW-10	pH	6.5 - 9.0	s.u.	7.04	7.01	--	6.88	--	7.04	6.85	7.03	6.95	6.96	7.03	8.39	6.87	6.85	7.02	7.90	7.09	6.74	7.16	7.36
MW-10	Selenium	1	mg/L	0.0042	0.0064	--	0.0043	--	0.0057	0.0065	0.0056	0.0056	0.0058	0.0074	0.0083	0.0043	0.0087	0.008	<0.0025	0.0073	0.0057	0.0048	0.0028
MW-10	Sulfate	1430	mg/L	62	64	--	67	--	64	72	76	63	58	59	69	92	150	90	160	140	110	95	46
MW-10	Thallium	0.0037	mg/L	<NP	<0.001	--	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
MW-10	Total Dissolved Solids	--	mg/L	530	520	--	650	--	470	540	530	550	580	420	440	580	530	620	670	630	590	550	530
MW-11	Arsenic	0.19	mg/L	0.0021	0.0025	--	0.0019	--	0.0016	0.0019	0.0021	0.0032	0.0038	0.03	0.045	0.028	0.038	0.038	0.057	0.036	0.068	0.045	0.022
MW-11	Boron	7.6	mg/L	1.6	1.8	--	1.6	--	1.5	1.8	2.3	1.9	2.6	<2	1.4	1.3	1.5	1.2	1.1	1.4	0.97	0.89	1.7
MW-11	Chloride	500	mg/L	70	66	--	120	--	53	87	54	150	52	83	84	79	110	79	67	70	120	91	66
MW-11	Iron	1	mg/L	0.44	0.01	--	0.029	--	0.018	<0.01	<0.01	0.056	2	0.7	2.4	3.1	3.9	3.3	5.8	3.8	5.5	5	3
MW-11	Lead	0.0485	mg/L	<NP	<NP	--	<0.001	--	<0.001	<0.001	<0.001	<0.001	0.0023	<0.005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MW-11	Manganese	3.04	mg/L	3.3	3.6	--	2.9	--	2.2	2.5	2.9	3.7	4.7	11	11	7.5	8	7.3	7.9	8	8.4	6.6	5.3
MW-11	Nitrogen/Nitrate	--	mg/L	0.41	0.17	--	0.04	--	0.74	1.5	0.39	<0.02	4.6	0.39	0.33	1.1	<0.1	0.18	0.34	0.27	<0.1	<0.1	<0.1
MW-11	Nitrogen/Nitrate, Nitrite	--	mg/L	NR	NR	--	NR	--	NR	NR	NR	NR	NR	NR	NR	1.1	<0.1	0.18	0.34	0.27	<0.1	<0.1	<0.1
MW-11	pH	6.5 - 9.0	s.u.	7.88	7.13	--	7.02	--	7.31	6.40	7.32	7.15	7.30	7.28	8.27	6.99	7.08	7.23	8.00	7.10	7.12	7.37	7.55
MW-11	Selenium	1	mg/L	0.0026	0.0015	--	0.0018	--	0.004	0.0031	0.0039	0.0039	0.004	<0.005	0.0014	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
MW-11	Sulfate	1430	mg/L	170	160	--	210	--	140	160	130	320	170	200	150	240	280	180	210	170	200	200	120
MW-11	Thallium	0.0037	mg/L	<NP	<NP	--	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
MW-11	Total Dissolved Solids	--	mg/L	740	710	--	930	--	620	730	740	1000	760	970	840	850	980	770	760	660	860	790	700
MW-12	Arsenic	0.19	mg/L	0.0088	0.013	--	0.0064	--	0.0087	0.0089	0.0042	0.014	0.011	0.022	0.0066	0.0031	0.016	0.018	0.0025	0.0017	0.0021	0.0019	<0.001
MW-12	Boron	7.6	mg/L	1.6	1.4	--	1.3	--	1.2	1.3	0.92	1.2	1.1	0.85	1.1	2.7	1.1	1.1	0.41	0.69	0.73	0.59	0.58
MW-12	Chloride	500	mg/L	170	180	--	180	--	190	210	170	190	170	210	190	200	190	180	220	220	210	200	210
MW-12	Iron	1	mg/L	5.5	6.3	--	5.6	--	4	3.1	4.8	8.2	8.9	6.4	5.8	8.9	4.5	0.23	2.4	0.39	0.17	0.33	1.7
MW-12	Lead	0.0485	mg/L	<NP	<NP	--	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.17
MW-12	Manganese	3.04	mg/L	0.32	0.58	--	0.26	--	0.37	0.25	0.13	0.71	0.64	1.7	0.38	0.24	1.3	1.5	0.23	0.65	1.2	1.2	0.17
MW-12	Nitrogen/Nitrate	--	mg/L	<NP	<NP	--	0.14	--	<0.02	<0.02	0.04	<0.2	0.03	<0.02	<0.02	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-12	Nitrogen/Nitrate, Nitrite	--	mg/L	NR	NR	--	NR	--	NR	NR	NR	NR	NR	NR	NR	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-12	pH	6.5 - 9.0	s.u.	7.65	7.51	--	6.98	--	7.66	7.38	7.22	7.40	7.50	7.37	8.36	7.17	7.29	7.73	7.99	7.14	7.37	7.33	7.61
MW-12	Selenium	1	mg/L	0.0026	0.0027	--	<0.001	--	0.0023	0.0034	0.0043	0.0038	0.0016	<0.005	0.002	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
MW-12	Sulfate	1430	mg/L	290	270	--	350	--	360	300	310	430	370	300	350	410	420	270	530	560	310	420	450
MW-12	Thallium	0.0037	mg/L	<NP	<NP	--	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
MW-12	Total Dissolved Solids	--	mg/L	980	1000	--	1100	--	970	970	1000	1200	1200	1100	1000	1200	1200	1000	1400	1300	1100	1000	1100

Table B-3-1
Groundwater Analytical Results for Constituents of Interest: December 2010 to February 2015
Midwest Generation – Powerton Generating Station - Pekin, Tazewell County, Illinois

Well	Constituent	Effects Value [1]	Units	Groundwater Analytical Results [Year [Month]]																		
				2010 [12]	2011 [02/03]	2011 [04]	2011 [06]	2011 [08]	2011 [09/10]	2011 [12]	2012 [03/04]	2012 [06]	2012 [09]	2012 [12]	2013 [02]	2013 [05]	2013 [07]	2013 [10]	2014 [01][2]	2014 [05][3]	2014 [08][4]	2014 [10]	2015 [02]
MW-13	Arsenic	0.19	mg/L	0.011	0.0069	0.0063	0.0057	0.0048	0.0066	0.023	0.027	--	--	0.041	0.029	0.031	0.029	0.024	0.028	0.024	0.031	0.028	0.028
MW-13	Boron	7.6	mg/L	3.9	3.1	2.6	3	2.7	3	4.1	4	--	--	3.6	4.2	1.6	3.8	3.5	2.9	3.5	3	2.2	3.5
MW-13	Chloride	500	mg/L	160	120	100	86	110	110	180	170	--	--	210	170	190	190	180	190	180	190	180	180
MW-13	Iron	1	mg/L	0.69	0.052	0.077	<0.01	0.043	<0.01	0.11	0.2	--	--	0.066	0.28	1.3	1.4	0.29	1.8	0.74	0.63	0.98	0.69
MW-13	Lead	0.0485	mg/L	<NP	<NP	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	--	<0.005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MW-13	Manganese	3.04	mg/L	5	3.8	2.7	2.9	2.6	3.6	3.5	3.5	--	--	3.7	3.5	3.8	4	2.8	2.9	3.4	3.5	3.8	3.8
MW-13	Nitrogen/Nitrate	--	mg/L	0.14	1.3	1.8	2.2	3.6	1.6	0.07	0.06	--	--	<0.02	<0.02	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-13	Nitrogen/Nitrate, Nitrite	--	mg/L	NR	NR	NR	NR	NR	NR	NR	NR	--	--	NR	NR	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-13	pH	6.5 - 9.0	s.u.	7.68	7.53	7.26	6.75	7.13	7.31	7.19	8.49	--	--	7.92	8.26	7.65	7.61	7.81	8.67	7.73	7.82	7.72	8.20
MW-13	Selenium	1	mg/L	0.0046	0.0046	0.0045	0.0029	0.0056	0.004	0.0036	0.0037	--	--	<0.0025	0.0025	0.01	0.0095	<0.0025	<0.0025	<0.0025	0.0047	0.0045	<0.0025
MW-13	Sulfate	1430	mg/L	1400	770	580	540	440	660	1100	1100	--	--	1100	730	880	1000	690	660	630	740	1400	1000
MW-13	Thallium	0.0037	mg/L	<NP	<NP	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	--	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
MW-13	Total Dissolved Solids	--	mg/L	2600	1600	1400	1300	1100	1500	2100	2300	--	--	1900	1600	2000	2000	1700	1900	2100	2300	2200	2300
MW-14	Arsenic	0.19	mg/L	0.024	0.019	0.0084	0.005	0.0062	0.015	0.0033	0.0039	--	--	0.0053	0.0066	0.0023	0.0016	<0.001	0.0016	0.0011	0.0052	0.0063	0.0011
MW-14	Boron	7.6	mg/L	2	1.9	1.9	1.9	1.8	1.9	1.9	1.8	--	--	<2	1.9	1.7	1.7	2	1.6	1.8	1.9	2.2	2.2
MW-14	Chloride	500	mg/L	160	160	160	160	240	200	200	190	--	--	190	92	160	190	190	220	140	190	180	180
MW-14	Iron	1	mg/L	2.3	0.94	0.36	0.3	0.71	2	0.12	0.77	--	--	0.012	0.02	<0.1	<0.1	0.39	1.3	0.6	44	5.3	0.17
MW-14	Lead	0.0485	mg/L	<NP	<NP	<0.001	<0.001	<0.001	<0.001	<0.001	0.0035	--	--	<0.005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00078	<0.0005
MW-14	Manganese	3.04	mg/L	0.68	0.81	0.29	0.36	0.57	0.84	0.067	0.63	--	--	0.11	0.12	0.72	0.32	1.2	1.3	0.34	1.8	1.3	0.15
MW-14	Nitrogen/Nitrate	--	mg/L	0.036	<NP	1	0.27	0.05	<0.02	0.33	0.31	--	--	0.32	3.5	<0.1	<0.1	0.16	<0.1	0.22	<0.1	<0.1	0.24
MW-14	Nitrogen/Nitrate, Nitrite	--	mg/L	NR	NR	NR	NR	NR	NR	NR	NR	--	--	NR	NR	<0.1	<0.1	0.18	<0.1	0.22	<0.1	<0.1	0.24
MW-14	pH	6.5 - 9.0	s.u.	7.55	7.75	7.27	7.15	7.08	7.40	6.65	8.35	--	--	7.13	8.21	7.03	6.93	7.11	7.72	6.99	7.17	7.31	7.28
MW-14	Selenium	1	mg/L	0.0024	0.0015	0.065	0.0035	0.003	0.0017	0.0037	0.022	--	--	0.0055	0.35	<0.0025	<0.0025	<0.0025	0.02	0.014	<0.0025	<0.0025	0.023
MW-14	Sulfate	1430	mg/L	960	820	770	810	940	850	880	990	--	--	810	390	800	900	840	680	720	1100	1300	850
MW-14	Thallium	0.0037	mg/L	0.0019	0.0018	0.0035	0.0039	0.0027	0.0016	0.0016	0.0034	--	--	0.0025	0.0045	0.0025	0.0045	0.0022	0.0023	0.0026	0.0023	<0.002	<0.002
MW-14	Total Dissolved Solids	--	mg/L	1800	1700	1800	1900	2000	1800	1800	2200	--	--	1700	1300	2000	2100	2100	1900	1700	2400	2200	2200
MW-15	Arsenic	0.19	mg/L	0.0099	0.0092	0.0064	0.0052	0.0053	0.011	0.0097	0.0061	--	--	0.011	0.0078	0.0037	0.0046	0.0066	0.0072	0.0019	0.0029	0.0059	0.0017
MW-15	Boron	7.6	mg/L	1.6	1.4	1.5	1.6	1.3	1.2	1.2	1.4	--	--	<2	1.7	1.5	1.6	1.3	1.1	1.2	0.95	0.74	1.1
MW-15	Chloride	500	mg/L	180	190	190	170	210	180	200	200	--	--	220	200	210	220	210	240	220	240	230	240
MW-15	Iron	1	mg/L	3.3	3.4	2.1	0.7	2.1	2.6	2.1	1.1	--	--	1.9	1.5	0.83	1.3	1.1	2	0.37	0.78	2.1	0.38
MW-15	Lead	0.0485	mg/L	<NP	<NP	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	--	--	<0.005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MW-15	Manganese	3.04	mg/L	0.56	0.42	0.36	0.6	0.37	0.48	0.39	0.25	--	--	0.51	0.35	0.27	0.3	0.41	0.59	0.3	0.95	0.87	0.4
MW-15	Nitrogen/Nitrate	--	mg/L	0.03	0.086	0.04	0.07	0.05	<0.02	0.07	0.12	--	--	0.12	0.02	<0.1	<0.1	0.22	<0.1	0.4	<0.1	<0.1	0.18
MW-15	Nitrogen/Nitrate, Nitrite	--	mg/L	NR	NR	NR	NR	NR	NR	NR	NR	--	--	NR	NR	<0.1	<0.1	0.22	<0.1	0.4	<0.1	<0.1	0.18
MW-15	pH	6.5 - 9.0	s.u.	7.43	7.23	7.06	6.79	6.89	7.37	6.84	8.23	--	--	7.30	8.09	6.71	6.93	7.18	7.75	6.89	7.45	7.36	7.53
MW-15	Selenium	1	mg/L	0.0042	0.0079	0.017	0.004	0.002	0.004	0.0047	0.025	--	--	<0.005	0.0024	0.0065	<0.0025	0.013	<0.0025	0.033	<0.0025	0.003	0.068
MW-15	Sulfate	1430	mg/L	300	220	270	650	250	180	140	200	--	--	320	280	570	460	420	260	390	620	660	460
MW-15	Thallium	0.0037	mg/L	<NP	<NP	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	--	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
MW-15	Total Dissolved Solids	--	mg/L	1000	1000	1100	1600	1000	890	840	1000	--	--	1100	1100	1700	1400	1400	1300	1300	1800	1600	1400
MW-16	Arsenic	0.19	mg/L	--	--	--	--	--	--	--	--	--	--	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-16	Boron	7.6	mg/L	--	--	--	--	--	--	--	--	--	--	<0.2	0.13	0.2	0.26	0.35	0.17	0.17	0.15	0.14	0.17
MW-16	Chloride	500	mg/L	--	--	--	--	--	--	--	--	--	--	26	18	19	21	35	230	20	25	24	24
MW-16	Iron	1	mg/L	--	--	--	--	--	--	--	--	--	--	0.012	0.019	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-16	Lead	0.0485	mg/L	--	--	--	--	--	--	--	--	--	--	<0.005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MW-16	Manganese	3.04	mg/L	--	--	--	--	--	--	--	--	--	--	0.022	0.0053	<0.0025	<0.0025	<0.0025	0.0035	<0.0025	<0.0025	<0.0025	0.0025
MW-16	Nitrogen/Nitrate	--	mg/L	--	--	--	--	--	--	--	--	--	--	18	23	20	13	19	16	21	22	28	28
MW-16	Nitrogen/Nitrate, Nitrite	--	mg/L	--	--	--	--	--	--	--	--	--	--	NR	NR	20	13	19	16	21	22	28	28
MW-16	pH	6.5 - 9.0	s.u.	--	--	--	--	--	--	--	--	--	--	7.38	8.31	7.10	7.18	7.27	7.85	7.20	7.41	7.30	7.56
MW-16	Selenium	1	mg/L	--	--	--	--	--	--	--	--	--	--	<0.005	0.0015	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
MW-16	Sulfate	1430	mg/L	--	--	--	--	--	--	--	--	--	--	37	31	50	55	55	34	40	35	54	27
MW-16	Thallium	0.0037	mg/L	--	--	--	--	--	--	--	--	--	--	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
MW-16	Total Dissolved Solids	--	mg/L	--	--	--	--	--	--	--	--	--	--	520	420	460	440	540	800	390	440	510	490

Table B-3-1
Groundwater Analytical Results for Constituents of Interest: December 2010 to February 2015
Midwest Generation -- Powerton Generating Station - Pekin, Tazewell County, Illinois

Well	Constituent	Effects Value[1]	Units	Groundwater Analytical Results (Year [Month])																			
				2010 [12]	2011 [02/03]	2011 [04]	2011 [06]	2011 [08]	2011 [09/10]	2011 [12]	2012 [03/04]	2012 [06]	2012 [09]	2012 [12]	2013 [02]	2013 [05]	2013 [07]	2013 [10]	2014 [03][2]	2014 [05][3]	2014 [08][3]	2014 [10]	2015 [02]
MW-02	Boron	1.0	mg/L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Chloride	500	mg/L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Fluoride	4.0	mg/L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Manganese	0.15	mg/L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	pH	6.5 - 9.0	s.u.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sulfate	500	mg/L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total Dissolved Solids	1000	mg/L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MW-06	Boron	1.0	mg/L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Chloride	500	mg/L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Fluoride	4.0	mg/L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Manganese	0.15	mg/L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	pH	6.5 - 9.0	s.u.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sulfate	500	mg/L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total Dissolved Solids	1000	mg/L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MW-07	Boron	1.0	mg/L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Chloride	500	mg/L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Fluoride	4.0	mg/L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Manganese	0.15	mg/L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	pH	6.5 - 9.0	s.u.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sulfate	500	mg/L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total Dissolved Solids	1000	mg/L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MW-12	Boron	1.0	mg/L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Chloride	500	mg/L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Fluoride	4.0	mg/L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Manganese	0.15	mg/L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	pH	6.5 - 9.0	s.u.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sulfate	500	mg/L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total Dissolved Solids	1000	mg/L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Notes
(1) Illinois General Use Water Quality Standards (WQS) and Illinois Water Quality Criteria (WQC) are used as surface water effects values.
(2) The manganese result for March 2014 for MW-07 was qualified as "E" by the laboratory. A qualifier definition was not identified.
(3) The total dissolved solids result for May 2014 for MW-12 was qualified as "H" by the laboratory. A qualifier definition was not identified.
(4) Chloride results for August 2014 for wells MW-02, MW-06, MW-07, and MW-12 were qualified as "^" by the laboratory, which denotes instrument-related QC exceeds the control limits.

mg/L = milligrams per liter
s.u. = standard units
"--" = value was not available
"<" = constituent was not detected; the reporting limit is presented
bold/shading = concentration exceeds effects value

Table B-3-2
Comparison Of Average Groundwater Analytical Results To Surface Water Effects Values
Midwest Generation – Powerton Generating Station - Pekin, Tazewell County, Illinois

Constituent	Units	Effects Value [1]	Groundwater Analytical Results - Average Concentrations [2]																Average [3]
			Gravelly Sand Unit [4]										Silt/Clay Unit [4]						
			MW-01	MW-02	MW-03	MW-04	MW-05	MW-07	MW-09	MW-10	MW-11	MW-13	MW-16	MW-06	MW-08	MW-12	MW-14	MW-15	
Arsenic	mg/L	0.19	0.00061	0.00099	0.00104	0.00062	0.00067	0.167	0.00096	0.00081	0.0237	0.0214	0.0014 U	0.0135	0.00376	0.0083	0.00647	0.00645	0.0161
Boron	mg/L	7.6	0.579	0.637	0.438	0.767	0.735	0.442	2.51	0.968	1.53	3.23	0.184	0.489	0.819	1.16	1.84	1.29	1.1
Chloride	mg/L	500	56.2	55.2	60.7	88.2	123	147	30.3	43.8	83.4	161	44.2	191	233	194	178	208	119
Iron	mg/L	1	0.055	0.0282	0.0293	0.0359	0.0773	**18.6**	0.0297	0.22	**2.11**	0.531	0.0431	**2.73**	**1.8**	**4.39**	**1.1**	**3.59**	**2.08**
Lead	mg/L	0.0485	0.0005	0.00053	0.00051	0.001 U	0.001 U	0.00313	0.00049	0.00116	0.00054	0.001 U	0.001 U	0.0005	0.001 U	0.00988	0.00064	0.00048	0.0013
Manganese	mg/L	3.04	0.0035	0.00187	0.00423	0.31	0.381	**7.76**	0.218	2.26	**5.99**	**3.49**	0.00408	1.1	0.257	0.657	0.645	0.467	1.47
Nitrogen/Nitrate	mg/L	--	4.9	3.75	2.09	0.561	0.358	0.0557	6.37	2.85	0.593	0.622	20.8	0.0482	0.121	0.0417	0.372	0.0926	2.73
Nitrogen/Nitrate, Nitrite	mg/L	--	2.76	2.38	1.58	0.449	0.558	0.1 U	7.28	1.36	0.261	0.1 U	20.9	0.0713	0.1 U	0.1 U	0.111	0.131	2.36
pH	s.u.	6.5 - 9.0	7.33	7.44	7.38	7.21	7.13	6.85	7.2	7.08	7.31	7.71	7.46	7.74	8.03	7.48	7.3	7.28	7.4
Selenium	mg/L	1	0.00256	0.00194	0.00222	0.00304	0.00213	0.00309	0.00715	0.0057	0.00215	0.00401	0.0014	0.00193	0.00199	0.00198	0.0179	0.0112	0.0044
Sulfate	mg/L	1430	87.2	75.3	68.1	160	194	47.6	121	85.4	189	857	41.8	348	289	372	856	369	260
Thallium	mg/L	0.0037	0.00147 U	0.00147 U	0.00147 U	0.00147 U	0.00147 U	0.00147 U	0.00147 U	0.00147 U	0.0015 U	0.0015 U	0.0018 U	0.00147 U	0.00147 U	0.0015 U	0.00252	0.0015 U	0.000861
Total Dissolved Solids	mg/L	--	548	482	456	701	806	1210	539	553	801	1880	501	1150	1160	1110	1920	1250	942

Notes
(1) Illinois General Use Water Quality Standards (WQS) and Illinois Water Quality Criteria (WQC) are used as surface water effects values.
(2) Average of concentrations reported between December 2010 and February 2015. If a constituent was not detected during this timeframe, the average reporting limit is presented in the table, indicated with a "U" qualifier. Otherwise, non-detect results were included in the average calculation assuming one-half the reporting limit.
(3) Average of concentrations (averages) presented in the table, assuming one-half the reporting limit for non-detect results.
(4) Groundwater in the gravelly sand unit flows in a northerly direction. Groundwater in the localized silt/clay units flows in a westerly direction. Summary statistics do not distinguish between these two units.

mg/L = milligram per liter
s.u. = standard units
"--" = value not available
U = constituent not detected above its reporting limit
bold/shading = concentration exceeds effects value

Table B-3-3
Comparison Of Maximum Groundwater Analytical Results To Surface Water Effects Values
Midwest Generation -- Powerton Generating Station - Pekin, Tazewell County, Illinois

Constituent	Units	Effects Value[1]	Groundwater Analytical Results - Maximum Concentrations[2]																Average[3]
			Gravelly Sand Unit[4]											Silt/Clay Unit[4]					
			MW-01	MW-02	MW-03	MW-04	MW-05	MW-07	MW-09	MW-10	MW-11	MW-13	MW-16	MW-06	MW-08	MW-12	MW-14	MW-15	
Arsenic	mg/L	0.19	0.001	0.0018	0.0017	0.0012	0.0011	**0.31**	0.0021	0.0015	0.068	0.041	0.005 U	**0.2**	0.0062	0.022	0.024	0.011	0.0434
Boron	mg/L	7.6	1.8	2.7	0.75	1	1.1	1	4.3	3.2	2.6	4.2	0.35	1	1.2	3.7	2.2	1.7	2.05
Chloride	mg/L	500	160	91	120	150	170	200	42	62	150	210	230	240	380	220	240	240	182
Iron	mg/L	1	0.43	0.046	0.042	0.14	0.43	**35**	0.066	**2.7**	**5.8**	**1.8**	0.019	**22**	**6.6**	**8.9**	**5.7**	**3.2**	5.79
Lead	mg/L	0.0485	0.0008	0.0013	0.00097	0.005 U	0.005 U	0.039	0.00051	0.012	0.0023	0.005 U	0.005 U	0.00082	0.005 U	**0.17**	0.0035	0.0012	0.0153
Manganese	mg/L	3.04	0.027	0.0063	0.034	1.018	1	**13**	0.84	**3.8**	**12**	**5**	0.022	**8**	0.7	1.7	1.8	0.95	3.12
Nitrogen/Nitrate	mg/L	--	11	7.5	9.4	2.7	2.2	0.31	13	6	4.6	3.6	28	0.16	1.6	0.14	3.5	0.4	5.88
Nitrogen/Nitrate, Nitrite	mg/L	--	4.7	5.9	5.3	0.5	2.2	0.1 U	13	2.1	1.1	0.1 U	28	0.16	0.1 U	0.1 U	0.24	0.4	3.99
pH	s.u.	6.5 - 9.0	**6.39-9.53**	**6.41-8.21**	6.58-8.34	**6.37-8**	**6.34-8.01**	**6.45-7.2**	**6.31-8**	**6.85-8.39**	**6.40-8.27**	6.75-8.67	7.1-8.31	**7.23-9.3**	7.39-8.46	6.98-8.36	**6.85-8.35**	6.71-8.23	6.6-8.35
Selenium	mg/L	1	0.005	0.0039	0.0067	0.013	0.0045	0.0073	0.016	0.0087	0.004	0.01	0.0015	0.0065	0.0048	0.0043	0.15	0.068	0.0196
Sulfate	mg/L	1430	330	190	100	390	310	120	160	160	320	1400	55	560	460	560	1300	660	442
Thallium	mg/L	0.0037	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	**0.0043**	0.002 U	0.00121
Total Dissolved Solids	mg/L	--	870	770	520	1100	1100	1400	630	670	1000	2600	800	1400	1400	1400	2400	1800	1240

Notes
(1) Illinois General Use Water Quality Standards (WQS) and Illinois Water Quality Criteria (WQC) are used as surface water effects values.
(2) Maximum detected concentrations reported between December 2010 and February 2015. If a constituent was not detected during this timeframe, the maximum reporting limit is presented in the table, indicated with a "U" qualifier. For pH, the range is presented.
(3) Average of well-specific concentrations (maximums) presented in the table. If the maximum is a non-detect result, one-half the reporting limit was used as a surrogate concentration in the calculation. For pH, the range presented in the "average" column is the average minimum and average maximum.
(4) Groundwater in the gravelly sand unit flows in a northerly direction. Groundwater in the localized silt/clay units flows in a westerly direction. Summary statistics (averages) do not distinguish between these two units.

mg/L = milligram per liter
s.u. = standard units
"--" = value not available
U = constituent not detected above its reporting limit
bold/shading = concentration exceeds effects value

Table B-4-1
Groundwater Analytical Results for Constituents of Interest: December 2010 to May 2014
Midwest Generation – Waukegan Generating Station - Waukegan, Lake County, Illinois

Well	Constituent	Effects Values [1]	Units	Groundwater Analytical Results (Year [Month])																
				2010 [10]	2011 [03]	2011 [06]	2011 [09]	2011 [12]	2012 [03] [2]	2012 [06]	2012 [09] [3]	2012 [12]	2013 [03]	2013 [06]	2013 [07]	2013 [10]	2014 [03]	2014 [05]	2014 [08]	2014 [11]	2015 [02]
MW-01	Antimony	0.32	mg/L	0.0052	<0.003	<0.003	<0.003	<0.003	<0.003	0.0056	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-01	Arsenic	0.148	mg/L	0.054	0.04	0.17	0.077	0.057	0.078	0.07	0.07	0.091	0.098	0.036	0.055	0.046	0.031	0.036	0.019	0.31	0.036
MW-01	Boron	7.6	mg/L	2.6	2	2.6	2.5	2.8	2.5	2	1.9	1.9	2.2	2.2	2.3	3.1	1.9	2	2	2.2	1.7
MW-01	Chloride	500	mg/L	39	48	52	41	32	47	46	47	48	45	34	42	28	33	31	79	70	31
MW-01	Iron	1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-01	Manganese	3.04	mg/L	<0.0025	0.0027	0.0086	0.02	0.011	0.0052	<0.0025	<0.0025	<0.0025	0.0047	0.011	0.011	0.021	0.0073	<0.0025	0.026	0.0054	<0.0025
MW-01	pH	6.5 - 9.0	s.u.	10.41	9.93	9.97	8.78	8.62	9.54	9.75	10.78	10.47	9.85	8.37	8.81	8.42	8.99	8.88	7.92	10.54	8.88
MW-01	Sulfate	500	mg/L	350	230	260	280	330	390	300	240	200	250	260	300	260	130	170	130	270	170
MW-01	Total Dissolved Solids	1000	mg/L	460	470	460	570	750	630	630	450	460	510	660	580	580	290	300	460	450	300
MW-02	Antimony	0.32	mg/L	0.015	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-02	Arsenic	0.148	mg/L	0.025	0.016	0.012	0.0087	0.0094	0.0094	0.011	0.011	0.0089	0.012	0.009	0.0087	0.0091	0.0085	0.0062	0.0081	0.0095	0.0062
MW-02	Boron	7.6	mg/L	2.2	2.2	2	1.7	1.9	2	2.6	2.1	1.9	2.2	1.9	2.1	2.2	2.8	2.6	3	3	3.2
MW-02	Chloride	500	mg/L	42	45	46	45	50	53	48	55	54	50	52	47	55	51	57	47	48	57
MW-02	Iron	1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.16	<0.1	<0.1	0.16
MW-02	Manganese	3.04	mg/L	0.0034	0.018	0.032	0.038	0.035	0.028	0.031	0.025	0.023	0.039	0.051	0.069	0.034	0.085	0.16	0.05	0.041	0.16
MW-02	pH	6.5 - 9.0	s.u.	9.90	9.31	8.65	7.82	7.77	7.82	7.9	8.24	7.94	8.95	7.63	7.61	7.97	8.38	7.65	8.13	8.61	7.65
MW-02	Sulfate	500	mg/L	230	160	150	200	180	200	210	270	210	230	220	260	290	370	280	210	350	280
MW-02	Total Dissolved Solids	1000	mg/L	410	400	410	460	490	480	520	540	500	520	550	530	770	670	710	550	510	710
MW-03	Antimony	0.32	mg/L	0.0051	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-03	Arsenic	0.148	mg/L	0.0043	0.0041	0.0049	0.0077	0.0049	0.0071	0.003	0.0044	0.0031	0.0018	0.0014	0.0025	0.005	0.0013	0.002	0.0041	0.0029	0.002
MW-03	Boron	7.6	mg/L	1.7	2.2	2.3	1.6	1.6	1.5	1.3	1.4	1.9	2	2.5	1.8	1.9	1.1	1.2	2.3	2.3	1.6
MW-03	Chloride	500	mg/L	53	49	53	49	51	52	41	47	49	45	39	43	25	37	37	89	64	37
MW-03	Iron	1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-03	Manganese	3.04	mg/L	<0.0025	0.0059	0.0044	<0.0025	0.0054	0.0036	0.007	0.0034	0.0014	0.015	0.0062	0.0033	0.0082	0.0069	0.0028	0.0083	0.0035	0.0028
MW-03	pH	6.5 - 9.0	s.u.	9.31	8.58	8.64	9.2	8.61	8.89	7.58	9.14	8.22	8.55	7.13	7.46	7.26	7.38	8.47	7.82	6.95	8.47
MW-03	Sulfate	500	mg/L	120	130	130	97	110	140	150	260	240	240	290	240	140	170	100	130	240	100
MW-03	Total Dissolved Solids	1000	mg/L	280	350	340	300	380	340	420	480	520	470	860	530	380	340	210	470	400	210
MW-04	Antimony	0.32	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-04	Arsenic	0.148	mg/L	0.006	0.0077	0.0059	0.0058	0.0065	0.0068	0.0091	0.0079	0.008	0.0081	0.0032	0.0044	0.0055	0.0062	0.0061	0.0064	0.008	0.0061
MW-04	Boron	7.6	mg/L	2	2.1	2	1.8	2.1	2.2	2.5	2.2	2.5	2.4	2.3	2.5	2.8	3	2.7	3.5	1.6	2
MW-04	Chloride	500	mg/L	39	47	45	59	60	71	53	55	55	50	51	42	46	41	34	33	36	34
MW-04	Iron	1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-04	Manganese	3.04	mg/L	0.058	0.035	0.028	0.36	0.025	0.038	0.041	0.028	0.031	0.034	0.016	0.024	0.036	0.074	0.052	0.046	0.035	0.052
MW-04	pH	6.5 - 9.0	s.u.	7.8	8.54	7.69	7.42	7.35	7.25	7.51	8.63	8.41	8.93	7.25	7.18	7.35	7.99	7.76	7.74	7.53	7.76
MW-04	Sulfate	500	mg/L	250	170	160	160	160	280	250	210	220	230	260	300	270	360	140	130	200	140
MW-04	Total Dissolved Solids	1000	mg/L	430	400	380	470	480	490	540	440	510	460	660	610	630	680	470	470	280	470
MW-05	Antimony	0.32	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-05	Arsenic	0.148	mg/L	0.0076	0.0082	0.0013	<0.001	0.01	0.01	0.0098	0.012	0.011	0.012	<0.001	0.0013	0.0086	0.0097	0.009	0.0019	0.0097	0.009
MW-05	Boron	7.6	mg/L	28	33	13	30	37	44	47	41	37	33	12	29	33	31	36	34	36	32
MW-05	Chloride	500	mg/L	100	120	540	220	110	50	50	170	220	68	600	210	49	45	47	47	42	47
MW-05	Iron	1	mg/L	3.5	2.8	0.95	0.42	5.6	6.6	5.9	5.1	3.9	4	0.41	1.1	4.6	5.5	5.5	4	8.6	5.4
MW-05	Manganese	3.04	mg/L	0.71	0.6	0.28	0.03	0.99	0.76	0.75	0.57	0.48	0.51	0.17	0.44	0.54	0.62	0.49	0.65	0.62	0.49
MW-05	pH	6.5 - 9.0	s.u.	7.21	7.56	6.72	6.87	7.15	7.45	6.97	7.32	7.36	7.33	6.61	6.74	7.2	7.64	7.07	7.06	7.3	7.07
MW-05	Sulfate	500	mg/L	920	700	1100	810	1100	900	800	710	550	650	1200	890	870	660	630	640	840	630
MW-05	Total Dissolved Solids	1000	mg/L	2500	1900	2300	2300	2900	2600	2400	1900	1800	1600	3500	2000	1600	1400	1500	1600	1500	1500
MW-06	Antimony	0.32	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-06	Arsenic	0.148	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	0.0029	0.0019	0.0065	0.0096	0.0034	0.0017	0.0043	0.0083	0.0045	0.0043
MW-06	Boron	7.6	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	1.1	2.8	6.7	4.3	2.4	2	2.2	2.9	3.7	3.5
MW-06	Chloride	500	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	110	61	48	69	85	8	84	98	97	84
MW-06	Iron	1	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	2.6	2	6.2	16	4.1	0.19	3	9.3	6.7	3
MW-06	Manganese	3.04	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	0.21	0.36	0.75	0.72	0.44	0.0073	0.17	0.38	0.44	0.17
MW-06	pH	6.5 - 9.0	s.u.	NS	NS	NS	NS	NS	NS	NS	NS	7.52	7.42	6.83	6.88	7.24	7.94	7.18	7.11	7.33	7.18
MW-06	Sulfate	500	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	160	380	390	360	350	93	170	120	240	170
MW-06	Total Dissolved Solids	1000	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	940	1100	1100	1100	1200	190	870	950	890	870
MW-07	Antimony	0.32	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-07	Arsenic	0.148	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	0.0099	0.017	0.01	0.011	0.012	0.0096	0.0098	0.011	0.0095	0.0098
MW-07	Boron	7.6	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	43	49	42	44	48	39	37	40	41	37
MW-07	Chloride	500	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	60	54	44	33	53	34	35	36	48	35
MW-07	Iron	1	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	12	12	13	15	11	12	11	9.4	12	
MW-07	Manganese	3.04	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	0.46	0.49	0.48	0.46	0.46	0.46	0.6	0.4	0.34	0.6

Table B-4-1
Groundwater Analytical Results for Constituents of Interest: December 2010 to May 2014
Midwest Generation – Waukegan Generating Station – Waukegan, Lake County, Illinois

Well	Constituent	Effects Values [1]	Units	Groundwater Analytical Results (Year [Month])																
				2010 [10]	2011 [03]	2011 [06]	2011 [09]	2011 [12]	2012 [03] [2]	2012 [06]	2012 [09] [3]	2012 [12]	2013 [03]	2013 [06]	2013 [07]	2013 [11]	2014 [03]	2014 [05]	2014 [08]	2014 [11]	2015 [02]
MW-07	pH	6.5 - 9.0	s.u.	NS	NS	NS	NS	NS	NS	NS	NS	7.27	8.24	7.09	7.1	7.18	7.67	6.89	7.25	7.46	6.89
MW-07	Sulfate	500	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	**630**	**710**	**650**	**560**	**770**	**540**	330	**690**	**880**	330
MW-07	Total Dissolved Solids	1000	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	**1000**	**1000**	**1000**	**1000**	**1000**	**1000**	**1300**	**1600**	**1400**	**1300**
MW-08	Antimony	0.32	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.003	<0.003	<0.003	<0.003
MW-08	Arsenic	0.148	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.0049	0.0057	0.0054	0.0049
MW-08	Boron	7.6	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	**19**	**24**	**28**	NS
MW-08	Chloride	500	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	50	56	30	50
MW-08	Iron	1	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	**5**	**7**	**4.2**	**5**
MW-08	Manganese	3.04	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.31	0.33	0.33	0.31
MW-08	pH	6.5 - 9.0	s.u.	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	6.92	6.97	7.16	6.92
MW-08	Sulfate	500	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	250	370	500	250
MW-08	Total Dissolved Solids	1000	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	1000	**1200**	**1200**	1000
MW-09	Antimony	0.32	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.003	<0.003	<0.003	<0.003
MW-09	Arsenic	0.148	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.0012	<0.001	<0.001	0.0012
MW-09	Boron	7.6	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	**16**	6.3	**13**	NS
MW-09	Chloride	500	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	370	380	430	370
MW-09	Iron	1	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.81	0.12	0.14	0.81
MW-09	Manganese	3.04	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.14	0.05	0.048	0.14
MW-09	pH	6.5 - 9.0	s.u.	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	6.94	6.9	7.2	6.94
MW-09	Sulfate	500	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	360	730	410	360
MW-09	Total Dissolved Solids	1000	mg/L	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	**1600**	**1300**	**1400**	**1600**

Notes
(1) Illinois Lake Michigan (LM) Basin Water Quality Standards (WQS) and Illinois LM Basin Water Quality Criteria (WQC) are used as surface water effects values.
(2) Manganese results for March 2012 for wells MW-01 through MW-05 were qualified as "+" by the laboratory, which denotes instrument-related QC exceeds the control limits.
(3) Iron results for September 2012 for wells MW-01 through MW-05 were qualified as "+" by the laboratory, which denotes instrument-related QC exceeds the control limits.
(2) Antimony results for November 2014 for wells MW-01 through MW-03 and MW-05 through MW-09 were qualified as "+" by the laboratory, which denotes instrument-related QC exceeds the control limits.

mg/L = milligrams per liter
NS = not sampled
"--" = value not available
"<" = constituent was not detected; the reporting limit is presented
bold/shading = concentration exceeds effects value

Table B-4-2
Comparison Of Average Groundwater Analytical Results To Surface Water Effects Values
Midwest Generation -- Waukegan Generating Station - Waukegan, Lake County, Illinois

Constituent	Units	Effects Value [1]	Groundwater Analytical Results - Average Concentrations [2]									Average [3]
			MW-01	MW-02	MW-03	MW-04	MW-05	MW-06	MW-07	MW-08	MW-09	
Antimony	mg/L	0.32	0.00193	0.00225	0.0017	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.00165
Arsenic	mg/L	0.148	0.0708	0.0105	0.00369	0.00654	0.00734	0.00474	0.0105	0.00523	0.00097	0.0134
Boron	mg/L	7.6	2.24	2.31	1.79	2.23	**31.9**	3.16	**40.7**	**23.7**	**11.8**	**13.3**
Chloride	mg/L	500	44.1	50.1	47.8	47.3	152	74.4	43.2	46.5	388	99.3
Iron	mg/L	1.0	0.1 U	0.0622	0.1 U	0.1 U	**411**	**5.3**	**11.8**	**5.8**	0.47	**31**
Manganese	mg/L	3.04	0.00786	0.0512	0.00513	0.0563	0.539	0.365	0.475	0.32	0.0945	0.213
Sulfate	mg/L	500	251	239	167	216	**819**	243	**639**	343	345	362
pH	s.u.	6.5 - 9.0	**9.38**	8.22	8.2	7.78	7.15	7.26	7.3	6.99	7	7.7
Total Dissolved Solids	mg/L	1000	501	536	404	487	**1950**	921	**1630**	1100	**1480**	**1000**

Notes
(1) Illinois Lake Michigan (LM) Basin Water Quality Standards (WQS) and Illinois LM Basin Water Quality Criteria (WQC) are used as surface water effects values.
(2) Average of concentrations reported between December 2010 and February 2015. If a constituent was not detected during this timeframe, the average reporting limit is presented in the table, indicated with a "U" qualifier. Otherwise, non-detect results were included in the average calculation assuming one-half the reporting limit.
(3) Average of concentrations (averages) presented in the table, assuming one-half the reporting limit for non-detect results.

mg/L = milligram per liter
s.u. = standard units
"--" = value not available
U = constituent not detected above its reporting limit
bold/shading = concentration exceeds effects value

Table B-4-3
Comparison Of Maximum Groundwater Analytical Results To Surface Water Effects Values
Midwest Generation – Waukegan Generating Station - Waukegan, Lake County, Illinois

Constituent	Units	Effects Value [1]	Groundwater Analytical Results - Maximum Concentrations [2]									Average [3]
			MW-01	MW-02	MW-03	MW-04	MW-05	MW-06	MW-07	MW-08	MW-09	
Antimony	mg/L	0.32	0.0056	0.015	0.0051	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.00386
Arsenic	mg/L	0.148	**0.21**	0.025	0.0077	0.0091	0.012	0.0096	0.012	0.0057	0.0012	0.0325
Boron	mg/L	7.6	3.1	3.2	2.5	3	**47**	6.7	**49**	**28**	**16**	**17.6**
Chloride	mg/L	500	79	57	89	71	**600**	110	60	56	430	172
Iron	mg/L	1.0	0.1 U	0.16	0.1 U	0.1 U	**8.6**	**16**	**13**	**7**	0.81	**5.08**
Manganese	mg/L	3.04	0.026	0.16	0.015	0.36	0.99	0.75	0.6	0.33	0.14	0.375
Sulfate	mg/L	500	390	370	290	360	**1200**	390	**880**	500	430	**534**
pH	s.u.	6.5 - 9.0	**7.92-10.78**	**7.61-9.98**	**6.95-9.21**	7.18-8.93	6.61-7.64	6.83-7.94	6.89-8.24	6.92-7.16	6.9-7.2	7.09-8.56
Total Dissolved Solids	mg/L	1000	750	770	860	680	**3500**	**1200**	**1800**	**1200**	**1600**	**1370**

Notes
(1) Illinois Lake Michigan (LM) Basin Water Quality Standards (WQS) and Illinois LM Basin Water Quality Criteria (WQC) are used as surface water effects values.
(2) Maximum detected concentrations reported between December 2010 and February 2015. If a constituent was not detected during this timeframe, the maximum reporting limit is presented in the table, indicated with a "U" qualifier. For pH, the range is presented.
(3) Average of well-specific concentrations (maximums) presented in the table. If the maximum is a non-detect result, one-half the reporting limit was used as a surrogate concentration in the calculation. For pH, the range presented in the "average" column is the average minimum and average maximum.

mg/L = milligram per liter
s.u. = standard units
"--" = value not available
U = constituent not detected above its reporting limit; reporting limit presented
bold/shading = concentration exceeds effects value

Table B-5-1
Groundwater Analytical Results for Constituents of Interest: December 2010 to February 2015
Midwest Generation – Will County Generating Station - Romeoville, Will County, Illinois

Well	Constituent	Effects Values [1]	Units	Groundwater Analytical Results [Year][Month]																	
				2010 [12]	2011 [03]	2011 [06]	2011 [09]	2011 [12]	2012 [03]	2012 [06]	2012 [09]	2012 [12] [2]	2013 [03]	2013 [05/06]	2013 [08]	2013 [10]	2014 [02]	2014 [05]	2014 [08]	2014 [10]	2015 [02]
MW-01	Antimony	0.32	mg/L	<0.003	<0.003	<0.003	<0.003	0.0063	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-01	Boron	7.6	mg/L	1.8	1.6	1.8	1.7	1.6	1.5	2.1	1.9	1.9	1.9	2.4	2.3	2.6	2.4	2.5	1.2	0.96	0.96
MW-01	Chloride	500	mg/L	110	210	110	120	140	190	170	120	160	220	190	120	160	120	87	35	29	30
MW-01	Manganese	3.04	mg/L	0.2	0.15	0.22	0.16	0.17	0.16	0.16	0.15	0.18	0.17	0.13	0.22	0.28	0.3	0.26	0.24	0.17	0.079
MW-01	pH	6.5 - 9.0	s.u.	7.89	8.05	7.28	7.57	7.16	7.84	7.55	7.7	7.79	8.41	7.56	7.18	7.04	8.96	7.19	6.91	7.12	7.41
MW-01	Sulfate	1350	mg/L	530	390	280	320	270	430	390	390	290	310	460	540	430	390	230	91	150	99
MW-01	Total Dissolved Solids	--		1100	1100	1100	760	770	910	950	790	880	930	1100	1300	1300	1300	890	600	600	570
MW-02	Antimony	0.32	mg/L	<0.003	<0.003	<0.015	0.0073	0.017	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-02	Boron	7.6	mg/L	1.8	1.7	2.3	2.3	1.7	1.7	2	2.2	1.8	1.7	1.9	2.2	2.4	2.4	2.8	3	3.6	3.8
MW-02	Chloride	500	mg/L	110	250	180	110	120	140	150	110	130	190	200	170	180	170	130	100	97	130
MW-02	Manganese	3.04	mg/L	0.032	0.032	0.043	0.036	0.031	0.031	0.038	0.029	0.033	0.029	0.041	0.041	0.043	0.044	0.024	0.074	0.083	0.064
MW-02	pH	6.5 - 9.0	s.u.	8.62	8.62	8	8.11	7.8	8.34	8.23	8.33	8.4	7.79	8	7.93	8.06	8.97	7.74	7.59	6.94	8.14
MW-02	Sulfate	1350	mg/L	430	280	400	330	220	330	340	280	250	260	250	300	280	210	300	340	510	400
MW-02	Total Dissolved Solids	--		870	970	900	720	650	810	850	690	710	740	890	900	950	1000	1000	1100	1200	1200
MW-03	Antimony	0.32	mg/L	<0.003	<0.003	<0.015	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-03	Boron	7.6	mg/L	2.7	2.4	2.6	3.3	2.8	2.7	3.1	3.9	3.4	3.2	3.7	3.6	3.5	3.2	3.3	3.5	3.6	2.9
MW-03	Chloride	500	mg/L	54	250	100	130	100	95	88	96	100	87	110	100	110	69	62	91	57	43
MW-03	Manganese	3.04	mg/L	0.34	0.31	0.34	0.26	0.29	0.27	0.37	0.24	0.25	0.29	0.22	0.19	0.16	0.45	0.25	0.16	0.29	0.47
MW-03	pH	6.5 - 9.0	s.u.	7.21	7.72	7.01	7.18	6.55	7.24	6.79	7.12	7.21	7.88	7.21	7.2	7.24	7.03	7.21	7.39	6.06	7.11
MW-03	Sulfate	1350	mg/L	330	270	240	250	280	320	500	440	480	390	610	530	540	560	560	570	570	320
MW-03	Total Dissolved Solids	--		940	1000	990	1000	930	1000	1400	1100	1100	1100	1200	1200	1100	1200	1200	1100	1100	1100
MW-04	Antimony	0.32	mg/L	<0.003	<0.003	<0.015	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-04	Boron	7.6	mg/L	3.7	3.3	3.6	4.3	3	4	5.3	6.2	5.2	4.5	3.8	5.1	5.6	4.6	4.2	4.8	4.5	3.9
MW-04	Chloride	500	mg/L	120	190	120	170	150	150	140	170	170	150	110	120	89	110	85	67	82	120
MW-04	Manganese	3.04	mg/L	0.52	0.58	0.7	1	0.62	0.6	0.7	0.99	0.62	0.47	0.44	0.58	0.65	0.72	0.49	0.88	0.64	0.52
MW-04	pH	6.5 - 9.0	s.u.	7.37	7.66	7.23	7.21	6.58	7.27	7.1	7.29	7.34	6.61	7.07	7.15	6.74	7.03	6.96	6.75	5.87	7.13
MW-04	Sulfate	1350	mg/L	1500	1500	1600	4000	1400	2000	2000	2200	2200	2000	1500	2200	1300	1400	1100	1200	1600	1100
MW-04	Total Dissolved Solids	--		2500	2600	2800	6000	3100	3700	4300	4400	4000	3600	2900	3500	2400	2800	2500	2200	2600	2600
MW-05	Antimony	0.32	mg/L	<0.003	<0.003	<0.015	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-05	Boron	7.6	mg/L	2.6	2.7	3.2	4	3.2	2.9	2.3	3.8	2.5	2.6	3.6	3.5	4.1	2.7	2.9	2.7	4.7	2.4
MW-05	Chloride	500	mg/L	110	150	140	150	130	170	150	160	150	140	110	120	130	130	160	170	81	200
MW-05	Manganese	3.04	mg/L	0.0079	0.0067	0.055	0.13	0.038	0.032	0.014	0.073	0.023	0.036	0.15	0.06	0.31	0.053	0.31	0.062	0.2	0.046
MW-05	pH	6.5 - 9.0	s.u.	9.58	9.51	7.44	7.38	8.2	9.3	9.41	7.54	9.37	7.43	7	7.88	6.75	8.45	7.07	7.36	6.87	9.7
MW-05	Sulfate	1350	mg/L	580	570	540	690	500	370	410	540	280	320	630	500	560	690	1700	610	840	430
MW-05	Total Dissolved Solids	--		1000	1300	1400	1500	1000	1000	750	1100	820	940	1600	1100	1300	1400	1600	1400	2100	1100
MW-06	Antimony	0.32	mg/L	<0.003	<0.003	<0.015	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-06	Boron	7.6	mg/L	2.7	2.5	2.4	3	2.5	2.5	2.9	3	3	2.7	2.8	2.9	3.7	3	2.9	2.8	3.4	3.2
MW-06	Chloride	500	mg/L	120	210	150	120	120	110	92	110	110	130	110	91	76	55	120	120	81	49
MW-06	Manganese	3.04	mg/L	0.073	0.031	0.047	0.024	0.038	0.029	0.033	0.038	0.034	0.03	0.082	0.023	0.083	0.099	0.056	0.028	0.11	0.12
MW-06	pH	6.5 - 9.0	s.u.	8.89	9.65	9.37	9.44	8.82	9.39	9.07	9.17	9.18	8.22	8.41	9.13	8.5	8.27	8.52	8.16	7.26	8.38
MW-06	Sulfate	1350	mg/L	500	540	570	420	440	380	450	550	360	370	360	400	310	270	320	200	420	310
MW-06	Total Dissolved Solids	--		990	1100	1200	870	880	900	770	890	820	840	880	860	790	780	840	660	800	770
MW-07	Antimony	0.32	mg/L	<0.003	<0.003	<0.015	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-07	Boron	7.6	mg/L	4.7	5	5.7	3.4	5	5.1	5.6	5.5	5.1	4.3	2.6	3.5	3	4	4.8	3.9	5.1	3
MW-07	Chloride	500	mg/L	160	140	140	160	150	130	120	150	140	140	190	180	180	210	190	200	190	170
MW-07	Manganese	3.04	mg/L	0.12	0.11	0.15	0.18	0.2	0.2	0.19	0.19	0.19	0.15	0.043	0.064	0.049	0.16	0.12	0.1	0.12	0.031
MW-07	pH	6.5 - 9.0	s.u.	8.61	8.79	8.13	7.91	7.69	8.16	7.92	8.02	7.75	8.08	8.14	8.43	8.07	8.18	8.22	8.26	7.88	8.68
MW-07	Sulfate	1350	mg/L	610	650	1000	710	710	770	670	600	480	400	390	460	530	380	540	570	680	400
MW-07	Total Dissolved Solids	--		1300	1500	1600	1400	1300	1400	1300	1200	1200	1000	1100	1100	1200	1300	1300	1300	1500	1100

Table B-5-1
Groundwater Analytical Results for Constituents of Interest: December 2010 to February 2015
Midwest Generation – Will County Generating Station - Romeoville, Will County, Illinois

Well	Constituent	Effects Values [1]	Units	Groundwater Analytical Results (Year [Month])																
				2010 [12]	2011 [03]	2011 [06]	2011 [09]	2011 [12]	2012 [03]	2012 [06]	2012 [09]	2012 [12] [2]	2013 [03]	2013 [05/06]	2013 [08]	2013 [10]	2014 [02]	2014 [05]	2014 [08]	2014 [10]	2015 [02]
MW-08	Antimony	0.32	mg/L	<0.003	<0.003	<0.015	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-08	Boron	7.6	mg/L	1.7	1.3	1.7	2.3	1.9	1.5	2	2.6	2.1	1.8	1.9	2.4	3.2	2	2.5	2.4	2.8	2.3
MW-08	Chloride	500	mg/L	93	270	200	160	130	160	160	150	150	150	190	170	150	180	160	170	180	170
MW-08	Manganese	3.04	mg/L	0.33	0.44	0.47	0.45	0.4	<0.005	0.36	0.41	0.43	0.33	0.47	0.31	0.42	0.39	0.35	0.3	0.44	0.31
MW-08	pH	6.5 - 9.0	s.u.	7.65	8.17	7.47	7.3	6.99	7.61	7.36	7.31	7.43	7.87	7.19	7.46	6.87	8.18	7.04	7.09	7.03	7.24
MW-08	Sulfate	1350	mg/L	440	440	420	690	330	330	370	630	380	360	270	440	650	330	450	430	730	530
MW-08	Total Dissolved Solids	--		930	1200	1100	1300	980	910	1000	1200	1200	1000	1100	1100	1600	1300	1400	1200	1500	1400
MW-09	Antimony	0.32	mg/L	<0.003	<0.003	<0.015	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-09	Boron	7.6	mg/L	2.2	1.4	1.7	2	1.9	1.4	1.8	2	1.7	1.5	1.7	1.8	2.2	1.4	1.5	1.7	1.9	1.4
MW-09	Chloride	500	mg/L	100	280	230	190	140	200	160	160	130	140	160	170	110	270	250	210	200	200
MW-09	Manganese	3.04	mg/L	<0.0025	<0.0025	<0.013	<0.0025	<0.0025	<0.0025	<0.0025	0.0036	<0.0025	<0.0025	<0.0025	0.0043	<0.0025	<0.0025	<0.0025	<0.0025	0.0025	0.0026
MW-09	pH	6.5 - 9.0	s.u.	**10.08**	**10.07**	**10.44**	**10.27**	**9.95**	**10.54**	**10.31**	**10.25**	**10.45**	**10.39**	**9.93**	**9.86**	**10.01**	**9.69**	**9.71**	**9.26**	8.73	**9.48**
MW-09	Sulfate	1350	mg/L	410	320	410	400	270	340	340	380	310	250	320	310	310	220	380	310	430	300
MW-09	Total Dissolved Solids	--		800	1000	940	850	660	820	880	880	780	600	690	700	680	780	880	870	820	810
MW-10	Antimony	0.32	mg/L	<0.003	<0.003	<0.015	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
MW-10	Boron	7.6	mg/L	2.1	1.8	2.2	2.8	2.5	2.1	2.1	3.2	2.7	2.7	2.7	2.3	3.8	2.5	2.2	2.1	3.3	3.3
MW-10	Chloride	500	mg/L	92	130	150	120	120	100	120	140	140	130	140	130	140	140	140	140	140	110
MW-10	Manganese	3.04	mg/L	0.25	0.22	0.25	0.27	0.29	0.25	0.26	0.23	0.29	0.29	0.24	0.14	0.22	0.18	0.12	0.12	0.25	0.38
MW-10	pH	6.5 - 9.0	s.u.	7.61	8.14	7.53	7.45	7.1	7.59	7.39	7.6	7.47	7.54	7.53	7.38	7.27	**9.18**	7.54	7.54	6.84	7.32
MW-10	Sulfate	1350	mg/L	370	370	350	420	290	330	350	380	270	350	350	300	330	290	270	260	380	260
MW-10	Total Dissolved Solids	--		990	960	990	1000	1100	990	1000	970	1100	1000	1100	900	920	1000	940	880	1100	1100

Notes
(1) Illinois General Use Water Quality Standards (WQS) and Illinois Water Quality Criteria (WQC) are used as surface water effects values.
(2) Antimony results (all non-detects) for December 2012 for wells MW-01 through MW-10 were qualified as "*" by the laboratory, which denotes instrument-related QC exceeds the control limits.

mg/L = milligrams per liter
s.u. = standard units
"--" = value not available
"<" = constituent was not detected; the reporting limit is presented
bold/shading = concentration exceeds effects value

Table B-5-2
Comparison Of Average Groundwater Analytical Results To Surface Water Effects Values
Midwest Generation -- Will County Generating Station - Romeoville, Will County, Illinois

Constituent	Units	Effects Value[1]	Groundwater Analytical Results - Average Concentrations[2]										Average[3]
			MW-01	MW-02	MW-03	MW-04	MW-05	MW-06	MW-07	MW-08	MW-09	MW-10	
Antimony	mg/L	0.32	0.00177	0.00302	0.00367 U	0.00367 U	0.00367 U	0.00367 U	0.00367 U	0.00367 U	0.00367 U	0.00367 U	0.00195
Boron	mg/L	7.6	1.84	2.29	3.19	4.42	3.13	2.88	4.41	2.13	1.73	2.58	2.86
Chloride	mg/L	500	129	148	96.8	129	142	110	163	166	183	129	140
Manganese	mg/L	3.04	0.189	0.0416	0.286	0.651	0.067	0.0554	0.132	0.367	0.00199	0.236	0.20
Sulfate	mg/L	1480	333	317	431	**1920**	599	398	586	452	334	329	570
pH	s.u.	6.5 - 9.0	7.59	8.09	7.13	7.02	8.12	8.76	8.16	7.4	**10**	7.56	7.98
Total Dissolved Solids	mg/L	--	942	897	1100	3250	1250	869	1280	1190	798	1000	1260

Notes
(1) Illinois General Use Water Quality Standards (WQS) and Illinois Water Quality Criteria (WQC) are used as surface water effects values.
(2) Average of concentrations reported between December 2010 and February 2015. If a constituent was not detected during this timeframe, the average reporting limit is presented in the table, indicated with a "U" qualifier. Otherwise, non-detect results were included in the average calculation assuming one-half the reporting limit.
(3) Average of concentrations (averages) presented in the table, assuming one-half the reporting limit for non-detect results.

mg/L = milligram per liter
s.u. = standard units
"--" = value not available
U = constituent not detected above its reporting limit
bold/shading = concentration exceeds effects value

Table B-5-3
Comparison Of Maximum Groundwater Analytical Results To Surface Water Effects Values
Midwest Generation -- Will County Generating Station - Romeoville, Will County, Illinois

Constituent	Units	Effects Value [1]	Groundwater Analytical Results - Maximum Concentrations [2]										Average [3]
			MW-01	MW-02	MW-03	MW-04	MW-05	MW-06	MW-07	MW-08	MW-09	MW-10	
Antimony	mg/L	0.32	0.0063	0.017	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.00833
Boron	mg/L	7.6	2.6	3.6	3.9	6.2	4.7	3.7	5.7	3.2	2.2	3.8	3.96
Chloride	mg/L	500	220	250	250	190	170	210	210	270	280	150	220
Manganese	mg/L	3.04	0.3	0.083	0.45	1	0.2	0.12	0.2	0.47	0.0043	0.38	0.32
Sulfate	mg/L	1480	540	510	610	**4800**	**1700**	570	1000	730	430	420	1130
pH	s.u.	6.5 - 9.0	6.91-8.96	6.94-8.97	**6.06-7.88**	**5.87-7.66**	**6.75-9.70**	**7.26-9.65**	7.69-8.79	6.87-8.18	**8.73-10.88**	**6.84-9.18**	6.99-8.99
Total Dissolved Solids	mg/L	--	1300	1200	1400	6000	2100	1200	1600	1600	1000	1100	1850

Notes
(1) Illinois General Use Water Quality Standards (WQS) and Illinois Water Quality Criteria (WQC) are used as surface water effects values.
(2) Maximum detected concentrations reported between December 2010 and February 2015. If a constituent was not detected during this timeframe, the maximum reporting limit is presented in the table, indicated with a "U" qualifier. For pH, the range is presented.
(3) Average of well-specific concentrations (maximums) presented in the table. If the maximum is a non-detect result, one-half the reporting limit was used as a surrogate concentration in the calculation. For pH, the range presented in the "average" column is the average minimum and average maximum.

mg/L = milligram per liter
s.u. = standard units
"--" = value not available
U = constituent not detected above its reporting limit
bold/shading = concentration exceeds effects value

Exhibit 36

Exhibit 36

Table B-1
Surface Water Effects Values
Midwest Generation

Constituent	CAS	Units	Surface Water Effects Values [1]							
			General Use [2]				Lake Michigan Basin [2]			
			Chronic		Acute [4]		Chronic		Acute [4]	
Antimony	7440-36-0	mg/L	0.32	(2e)	1.2	(2e)	0.32	(3d)	1.2	(3d)
Arsenic	7440-38-2	mg/L	0.19	(2a)	0.36	(2a)	0.148	(3a)	0.34	(3a)
Boron	7440-42-8	mg/L	7.6	(2a)	40.1	(2a)	7.6	(3a)	40.1	(3a)
Chloride	16887-00-6	mg/L	500	(2b)	--		500	(3b)	--	
Iron	7439-89-6	mg/L	1.0	(2b)	--		1.0	(3b)	--	
Lead	7439-92-1	mg/L	0.0485	(2a,i)	0.231	(2a,i)	n/a		n/a	
Manganese	7439-96-5	mg/L	3.04	(2a,ii)	7.15	(2a,ii)	3.04	(3a)	7.15	(3a)
Nitrate	14797-55-8	mg/L	--		--		n/a		n/a	
pH	--	s.u.	6.5 - 9.0	(2d)	--		6.5 - 9.0	(3c)	--	
Selenium	7782-49-2	mg/L	1.0	(2b)	--		n/a		n/a	
Sulfate	18785-72-3	mg/L	site-specific	(2c)	--		500	(3b)	--	
Joliet #29	18785-72-3	mg/L	1350	(2c)	--		500	(3b)	--	
Powerton	18785-72-3	mg/L	1430	(2c)	--		500	(3b)	--	
Waukegan	18785-72-3	mg/L	n/a		--		500	(3b)	--	
Will County	18785-72-3	mg/L	1420	(2c)	--		500	(3b)	--	
Thallium	7440-28-0	mg/L	0.003	(2f)	0.086	(2e)	n/a		n/a	
Total Dissolved Solids	--	mg/L	--		--		1,000	(3c)	--	

Notes

(1) Illinois Water Quality Standards (WQS) are used as surface water effects values for evaluating hypothetical human and ecological exposure scenarios. In the absence of a WQS, Illinois Water Quality Criteria (WQC) are used. Values are applicable to total (rather than dissolved) concentrations.

(2) Concentration represents an Illinois General Use WQS as defined in 35 IAC 302, Subpart B or an Illinois WQC (lower of aquatic life and human health WQC):

(a) 35 IAC 302.208(e), Numerical Water Quality Standards for the Protection of Aquatic Life
(i) Standard for total lead is a hardness (H)-dependent value, calculated as follows (see also footnote 5):
Chronic = exp[-2.863+1.273*ln(H)]*1E-3 mg/µg
Acute = exp[-1.301+1.273*ln(H)]*1E-3 mg/µg
(ii) Standard for total manganese is a hardness (H)-dependent value, calculated as follows (see also footnote 5):
Chronic = exp[4.0635+0.7467*ln(H)]*1E-3 mg/µg
Acute = exp[4.9187+0.7467*ln(H)]*1E-3 mg/µg
(b) 35 IAC 302.208(g), Single-Value Standards
(c) 35 IAC 302.208(h)(2)(A), Water Quality Standard for Sulfate; standard is hardness (H) and chloride (Cl) dependent, and calculated as follows (see also footnotes 5 and 6):
Chronic = exp[1276.7+5.508*(H)-1.457(Cl)]*0.65
(d) 35 IAC 302.204, pH
(e) Illinois WQC for the protection of aquatic life.
(f) Illinois WQC for the protection of human health (applicable to chronic values only).

(3) Concentration represents an Illinois Lake Michigan Basin WQS as defined in 35 IAC 302, Subpart E. Note that of the four subject sites, Lake Michigan Basin WQS are only applicable to the Waukegan Power Generating Station. "n/a" indicates a constituent is not of interest at the Waukegan Power Generating Station.

(a) 35 IAC 302.504(a), Lake Michigan Basin Water Quality Standards for Chemical Constituents. WQS for manganese are calculated using the hardness-dependent GU equations.
(b) 35 IAC 302.504(b)
(c) IAC 302.503, pH
(d) If a Lake Michigan Basin WQS was not available, the General Use WQS was assumed to be applicable.

(4) Chronic values are used as the primary effects values for this evaluation; however, acute values are also presented for discussion purposes.

(5) Site-specific hardness data is not available. However, based on data from the Illinois Water Quality Database (http://ildrdss.isws.illinois.edu/WQ/), a value of 200 mg/L is considered a conservative estimate for this evaluation.

(6) General use sulfate WQS calculated using the average chloride concentration for available data, which are listed below. The Lake Michigan Basin criterion, which is applicable to the Waukegan Station is not chloride-dependent.

Joliet #29 206
Powerton 118
Will Count 128

Definitions
"--" = value not available
n/a = not applicable
mg/L = milligram per liter
s.u. = standard unit

EXHIBIT
Bunberg No. 5206
MWG907

JOLIET 29

Table B-2-2
Comparison Of Average Groundwater Analytical Results To Surface Water Effects Values
Midwest Generation -- Joliet #29 Generating Station - Joliet, Will County, Illinois

Constituent	Units	Effects Value [1]	Groundwater Analytical Results - Average Concentrations [2]											Average [3]
			MW-01	MW-02	MW-03	MW-04	MW-05	MW-06	MW-07	MW-08	MW-09	MW-10	MW-11	
Antimony	mg/L	0.32	0.00222	0.0021	0.00274	0.00224	0.00167	0.00161	0.003 U	0.003 U	0.003 U	0.003 U	0.00344 U	0.00185
Boron	mg/L	7.6	0.268	0.297	0.387	0.377	0.61	0.249	0.254	0.198	0.359	0.432	1.21	0.422
Chloride	mg/L	500	156	223	237	222	191	177	195	222	213	209	188	203
Iron	mg/L	1.0	0.1 U	0.116 U	0.0656	0.101	0.115 U	0.0685	0.272	0.442	236	0.0704	0.0885	21.6
Manganese	mg/L	3.04	0.00477	0.00168	0.009	0.0291	0.00711	0.0115	0.0221	0.0466	1.24	0.00663	0.0359	0.129
Sulfate	mg/L	1350	119	104	134	127	188	115	131	119	2030	112	128	301
Total Dissolved Solids	mg/L	--	676	789	932	868	888	714	759	805	3810	860	779	1080

Notes
(1) Illinois General Use Water Quality Standards (WQS) and Illinois Water Quality Criteria (WQC) are used as surface water effects values.
(2) Average of concentrations reported between December 2010 and April 2017. If a constituent was not detected during this timeframe, the average reporting limit is presented in the table, indicated with a "U" qualifier. Otherwise, non-detect results were included in the average calculation assuming one-half the reporting limit.
(3) Average of concentrations (averages) presented in the table, assuming one-half the reporting limit for non-detect results.

mg/L = milligram per liter
s.u. = standard units
"--" = value not available
U = constituent not detected above its reporting limit; reporting limit presented
bold/shading = concentration exceeds effects value

Table B-2-3
Comparison Of Maximum Groundwater Analytical Results To Surface Water Effects Values
Midwest Generation -- Joliet #29 Generating Station - Joliet, Will County, Illinois

Constituent	Units	Effects Value [1]	Groundwater Analytical Results - Maximum Concentrations [2]											Average [3]
			MW-01	MW-02	MW-03	MW-04	MW-05	MW-06	MW-07	MW-08	MW-09	MW-10	MW-11	
Antimony	mg/L	0.32	0.0052	0.012	0.016	0.012	0.004	0.0045	0.003 U	0.003 U	0.003 U	0.003 U	0.015 U	0.00611
Boron	mg/L	7.6	0.38	0.74	0.74	0.51	1.1	0.44	0.51	0.64	0.72	0.56	2.6	0.813
Chloride	mg/L	500	400	410	380	290	370	370	470	780	390	320	430	419
Iron	mg/L	1.0	0.1 U	0.5 U	0.22	0.46	0.5 U	0.15	3.8	10	3400	0.32	0.42	311
Manganese	mg/L	3.04	0.015	0.0036	0.1	0.33	0.081	0.14	0.29	1.1	6	0.12	0.49	0.788
Sulfate	mg/L	1350	240	190	260	300	360	160	260	600	12000	250	290	1360
Total Dissolved Solids	mg/L	--	1100	1200	1300	1100	1100	1000	1200	2100	19000	1100	1300	2860

Notes
(1) Illinois General Use Water Quality Standards (WQS) and Illinois Water Quality Criteria (WQC) are used as surface water effects values.
(2) Maximum detected concentrations reported between December 2010 and April 2017. If a constituent was not detected during this timeframe, the maximum reporting limit is presented in the table, indicated with a "U" qualifier.
(3) Average of concentrations (maximums) presented in the table, assuming one-half the reporting limit for non-detect results.

mg/L = milligram per liter
s.u. = standard units
"--" = value not available
U = constituent not detected above its reporting limit; reporting limit presented
bold/shading = concentration exceeds effects value

POWERTON

Table B-3-2
Comparison Of Average Groundwater Analytical Results To Surface Water Effects Values
Midwest Generation – Powerton Generating Station - Pekin, Tazewell County, Illinois

Constituent	Units	Effects Value [1]	Groundwater Analytical Results - Average Concentrations [2]																Average [3]
			Gravelly Sand Unit [4]										Silt/Clay Unit [4]						
			MW-01	MW-02	MW-03	MW-04	MW-05	MW-07	MW-09	MW-10	MW-11	MW-13	MW-16	MW-06	MW-08	MW-12	MW-14	MW-15	
Arsenic	mg/L	0.19	0.00057	0.00106	0.00096	0.00058	0.00062	0.167	0.00081	0.00076	0.0214	0.0238	0.00121 U	0.0094	0.00311	0.00689	0.00487	0.00504	0.0155
Boron	mg/L	7.6	0.484	0.513	0.383	0.715	0.739	0.418	2.61	0.787	1.48	3.26	0.252	0.466	0.933	1.02	1.92	1.45	1.09
Chloride	mg/L	500	54	54	55.7	78	111	151	32.4	45	90	165	38.5	193	237	198	173	191	117
Iron	mg/L	1	0.0533	0.0354	0.0362	0.0406	0.0682	18.7	0.0364	0.192	1.95E+3	0.701	0.0464	2.1	1.49	2.3	0.936	1.29	1.34
Lead	mg/L	0.0485	0.00042	0.00044	0.00043	0.00083 U	0.00083 U	0.00217	0.00041	0.00087	0.00045	0.00084 U	0.00076 U	0.00042	0.00083 U	0.00667	0.00052	0.00042	0.000952
Manganese	mg/L	3.04	0.00296	0.00222	0.00385	0.229	0.267	7.84	0.174	2.06	5.53	2.36	0.00298	1	0.291	0.612	0.67	0.474	1.44
Nitrogen/Nitrate	mg/L	--	4.66	3.37	1.95	0.516	0.266	0.0538	6.22	2.39	0.435	0.439	21.5	0.054	0.117	0.0444	0.367	0.168	2.66
Nitrogen/Nitrate, Nitrite	mg/L	--	3.51	2.5	1.63	0.295	0.306	0.1 U	6.55	1.44	0.186	0.0647	21.6	0.0682	0.0812	0.0653	0.242	0.23	2.43
pH	s.u.	6.5 - 9.0	7.28	7.4	7.38	7.2	7.13	6.84	7.23	7.02	7.25	7.72	7.27	7.7	7.8	7.46	7.22	7.18	7.3
Selenium	mg/L	1	0.00221	0.00171	0.00227	0.0027	0.00184	0.00248	0.00688	0.00501	0.00185	0.00502	0.00133	0.00171	0.00175	0.00174	0.015	0.0132	0.00417
Sulfate	mg/L	1430	76.3	68.7	64.5	129	182	50.9	127	78.7	212	1060	43.1	372	298	423	948	510	290
Thallium	mg/L	0.003	0.00165 U	0.00165 U	0.00165 U	0.00165 U	0.00165 U	0.00165 U	0.00165 U	0.00165 U	0.00168 U	0.00176 U	0.00189 U	0.00165 U	0.00165 U	0.00168 U	0.00298	0.00176 U	0.000976
Total Dissolved Solids	mg/L	--	537	480	451	638	778	1200	556	550	839	2240	517	1160	1190	1190	2130	1510	998

Notes
(1) Illinois General Use Water Quality Standards (WQS) and Illinois Water Quality Criteria (WQC) are used as surface water effects values.
(2) Average of concentrations reported between December 2010 and May 2017. If a constituent was not detected during this timeframe, the average reporting limit is presented in the table, indicated with a "U" qualifier. Otherwise, non-detect results were included in the average calculation assuming one-half the reporting limit.
(3) Average of concentrations (averages) presented in the table, assuming one-half the reporting limit for non-detect results.
(4) Groundwater in the gravelly sand unit flows in a northerly direction. Groundwater in the localized silt/clay units flows in a westerly direction. Summary statistics do not distinguish between these two units.

mg/L = milligram per liter
s.u. = standard units
"--" = value not available
U = constituent not detected above its reporting limit
bold/shading = concentration exceeds effects value

Table B-3-3
Comparison Of Maximum Groundwater Analytical Results To Surface Water Effects Values
Midwest Generation -- Powerton Generating Station - Pekin, Tazewell County, Illinois

Constituent	Units	Effects Value [1]	Groundwater Analytical Results - Maximum Concentrations [2]																Average [3]
			Gravelly Sand Unit [4]											Silt/Clay Unit [4]					
			MW-01	MW-02	MW-03	MW-04	MW-05	MW-07	MW-09	MW-10	MW-11	MW-13	MW-16	MW-06	MW-08	MW-12	MW-14	MW-15	
Arsenic	mg/L	0.19	0.001	0.0018	0.0017	0.0012	0.0011	[illegible]	0.0021	0.0015	0.068	0.041	0.005 U	[illegible]	0.0062	0.022	0.024	0.011	0.0434
Boron	mg/L	7.6	1.8	2.7	0.75	1	1.3	1	4.3	3.2	2.6	4.2	1	1	1.8	3.7	2.5	2.4	2.2
Chloride	mg/L	500	160	92	120	150	170	200	42	62	160	210	230	240	380	230	240	240	183
Iron	mg/L	1	0.43	0.046	0.042	0.14	0.43	[illegible]	0.066	[illegible]	[illegible]	[illegible]	0.019	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5.99
Lead	mg/L	0.0485	0.0008	0.0013	0.00097	0.005 U	0.005 U	0.039	0.00051	0.012	0.0023	0.005 U	0.005 U	0.00082	0.005 U	[illegible]	0.0035	0.0012	0.0153
Manganese	mg/L	3.84	0.027	0.015	0.034	1.018	1	[illegible]	0.84	[illegible]	[illegible]	[illegible]	0.022	[illegible]	0.78	1.7	1.8	1.3	[illegible]
Nitrogen/Nitrate	mg/L	--	11	7.5	9.4	2.7	2.2	0.31	13	6	4.6	3.6	28	0.19	1.6	0.14	3.5	2	5.98
Nitrogen/Nitrate, Nitrite	mg/L	--	6.4	5.9	5.3	1.3	2.2	0.1 U	13	3.2	1.1	0.3	28	0.19	0.44	0.31	2.4	2	4.51
pH	s.u.	6.5 - 9.0	6.39 - 9.53	6.18 - 8.21	6.58 - 8.34	6.37 - 8.1	6.34 - 8.01	6.45 - 7.2	6.31 - 8	6.03 - 8.39	6.48 - 8.27	6.75 - 8.67	6.72 - 8.31	7.23 - 9.33	6.9 - 8.62	6.98 - 8.36	6.05 - 8.35	6.55 - 8.23	6.60 - 8.35
Selenium	mg/L	1	0.005	0.0039	0.0067	0.013	0.0045	0.0073	0.016	0.0087	0.004	0.019	0.0015	0.0065	0.0048	0.0043	0.15	0.068	0.0202
Sulfate	mg/L	1430	330	190	100	390	310	120	180	160	410	[illegible]	64	560	530	750	[illegible]	[illegible]	568
Thallium	mg/L	0.003	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004 U	0.002 U	0.002 U	0.002 U	0.002 U	[illegible]	0.004 U	0.00147
Total Dissolved Solids	mg/L	--	870	770	530	1100	1100	1400	760	670	1300	3500	800	1400	1400	1700	3600	2800	1480

Notes
(1) Illinois General Use Water Quality Standards (WQS) and Illinois Water Quality Criteria (WQC) are used as surface water effects values.
(2) Maximum detected concentrations reported between December 2010 and May 2017. If a constituent was not detected during this timeframe, the maximum reporting limit is presented in the table, indicated with a "U" qualifier. For pH, the range is presented.
(3) Average of well-specific concentrations (maximums) presented in the table. If the maximum is a non-detect result, one-half the reporting limit was used as a surrogate concentration in the calculation. For pH, the range presented in the "average" column is the average minimum and average maximum.
(4) Groundwater in the gravelly sand unit flows in a northerly direction. Groundwater in the localized silt/clay units flows in a westerly direction. Summary statistics (averages) do not distinguish between these two units.

mg/L = milligram per liter
s.u. = standard units
"--" = value not available
U = constituent not detected above its reporting limit
bold/shading = concentration exceeds effects value

WAUKEGAN

Table B-4-2
Comparison Of Average Groundwater Analytical Results To Surface Water Effects Values
Midwest Generation -- Waukegan Generating Station - Waukegan, Lake County, Illinois

Constituent	Units	Effects Value [1]	Groundwater Analytical Results - Average Concentrations [2]									Average [3]
			MW-01	MW-02	MW-03	MW-04	MW-05	MW-06	MW-07	MW-08	MW-09	
Antimony	mg/L	0.32	0.00179	0.002	0.00163	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.0016
Arsenic	mg/L	0.148	0.081	0.0125	0.00463	0.00727	0.0081	0.00417	0.0101	0.00523	0.00085	0.0149
Boron	mg/L	7.6	2.12	2.54	1.93	2.16	**29.7**	3.57	**37.2**	**23.7**	**11.8**	**12.7**
Chloride	mg/L	500	49.8	49.8	55.2	49.6	182	86.1	49.4	46.5	388	106
Iron	mg/L	1.0	0.1 U	0.0581	0.1 U	0.0756	**4.62**	**5.5**	**12.7**	**5.8**	0.47	**3.3**
Manganese	mg/L	3.04	0.00565	0.0449	0.00529	0.0596	0.483	0.326	0.493	0.32	0.0945	0.204
Sulfate	mg/L	500	253	232	180	221	**861**	229	**646**	343	345	368
pH	s.u.	6.5 - 9.0	**9.94**	8.31	8.13	7.64	7.07	7.24	7.23	6.99	7	7.73
Total Dissolved Solids	mg/L	1000	517	513	437	516	**2120**	934	**1620**	**1100**	**1480**	**1030**

Notes
(1) Illinois Lake Michigan (LM) Basin Water Quality Standards (WQS) and Illinois LM Basin Water Quality Criteria (WQC) are used as surface water effects values.
(2) Average of concentrations reported between December 2010 and May 2017. If a constituent was not detected during this timeframe, the average reporting limit is presented in the table, indicated with a "U" qualifier. Otherwise, non-detect results were included in the average calculation assuming one-half the reporting limit.
(3) Average of concentrations (averages) presented in the table, assuming one-half the reporting limit for non-detect results.

mg/L = milligram per liter
s.u. = standard units
"--" = value not available
U = constituent not detected above its reporting limit
bold/shading = concentration exceeds effects value

Table B-4-3
Comparison Of Maximum Groundwater Analytical Results To Surface Water Effects Values
Midwest Generation – Waukegan Generating Station - Waukegan, Lake County, Illinois

Constituent	Units	Effects Value [1]	Groundwater Analytical Results - Maximum Concentrations [2]									Average [3]
			MW-01	MW-02	MW-03	MW-04	MW-05	MW-06	MW-07	MW-08	MW-09	
Antimony	mg/L	0.32	0.0056	0.015	0.0051	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.00386
Arsenic	mg/L	0.148	0.21	0.042	0.016	0.018	0.04	0.0096	0.014	0.0057	0.0012	0.0396
Boron	mg/L	7.6	3.1	3.6	3.5	3	49	10	50	28	16	18.5
Chloride	mg/L	500	79	57	89	71	720	140	85	56	430	192
Iron	mg/L	1.0	0.1 U	0.16	0.1 U	0.56	15	16	19	7	0.81	6.51
Manganese	mg/L	3.04	0.026	0.16	0.015	0.36	0.99	0.75	0.69	0.33	0.14	0.385
Sulfate	mg/L	500	390	370	290	360	1200	390	880	500	430	534
pH	s.u.	6.5 - 9.0	7.92-11.83	7.52 - 10.13	6.67 - 9.26	6.68 - 8.93	6.18 - 7.64	6.76 - 7.94	6.59 - 8.24	6.92 - 7.16	6.90 - 7.20	7.09 - 8.56
Total Dissolved Solids	mg/L	1000	750	770	860	990	3500	1200	1900	1200	1600	1420

Notes
(1) Illinois Lake Michigan (LM) Basin Water Quality Standards (WQS) and Illinois LM Basin Water Quality Criteria (WQC) are used as surface water effects values.
(2) Maximum detected concentrations reported between December 2010 and May 2017. If a constituent was not detected during this timeframe, the maximum reporting limit is presented in the table, indicated with a "U" qualifier. For pH, the range is presented.
(3) Average of well-specific concentrations (maximums) presented in the table. If the maximum is a non-detect result, one-half the reporting limit was used as a surrogate concentration in the calculation. For pH, the range presented in the "average" column is the average minimum and average maximum.

mg/L = milligram per liter
s.u. = standard units
"--" = value not available
U = constituent not detected above its reporting limit; reporting limit presented
bold/shading = concentration exceeds effects value

WILL COUNTY

Table B-5-2
Comparison Of Average Groundwater Analytical Results To Surface Water Effects Values
Midwest Generation – Will County Generating Station - Romeoville, Will County, Illinois

Constituent	Units	Effects Value [1]	Groundwater Analytical Results - Average Concentrations [2]										Average [3]
			MW-01	MW-02	MW-03	MW-04	MW-05	MW-06	MW-07	MW-08	MW-09	MW-10	
Antimony	mg/L	0.32	0.00168	0.00251	0.00344 U	0.00344 U	0.00344 U	0.00344 U	0.00344 U	0.00344 U	0.00344 U	0.00344 U	0.0018
Boron	mg/L	7.6	1.5	2.91	3.21	4.6	3.51	2.88	4.05	2.35	1.77	2.9	2.97
Chloride	mg/L	500	96	125	75.3	109	131	108	159	158	194	124	128
Manganese	mg/L	3.04	0.143	0.0578	0.305	0.637	0.0765	0.0622	0.104	0.344	0.00253	0.246	0.20
Sulfate	mg/L	1420	258	407	403	**1700**	593	373	554	492	308	309	540
pH	s.u.	6.5 - 9.0	7.49	8.01	7.15	7.03	7.93	8.59	8.1	7.3	**9.68**	7.5	7.88
Total Dissolved Solids	mg/L	--	807	1040	1060	3050	1320	827	1250	1260	789	996	1240

Notes
(1) Illinois General Use Water Quality Standards (WQS) and Illinois Water Quality Criteria (WQC) are used as surface water effects values.
(2) Average of concentrations reported between December 2010 and May 2017. If a constituent was not detected during this timeframe, the average reporting limit is presented in the table, indicated with a "U" qualifier. Otherwise, non-detect results were included in the average calculation assuming one-half the reporting limit.
(3) Average of concentrations (averages) presented in the table, assuming one-half the reporting limit for non-detect results.

mg/L = milligram per liter
s.u. = standard units
"--" = value not available
U = constituent not detected above its reporting limit
bold/shading = concentration exceeds effects value

Table B-5-3
Comparison Of Maximum Groundwater Analytical Results To Surface Water Effects Values
Midwest Generation -- Will County Generating Station - Romeoville, Will County, Illinois

Constituent	Units	Effects Value [1]	Groundwater Analytical Results - Maximum Concentrations [2]										Average [3]
			MW-01	MW-02	MW-03	MW-04	MW-05	MW-06	MW-07	MW-08	MW-09	MW-10	
Antimony	mg/L	0.32	0.0063	0.017	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.00833
Boron	mg/L	7.6	2.6	4.9	4.1	6.2	5.9	3.9	5.7	4.1	2.6	4.4	4.44
Chloride	mg/L	500	220	250	250	190	200	210	210	270	360	150	231
Manganese	mg/L	3.04	0.3	0.21	0.49	1	0.2	0.13	0.2	0.62	0.005	0.43	0.36
Sulfate	mg/L	1420	540	710	610	**4800**	**1700**	570	1000	800	430	420	1160
pH	s.u.	6.5 - 9.0	6.91 - 8.96	6.94 - 8.97	**6.06 - 8.12**	**5.87 - 7.67**	**6.73 - 9.7**	**7.26 - 9.65**	7.11 - 8.79	6.85 - 8.18	**8.35 - 10.88**	**6.84 - 9.18**	6.99 - 8.99
Total Dissolved Solids	mg/L	--	1300	1500	1400	6000	2100	1200	1600	1700	1000	1100	1890

Notes
(1) Illinois General Use Water Quality Standards (WQS) and Illinois Water Quality Criteria (WQC) are used as surface water effects values.
(2) Maximum detected concentrations reported between December 2010 and May 2017. If a constituent was not detected during this timeframe, the maximum reporting limit is presented in the table, indicated with a "U" qualifier. For pH, the range is presented.
(3) Average of well-specific concentrations (maximums) presented in the table. If the maximum is a non-detect result, one-half the reporting limit was used as a surrogate concentration in the calculation. For pH, the range presented in the "average" column is the average minimum and average maximum.

mg/L = milligram per liter
s.u. = standard units
"--" = value not available
U = constituent not detected above its reporting limit
bold/shading = concentration exceeds effects value

Exhibit 37

April 22, 2021

EXPERT REPORT ON RELIEF AND REMEDY

SIERRA CLUB, ET AL (COMPLAINANTS) V. MIDWEST GENERATION, LLC (RESPONDENT)

PREPARED BY

Exhibit
1701

MWG13-15_81413

Table of Contents

1 INTRODUCTION 1

1.1 Qualifications 1

1.1.1 Douglas G Dorgan, Jr., LPG 1

1.1.2 Michael B. Maxwell, LPG 2

1.2 Information Considered 3

1.3 Background 4

1.4 Regulatory Background/Applicable Definitions 5

1.4.1 Federal CCR Rules 5

1.4.2 State CCR Rules 6

1.4.3 Beneficial Use of Coal Ash 8

1.5 Station Background 8

1.5.1 Joliet 29 Station 8

1.5.1.1 Surface Impoundments 9

1.5.1.2 Historical Fill Areas 10

1.5.2 Powerton Station 10

1.5.2.1 Surface Impoundments 11

1.5.2.2 Historical Fill Areas 15

1.5.3 Will County Station 15

1.5.3.1 CCR Surface Impoundments 16

1.5.3.2 Historical Fill Areas 18

1.5.4 Waukegan Station 18

1.5.4.1 CCR Surface Impoundments 18

1.5.4.2 Historical Fill Area 20

2 ISSUES WITH QUARLES OPINIONS 21

2.1 Quarles incorrectly applies the Federal CCR Rules to each Station 21

2.2 Quarles incorrectly concludes that the Federal CCR Surface Impoundments are used for permanent disposal of coal ash. 21

2.3 Quarles fails to consider the extensive data record available at each Station. 21

2.4 Quarles fails to adequately consider the specific factors used by the Board as the basis for a remedy at each Station 22

3 REGULATORY FRAMEWORK 23

3.1 The Federal and State CCR Rules apply to specific units at each Station, not to all coal ash present at the Station. 23

3.2 The 2012 CCAs at each of the Stations are key compliance mechanisms that have also resulted in collection of a substantial quantity of data useful for characterization of environmental conditions and implementation of measures to control potential contaminant sources at each Station. 23

4 APPROPRIATE ACTIONS/REMEDY 27

4.1 The Federal/State CCR Surface Impoundments at each Station do not need to be investigated further to determine appropriate actions 27

4.1.1 Groundwater Conditions at Powerton 28

4.1.2 Alternate Source Demonstrations (ASDs) 29

4.1.2.1 Powerton ASD 30

4.1.2.2 Will County ASD 31

4.1.2.3 Waukegan ASD 32

4.1.3 Testing of Coal Ash Under Beneficial Use Requirements 33

4.2 Historical fill areas at each Station do not need to be investigated further to determine appropriate actions 33

4.2.1 Joliet 29 34

4.2.2 Powerton 38

4.2.3 Will County 39

4.2.4 Waukegan 41

4.3 Analysis of the historical groundwater quality data indicates that groundwater concentrations are decreasing at the Joliet 29, Powerton, and Will County Stations. 42

4.4 There is no unacceptable risk to offsite receptors at the four Stations. 45

4.5 MWG has already committed to following the Federal/State CCR Rules for applicable Existing and Inactive Surface Impoundments at each Station, until closure is complete. Therefore, no additional action beyond continued compliance with these Rules is warranted. 47

4.6 MWG should continue to maintain the GMZs at each Station until the corrective action is complete 50

4.7 No further remedy is warranted at the Joliet 29, Powerton, and Will County Stations. 51

4.8 Despite the absence of risk, an appropriate remedy is warranted at the Waukegan FS Area to attain compliance with applicable regulations. 52

4.9 Relevant Section 33(c) and 42(h) Criteria 53

LIST OF FIGURES

Figure 1: Site Layout Map – Joliet 29 Station

Figure 2: Site Layout Map – Powerton Station

Figure 3: Site Layout Map – Will County Station

Figure 4: Site Layout Map – Waukegan Station

Figure 5: Monitoring Well Location Map – Joliet 29 Station

Figure 6: Monitoring Well Location Map – Powerton Station

Figure 7: Monitoring Well Location Map– Will County Station

Figure 8: Monitoring Well Location Map – Waukegan Station

LIST OF TABLES

Table 1: Summary of Historical Soil Analytical Data – Joliet 29 Station

Table 2: Summary of Historical Soil Analytical Data – Powerton Station

Table 3: Summary of Historical Soil Analytical Data – Will County Station

Table 4: Summary of Historical Soil Analytical Data – Waukegan Station

APPENDICES

Appendix A: Resumes

Appendix B: List of References

Appendix C: Statistical Evaluation of Groundwater Data

Appendix D: Comparison of Groundwater Concentrations to Surface Water Standards

Appendix E: HELP Model

1 INTRODUCTION

Weaver Consultants Group (WCG) has been retained by "Respondent", Midwest Generation, LLC (MWG), to provide its opinions on recommended relief, if any, in the case of Sierra Club, Environmental Law and Policy Center, Prairie Rivers Network, and Citizens Against Ruining the Environment v. Midwest Generation, LLC., and to respond to opinions expressed by Mr. Mark A. Quarles in his expert report (the "Quarles Report"). WCG's opinions in this Report are made to a reasonable degree of scientific certainty. WCG reserves the right to supplement this report, if additional relevant information becomes available.

1.1 Qualifications

1.1.1 Douglas G Dorgan, Jr., LPG

Mr. Dorgan's resume and list of publications is presented in **Appendix A**.

I have over 30 years of experience working as an environmental consultant. I have a Bachelor of Science (BS) in Earth Science, with a Minor in Geology, and a Master of Science (MS) in Geography with a Concentration in Environmental Science. I am a Licensed Professional Geologist (PG) in the states of Illinois, Indiana, and Kansas.

Since 1986, my practice has focused on providing consulting services and performing remedial investigation, planning, design, and construction for a wide range of industrial, commercial, and institutional properties. I have been qualified as an expert witness and supported litigation associated with projects involving environmental assessment, design, permitting, and engineering design and construction-related issues. I have also implemented various projects involving compliance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and under various Illinois regulatory programs (e.g., Leaking Underground Storage Tank (LUST), Site Remediation Program (SRP), Tiered Approach to Corrective Action Objectives (TACO)). I have regularly interfaced with both the United States Environmental Protection Agency (USEPA) and the Illinois Environmental Protection Agency (EPA) in many contexts.

I have worked on numerous commercial and industrial properties exhibiting legacy environmental impacts. I have experience assessing and remediating soils and fill material impacted by a wide range of contaminants of concern (COCs). I also have experience supporting environmental investigation and restoration associated with Brownfields redevelopment.

During my career, I have extensive experience:

1. Investigating contaminated properties;
2. Evaluating appropriate environmental risk mitigation options;
3. Designing environmental remediation programs and preparing cost models to support same;
4. Managing all aspects of environmental remediation implementation including, but not limited to, developing bid specifications (general and technical), coordinating the bid process and contractor selection, managing implementation of remediation work, and review and approval of contractor pay requests.
5. Managing technical consulting services associated with remedial program implementation to assess conformity with project plans and technical criteria.
6. Managing documentation of remedial program implementation via project completion reports.

Finally, I have worked on projects involving a range of anthropogenically produced fill materials including coal ash, dredge spoils, slag, and construction/demolition debris. I have supervised closure of Federal CCR regulated ash ponds. I also served as the Principal in Charge for implementation of various elements of the CERCLA Remedial Investigation/Feasibility Study (RI/FS) activities for a northern Indiana Restricted Waste Site (RWS) containing exclusively locally-generated Coal Combustion By-products (CCB).

1.1.2 Michael B. Maxwell, LPG

Mr. Maxwell's resume is presented in **Appendix A**.

I have attained nearly 25 years of experience working in the local Chicagoland area as an environmental consultant with WCG. I have a Bachelor of Arts (BA) in Geological Sciences from the State University of New York, College at Geneseo in 1994 and earned a MS in Geology from the University of Iowa in 1996. My Masters' Thesis involved investigation and characterization of various solid waste products produced in southcentral Iowa, including coal ash, as a means for strip mine remediation. I have been licensed for nearly 20 years as a PG in the states of Illinois and Indiana and am also certified as a Certified Hazardous Materials Manager (CHMM).

I have been practicing environmental consulting in the Chicagoland market since 1996, providing services related to site investigation, remedial investigation, planning, design, and construction

for a wide range of industrial, commercial, and institutional properties. I have implemented various projects involving compliance with the Resource Conservation Recovery Act (RCRA) Subtitle D (solid waste disposal facilities) and Subtitle C (hazardous waste disposal facilities), as well as the 40 CFR 257 Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments (Federal CCR Rules). Additionally, I have implemented various technical projects involving compliance with CERCLA. Since the beginning of my professional practice in 1996, I have regularly applied the SRP regulations and related TACO regulations to a variety of different Illinois sites. I have regularly interfaced with both the USEPA and Illinois EPA on behalf of various industrial clients involving RCRA and alleged violations of the Illinois Environmental Protection Act, including negotiations and compliance with various Compliance Commitment Agreements (CCAs).

I have provided previous testimony before the Illinois Pollution Control Board (Board or IPCB) in connection with an Adjusted Standard Hazardous Waste Delisting Petition that was approved by the Board in 2008. I provided technical assistance and support in a case involving CERCLA liability, cost allocation, appropriateness, and costs associated with the selected remedy related to a former zinc smelter located in downstate Illinois. I have also played the key supporting role in toxic tort and property damage claims related to the historical use of chlorinated solvents at an industrial facility in St. Louis, MO.

I have worked on various different projects involving regulatory compliance/permitting, investigation, and remediation of coal ash surface impoundments, and coal ash fill disposal sites. At one such site in northwest Indiana, I manage the permitting, closure, groundwater monitoring, and corrective action at a restricted waste site (RWS). I have overseen the design and installation of the initial groundwater monitoring system required under the Federal CCR Rules and managed the collection of background groundwater quality data, as well as the statistical evaluation of the groundwater monitoring data at two former coal ash surface impoundment sites in Indiana. I also managed the review of Groundwater Monitoring Reports prepared under the Federal CCR Rules for two former coal ash impoundment sites in northern New Jersey.

1.2 Information Considered

For purposes of this Report, WCG has reviewed the documents presented within the Quarles Report, select publicly available information obtained from the administrative record on the IPCB website (available at https://pcb.illinois.gov/), select publicly available information available concerning MWG on the CCR Rule Compliance Data and Information website (available at:

https://www.nrg.com/legal/coal-combustion-residuals.html) and other information provided by MWG. These sources are listed in **Appendix B**.

1.3 Background

MWG owns/operates the following electric generating stations:

1. Joliet #29 Generating Station, located in Joliet, IL (Joliet 29);
2. Powerton Generating Station, located in Pekin, IL (Powerton);
3. Will County Generating Station, located Romeoville, IL (Will County); and
4. Waukegan Generating Station, located in Waukegan, IL (Waukegan).

Each of the above facilities have been operated by MWG since 1999, when MWG acquired the Stations from a prior owner. On October 3, 2012, Sierra Club, Environmental Law and Policy Center, Prairie Rivers Network, and Citizens Against Ruining the Environment (collectively, "Complainants") filed a complaint against MWG, alleging that MWG allowed groundwater contamination and open dumping at the above facilities in violation of the Environmental Protection Act (Act) and Board regulations.

The Interim Opinion and Order of the Board dated June 20, 2019, (2019 Board Order) concluded that "it is more probable than not" that MWG violated certain portions of the Act and Board Regulations[1], identifying areas at each facility. Specifically, the Board found that MWG violated Sections 12(a) and 21(a) of the Act at each of the four Stations. The Section 12(a) violation identified by the Board relates to causing or allowing discharge of coal ash constituents into groundwater causing water pollution. Section 21(a) relates to allowing coal ash to consolidate in fill areas around ash ponds and historical ash storage areas. In addition, the Board found that MWG violated Section 12(d) of the Act (open dumping of coal ash onto the ground) at the Powerton Station (only) by temporarily storing coal ash outside of the surface impoundments on a single occasion.

The 2019 Board Order was reconsidered and modified by a February 6, 2020 Order of the Board (2020 Board Order). Importantly, the subsequent 2020 Board Order found that the Groundwater Management Zones (GMZs) previously established at the Joliet 29, Powerton, and Will County Stations in 2013 had not been terminated and are still in place. With the continued applicability

[1] 2019 Board Order, pg. 79.

of the GMZs at the Joliet 29, Powerton and Will County Stations, there are presently no ongoing violations of Part 620 of the Board Regulations[2].

The 2019 Board Order concluded by indicating that the record up to that point lacks sufficient information to determine the appropriate remedy (in response to the above violations identified by the Board). The Board further indicated that additional hearings were to be held to determine the appropriate relief and any remedy, which will be enacted based upon Sections 33(c) and 42(h) of the Act[3]. Accordingly, WCG's opinions expressed in this Report were developed in consideration of the factors presented in these referenced sections of the Act. These relevant criteria are cited below in Sections 3-4.

1.4 Regulatory Background/Applicable Definitions

1.4.1 Federal CCR Rules

The materials managed at the above Stations that are the subject of this litigation are considered coal combustion wastes (CCW) or coal combustion residuals (CCR). CCW is defined in the 2019 Board Order as:

> *"any fly ash, bottom ash, slag, or flue gas or fluid bed boiler desulfurization by-products generated as a result of the combustion of…coal, or…coal in combination with [other material]."*[4]

CCR is not specifically defined in the 2019 Board Order, but is defined in 40 CFR 257, Subpart D – Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments (Federal CCR Rules). According to 40 CFR 257.53:

> *"Coal combustion residuals (CCR) means fly ash, bottom ash, boiler slag, and flue gas desulfurization materials generated from burning coal for the purpose of generating electricity by electric utilities and independent power producers."*

CCR has been found at various locations at the four Stations, however, based on MWG's assessment, all of the CCR does not necessarily fall under the same regulations. MWG has concluded that certain areas at the Stations fall under the definition of "existing CCR surface

[2] 2020 Board Order, pg. 13.
[3] 2019 Board Order, pg. 92-93.
[4] 2019 Board Order, pg. 14.

impoundment" pursuant to the Federal CCR Rules. The terms "CCR surface impoundment or impoundment" and "existing CCR surface impoundment", are defined as:

> CCR surface impoundment:
>
> *"a natural topographic depression, man-made excavation, or diked area, which is designed to hold an accumulation of CCR and liquids, and the unit treats, stores, or disposes of CCR".*
>
> Existing CCR surface impoundment:
>
> *"a CCR surface impoundment that receives CCR both before and after October 19, 2015, or for which construction commenced prior to October 19, 2015 and receives CCR on or after October 19, 2015".*

The Federal CCR Rules also define the term "inactive surface impoundments", as:

> *"a CCR surface impoundment that no longer receives CCR on or after October 19, 2015 and still contains both CCR and liquids on or after October 19, 2015"*.

MWG has determined that none of the areas at the MWG Stations are Federal inactive surface impoundments., with the exception of the Former Ash Basin at the Powerton Station.

While some of the CCR at the above facilities is managed in CCR surface impoundments (i.e., ponds), other CCR is not. The Federal CCR Rules also identify another CCR unit, known as a landfill. A "CCR landfill" or "landfill" means:

"an area of land or an excavation that receives CCR and which is not a surface impoundment, an underground injection well, a salt dome formation, a salt bed formation, and underground or surface coal mine, or a cave".

The Federal CCR Rules state that they do not apply to CCR landfills that have ceased receiving CCR prior to October 19, 2015[5]. MWG has concluded that there are no areas at these Stations that fall within the definition of CCR landfill.

1.4.2 State CCR Rules

Illinois has promulged rules related to CCR Surface Impoundments (Illinois Pollution Control Board Case #R20-19). The rulemaking authority is related to Section 22.59 of the Act. In Section 22.59, the General Assembly found that "environmental laws should be supplemented to ensure

[5] Preamble to 40 CFR 257, Disposal of Coal Combustion Residuals From Electric Utilities, Final Rule, April 2015.

consistent, responsible regulation of all existing CCR surface impoundments". Section 22.59 of the Act further required that Illinois EPA propose, and the Board adopt, new rules on CCR surface impoundments. Illinois EPA timely filed a rulemaking proposal in March 2020.

The Second Notice of Proposed Rule R20-19, Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments, Proposed New 35 Ill. Adm. Code 845 was published by the Board on February 4, 2021 (IL CCR Rules). The IL CCR Rules were adopted by the Board on April 15, 2021. These rules are based largely on the Federal CCR Rules, with some modifications, and will also apply to certain CCR surface impoundments at the four Stations. One key difference between the IL CCR Rules and Federal CCR Rules is that the IL CCR Rules include a broader definition of "inactive surface impoundment". The definition of "inactive CCR surface impoundment" under the IL CCR Rules is as follows:

> *"CCR surface impoundment in which CCR was placed before but not after October 19, 2015 and still contains CCR on or after October 19, 2015."*

The Federal definition states that an inactive surface impoundment must contain BOTH CCR and liquids, while the IL definition encompasses units that contain just CCR after the specified date.

The IL CCR Rules do not include CCR Landfills, because CCR disposed in Illinois landfills is already regulated as a solid waste under different regulations. The 35 Ill. Adm. Code 811 landfill regulations (and predecessor 35 Ill. Adm. Code 807 regulations) require solid waste landfill facilities operating (i.e., receiving and disposing of solid waste) after the effective date of the regulations to attain a permit from the Illinois EPA Bureau of Land.

CCR outside regulated surface impoundments has also been included within the scope of this case. The subject of historical unconsolidated coal ash fill areas was raised during the above IL CCR Rules rulemaking. The Board found that regulation of "unconsolidated coal ash fills" was beyond the scope of Section 22.59(g) of the Act, and directed the Clerk to open a sub-docket to R20-19 to explore "historic, unconsolidated coal ash fill in the State", located outside of surface impoundments.

The opinions expressed herein are subject to change, based upon future Illinois regulations pertaining to the above sub-docket to R20-19[6].

[6] The deadline for filing this report did not allow for incorporation of the final Illinois CCR rules, adopted on April 15, 2021, and WCG reserves the right to supplement this report in consideration of the final rules, if necessary.

1.4.3 Beneficial Use of Coal Ash

The Federal CCR rules do not regulate practices that meet the definition of a beneficial use of CCR and the Federal CCR rules do not affect past beneficial uses (i.e., uses completed before the effective date of the rule)[7]. The Act states that CCW is excluded from the definition of "waste" under the Act. "Waste" does not include "coal combustion by-products as defined in Section 3.135." "Coal combustion by-product" or CCB is defined as "coal combustion waste when used beneficially in any of the following ways…". Specific beneficial uses are included in Section 3.135(a), including use as structural fill, foundation backfill, antiskid material, soil stabilization, pavement, or mine subsidence.

As discussed below in support of WCG's opinions, historical Neutral Leaching Extraction Test (NLET) testing was performed by MWG on samples of coal ash removed from the Federal CCR surface impoundments to support beneficial use demonstrations. The comparison of the NLET results to the Illinois Class 1 Groundwater Quality Standards was also utilized to characterize the potential for the coal ash to result in impacts to groundwater. In addition to the NLET testing on the coal ash from the surface impoundments, a substantial amount of NLET testing was performed by MWG at Joliet 29, Powerton, and Will County Stations to characterize the potential for the historical coal ash fill areas to impact groundwater. The data collected from these prior site investigations and related comparisons to the Class 1 Groundwater Quality Standards is also used to support WCG's opinions presented in this Report.

1.5 Station Background

1.5.1 Joliet 29 Station

The Joliet 29 Station is located in a primarily industrial area, bordered on the west by a former Caterpillar, Inc. manufacturing facility. The north side of the Joliet 29 Station is bordered by Channahon Road (East James St.), beyond which are the Illinois and Michigan Canal Trail and industrial facilities. Brandon Rd. borders the east side and the Des Plaines River borders the south side of the facility. A site layout map is included as **Figure 1**.

The Station has produced electricity since the mid-1960s. The power plant has been operated by MWG since its acquisition in 1999. On March 18, 2016, the Plant ceased burning coal. On May 26, 2016, Joliet 29 began generating electricity with natural gas. The source of coal utilized by

[7] Preamble to 40 CFR 257, Disposal of Coal Combustion Residuals From Electric Utilities, Final Rule, April 2015.

MWG to produce electricity was subbituminous coal sourced from Wyoming's Powder River Basin[8].

1.5.1.1 Surface Impoundments

Two coal ash surface impoundments (Pond 1 and Pond 2) and one service water basin (Pond 3) were constructed in 1978 with 12-inch thick Poz-o-Pac™ dense aggregate liners, which is similar to concrete[9]. Each pond is permitted under the Station's National Pollutant Discharge Elimination System (NPDES) Permit. During historical operations, most of the bottom ash produced at the Joliet 29 Station was conveyed across the Des Plaines River to an off-site permitted landfill[10]. On rare occasions when the enclosed pipe system was offline, bottom ash was pumped to either Pond 1 or Pond 2, where it was temporarily staged, until it could be removed for disposal at the off-site permitted landfill. Water from Pond 1/Pond 2 flowed to Pond 3, which was used exclusively as a finishing pond and received a *de minimis* quantity of coal ash[11].

Ponds 1 and 2 were relined in 2008. The new liners consisted of the following, from the bottom up: a bottom geotextile cushion layer placed on top of the Poz-o-Pac™, 60-mil high-density polyethylene (HDPE) geomembrane liner, a top geotextile cushion, a 12 inch thick sand cushion layer, and 6 inch thick limestone warning layer. The bottom elevation of Pond 2 is approximately 516 feet (ft.) above mean sea level (MSL). The highest recorded groundwater elevations since June 2011 in the vicinity of Pond 2 (i.e., in MW-03, MW-04, MW-05 and MW-10) ranged from approximately 511.5 ft. MSL at MW-05 and 511.8 ft. MSL at MW-10 (both data points observed in May 2020). The average groundwater elevation in the vicinity of Pond 2 between June 2011 and October 2020 was approximately 506.0 ft. MSL.

Coal ash was removed from Pond 1 and MWG cleaned Pond 1 prior to October 12, 2015[12]. Coal ash from Pond 2 was removed by November 22, 2019 and is in the process of being closed as soon as a permit is received[13]. The Pond 3 Finishing Pond was relined in 2013, and never received CCR[14].

[8]Joint Agreed Stipulations (JAS), Oct. 2, 2017, 51.
[9] JAS, Oct. 2, 2017, 5.
[10] 1/29/18, Tr. pg. 192-194 (Test. of Race).
[11] JAS, Oct 2, 2017, 10; 1/29/18 Tr. pg. 188-191 (Test. of Race).
[12] JAS, Oct 2, 2017, 12.
[13] Annual CCR Fugitive Dust Control Report, Joliet #29 Generating Station, December 10, 2020, pg. 2.
[14] 1/29/18 Tr. at 188-191 (Test. of Race).

Based on the Federal CCR Rules, MWG has determined that Pond 1 at Joliet 29 is not a Federal CCR Surface Impoundment, because it did not contain CCR after October 19, 2015. Pond 3 never received an accumulation of CCR, so MWG determined Pond 3 is not a Federal CCR surface impoundment. In 2020, MWG conducted a multi-layered analysis of the contents of Pond 1 and Pond 3, including a bathymetric survey of the base of the ponds and an analysis of the material found at the base of the ponds. The analysis demonstrated that the material in the ponds was not CCR. Instead, it was a mixture of biologic material, as well as sand and silt, air deposits, and stormwater runoff.[15] MWG has determined that Pond 2 is considered a Federal CCR Surface Impoundment because CCR and water was present in this surface impoundment after October 19, 2015. MWG removed the CCR from Pond 2 in 2019, and, under the IL CCR Rules, closure will be completed when a permit is issued by Illinois EPA, pursuant to the IL CCR Rules.

1.5.1.2 Historical Fill Areas

In addition to coal ash surface impoundments, according to the case record, three other areas at Joliet 29 Station are suspected to contain historical coal ash. One is in the northeastern portion of the facility, one is on the southwest side, and one is northwest of the former coal pile[16]. As presented in further detail in the sections below presenting WCG's opinions, some of these areas have been historically investigated. Based on the results from prior site investigation activities, in some areas, coal ash was excavated and hauled to an appropriately permitted landfill, as a remedial measure. These areas did not receive coal ash after October 19, 2015 and were not operated as units meeting the definition of a Federal CCR surface impoundment and therefore MWG has not included them within the scope of the Federal CCR Rules.

1.5.2 Powerton Station

The Powerton Station is a 1,710-acre property located at 13082 East Manito Road in Pekin, Tazewell County, Illinois. The plant is bordered on the north by the Illinois River, Powerton Lake and Wildlife Area to the west, industrial and residential areas to the east, and agricultural land to the south. A site layout map is included as **Figure 2**.

Powerton has been operating as a generating station since the 1920s. Historically, operations were conducted with four coal-fired units; however, these units were replaced in the early 1970s

[15] MWG13-15_79325-79340.
[16] 2019 Board Order, pg. 26.

by the currently operating Units 5 and 6. The source of coal to produce electricity at Powerton is subbituminous coal sourced from Wyoming's Powder River Basin[17].

1.5.2.1 Surface Impoundments

Various basins either historically or currently used to treat/manage materials are present at the Powerton Station, including:

- Ash Surge Basin;
- Bypass Basin;
- Metal Cleaning Basin;
- Secondary Settling Basin/Service Water Basin;
- Former Ash Basin;
- Limestone Runoff Basin; and
- East Yard Runoff Basin.

The Ash Surge Basin is the primary basin used for the collection of ash at the Powerton Station. The Ash Surge Basin was constructed in 1978 with at least a 12-inch Poz-o-Pac™ liner on the bottom topped with a bituminous seal coat and a Hypalon® liner on the sides of the basin[18]. The Ash Surge Basin was relined in 2013 with a bottom geotextile cushion layer placed on top of the Poz-o-Pac™ , 60-mil HDPE geomembrane liner, a top geotextile cushion, a 12-inch-thick sand cushion layer, and 6-inch-thick limestone warning layer[19]. The bottom elevation of the Ash Surge Basin is 452 ft. MSL[20]. The highest recorded groundwater elevations since September 2011 in the vicinity of the Ash Surge Basin ranged between approximately 446.8 ft. MSL at MW-18 in May 2017 and 449.4 ft. MSL at MW-15 in May 2013. The average groundwater elevation in the vicinity of the Ash Surge Basin between September 2011 and December 2020 was approximately 445.2 ft. MSL.

The Bypass Basin is used only when the Ash Surge Basin is being emptied[21]. The Bypass Basin was constructed in 1978 with a Poz-o-Pac™ liner on the bottom and a Hypalon® liner on the

[17] JAS, Oct. 2, 2017, 51.
[18] JAS, Oct. 2, 2017, 20; MWG Exhibit 901, pg. 28.
[19] Id.
[20] Id at 30.
[21] 1/31/18 Tr. p. 75:20-23 and 75:16-19; Exh. 667, p. 12; MWG Ex. 901, p. 27-28; 1/30/18 Tr. p. 58:13-18 and p. 59:17-21; JAS, Oct. 2, 2017, 30.

sides. The Bypass Basin was relined in 2010 with 12 inches of Poz-o-Pac™ on the bottom, a bottom geotextile cushion, a 60 mil HDPE liner, a top geotextile cushion, a sand cushion, and a limestone warning layer[22]. The pond's bottom elevation is at 459 ft MSL[23]. The highest recorded groundwater elevation since September 2011 in the vicinity of the Bypass Basin was 452.8 ft. MSL at MW-12 in February 2020, and the average groundwater elevation in the vicinity of the Bypass Basin between September 2011 and December 2020 was approximately 450.4 ft. MSL.

The Metal Cleaning Basin is not a part of the ash sluice system and instead is used during outages in at the Station as a temporary lay-down area for dry ash cleaned out of the boiler tubes[24]. The Metal Cleaning Basin was constructed in 1978 with a 12-inch Poz-o-Pac™ liner on the bottom and a Hypalon® liner on the sides[25]. The Metal Cleaning Basin was relined in 2010 with 12 inches of Poz-o-Pac™ on the bottom, a bottom geotextile cushion, a 60 mil HDPE liner, a top geotextile cushion, a sand cushion, and a limestone warning layer[26]. The bottom elevation of the pond is 457.5 ft. MSL. In addition to use for the temporary lay-down of ash, the Metal Cleaning Basin occasionally holds process water. The Metal Cleaning Basin does not receive commingled ash and process water[27].

The highest recorded groundwater elevation since April 2011 in the vicinity of the Metal Cleaning Basin (i.e., from MW-13, MW-14, MW-15, and MW-17) ranged from approximately 449.0 ft. MSL at MW-17 in April 2019 and 450.1 ft. MSL at MW-14 in March 2018. The average groundwater elevation in the vicinity of the Metal Cleaning Basin between April 2011 and December 2020 was approximately 445.6 ft. MSL.

The Secondary Settling Basin/Service Water Basin is used as a finishing pond and receives *de minimis* ash from the Surge Basin[28]. Since before 1999, the Service Water Basin had a Hypalon® liner. The pond was relined in 2013 with a geotextile separator fabric, gravel underdrain system 18-24 inches thick, another geotextile separator fabric, a sand cushion layer, a bottom geotextile cushion, and a 60 mil HDPE liner[29]. Because the Service Water Basin would not be cleaned out,

[22] MWG Exhibit 901, pg. 28.
[23] Id at 31.
[24] Id at 28.
[25] Id.
[26] MWG Exhibit 901, p. 28.
[27] Interview with Sharene Shealey, MWG Director, Environment, April 19, 2021.
[28] 2019 Board Order at 3(A)(ii).
[29] MWG Exhibit 901, pg. 28.

no cushion or warning layer above the HDPE was necessary[30]. The pond's bottom elevation is at 440 ft. MSL. Average groundwater elevation is at 441.5 feet (about 1.5 ft above the pond's bottom)[31]. To address higher groundwater levels in the area, MWG installed an underdrain system beneath the Service Water Basin[32]. The purpose of the underdrain system, composed of stone, drain tiles, and riprap on the sides, is to divert water that may seep into the ground near the pond, away from the pond liner[33]. In 2020, MWG conducted a multi-layered analysis of the contents of the Service Water Basin, including a bathymetric survey of the base of the basin and an analysis of the material found within the basin. The analysis demonstrated that there was little to no material that had accumulated in the basin and that the material in the basin was not CCR. Instead, it was sand and silt from air deposition and stormwater runoff.[34]

Located to the northeast of the existing Ash Surge Basin, the Former Ash Basin is an inactive CCR surface impoundment which was historically used for bottom ash management prior to MWG's operations at the Station[35]. The Former Ash Basin is part of the Station's NPDES permit solely as an emergency overflow for the Ash Surge Basin[36]. Originally a single pond, in 2010 the Former Ash Basin was bisected into two areas by construction of a railroad embankment[37]. The two bisected ponds are now designated as the North Pond and South Pond[38] and are shown on **Figure 2**.

The Limestone Runoff Basin, located directly east of the Ash Surge Basin, is lined on the bottom with a Poz-o-Pac™ liner and also had a Hypalon® liner on the sides[39]. The Limestone Runoff Basin has been used on two occasions to temporarily store coal ash when equipment changes occurred at the Station and there was an immediate need for a lined storage space[40]. The last time was in 2013, when the Station was relining the Ash Surge Basin and the Secondary Ash Basin, and since that time the basin has been empty and not used[41].

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[30] 1/31/18 Tr. p. 135:10-18.
[31] MWG Exhibit 901, pg. 28.
[32] [32] MWG Exh. 710; MWG13-15_34265; 1/31/18 Tr. p. 132:11-12 (Test. of Kelly).
[33] 1/31/18 Tr. p. 133:2-10; MWG Ex. 710; MWG13-15_34265.
[34] MWG13-15_79325-79340.
[35] 1/31/18 Tr. p. 141:19-23 (Test. of Kelly); MWG Exh. 667, p. 15; MWG Ex. 901, p. 38.
[36] MWG Exh. 901 at 38; 1/30/18 Tr. at 2:14-18 (Test. of Race).
[37] Geosyntec Consultants, History of Construction Former Ash Basin, dated April 2018.
[38] Id.
[39] MWG Exh. 667, p. 15; JAS 31; 1/31/18 Tr. p. 144:12-145:1 (Test. of Kelly).
[40] 1/31/18 Tr. p. 144:2-6 (Test. of Kelly); 1/30/18 Tr. p. 70:2-7 (Test. of Race).
[41] 1/31/18 Tr. p. 144:7-145:1. (Test. of Kelly).

The East Yard Runoff Basin is located southwest of the Ash Surge Basin and west of the Bypass Basin and is not part of the ash sluicing system, nor used by MWG to store or receive ash[42] (see **Figure 2**). The East Yard Runoff Basin is used for stormwater runoff from the east half of the property at the Station[43].

Based on the Federal CCR Rules, MWG considers the Ash Surge Basin and the Bypass Basin to be Federal CCR Surface Impoundments because they have been used to temporarily accumulate CCR and liquid after October 19, 2015. In addition, MWG considers the Former Ash Basin to be a Federal CCR Surface Impoundment because, although it is inactive and CCR ceased being sent to the Former Ash Basin prior to MWG's operations at the Station, CCR and water were present in this surface impoundment after October 19, 2015. In addition, MWG considers the Metal Cleaning Basin to be an Illinois Surface Impoundment, because it contained CCR materials after October 19, 2015. The Limestone Runoff Basin, Service Water Basin, and East Yard Runoff Basins are not considered Federal or Illinois Surface Impoundments, because none of the basins accumulated coal ash materials and liquid[44].

The most recent technical document pertaining to the Federal CCR surface impoundments at the Powerton Station was submitted to USEPA in late 2020. On November 30, 2020, MWG submitted a Demonstration for a Site Specific Alternative Deadline to Initiate Closure (a/k/a Alternative Closure Demonstration (ACD)) under the Federal CCR Rule for the Ash Surge Basin and Bypass Basin due to the infeasibility for the development of alternative capacity for CCR at Powerton [45]. In accordance with the Federal CCR rules, Powerton must cease placing the CCR and non-CCR waste streams sent to the Ash Surge Basin and Bypass Basins as soon as technically feasible but no later than April 11, 2021, unless an alternate schedule is approved by the EPA, as the Basins do not meet the liner design requirements of the Federal CCR Rules.

This ACD proposes to cease sending CCR and non-CCR waste streams to the Bypass Basin after April 11, 2021. The ACD also proposes a workplan for the development of alternate disposal capacity to replace the Ash Surge Basin. This workplan calls for implementation of a multiple technology system (MTS) to address CCR and non-CCR waste streams being managed within the Ash Surge Basin. The system is proposed to consist of refurbished dewatering bins, a new

[42] MWG Exh. 254 at 4; 1/31/18 Tr. at 138:5-22 (Test. of Kelly); MWG Exh. 667 at 12.
[43] MWG Exh. 710, MWG13-15_34265 (Construction Documentation of the Secondary Ash Basin Liner Replacement); 1/31/18 Tr. p. 132:11-12 (Test. of Kelly).
[44] 1/31/18 Tr. at 138:5-22 (Test. of Kelly); MWG13-15_48645; MWG13-15_48742; MWG Exh. 711.
[45] Sargent & Lundy, Demonstration for a Site-Specific Alternative Deadline to Initiate Closure, November 30, 2020.

concrete ash-settling tank, a new Recycle Cooling Water Basin, and a new Low-Volume Waste Basin. The MTS will be developed in two phases. The first phase will bring Powerton into compliance with the Federal CCR Rule and will set up the second phase which will bring the Station into compliance with the EPA's recently-revised effluent limitation guidelines for steam electric power generating stations (ELG Rule). To allow for sufficient time for the design and installation of the modified treatment system, the ACD requests USEPA allow the Ash Surge Basin to continue receiving CCR and non-CCR waste streams until August 11, 2023. WCG understands that the ACD is under review by USEPA.

1.5.2.2 Historical Fill Areas

In addition to the CCR surface impoundments, there are other areas of the Powerton Station that are known or suspected to have had or currently contain coal ash and have been referred to in the record as the historical coal ash fill areas.

As described in Section 1.3 above, the 2019 Board Order found that MWG was in violation of Section 12(d) of the Act due to the temporary storage of cinders stored on the ground in an open area directly south of the Bypass Basin for "two to three months" during the "winter before 2012"[46]. MWG subsequently removed the cinders within two to three months[47].

The Quarles Report also identified two "suspected" disposal areas between the intake and discharge channels (noting that this area was not previously recognized by the Board) and underlying the area to the southeast of the power plant. The Quarles Report fails to present the basis for the conclusion that there are additional, unrecognized historical ash management areas. Based on a review of historical aerials and topographic maps, WCG's was unable to independently substantiate Quarles' characterization of these two suspected disposal areas.

1.5.3 Will County Station

The Will County Station began producing power in 1955, with four coal-fired electric generating units. Units 1-3 were deactivated between 2010 and 2015, which leaves only one active unit (Unit 4) as of the date of this report. As was the case with the other Stations, the Powder River Basin in Wyoming is also the source of coal burned by MWG at the Will County Station[48].

[46] 2019 Board Order, pg. 42.
[47] 1/31/18 Tr. at 185:14-16 (Test. of Kelly).
[48] 2019 Board Order, pg. 20.

The Will County Station is bordered on two sides by surface water features. The Chicago Sanitary and Ship Canal (CSSC) is located to the east of the plant and the Des Plaines River borders the plant on the west. The Station is bordered on the north by Romeo Road and on the south by Hanson Materials (f/k/a Materials Services Corp.). A site layout map is included as **Figure 3**.

1.5.3.1 CCR Surface Impoundments

Four CCR surface impoundments are located at the Will County Station. Ponds 1N, 1S, 2S, and 3S are each permitted under the Station's NPDES Permit[49]. The above four ponds were constructed in 1977, with 24-36 inches of Poz-o-Pac™ liner. Only Ponds 2S and 3S are presently used as part of Station operations. They are used interchangeably. While one of the ponds is in service, the other is designated for cleaning, which generally occurs approximately on an annual basis[50].

When they were part of the facility coal ash treatment system, Ponds 1N and 1S collected bottom ash fines from Units 1 and 2 at the Will County Station[51]. Units 1 and 2 were shut down in 2010 and Ponds 1N and 1S were removed from service at that time[52]. A dewatering system has been installed at Ponds 1N and 1S that is designed to maintain no more than 1 ft. of water in the ponds[53].

The liner for Pond 3S was installed in 2009. The new liner consisted of the following, from the bottom up: a bottom geotextile cushion layer placed on top of the Poz-o-Pac™, 60-mil HDPE geomembrane liner, a top geotextile cushion, a 12" thick sand cushion layer, and 6" thick limestone warning layer. Pond 2S was upgraded with a similar liner system in 2013. Due to the smaller size of the pond, MWG also installed a geocell on the sideslopes of Pond 2S[54]. The purpose of the geocell was for additional protection of the liner during operation and cleanup in the pond.

The bottom elevation of Pond 2S and Pond 3S is 582.5 ft. MSL[55]. The highest recorded groundwater elevations since June 2011 in the vicinity of Ponds 2S and 3S (i.e., from MW-05, MW-06, MW-09, MW-10, MW-11, and MW-12) ranged between approximately 581.6 ft. MSL at

[49] NPDES Permit No. IL0002208.
[50] JAS, Oct 2, 2017, 47.
[51] JAS, Oct 2, 2017, 48 and 1/31/18 Tr. p. 253 (Test. of Veenbaas).
[52] JAS, Oct 2, 2017, 50; 10/24/18 Tr. p. 276 (Test. of Maddox); 1/30/18 Tr. p. 254 (Test. of Race).
[53] Compliance Commitment Agreement, Will County, Oct 24, 2012.
[54] MWG Exhibit 901, p. 61.
[55] Id.

MW-12 in May 2019 and 584.1 ft. MSL at MW-05 in May 2019. The average groundwater elevation in the vicinity of Ponds 2S and 3S between June 2011 and November 2020 was approximately 581.4 ft. MSL.

Based on the Federal CCR Rules, MWG considers Ponds 2S and 3S at Will County to be Federal CCR Surface Impoundments, as they meet the definition of surface impoundment and contained CCR and liquids after October 19, 2015. Because of the dewatering system previously installed at Ponds 1S and 1N prior to 2015, they do not contain both CCR and liquids after 2015 and MWG determined they are not covered under the Federal CCR Rules. Based on the Illinois definition, Ponds 1S and 1N are considered Illinois CCR Surface Impoundments, because they meet the definition of an inactive CCR surface impoundment and contained CCR materials after October 19, 2015.

The most recent technical document pertaining to the Federal CCR surface impoundments at the Will County Station was submitted to USEPA in late 2020. MWG submitted an ACD under the Federal CCR Rules (40 CFR 257.103) to USEPA on November 30, 2020 addressing Ponds 2S and 3S[56]. The ACD was submitted because Pond 2S and Pond 3S do not meet the liner design criteria or uppermost aquifer location criteria under the Federal CCR Rule, but the Will County Station does not have an alternative capacity for CCR.

The ACD for the Will County Station proposes to cease sending CCR and non-CCR waste streams to Pond 3S after April 11, 2021 and subsequently clean close Pond 3S. The ACD also proposes a workplan for the development of alternate disposal capacity to replace Pond 2S. This workplan calls for implementation of a multiple technology system (MTS) to address CCR and non-CCR waste streams being managed within Pond 2S. The system is proposed to consist of a remote submerged scraper conveyor (SSC) for the CCR waste streams and a new Low Volume Waste Basin for the Station's non-CCR waste streams managed at Pond 2S. The MTS will be developed in two phases. The first phase will separate the CCR and non-CCR waste streams that are currently commingled and then the second phase will convert the Station's bottom ash-handling system into a closed-loop system. To allow for sufficient time for the design and installation of the modified treatment system, the ACD requests USEPA allow Pond 2S to continue receiving CCR waste streams until July 23, 2023 and non-CCR waste streams until April 28, 2023. WCG understands that the ACD is under review by USEPA.

[56] Sargent & Lundy, Demonstration for a Site-Specific Alternative Deadline to Initiate Closure, Will County Generating Station, November 30, 2020.

1.5.3.2 Historical Fill Areas

In addition to the above coal ash surface impoundments, other areas at the Will County Station are suspected or known to contain historic coal ash and have been included in the case record. These areas include: 1) fill areas around coal ash surface impoundments and 2) an alleged former coal ash placement area in the southeastern portion of the Station. These areas have been investigated and the data collected during these historical environmental investigations has assisted with development of WCG's opinions expressed within this Report.

1.5.4 Waukegan Station

The Waukegan Station is a 194-acre property located at 401 East Greenwood Avenue, Waukegan, Lake County, Illinois. The station has been operating since 1923 with five coal-fired units, later expanded to eight units. The Station currently has two active units that have been in operation since 1958 and 1962. MWG has owned and operated that Station since 1999. As was the case with the other Stations, the Powder River Basin in Wyoming is also the source of coal burned by MWG at the Waukegan Station[57]. A Site Layout Map is included as **Figure 4.**

The surrounding area has been utilized for industrial purposes since the 1930s. Bordered to the north by Johns Manville Company Superfund site; North Shore Sanitary District to the south with Johnson Marine Plant Superfund site beyond; to the east by Lake Michigan; and to the west by the former General Boiler Company and former Greiss-Pfleger Leather Tanning Facility. Both the former General Boiler Company and the former Greiss-Pfleger Leather Tanning Facility area are located upgradient of the Waukegan Station.

1.5.4.1 CCR Surface Impoundments

The Waukegan Station has two ash ponds, East Pond and West Pond, located on the southern side of the Station, and operated as part of the Station's NPDES permitted system[58]. The East Pond and West Pond are "U-shaped" and were constructed in 1977 with a Hypalon® liner[59]. The East Pond and West Pond alternate receiving bottom ash, thus only one pond (East Pond or West Pond) is in service at a time[60]. Additionally, typically the bottom ash settles out on the influent

[57] 2019 Board Order, pg. 20.

[58] MWG Ex. 901, p. 45, 46; MWG Ex. 667, p. 20; MWG Ex. 642 ;1/30/18 Tr. p. 120:4-18 (Test. of Race).

[59] JAS 34; MWG Ex. 901, p. 45, 46; 1/31/18 Tr. p. 225:22-226:4 (Test. of Veenbaas); MWG Ex. 901, p. 45.

[60] JAS 37; 10/24/17 Tr. p. 162:3-6 (Test. of Lux); 1/30/18 Tr. p. 118:13-18 (Test. of Race); 1/31/18 Tr. p. 230 (Test. of Veenbaas).

side of the "U" of the pond, and the opposite side of the "U" typically only contains water and a small quantity of bottom ash[61].

MWG replaced the liner at the East Ash Pond in 2003 with a 60 mil HDPE liner and replaced the West Ash Pond a year later in 2004[62]. The East and West Ponds liner system includes a prepared subgrade, HDPE liner, a sand cushion and limestone warning layer[63]. The bottom elevation of the CCR surface impoundments is 585 ft. MSL[64]. The highest recorded groundwater elevation since June 2011 in the vicinity of the Waukegan ash ponds (i.e., from MW-01, MW-02, MW-03, MW-04, MW-05, MW-07, and MW-16) ranged from approximately 584.2 ft. MSL at MW-01 in May 2019 and MW-16 in November 2019 to 584.6 ft. MSL at MW-05 in May 2018. The average groundwater elevation in the vicinity of the ash ponds between June 2011 and November 2020 was approximately 582.0 ft. MSL.

Based on the Federal CCR Rules, MWG considers the East and West Ash Ponds at Waukegan to be Federal CCR Surface Impoundments, as they meet the definition of surface impoundment and contained CCR after October 19, 2015.

MWG has prepared an ACD for the Waukegan Station, as neither the East Ash Pond nor the West Ash Pond meet the liner design criteria required by the Federal CCR Rules[65]. Under the Federal CCR Rules, Waukegan must cease placing CCR and non-CCR waste streams into the East and West Ash Ponds as soon as technically feasible, but no later than April 11, 2021, unless an alternative deadline is granted by the EPA in accordance with 40 CFR 257.103. Because the Station does not need to have both of its CCR surface impoundments in service to operate – and pursuant to the revised Federal CCR Rule – Waukegan will not send CCR or non-CCR waste streams to the West Ash Pond after April 11, 2021 and does not plan on sending any waste streams to that basin in the interim. After evaluating several on- and off-site alternative disposal solutions for the waste streams currently managed within the East Ash Pond (both permanent and temporary), MWG has concluded that no alternative disposal capacity is available for these waste streams. Further, it is technically infeasible to obtain alternative disposal capacity for these waste streams on- or off-site by April 11, 2021.

[61] 10/24/17 Tr. p. 163:15-24 (Test. of Lux); 1/31/18 Tr. p.235:4-10 (Test. of Veenbaas); 2/2/18 Tr. p. 82:15-83:4 (Test. of Seymour).
[62] JAS 35, 36; MWG Ex. 901, p. 46.
[63] MWG Exh. 901, pg. 46.
[64] MWG Exh. 901, pg. 47.
[65] Sargent & Lundy, Demonstration for a Site-Specific Alternative Deadline to Initiate Closure, November 30, 2020

As described in the ACD, MWG is proposing to install a multiple technology system, consisting of a remote SSC for Waukegan's CCR waste streams and construct a new Low Volume Waste Pond for the Station's non-CCR waste streams that are currently being managed by the East Ash Pond. This multiple technology system will be developed in two phases. The first phase will bring Waukegan into compliance with the Federal CCR Rule and will separate the CCR and non-CCR waste streams that are currently being commingled in the East Ash Pond. This will set up the second phase in which MWG will bring the Station into compliance with the EPA's recently revised effluent limitation guidelines for steam electric power generating stations (ELG Rule) by converting Waukegan's bottom ash-handling system into a closed-loop system.

This proposed multiple technology solution to replace the East Ash Pond will be installed in accordance with the Federal CCR Rule and with the Illinois EPA's forthcoming regulations and permit program for CCR surface impoundments. Pursuant to the Illinois Public Act authorizing the Illinois EPA to prepare and the Illinois Pollution Control Board to adopt the Final Illinois CCR Rule, MWG cannot "close any CCR surface impoundment without a permit granted by the [Illinois EPA]." To allow for sufficient time for the design and installation of the modified treatment system, the ACD requests USEPA allow the East Ash Pond to continue receiving the noted CCR waste streams until October 11, 2023 and the noted non-CCR waste streams until June 16, 2023. WCG understands the ACD is under review by USEPA.

1.5.4.2 Historical Fill Area

In addition to the above coal ash surface impoundments, the Former Slag Area (FS Area), located to the west of the West Pond, is reported to contain historical coal ash that was placed before 1998[66]. This area has been investigated as part of work performed by MWG[67]. The presence of coal ash has also been noted at certain areas outside of the surface impoundments during geotechnical investigations. The data collected during these environmental investigations has assisted with development of WCG's opinions expressed within this Report.

[66] 2019 Illinois Pollution Control Board Order at 66-67.
[67] MWG 13-15 79493-79771; MWG 13-15_81195-81293.

2 ISSUES WITH QUARLES OPINIONS

2.1 Quarles incorrectly applies the Federal CCR Rules to each Station.

The conclusions of the Quarles report are presented in three primary sections, containing Mr. Quarles' opinions with respect to contaminant sources, nature and extent of potential contamination, and potential remedies for the Stations. Mr. Quarles draws heavily from the 2019 Interim Opinion and Order of the Board, resulting in a Report that presents little independent analysis of the extensive Station-specific information developed to date through historical investigation prior to MWG's operation of the Stations, voluntary implementation of the CCAs entered with Illinois EPA, compliance with the 2015 Federal CCR Rules, and on-going investigative activities. He also ignores the Board's February 2020 Opinion and Order that significantly modifies the 2019 Opinion and Order. There should be a distinction made between areas of the Stations that are subject to the Federal CCR Rules (40 CFR 257) and/or the IL CCR Surface Impoundment regulations (35 Ill. Adm. Code 845) and those areas of the Stations which are not subject to those regulations. Quarles attempts to apply the regulatory requirements of the Federal CCR Rules to the entirety of the Stations, including both the Federal CCR regulated units and the historical fill areas. Quarles did not mention the IL CCR Rules, which were under review by the Board as of the date of the Quarles Report. Certain surface impoundments fall under the Federal CCR Rules, while others fall under the IL CCR Rules. The specific areas at each Station covered under the Federal and IL CCR Rules was discussed above in Section 1.5.

2.2 Quarles incorrectly concludes that the Federal CCR Surface Impoundments are used for permanent disposal of coal ash.

Quarles indicates that the CCR surface impoundments at the Stations are intended for permanent disposal of coal ash. However, each of the CCAs signed by MWG with Illinois EPA clearly state that the active surface impoundments are temporary units for dewatering CCR and use of the surface impoundments will be discontinued. Also, the MWG employees testified that the active CCR impoundments are routinely emptied.

2.3 Quarles fails to consider the extensive data record available at each Station.

Quarles does not adequately consider the entire record. In particular, the record contains an extensive amount of environmental data (i.e., soil, ash, and groundwater) collected from the MWG Stations. These data have been collected from 1998 up until late 2020, in the case of recent

investigations performed at both the Joliet 29 and Waukegan Stations. Quarles fails to consider the extensive environmental data collected by MWG that is relevant to deciding the appropriate remedy at each of the Stations.

Although Quarles does not identify a specific remedy for each of the Stations, he broadly concludes that "Even though MWG plans to close ash ponds at Joliet 29, Powerton, Waukegan, and Will County by excavation and removal, those closure efforts will be incomplete to remove contaminant sources if historical coal ash remains in adjacent areas or beneath the former active ash ponds. Closure by excavation is expected to improve groundwater quality over time because the source of the contaminants is removed"[68]. However, there is no independent analysis performed in the Quarles Report to demonstrate that there are or will be source areas at the Stations. As described in greater detail in subsequent sections, an evaluation of the leaching data collected from CCR surface impoundments and soil obtained from historical fill areas indicates that not all coal ash is necessarily a source that will contribute to groundwater contamination.

Not only does the Quarles Report fail to reference data already available, it fails to mention the February 2020 Board Order reaffirming the continued application of the GMZs at three of the Stations, which cease the applicability and the violations of Part 620 of the Board regulations that were previously found by the Board in the 2019 Board Order.

2.4 Quarles fails to adequately consider the specific factors used by the Board as the basis for a remedy at each Station.

The Quarles Report does not adequately evaluate the factors listed in the Act Section 33(c) and 42(h) that the Board directed be utilized as the basis for any remedy. Rather than concluding that a specific remedy was or was not required at the various Stations, Quarles more broadly stated that other actions are required to meet Illinois EPA groundwater standards, but he fails to address the technical practicability or economic reasonableness of a remedy, the suitability of the Stations to the area at which they are located, and any due diligence to comply, including entry into and compliance with the CCAs.

[68] Quarles Report at 25.

3 REGULATORY FRAMEWORK

The following opinions set the applicable regulatory background relevant to determining the appropriate action and/or remedy, which is discussed in more detail below in Section 4.

3.1 The Federal and State CCR Rules apply to specific units at each Station, not to all coal ash present at the Station.

As first mentioned above in Section 1.4, the Federal and IL CCR Rules apply to each of the four Stations. Specifically, these rules apply to both existing and inactive surface impoundments under the definitions in the Federal CCR Rules and Illinois CCR Rules. However, these rules only apply to specific areas of each Station, based upon those areas meeting the regulatory definitions of existing or inactive surface impoundment, discussed above in Section 1.4.1. Other areas outside the federal/state surface impoundments do not meet the regulatory definition of a surface impoundment.

The specific CCR units subject to either the Federal and/or State CCR requirements at each of the four Stations is discussed above in the Station Background Section 1.5.

The record associated with Illinois rulemaking R20-19 indicates that certain parties (including some of the Complainants) formally requested that the Board develop Illinois regulations for "historic, unconsolidated coal ash fill". If these areas were already regulated under the IL CCR Rules, there would be no need for additional regulations. However, the areas of unconsolidated fill are not unregulated. Instead, the Act and the Board regulations generally apply to all areas in all parts of the State of Illinois.

3.2 The 2012 CCAs at each of the Stations are key compliance mechanisms that have also resulted in collection of a substantial quantity of data useful for characterization of environmental conditions and implementation of measures to control potential contaminant sources at each Station.

In response to the issuance of notices from Illinois EPA related to alleged violations of the Act and 35 Ill. Adm. Code 620 Groundwater Quality Standards, MWG entered into CCAs with Illinois EPA at all four Stations. Each of the CCAs was accepted by Illinois EPA in separate letters to MWG dated October 24, 2012. The CCAs placed various obligations on MWG for each of the Stations.

At Joliet 29, MWG agreed to undertake the following to attain compliance with the alleged violations:

a) The ash ponds at Joliet 29 shall not be used as permanent disposal sites and shall continue to function as treatment ponds to precipitate ash. Ash shall continue to be removed from the ponds on a periodic basis.

b) The ash treatment ponds shall be maintained and operated in a manner which protects the integrity of the existing liners. During the removal of ash from the ponds, appropriate procedures shall be followed to protect the integrity of the existing liners, including operating the ash removal equipment in a manner which minimizes the risk of any damage to the liner.

c) During the ash removal process, visual inspections of the ponds shall be conducted to identify any signs of a breach in the integrity of the pond liners. If a breach of the pond liners is detected, MWG shall promptly notify the Illinois EPA and shall implement a corrective action plan for repair or replacement as necessary. Upon Illinois EPA approval, and issuance of any necessary construction permit, MWG will implement the corrective action plan.

d) Continue quarterly groundwater monitoring and submit the results to Illinois EPA, including groundwater elevation data/potentiometric surface map.

e) Submit an application for a construction permit to reline Pond #3 with a HDPE liner.

f) Submit an application to establish a GMZ within 90 days.

g) Establish a GMZ within one year.

h) Once Pond #3 was relined and the GMZ established, submit a certification/statement of compliance.

The CCA for Powerton included the same basic provisions as items (a) through (d), (g), and (h) above for Joliet 29. In addition, the Powerton CCA included the following requirements:

a) Submit an application for a construction permit to reline the Ash Surge Basin and Secondary Ash Settling Basin with a HDPE liner or approved equivalent.

b) Install an additional groundwater monitoring well south of well 9.

c) Enter/record an Environmental Land Use Control (ELUC) to cover the area of the Powerton Station property contained within the GMZ.

d) Do not allow the East Yard Run-off Basin to be part of the ash sluicing flow system. Also, submit monitoring results from water contained in the East Yard Run-off Basin proximate to outfall monitoring point 003 within 60 days. Quarterly monitoring of the East Yard Run-off Basin shall also be performed.

e) No unlined areas may be used for permanent or temporary ash storage or ash handling.

The CCA for Will Co. contained the same basic provisions as items (a) through (d), (g), and (h) above for Joliet 29. The following items were also included:

a) Remove Ponds 1N and 1S from service and divert process water to Ponds 2S and 3S. Also, a dewatering system shall be developed and implemented, which will not allow water to exceed a depth of one foot above the bottom of Ponds 1N and 1S.

b) Submit an application for a construction permit to reline Pond 2S with HDPE liner (or approved equivalent material).

c) Enter an ELUC to cover the area of the Will County Station property covered under the GMZ, except for the portion owned by ComEd.

The Waukegan CCA included the same requirements as those listed for the other Stations above related to operations at the ash ponds and regular groundwater monitoring. The Waukegan CCA also required:

a) Installation of two additional groundwater monitoring wells at locations approved by Illinois EPA;

b) Enter an ELUC to cover the remaining Station property to the east not already included in the existing ComEd Former Tannery Site ELUC.

As required by the CCAs, MWG filed a certificate with the Illinois EPA that the measures outlined in the CCA were implemented (with groundwater monitoring continuing at all stations and GMZs in place at three), as follows:

- Joliet 29, on October 9, 2013;
- Powerton, on October 17, 2013;
- Will County, on October 17, 2013; and
- Waukegan, on October 22, 2013.

Illinois EPA has not pursued any additional enforcement action against MWG at any of the four Stations since the CCAs were signed.

The CCAs resulted in a database of groundwater quality data since the CCAs were established in 2012. Groundwater data has also been collected at the four Stations under the Federal CCR Rules. A total of 57 monitoring wells have been monitored at the four Stations for thirty-four (34) constituents four times per year, which has resulted in the collection of over 62,000 individual data points since establishment of the CCAs in 2012 (8 years of monitoring). As will be discussed further below, WCG has statistically evaluated the data collected near the downgradient property boundaries at each Station. This statistical analysis indicates that the majority of statistical trends in the data are downward, as discussed in Section 4.3.

WCG has assisted clients in the development of many different CCAs in the past. We have CCA experience related to various environmental regulations, primarily issues with the Illinois EPA Bureau of Land involving solid and/or hazardous waste management/disposal, related to the RCRA, as well as issues with the Illinois EPA Bureau of Water primarily involving the Clean Water Act (CWA). A common attribute associated with clients that enter CCAs is a desire to voluntarily comply with environmental regulations, not avoid compliance. The alleged violations of the 35 Ill. Adm. Code 620 standards addressed by the CCAs are the same violations of the Act cited in the 2019 Board Order. The CCAs were entered on a voluntary basis to responsibly address the alleged violations identified by Illinois EPA and comply with the applicable regulations.

Whether the Respondent has successfully completed a CCA is one of the factors the Board must consider under Section 42(h) of the Act in mitigation or aggravation of any penalty, if a penalty is to be imposed. MWG having successfully entered CCAs for each Station and subsequent compliance with the terms and conditions included in the CCAs, is a mitigating factor in this case.

4 APPROPRIATE ACTIONS/REMEDY

As discussed in the 2019 Board Order, the current phase of this litigation is intended to determine the appropriate relief and any remedy that may be required. WCG's opinions concerning relief and remedy presented in this section are subdivided into two categories addressing the potential need for:

1. Additional site investigation; and
2. A remedy to address the environmental conditions, based on both Board Orders.

The above items are presented separately because the need for additional investigation was discussed by Quarles and additional investigation to characterize a site (such as additional soil/groundwater sampling/analysis) is viewed as fundamentally different than a remedy, which under certain circumstances, may be required to address contaminated groundwater previously documented at the Stations.

4.1 The Federal/State CCR Surface Impoundments at each Station do not need to be investigated further to determine appropriate actions.

The Federal/State CCR surface impoundments do not need to be investigated further because the existing Federal/State CCR Rules already sufficiently address any required investigation. Moreover, the record indicates that the Federal CCR surface impoundments are operated pursuant to the Federal CCR Rules, which are deemed sufficiently protective of human health and the environment.

A rigorous groundwater monitoring program is being implemented at each of the Stations. The groundwater monitoring program is largely based upon the RCRA Subtitle D groundwater monitoring program implemented at solid waste landfills since the 1990s. Pursuant to the Federal CCR Rules, MWG is implementing a detection or assessment groundwater monitoring program at each of the Stations. The groundwater concentrations are compared to statistically derived background concentrations to evaluate whether the regulated units are adversely impacting groundwater.

Quarles incorrectly opines that the existing background groundwater data are not sufficient for evaluating whether the regulated CCR units have impacted groundwater quality. The existing background groundwater data utilized to evaluate whether the Federal CCR Surface Impoundments are adversely impacting groundwater are appropriate for satisfying the

regulatory requirements in the Federal CCR Rules and determining background concentrations at the Stations. The Federal CCR Rules require that the detection and assessment monitoring (if needed) programs focus on potential contributions of the regulated units to groundwater. The upgradient wells identified by KPRG[69] in the monitoring programs for the Stations are not affected by the regulated units because the wells are upgradient based on groundwater elevation contour maps, there is no evidence of mounding from the units, the units are lined, and those liners are functioning as designed to control infiltration from the surface impoundments. Groundwater elevation contour maps produced annually, most recently for data collected in 2020 and 2021[70], in accordance with the CCR monitoring at each Station do not indicate groundwater mounding in proximity of the regulated units. WCG agrees with the direction of groundwater flow depicted in the 2020 CCR Compliance Annual Groundwater Monitoring and Corrective Action Reports for all the Stations prepared by KPRG.

Based on the lack of groundwater mounding observed at the Stations, the upgradient wells represent the character of groundwater flowing from areas upgradient of the CCR surface impoundments and that the identified upgradient groundwater quality is the correct basis for comparison to the groundwater quality after it has passed beneath the CCR Surface Impoundments.

4.1.1 Groundwater Conditions at Powerton

WCG disagrees with Quarles' attempt to identify mounded groundwater and radial groundwater flow conditions emanating from the Ash Surge Basin and the Bypass Basin at the Powerton Station[71].

The Quarles Report fails to differentiate that at the Powerton Station, there are two saturated vertical units. Quarles instead inappropriately combines groundwater elevation data for monitoring wells screened in two different saturated zones into one contour map. Using groundwater elevation data from two separate units to create one potentiometric surface

[69] KPRG is the environmental consultant performing groundwater monitoring at each of the Stations.
[70] CCR Compliance Annual Groundwater Monitoring and Corrective Action Report – 2020 for the Joliet #29 Station at 11 – 12; CCR Compliance Annual Groundwater Monitoring and Corrective Action Report – 2020 for the Ash Surge Basin and Bypass Basin at the Powerton Station at 13 – 14; CCR Compliance Annual Groundwater Monitoring and Corrective Action Report – 2020 for the Former Ash Basin at the Powerton Station at 16 – 17; CCR Compliance Annual Groundwater Monitoring and Corrective Action Report – 2020 for the Will County Station at 11 – 12; and CCR Compliance Annual Groundwater Monitoring and Corrective Action Report – 2020 for East and West Ash Ponds at the Waukegan Station at 13 – 14.
[71] Expert Report of Mark A. Quarles at pg. 16.

diagram is inconsistent with industry standard practice and results in his inaccurate conclusion that there is mounding under the Ash Surge Basin and the Bypass Basin. WCG's evaluation of the April 2020 groundwater elevation data along with the monitoring well boring logs and well construction logs identified the following:

- Six wells (MW-6, MW-8, MW-12, MW-14, MW-15, and MW-17) screened within a confining clay/silt unit and the overlying gravel, sand, and cinders unit;
- Twelve (12) wells screened within the deeper unit consisting mostly of gravel and sand; and one well (MW-18) screened within both the deep and shallow sand units separated by a confining clay unit. Given MW-18 is screened across two water bearing units, MW-18 groundwater elevation data is not an accurate representation of either water bearing units. Therefore, MW-18 groundwater elevation data should not be used in the creation of potentiometric surface maps.

The two different units demonstrate that there are two distinct but hydraulically connected groundwater units, a conclusion that was identified by KPRG and that has been consistently demonstrated in each of MWG's groundwater reports for the CCR surface impoundments. In fact, that there are two distinct but hydraulically connected units was never in dispute. Rather, Complainants' first expert agreed with KPRG's analysis, testifying that there are two aquifers at Powerton, that one was a sand-and-gravel unit, and the other was a silty clay aquifer.[72] Once the two saturated vertical units are identified, it is clear that there is no mounding in the groundwater under the Ash Surge Basin and the Bypass Basin.

4.1.2 Alternate Source Demonstrations (ASDs)

The Federal CCR Rules allow for a demonstration that the regulated units are not the source of the confirmed statistically significant increases above the background concentrations. MWG has pursued this Alternate Source Demonstration (ASD) path at three of the Stations: Powerton, Will County, and Waukegan. No ASD was needed for Joliet 29 because no statistically significant increases have been confirmed at monitoring wells monitoring Pond 2, which is the only unit covered under the Federal CCR Rules at the Joliet 29 Station. Each of the ASDs has been certified by an Illinois Licensed Professional Engineer (PE) and made available to the on-line MWG CCR platform. Further discussion concerning the ASDs is presented below:

[72] Oct. 26, 2017 Afternoon Transcript, pg. 93:15-20.

4.1.2.1 Powerton ASD

The initial detection monitoring results for the Powerton Station were discussed by KPRG in the 2017 CCR Groundwater Monitoring Report dated January 24, 2018[73]. KPRG recommended completing an ASD because the detection monitoring statistical evaluations indicated statistically significant increases (SSIs) in downgradient monitoring wells relative to established background for various 40 CFR 257 Appendix III parameters.

The recommended ASD for SSIs of Appendix III detection monitoring parameters was performed April 12, 2018[74]. Ash and water samples were collected from the Ash Surge Basin and the Bypass Basin and analyzed using the Leaching Environmental Assessment Framework (LEAF) method to determine whether the noted SSIs may be associated with a release from the regulated unit(s) or if another potential source in the vicinity of the ash ponds may be affecting the local groundwater quality. Each of the samples underwent leaching over a range of 8 pH values and under "Natural pH" conditions, which is the actual pH of the sample itself. The natural pH results are believed to be the most applicable to field conditions because the natural pH represents the best approximation of field conditions. A summary of the LEAF data is located in **Table 2**. KPRG concluded that the Ash Surge Basin is not the source of downgradient monitoring well SSIs and that there is an alternate source(s) of impacts.

KPRG concluded that the data relative to the Bypass Basin was not definitive and potential contribution of leachate from the Bypass Basin to the local downgradient groundwater impacts could not be ruled out. KPRG recommended that the Ash Surge Basin and Bypass Basin be shifted from detection monitoring into assessment monitoring[75]. In accordance with the Federal CCR rules, KPRG performed a round of assessment monitoring for all Appendix III and Appendix IV parameters and determined that there were detections of Appendix IV parameters at concentrations exceeding Groundwater Protection Standards (GWPS), including arsenic at three well locations MW-11, MW-12 and MW-17, barium at well location MW-11 (August sampling only), selenium at well location MW-15, and molybdenum (May sampling only) and thallium at

[73] KPRG, CCR Compliance Annual Groundwater Monitoring and Corrective Action Report – 2017 Powerton Station, dated January 24, 2018.
[74] KPRG, Alternate Source Demonstration CCR Groundwater Monitoring Powerton Generating Station, dated April 12, 2018.
[75] Both Basins were shifted into assessment monitoring even though KPRG determined that the Ash Surge Basin was not the source of the SSIs. As described in the CCR Annual Groundwater Monitoring and Corrective Action Report – 2018, dated January 31, 2019, KPRG concluded that Ash Surge Basin should be included in the assessment monitoring as the well network for the Ash Surge Basin and Bypass Basins are "somewhat integrated".

well location MW-17. KPRG recommended that an ASD for the Appendix IV parameters be completed[76].

An ASD for detected Appendix IV parameters above established groundwater protection standards (GWPSs) was performed on March 25, 2019[77]. Ash and water samples were again collected from the Ash Surge Basin and Bypass Basin and analyzed using the LEAF method. A summary of the LEAF data is located in **Table 2**. KPRG performed a statistical evaluation of the LEAF data relative to groundwater and concluded that the Ash Surge Basin and Bypass Basin are not the source of downgradient monitoring well detections of arsenic, barium, molybdenum, selenium, and thallium concentrations detected above the GWPSs.

4.1.2.2 Will County ASD

The ASD for Will County was prepared by KPRG and dated April 12, 2018. The 2017 CCR Groundwater Monitoring Report dated January 12, 2018 included the following recommendation:

> *"The completed detection monitoring statistical evaluations have determined that there are SSIs in downgradient monitoring wells relative to established background for chloride, fluoride and TDS. At this time, KPRG recommends completing an alternate source demonstration to determine whether these exceedances may be associated with an actual release from the regulated unit(s) or if another potential historical source in the vicinity of the ash ponds may be affecting the local groundwater quality. If the alternate source demonstration is successful, then detection monitoring will resume. If the alternate source demonstration is not successful, then a transition to an assessment monitoring program complying with Section 257.95 will be required."*

To support the ASD, composite ash samples were collected from Pond 2S and Pond 3S. The composite samples consisted of a series of equivalent grab samples from across the length of the ponds, from the inlet area to the outfall. The samples were analyzed using the LEAF method. Each of the samples underwent leaching over a range of 8 pH values and under "Natural pH" conditions, which is the actual pH of the sample itself. The natural pH results are believed to be the most applicable to field conditions because the natural pH represents the best approximation

[76] Id.
[77] KPRG, CCR Compliance Annual Groundwater Monitoring and Corrective Action Report – 2018 Ash By-Pass Basin and Ash Surge Basin, dated January 31, 2019.

of field conditions. The leachate was analyzed for the CCR Appendix III detection parameters. The results from the LEAF Natural pH testing are summarized in **Table 3**.

The Will County ASD concluded that the SSIs for chloride, fluoride, and total dissolved solids (TDS) identified in the groundwater are not the result of leakage of leachate from the regulated units (Ponds 2S and 3S), but rather from "other potential sources". This was based on the following:

- Upgradient monitoring well concentrations of fluoride and TDS are higher than those measured for ash leachate at Natural pH conditions.
- The ash leachate at Natural pH conditions does not contain a sufficient concentration of each of these constituents to result in the measured downgradient well concentrations.

4.1.2.3 Waukegan ASD

The initial detection monitoring results for the Waukegan monitoring were presented by KPRG in the CCR Compliance Annual Groundwater Monitoring and Corrective Action Report dated January 31, 2019[78].

According to an ASD prepared by KPRG on April 12, 2018 for the Waukegan Station[79], detection monitoring statistical evaluations determined that there were SSIs in downgradient monitoring wells relative to established background for boron, pH and sulfate. Therefore, the ASD evaluated boron, pH, and sulfate. Ash and water samples were collected from each of the two CCR Ponds (East and West) and analyzed using the LEAF method (as described above). A summary of the LEAF data is located in **Table 4**. KPRG concluded that the SSIs for boron, pH, and sulfate are not the result of a release of leachate from the regulated units (East and West Ash Ponds) but rather from other potential source(s). KPRG based the recommendation on evaluation of the boron and sulfate ratio for ash samples and groundwater, the downgradient sulfate concentrations relative to the LEAF data, elevated sulfate outside the regulated units, and the concentration of sulfate and boron in groundwater upgradient of the CCR Ponds relative to the downgradient groundwater and LEAF results. The recommendation was to continue with routine detection monitoring.

[78] KPRG, CCR Compliance Annual Groundwater Monitoring and Corrective Action Report – 2018 for the Waukegan Generating Station, dated January 31, 2019.
[79] KPRG, Alternate Source Demonstration CCR Groundwater Monitoring at the Waukegan Generating Station, dated April 12, 2018.

4.1.3 Testing of Coal Ash Under Beneficial Use Requirements

The coal ash that is removed from the Federal CCR surface impoundments at the Stations for offsite use has been sampled and analyzed to support the beneficial reuse of this product. Specifically, as discussed above in Section 1.4.3 and pursuant to Section 3.135(a) of the Act, NLET test results are obtained and compared to the Illinois Class I Groundwater Quality Standards located in 35 Ill. Adm. Code 620.410. A summary of this historical analytical data included in the record reviewed by WCG is presented in **Tables 1 - 4**. These data indicate:

- Powerton: a composite sample of bottom ash collected in February 2007 did not exhibit any metals concentrations above the Class I Groundwater Quality Standards;
- Will County: a composite sample of bottom ash collected in December 2010 did not exhibit any metals concentrations above the Class I Groundwater Quality Standards;
- Waukegan: two composite samples of bottom ash collected in July 2004 did not exhibit any metals concentrations above the Class I Groundwater Quality Standards.

Overall, the above NLET data indicates that the coal ash sampled from the Federal CCR surface impoundments exhibits concentrations of metals less than the Class I Groundwater Quality Standards. In addition, the upgraded liners installed above the historical Poz-o-Pac™ liners are consistent with industry-accepted standards, USEPA's Guide for Industrial Waste Management (2012), and industry acceptance of and reliance on HDPE liners under RCRA.

4.2 Historical fill areas at each Station do not need to be investigated further to determine appropriate actions.

When the vast quantity of available data collected at the Stations and available in the regulatory record associated with the Federal CCR Rules is considered, the data and information indicate that sufficient investigation of historical fill areas identified at the Stations has already occurred. These historical fill areas do not meet the regulatory definition of "CCR surface impoundment" because they were not designed to hold an accumulation of CCR and liquids. Because the record indicates that these historical fill areas received CCR before October 19, 2015, these areas are excluded from the Federal CCR Rules.

One reason for excluding these units from the Federal CCR rules is discussed in the preamble to the CCR Rulemaking, wherein USEPA specifically states that the Agency is not aware of any damage cases associated with inactive CCR landfills. Further, the risks of releases to the environment from such units are significantly lower than CCR surface impoundments or active

CCR landfills[80]. The primary reason for the reduced risk associated with inactive landfills is that these areas do not exhibit a constant head of water on top of the CCR materials, as is the case with surface impoundments and active landfills. The weight and pressure of water in surface impoundments is more likely to result in releases to the environment.

The above opinion is further supported by a substantial amount of data historically collected at each of the four Stations. Some of these data were collected before MWG's acquisition of the Stations, additional data was collected during MWG's ownership, and data collection has occurred until recently, as the most recent data was obtained at the Joliet 29 and Waukegan Stations during the 4th quarter of 2020. The following provides a discussion of the historical data collected related to the historical fill areas at each of the Stations.

4.2.1 Joliet 29

The 1998 Phase II Environmental Site Assessment (ESA) performed by ENSR[81], included the results from 17 soil borings, installation of five monitoring wells, 23 surface soil samples, and 6 sediment samples. The locations of the various samples collected is shown on **Figure 5**.

As related to the historical fill areas relevant to the case, groundwater monitoring wells MW-3 and MW-4 installed as part of the 1998 Phase II ESA are located downgradient of the Northwest and Southwest Fill Areas, while MW-5 is also located near the Northwest Fill Area. While an insufficient volume of groundwater was present in MW-4, the results from the groundwater samples analyzed at MW-3 and MW-5 did not identify concentrations of RCRA Metals (As, Ba, Cd, Cr, Pb, Hg, Se, Ag) above the Class I Groundwater Quality Standards.[82]

The 1998 Phase II ESA Report indicated: "Based on the current land use (industrial) and site conditions (analytical results and soil types), it is judged that the potential for human exposure to the constituents of concern from this facility is low." The Phase II ESA Report concluded: "There is not a requirement under Illinois environmental law to further investigate or remediate this property."[83]

MWG collected additional information at the Northwest Fill Area in 2004. An initial investigation performed by Andrews Environmental Engineering (AEE) is referenced in KPRG's August 18, 2005

[80] 40 FR 21342.
[81] ENSR, December 1998.
[82] Arsenic, barium, cadmium, chromium, lead, mercury, and selenium are listed as constituents to evaluate the presence of contamination of coal ash in groundwater. 35 Ill. Adm. Code 845.600.
[83] ENSR, December 1998.

Letter Report to MWG[84]. AEE performed an initial site assessment of an area at Joliet 29 to determine whether a CCB classification was feasible. The area investigated by AEE is now referred to as the Northwest Fill Area. AEE found that the subsurface materials were generally homogenous, consisting of interlayered fly ash and bottom ash/slag. A total of 20 samples were collected from 20 borings across a 13.2-acre area. The 20 samples were composited into one representative sample and analyzed for NLET metals and for "Code R" disposal parameters, which included Toxicity Characteristic Leaching Procedure (TCLP) metals, semi-volatile organic compounds (SVOCs), volatile organic compounds (VOCs), ignitability, reactive cyanide, and reactive sulfide.

According to the above 2005 KPRG report, the results indicated that none of the leachable metals analyzed using the NLET method exceeded the Class I Groundwater Quality Standards and the material would be classified as non-hazardous for disposal purposes.

Intending to build off the information collected in 2004 by AEE, MWG contracted with KPRG to perform additional investigation of the Northwest Fill Area in June 2005. A total of 15 Geoprobes (GP-1 through GP-15) were advanced over the 13.2-acre study area. Three of the original locations (GP-12, GP-14, and GP-15) did not exhibit CCR and therefore these locations were off-set to locations GP-12A, GP-14A, and GP-15A. The coal ash deposits encountered within these Geoprobes were consistent and homogeneous, consisting of interlayered fly ash and bottom ash/slag from the coal combustion process.

A composite soil sample of the entire vertical profile of each of the Geoprobes was submitted for laboratory analysis using the NLET method for metals. A total of 17 composite samples from the Northwest area were analyzed for NLET metals and the results are summarized in **Table 1**. The results from 16/17 samples exhibited NLET metals below the Class I Groundwater Quality Standards. Concentrations of copper and lead from GP-14A were higher than the Class I Groundwater Quality Standards. A statistical analysis was performed on the remaining 16 samples. The results indicated "with a high degree of statistical certainty that the criteria established in 415 ILSC 5/3.135…are met and that the material may be considered CCB relative to this criterion" and the "data set is sufficiently large to support the statistical evaluations based on the variance and specific regulatory threshold relationships"[85].

[84] KPRG, August 18, 2005.
[85] KPRG, August 18, 2005.

In response to the identification of the above concentrations of copper and lead in the NLET result from GP-14A, additional delineation within this area was undertaken in the Northwest area in November 2005. The results were presented in a report to MWG by KPRG dated December 6, 2005[86]. Eight additional Geoprobes and one test pit was installed to collect ash/slag samples from around boring GP-14A. One composite sample was collected from the entire vertical profile at each Geoprobe and the test pit and submitted for NLET for copper and lead. The additional samples collected in November each exhibited concentrations of NLET copper and lead below the Class I Groundwater Quality Standards, which adequately delineated the (limited) extent of the soils exhibiting concentrations of NLET copper and lead above the Class I Groundwater Quality Standard.

As documented in KPRG's 12/6/2005 Report, waste profiling data consisting of TCLP metals, TCLP VOCs, TCLP SVOCs, pH, paint filter, reactive cyanide/sulfate, flashpoint, phenols, and chlorinated solvents scan, was used to classify the materials as non-hazardous special waste for disposal purposes. A total of 52 loads of soil/CCR weighing 1,062.88 tons were excavated and hauled to the Environtech Landfill facility in Morris, Illinois for disposal, as a remedial action[87].

The most recent site investigation work at the Joliet 29 Station was performed in November 2020 and focused on the area in proximity to monitoring well MW-09, which has historically exhibited fluctuating concentrations of TDS and sulfate in the groundwater exceeding the 35 Ill. Adm. Code 620 Class 1 Groundwater Quality Standards. This area was the only area at the Joliet 29 Station identified by the Board as evidence of a violation of 12(a) of the Act[88]. A total of 18 soil borings were advanced in the vicinity of MW-09 and various soil samples obtained from these borings were analyzed for sulfate, iron, and manganese[89].

The soils in the investigation area consisted of a mixture of brown to gray sand, gravel, silty sand, and some clay. No coal ash materials were identified in the above boring logs. The analytical results from this investigation indicated concentrations of iron and manganese in the soil in this area generally at consistent concentrations, some which exceed the Soil Background Concentration in Metropolitan Statistical Areas included in the 35 Ill. Adm. Code TACO Regulations. However, the sulfate concentrations reported in the soil samples varied widely.

[86] KPRG, December 6, 2005.
[87] 2019 Board Order mistakenly states on pg. 28 that "the record does not include information as to whether MWG separated or removed this part of the material from the sampled area."
[88] 2019 Board Order, pg. 31-33 and pg. 78.
[89] MWG 13-15_ 79341-79442.

Most of the sulfate concentrations were reported below 100 mg/kg. However, certain samples exhibited sulfate concentrations of an order of magnitude (or more) higher. For example, SB-11 (11-13') reported sulfate at 2,000 mg/kg, SB-14 (3-4') reported sulfate at 4,000 mg/kg, SB-15 (6-8') reported sulfate at 16,000 mg/kg. There are no apparent distribution trends either horizontally or vertically in the soil.

The pH in the groundwater at MW-09 is more acidic, compared to the other locations, which is believed to be related to oxidation of a localized pocket of residual sulfide minerals near the MW-9. Sulfide minerals are common within the underlying Silurian dolomite bedrock[90], which comprises the parent material for the soil. Oxidation reactions of sulfide minerals results in the formation of sulfuric acid and mobilization of metals such as iron, manganese, and other metals, depending on the specific mineral and associated impurities. These oxidation reactions are believed to be associated with the groundwater quality conditions observed in the groundwater at MW-09. Thus, the sporadic sulfate and TDS groundwater concentrations are naturally occurring in the soil and not due to Station operations, including the presence of CCR in the soil or leaking from a pond.

The Northeast area is regularly inspected under the Station's NPDES stormwater permit. The inspections are performed on an annual basis by a third party contractor (KPRG). If erosional features are identified during the inspections, the appropriate repairs have been implemented in a timely manner[91].

The historical data as described above are sufficient to adequately characterize the historical coal ash fill areas at the Joliet 29 Station for the purposes of assessing a remedial approach. The Board did not identify the northwest, northeast or the southwest areas as causes for the elevated concentrations in the groundwater, based on the lack of monitoring well data.[92] It appears that the Board did not consider the 1998 groundwater data when making this conclusion.[93] Additionally, the Board has created a sub-docket in the Illinois CCR Rulemaking, R20-19(A) to explore "historic, unconsolidated coal ash fill in the State", located outside of surface impoundments, *In the Matter of: Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments: Proposed new 35 Ill. Adm. Code 845 (Sub Docket A)*, PCB R20-19(A). Any

[90] MWG Ex. 621 (MWG13-15_297); https://www.mdpi.com/2076-3263/6/2/29/htm.
[91] MWG Exhibits 800-805.
[92] Board 2019 Order, pp. 27-28.
[93] Id.

additional assessment of these historical fill areas that is deemed necessary will be addressed by the Board's rulemaking in Sub-docket 20-19(A).

4.2.2 Powerton

A Phase II ESA was also prepared by ENSR for the Powerton Station in 1998[94]. The investigation included the results from 28 soil borings, six monitoring wells, 17 surface soil samples, and 12 sediment samples. A summary of the locations of the various samples collected is shown on **Figure 6**.

During the groundwater investigation, monitoring wells were installed to assess groundwater quality in proximity of the Yard and Roof Runoff Basin (also referred to as the East Yard Runoff Basin) and the Former Ash Basin. The results from the groundwater samples analyzed at MW-1 and MW-2 did not identify concentrations of RCRA Metals (As, Ba, Cd, Cr, Pb, Hg, Se, Ag) above the Class I Groundwater Quality Standards.[95]

The 1998 Phase II ESA Report indicated: "Based on the current land use (industrial) and site conditions (analytical results and soil types), it is judged that the potential for human exposure to the constituents of concern from this facility is low." The Report concluded: "There is no requirement under Illinois environmental law to further investigate or remediate this property."

After the 1998 Phase II, Patrick Engineering, on behalf of MWG, conducted a hydrogeologic investigation at the Powerton Station in 2010. This evaluation included the installation of monitoring wells downgradient of the Former Ash Basin, including MW-3, MW-4 and MW-5. Monitoring well locations are shown on **Figure 6**.

Based on the data available at the time of the proceedings, the Board determined in its 2019 opinion that the groundwater samples taken downgradient of the Former Ash Basin showed no coal ash constituents. The Board concluded that the Complainants did not prove that it was more likely than not to be a source of contamination at the Station[96]. After the ENSR 1998 Phase II ESA and Patrick 2010 Hydrogeologic Investigation, additional evaluation of the Former Ash Basin has been on-going since October 2016 in accordance with 40 CFR 257.100(b) through (d) of the

[94] ENSR, December 1998.
[95] Arsenic, barium, cadmium, chromium, lead, mercury and selenium are listed as constituents to evaluate the presence of contamination of coal ash in groundwater. 35 Ill. Adm. Code 845.600.
[96] 2019 IPCB Order, pg. 41.

Federal CCR Rules[97]. For the purpose of the Federal CCR groundwater monitoring requirements, monitoring wells MW-01 and MW-10 (upgradient) and monitoring wells MW-02 through MW-05 (downgradient) are sampled annually[98]. MWG is required to implement the detection and assessment monitoring program for the Former Ash Basin, and, if necessary, to conduct corrective action.

The historical data as described above are sufficient to adequately characterize the historical coal ash fill areas at the Powerton Station.

4.2.3 Will County

Like the other Stations discussed above, a Phase II ESA Report was generated in 1998 prior to MWG's acquisition of the Will County Station. The 1998 Phase II Environmental Site Assessment (ESA) was also performed by ENSR[99]. This investigation included the results from 18 soil borings, installation of five monitoring wells, 23 surface soil samples, and 14 sediment samples. The locations of the various samples collected is shown on **Figure 7**.

Pertaining to the historical fill areas relevant to the case, borings B-1 and B-2 were advanced within the southeast portion of the Station and MW-1 was installed near B-2 (see **Figure 7**). While coal ash was noted as mixed with soils obtained from B-1 and B-2, concentrations of total RCRA metals in the soils from 0-3 ft. below ground surface (bgs) did not exceed the TACO Tier 1 soil remediation objectives (SRO). Of note is arsenic, as it has been noted in the record as present in the groundwater at certain wells monitored under the Federal CCR Rules and the CCA above the Class I Groundwater Quality Standard. The arsenic concentrations at B-1 and B-2 were reported as 4.6 mg/kg and 4.9 mg/kg respectively, which are below the TACO Tier 1 SRO, which is currently 13 mg/kg (i.e., the background concentration for sites within Metropolitan Statistical Areas). The groundwater sample collected from MW-1 did not exhibit concentrations of RCRA Metals (As, Ba, Cd, Cr, Pb, Hg, Se, Ag) above the Class I Groundwater Quality Standards[100].

[97] KPRG, CCR Compliance Annual Groundwater Monitoring and Corrective Action Report – 2020 for the Former Ash Basin. January 31,2021.
[98] Id.
[99] ENSR, December 1998.
[100] Arsenic, barium, cadmium, chromium, lead, mercury, and selenium are listed as constituents to evaluate the presence of contamination of coal ash in groundwater. 35 Ill. Adm. Code 845.600.

Given these historical analytical results, although coal ash was noted within the southeast portion of the Station, sufficient investigation has been performed to evaluate whether this area presents an unacceptable risk to human health and the environment.

Although coal ash was identified in certain borings advanced as part of the 1998 Phase II ESA performed at the Will County Station, no concentrations of RCRA metals were reported above the TACO Tier 1 SRO, including arsenic. As mentioned above, arsenic is of particular relevance because arsenic is a more common heavy metal constituent that may be related to CCR and it has been identified in the groundwater at concentrations exceeding the Class I Groundwater Quality Standard. This historical analytical data supports the conclusion that the mere presence of CCR within historical boring logs does not necessarily mean that these areas serve as sources and represent a threat to human health and the environment.

Another investigation of the historical fill areas was performed by MWG in 2015[101]. As part of this investigation, KPRG advanced 20 borings in a grid pattern east of Pond 1N. The Geoprobes were advanced to the top of the dolomite bedrock and composite soil samples of the entire vertical profile were submitted for laboratory analysis using the NLET method for metals. The subsurface materials encountered during this investigation were consistent and homogeneous and consisted of bottom ash/slag from the coal combustion process. The analytical results from this site investigation are presented in **Table 3**.

There were no detections for antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, lead, manganese, mercury, molybdenum, nickel, potassium, selenium, silver, thallium, or zinc in the leachate from any of the samples analyzed and the method detection limits were below the Class I Groundwater Quality Standards. While boron, iron, and sodium were detected, the statistical analysis of the NLET data described in KPRG's report indicated "with a high degree of statistical certainty that the criteria established in 415 ILSC 5/3.135…are met and that the material may be considered CCB relative to this criterion for engineering/beneficial reuse".

The historical data as described above are sufficient to adequately characterize the historical coal ash fill areas at the Will County Station.

[101] KPRG, September 8, 2015.

4.2.4 Waukegan

The Waukegan Station was also investigated in 1998, along with the other Stations[102]. The Phase II ESA included the results from 22 soil borings, 5 monitoring wells, 13 surface soil samples, and 6 sediment samples. A summary of the locations of the various samples collected is shown on **Figure 8**. One soil boring (B-22) was installed in the far northern portion of the FS Area to the west of the West Ash pond. This boring was installed to a depth of approximately two feet bgs. The boring log indicated the presence of coal and gray coal ash. A sample was collected from the boring for analysis of several constituents, including RCRA metals. Concentrations of RCRA metals were below laboratory reporting limits or Tier 1 SROs, except for arsenic which was detected at a concentration of 14 mg/kg, slightly above the TACO soil background concentration of 13 mg/kg (which is the applicable SRO under TACO).

As part of the hydrogeologic investigation conducted at the Waukegan Station in 2010, Patrick Engineering installed five wells (MW-1 through MW-5) with wells MW- 6 and 7 added as upgradient wells at the request of Illinois EPA. Monitoring wells MW-8 and MW-9 were installed in 2014[103]. Five additional wells (MW-10, 11, 12, 14 and MW-15) located west of the ash ponds have been monitored since August 2014 to assess the groundwater impacted by the adjoining former Greiss-Pfleger Tannery and General Boiler properties[104]. In its 2019 Interim Order, the Board recognized that groundwater contamination is migrating from the upgradient Greiss-Pfleger Leather Tanning Facility property[105]. In 2003, at the neighboring property owner's request, MWG established an ELUC on the western side of its property as an institutional control to prevent exposure to historically contaminated soil and groundwater that has migrated onto MWG's Waukegan site as the result of past industrial activities on the former Greiss-Pfleger Tannery Site. It is suspected that contamination may also be migrating from the General Boiler Site, also located upgradient of the Waukegan Station[106].

To evaluate if the FS Area to the west of the West Pond could be contributing to observed groundwater concentrations in MW-5, located downgradient of the former Greiss-Pfleger Tannery and General Boiler properties, KPRG investigated the FS Area in November 2020. KPRG installed 40 probes over a 1,000 ft by 400 ft area and collected 100 samples for the evaluation of

[102] ENSR, December 1998.
[103] 2019 IPCB Order at 68.
[104] Id.
[105] 2019 IPCB Order at 74.
[106] 1/30/18 Tr. p. 124:22-125:3; MWG Ex. 623, p. MWG13-15_472.

metals including arsenic, boron, calcium, iron, lithium, manganese, molybdenum and thallium and general chemistry parameters including pH, chloride, and sulfate. In addition, four samples were collected for the analysis of leachable sulfate via the Synthetic Precipitation Leaching Procedure (SPLP) (A8-5-7, B10-5-9, C7-5-10, D5-5-10)[107] and three additional samples were collected for LEAF analysis (A1-0-5, A9-0-5 and C7-0-5)[108]. Sample locations are shown on **Figure 8** and a summary of the analytical results from the leaching analysis performed during this investigation is included in **Table 4**.

Boring logs indicate the presence of coal ash at depths ranging from near ground surface to approximately 7 to 17 ft. SPLP data indicate one sulfate concentration of 460 milligrams per liter (mg/L) at sample locations B10-5-9, which exceeds the Class I Groundwater Quality Standard of 400 mg/L. All LEAF results for samples at the natural pH are below the applicable Class I Groundwater Quality Standard, with the exception of boron which was detected at a concentration of 5 mg/L, 8.2 mg/L and 13 mg/L at A1-0-5, A9-0-5, and C7-0-5, respectively, each of which exceed the Class I Groundwater Quality Standard of 2 mg/L. In addition, arsenic was detected at a concentration of 0.058 mg/L at A9-0-5 which slightly exceeds the Class I Groundwater Quality Standard of 0.05 mg/L. Based on the results from the November 2020 evaluation, sufficient information is available to determine if a remedy is appropriate to address potential leaching of CCR-related constituents from ash in the FS Area to groundwater at concentrations exceeding Class 1 Groundwater Quality Standards.

The historical data as described above are sufficient to adequately characterize the historical coal ash fill area at the Waukegan Station.

4.3 Analysis of the historical groundwater quality data indicates that groundwater concentrations are decreasing at the Joliet 29, Powerton, and Will County Stations.

An extensive database of groundwater quality data has been attained at each Station by MWG over approximately the last decade. Groundwater data have been collected in compliance with both the CCAs and the Federal CCR Rules. WCG conducted statistical testing of these analytical data to evaluate changes in groundwater constituent concentrations over time at each of the Stations. Our analysis included the detection groundwater monitoring constituents under 40 CFR 257 Appendix III. These are the constituents recognized by USEPA as representing the most

[107] MWG13-15 79493-79771.
[108] MWG13-15 81195-81293.

reliable indications of CCR impacts within groundwater. For completeness, WCG also evaluated trends for the 40 CFR 257 Appendix IV assessment groundwater monitoring constituents.

The monitoring wells evaluated at each Station included the wells that were at the farthest downgradient locations. These wells are most relevant because they best represent groundwater quality after the natural groundwater mechanisms of advective dispersion and attenuation have impacted groundwater concentrations. In most cases, these wells are not necessarily located at the downgradient property boundary, and therefore use of these wells presents a conservative assessment of groundwater quality conditions because further advective dispersion, and attenuation will occur before the groundwater migrates further downgradient, toward the property boundary. The following monitoring wells were included in the trend testing:

- Joliet 29: MW-1, MW-2, MW-3, MW-4, MW-6, and MW-7;
- Powerton: MW-3, MW-4, MW-5, MW-6, MW-7, MW-8, MW-13, MW-14, and MW-15;
- Will Co.: MW-7, MW-8, MW-9, MW-10, MW-11, and MW-12;
- Waukegan: MW-1, MW-2, MW-3, and MW-4.

WCG has performed groundwater monitoring at many solid and hazardous waste disposal facilities since inception of the RCRA Subtitle D regulations in the 1990s. Temporal trends in groundwater quality data are often used to evaluate whether a corrective action is needed or if prior corrective action is having the intended beneficial impact on groundwater quality. In WCG's experience, the most common statistical method for evaluating temporal trends in groundwater quality data is the Mann-Kendall Test for Trend. The Mann-Kendall Test is included in the USEPA Statistical Analysis of Groundwater Monitoring Data At RCRA Facilities Unified Guidance dated March 2009.

The Mann-Kendall test can be utilized to evaluate both upward and downward trends. The statistical software program Sanitas Version 9.6 was utilized to conduct Mann-Kendall trend analyses on the groundwater monitoring data. WCG has found that the Sanitas software is commonly utilized by regulators overseeing groundwater monitoring programs at solid waste landfills regulated under RCRA Subtitle D. Results from the Mann-Kendall Testing are included in **Appendix C**.

The results from the Mann-Kendall Trend testing are summarized in the tables at the front of **Appendix C**. The supporting output from the statistical software is also presented in **Appendix D**, following the summary tables. In summary, the results indicate:

- Joliet 29: Of the 132 trend tests performed, 64% exhibited no trend, 26% exhibited a downward trend (11/34 statistically significant downward), and 10% exhibited an upward trend. Of the data where a trend was observed, 72% of the trends are downward and 28% upward.
- Powerton: Of the 233 trend tests performed, 64% exhibited no trend, 30% exhibited a downward trend (25/70 statistically significant downward), and 6% exhibited an upward trend. Of the data where a trend was observed, 82% of the trends are downward and 18% upward.
- Will Co.: Of the 140 trend tests performed, 57% exhibited no trend, 27% exhibited a downward trend (13/38 statistically significant downward), and 16% exhibited an upward trend. Of the data where a trend was observed, 63% of the trends are downward and 37% are upward.
- Waukegan: Of the 135 trend tests performed, 60% exhibited no trend, 19% exhibit a downward trend (9/26 statistically significant downward), and 21% exhibited an upward trend. Of the data where a trend was observed, 48% of the trends are downward and 52% are upward.

Many of the trend tests returned "no trend" results because the majority of the constituents evaluated were reported as not detected by the laboratory. Generally, the laboratory reporting limits are consistent from event to event and thus, results in no trend.

In cases where there were enough results reported above the laboratory detection limit so that meaningful trend testing could be performed, the majority of the trend test results from Joliet 29, Powerton, and Will Co. indicate that groundwater concentrations are decreasing over the approximately 10 years of data available. These results validate the continued applicability of monitored natural attenuation, and the application of the GMZ, as an appropriate remedy.

The trend testing results for Waukegan are not necessarily skewed towards more downward than upward trends. Consequently, WCG's opinions regarding the appropriate remedy for Waukegan are discussed separately below, in Section 4.8.

The groundwater monitoring wells installed by MWG beginning in 2010 and results obtained from the CCA and CCR monitoring programs are sufficient to monitor the natural attenuation occurring at the Stations, as applicable.

4.4 There is no unacceptable risk to offsite receptors at the four Stations.

Each of the Stations are bordered by surface water and the shallow groundwater unit at each of the Stations discharges into either the adjacent river or Lake Michigan (in the case of Waukegan). To support the above opinion, WCG conducted an updated evaluation to assess whether the groundwater conditions will result in discharge to surface water at concentrations that meet the applicable surface water quality standards. A similar statistical risk evaluation was presented in the expert opinion of John Seymour[109]. While the concentrations in groundwater will be reduced as the groundwater discharges to surface water and mixes with the surface water, the following evaluation takes the very conservative approach of first excluding the (beneficial) effects of groundwater/surface water mixing. Mixing is only considered in those rare instances where a groundwater concentration slightly exceeded an applicable surface water standard.

Downgradient groundwater sample concentrations were compared to Illinois Water Quality Standards (WQS) included in 35 Ill. Adm. Code Part 302 and Illinois Water Quality Criteria (WQC) for surface water. Downgradient groundwater concentrations were compared to Illinois chronic WQS, or if a WQS was not available, the Illinois chronic WQC. The surface water standards and their sources are provided in **Table 1** in **Appendix D**. No unacceptable risk is deemed present if groundwater concentrations are less than the applicable WQS or WQC for surface water, which are set at levels that are protective of human health and the environment in accordance with the surface water's designated uses.

The surface water comparisons were conducted for CCR constituents listed in Appendices III and IV to 40 CFR Part 257. Appendix III constituents are Constituents for Detection Monitoring and Appendix IV constituents are Constituents for Assessment Monitoring.

For each Station, the extensive dataset from downgradient monitoring wells was averaged using the Sanitas™ groundwater statistical software. The mean concentration was calculated by Sanitas™ at each sites' respective downgradient monitoring wells is presented in each table included in **Appendix D**. The average groundwater concentration was compared to the surface water standards presented in Table 1 in **Appendix D**. While both chronic and acute surface water standards are presented in Table 1 for completeness, the groundwater data has been compared to the chronic standards, as they are the lower standard. This approach is therefore deemed conservative. If a constituent was reported as non-detect in seventy-five percent (75%) or more

[109] MWG Exh. 903. pgs. 44-45 and Appendix B.

in the historical data, then the laboratory reporting limit was presented as the average concentration for that constituent.

Joliet 29

Shallow groundwater in the vicinity of the Joliet 29 Station ash ponds discharges to the south of the Station to the Des Plaines River. Groundwater data collected between December 2010 and October 2020 from downgradient monitoring wells (i.e., wells south of the ponds) MW-01 through MW-04, and MW-06 and MW-07 was averaged using the Sanitas™ groundwater statistical software and compared to applicable surface water standards. For Joliet 29, average groundwater concentrations at downgradient monitoring wells did not exceed surface water standards.

Powerton

Shallow groundwater in the vicinity of the Powerton Station ash ponds discharges to the north and west. Groundwater data collected between December 2010 and December 2020 from downgradient monitoring wells MW-03 through MW-08 and MW-13 through MW-15 was averaged using the Sanitas™ groundwater statistical software and compared to applicable surface water standards. For Powerton, average groundwater concentrations at downgradient monitoring wells did not exceed surface water standards.

Will County

Shallow groundwater in the vicinity of the Will County Station ash ponds discharges west to the adjacent Des Plaines River. Groundwater data collected between December 2010 and November 2020 from downgradient monitoring wells MW-07 through MW-12 was averaged using the Sanitas™ groundwater statistical software and compared to applicable surface water standards. Apart from pH at monitoring well MW-09, the Will County average groundwater concentrations at downgradient monitoring wells did not exceed the applicable surface water standards. At MW-09, the average pH concentration of 9.22 slightly exceeded the applicable pH range of 6.5-9.0 for surface water. However, MW-9 is located approximately 120 feet upgradient of the downgradient property boundary, which approximately coincides with the Des Plaines River. Groundwater flowing from MW-09 to the west towards the Des Plaines River will undergo further advection dispersion and attenuation. Additionally, the mixing that occurs as groundwater discharges into surface water will further moderate the pH. Therefore, the average pH concentration of 9.22 at MW-09 does not pose an unacceptable risk to surface water receptors in the Des Plaines River.

Waukegan

Shallow groundwater in the vicinity of the Waukegan Station ash ponds discharges to the east to adjacent Lake Michigan. Groundwater data collected between December 2010 and November 2020 from downgradient monitoring wells MW-01 through MW-4 was averaged using the Sanitas™ groundwater statistical software. Except for pH at monitoring well MW-01, the Waukegan average groundwater concentrations at downgradient monitoring wells did not exceed the applicable surface water standards for the Lake Michigan Basin. At MW-01, the average pH concentration of 9.74 slightly exceeded the applicable pH range of 6.5-9.0 for surface water. However, MW-1 is located over 700 feet upgradient from the existing shore of Lake Michigan. Groundwater flowing from MW-01 to the east towards Lake Michigan will undergo further advection dispersion and attenuation. Additionally, the mixing that occurs as groundwater discharges into surface water will further moderate the pH. Therefore, the average pH concentration of 9.74 at MW-01 does not pose an unacceptable risk to potential surface water receptors in Lake Michigan.

The results of the surface water risk evaluation indicate that downgradient groundwater conditions at each of the four Stations do not pose unacceptable risks to surface water receptors. WCG's opinion is consistent with the export report of John Seymour, who concluded that it was his opinion that "groundwater conditions do not pose risks to surface water receptors[110]."

4.5 MWG has already committed to following the Federal/State CCR Rules for applicable Existing and Inactive Surface Impoundments at each Station, until closure is complete. Therefore, no additional action beyond continued compliance with these Rules is warranted.

MWG has been operating the active surface impoundments in a manner that minimizes potential impacts to groundwater. Regarding the liners previously installed at the Federal CCR Surface Impoundments, it is WCG's opinion that the prior and current liners are consistent with industry practice for this type of application and are effective at containing the materials managed in the surface impoundments. However, the existing HDPE liners – even though many were required by the CCAs and approved by Illinois EPA when installed -- do not meet the Federal CCR Rules which require a dual liner. MWG has opted to close the surface impoundments.

[110] MWG Exh. 903. pg. 44.

Regular inspections occur at each Station to ensure that design, construction, operation, and maintenance of the CCR units are consistent with recognized generally accepted good engineering standards[111][112][113].

In addition, MWG implemented a detection monitoring program at Joliet 29, Will County, and Waukegan Stations to identify potential impacts to groundwater from the regulated impoundments. An assessment program is being implemented at the Powerton Station. Further assessment monitoring will be implemented at the other Stations if statistically significant increases attributable to the regulated units are confirmed. Corrective action will be conducted if assessment monitoring data indicates that the groundwater protection standards are exceeded. MWG continues to upload reports associated with these activities as well as other technical reports to the website for CCR Rule Compliance Data and Information[114]. Also, the recently adopted Illinois CCR Rule does not distinguish between detection monitoring and assessment monitoring. Instead, pursuant to the Illinois EPA Rule, beginning in the second quarter of 2021, MWG will be sampling the groundwater for all of the constituents identified in the federal CCR rule pursuant to 35 Ill. Adm. Code 845.600.

Pursuant to the Federal CCR Rules, MWG prepared Closure Plans for the regulated surface impoundments at each of the Stations, including Pond 2 at Joliet 29[115], the Ash Surge Basin, Bypass Basin[116], and the Former Ash Basin[117] at Powerton, the South Ash Ponds 2S and 3S at Will County[118], and the East and West Ash Basins at Waukegan[119].

As discussed in Section 1.5, in compliance with the Federal CCR Rules, MWG has prepared and submitted to the USEPA Alternative Closure Demonstrations (ACD) related to the infeasibility of

[111] Annual Inspection Reports for Ash Pond 2 at Joliet 29 Station, October 2020, Ash Surge Basin and Bypass Basin at Powerton Station, January 2016, October 2018, October 2019, October 2020; Annual Inspection Reports for Former Ash Basin at Powerton Station, July 2017, July 2018, July 2019, July 2020; and Annual Inspection Reports for East Ash Pond and West Ash Pond at Waukegan Station, January 2016, October 2018, October 2019, October 2020.
[112] MWG Ex. 903, p. 38; 1/31/18 Tr. p. 145:2-23 and p. 145:18-146:3 (Test. of Kelly); 10/24/17 Tr. p. 126:20-127:6 (Test. of Lux); 1/31/18 Tr. p. 237:20-23 and p. 257:15-258:4 (Test. of Veenbaas); 10/24/18 Tr. p. 222:18-223:8 (Test. of Maddox).
[113] Op. cit. footnote 47.
[114] NRG website for CCR Rule Compliance Data and Information available at: https://www.nrg.com/legal/coal-combustion-residuals.html.
[115] Closure Plan for Ash Pond 2 at the Joliet 29 Station, October 2016.
[116] Closure Plan for the Ash Surge Basin and Bypass Basin at the Powerton Station, October 2016.
[117] Closure Plan for the Former Ash Basin at the Powerton Station, April 2018 as amended in May 2019.
[118] Closure Plan for the South Ash Ponds 2S and 3 S at the Will County Station, October 2016.
[119] Closure Plan for the East and West Ash Basins at the Waukegan Station, October 2016.

the development of alternative capacity for the Ash Surge Basin at Powerton, Ash Pond 2S at Will County and the East Ash Pond at Waukegan. Continued operation of the CCR Ponds until the alternate closure deadlines identified for each Station will be monitored to mitigate any potential impacts to groundwater. The detection and assessment groundwater monitoring programs implemented by MWG are designed to identify potential issues with the regulated impoundments until such time that the ponds are taken out of service and formally closed in accordance with the applicable permits. According to IL Public Act 101-171, signed into law July 30, 2019, closure activities related to Federal/State Ponds cannot be completed until a permit is attained from Illinois EPA.

Contrary to Quarles's opinion, the scope of the ASDs associated with the Powerton, Will Co., and Waukegan Stations is appropriate and complies with the Federal CCR Rules and likely also the Illinois CCR Rules. Quarles's suggestion that MWG should have used the ASD process to specifically identify the source of statistically significant increases in groundwater concentrations is incorrect. It is not appropriate nor required by the Federal CCR Rules or the Illinois CCR Rules to pursue additional investigation of non-regulated units as part of this process. The Federal CCR Rules and the Illinois CCR Rules require the owner/operator to evaluate whether the *regulated unit(s)* are adversely impacting groundwater, but neither require an exhaustive site-wide study to identify a specific alternate source.

Moreover, additional investigation is not needed for purposes of identifying the appropriate relief/remedy related to groundwater conditions attributed by the Board to MWG. The appropriate action recommended by WCG is based on the existing applicable regulatory framework and data historically collected at the Stations.

In closing, no additional relief is warranted at the Stations with respect to Section 33(c), criteria (i), the character and degree of injury to, or interference with the protection of the health, general welfare, and physical property of the people. MWG is actively complying with the detection and assessment groundwater monitoring requirements of the Federal CCR Rules at these Stations and has created a long-term plan for closure of the regulated active and inactive CCR surface impoundments, as appropriate. The plans comply with the existing Federal CCR Rules and MWG is aware of, and further intends to comply with the IL CCR Rules, once promulgated.

4.6 MWG should continue to maintain the GMZs at each Station until the corrective action is complete.

GMZs have been established at Joliet 29, Powerton, and Will County Stations. The GMZs are a component of corrective action included in the CCAs implemented for the Joliet, Powerton and Will County Stations. A GMZ would not have been approved by the Illinois EPA if a specific means for managing the groundwater was not implemented. The means for managing the groundwater for the three Stations is deemed to be the various corrective measures specified in the CCAs, including:

- Upgrades to various CCR surface impoundment liners;
- Installation of the dewatering system at Will County Ponds 1N and 1S; and
- At Powerton, the East Yard Run-off Basin was not to be used as part of the ash sluicing flow system and no unlined areas may be used for temporary or permanent management of CCR.

The GMZ also includes conducting long-term groundwater monitoring to confirm the effectiveness of the corrective measures included in the CCAs, and the maintenance of institutional controls to prevent potential exposures to groundwater containing CCR-related constituents at concentrations above Class I Groundwater Quality Standards. The 2020 Board Order specifically clarifies that *"(t)he Board is aware that the process of monitored natural attenuation (MNA) can be, by its nature, a long one. Monitored natural attenuation, depending upon its efficacy and subject to the Agency's review, can conceivably last for many years."*[120]

WCG agrees that MNA is a long-term process, which may require multiple decades to complete. WCG recommends that MWG maintain the GMZs and continue the groundwater monitoring until the corrective actions through MNA are complete. Because there are no off-site complete or potentially complete exposure pathways, that the MNA may take time would not result in unacceptable impact to human health or the environment at the Stations. Additionally, as discussed further below in Section 4.8, WCG recommends implementation of a remedy at the Waukegan Station, which includes the establishment of a GMZ.

[120] Board Opinion, February 6, 2020, pg. 13.

4.7 No further remedy is warranted at the Joliet 29, Powerton, and Will County Stations.

As discussed in Section 4.5, MWG has already committed to following the Federal/State CCR Rules for applicable Existing and Inactive Surface Impoundments at each Station, until closure is complete. Therefore, no additional action beyond continued compliance with these Rules is warranted for these regulated areas of the Stations. In addition, Section 4.3 demonstrates that detections of CCR-related constituents in groundwater at the Joliet 29, Powerton, and Will County Stations are decreasing through natural attenuation. The institutional controls in place at each of the Stations are sufficient to control potential on-site exposures to impacted groundwater while corrective action activities previously implemented under the prior CCAs continue to take effect. Illinois regulatory programs rely on institutional controls when a risk-based evaluation indicates that potential exposures to impacted media may be managed by the implementation of these corrective actions. GMZs and ELUCs are proven as effective, industry-accepted remedial approaches approved by the State of Illinois to adequately control exposure to impacted groundwater. These types of controls can be implemented in lieu of active remediation, when exposures can be controlled. Risk-based remediation is particularly beneficial at sites like the MWG Stations, where both the properties and surrounding areas are industrial in nature and site access can be controlled. Further, as discussed in Section 4.4, there are no off-site complete or potentially complete exposure pathways that would result in unacceptable impact to human health or the environment at the Stations. The administrative record is clear that there are no off-site downgradient potable use wells at any of the Stations, and a review of the Annual CCR Fugitive Dust Reports indicate that there are no significant issues with fugitive dust at the Stations or citizen complaints related to dust originating from the Stations.

Additional support for continuing to utilize monitored natural attenuation at these three Stations includes:

- Groundwater monitoring will continue to be performed while the GMZs are in place, to confirm monitored natural attenuation continues to be effective;
- As discussed above, the existing regulatory framework does not require additional action at the historical fill areas; and
- Illinois EPA has not identified any noncompliance with the CCAs or pursued any enforcement action against MWG, since the CCAs were signed in 2012.

Because the statistical evaluation indicates that natural attenuation is occurring and that there is no unacceptable risk to human health or the environment, no further remedy is required at Joliet 29, Powerton, or Will County Stations to address the regulated CCR units or the historical fill areas.

4.8 Despite the absence of risk, an appropriate remedy is warranted at the Waukegan FS Area to attain compliance with applicable regulations.

The 2020 KRPG investigation[121] indicates that impacts to groundwater at MW-5, MW-7 and MW-16 (downgradient of the FS Area) are potentially caused by leaching of materials at the FS Area. Additionally, migration of impacted groundwater from the upgradient General Boiler and Tannery properties is occurring[122]. The evaluation of groundwater data in Section 4.4 demonstrates that concentrations of CCR-related analytes are attenuating below applicable surface water quality criteria before groundwater leaves the property. However, the statistical evaluation of the groundwater concentration trends in samples collected from downgradient wells at Waukegan indicates that supplemental activities may be implemented to enhance natural attenuation of groundwater underlying the Station.

Therefore, it is WCG's opinion that a presumptive remedy in the form of a low permeability cap be installed in the FS Area in order to enhance the natural attenuation remedy. A presumptive remedy is a technology that regulators believe, based upon prior experience, will be the most appropriate remedy for a specified type of site. Use of presumptive remedies accelerates the remedial alternatives analysis. Capping is a proven remedial technology that has been used for decades and is particularly prevalent as a means of closing solid and hazardous waste landfills, and surface impoundments (usually after removal of liquids) under RCRA.

Capping of the FS Area would reduce infiltration, leading to a decrease in water percolation through the coal ash materials. It is anticipated that this reduction in percolation will significantly decrease leaching from coal ash materials within the FS area. The installation of the cap is expected to reduce the time required for natural attenuation to restore groundwater concentrations to Class I Groundwater Quality Standards.

[121] MWG-13-15_79493-79771; MWG13-15_81195-81293.
[122] MWG Ex. 644; MWG13-15_46627 -46630; 1/30/18 Tr. pp. 135:23-136:18, 138:3-139:3,155:10-21 (Test. of Race); MWG Ex. 644, p.; 1/30/18 Tr. p. 136:19-138:1 (Test. of Race).; Ex. 19D, p MWG13-15_45800.

An evaluation of the potential to reduce infiltration via the installation of a low permeability cap at the FS Area was modeled with the Hydrologic Evaluation of Landfill Performance (HELP) Model, Version 3.07. The results from the HELP Model are presented in **Appendix E**. According to the model results, a cap would significantly reduce infiltration and thereby would be expected to mitigate potential leaching from ash materials to groundwater.

WCG recommends that, if implemented, the cap should be designed specifically for the Waukegan Station by a Professional Engineer licensed in Illinois in consideration of site-specific performance-based infiltration reduction goals. In addition, WCG recommends that initiation of the design of the cap wait until the Board has finalized its rulemaking in the sub-docket A of R20-19 to explore "historic, unconsolidated coal ash fill in the State", located outside of surface impoundments. Because WCG has confirmed that there is no risk to Lake Michigan or other potential offsite receptors and groundwater use on-site is controlled by the ELUC, staying initiation of the corrective actions will not harm the environment nor public health and will also ensure that the corrective actions taken for the FS Area are in compliance with the Board's final rule in R20-19(A).

WCG believes that it is both technically practicable and economically reasonable to implement a low permeability cap for the FS Area. The estimated cost of a low permeability cap is variable and could range from approximately $1.9 million to $3.3 million, depending upon the performance objectives of the cap. The ultimate performance objectives are expected to be informed by regulatory standards, remedial goals, technical practicability and implementability, among other considerations.

A GMZ should be established in conjunction with the implementation of the cap corrective action. When the GMZ is established, the Class I Groundwater Quality Standards are inapplicable, while monitored natural attenuation is occurring in the groundwater at the Station.

4.9 Relevant Section 33(c) and 42(h) Criteria

The record reviewed by WCG and discussed in this Report indicates that all the Stations are located in industrial areas. This is a factor the Board considers under 33(c) of the Act when making its orders and determinations.

The Stations are each surrounded by other industries and commercial properties. Each of the Stations have been at their current location for at least 50 years and nearly 100 years in the case of Powerton and Waukegan Stations. Joliet 29 and Will County were established later, built in 1964 and 1955, respectively. Powerton and Waukegan were both built in the 1920s and are also

surrounded by industrial properties and in many cases, the industrial development surrounding the Stations occurred after original construction of the Stations. For example, Waukegan is surrounded by properties that have historic contamination from prior uses, including the Superfund sites such as the Johns Manville Site to the north, and the General Boiler and Greiss-Pfleger Tannery sites to the west. A SRP site that previously attained a NFR Letter also adjoins the Joliet 29 Station, on the west side. Based upon the age of the Stations and that they are all in industrial areas, the existing environmental conditions are suitable for the areas in which they are located.

It is common in most Federal and State environmental remediation programs to utilize risk-based remedial goals as the basis of a remedial approach. Illinois EPA's method for developing remediation objectives for contaminated soil and groundwater is known as TACO. Remediation objectives developed under TACO protect human health and the environment, take into account site conditions and land use, and are risk-based and site-specific. Therefore, even those adjacent properties that have been, or are currently enrolled within a regulatory program have some level of residual impact corresponding to compliance with risk-based goals. These risk-based goals may consider engineering and institutional controls to preclude exposures to impacted material (such as the ELUCs already established for the Greiss-Pfleger Tannery west of the Waukegan Station and the former Caterpillar facility west of the Joliet 29 Station) which allow impacted materials to remain in-place, if there are no unacceptable hazards posed to human health or the environment. The Stations are located within areas that are known or suspected to be similarly impacted by long-term industrial land use.

Another factor included in Section 33(c) of the Act is technical practicability and economic reasonableness. MWG has already implemented multiple measures at the CCR surface impoundments and historical fill areas, including implementing corrective actions (relining the ponds and establishing institutional controls that prevent access to the groundwater). In addition, MWG has implemented GMZs to address violations of Class I Groundwater Quality Standards, while the monitored natural attenuation corrective action at the Joliet 29, Powerton and Will County Stations continues to be implemented. The GMZs were established in accordance with 35 Ill. Adm. Code Section 620.250, which indicates that a GMZ may be established to mitigate impairment caused by the release of contaminants from a site: ***that is subject to a correction action process approved by the Agency*** (emphasis added) or for which the owner or operator undertakes an adequate corrective action in a timely and appropriate manner and provides a written confirmation to the Agency. Therefore, in the case of Joliet 29, Powerton and Will County, the GMZs were established as part of a corrective action process that

has been approved by a regulatory agency. Illinois EPA has not required or requested MWG conduct additional corrective action after establishment of the CCAs.

Duration and gravity of the violation is also listed in Section 33(c) of the Act as a factor utilized by the Board to determine an appropriate remedy. The 2020 Board Order indicates that the violations of Part 620 of the Board regulations do not apply, given the ongoing nature of the previously established GMZs at Joliet 29, Powerton, and Will County. Thus, the duration of the Part 620 violations was limited to the first identification of an exceedance of the Class 1 Groundwater Quality Standards in late 2010, until the GMZs were formally established in 2013.

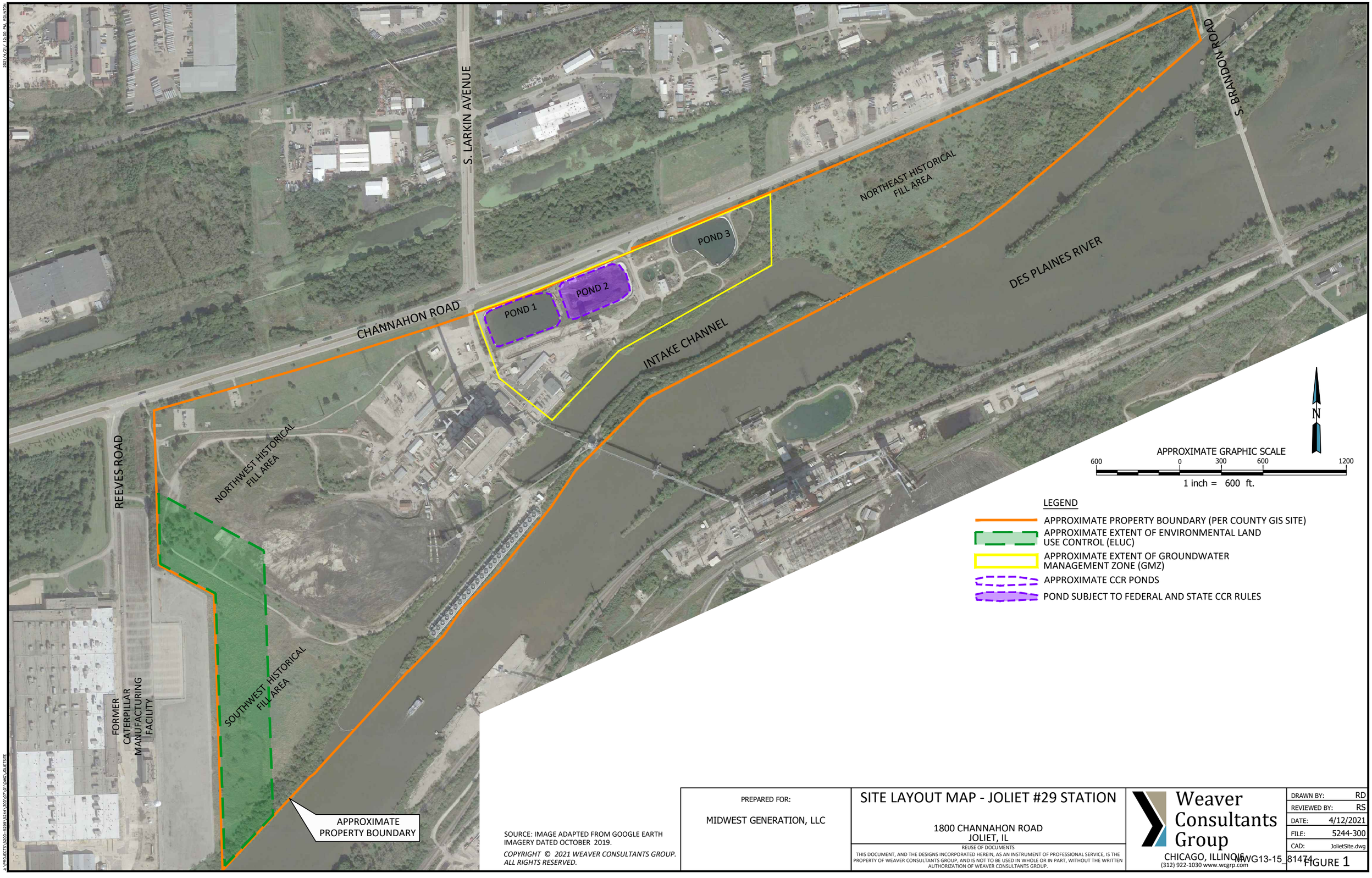
The comparison of groundwater data to surface water quality standards presented above in Section 4.4 provides further evidence for the lack of gravity of the violations. This evaluation indicates that surface water, including related receptors, will not be adversely impacted by the groundwater concentrations at the Stations. Minimal gravity of the noted violations is also exhibited based on the incomplete exposure pathway for groundwater. Human consumption of groundwater at each of the Stations is controlled using various ELUCs, which prohibit the installation and use of groundwater for potable purposes. In any case, there are no downgradient potable receptors at any of the Stations.

The record indicates that the violation of Section 12(d) of the Act at the Powerton Station was based on temporarily storing coal ash outside of the surface impoundments during a single occasion lasting approximately two to three months during the winter before 2012[123]. The condition was corrected and the materials were removed. Moreover, storage during the winter, when the ground would have been frozen further decreasing the likelihood that runoff from the coal ash could have infiltrated the ground and subsequently impacted groundwater, thus further decreasing the gravity of what was already an event of very limited duration.

Due diligence in attempting to comply is another 33(c) factor supporting WCG's opinion. MWG proactively undertook appropriate investigation of the Stations prior to any agency request beginning in 2002, voluntarily agreed to perform a hydrogeologic assessment and later sampling (where other utilities did not) in 2008-2010 and implemented the CCAs under oversight by the Illinois EPA. MWG consistently attempted to act diligently, based on: early site investigations, sampling for CCB, relining ponds, CCAs (and related GMZs/ELUCs) and other investigations discussed above.

[123]2019 Board Order, pg. 42.

Figures



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SITE LAYOUT MAP - JOLIET #29 STATION

1800 CHANNAHON ROAD
JOLIET, IL

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DRAWN BY:	RD
REVIEWED BY:	RS
DATE:	4/12/2021
FILE:	5244-300
CAD:	JolietSite.dwg

NWG13-15_81471

FIGURE 1

LEGEND

APPROXIMATE PROPERTY BOUNDARY (PER COUNTY GIS SITE)

PROPERTY NOT OWNED BY MWG

APPROXIMATE EXTENT OF ENVIRONMENTAL LAND USE CONTROL (ELUC)

APPROXIMATE EXTENT OF GROUNDWATER MANAGEMENT ZONE (GMZ)

APPROXIMATE CCR PONDS

POND SUBJECT TO FEDERAL AND/OR STATE CCR RULES

NOTE: ASH SURGE BASIN, BYPASS BASIN, AND FORMER ASH BASIN ARE SUBJECT TO FEDERAL AND STATE CCR RULES. METAL CLEANING BASIN IS SUBJECT TO STATE CCR RULES.

APPROXIMATE GRAPHIC SCALE

600 0 300 600 1200

1 inch = 600 ft.

N

SOURCE: IMAGE ADAPTED FROM GOOGLE EARTH IMAGERY DATED SEPTEMBER 2017.

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SITE LAYOUT MAP - POWERTON STATION

13082 E. MANITO ROAD
PEKIN, IL

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DRAWN BY:	RD
REVIEWED BY:	AF
DATE:	4/16/2021
FILE:	5244-300
CAD:	PowertonSite.dwg

MWG13-15_81475

FIGURE 2

2021/4/21/ 11:58 AM RDENTON
A:\PROJECTS\2020-2299\5244\300\07\01\DWG\POWERTONSITE

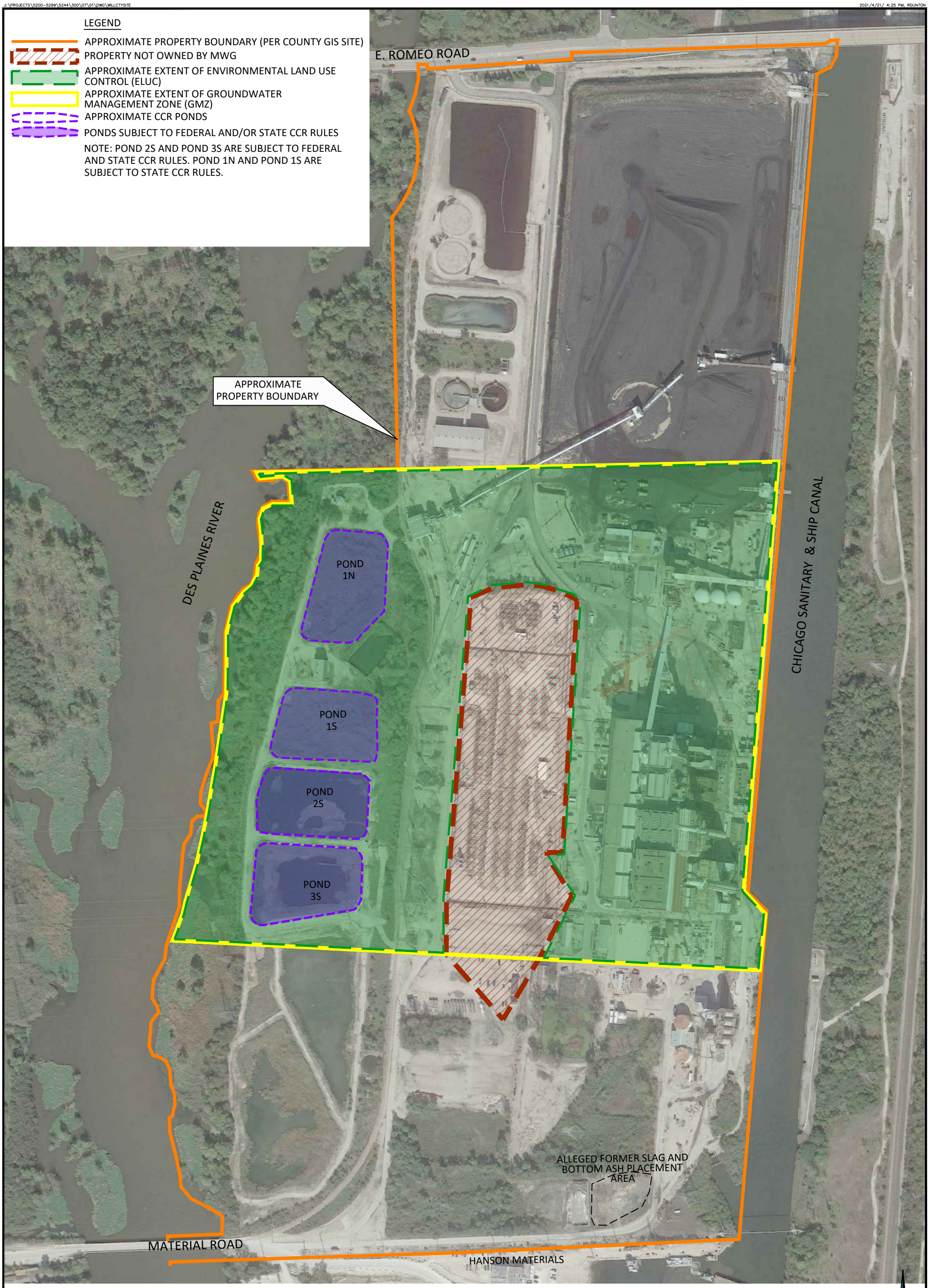
J:\PROJECTS\5200-5299\5244\300\07\01\DWG\WILLCTYSITE

2021/4/21/ 4:25 PM, RDUNTON

LEGEND

- APPROXIMATE PROPERTY BOUNDARY (PER COUNTY GIS SITE)
- PROPERTY NOT OWNED BY MWG
- APPROXIMATE EXTENT OF ENVIRONMENTAL LAND USE CONTROL (ELUC)
- APPROXIMATE EXTENT OF GROUNDWATER MANAGEMENT ZONE (GMZ)
- APPROXIMATE CCR PONDS
- PONDS SUBJECT TO FEDERAL AND/OR STATE CCR RULES

NOTE: POND 2S AND POND 3S ARE SUBJECT TO FEDERAL AND STATE CCR RULES. POND 1N AND POND 1S ARE SUBJECT TO STATE CCR RULES.



APPROXIMATE GRAPHIC SCALE

300 0 150 300 600

1 inch = 300 ft.

N

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SITE LAYOUT MAP - WILL COUNTY STATION

529 E. ROMEO ROAD
ROMEOVILLE, IL

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MWG13-15_81476 FIGURE 3

LEGEND

- APPROXIMATE PROPERTY BOUNDARY (PER COUNTY GIS SITE)
- APPROXIMATE EXTENT OF ENVIRONMENTAL LAND USE CONTROL (ELUC)
- APPROXIMATE CCR PONDS
- POND SUBJECT TO FEDERAL AND STATE CCR RULES

APPROXIMATE GRAPHIC SCALE

400 0 200 400 800

1 inch = 400 ft.

N

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SITE LAYOUT MAP - WAUKEGAN STATION

401 E. GREENWOOD AVENUE
WAUKEGAN, IL

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MWG13-15_81477

FIGURE 4

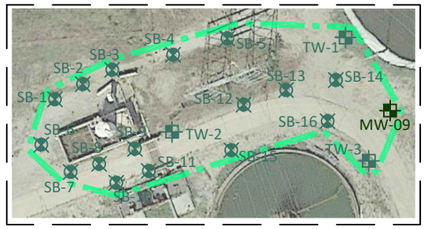
2021/4/21 - 4:06 PM - RDENTON
J:\PROJECTS\2020-5299\5244\MXD\GIS\MWG WAUKEGANSITE

2021/4/29/ 12:03 PM RDUNTON

LEGEND

SB-2 KPRG 2020 INVESTIGATION APPROXIMATE BORING LOCATION (PER KPRG MAP, 11/2020)

TW-2 KPRG 2020 INVESTIGATION APPROXIMATE TEMPORARY WELL LOCATION (PER KPRG MAP, 11/2020)



KPRG 2020 INVESTIGATION AREA

SCALE: 1" = 100'

CHANNAHON ROAD

NORTHWEST HISTORICAL FILL AREA

POND 1

POND 2

POND 3

INTAKE CHANNEL

DES PLAINES RIVER

KPRG 2020 SOIL INVESTIGATION AREA (PER KPRG MAP, 11/2020) SEE DETAIL

APPROXIMATE GRAPHIC SCALE

300 0 150 300 600

1 inch = 300 ft.

LEGEND

- APPROXIMATE PROPERTY BOUNDARY (PER COUNTY GIS SITE)
- APPROXIMATE CCR PONDS
- POND SUBJECT TO FEDERAL AND STATE CCR RULES
- KPRG 2005 APPROXIMATE REMOVAL AREA (PER KPRG EXCAVATION AREA MAP, 12/2005) (PER KPRG MAP, 12/2020)
- MW-2 PATRICK 2010 HYDRO ASSESSMENT APPROXIMATE MONITORING WELL LOCATION (PER KPRG MAP, 12/2020)
- GP-8 KPRG 2005 CCB DETERMINATION GEOPROBE BORING LOCATION (PER KPRG MAP, 6/2005)
- B-2905 ANDREWS ENVIRONMENTAL 2004 CCB ASSESSMENT APPROXIMATE BORING LOCATION (BY ANDREWS ENVIRONMENTAL, 7/2004)
- B-12 ENSR 1998 PHASE II ESA APPROXIMATE BORING LOCATION (PER ENSR SITE PLAN, 11/1998)
- MW-5 ENSR 1998 PHASE II ESA APPROXIMATE MONITORING WELL LOCATION (PER ENSR SITE PLAN, 11/1998)
- S-15 ENSR 1998 PHASE II ESA APPROXIMATE SURFACE SOIL SAMPLE LOCATION (PER ENSR SITE PLAN, 11/1998)
- JS29-GT-4 KPRG 2005 GEOTECH APPROXIMATE BORING LOCATION (PER KPRG FIGURE PLAN, 2005)

PREPARED FOR:

MIDWEST GENERATION, LLC

APPROXIMATE SAMPLE LOCATION MAP - JOLIET #29 STATION

1800 CHANNAHON ROAD
JOLIET, IL

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CAD:	JolietSite.dwg

NWG13-15_81478

FIGURE 5

SOURCE: IMAGE ADAPTED FROM GOOGLE EARTH IMAGERY DATED OCTOBER 2019.

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J:\PROJECTS\5200-5299\5244.300\GIS\MXD\JOLIETSITE

LEGEND

APPROXIMATE PROPERTY BOUNDARY (PER COUNTY GIS SITE)

PROPERTY NOT OWNED BY MWG

APPROXIMATE CCR PONDS

POND SUBJECT TO FEDERAL AND/OR STATE CCR RULES

NOTE: ASH SURGE BASIN, BYPASS BASIN, AND FORMER ASH BASIN ARE SUBJECT TO FEDERAL AND STATE CCR RULES. METAL CLEANING BASIN IS SUBJECT TO STATE CCR RULES.

MW-2 PATRICK 2010 HYDRO ASSESSMENT/KPRG 2012-2019 CCR APPROXIMATE MONITORING WELL LOCATION (PER KPRG MAP, 12/2020)

B-12 ENSR 1998 PHASE II ESA APPROXIMATE BORING LOCATION (PER ENSR SITE PLAN, 11/1998)

MW-5 ENSR 1998 PHASE II ESA APPROXIMATE MONITORING WELL LOCATION (PER ENSR SITE PLAN, 11/1998)

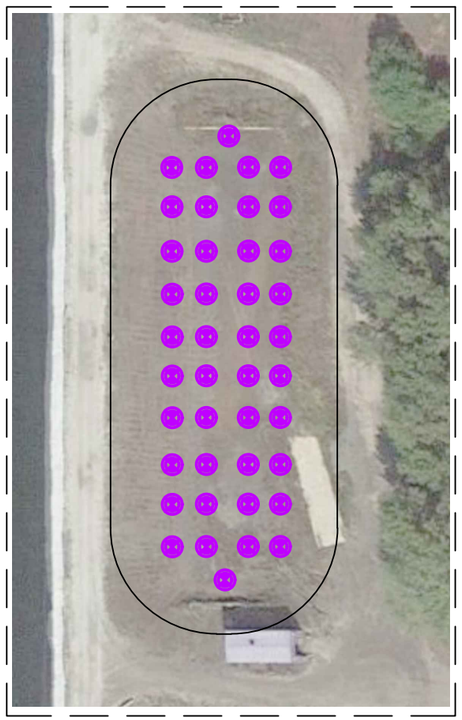
S-15 ENSR 1998 PHASE II ESA APPROXIMATE SURFACE SOIL SAMPLE LOCATION (PER ENSR SITE PLAN, 11/1998)

X-8 ENSR 1998 PHASE II ESA APPROXIMATE SEDIMENT SAMPLE LOCATION (PER ENSR SITE PLAN, 11/1998)

ANDREWS 2004 BASIN SAMPLING APPROXIMATE TEST PIT LOCATION (PER ANDREWS SITE MAP, 6/2004)

PS-GT-4 KPRG 2005 GEOTECH APPROXIMATE BORING LOCATION (PER KPRG FIGURE PLAN, 2005)

NOTE:
* ASH AND WATER SAMPLES COLLECTED FROM THE BYPASS BASIN AND ASH SURGE BASIN IN 2018 AND 2019 AS PART OF 2019 AND 2020 KPRG ASDs.



ANDREWS 2004 BASIN SAMPLING AREA

SCALE: 1" = 100'

NOTE: SAMPLE LOCATIONS PER ANDREWS SITE MAP, 6/2004. UNABLE TO DISCERN TEST PIT NUMBERING DUE TO IMAGE QUALITY, REFER TO ANDREWS REPORT FOR CLARITY.

POWERTON LAKE

DISCHARGE CHANNEL

INTAKE CHANNEL

NORTH POND

SOUTH POND

ASH SURGE BASIN *

METAL CLEANING BASIN

BYPASS BASIN *

FORMER ASH BASIN *

APPROXIMATE ANDREWS 2004 BASIN SAMPLING AREA (PER ANDREWS SITE MAP, 6/2004), SEE DETAIL

EAST YARD RUN-OFF BASIN

APPROXIMATE PROPERTY BOUNDARY

MW-1 MW-2 MW-3 MW-4 MW-5 MW-6 MW-7 MW-8 MW-9 MW-10 MW-11 MW-12 MW-13 MW-14 MW-15 MW-16 MW-17 MW-18 MW-19

PS-GT-1 PS-GT-2 PS-GT-3 PS-GT-4 PS-GT-5 PS-GT-6 PS-GT-7 PS-GT-8 PS-GT-9

B-1 B-2 B-3 B-4 B-5 B-6 B-8 B-10 B-11 B-12 B-13 B-14 B-16 B-17 B-18 B-19 B-21 B-22 B-23 B-26 B-27 B-30 B-31 B-32 B-33 B-34 B-35

S-1 S-2 S-4 S-9 S-10 S-11 S-12 S-13 S-14 S-17 S-18 S-19 S-20 S-21 S-23 S-24 S-25 S-27 S-30

X-1 X-2 X-3 X-4 X-5 X-6 X-7 X-8 X-9 X-10 X-11 X-12

APPROXIMATE GRAPHIC SCALE

400 0 200 400 800

1 inch = 400 ft.

N

SOURCE: IMAGE ADAPTED FROM GOOGLE EARTH IMAGERY DATED SEPTEMBER 2017.

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MIDWEST GENERATION, LLC

APPROXIMATE SAMPLE LOCATION MAP - POWERTON STATION

13082 E. MANITO ROAD
PEKIN, IL

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MWG13-15_81479

FIGURE 6

2021/4/21/ 11:54 AM RDENTON
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LEGEND

APPROXIMATE PROPERTY BOUNDARY (PER COUNTY GIS SITE)

PROPERTY NOT OWNED BY MWG

APPROXIMATE CCR PONDS

PONDS SUBJECT TO FEDERAL AND/OR STATE CCR RULES

NOTE: POND 2S AND POND 3S ARE SUBJECT TO FEDERAL AND STATE CCR RULES. POND 1N AND POND 1S ARE SUBJECT TO STATE CCR RULES.

MW-2 PATRICK 2010 HYDRO ASSESSMENT/ KPRG 2015 CCR APPROX. MONITORING WELL LOCATION (PER KPRG MAP, 12/2020)

B-12 ENSR 1998 PHASE II ESA APPROXIMATE BORING LOCATION (PER ENSR SITE PLAN, 11/1998)

MW-5 ENSR 1998 PHASE II ESA APPROXIMATE MONITORING WELL LOCATION (PER ENSR SITE PLAN, 11/1998)

S-15 ENSR 1998 PHASE II ESA APPROXIMATE SURFACE SOIL SAMPLE LOCATION (PER ENSR SITE PLAN, 11/1998)

X-8 ENSR 1998 PHASE II ESA APPROXIMATE SEDIMENT SAMPLE LOCATION (PER ENSR SITE PLAN, 11/1998)

WC-GT-4 KPRG 2005 GEOTECH APPROXIMATE BORING LOCATION (PER KPRG FIGURE PLAN, 2005)

NOTES:

* ASH AND WATER SAMPLES COLLECTED FROM POND 2S AND POND 3S IN 2018 AS PART OF 2019 KPRG ASD.

** COAL ASH SAMPLES COLLECTED FROM THIS AREA FROM 20 BORINGS (A1 TO D7) AS PART OF 2014 KPRG CCB DETERMINATION

E. ROMEO ROAD

APPROXIMATE PROPERTY BOUNDARY

DES PLAINES RIVER

CHICAGO SANITARY & SHIP CANAL

APPROXIMATE KPRG 2015 INVESTIGATION AREA **

POND 1N

POND 1S

POND 2S*

POND 3S*

ALLEGED FORMER SLAG AND BOTTOM ASH PLACEMENT AREA

MATERIAL ROAD

HANSON MATERIALS

APPROXIMATE GRAPHIC SCALE

300 0 150 300 600

1 inch = 300 ft.

N

SOURCE: IMAGE ADAPTED FROM GOOGLE EARTH IMAGERY DATED OCTOBER 2019.

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APPROXIMATE SAMPLE LOCATION MAP - WILL COUNTY STATION

529 E. ROMEO ROAD
ROMEOVILLE, IL

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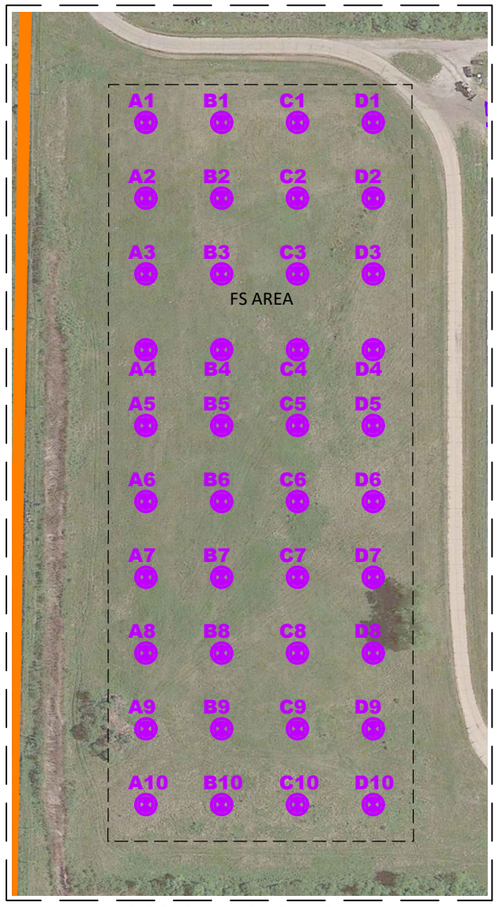
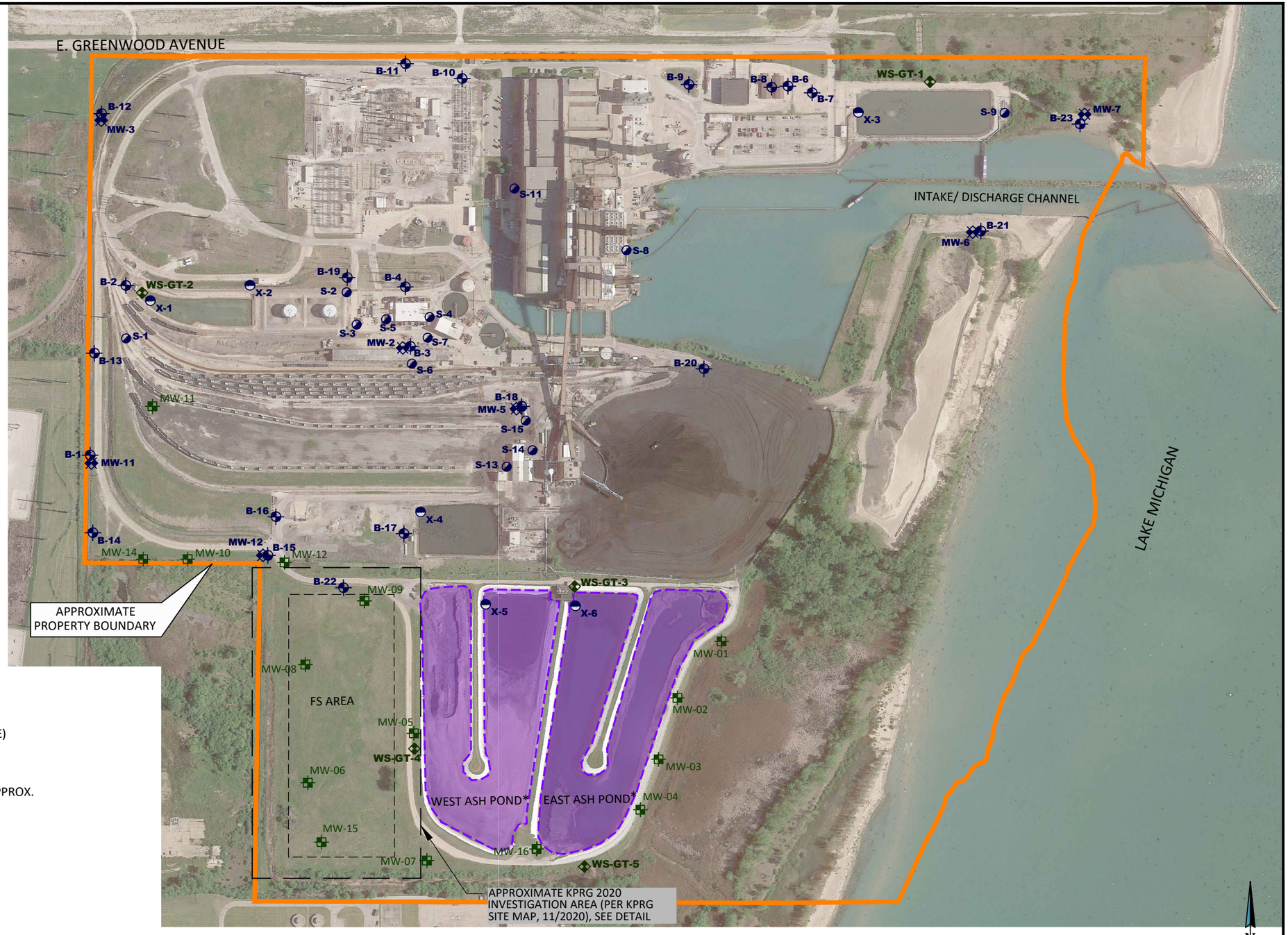
CAD:	WillCtySite.dwg

MWG13-15_8148F FIGURE 7



KPRG 2020 INVESTIGATION AREA

SCALE: 1" = 200'



APPROXIMATE GRAPHIC SCALE

400 0 200 400 800

1 inch = 400 ft.

N

LEGEND

- APPROXIMATE PROPERTY BOUNDARY (PER COUNTY GIS SITE)
- APPROXIMATE CCR PONDS
- POND SUBJECT TO FEDERAL AND STATE CCR RULES
- MW-2 — PATRICK 2010 HYDRO ASSESSMENT/KPRG 2010-2014 CCR APPROX. MONITORING WELL LOCATION (PER KPRG MAP, 11/2020)
- B-12 — ENSR 1998 PHASE II ESA APPROXIMATE BORING LOCATION (PER ENSR SITE PLAN, 11/1998)
- MW-5 — ENSR 1998 PHASE II ESA APPROXIMATE MONITORING WELL LOCATION (PER ENSR SITE PLAN, 11/1998)
- S-15 — ENSR 1998 PHASE II ESA APPROXIMATE SURFACE SOIL SAMPLE LOCATION (PER ENSR SITE PLAN, 11/1998)
- X-8 — ENSR 1998 PHASE II ESA APPROXIMATE SEDIMENT SAMPLE LOCATION (PER ENSR SITE PLAN, 11/1998)
- A4 — KPRG 2020 INVESTIGATION APPROXIMATE SAMPLING LOCATION (PER RUETTIGER, TONELLI & ASSOC. INC. PLAN, 11/2020)
- WS-GT-4 — KPRG 2005 GEOTECH APPROXIMATE BORING LOCATION (PER KPRG FIGURE PLAN, 2005)

NOTES:

* ASH AND WATER SAMPLES COLLECTED FROM THE EAST AND WEST ASH PONDS IN 2018 AS PART OF 2019 KPRG ASD. BOTTOM ASH SAMPLES (BOTTOM ASH-1, BOTTOM ASH-2, AND BOTTOM ASH1/2) COLLECTED FROM EAST AND WEST ASH PONDS AS PART OF KPRG 2004 SAMPLING.

SOURCE: IMAGE ADAPTED FROM GOOGLE EARTH IMAGERY DATED JUNE 2020.

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APPROXIMATE SAMPLE LOCATION MAP - WAUKEGAN STATION

401 E. GREENWOOD AVENUE
WAUKEGAN, IL

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DATE:	4/16/2021
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CAD:	WaukeganSite.dwg

MWG13-15_8148

FIGURE 8

2021/4/21/ 4:08 PM RDENTON
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Tables

Table 1
Historical Leaching Data
Joliet 29 Station

Parameter	Units	Tier 1 SRO for the Soil Component of the Groundwater Ingestion Exposure Route for Class I Groundwater [a]	KPRG CCB Determination June 8, 2005													
			Soil Borings - Composite													
			GP-1/0-8'	GP-2/0-11'	GP-3/0-8'	GP-4/0-4'	GP-5/0-4'	GP-6/0-7'	GP-7/0-2'	GP-8/0-13'	GP-9/0-18'	GP-10/0-9'	GP-11/0-17'	GP-12/0-7'	GP-13/0-3'	GP-14/0-9'	GP-15/0-6'
Toxicity Characteristic Leaching Procedure																	
Arsenic	mg/L	0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	mg/L	2.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	mg/L	0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	mg/L	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	mg/L	0.0075	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	mg/L	0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	mg/L	0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	mg/L	0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Neutral Leaching Extraction Test																	
Arsenic	mg/L	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0 .01	<0.01	<0.01	<0.01	<0 .01	<0.01	<0.01	<0.01	<0.01	<0.01
Barium	mg/L	2.0	0.11	0.088	0.13	0.042	0 .091	0.11	0.16	0.15	0.14	0.11	0.0878	0.12	0.26	0 .15	0 .17
Beryllium	mg/L	0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0 .004	<0 .004	<0.004	<0.004	<0.004
Boron	mg/L	2.0	0.37	1.1	0.66	0.47	0.33	0.73	0.87	1.2	**2.2**	0.77	1.3	0.86	0.43	1.9	1.2
Cadmium	mg/L	0.005	0.005	<0.002	<0.002	<0.002	<0.002	<0 .002	<0.002	<0.002	<0.002	<0.002	<0.002	<0 .002	<0.002	<0.002	<0.002
Chromium	mg/L	0.1	<0.01	0.012	<0.01	<0.01	<0 .01	<0.01	<0.01	0.011	0.010	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	mg/L	1.0	<0.005	<0.005	<0.005	<0.005	<0 .006	<0.006	<0.005	<0.005	<0.005	<0 .005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper	mg/L	0.65	<0.01	<0.01	<0.01	<0:01	<0.01	0.048	0.0158	<0.01	<0.01	0.021	<0.01	0.43	<0.01	**1.6**	<0.01
Iron	mg/L	5.0	<0.05	<0.05	<0 .05	<0.06	<0.05	<0 .05	<0.05	<0.05	<0.05	<0 .06	<0.05	<0.05	<0.06	<0.05	<0.06
Lead	mg/L	0.0075	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.006	**0.016**	<0.005	**0.043**	<0.005
Manganese	mg/L	0.15	<0 .01	<0.01	<0 .01	<0.01	<0.01	<0 .01	<0 .01	<0.01	<0.01	<0.01	0.036	<0.01	<0.01	<0.01	<0.01
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0 .0002	<0.0002	<0.0002	<0.0002	<0.0002	<0 .0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	mg/L	0.035	0.017	0.022	0.013	<0.01	<0.01	0.011	0.026	0.012	**0.088**	<0 .01	0.015	0.0188	<0.01	0.026	<0.01
Nickel	mg/L	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Potassium	mg/L	---	0.96	1.3	1.2	0.52	<6	1.8	3.68	2.4 8	3.3	1.3 8	3.8	1.88	1.28	2.48	1.88
Selenium	mg/L	0.05	<0 .002	<0.002	<0.002	<0 .002	<0.002	<0.002	0.0027	0.0039	0.0046	<0.002	<0 .002	<0.002	0.0027	<0.002	<0.002
Sodium	mg/L	---	3.9	6.1	4.4	6.4	3.1	14	36	24	43	5.6	9.2	36	9 .1	9.2	7.2
Zinc	mg/L	5	<0.02	<0.02	<0.02	<0.02	<0.02	<0 .02	<0.02	<0.02	<0.02	<0.02	<0.02	0.068	<0 .02	0.21	<0.02
General Chemistry																	
pH	S.U.	---	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

5 Concentration exceeds the Tier 1 SRO

Notes:

[a] Tier 1 SRO obtained from TACO 35 IAC 742, Appendix B, Table A.

Italics indicates a non-TACO objective. Objective obtained from the IEPA non-TACO Table revised 10/24/2018.

NA - Not Analyzed

"<" - Indicates the parameter was not detected above the laboratory reporting limit.

--- Not listed in 35 IAC 742, Appendix B, Table A or IEPA non-TACO Table.

Table 1
Historical Leaching Data
Joliet 29 Station

Parameter	Units	Tier 1 SRO for the Soil Component of the Groundwater Ingestion Exposure Route for Class I Groundwater [a]	KPRG Ash/Slag Removal November 4, 2005									
			Soil Probes - Composite		Test Pit - Composite	Soil Probes - Composite						
			GP14A-25N/0-9'	GP14A-40N/0-9'	GP14A-45N/0-9'	GP14A-25W/0-9'	GP14A-40W/0-9'	GP14A-25S/0-9'	GP14A-40S/0-9'	GP14A-25E/0-9'	GP14A-40E/0-9'	GP14A-Profile/0-9'
Toxicity Characteristic Leaching Procedure												
Arsenic	mg/L	0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1
Barium	mg/L	2.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1
Cadmium	mg/L	0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.05
Chromium	mg/L	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.05
Lead	mg/L	0.0075	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.05
Mercury	mg/L	0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.002
Selenium	mg/L	0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1
Silver	mg/L	0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.05
Neutral Leaching Extraction Test												
Arsenic	mg/L	0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	mg/L	2.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	mg/L	0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Boron	mg/L	2.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	mg/L	0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	mg/L	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	mg/L	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	mg/L	0.65	<0.05	<0.05	NA	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA
Iron	mg/L	5.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	mg/L	0.0075	<0.0075	**0.018**	<0.0075	0.0072	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	NA
Manganese	mg/L	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	mg/L	0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Molybdenum	mg/L	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	mg/L	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	mg/L	---	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	mg/L	0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	mg/L	---	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	mg/L	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
General Chemistry												
pH	S.U.	---	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.4

5 Concentration exceeds the Tier 1 SRO

Notes:

[a] Tier 1 SRO obtained from TACO 35 IAC 742, Appendix B, Table A.

Italics indicates a non-TACO objective. Objective obtained from the IEPA non-TACO Table revised 1(

NA - Not Analyzed

"<" - Indicates the parameter was not detected above the laboratory reporting limit.

--- Not listed in 35 IAC 742, Appendix B, Table A or IEPA non-TACO Table.

Table 2
Historical Leaching Data
Powerton Station

Parameter	Units	Tier 1 SRO for the Soil Component of the Groundwater Ingestion Exposure Route for Class I Groundwater [a]	Andrews Environmental Engineering, Inc. Test Pit Activities May 6, 2004												MWG Bottom Ash Sampling February 27, 2007	KPRG Alternate Source Demonstration January 11, 2018		KPRG Alternate Source Demonstration January 4, 2019	
			Test Pit Samples												Composite	Composite	Composite	Composite	Composite
			TP-03/2.9'	TP-12/3.0'	TP-15/5.4'	SFA-1	TP-16/6.6'	TP-19/2.7	TP-23/4.8	TP-27/7.2	TP-29/8.0'	FS-01	FS-02	BA-01	Powerton Bottom Ash	Ash Bypass Basin	Ash Surge Basin	Ash Bypass Basin	Ash Surge Basin
Toxicity Characteristic Leaching Procedure																			
Arsenic	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	NA	NA	NA	NA	NA
Barium	mg/L	2.0	0.18	0.43	0.21	0.22	0.095	1.5	0.17	0.17	0.17	0.16	0.18	NA	NA	NA	NA	NA	NA
Cadmium	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**0.008**	<0.005	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	NA	NA	NA
Chromium	mg/L	0.1	<0.05	0.027	**0.16**	**0.13**	0.024	<0.05	<0.05	0.026	0.053	<0.05	<0.05	NA	NA	NA	NA	NA	NA
Lead	mg/L	0.0075	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	NA	NA	NA	NA	NA	NA
Mercury	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	NA	NA	NA	NA	NA	NA
Selenium	mg/L	0.05	**0.14**	**0.059**	**0.19**	**0.095**	**0.052**	0.016	0.021	0.046	**0.077**	**0.056**	**0.069**	NA	NA	NA	NA	NA	NA
Silver	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	NA	NA	NA	NA	NA
Neutral Leaching Extraction Test																			
Antimony	mg/L	0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	NA	NA	NA	NA
Arsenic	mg/L	0.05	<0.05	<0.05	0.013	<0.05	<0.05	0.011	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	NA	NA	NA
Barium	mg/L	2.0	0.22	0.27	0.21	0.15	0.24	0.33	0.37	0.21	0.2	0.28	0.21	0.39	0.27	NA	NA	NA	NA
Beryllium	mg/L	0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	NA	NA	NA	NA
Boron	mg/L	2	1.5	1.1	1.2	1	0.32	0.1	1.4	0.84	0.65	**4**	**3**	0.087	<0.1	NA	NA	NA	NA
Cadmium	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	NA
Chromium	mg/L	0.1	0.027	<0.05	**0.16**	**0.16**	0.032	<0.05	<0.05	0.036	0.092	0.015	0.021	<0.05	<0.025	NA	NA	NA	NA
Cobalt	mg/L	1.0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.025	NA	NA	NA	NA
Copper	mg/L	0.65	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.025	NA	NA	NA	NA
Iron	mg/L	5.0	<0.1	0.15	<0.1	<0.1	<0.1	0.31	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA	NA	NA
Lead	mg/L	0.0075	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	NA	NA	NA	NA
Manganese	mg/L	0.15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.025	NA	NA	NA	NA
Mercury	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0004	<0.002	<0.002	<0.002	<0.002	<0.002	NA	NA	NA	NA
Nickel	mg/L	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.025	NA	NA	NA	NA
Selenium	mg/L	0.05	**0.08**	0.035	**0.15**	**0.099**	0.04	<0.05	<0.05	0.035	0.04	0.044	0.038	<0.05	<0.05	NA	NA	NA	NA
Silver	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.025	NA	NA	NA	NA
Thallium	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	NA	NA	NA	NA
Zinc	mg/L	5	0.07	0.17	0.098	0.037	0.041	0.067	0.053	0.054	0.056	0.053	0.053	0.044	<0.1	NA	NA	NA	NA
Leaching Environmental Assessment Framework Analyses [b]																			
Antimony	mg/L	0.006	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0011	0.0013
Arsenic	mg/L	0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0048	0.0033
Barium	mg/L	2.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.35	0.15
Beryllium	mg/L	0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00011	<0.000057
Boron	mg/L	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**3.7**	0.36	NA	NA
Cadmium	mg/L	0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00018	<0.00013
Calcium	mg/L	---	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	130	35	NA	NA
Chromium	mg/L	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0085	0.002
Chloride	mg/L	200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	27	6.5	NA	NA
Cobalt	mg/L	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0014	<0.000075
Fluoride	mg/L	4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.8	0.21	1.4	0.45
Lead	mg/L	0.0075	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0033	<0.000094
Lithium	mg/L	---	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0034	0.0097
Mercury	mg/L	0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.000065	<0.000065
Molybdenum	mg/L	*0.035*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0039	0.0029
Selenium	mg/L	0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.00081	<0.00081
Sulfate	mg/L	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**910**	87	NA	NA
Thallium	mg/L	0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.000063	<0.000063
TDS	mg/L	1200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1500**	200	NA	NA
pH	S.U.	---	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8.8	8.5	9	8.6
General Chemistry																			
pH	S.U.	---	11.5	11.8	12.2	11.4	10.4	8.6	10.3	10.7	10.8	8.7	9.9	NA	NA	NA	NA	NA	NA

0.14 Concentration exceeds the Tier 1 SRO

Notes:

[a] Tier 1 SROs obtained from TACO 35 IAC 742, Appendix B, Table A.

[b] LEAF results from natural pH analysis shown.

Italics indicates a non-TACO objective. Objective obtained from the IEPA non-TACO Table revised 10/24/2018.

NA - Not Analyzed

"<" - Indicates the parameter was not detected above the laboratory reporting limit.

--- Not listed in 35 IAC 742, Appendix B, Table A or IEPA non-TACO Table.

Table 3
Historical Leaching Data
Will County Station

Parameter	Units	Tier 1 SRO for the Soil Component of the Groundwater Ingestion Exposure Route for Class I Groundwater [a]	MWG Bottom Ash Sampling December 2, 2010	KPRG CCB Determination June-August 2015																				KPRG Alternate Source Demonstration	
			Composite	Soil Borings - Composite																				Composite	
			3 South Bottom Ash	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C2	C3	C4	C5	C6	C7	D5	D6	D7	Protocol 1	AP 2S Ash	AP 3S Ash
Toxicity Characteristic Leaching Procedure																									
Arsenic	mg/L	0.05	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.05	NA	NA
Barium	mg/L	2.0	0.96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.83	NA	NA
Boron	mg/L	2.0	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	mg/L	0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.005	NA	NA
Chromium	mg/L	0.1	0.029	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.025	NA	NA
Copper	mg/L	0.65	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.025	NA	NA
Lead	mg/L	0.0075	<0.0075	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.05	NA	NA
Nickel	mg/L	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.025	NA	NA
Selenium	mg/L	0.05	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.05	NA	NA
Silver	mg/L	0.05	<0.025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.025	NA	NA
Zinc	mg/L	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	NA	NA
Neutral Leaching Extraction Test																									
Antimony	mg/L	0.006	<0.006	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	NA	NA
Arsenic	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	NA	NA
Barium	mg/L	2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NA	NA	NA
Beryllium	mg/L	0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	NA	NA	NA
Boron	mg/L	2.0	1.3	0.2	0.16	0.16	0.16	0.24	<0.1	<0.1	<0.1	<0.1	0.12	0.16	0.15	<0.1	0.15	<0.1	<0.1	<0.1	<0.1	0.12	0.13	NA	NA	NA
Cadmium	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NA	NA	NA
Chromium	mg/L	0.1	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	NA	NA	NA
Cobalt	mg/L	1.0	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	NA	NA	NA
Copper	mg/L	0.65	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	NA	NA	NA
Iron	mg/L	5.0	<0.1	<0.2	<0.2	0.3	0.21	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.24	0.42	<0.2	0.22	0.47	<0.2	NA	NA	NA
Lead	mg/L	0.0075	<0.0075	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	NA	NA
Manganese	mg/L	0.15	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	NA	NA	NA
Molybdenum	mg/L	*0.035*	NA	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	NA	NA
Mercury	mg/L	0.002	<0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	NA	NA	NA
Nickel	mg/L	0.1	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	NA	NA	NA
Potassium	mg/L	---	NA	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	NA	NA	NA
Selenium	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	NA	NA
Silver	mg/L	0.05	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	NA	NA	NA
Sodium	mg/L	---	NA	14	7.6	6.4	6.4	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	NA	NA	NA
Thallium	mg/L	0.002	<0.002	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	NA	NA	NA
Zinc	mg/L	5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA	NA
Cyanide, Total	mg/L	0.2	<0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloride	mg/L	200	0.97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoride	mg/L	4	0.25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate as N	mg/L	10	<0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L	400	49	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TDS	mg/L	1200	200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Leaching Environmental Assessment Framework Analyses [b]																									
Boron	mg/L	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**4.6**	**3.3**
Calcium	mg/L	---	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	59	95
Chloride	mg/L	200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	69	15
Fluoride	mg/L	4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	0.31
Sulfate	mg/L	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	310	390
TDS	mg/L	1200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	590	610
pH	SU	---	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8.8	9.3
General Chemistry																									
pH	S.U.	---	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.99	NA	NA

4.6 Concentration exceeds the Tier 1 SRO

Notes:

[a] Tier 1 SROs obtained from TACO 35 IAC 742, Appendix B, Table A.

[b] LEAF results from natural pH analysis shown.

Italics indicates a non-TACO objective. Objective obtained from the IEPA non-TACO Table revised 10/24/2018.

NA - Not Analyzed

"<" - Indicates the parameter was not detected above the laboratory reporting limit.

--- Not listed in 35 IAC 742, Appendix B, Table A or IEPA non-TACO Table.

Table 4
Historical Leaching Data
Waukegan Station

Parameter	Units	Tier 1 SRO for the Soil Component of the Groundwater Ingestion Exposure Route for Class I Groundwater [a]	MWG Bottom Ash Sampling July 22, 2004			KPRG Alternate Source Demonstration January 17, 2018		KPRG Bates Soil Investigation November 2020						
			Composite			Composite		Soil Probes						
			Bottom Ash-1	Bottom Ash-2	Bottom Ash 1/2	East Pond Ash	West Pond Ash	A1-0-5	A8-5-7	A9-0-5	B10-5-9	C7-0-5	C7-5-10	D5-5-10
Toxicity Characteristic Leaching Procedure														
Arsenic	mg/L	0.05	NA	NA	<0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	mg/L	2.0	NA	NA	0.51	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	mg/L	0.005	NA	NA	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	mg/L	0.1	NA	NA	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	mg/L	0.15	NA	NA	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	mg/L	0.0075	NA	NA	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	mg/L	0.002	NA	NA	<0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	mg/L	0.05	NA	NA	0.025	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	mg/L	0.05	NA	NA	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	mg/L	5	NA	NA	<0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA
Synthetic Precipitation Leaching Procedure														
Sulfate	mg/L	400	NA	NA	NA	NA	NA	NA	97	NA	**460**	NA	49	150
Neutral Leaching Extraction Test														
Antimony	mg/L	0.006	<0.006	<0.006	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	mg/L	0.05	<0.05	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	mg/L	2.0	0.19	0.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	mg/L	0.004	<0.004	<0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Boron	mg/L	2	1.1	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	mg/L	0.005	<0.005	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	mg/L	0.1	<0.05	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	mg/L	1.0	<0.05	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	mg/L	0.65	<0.05	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	mg/L	5.0	<0.1	<0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	mg/L	0.0075	<0.0075	<0.0075	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	mg/L	0.15	<0.05	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	mg/L	0.002	<0.002	<0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	mg/L	0.1	<0.05	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	mg/L	0.05	<0.05	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	mg/L	0.002	<0.002	<0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	mg/L	5	<0.1	<0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Leaching Environmental Assessment Framework Analyses [b]														
Arsenic	mg/L	0.05	NA	NA	NA	NA	NA	0.011	NA	**0.058**	NA	0.022	NA	NA
Boron	mg/L	2	NA	NA	NA	2	1.9	**5**	NA	**8.2**	NA	**13**	NA	NA
Calcium	mg/L	---	NA	NA	NA	43	42	55	NA	85	NA	150	NA	NA
Chloride	mg/L	200	NA	NA	NA	2.9	17	2.5	NA	1.2	NA	1.2	NA	NA
Fluoride	mg/L	4	NA	NA	NA	0.32	0.53	NA	NA	NA	NA	NA	NA	NA
Iron	mg/L	5	NA	NA	NA	NA	NA	<0.05	NA	<0.05	NA	<0.05	NA	NA
Lithium	mg/L	---	NA	NA	NA	NA	NA	0.014	NA	0.0048	NA	0.0042	NA	NA
Manganese	mg/L	0.15	NA	NA	NA	NA	NA	0.00093	NA	0.0013	NA	0.00098	NA	NA
Molybdenum	mg/L	0.035	NA	NA	NA	NA	NA	**0.094**	NA	**0.072**	NA	**0.17**	NA	NA
Sulfate	mg/L	400	NA	NA	NA	130	38	93	NA	140	NA	290	NA	NA
Thallium	mg/L	0.002	NA	NA	NA	NA	NA	0.00026	NA	0.00017	NA	<0.001	NA	NA
TDS	mg/L	1,200	NA	NA	NA	270	240	220	NA	310	NA	580	NA	NA
pH	SU	---	NA	NA	NA	9.7	9.7	9.4	NA	10.1	NA	9.6	NA	NA
General Chemistry														
pH	S.U.	---	NA	NA	10.5	NA	NA	9.0	9.1	9.2	7.5	8.5	8.8	7.3

5 Concentration exceeds the Tier 1 SRO

Notes:

[a] Tier 1 SROs obtained from TACO 35 IAC 742, Appendix B, Table A.

[b] LEAF results from natural pH analysis shown.

Italics indicates a non-TACO objective. Objective obtained from the IEPA non-TACO Table revised 10/24/2018.

NA - Not Analyzed

"<" - Indicates the parameter was not detected above the laboratory reporting limit.

--- Not listed in 35 IAC 742, Appendix B, Table A or IEPA non-TACO Table.

Appendix A

Resumes

Weaver Consultants Group

Douglas G. Dorgan, Jr., LPG

Co-President, Principal

EDUCATION

B.S. Earth Science, Eastern Illinois University, 1986

Graduate Course Work in Environmental Studies, Sangamon State University, 1986

M.S. Geography/Environmental Science, Northern Illinois University, 1993

CERTIFICATIONS

Licensed Professional Geologist: Illinois, Indiana, and Kansas

OSHA Supervisor's Health & Safety Training Chemical-terrorism Vulnerability Information (CVI) Authorized User

FIELDS OF EXPERTISE

Environmental Due Diligence, Environmental Permitting, Brownfield's Redevelopment, Remediation Design and Cost Modeling, Groundwater Impact Assessment, Risk Based Corrective Action, Expert Witness and Litigation Support

Professional Summary

Mr. Dorgan serves as Co-President and Principal of Weaver Consultants Group. He has over thirty-five years of environmental and solid waste control project experience. He has supervised completion of numerous projects including multi-phase environmental site assessments, risk based corrective action, Brownfield's redevelopment, hydrogeological investigations, groundwater impact assessments, remediation planning and implementation, multi media compliance audits, UST closures, and solid waste management facility permitting. He has also served as an Expert Witness.

Prior to joining Weaver Consultants Group, Mr. Dorgan was an Office Director for a national environmental consulting firm.

Select Project Experience

He has been involved in over 100 state voluntary remediation program projects at sites located across the country. These projects have utilized a range of closure strategies involving site-specific fate and transport modeling, risk assessment, remediation, land use controls, and engineered barriers. Many of these projects were completed in support of property acquisition and consequently completed in accordance with aggressive schedule and risk mitigation requirements.

Mr. Dorgan has provided services to both private and public sector clients redeveloping Brownfield's. Plans have included residential, retail, commercial, industrial, institutional, and mixed use developments. He also consults on the unique construction related aspects of developing distressed properties.

He has been the Principal in Charge for the Environmental Due Diligence associated with acquisition of the 3100 acre former Bethlehem/RG Steel facility in Sparrows Point, Maryland. Since completion of the property acquisition, Mr. Dorgan has been serving as the Project Coordinator on behalf of the owner, Tradepoint Atlantic, LLC. His responsibilities include coordination of environmental obligations being performed pursuant to regulatory agreements executed with both the Maryland Department of Environment and the United States Environmental Protection Agency.

In his role as lead consultant, Mr. Dorgan is supporting due diligence undertaken by a national industrial redevelopment company that specializes in acquisition of distressed assets across the United States. Mr. Dorgan's role includes leading a team of environmental professionals supporting due diligence including completion of Environmental Site Assessments, remedial options evaluation and cost modeling, support to environmental insurance underwriting review, and support in communications with capital partners and investment advisors. Properties include closed steel mills, power plants, petrochemical facilities, shipyards, ports, and oil and gas operations.

Weaver Consultants Group

Select Project Experience - Continued

Mr. Dorgan has been the Principal in Charge for environmental investigation and cleanup activities conducted by a Class I Railroad Operator at sites located in five states across the Midwest. Activities have included investigations and risk based cleanups conducted pursuant to various state voluntary cleanup programs.

He managed activities performed in compliance with a RCRA Hazardous Waste Management Permit for a major steel company located in Northwest Indiana. Responsibilities include supervision of preparation of permit renewal and amendment applications, permit negotiations with IDEM and USEPA, and ongoing groundwater sampling and reporting for a hazardous waste landfill network comprised of 64 monitoring points. Mr. Dorgan also managed RCRA Corrective Action activities for the site, including preparation of required plans and deliverables and investigation and corrective measures implementation pursuant to approved workplans.

Mr. Dorgan managed acquisition of a comprehensive "No Further Remediation" letter pursuant to the Illinois Site Remediation Program for a 14-acre parcel located in the northern suburbs of Chicago. A soil and groundwater investigation was performed to assess site impacts. Tier 2 modeling and development of site specific background following the Illinois Tiered Approach to Corrective Action Objectives (TACO) methods were used to support appropriate soil and groundwater remediation objectives. Remediation activities included removal of 45,000 tons of debris and fill material, and excavation and disposal of LUST contaminated soils.

As Principal in Charge, Mr. Dorgan was previously responsible for overseeing design, permitting and compliance activities for a Type II and III Solid Waste Disposal facility in Pines, Indiana. He was also responsible for oversight of ongoing RI/FS activities for the Town of Pines Superfund Site in Pines, Indiana. On behalf of a major PRP, Mr. Dorgan collaborated with other technical consultants on the implementation of the RI/FS and ongoing remedial measures development and construction.

He managed the site investigation and Indiana Voluntary Remediation Program activities for a large glass manufacturing facility in Central Indiana. Site investigation activities resulted in remediation of select facility areas to control for impacts attributable to semi-volatile organic compounds, polychlorinated biphenyl's (PCB's), and inorganic constituents. Additional site measures included removal of contaminated creek sediments and implementation of a comprehensive groundwater investigation.

Mr. Dorgan managed an Illinois SRP application for a former die casting facility with PCB impacts to facility structures, soils, and shallow groundwater. Extensive site investigation was undertaken and TACO Tier 2 and 3 modeling performed. Certain remedial objectives for the project were approved through a Risk Based Disposal Approval Request submitted to USEPA Region 5.

He was Project Manager for a comprehensive Phase I Environmental Site Assessment of the General Motors Danville, IL gray iron foundry whose operations date to the early 1940s. Project required a detailed records review and site inspection to identify potential areas of concern. Subsequent responsibilities included developing a scope of work for site investigation.

Mr. Dorgan managed implementation of a facility-wide investigation for PCB-related impacts at a die casting facility in Chicago, Illinois. The investigation scope included sampling of soil, concrete, structural surfaces, and process equipment. Based on investigation results, alternative risk-based opinions were evaluated for site remediation. In support of on-going litigation, an engineering remediation cost estimate was generated.

Mr. Dorgan managed RCRA Corrective Action activities for a specialty steel manufacturing facility in Niles, Michigan. Activities included operation and monitoring of an Interim Measures groundwater remediation system, implementation of preliminary subsurface investigations, development of RCRA RFI Workplans, and negotiations with Michigan Department of Environmental Quality personnel.

He conducted comprehensive and media-specific environmental compliance audits of facilities located in four states for a major medical diagnostic imaging equipment manufacturer. Comprehensive audits were performed for select waste and scrap material management facilities. Audits included recommendations for corrective measures in addition to development of a division-wide program for management of recoverable waste streams.

Weaver Consultants Group

Select Project Experience - Continued

Mr. Dorgan was the Project Manager for a Phase I and II Environmental Site Assessment of a 1.1 million square foot former can manufacturing facility in Chicago. Assessment activities were designed to evaluate long term liabilities and environmental considerations associated with facility reuse and/or demolition planning.

Publications and Presentations

"Environmental Audits for Selection of Solid Waste Disposal Sites", presented at Waubonsee Community College, Sugar Grove, IL, November, 1992

"Conducting Effective Environmental Site Assessments", presented to the Institute of Business Law Conference 'Environmental Regulation in Illinois', September, 1993

"Minimizing Liability in Real Estate Transactions by Conducting Effective Environmental Site Assessments", New Mexico Conference on the Environment, Journal of Conference Proceedings, April, 1994

"General Geologic/Hydrogeologic and Contaminant Transport Principles", presented to ITT/Hartford Insurance Co., January, 1996

"Environmental Site Assessments and the Due Diligence Process", presented to the AIG Environmental seminar 'Legal Actions Against Facilities', March, 1998

"Brownfields Development, TACO and the SRP Process", presented to the Calumet Area Industrial Commission Executive Council, May, 1998

"Property Acquisition and the Due Diligence Process", presented to Cushman and Wakefield Corporate Services Department, August, 1998

"Brownfields Development, TACO and the SRP Process", presented to the Calumet Area Industrial Commission, March, 1999

"Risk Management Tools for Contaminated Site Development", presented to a construction industry seminar 'A View From the Top', February, 2000

"Voluntary Remediation of Brownfields/Risk Based Remediation", presented to Illinois Association of Realtors, October, 2002

"Blue Skies for Brownfields", Illinois Association of Realtors Magazine, May, 2003

"Environmental Considerations Associated with Site Development", presented to Power Construction Operations Meeting, March, 2006

"Weaver Consultants Group Environmental Manager AAI Roundtable", facilitator and presenter, June, 2006

"Overview of AAI and ASTM E1527-05: The Changing Due Diligence Landscape", presented to Grand Rapids Chamber of Commerce Environmental Committee, January, 2007

"Weaver Consultants Group Environmental Manager Vapor Intrusion Roundtable", facilitator and presenter, July/November, 2007

"Brownfields Redevelopment: A Catalyst for Change", presented to Indiana University Northwest, July, 2011

Weaver Consultants Group

Michael B. Maxwell, LPG

EPG Chicago Operations Manager

EDUCATION

M.S. Geology, University of Iowa, 1996

B.A. Geological Science, State University of New York, College at Geneseo, 1994

CERTIFICATIONS

Licensed Professional Geologist (LPG), Illinois and Indiana

Certified Hazardous Materials Manager (CHMM)
OSHA 40 Hour Hazardous Waste Site Worker and OSHA 8 Hour Refresher Course

Professional Summary

Mr. Maxwell serves as the Environmental Practice Group Chicago Operations Manager for Weaver Consultants Group. He has over twenty four years of professional consulting experience in conducting and managing a wide variety of environmental and solid/hazardous waste facility projects. These projects have included detailed environmental studies and closures of solid and hazardous waste disposal facilities, as well as industrial manufacturing operations. He has successfully completed numerous environmental projects including: multi-phase environmental site assessments, risk-based corrective action and closure, UST closures, hazardous and solid waste permitting, and corrective action, routine groundwater monitoring, groundwater assessment reports, and hydrogeological investigations. He has also played the key supporting/management role in preparation of Expert Reports and testimony as an Expert Witness related to various legal cases involving investigations/remediation under CERCLA (Superfund) and various state voluntary cleanup program regulations.

Select Project Experience

Mr. Maxwell is project director for permitting, design, and compliance activities at an industrial waste (coal ash) disposal facility in northwest Indiana. The facility is regulated under two different permits and is also part of a larger RI/FS investigation conducted within the local municipality under an Agreed Order with USEPA based on the CERCLA regulations. Activities managed include detection, assessment, and corrective action groundwater/surface water planning/monitoring, and supplemental closure, including wetlands investigations and permitting.

Mr. Maxwell assisted with the preparation of an Expert Witness Report and subsequent deposition testimony associated with CERCLA liability, cost allocation, appropriateness, and costs associated with the selected remedy related to a former zinc smelter located in the Metro East Area in Illinois.

He has also played the key supporting role in the preparation of Expert Opinions and deposition testimony in support of defendants involved in toxic tort and property damage litigation claims related to historic use of chlorinated solvents at an industrial facility in St. Louis, MO. The facility and surrounding residential neighborhood has been extensively investigated over the last 25 plus years under a prior Consent Degree with the State of Missouri and ongoing investigation/remediation under a separate Consent Decree with USEPA, which requires extensive investigation/remediation activities modeled after CERCLA.

Mr. Maxwell has been involved in over 100 state voluntary remediation program projects at sites in the Midwest and Mid-Atlantic. These projects have utilized a range of closure strategies, often involving site-specific fate and transport modeling, risk assessment, remediation, land use controls, and engineered barriers. Many of these projects were completed to support property transactions with aggressive schedules and risk mitigation requirements.

He has provided environmental consulting services related to compliance with the closure and groundwater monitoring requirements under 40 CFR 257 Hazardous and Solid Waste Management System, Disposal of Coal Combustion Residuals From Electric Utilities rules (Federal CCR Regulations). Mr. Maxwell assisted in the design and installation of the initial groundwater monitoring system, including preparation of the Groundwater Sampling and Analysis Plan, oversaw the collection of the initial eight rounds of background data, as well as the statistical evaluation of the groundwater monitoring data. The groundwater monitoring data was intended to support the preparation and regulatory approval of Closure Plans for the facilities. He was also involved in addressing various technical comments provided by the state regulators concerning the Closure Plans for both facilities. Services provided to local Indiana utility and general contractor that prepared the Closure Plans.

Mr. Maxwell managed the review of Groundwater Monitoring Reports prepared under the Federal CCR Regulations for two former Coal Ash Impoundment sites in northern New Jersey. The former surface impoundments were closed by removal as part of the facilities being redeveloped into commercial/industrial mixed use properties. Liability protections were attained for the site owner under the New Jersey Voluntary Cleanup Program.

He prepared a Technical Impracticability (TI) Waiver related to the remedial approach selected in the Record of Decision (ROD) to address a complex chlorinated solvents groundwater plume at a rail yard Superfund site located in northern Indiana. Supporting information for the TI waiver was obtained from a number of other chlorinated solvent groundwater remediation projects in vicinity of the railyard. The TI Waiver was utilized as the basis for the issuance of an Amended ROD by USEPA. The Amended ROD waived the prior requirement to restore the aquifer to drinking water standards throughout the plumes and required various other source control measures, aquifer flushing, groundwater monitoring, and further investigation/remediation within certain parts of the Superfund site.

Mr. Maxwell has managed Phase II ESA activities and developed a Response Action Plan (RAP) compliant with the Maryland Voluntary Cleanup Program for a 48-acre parcel of prime real estate not far from the I-95 corridor that is part of a larger 3,300 acre redevelopment of a former steel mill located in Baltimore, MD. The environmental due diligence and risk management activities are being performed to support attainment of a NFA Letter that will be acceptable to the current landowner, developer, and future lessee.

He has performed site investigation and Indiana Voluntary Remediation Program (VRP) closure activities for a large glass manufacturing facility in Central Indiana. Site Investigation activities resulted in remediation of select facility areas to control for impacts attributable to semi-volatile organic compounds, PCB's and inorganic constituents. Additional site measures included removal of contaminated creek sediments and implementation of a comprehensive groundwater investigation. The Remediation Completion Report was approved by IDEM and a Comprehensive Certificate of Completion has been issued under the Indiana VRP.

Mr. Maxwell supervised a team of over five technical staff involved in the due diligence review of the environmental conditions associated with a portfolio of nearly 300 commercial/industrial properties owned by a Real Estate Investment Trust in support of a proposed asset transfer totaling approximately $3.4 billion. The results of the due diligence review were presented in a master spreadsheet that highlighted key environmental issues associated with each property. The review was completed within a compressed timeline of 3 weeks in order to meet the client specified closing schedule.

He was project manager for a LUST remediation project for a 2 acre parcel in the west suburbs of Chicago formerly containing a gasoline station and various other commercial buildings. Remedial and site development activities completed at the site included the demolition of the previous gas station and other commercial buildings, UST removal, along with the excavation and disposal of greater than 2,000 tons of petroleum impacted soils. The costs incurred for the remedial activities were eligible for reimbursement under the Illinois LUST Fund and over $200,000 were approved for payment from the LUST Fund. The remediation activities allowed for the timely redevelopment of the property as a drug store for a nationwide chain.

Mr. Maxwell has managed remedial and report writing activities for the remediation and redevelopment of a high profile 7.5 acre Brownfield redevelopment property on Goose Island within the City of Chicago. The undeveloped site was entered into the Illinois SRP for purposes of securing a Comprehensive NFR Letter. A Draft NFR Letter was attained in a timely manner, allowing for the closing of the real estate transaction. Implementation of risk-based remediation strategies, including soil management zone, engineered barriers, and institutional controls instead of active remediation saved the property owner millions of dollars. The final NFR Letter from the state agency has been issued.

He has prepared two petitions to delist multi-source leachates that were considered listed hazardous wastes under RCRA. The documents include a risk assessment of the petitioned waste using the Delisting Risk Assessment Software (DRAS) developed by USEPA. Also, Mr. Maxwell provided testimony relating to the technical content of the Delisting Petition at a hearing before the Illinois Pollution Control Board. One Delisting Petition has been approved by the Illinois Pollution Control Board and the other is under review by USEPA Region VII.

Mr. Maxwell has supervised technical support staff involved in hydrogeologic site investigations designed to comply with detailed solid and hazardous waste permitting requirements in Indiana. The specific activities included the field drilling program, data evaluation, and preparation of the hydrogeologic site investigation for inclusion in the permit applications. The reports were subsequently approved by the state agency and assisted the client in attaining expansion and/or renewal permits.

He has both performed and supervised numerous projects relating to permitting and regulatory compliance at a Hazardous Waste Disposal Facility in northwest Indiana. Tasks completed included: RCRA permit compliance, RCRA permit modifications, permit renewals, preparation of assessment monitoring reports and preparation of Alternate Source Demonstration Reports. The Alternate Source Demonstration Reports documented that the hazardous waste landfill was not the cause of statistically significant concentrations of barium and cyanide in groundwater. The reports were subsequently approved by state regulators, which avoided implementation of costly compliance groundwater monitoring at the facility.

Mr. Maxwell has prepared various report documents supporting RCRA Corrective Action activities at two steel finishing facility properties located in Portage, IN. The RCRA Facility Investigation (RFI) Workplan detailed proposed investigation and corrective action activities at numerous solid waste management units (SWMUs) identified on the property containing the active steel finishing mill, as well as the property that formerly contained various waste disposal lagoons associated with the mill.

The reports prepared by Mr. Maxwell have resulted in the regulatory closure under RCRA in the form of the attainment of No Further Action (NFA) Letters for two individual SWMUs and three interim status RCRA Units located on the property that formerly contained various waste disposal lagoons. The closure of these SWMUs allowed for 50 acres of land along Lake Michigan to ultimately become part of the Indiana Dunes National Lakeshore.

The various reports and evaluations prepared by Mr. Maxwell have resulted in the regulatory closure under RCRA in the form of the issuance of NFA Letters for 12 SWMUs located on property containing an active steel finishing mill. The technical evaluation which demonstrates that site conditions were eligible for closure included application of Indiana's Risk-Integrated System of Closure (RISC), as well as the more recently implemented Indiana Remediation Closure Guidance.

He is responsible for all aspects of groundwater monitoring projects at over two dozen solid and hazardous waste disposal facilities, including: groundwater sampling, interpretation of analytical results, statistical evaluation, and report writing.

Mr. Maxwell is presently managing implementation of a comprehensive groundwater monitoring and free product recovery program at various RCRA land disposal units located at a 4,000 acre steelmaking/finishing facility in northwest Indiana. Quarterly groundwater monitoring is being performed at over 100 monitoring points by a team of environmental professionals. Closure has also been approved under the Indiana State Cleanup Program for a historical LUST Incident on an adjacent railyard.

He has prepared an Alternate Concentration Limit (ACL) Demonstration for a closed RCRA Solid Waste Disposal facility in southern Indiana. The ACLs were shown to be protective of human health and the environment using various risk-based methodologies, including: Risk-Based Corrective Action (RBCA), and the state of Indiana Risk Integrated System of Closure. The ACL Demonstration was subsequently approved by IDEM.

Publications/Presentations

"Synthetic Soils From Industrial and Municipal Wastes, For the Reclamation of Strip Mines in Southern Iowa", presented at the Geological Society of America North-Central Meeting, Ames, IA, May 1996.

"Side-by-Side Comparison of Two Groundwater Sampling Methodologies: A Quantitative Review of Analytical Data from Groundwater Samples Collected Simultaneously Using Micropurge 'Low-Flow' and Traditional Standard Groundwater Sampling Techniques", presented at the National Groundwater Association National Conference, Denver, CO, April 2010.

Weaver Consultants Group

References

Name: **Mr. John Olashuk,** Landfill Operator/Solid Waste Engineer - ArcelorMittal Burns Harbor
Address: 4100 Edison Lakes Parkway, Mishawaka, IN 46545
Phone Number: (574) 855-1522

Name: **Mr. Kevin Stetter,** Manager, Corrective Action - United States Steel Corporation
Address: Penn Liberty Plaza 1, 1350 Penn Ave – Suite 200, Pittsburgh, PA 1522-4211
Phone Number: (412) 433-4070

Name: **Mr. Jim Hitzeroth,** Environmental Manager**,** Republic Services
Address: 26W580 Schick Rd., Hanover Park, IL 60133
Phone Number: (224) 970-1129

Appendix B

List of References

REFERENCES

American Society for Testing Materials (ASTM) Standard Test Method for Shake Extraction of Solid Waste with Water (ASTM D3987-85).

CCR Rule Compliance Data and Information. (2021, April). Retrieved from https://www.nrg.com/legal/coal-combustion-residuals.html

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Civil & Environmental Consultants, Inc. (2017, July). *Annual Inspection Report Powerton Station – Former Ash Basin.*

Civil & Environmental Consultants, Inc. (2017, October). *Annual Inspection Report West and East Ash Basins, Waukegan Station.*

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Civil & Environmental Consultants, Inc. (2018, October). *Annual Inspection Report East Ash Pond and West Ash Pond, Waukegan Station.*

Civil & Environmental Consultants, Inc. (2019, July). *Annual Inspection Report Powerton Station – Former Ash Basin.*

Civil & Environmental Consultants, Inc. (2019, October). *Annual Inspection Report Ash Surge Basin and Ash Bypass Basin, Powerton Station.*

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Civil & Environmental Consultants, Inc. (2020, July). *Annual Inspection Report Powerton Station – Former Ash Basin.*

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Civil & Environmental Consultants, Inc. (2020, October). *Annual Inspection Report East Ash Pond and West Ash Pond, Waukegan Station.*

Code of Federal Regulations (CFR), Title 40. Protection of Environment, Chapter I. Environmental Protection Agency, Subchapter I. Solid Wastes, Part 257. Criteria for Classification of Solid Waste Disposal Facilities and Practices.

Code of Federal Regulations (CFR), Title 40. Protection of Environment, Chapter I. Environmental Protection Agency, Subchapter I. Solid Wastes, Part 258. Criteria for Municipal Solid Waste Landfills.

Code of Federal Regulations (CFR), Title 40. Protection of Environment, Chapter I. Environmental Protection Agency, Subchapter I. Solid Wastes, Part 261. Identification and Listing of Hazardous Waste.

ENSR Consulting. (1998, October). *Phase I Environmental Site Assessment of Commonwealth Edison Joliet #29 Generating Station 1800 Channahon Road, Joliet, Illinois.*

ENSR Consulting. (1998, October). *Phase I Environmental Site Assessment of the ComEd Powerton Generating Station, Pekin, Illinois.*

ENSR Consulting. (1998, October). *Phase I Environmental Site Assessment of Commonwealth Edison Waukegan Generating Station, 10 Greenwood Avenue, Waukegan, Illinois.*

ENSR Consulting. (1998, October). *Phase I Environmental Site Assessment of Commonwealth Edison Will County Generating Station, 529 E. Romeo Road, Romeoville, Illinois.*

ENSR Consulting. (1998, December). *Phase II Environmental Site Assessment of Commonwealth Edison Joliet #29 Generating Station 1800 Channahon Road, Joliet, Illinois.*

ENSR Consulting. MWG Exhibit 19D. (1998, December). *Phase II Environmental Site Assessment of Commonwealth Edison Powerton Generating Station Route 29 & Mantino Road, Pekin, Illinois.*

ENSR Consulting. (1998, November). *Phase II Environmental Site Assessment of Commonwealth Edison Waukegan Generating Station, 10 Greenwood Avenue, Waukegan, Illinois.*

ENSR Consulting. (1998, December). *Phase II Environmental Site Assessment of Commonwealth Edison Will County Generating Station, 529 East Romeo Road, Romeoville, Illinois.*

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Geosyntec Consultants. (2016, October). *Closure Plan South Ash Ponds 2S and 3S, Will County Station.*

Geosyntec Consultants. (2016, October). *Closure East and West Ash Basins, Waukegan Station.*

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Appendix C

Statistical Evaluation of Groundwater Data

Downgradient Groundwater Statistical Analysis
Mann-Kendall Trend Tests
Joliet 29 Station

Constituent	Well	Trend	Statistically Significant Trend? (99% Confidence Level)	Has well with stat. sig upward trend ever exceeded a GW standard?
Antimony, Dissolved	MW-01	none		
Antimony, Dissolved	MW-02	none		
Antimony, Dissolved	MW-03	none		
Antimony, Dissolved	MW-04	none		
Antimony, Dissolved	MW-06	none		
Antimony, Dissolved	MW-07	none		
Antimony, Total	MW-03	none		
Antimony, Total	MW-04	none		
Arsenic, Dissolved	MW-01	none		
Arsenic, Dissolved	MW-02	none		
Arsenic, Dissolved	MW-03	Down ↓	No	
Arsenic, Dissolved	MW-04	none		
Arsenic, Dissolved	MW-06	Down ↓	No	
Arsenic, Dissolved	MW-07	none		
Arsenic, Total	MW-03	Up ↑	No	
Arsenic, Total	MW-04	none		
Barium, Dissolved	MW-01	Down ↓	No	
Barium, Dissolved	MW-02	Down ↓	Yes	
Barium, Dissolved	MW-03	Up ↑	No	
Barium, Dissolved	MW-04	Up ↑	Yes	No
Barium, Dissolved	MW-06	Up ↑	No	
Barium, Dissolved	MW-07	none		
Barium, Total	MW-03	Down ↓	No	
Barium, Total	MW-04	Down ↓	No	
Beryllium, Dissolved	MW-01	none		
Beryllium, Dissolved	MW-02	none		
Beryllium, Dissolved	MW-03	none		
Beryllium, Dissolved	MW-04	none		
Beryllium, Dissolved	MW-06	none		
Beryllium, Dissolved	MW-07	none		
Beryllium, Total	MW-03	none		
Beryllium, Total	MW-04	none		
Boron, Dissolved	MW-01	Down ↓	No	
Boron, Dissolved	MW-02	Down ↓	Yes	
Boron, Dissolved	MW-03	Up ↑	No	
Boron, Dissolved	MW-04	Down ↓	No	
Boron, Dissolved	MW-06	Down ↓	Yes	
Boron, Dissolved	MW-07	Down ↓	No	
Boron, Total	MW-03	Down ↓	No	
Boron, Total	MW-04	none		
Cadmium, Dissolved	MW-01	none		
Cadmium, Dissolved	MW-02	none		
Cadmium, Dissolved	MW-03	none		
Cadmium, Dissolved	MW-04	none		
Cadmium, Dissolved	MW-06	none		
Cadmium, Dissolved	MW-07	none		
Cadmium, Total	MW-03	none		
Cadmium, Total	MW-04	none		
Calcium, Total	MW-03	none		

Downgradient Groundwater Statistical Analysis
Mann-Kendall Trend Tests
Joliet 29 Station

Constituent	Well	Trend	Statistically Significant Trend? (99% Confidence Level)	Has well with stat. sig upward trend ever exceeded a GW standard?
Calcium, Total	MW-04	Up ↑	No	
Chloride	MW-01	Down ↓	No	
Chloride	MW-02	none		
Chloride	MW-03	Down ↓	Yes	
Chloride	MW-04	Down ↓	No	
Chloride	MW-06	none		
Chloride	MW-07	Down ↓	No	
Chromium, Dissolved	MW-01	none		
Chromium, Dissolved	MW-02	none		
Chromium, Dissolved	MW-03	none		
Chromium, Dissolved	MW-04	none		
Chromium, Dissolved	MW-06	none		
Chromium, Dissolved	MW-07	none		
Chromium, Total	MW-03	none		
Chromium, Total	MW-04	none		
Cobalt, Dissolved	MW-01	none		
Cobalt, Dissolved	MW-02	none		
Cobalt, Dissolved	MW-03	none		
Cobalt, Dissolved	MW-04	Up ↑	No	
Cobalt, Dissolved	MW-06	none		
Cobalt, Dissolved	MW-07	none		
Cobalt, Total	MW-03	none		
Cobalt, Total	MW-04	none		
Fluoride	MW-01	Down ↓	No	
Fluoride	MW-02	Down ↓	Yes	
Fluoride	MW-03	none		
Fluoride	MW-04	none		
Fluoride	MW-06	Down ↓	Yes	
Fluoride	MW-07	Down ↓	Yes	
Lead, Dissolved	MW-01	none		
Lead, Dissolved	MW-02	none		
Lead, Dissolved	MW-03	none		
Lead, Dissolved	MW-04	none		
Lead, Dissolved	MW-06	none		
Lead, Dissolved	MW-07	none		
Lead, Total	MW-03	none		
Lead, Total	MW-04	none		
Lithium, Total	MW-03	none		
Lithium, Total	MW-04	Up ↑	No	
Mercury, Dissolved	MW-01	none		
Mercury, Dissolved	MW-02	none		
Mercury, Dissolved	MW-03	none		
Mercury, Dissolved	MW-04	none		
Mercury, Dissolved	MW-06	none		
Mercury, Dissolved	MW-07	none		
Mercury, Total	MW-03	none		
Mercury, Total	MW-04	none		
Molybdenum, Total	MW-03	Up ↑	No	
Molybdenum, Total	MW-04	Up ↑	No	

Downgradient Groundwater Statistical Analysis
Mann-Kendall Trend Tests
Joliet 29 Station

Constituent	Well	Trend	Statistically Significant Trend? (99% Confidence Level)	Has well with stat. sig upward trend ever exceeded a GW standard?
pH, Field	MW-03	Down ↓	No	
pH, Field	MW-04	Down ↓	No	
pH, Field	MW-06	Down ↓	No	
pH, Field	MW-07	Down ↓	Yes	
Radium 226 + 228, Comb	MW-03	none		
Radium 226 + 228, Comb	MW-04	none		
Selenium, Dissolved	MW-01	Up ↑	No	
Selenium, Dissolved	MW-02	none		
Selenium, Dissolved	MW-03	none		
Selenium, Dissolved	MW-04	none		
Selenium, Dissolved	MW-06	Down ↓	No	
Selenium, Dissolved	MW-07	none		
Selenium, Total	MW-03	none		
Selenium, Total	MW-04	none		
Sulfate	MW-01	Down ↓	No	
Sulfate	MW-02	Down ↓	No	
Sulfate	MW-03	Down ↓	Yes	
Sulfate	MW-04	Down ↓	No	
Sulfate	MW-06	Down ↓	No	
Sulfate	MW-07	Down ↓	No	
Thallium, Dissolved	MW-01	none		
Thallium, Dissolved	MW-02	none		
Thallium, Dissolved	MW-03	none		
Thallium, Dissolved	MW-04	none		
Thallium, Dissolved	MW-06	none		
Thallium, Dissolved	MW-07	none		
Thallium, Total	MW-03	none		
Thallium, Total	MW-04	none		
Total Dissolved Solids	MW-01	Up ↑	No	
Total Dissolved Solids	MW-02	Up ↑	No	
Total Dissolved Solids	MW-03	Down ↓	Yes	
Total Dissolved Solids	MW-04	Down ↓	Yes	
Total Dissolved Solids	MW-06	none		
Total Dissolved Solids	MW-07	Down ↓	No	

Joliet Stats Summary:

34	26%	Downward trends (11 significant)
13	10%	Upward trends (1 significant)
85	64%	No trend
132		**Total Tests Performed**

47 Total Tests where a trend is present
72% of tests where a trend is present are downward
28% of tests where a trend is present are upward

Downgradient Groundwater Statistical Analysis
Mann-Kendall Trend Tests
Powerton Station

Constituent	Well	Trend	Statistically Significant Trend? (99% Confidence Level)	Has well with stat. sig upward trend ever exceeded a GW standard?
Antimony, Dissolved	MW-03	none		
Antimony, Dissolved	MW-04	none		
Antimony, Dissolved	MW-05	none		
Antimony, Dissolved	MW-06	none		
Antimony, Dissolved	MW-07	none		
Antimony, Dissolved	MW-08	none		
Antimony, Dissolved	MW-13	none		
Antimony, Dissolved	MW-14	none		
Antimony, Dissolved	MW-15	none		
Antimony, Total	MW-03	none		
Antimony, Total	MW-04	none		
Antimony, Total	MW-05	none		
Antimony, Total	MW-08	none		
Antimony, Total	MW-15	none		
Arsenic, Dissolved	MW-03	none		
Arsenic, Dissolved	MW-04	none		
Arsenic, Dissolved	MW-05	none		
Arsenic, Dissolved	MW-06	Down ↓	Yes	
Arsenic, Dissolved	MW-07	Down ↓	No	
Arsenic, Dissolved	MW-08	Down ↓	Yes	
Arsenic, Dissolved	MW-13	Down ↓	No	
Arsenic, Dissolved	MW-14	Down ↓	Yes	
Arsenic, Dissolved	MW-15	Down ↓	Yes	
Arsenic, Total	MW-03	none		
Arsenic, Total	MW-04	none		
Arsenic, Total	MW-05	none		
Arsenic, Total	MW-08	Down ↓	No	
Arsenic, Total	MW-15	Down ↓	No	
Barium, Dissolved	MW-03	none		
Barium, Dissolved	MW-04	Down ↓	Yes	
Barium, Dissolved	MW-05	Down ↓	No	
Barium, Dissolved	MW-06	Down ↓	Yes	
Barium, Dissolved	MW-07	Down ↓	No	
Barium, Dissolved	MW-08	Down ↓	Yes	
Barium, Dissolved	MW-13	none		
Barium, Dissolved	MW-14	Up ↑	No	
Barium, Dissolved	MW-15	Down ↓	No	
Barium, Total	MW-03	none		
Barium, Total	MW-04	Down ↓	No	
Barium, Total	MW-05	Down ↓	No	
Barium, Total	MW-08	Down ↓	No	
Barium, Total	MW-15	Down ↓	No	
Beryllium, Dissolved	MW-03	none		
Beryllium, Dissolved	MW-04	none		
Beryllium, Dissolved	MW-05	none		
Beryllium, Dissolved	MW-06	none		
Beryllium, Dissolved	MW-07	none		
Beryllium, Dissolved	MW-08	none		
Beryllium, Dissolved	MW-13	none		
Beryllium, Dissolved	MW-14	none		
Beryllium, Dissolved	MW-15	none		
Beryllium, Total	MW-03	none		
Beryllium, Total	MW-04	none		
Beryllium, Total	MW-05	none		
Beryllium, Total	MW-08	none		
Beryllium, Total	MW-15	none		
Boron, Dissolved	MW-03	Down ↓	No	
Boron, Dissolved	MW-04	Down ↓	Yes	
Boron, Dissolved	MW-05	Down ↓	Yes	
Boron, Dissolved	MW-06	Down ↓	Yes	
Boron, Dissolved	MW-07	none		
Boron, Dissolved	MW-08	none		
Boron, Dissolved	MW-13	Down ↓	No	
Boron, Dissolved	MW-14	none		
Boron, Dissolved	MW-15	Up ↑	No	
Boron, Total	MW-03	Down ↓	No	
Boron, Total	MW-04	Down ↓	No	
Boron, Total	MW-05	Down ↓	Yes	
Boron, Total	MW-08	Down ↓	Yes	
Boron, Total	MW-15	Down ↓	No	
Cadmium, Dissolved	MW-03	none		
Cadmium, Dissolved	MW-04	none		
Cadmium, Dissolved	MW-05	none		
Cadmium, Dissolved	MW-06	none		
Cadmium, Dissolved	MW-07	none		
Cadmium, Dissolved	MW-08	none		
Cadmium, Dissolved	MW-13	none		
Cadmium, Dissolved	MW-14	none		
Cadmium, Dissolved	MW-15	none		
Cadmium, Total	MW-03	none		
Cadmium, Total	MW-04	none		
Cadmium, Total	MW-05	none		
Cadmium, Total	MW-08	none		

Downgradient Groundwater Statistical Analysis
Mann-Kendall Trend Tests
Powerton Station

Constituent	Well	Trend	Statistically Significant Trend? (99% Confidence Level)	Has well with stat. sig upward trend ever exceeded a GW standard?
Cadmium, Total	MW-15	none		
Calcium, Total	MW-03	none		
Calcium, Total	MW-04	Down ↓	No	
Calcium, Total	MW-05	none		
Calcium, Total	MW-08	Down ↓	Yes	
Calcium, Total	MW-15	Down ↓	No	
Chloride	MW-03	Down ↓	No	
Chloride	MW-04	Down ↓	No	
Chloride	MW-05	Down ↓	Yes	
Chloride	MW-06	Down ↓	Yes	
Chloride	MW-07	Up ↑	Yes	No
Chloride	MW-08	Down ↓	No	
Chloride	MW-13	Down ↓	No	
Chloride	MW-14	Down ↓	Yes	
Chloride	MW-15	Down ↓	No	
Chromium, Dissolved	MW-03	none		
Chromium, Dissolved	MW-04	none		
Chromium, Dissolved	MW-05	none		
Chromium, Dissolved	MW-06	none		
Chromium, Dissolved	MW-07	none		
Chromium, Dissolved	MW-08	none		
Chromium, Dissolved	MW-13	none		
Chromium, Dissolved	MW-14	none		
Chromium, Dissolved	MW-15	none		
Chromium, Total	MW-03	none		
Chromium, Total	MW-04	none		
Chromium, Total	MW-05	none		
Chromium, Total	MW-08	none		
Chromium, Total	MW-15	none		
Cobalt, Dissolved	MW-03	none		
Cobalt, Dissolved	MW-04	none		
Cobalt, Dissolved	MW-05	none		
Cobalt, Dissolved	MW-06	none		
Cobalt, Dissolved	MW-07	Down ↓	No	
Cobalt, Dissolved	MW-08	none		
Cobalt, Dissolved	MW-13	none		
Cobalt, Dissolved	MW-14	none		
Cobalt, Dissolved	MW-15	none		
Cobalt, Total	MW-03	none		
Cobalt, Total	MW-04	none		
Cobalt, Total	MW-05	none		
Cobalt, Total	MW-08	none		
Cobalt, Total	MW-15	none		
Fluoride	MW-03	Down ↓	No	
Fluoride	MW-04	Down ↓	No	
Fluoride	MW-05	Up ↑	No	
Fluoride	MW-06	Down ↓	No	
Fluoride	MW-07	Down ↓	No	
Fluoride	MW-08	Down ↓	Yes	
Fluoride	MW-13	Down ↓	No	
Fluoride	MW-14	Down ↓	No	
Fluoride	MW-15	Down ↓	Yes	
Lead, Dissolved	MW-03	none		
Lead, Dissolved	MW-04	none		
Lead, Dissolved	MW-05	none		
Lead, Dissolved	MW-06	none		
Lead, Dissolved	MW-07	none		
Lead, Dissolved	MW-08	none		
Lead, Dissolved	MW-13	none		
Lead, Dissolved	MW-14	none		
Lead, Dissolved	MW-15	none		
Lead, Total	MW-03	none		
Lead, Total	MW-04	none		
Lead, Total	MW-05	none		
Lead, Total	MW-08	none		
Lead, Total	MW-15	none		
Lithium, Total	MW-03	none		
Lithium, Total	MW-04	none		
Lithium, Total	MW-05	none		
Lithium, Total	MW-08	none		
Lithium, Total	MW-15	Down ↓	No	
Mercury, Dissolved	MW-03	none		
Mercury, Dissolved	MW-04	none		
Mercury, Dissolved	MW-05	none		
Mercury, Dissolved	MW-06	none		
Mercury, Dissolved	MW-07	none		
Mercury, Dissolved	MW-08	none		
Mercury, Dissolved	MW-13	none		
Mercury, Dissolved	MW-14	none		
Mercury, Dissolved	MW-15	none		
Mercury, Total	MW-03	none		
Mercury, Total	MW-04	none		
Mercury, Total	MW-05	none		

Downgradient Groundwater Statistical Analysis
Mann-Kendall Trend Tests
Powerton Station

Constituent	Well	Trend	Statistically Significant Trend? (99% Confidence Level)	Has well with stat. sig upward trend ever exceeded a GW standard?
Mercury, Total	MW-08	none		
Mercury, Total	MW-15	none		
Molybdenum, Total	MW-03	none		
Molybdenum, Total	MW-04	none		
Molybdenum, Total	MW-05	Up ↑	No	
Molybdenum, Total	MW-08	Down ↓	No	
Molybdenum, Total	MW-15	Down ↓	No	
pH, Field	MW-03	Down ↓	No	
pH, Field	MW-04	Down ↓	No	
pH, Field	MW-05	Down ↓	No	
pH, Field	MW-06	Down ↓	No	
pH, Field	MW-07	Down ↓	No	
pH, Field	MW-08	Down ↓	Yes	
pH, Field	MW-13	Up ↑	No	
pH, Field	MW-14	Down ↓	Yes	
pH, Field	MW-15	Down ↓	No	
Radium 226 + 228, Combined	MW-03	none		
Radium 226 + 228, Combined	MW-04	none		
Radium 226 + 228, Combined	MW-05	Up ↑	No	
Radium 226 + 228, Combined	MW-08	none		
Radium 226 + 228, Combined	MW-15	none		
Selenium, Dissolved	MW-03	none		
Selenium, Dissolved	MW-04	none		
Selenium, Dissolved	MW-05	none		
Selenium, Dissolved	MW-06	none		
Selenium, Dissolved	MW-07	none		
Selenium, Dissolved	MW-08	none		
Selenium, Dissolved	MW-13	Up ↑	No	
Selenium, Dissolved	MW-14	none		
Selenium, Dissolved	MW-15	none		
Selenium, Total	MW-03	none		
Selenium, Total	MW-04	none		
Selenium, Total	MW-05	none		
Selenium, Total	MW-08	none		
Selenium, Total	MW-15	Down ↓	No	
Sulfate	MW-03	Down ↓	No	
Sulfate	MW-04	Down ↓	No	
Sulfate	MW-05	Down ↓	Yes	
Sulfate	MW-06	none		
Sulfate	MW-07	Up ↑	No	
Sulfate	MW-08	Down ↓	Yes	
Sulfate	MW-13	Up ↑	Yes	Yes
Sulfate	MW-14	none		
Sulfate	MW-15	Up ↑	No	
Thallium, Dissolved	MW-03	none		
Thallium, Dissolved	MW-04	none		
Thallium, Dissolved	MW-05	none		
Thallium, Dissolved	MW-06	none		
Thallium, Dissolved	MW-07	none		
Thallium, Dissolved	MW-08	none		
Thallium, Dissolved	MW-13	none		
Thallium, Dissolved	MW-14	Up ↑	No	
Thallium, Dissolved	MW-15	none		
Thallium, Total	MW-03	none		
Thallium, Total	MW-04	none		
Thallium, Total	MW-05	none		
Thallium, Total	MW-08	none		
Thallium, Total	MW-15	none		
Total Dissolved Solids	MW-03	Down ↓	No	
Total Dissolved Solids	MW-04	Down ↓	Yes	
Total Dissolved Solids	MW-05	Down ↓	No	
Total Dissolved Solids	MW-06	Down ↓	No	
Total Dissolved Solids	MW-07	Down ↓	Yes	
Total Dissolved Solids	MW-08	Down ↓	Yes	
Total Dissolved Solids	MW-13	Up ↑	Yes	Yes
Total Dissolved Solids	MW-14	Up ↑	No	
Total Dissolved Solids	MW-15	Up ↑	No	

Powerton Stats Summary:

70	30%	Downward trends (25 significant)
15	6%	Upward trends (3 significant)
148	64%	No trend
233		**Total Tests Performed**

85 Total Tests where a trend is present
82% of tests where a trend is present are downward
18% of tests where a trend is present are upward

Downgradient Groundwater Statistical Analysis
Mann-Kendall Trend Tests
Will County Station

Constituent	Well	Trend	Statistically Significant Trend? (99% Confidence Level)	Has well with stat. sig upward trend ever exceeded a GW standard?
Antimony, Dissolved	MW-07	none		
Antimony, Dissolved	MW-08	none		
Antimony, Dissolved	MW-09	none		
Antimony, Dissolved	MW-10	none		
Antimony, Total	MW-09	none		
Antimony, Total	MW-10	none		
Antimony, Total	MW-11	none		
Antimony, Total	MW-12	none		
Arsenic, Dissolved	MW-07	Down ↓	Yes	
Arsenic, Dissolved	MW-08	Down ↓	Yes	
Arsenic, Dissolved	MW-09	Down ↓	Yes	
Arsenic, Dissolved	MW-10	Up ↑	No	
Arsenic, Total	MW-09	Down ↓	No	
Arsenic, Total	MW-10	Down ↓	No	
Arsenic, Total	MW-11	Up ↑	No	
Arsenic, Total	MW-12	Up ↑	No	
Barium, Dissolved	MW-07	Down ↓	No	
Barium, Dissolved	MW-08	Down ↓	No	
Barium, Dissolved	MW-09	Up ↑	Yes	No
Barium, Dissolved	MW-10	Down ↓	No	
Barium, Total	MW-09	Up ↑	No	
Barium, Total	MW-10	none		
Barium, Total	MW-11	Up ↑	No	
Barium, Total	MW-12	Up ↑	No	
Beryllium, Dissolved	MW-07	none		
Beryllium, Dissolved	MW-08	none		
Beryllium, Dissolved	MW-09	none		
Beryllium, Dissolved	MW-10	none		
Beryllium, Total	MW-09	none		
Beryllium, Total	MW-10	none		
Beryllium, Total	MW-11	none		
Beryllium, Total	MW-12	none		
Boron, Dissolved	MW-07	Down ↓	No	
Boron, Dissolved	MW-08	Up ↑	No	
Boron, Dissolved	MW-09	none		
Boron, Dissolved	MW-10	Up ↑	No	
Boron, Total	MW-09	none		
Boron, Total	MW-10	Down ↓	No	
Boron, Total	MW-11	none		
Boron, Total	MW-12	Down ↓	No	
Cadmium, Dissolved	MW-07	none		
Cadmium, Dissolved	MW-08	none		
Cadmium, Dissolved	MW-09	none		
Cadmium, Dissolved	MW-10	none		
Cadmium, Total	MW-09	none		
Cadmium, Total	MW-10	none		
Cadmium, Total	MW-11	none		
Cadmium, Total	MW-12	none		
Calcium, Total	MW-09	Down ↓	No	
Calcium, Total	MW-10	Down ↓	No	
Calcium, Total	MW-11	Down ↓	No	
Calcium, Total	MW-12	Up ↑	No	
Chloride	MW-07	Down ↓	No	

Downgradient Groundwater Statistical Analysis
Mann-Kendall Trend Tests
Will County Station

Constituent	Well	Trend	Statistically Significant Trend? (99% Confidence Level)	Has well with stat. sig upward trend ever exceeded a GW standard?
Chloride	MW-08	Down ↓	No	
Chloride	MW-09	Up ↑	Yes	Yes*
Chloride	MW-10	none		
Chloride	MW-11	Up ↑	No	
Chloride	MW-12	Down ↓	No	
Chromium, Dissolved	MW-07	none		
Chromium, Dissolved	MW-08	none		
Chromium, Dissolved	MW-09	none		
Chromium, Dissolved	MW-10	none		
Chromium, Total	MW-09	none		
Chromium, Total	MW-10	none		
Chromium, Total	MW-11	none		
Chromium, Total	MW-12	none		
Cobalt, Dissolved	MW-07	none		
Cobalt, Dissolved	MW-08	Up ↑	Yes	No
Cobalt, Dissolved	MW-09	none		
Cobalt, Dissolved	MW-10	none		
Cobalt, Total	MW-09	none		
Cobalt, Total	MW-10	none		
Cobalt, Total	MW-11	none		
Cobalt, Total	MW-12	none		
Fluoride	MW-07	Down ↓	Yes	
Fluoride	MW-08	Down ↓	No	
Fluoride	MW-09	Up ↑	No	
Fluoride	MW-10	Up ↑	Yes	No
Fluoride	MW-11	Down ↓	No	
Fluoride	MW-12	Down ↓	No	
Lead, Dissolved	MW-07	none		
Lead, Dissolved	MW-08	none		
Lead, Dissolved	MW-09	none		
Lead, Dissolved	MW-10	none		
Lead, Total	MW-09	none		
Lead, Total	MW-10	none		
Lead, Total	MW-11	none		
Lead, Total	MW-12	none		
Lithium, Total	MW-09	none		
Lithium, Total	MW-10	Down ↓	No	
Lithium, Total	MW-11	none		
Lithium, Total	MW-12	Down ↓	No	
Mercury, Dissolved	MW-07	none		
Mercury, Dissolved	MW-08	none		
Mercury, Dissolved	MW-09	none		
Mercury, Dissolved	MW-10	none		
Mercury, Total	MW-09	none		
Mercury, Total	MW-10	none		
Mercury, Total	MW-11	none		
Mercury, Total	MW-12	none		
Molybdenum, Total	MW-09	Down ↓	No	
Molybdenum, Total	MW-10	Up ↑	No	
Molybdenum, Total	MW-11	Down ↓	No	
Molybdenum, Total	MW-12	Up ↑	No	
pH, Field	MW-07	Down ↓	Yes	
pH, Field	MW-08	Down ↓	Yes	

Downgradient Groundwater Statistical Analysis
Mann-Kendall Trend Tests
Will County Station

Constituent	Well	Trend	Statistically Significant Trend? (99% Confidence Level)	Has well with stat. sig upward trend ever exceeded a GW standard?
pH, Field	MW-09	Down ↓	Yes	
pH, Field	MW-10	Down ↓	Yes	
Radium 226 + 228, Combined	MW-09	none		
Radium 226 + 228, Combined	MW-10	Down ↓	No	
Radium 226 + 228, Combined	MW-11	Up ↑	No	
Radium 226 + 228, Combined	MW-12	none		
Selenium, Dissolved	MW-07	Up ↑	Yes	No
Selenium, Dissolved	MW-08	none		
Selenium, Dissolved	MW-09	Down ↓	Yes	
Selenium, Dissolved	MW-10	none		
Selenium, Total	MW-09	none		
Selenium, Total	MW-10	none		
Selenium, Total	MW-11	none		
Selenium, Total	MW-12	none		
Sulfate	MW-07	Down ↓	No	
Sulfate	MW-08	Up ↑	No	
Sulfate	MW-09	Down ↓	Yes	
Sulfate	MW-10	Down ↓	Yes	
Sulfate	MW-11	Down ↓	Yes	
Sulfate	MW-12	Down ↓	No	
Thallium, Dissolved	MW-07	none		
Thallium, Dissolved	MW-08	none		
Thallium, Dissolved	MW-09	none		
Thallium, Dissolved	MW-10	none		
Thallium, Total	MW-09	none		
Thallium, Total	MW-10	none		
Thallium, Total	MW-11	none		
Thallium, Total	MW-12	none		
Total Dissolved Solids	MW-07	none		
Total Dissolved Solids	MW-08	Up ↑	No	
Total Dissolved Solids	MW-09	Down ↓	No	
Total Dissolved Solids	MW-10	Down ↓	Yes	
Total Dissolved Solids	MW-11	none		
Total Dissolved Solids	MW-12	Up ↑	No	

*Choride covered under 2018 ASD.

Will County Summary Stats:

38	27%	Downward trends (13 significant)
22	16%	Upward trends (5 significant)
80	57%	No trend
140		**Total Tests Performed**

60 Total Tests where a trend is present
63% of tests where a trend is present are downward
37% of tests where a trend is present are upward

Downgradient Groundwater Statistical Analysis
Mann-Kendall Trend Tests
Waukegan Station

Constituent	Well	Trend	Statistically Significant Trend? (99% Confidence Level)	Has well with SSI ever exceeded a GW standard?
Antimony, Dissolved	MW-01	none		
Antimony, Dissolved	MW-02	none		
Antimony, Dissolved	MW-03	none		
Antimony, Dissolved	MW-04	none		
Antimony, Total	MW-01	none		
Antimony, Total	MW-02	none		
Antimony, Total	MW-03	none		
Antimony, Total	MW-04	none		
Arsenic, Dissolved	MW-01	Up ↑	No	
Arsenic, Dissolved	MW-02	Down ↓	No	
Arsenic, Dissolved	MW-03	Up ↑	No	
Arsenic, Dissolved	MW-04	Up ↑	No	
Arsenic, Total	MW-01	Down ↓	Yes	
Arsenic, Total	MW-02	Down ↓	Yes	
Arsenic, Total	MW-03	Down ↓	No	
Arsenic, Total	MW-04	Down ↓	No	
Barium, Dissolved	MW-01	Down ↓	No	
Barium, Dissolved	MW-02	Up ↑	No	
Barium, Dissolved	MW-03	Up ↑	No	
Barium, Dissolved	MW-04	Up ↑	No	
Barium, Total	MW-01	Up ↑	Yes	No
Barium, Total	MW-02	Up ↑	No	
Barium, Total	MW-03	Up ↑	No	
Barium, Total	MW-04	Down ↓	No	
Beryllium, Dissolved	MW-01	none		
Beryllium, Dissolved	MW-02	none		
Beryllium, Dissolved	MW-03	none		
Beryllium, Dissolved	MW-04	none		
Beryllium, Total	MW-01	none		
Beryllium, Total	MW-02	none		
Beryllium, Total	MW-03	none		
Beryllium, Total	MW-04	none		
Boron, Dissolved	MW-01	Down ↓	Yes	
Boron, Dissolved	MW-02	Up ↑	Yes	Yes
Boron, Dissolved	MW-03	Up ↑	No	
Boron, Dissolved	MW-04	none		
Boron, Total	MW-01	Up ↑	No	
Boron, Total	MW-02	Down ↓	No	
Boron, Total	MW-03	Up ↑	No	
Boron, Total	MW-04	Up ↑	No	
Cadmium, Dissolved	MW-01	none		
Cadmium, Dissolved	MW-02	none		
Cadmium, Dissolved	MW-03	none		
Cadmium, Dissolved	MW-04	none		
Cadmium, Total	MW-01	none		
Cadmium, Total	MW-02	none		
Cadmium, Total	MW-03	none		
Cadmium, Total	MW-04	none		
Calcium, Total	MW-01	Up ↑	No	
Calcium, Total	MW-02	Up ↑	No	
Calcium, Total	MW-03	Up ↑	No	

Downgradient Groundwater Statistical Analysis
Mann-Kendall Trend Tests
Waukegan Station

Constituent	Well	Trend	Statistically Significant Trend? (99% Confidence Level)	Has well with SSI ever exceeded a GW standard?
Calcium, Total	MW-04	none		
Chloride	MW-01	Up ↑	No	
Chloride	MW-02	none		
Chloride	MW-03	Down ↓	No	
Chloride	MW-04	Down ↓	No	
Chromium, Dissolved	MW-01	none		
Chromium, Dissolved	MW-02	none		
Chromium, Dissolved	MW-03	none		
Chromium, Dissolved	MW-04	none		
Chromium, Total	MW-01	none		
Chromium, Total	MW-02	none		
Chromium, Total	MW-03	none		
Chromium, Total	MW-04	none		
Cobalt, Dissolved	MW-01	none		
Cobalt, Dissolved	MW-02	none		
Cobalt, Dissolved	MW-03	none		
Cobalt, Dissolved	MW-04	none		
Cobalt, Total	MW-01	none		
Cobalt, Total	MW-02	none		
Cobalt, Total	MW-03	none		
Cobalt, Total	MW-04	none		
Fluoride	MW-01	Down ↓	Yes	
Fluoride	MW-02	none		
Fluoride	MW-03	Down ↓	Yes	
Fluoride	MW-04	Down ↓	No	
Lead, Dissolved	MW-01	none		
Lead, Dissolved	MW-02	none		
Lead, Dissolved	MW-03	none		
Lead, Dissolved	MW-04	none		
Lead, Total	MW-01	none		
Lead, Total	MW-02	none		
Lead, Total	MW-03	none		
Lead, Total	MW-04	none		
Lithium, Total	MW-01	none		
Lithium, Total	MW-02	none		
Lithium, Total	MW-03	none		
Lithium, Total	MW-04	none		
Mercury, Dissolved	MW-01	none		
Mercury, Dissolved	MW-02	none		
Mercury, Dissolved	MW-03	none		
Mercury, Dissolved	MW-04	none		
Mercury, Total	MW-01	none		
Mercury, Total	MW-02	none		
Mercury, Total	MW-03	none		
Mercury, Total	MW-04	none		
Molybdenum, Total	MW-01	Down ↓	No	
Molybdenum, Total	MW-02	Down ↓	No	
Molybdenum, Total	MW-03	Up ↑	No	
Molybdenum, Total	MW-04	Up ↑	No	
pH, Field	MW-01	Down ↓	No	
pH, Field	MW-02	Down ↓	No	

Downgradient Groundwater Statistical Analysis
Mann-Kendall Trend Tests
Waukegan Station

Constituent	Well	Trend	Statistically Significant Trend? (99% Confidence Level)	Has well with SSI ever exceeded a GW standard?
pH, Field	MW-03	Down ↓	Yes	
pH, Field	MW-04	Down ↓	Yes	
Radium-226	MW-01	none		
Radium-226	MW-02	none		
Radium-226	MW-03	none		
Radium-228	MW-01	none		
Radium-228	MW-02	none		
Radium-228	MW-03	none		
Radium-228	MW-04	Down ↓	No	
Selenium, Dissolved	MW-01	Down ↓	No	
Selenium, Dissolved	MW-02	Down ↓	Yes	
Selenium, Dissolved	MW-03	Down ↓	Yes	
Selenium, Dissolved	MW-04	Down ↓	No	
Selenium, Total	MW-01	Down ↓	No	
Selenium, Total	MW-02	none		
Selenium, Total	MW-03	none		
Selenium, Total	MW-04	none		
Sulfate	MW-01	Up ↑	No	
Sulfate	MW-02	Up ↑	No	
Sulfate	MW-03	Up ↑	Yes	No
Sulfate	MW-04	Up ↑	No	
Thallium, Dissolved	MW-01	none		
Thallium, Dissolved	MW-02	none		
Thallium, Dissolved	MW-03	none		
Thallium, Dissolved	MW-04	none		
Thallium, Total	MW-01	none		
Thallium, Total	MW-02	none		
Thallium, Total	MW-03	none		
Thallium, Total	MW-04	none		
Total Dissolved Solids	MW-01	Up ↑	No	
Total Dissolved Solids	MW-02	Up ↑	Yes	No
Total Dissolved Solids	MW-03	Up ↑	Yes	No
Total Dissolved Solids	MW-04	Up ↑	Yes	No

Waukegan Stats Summary:

26	19%	Downward trends (9 significant)
28	21%	Upward trends (6 significant)
81	60%	No trend
135		**Total Tests Performed**

54 Total Tests where a trend is present
48% of tests where a trend is present are downward
52% of tests where a trend is present are upward

Trend Test

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database Printed 4/2/2021, 11:05 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Antimony, Dissolved (mg/L)	MW-01	0	-6	-58	No	16	81.25	n/a	n/a	0.01	NP
Antimony, Dissolved (mg/L)	MW-02	0	-96	-176	No	34	91.18	n/a	n/a	0.01	NP
Antimony, Dissolved (mg/L)	MW-03	0	-128	-223	No	40	90	n/a	n/a	0.01	NP
Antimony, Dissolved (mg/L)	MW-04	0	-80	-223	No	40	92.5	n/a	n/a	0.01	NP
Antimony, Dissolved (mg/L)	MW-06	0	-21	-223	No	40	97.5	n/a	n/a	0.01	NP
Antimony, Dissolved (mg/L)	MW-07	0	0	223	No	40	100	n/a	n/a	0.01	NP
Antimony, Total (mg/L)	MW-03	0	0	30	No	10	100	n/a	n/a	0.01	NP
Antimony, Total (mg/L)	MW-04	0	0	30	No	10	100	n/a	n/a	0.01	NP
Arsenic, Dissolved (mg/L)	MW-01	0	-33	-58	No	16	68.75	n/a	n/a	0.01	NP
Arsenic, Dissolved (mg/L)	MW-02	0	-23	-176	No	34	97.06	n/a	n/a	0.01	NP
Arsenic, Dissolved (mg/L)	MW-03	-6.3e-12	-100	-223	No	40	27.5	n/a	n/a	0.01	NP
Arsenic, Dissolved (mg/L)	MW-04	0	36	223	No	40	45	n/a	n/a	0.01	NP
Arsenic, Dissolved (mg/L)	MW-06	-0.00...	-196	-223	No	40	22.5	n/a	n/a	0.01	NP
Arsenic, Dissolved (mg/L)	MW-07	0	-104	-223	No	40	60	n/a	n/a	0.01	NP
Arsenic, Total (mg/L)	MW-03	0.000...	10	30	No	10	0	n/a	n/a	0.01	NP
Arsenic, Total (mg/L)	MW-04	0	3	30	No	10	0	n/a	n/a	0.01	NP
Barium, Dissolved (mg/L)	MW-01	-0.01058	-56	-58	No	16	0	n/a	n/a	0.01	NP
Barium, Dissolved (mg/L)	**MW-02**	**-0.00...**	**-178**	**-176**	**Yes**	**34**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Barium, Dissolved (mg/L)	MW-03	0.000...	177	223	No	40	0	n/a	n/a	0.01	NP
Barium, Dissolved (mg/L)	**MW-04**	**0.002242**	**336**	**223**	**Yes**	**40**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Barium, Dissolved (mg/L)	MW-06	0.002711	206	223	No	40	0	n/a	n/a	0.01	NP
Barium, Dissolved (mg/L)	MW-07	0	50	223	No	40	0	n/a	n/a	0.01	NP
Barium, Total (mg/L)	MW-03	-0.00...	-13	-30	No	10	0	n/a	n/a	0.01	NP
Barium, Total (mg/L)	MW-04	-0.00...	-11	-30	No	10	0	n/a	n/a	0.01	NP
Beryllium, Dissolved (mg/L)	MW-01	0	0	58	No	16	100	n/a	n/a	0.01	NP
Beryllium, Dissolved (mg/L)	MW-02	0	0	176	No	34	100	n/a	n/a	0.01	NP
Beryllium, Dissolved (mg/L)	MW-03	0	0	223	No	40	100	n/a	n/a	0.01	NP
Beryllium, Dissolved (mg/L)	MW-04	0	0	223	No	40	100	n/a	n/a	0.01	NP
Beryllium, Dissolved (mg/L)	MW-06	0	0	223	No	40	100	n/a	n/a	0.01	NP
Beryllium, Dissolved (mg/L)	MW-07	0	0	223	No	40	100	n/a	n/a	0.01	NP
Beryllium, Total (mg/L)	MW-03	0	0	30	No	10	100	n/a	n/a	0.01	NP
Beryllium, Total (mg/L)	MW-04	0	0	30	No	10	100	n/a	n/a	0.01	NP
Boron, Dissolved (mg/L)	MW-01	-0.00...	-25	-58	No	16	0	n/a	n/a	0.01	NP
Boron, Dissolved (mg/L)	**MW-02**	**-0.02673**	**-356**	**-176**	**Yes**	**34**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Boron, Dissolved (mg/L)	MW-03	0.000...	19	223	No	40	0	n/a	n/a	0.01	NP
Boron, Dissolved (mg/L)	MW-04	-0.00...	-128	-223	No	40	0	n/a	n/a	0.01	NP
Boron, Dissolved (mg/L)	**MW-06**	**-0.00...**	**-229**	**-223**	**Yes**	**40**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Boron, Dissolved (mg/L)	MW-07	-0.00...	-191	-223	No	40	0	n/a	n/a	0.01	NP
Boron, Total (mg/L)	MW-03	-0.02859	-6	-38	No	12	0	n/a	n/a	0.01	NP
Boron, Total (mg/L)	MW-04	0	0	38	No	12	0	n/a	n/a	0.01	NP
Cadmium, Dissolved (mg/L)	MW-01	0	0	58	No	16	100	n/a	n/a	0.01	NP
Cadmium, Dissolved (mg/L)	MW-02	0	-13	-176	No	34	94.12	n/a	n/a	0.01	NP
Cadmium, Dissolved (mg/L)	MW-03	0	-29	-223	No	40	97.5	n/a	n/a	0.01	NP
Cadmium, Dissolved (mg/L)	MW-04	0	0	223	No	40	100	n/a	n/a	0.01	NP
Cadmium, Dissolved (mg/L)	MW-06	0	0	223	No	40	100	n/a	n/a	0.01	NP
Cadmium, Dissolved (mg/L)	MW-07	0	-7	-223	No	40	97.5	n/a	n/a	0.01	NP
Cadmium, Total (mg/L)	MW-03	0	0	30	No	10	100	n/a	n/a	0.01	NP
Cadmium, Total (mg/L)	MW-04	0	0	30	No	10	100	n/a	n/a	0.01	NP

Trend Test

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database Printed 4/2/2021, 11:05 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Chloride (mg/L)	MW-01	-3.938	-11	-58	No	16	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-02	0	-4	-176	No	34	0	n/a	n/a	0.01	NP
Chloride (mg/L)	**MW-03**	**-8.834**	**-3.043**	**-2.58**	**Yes**	**41**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Chloride (mg/L)	MW-04	-4.891	-2.294	-2.58	No	41	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-06	0	-13	-223	No	40	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-07	-1.487	-40	-223	No	40	0	n/a	n/a	0.01	NP
Chromium, Dissolved (mg/L)	MW-01	0	0	58	No	16	100	n/a	n/a	0.01	NP
Chromium, Dissolved (mg/L)	MW-02	0	0	176	No	34	100	n/a	n/a	0.01	NP
Chromium, Dissolved (mg/L)	MW-03	0	0	223	No	40	100	n/a	n/a	0.01	NP
Chromium, Dissolved (mg/L)	MW-04	0	13	223	No	40	97.5	n/a	n/a	0.01	NP
Chromium, Dissolved (mg/L)	MW-06	0	0	223	No	40	100	n/a	n/a	0.01	NP
Chromium, Dissolved (mg/L)	MW-07	0	0	223	No	40	100	n/a	n/a	0.01	NP
Chromium, Total (mg/L)	MW-03	0	-1	-30	No	10	90	n/a	n/a	0.01	NP
Chromium, Total (mg/L)	MW-04	0	7	30	No	10	90	n/a	n/a	0.01	NP
Cobalt, Dissolved (mg/L)	MW-01	0	15	58	No	16	87.5	n/a	n/a	0.01	NP
Cobalt, Dissolved (mg/L)	MW-02	0	-10	-176	No	34	85.29	n/a	n/a	0.01	NP
Cobalt, Dissolved (mg/L)	MW-03	0	-76	-223	No	40	95	n/a	n/a	0.01	NP
Cobalt, Dissolved (mg/L)	MW-04	0.000...	74	223	No	40	15	n/a	n/a	0.01	NP
Cobalt, Dissolved (mg/L)	MW-06	0	-62	-223	No	40	87.5	n/a	n/a	0.01	NP
Cobalt, Dissolved (mg/L)	MW-07	0	-41	-223	No	40	95	n/a	n/a	0.01	NP
Cobalt, Total (mg/L)	MW-03	0	0	30	No	10	100	n/a	n/a	0.01	NP
Cobalt, Total (mg/L)	MW-04	0.000...	1	30	No	10	0	n/a	n/a	0.01	NP
Fluoride (mg/L)	MW-01	-0.01075	-52	-58	No	16	0	n/a	n/a	0.01	NP
Fluoride (mg/L)	**MW-02**	**-0.02597**	**-321**	**-176**	**Yes**	**34**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Fluoride (mg/L)	MW-03	0	0.2372	2.58	No	41	0	n/a	n/a	0.01	NP
Fluoride (mg/L)	MW-04	0	-0.486	-2.58	No	41	0	n/a	n/a	0.01	NP
Fluoride (mg/L)	**MW-06**	**-0.0074**	**-315**	**-223**	**Yes**	**40**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Fluoride (mg/L)	**MW-07**	**-0.00...**	**-320**	**-223**	**Yes**	**40**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Lead, Dissolved (mg/L)	MW-01	0	0	58	No	16	100	n/a	n/a	0.01	NP
Lead, Dissolved (mg/L)	MW-02	0	0	176	No	34	100	n/a	n/a	0.01	NP
Lead, Dissolved (mg/L)	MW-03	0	0	223	No	40	100	n/a	n/a	0.01	NP
Lead, Dissolved (mg/L)	MW-04	0	-23	-223	No	40	97.5	n/a	n/a	0.01	NP
Lead, Dissolved (mg/L)	MW-06	0	0	223	No	40	100	n/a	n/a	0.01	NP
Lead, Dissolved (mg/L)	MW-07	0	-7	-223	No	40	92.5	n/a	n/a	0.01	NP
Lead, Total (mg/L)	MW-03	0	0	30	No	10	100	n/a	n/a	0.01	NP
Lead, Total (mg/L)	MW-04	0	4	30	No	10	60	n/a	n/a	0.01	NP
Lithium, Total (mg/L)	MW-03	0	-7	-30	No	10	10	n/a	n/a	0.01	NP
Lithium, Total (mg/L)	MW-04	0.000...	15	30	No	10	0	n/a	n/a	0.01	NP
Mercury, Dissolved (mg/L)	MW-01	0	0	58	No	16	100	n/a	n/a	0.01	NP
Mercury, Dissolved (mg/L)	MW-02	0	0	176	No	34	100	n/a	n/a	0.01	NP
Mercury, Dissolved (mg/L)	MW-03	0	0	223	No	40	100	n/a	n/a	0.01	NP
Mercury, Dissolved (mg/L)	MW-04	0	0	223	No	40	100	n/a	n/a	0.01	NP
Mercury, Dissolved (mg/L)	MW-06	0	0	223	No	40	100	n/a	n/a	0.01	NP
Mercury, Dissolved (mg/L)	MW-07	0	0	223	No	40	100	n/a	n/a	0.01	NP
Mercury, Total (mg/L)	MW-03	0	0	30	No	10	100	n/a	n/a	0.01	NP
Mercury, Total (mg/L)	MW-04	0	0	30	No	10	100	n/a	n/a	0.01	NP
Molybdenum, Total (mg/L)	MW-03	0.000...	9	30	No	10	10	n/a	n/a	0.01	NP
Molybdenum, Total (mg/L)	MW-04	0.000	14	30	No	10	0	n/a	n/a	0.01	NP

Trend Test

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database Printed 4/2/2021, 11:05 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
pH, Field (Standard Units)	MW-03	-0.0136	-113	-214	No	39	0	n/a	n/a	0.01	NP
pH, Field (Standard Units)	MW-04	-0.01699	-116	-214	No	39	0	n/a	n/a	0.01	NP
pH, Field (Standard Units)	MW-06	-0.03421	-202	-214	No	39	0	n/a	n/a	0.01	NP
pH, Field (Standard Units)	**MW-07**	**-0.03777**	**-246**	**-214**	**Yes**	**39**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Radium 226 + Radium 228, Combin...	MW-03	0	-2	-30	No	10	70	n/a	n/a	0.01	NP
Radium 226 + Radium 228, Combin...	MW-04	0	-6	-30	No	10	70	n/a	n/a	0.01	NP
Selenium, Dissolved (mg/L)	MW-01	0.000...	44	58	No	16	37.5	n/a	n/a	0.01	NP
Selenium, Dissolved (mg/L)	MW-02	0	-102	-176	No	34	79.41	n/a	n/a	0.01	NP
Selenium, Dissolved (mg/L)	MW-03	0	26	223	No	40	32.5	n/a	n/a	0.01	NP
Selenium, Dissolved (mg/L)	MW-04	0	39	223	No	40	82.5	n/a	n/a	0.01	NP
Selenium, Dissolved (mg/L)	MW-06	-0.00...	-155	-223	No	40	27.5	n/a	n/a	0.01	NP
Selenium, Dissolved (mg/L)	MW-07	0	26	223	No	40	82.5	n/a	n/a	0.01	NP
Selenium, Total (mg/L)	MW-03	0.000...	5	30	No	10	10	n/a	n/a	0.01	NP
Selenium, Total (mg/L)	MW-04	0	17	30	No	10	80	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-01	-4.6	-30	-58	No	16	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-02	-7.826	-175	-176	No	34	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	**MW-03**	**-6.868**	**-3.501**	**-2.58**	**Yes**	**41**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Sulfate (mg/L)	MW-04	-5.06	-2.356	-2.58	No	41	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-06	-0.4307	-49	-223	No	40	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-07	-5.456	-215	-223	No	40	0	n/a	n/a	0.01	NP
Thallium, Dissolved (mg/L)	MW-01	0	0	58	No	16	100	n/a	n/a	0.01	NP
Thallium, Dissolved (mg/L)	MW-02	0	0	176	No	34	100	n/a	n/a	0.01	NP
Thallium, Dissolved (mg/L)	MW-03	0	0	223	No	40	100	n/a	n/a	0.01	NP
Thallium, Dissolved (mg/L)	MW-04	0	0	223	No	40	100	n/a	n/a	0.01	NP
Thallium, Dissolved (mg/L)	MW-06	0	0	223	No	40	100	n/a	n/a	0.01	NP
Thallium, Dissolved (mg/L)	MW-07	0	0	223	No	40	100	n/a	n/a	0.01	NP
Thallium, Total (mg/L)	MW-03	0	0	30	No	10	100	n/a	n/a	0.01	NP
Thallium, Total (mg/L)	MW-04	0	0	30	No	10	100	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-01	12.34	24	58	No	16	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-02	3.834	21	176	No	34	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	**MW-03**	**-27.74**	**-4.189**	**-2.58**	**Yes**	**41**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Total Dissolved Solids (mg/L)	**MW-04**	**-17.39**	**-2.826**	**-2.58**	**Yes**	**41**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Total Dissolved Solids (mg/L)	MW-06	0	-4	-223	No	40	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-07	-9.923	-96	-223	No	40	0	n/a	n/a	0.01	NP

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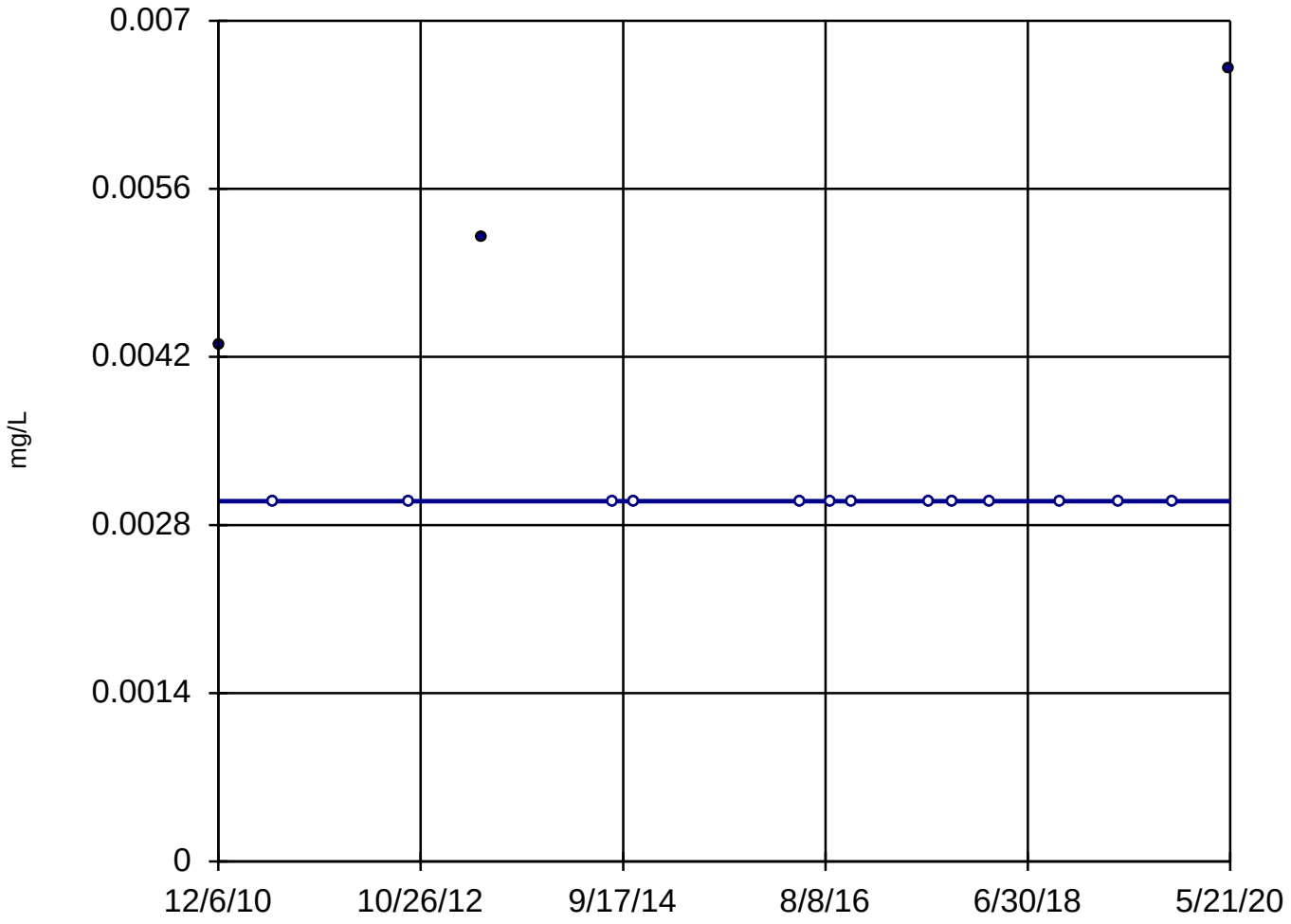
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-01



n = 16

Slope = 0
units per year.

Mann-Kendall
statistic = -6
critical = -58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Antimony, Dissolved Analysis Run 4/2/2021 11:00 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

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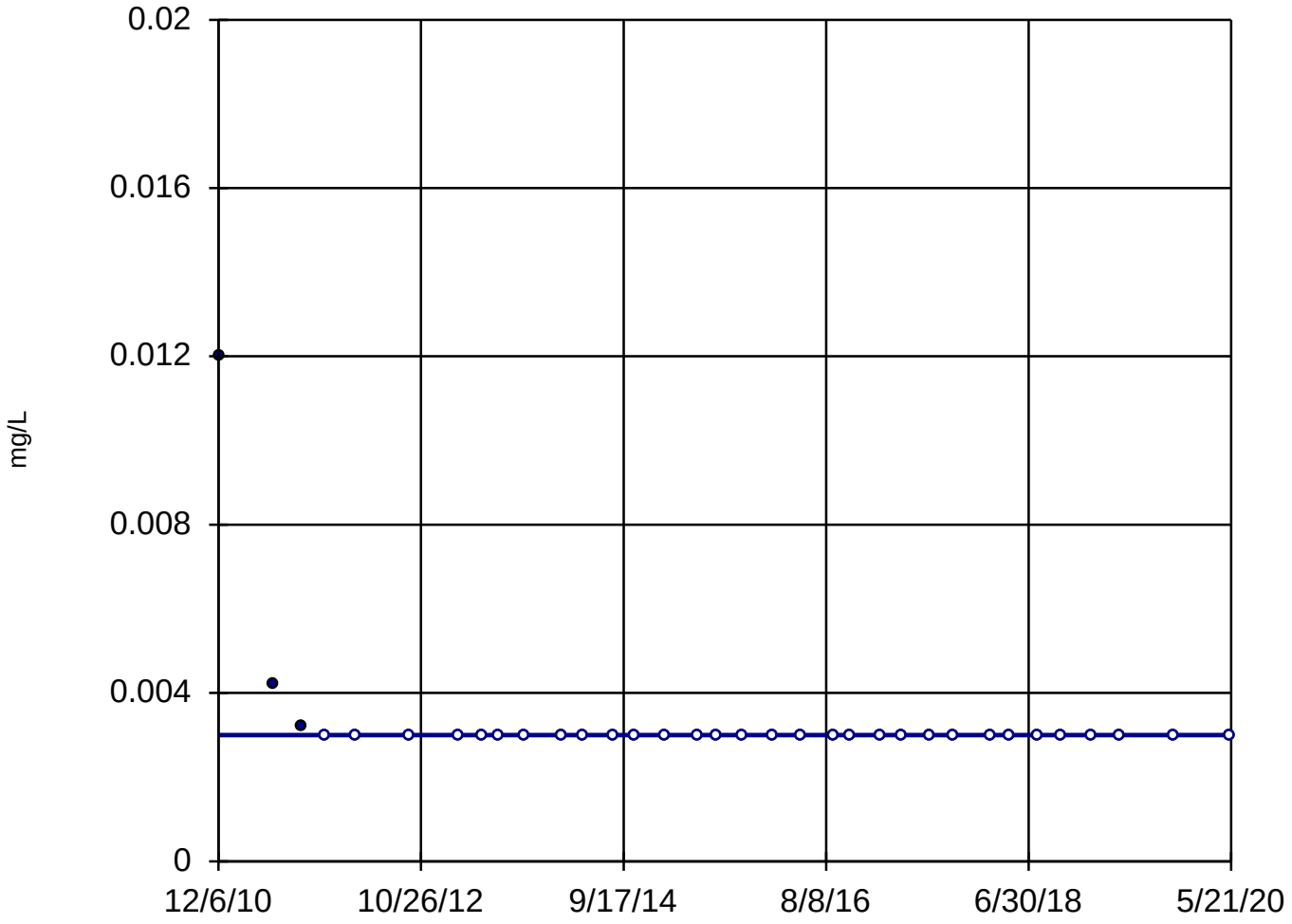
Sen's Slope Estimator

MW-02



n = 34

Slope = 0
units per year.

Mann-Kendall
statistic = -96
critical = -176

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Antimony, Dissolved Analysis Run 4/2/2021 11:00 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

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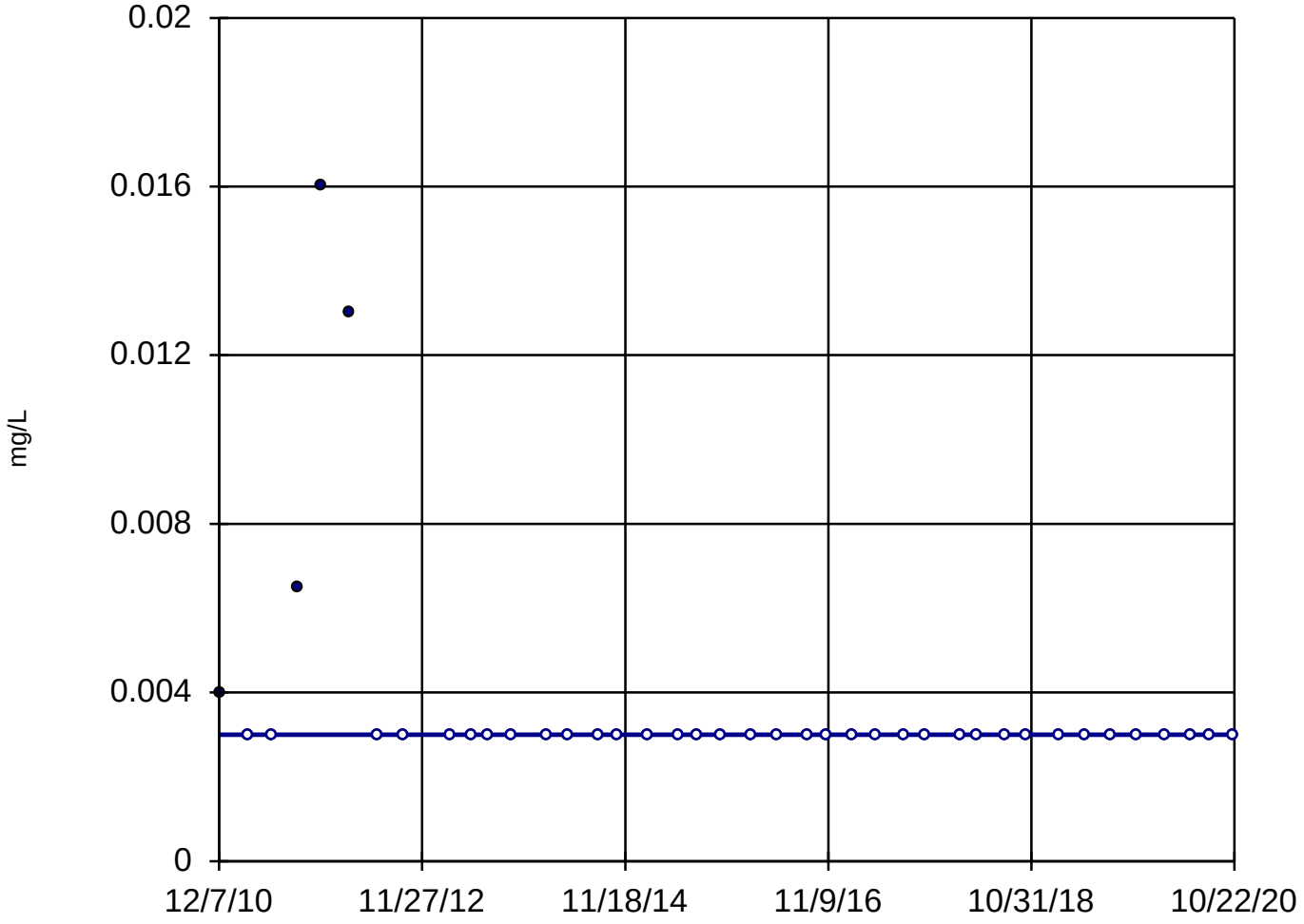
Sen's Slope Estimator

MW-03



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = -128
critical = -223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Antimony, Dissolved Analysis Run 4/2/2021 11:00 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

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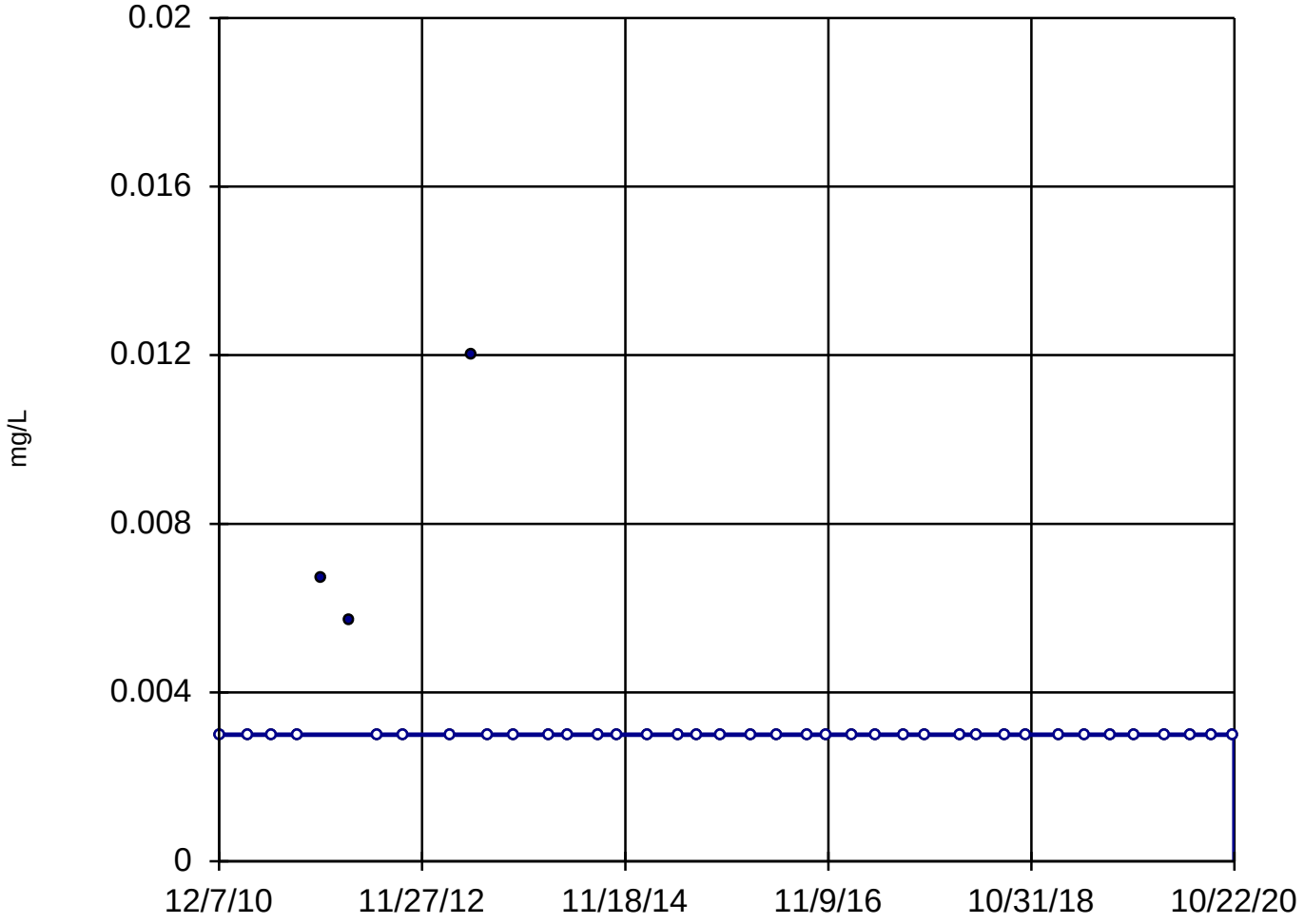
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = -80
critical = -223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Antimony, Dissolved Analysis Run 4/2/2021 11:00 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

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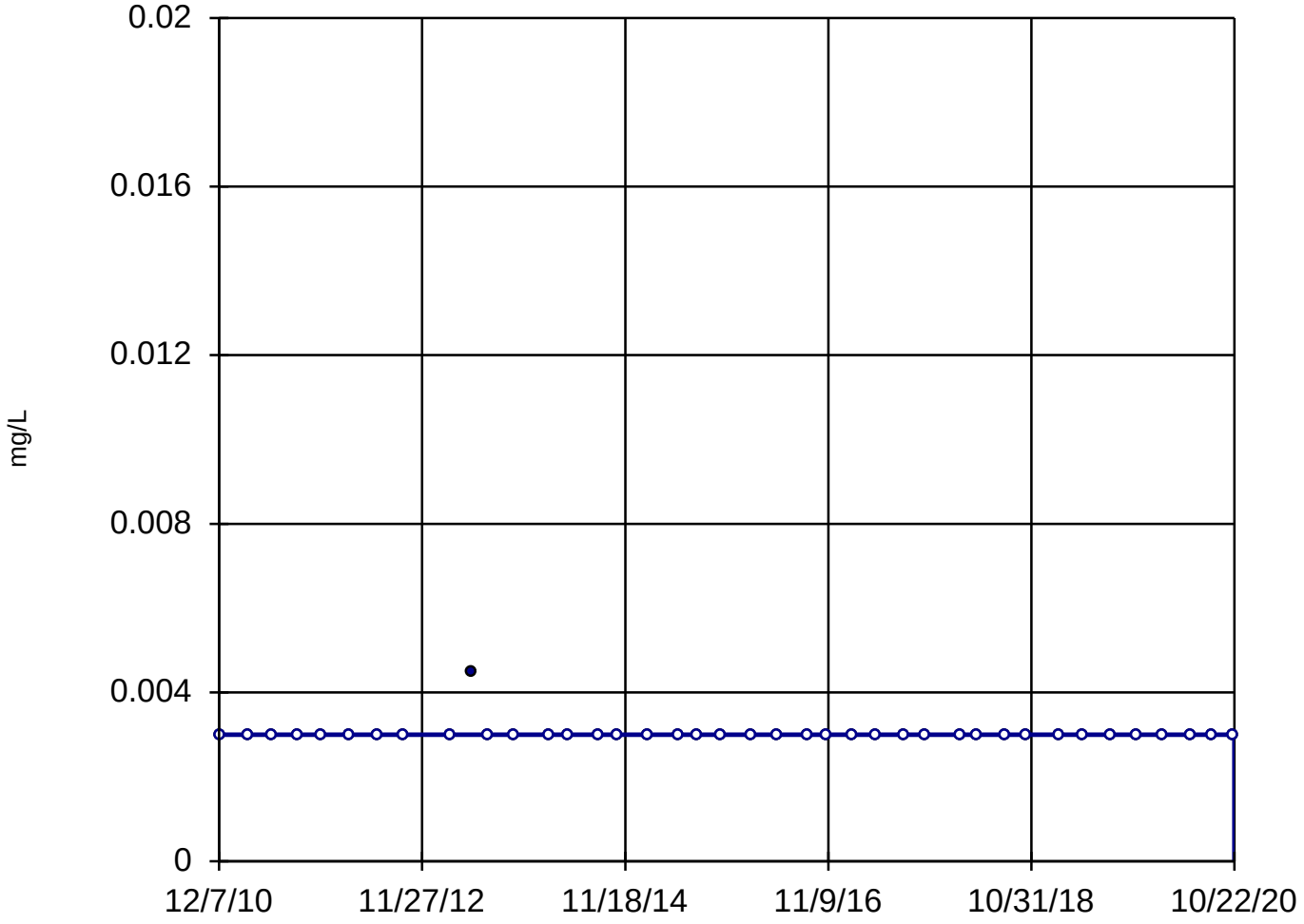
Sen's Slope Estimator

MW-06



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = -21
critical = -223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Antimony, Dissolved Analysis Run 4/2/2021 11:00 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

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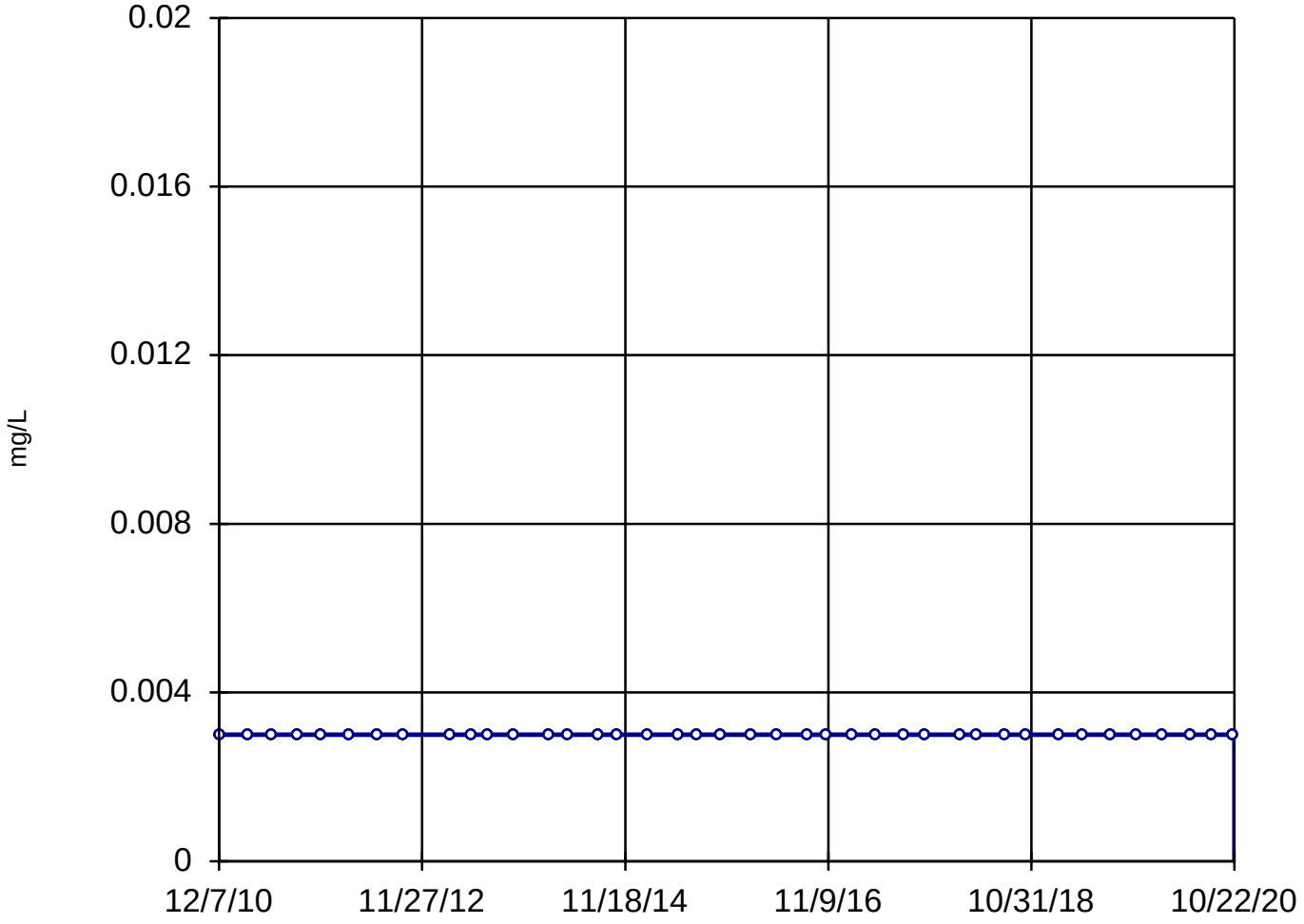
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-07



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Antimony, Dissolved Analysis Run 4/2/2021 11:00 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

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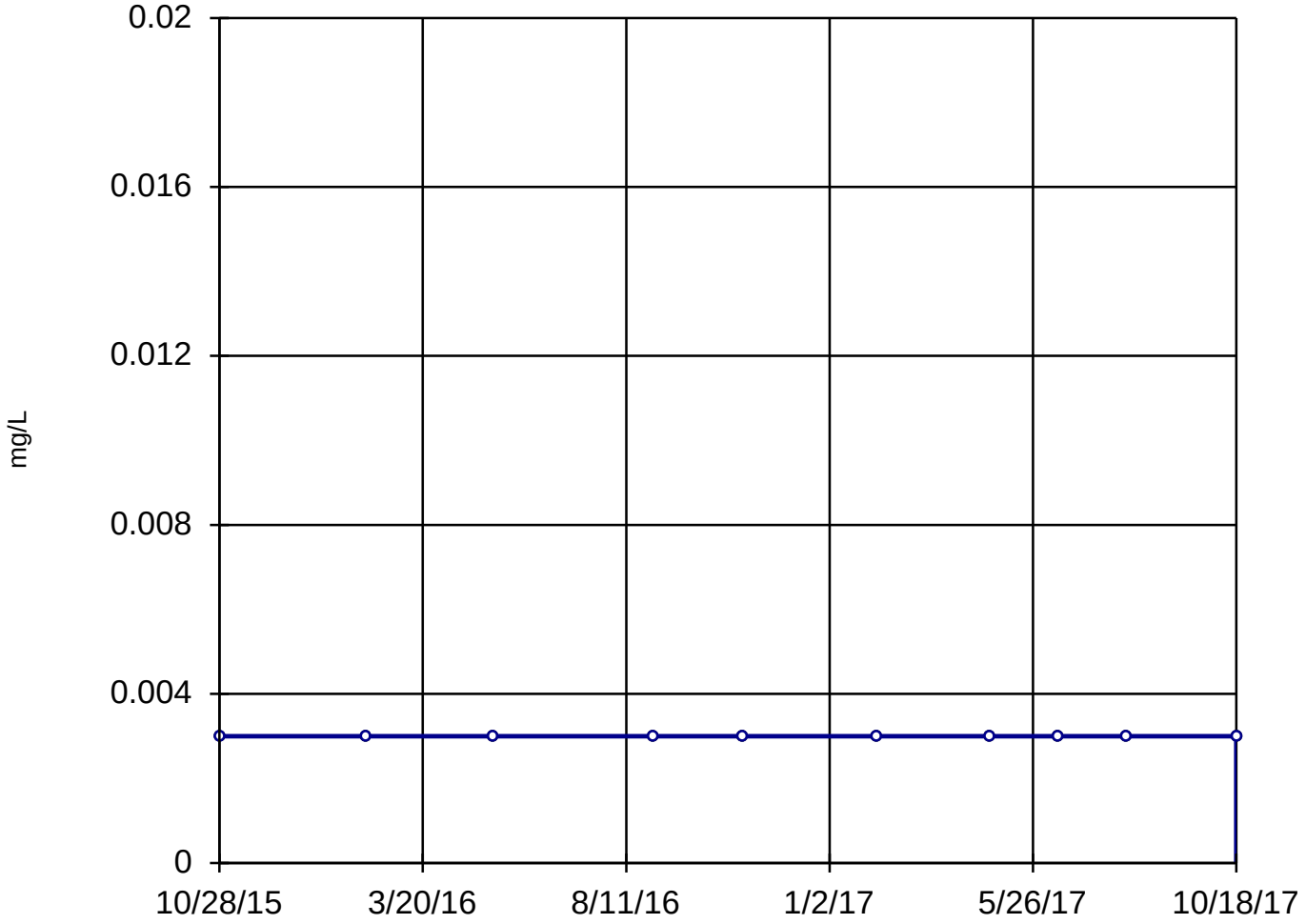
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Antimony, Total Analysis Run 4/2/2021 11:00 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

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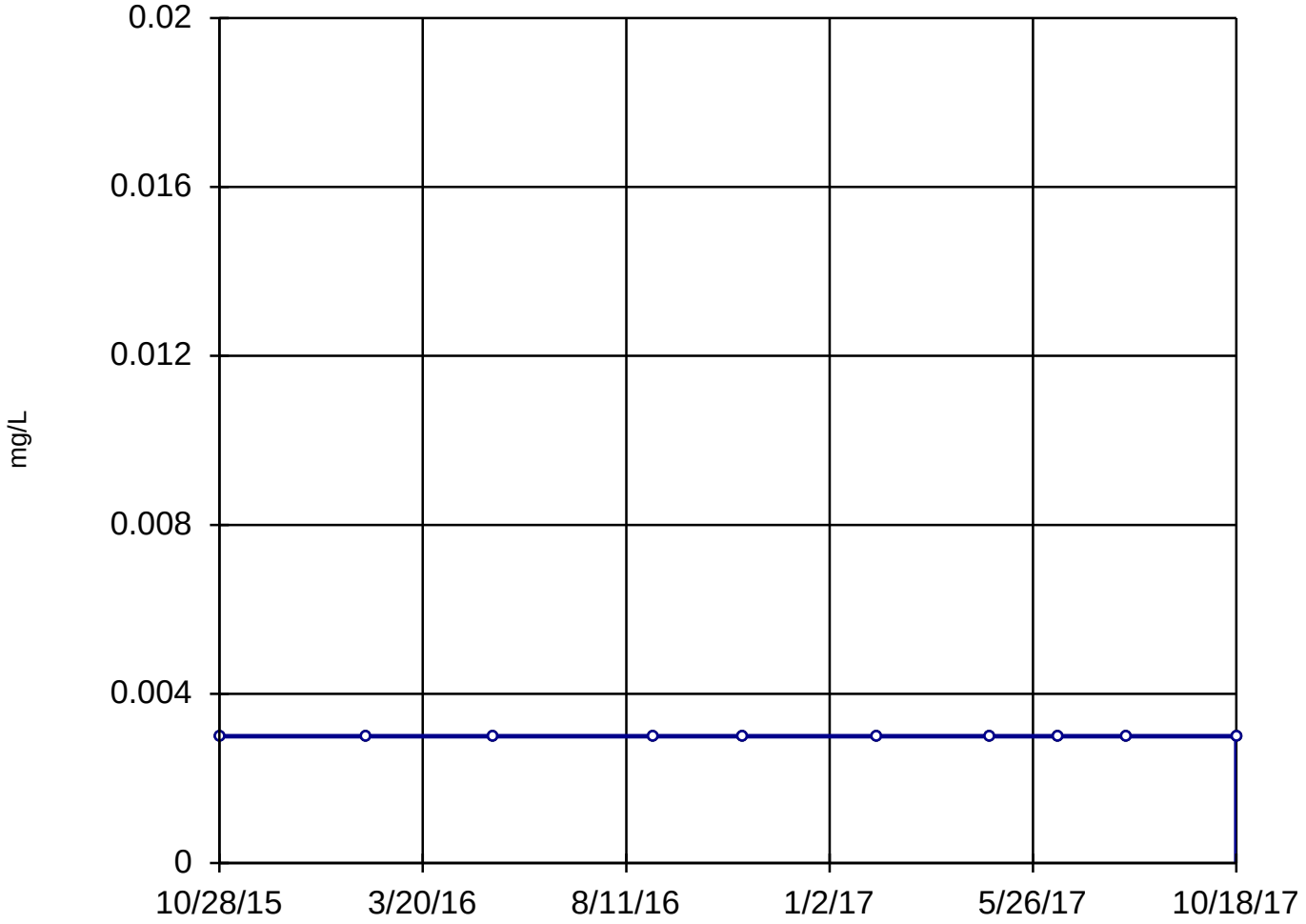
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Antimony, Total Analysis Run 4/2/2021 11:00 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

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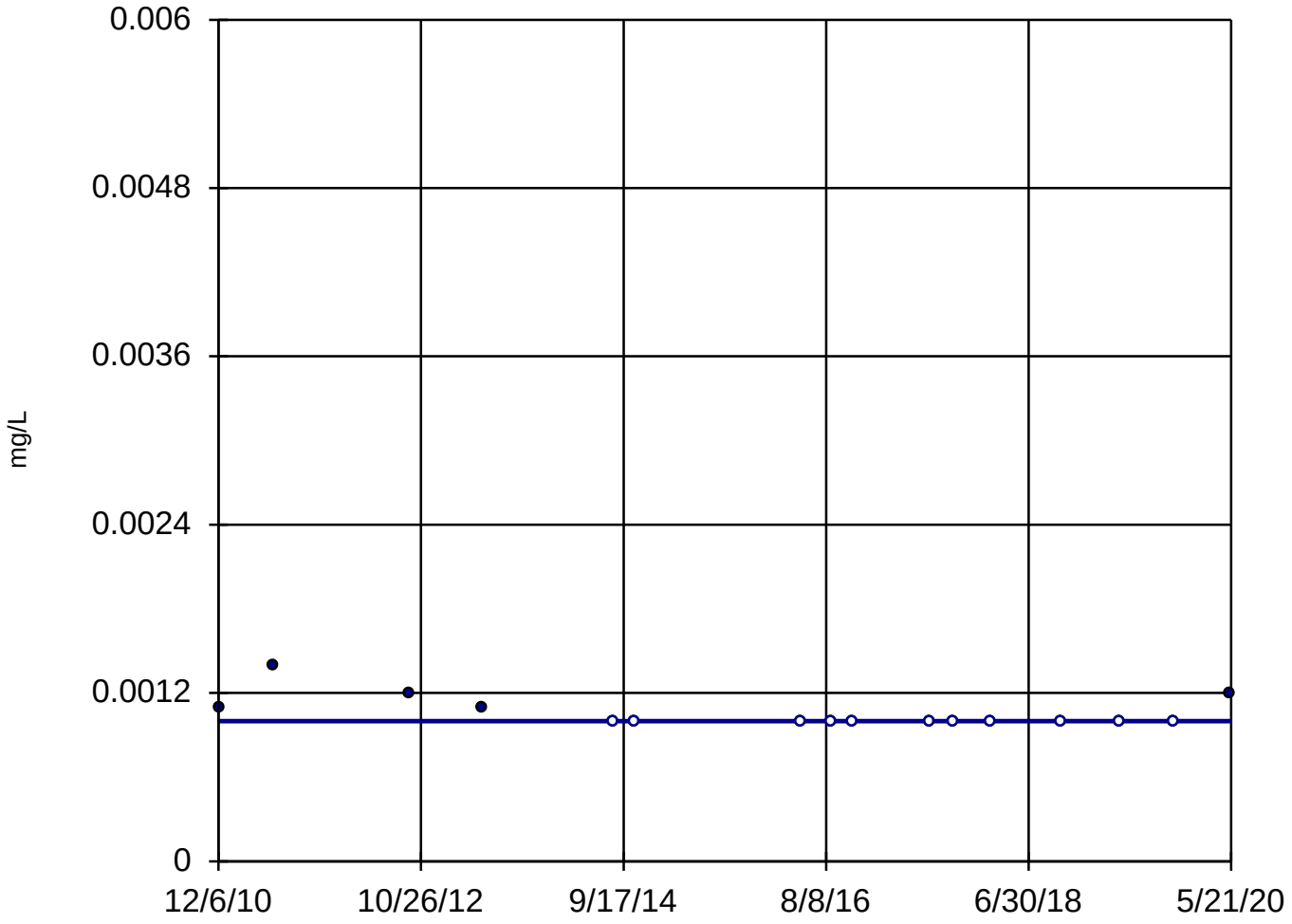
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-01



n = 16

Slope = 0
units per year.

Mann-Kendall
statistic = -33
critical = -58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Arsenic, Dissolved Analysis Run 4/2/2021 11:00 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

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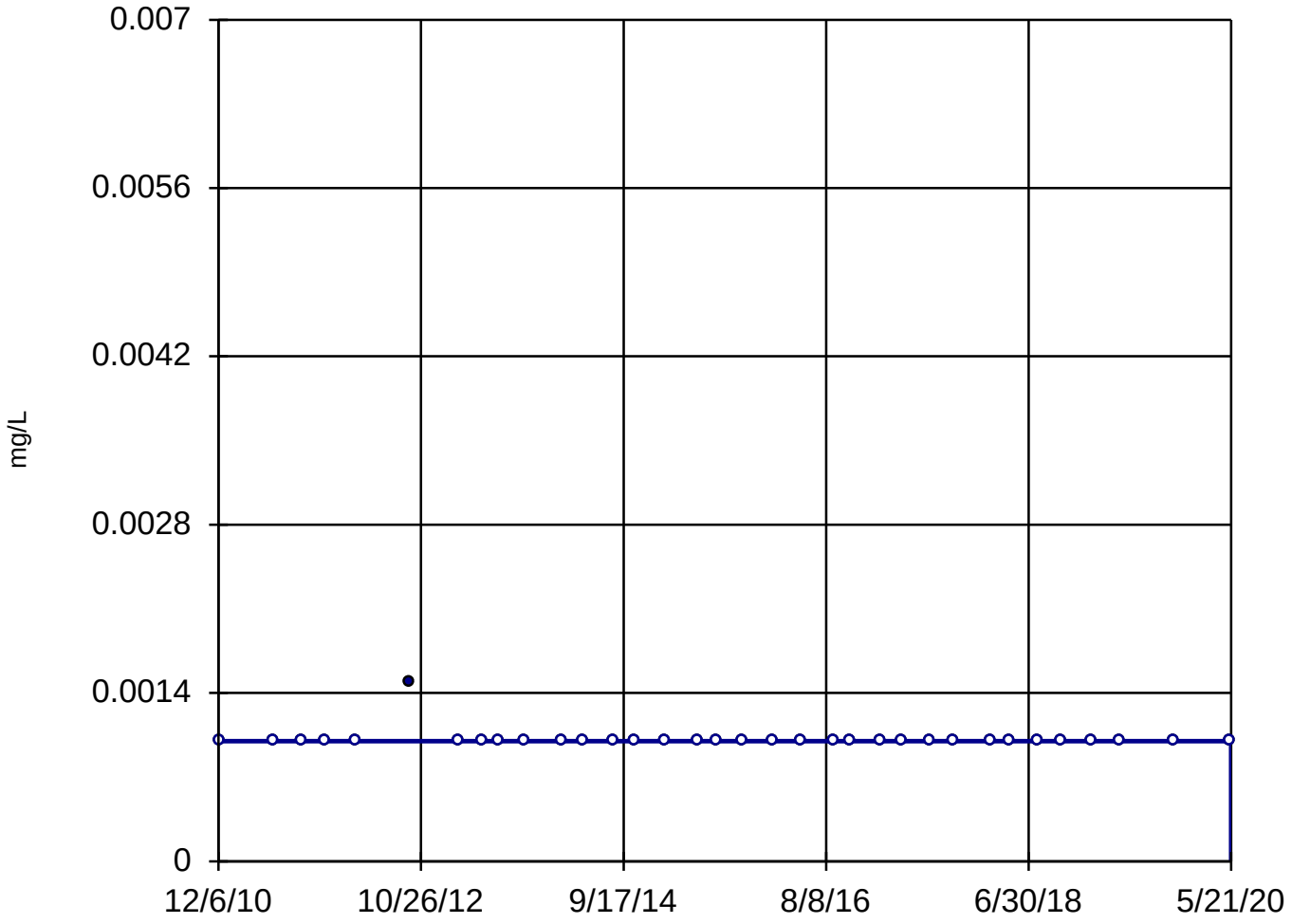
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-02



n = 34

Slope = 0
units per year.

Mann-Kendall
statistic = -23
critical = -176

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Arsenic, Dissolved Analysis Run 4/2/2021 11:00 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

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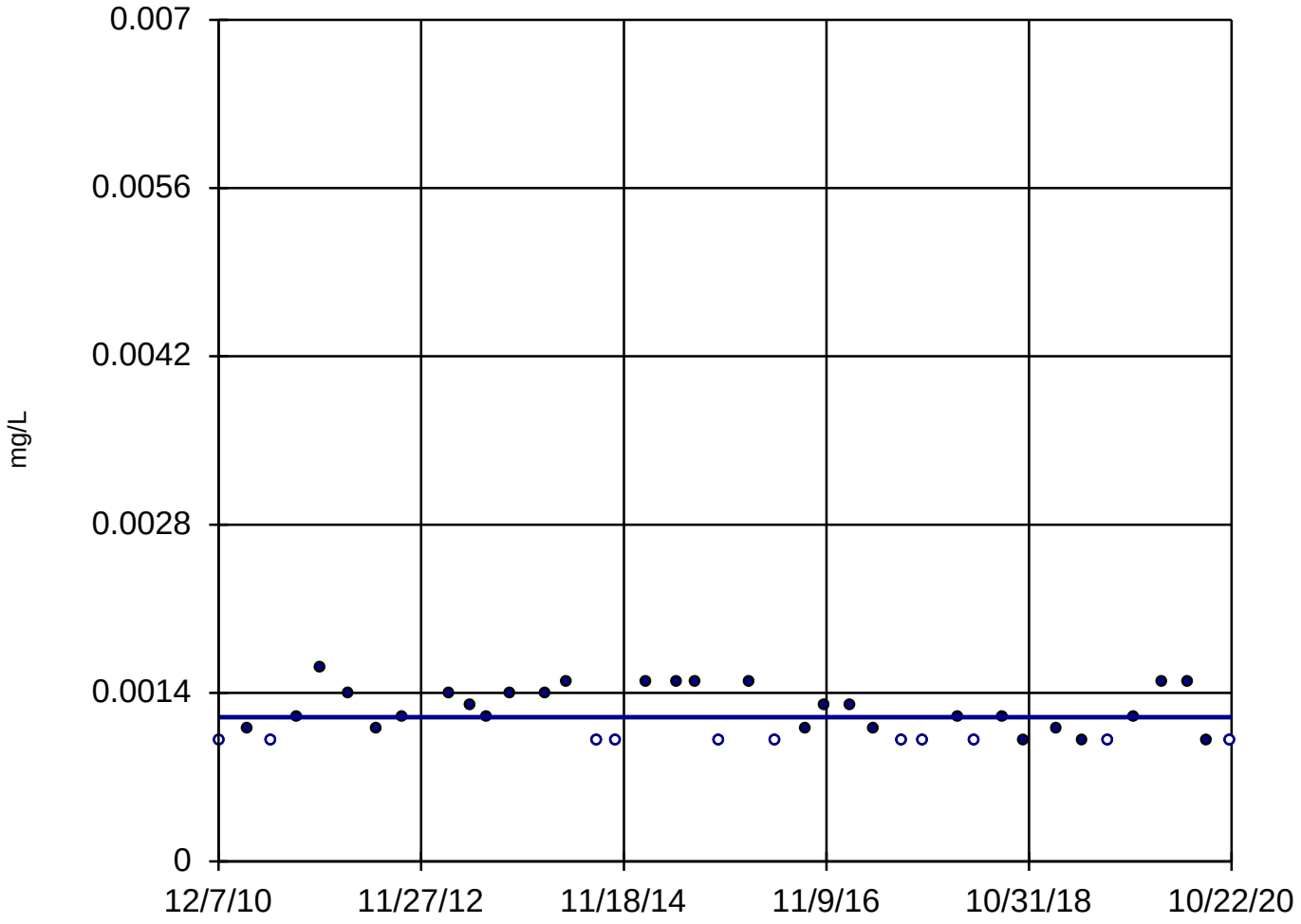
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 40

Slope = -6.3e-12 units per year.

Mann-Kendall statistic = -100
critical = -223

Trend not significant at 99% confidence level (α = 0.005 per tail).

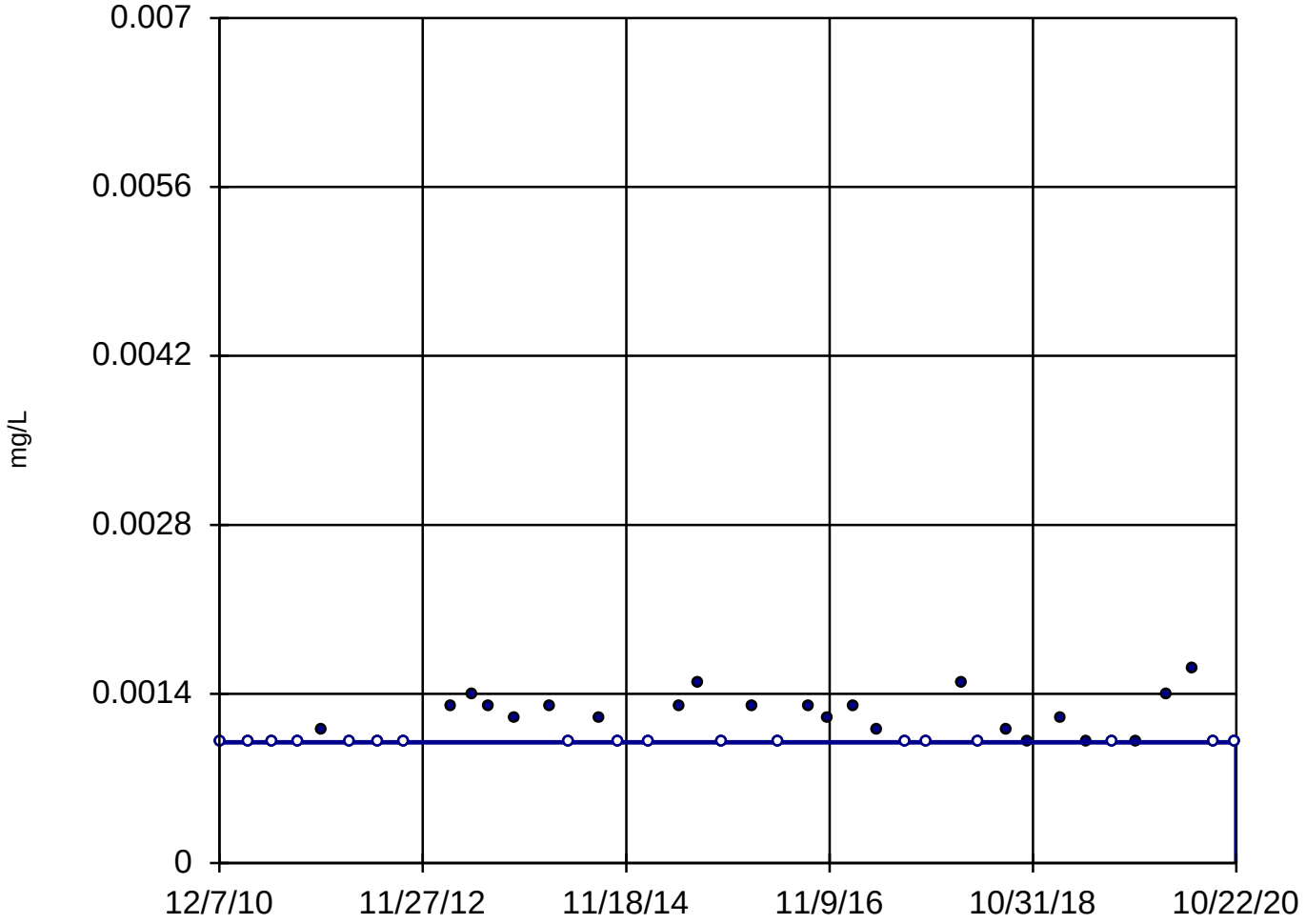
Constituent: Arsenic, Dissolved Analysis Run 4/2/2021 11:00 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = 36
critical = 223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

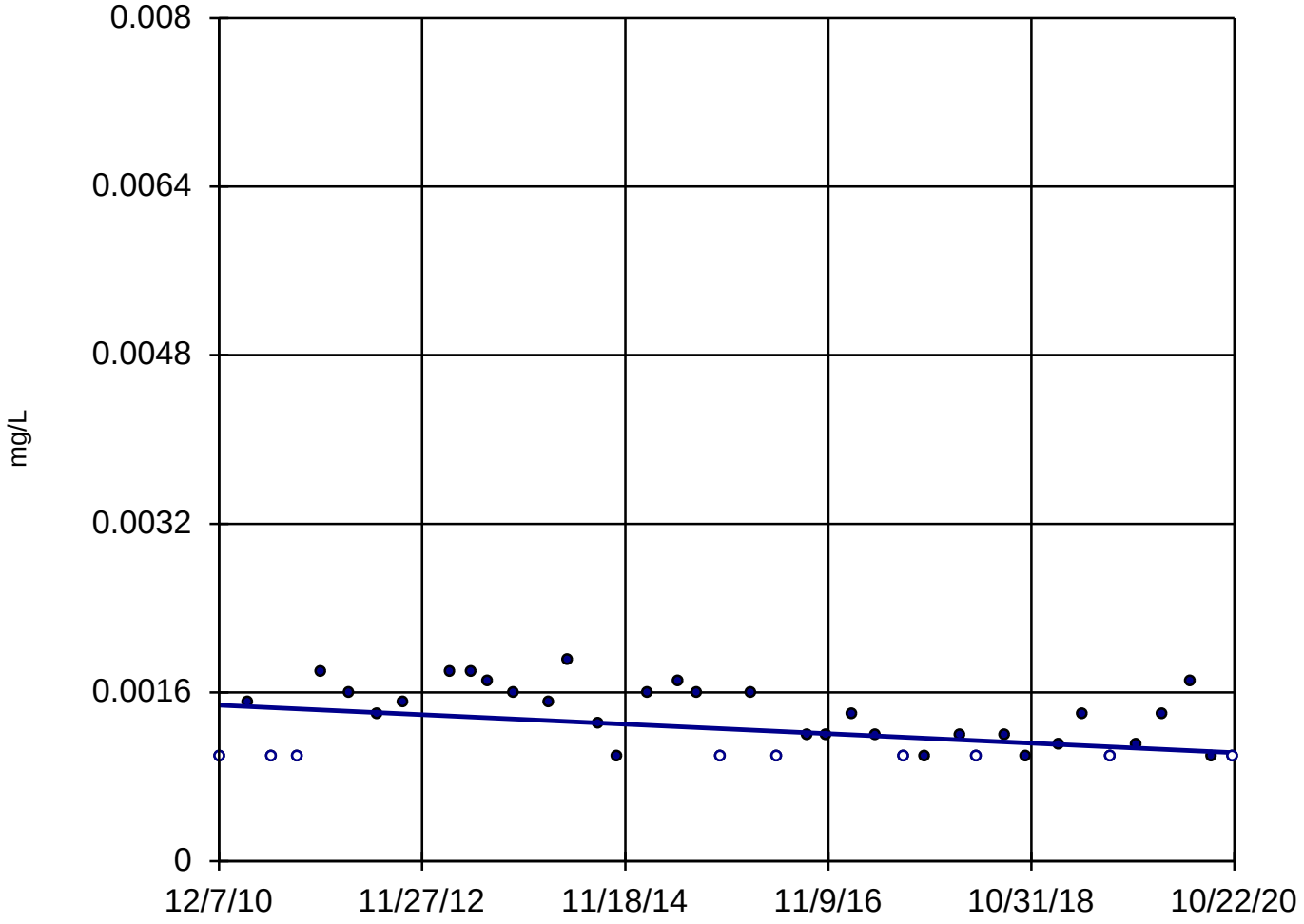
Constituent: Arsenic, Dissolved Analysis Run 4/2/2021 11:00 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-06



n = 40

Slope = -0.00004546 units per year.

Mann-Kendall statistic = -196
critical = -223

Trend not significant at 99% confidence level (α = 0.005 per tail).

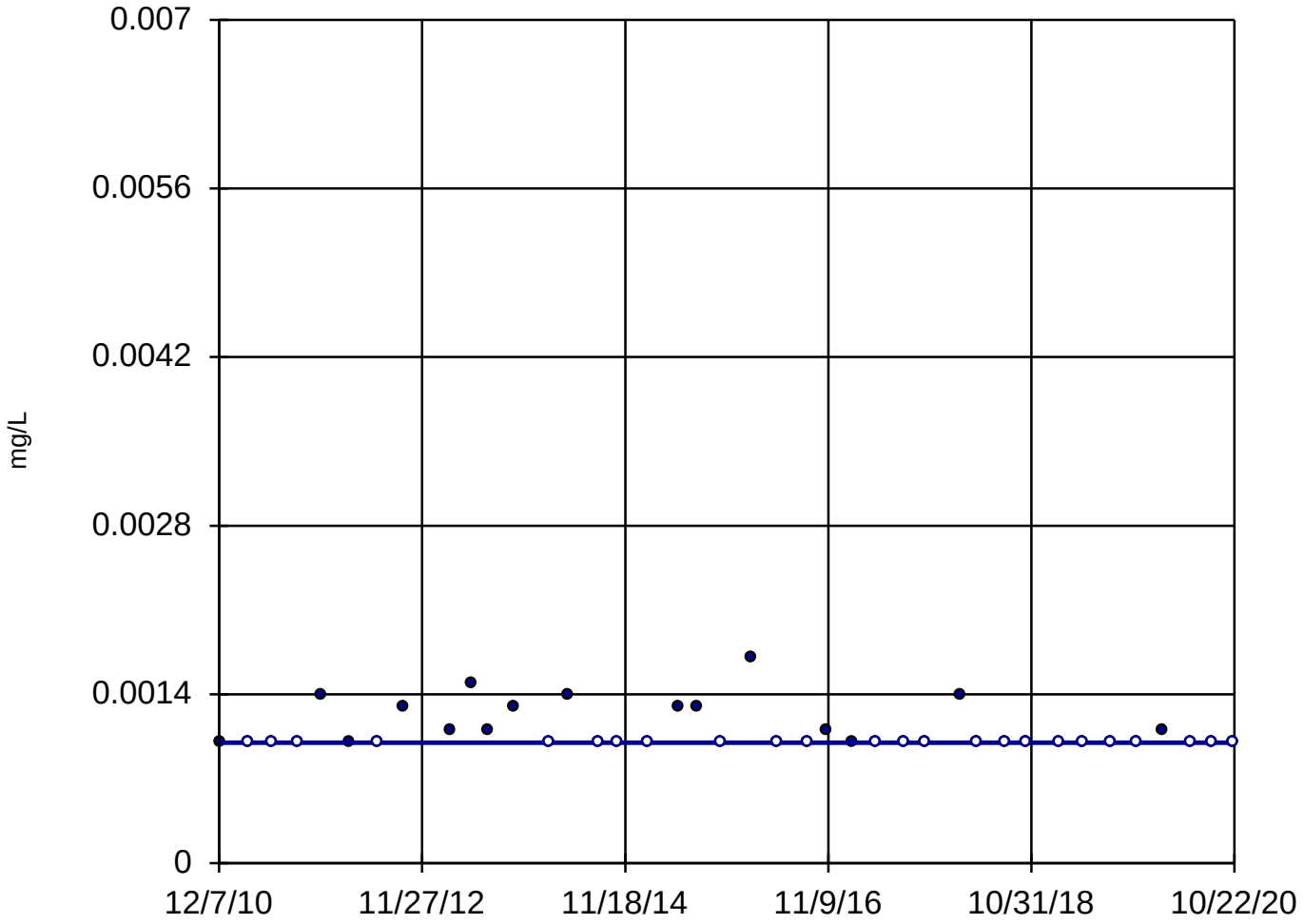
Constituent: Arsenic, Dissolved Analysis Run 4/2/2021 11:00 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-07



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = -104
critical = -223

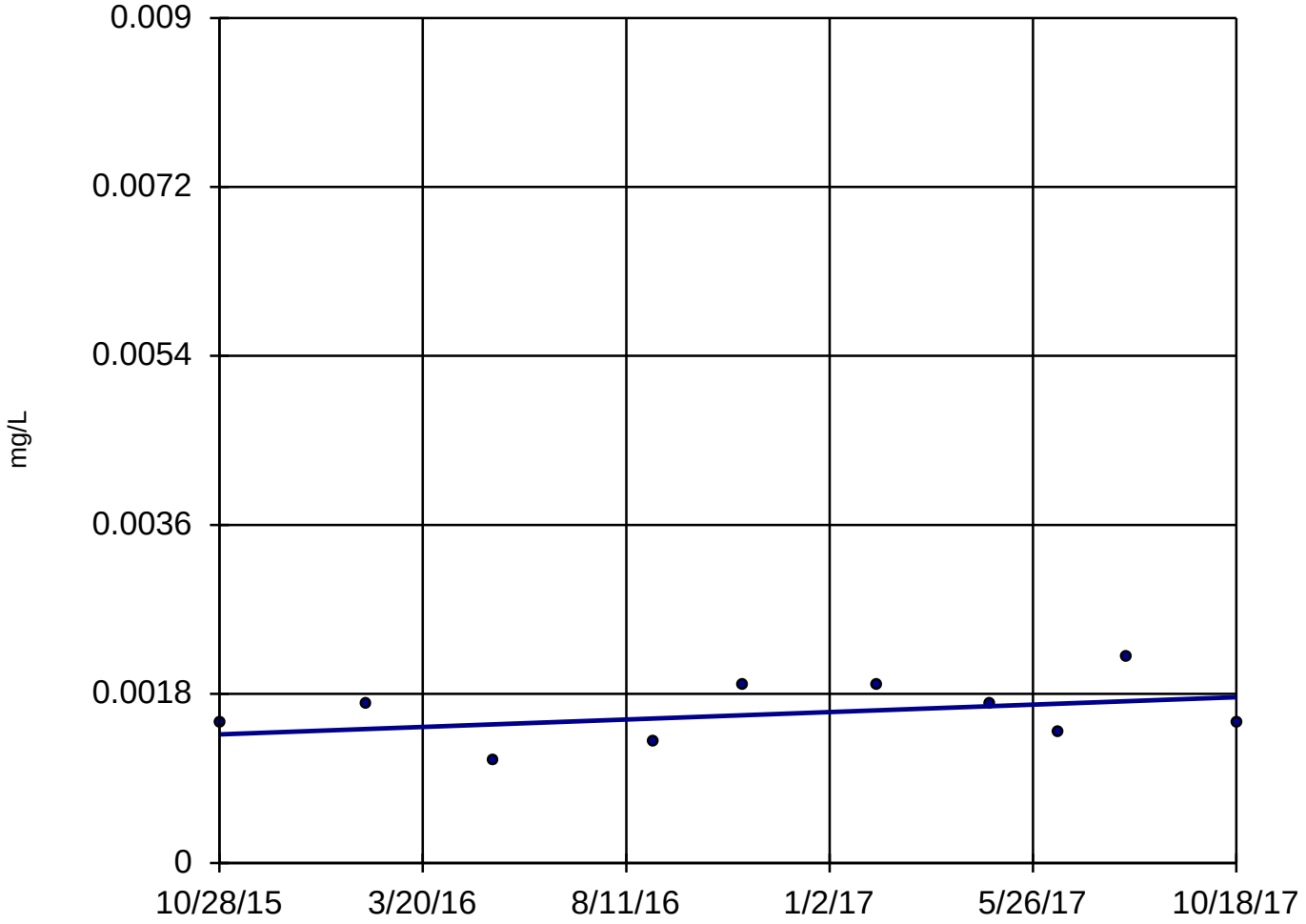
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Arsenic, Dissolved Analysis Run 4/2/2021 11:00 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-03



n = 10

Slope = 0.0002017 units per year.

Mann-Kendall statistic = 10
critical = 30

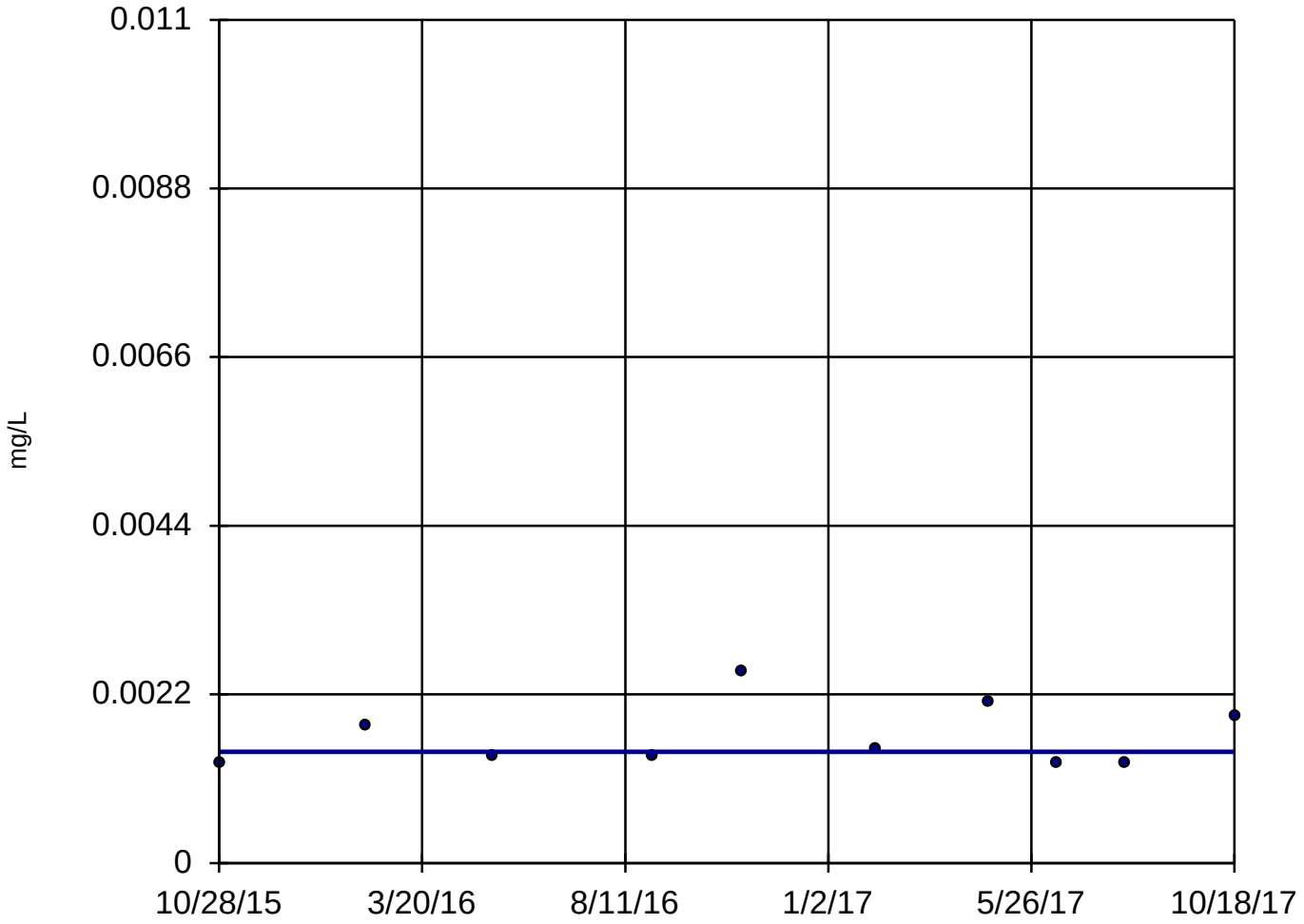
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Arsenic, Total Analysis Run 4/2/2021 11:00 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-04



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 3
critical = 30

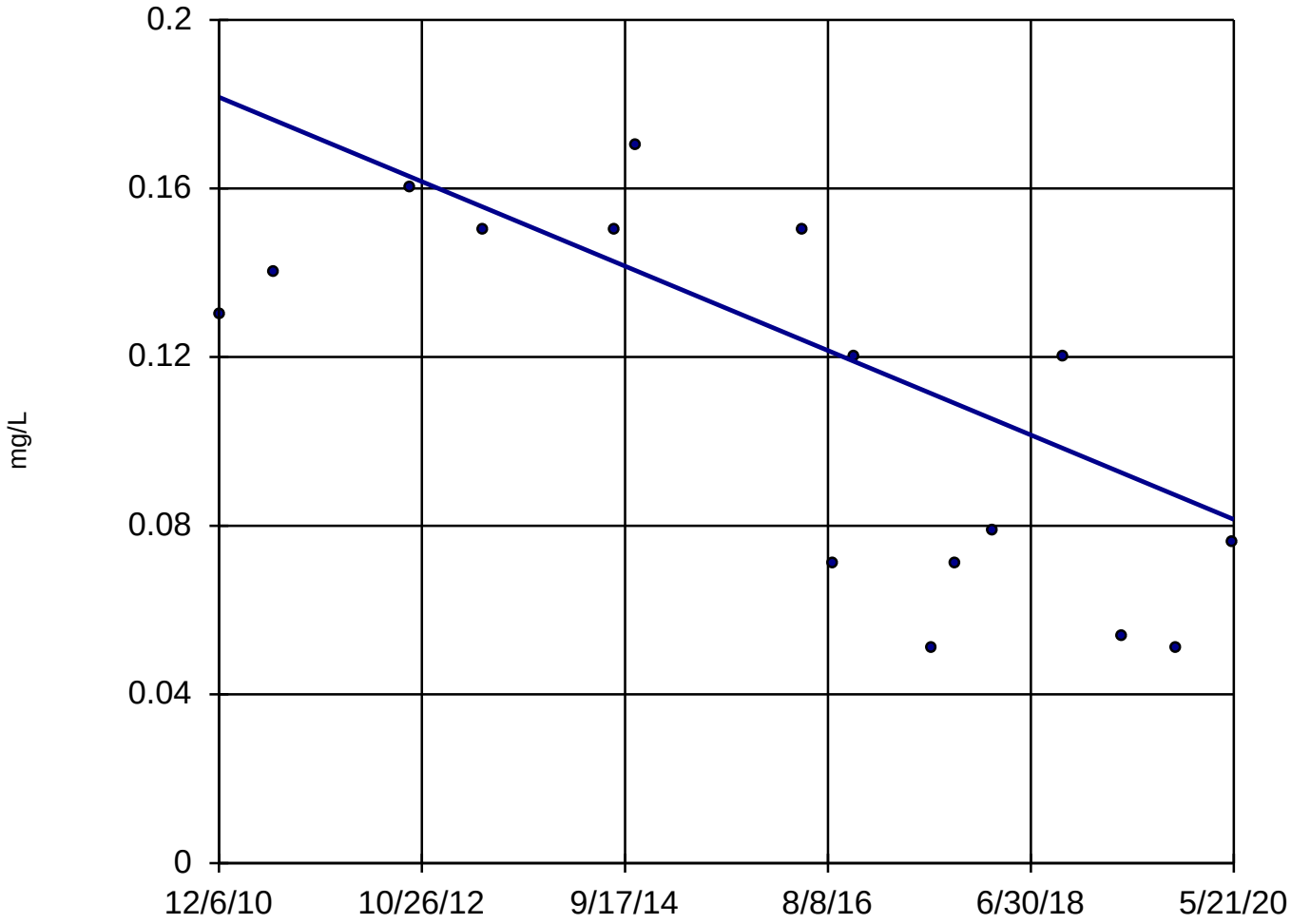
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Arsenic, Total Analysis Run 4/2/2021 11:00 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-01



n = 16

Slope = -0.01058 units per year.

Mann-Kendall statistic = -56
critical = -58

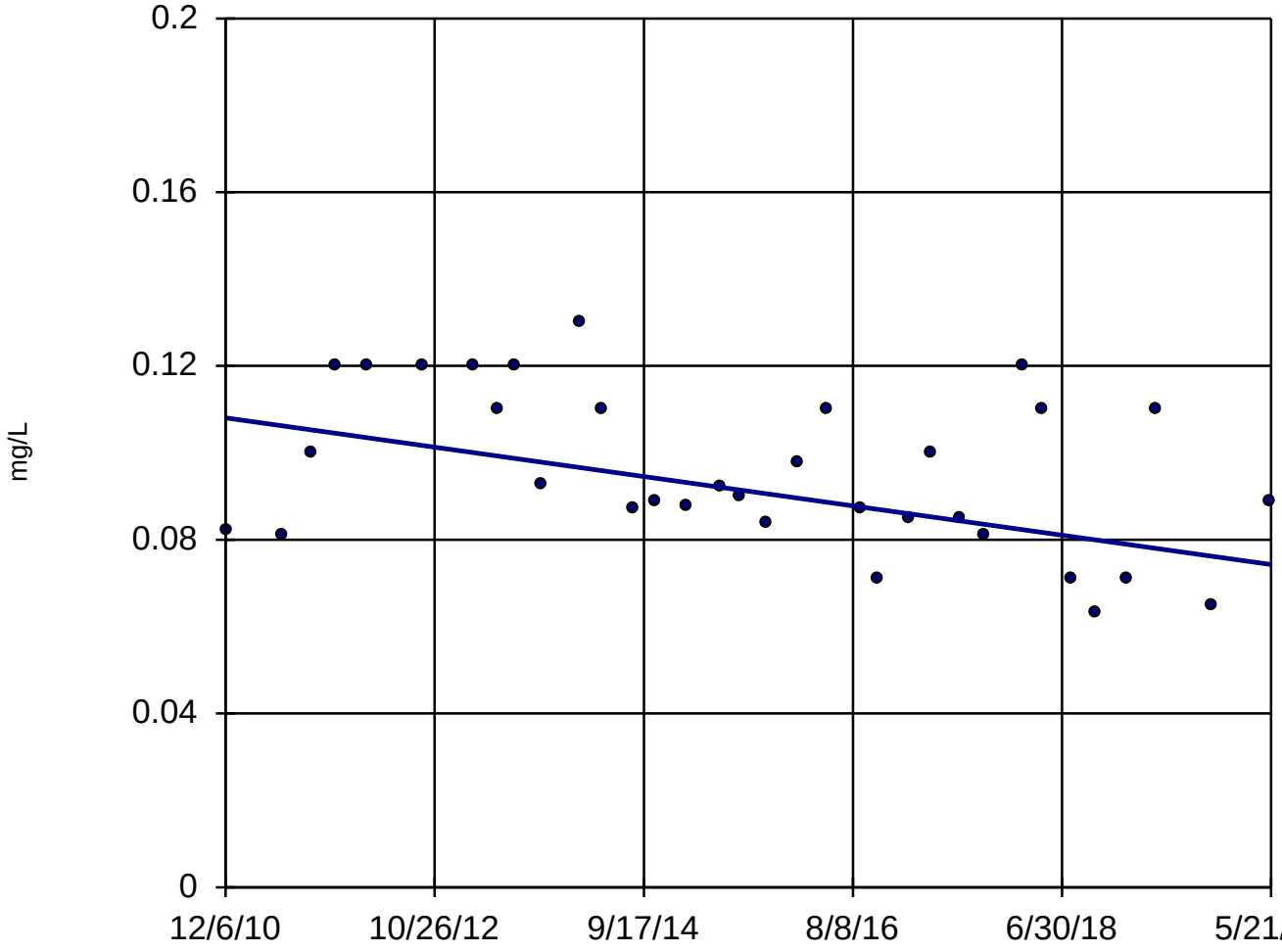
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Dissolved Analysis Run 4/2/2021 11:00 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-02



n = 34

Slope = -0.003564 units per year.

Mann-Kendall statistic = -178
critical = -176

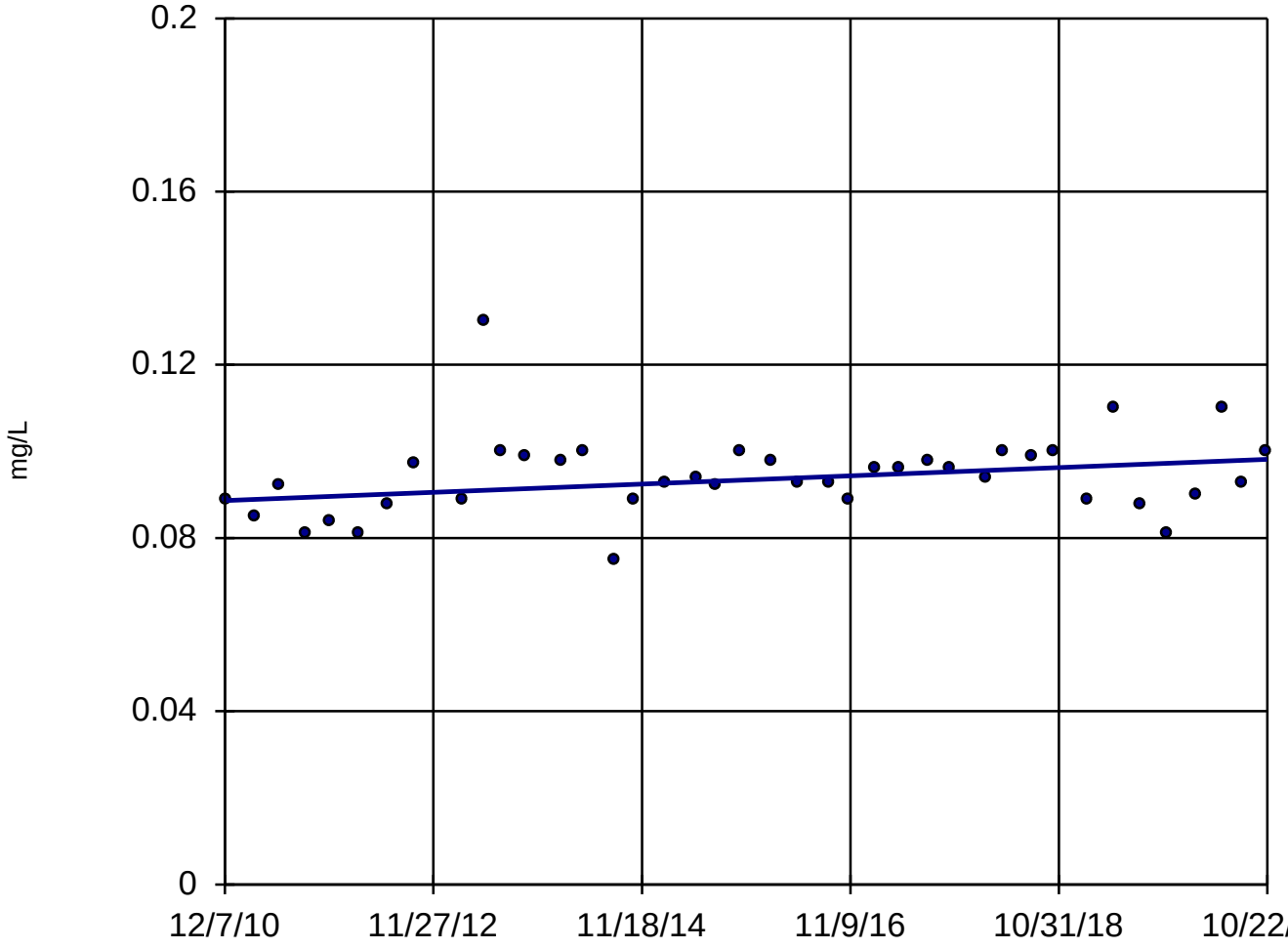
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Dissolved Analysis Run 4/2/2021 11:00 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-03



n = 40

Slope = 0.0009656 units per year.

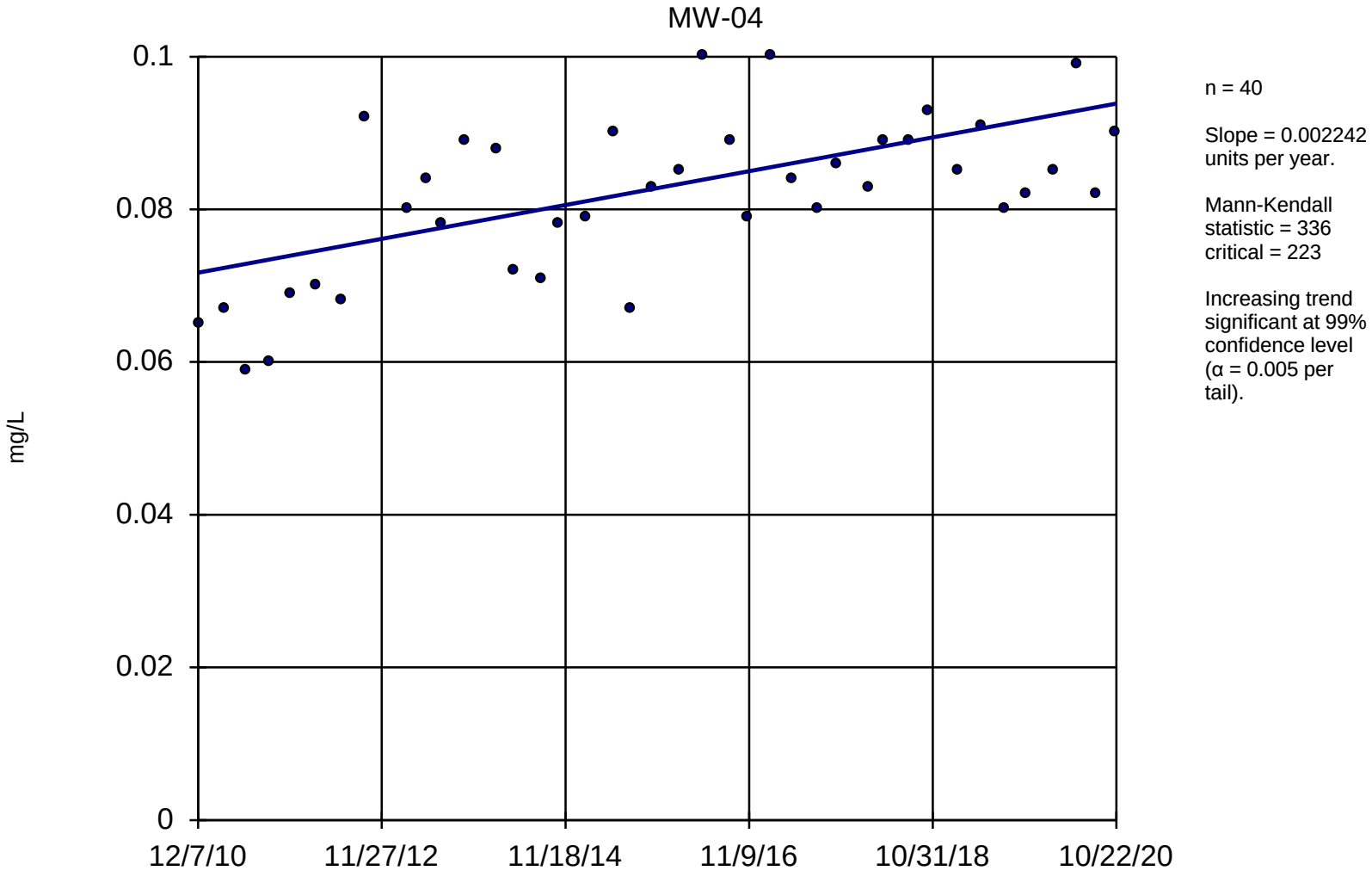
Mann-Kendall statistic = 177
critical = 223

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Dissolved Analysis Run 4/2/2021 11:00 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator



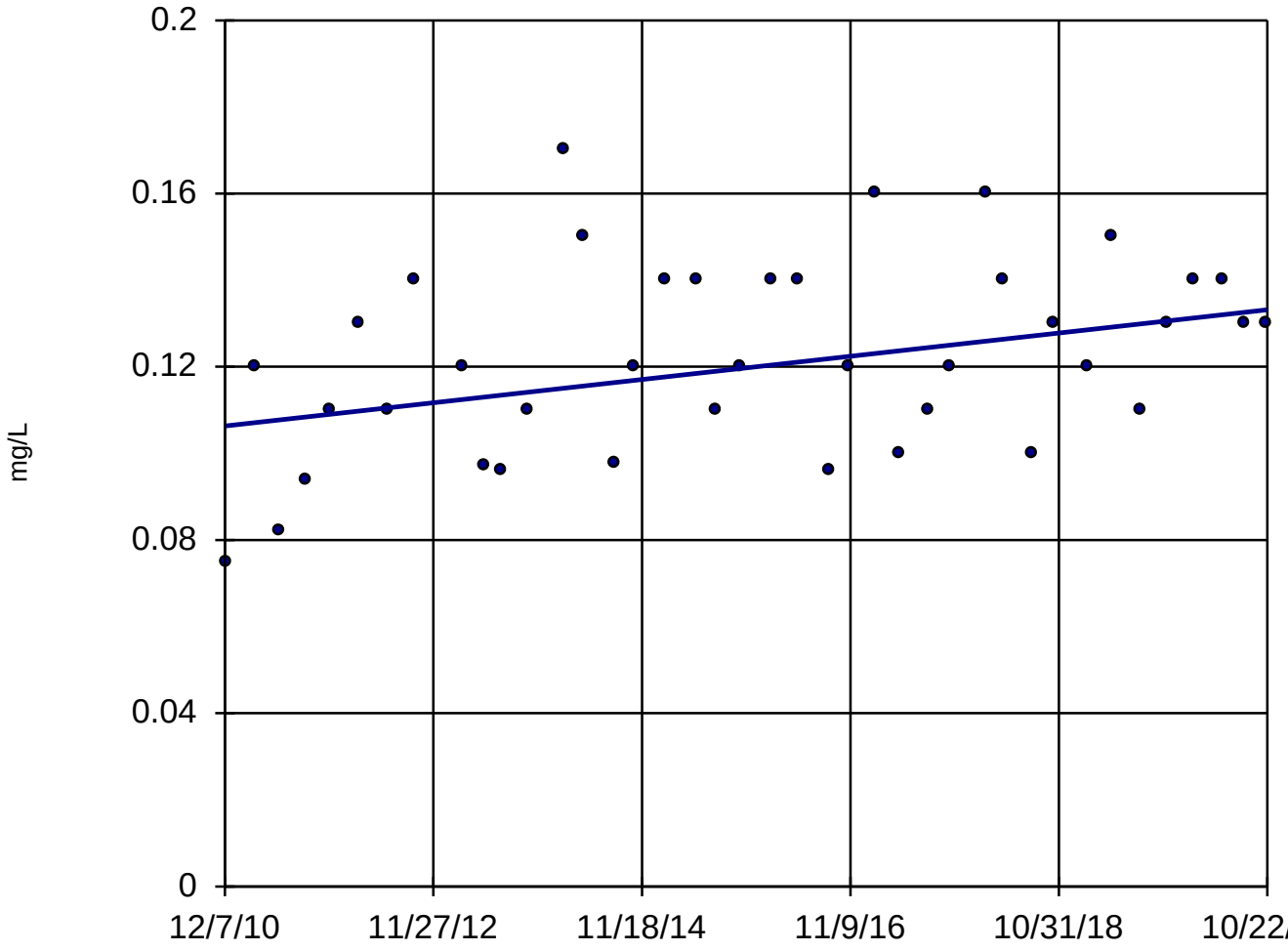
Constituent: Barium, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA

Sen's Slope Estimator

MW-06



n = 40

Slope = 0.002711 units per year.

Mann-Kendall statistic = 206
critical = 223

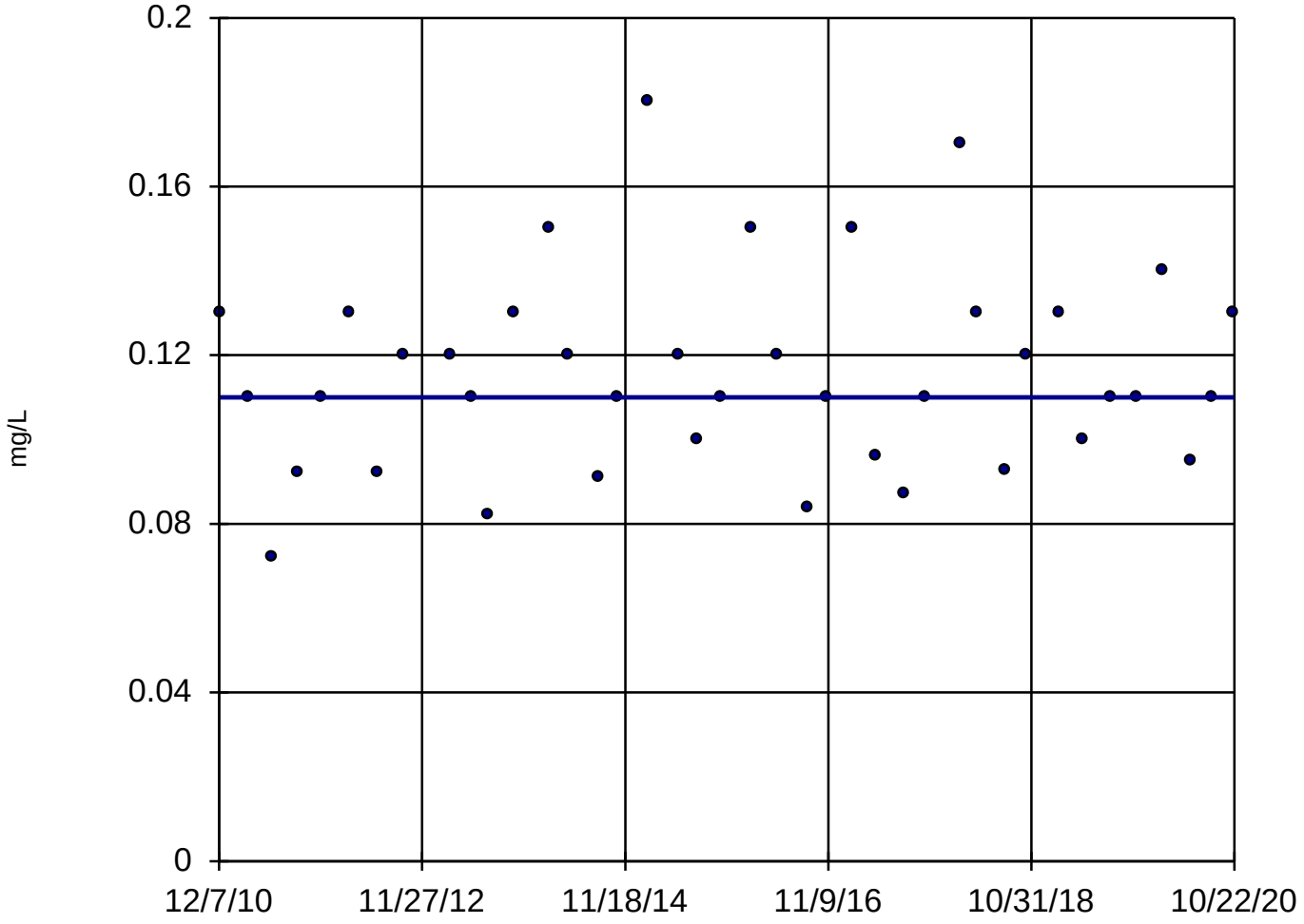
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-07



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = 50
critical = 223

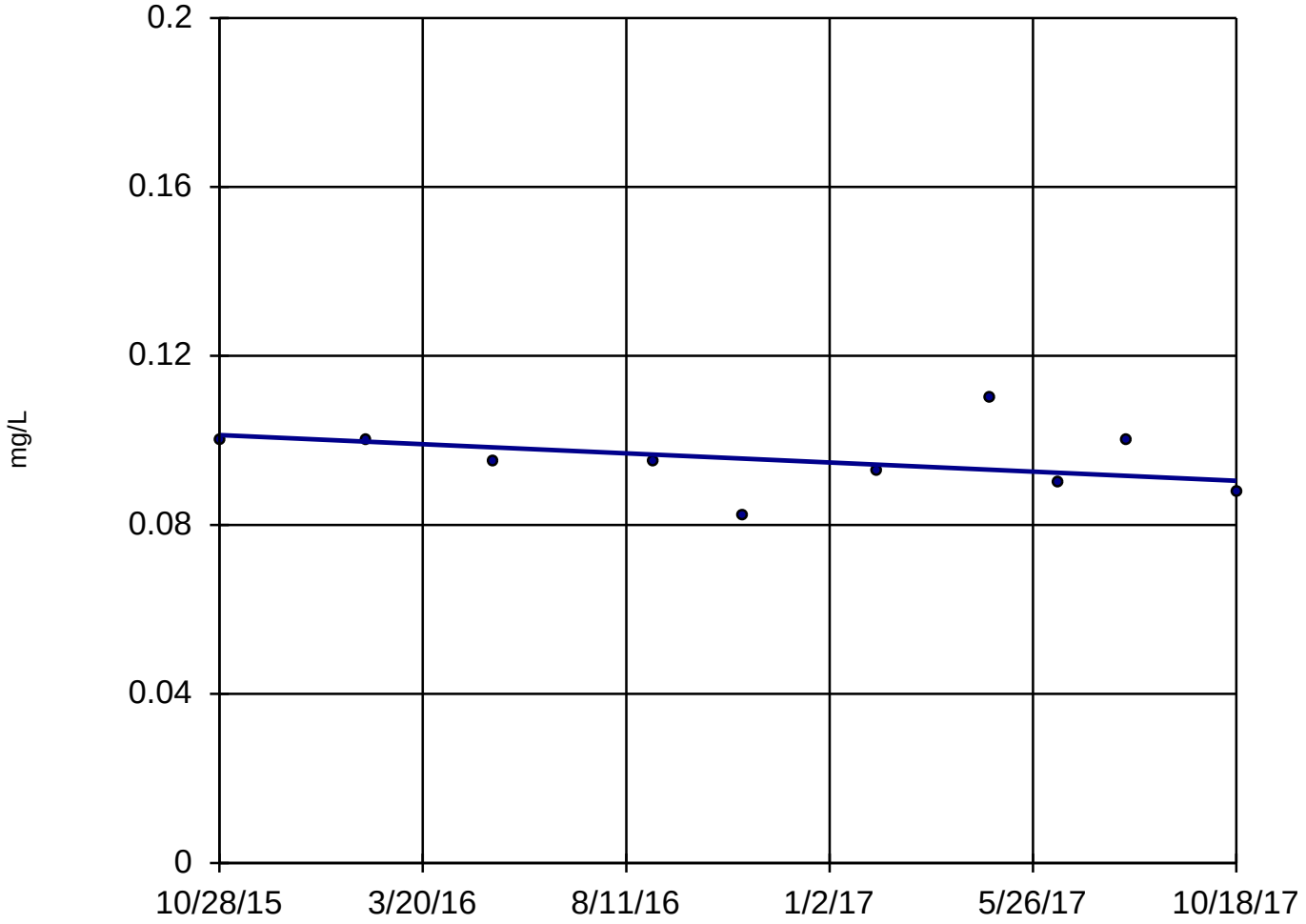
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Barium, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-03



n = 10

Slope = -0.005471 units per year.

Mann-Kendall statistic = -13
critical = -30

Trend not significant at 99% confidence level (α = 0.005 per tail).

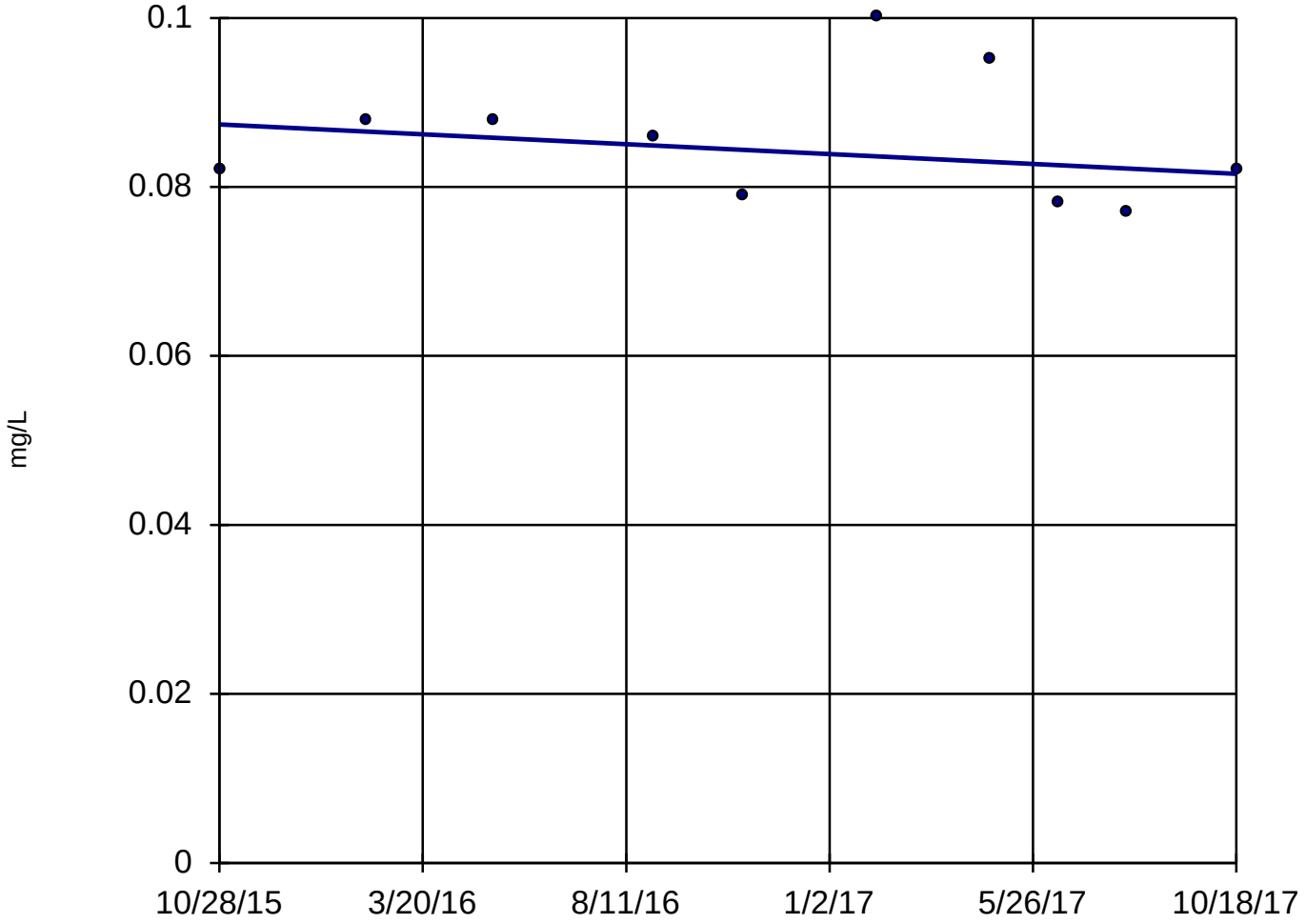
Constituent: Barium, Total Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA

Sen's Slope Estimator

MW-04



n = 10

Slope = -0.002951 units per year.

Mann-Kendall statistic = -11
critical = -30

Trend not significant at 99% confidence level (α = 0.005 per tail).

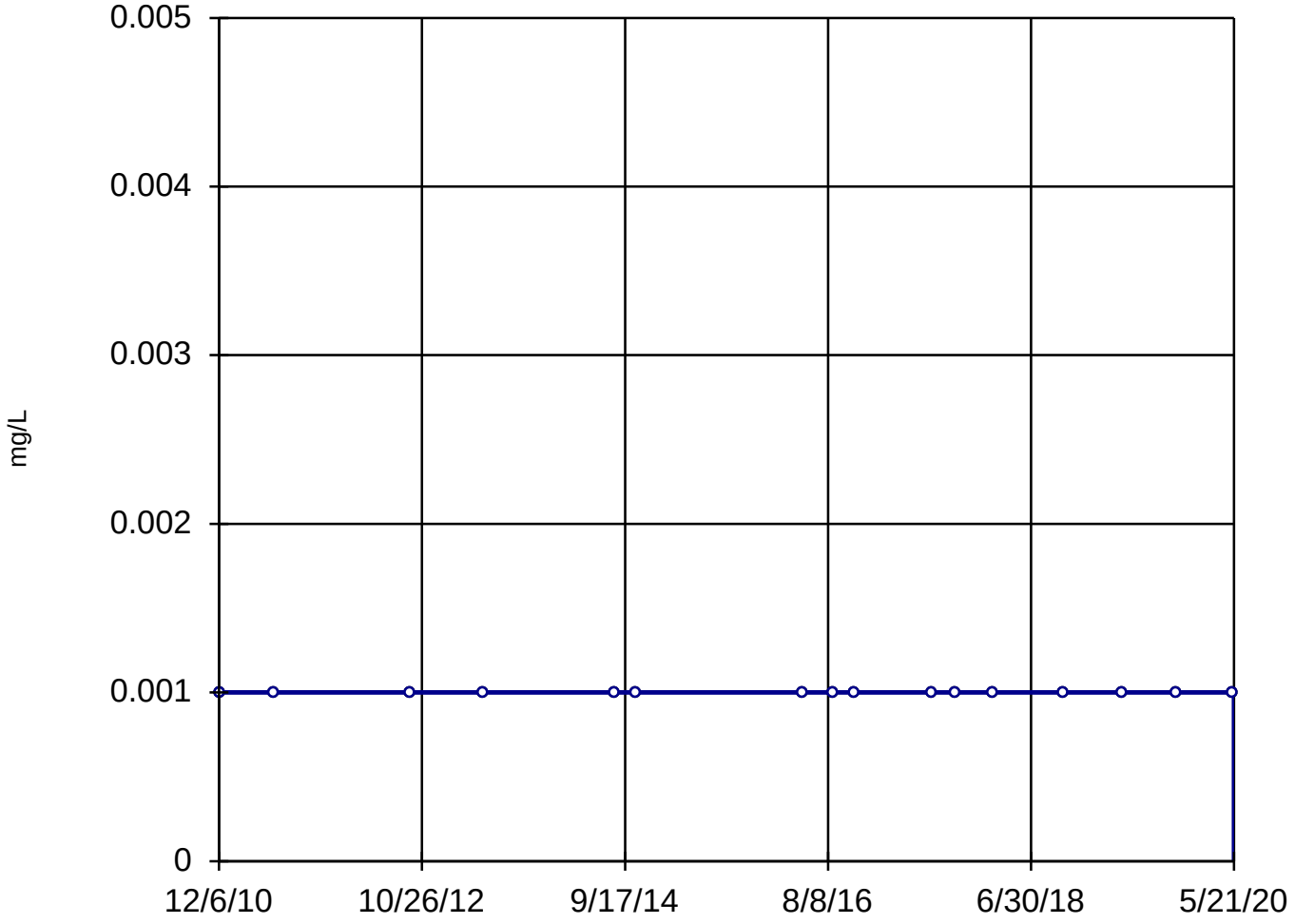
Constituent: Barium, Total Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-01



n = 16

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

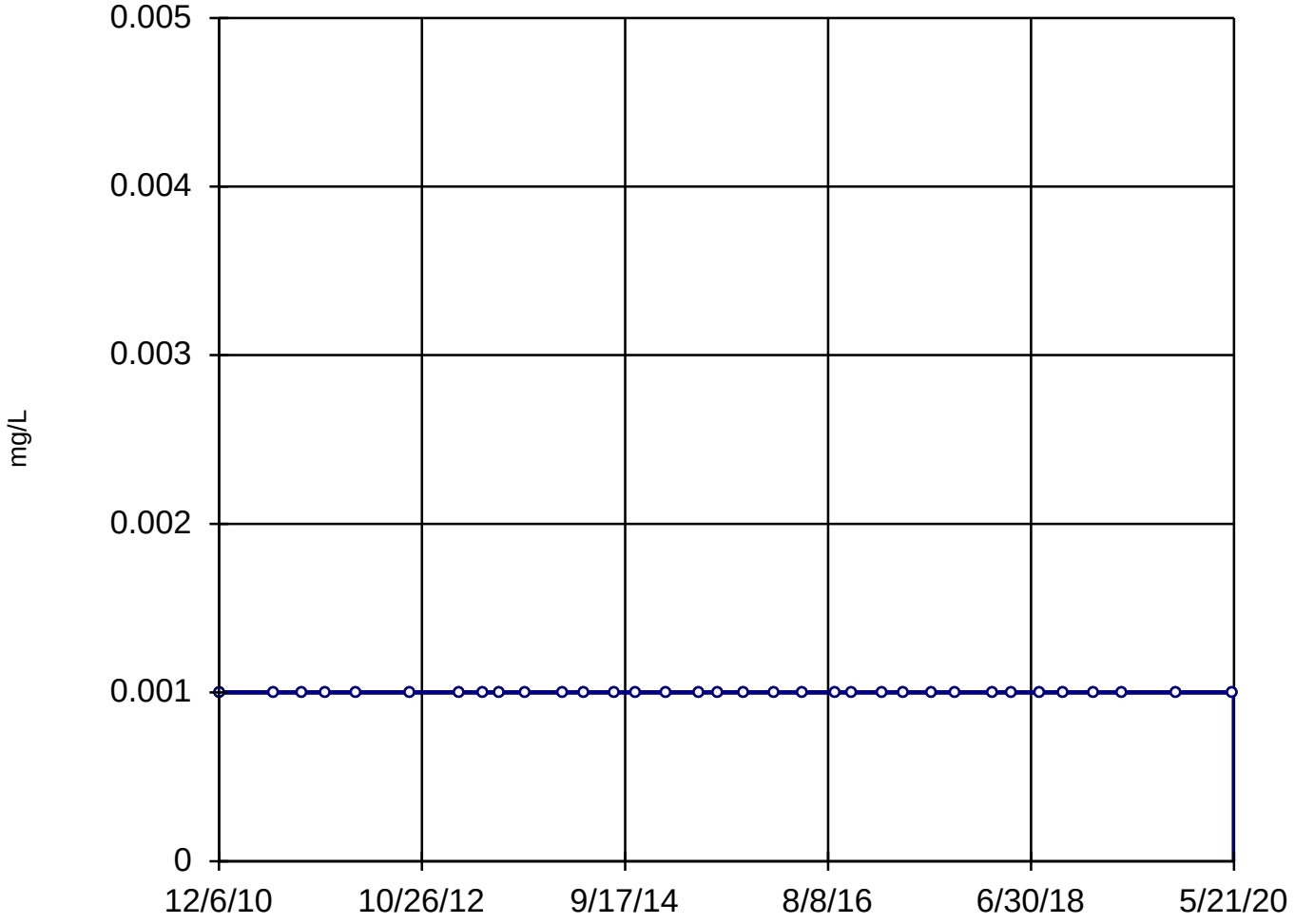
Constituent: Beryllium, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-02



n = 34

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 176

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

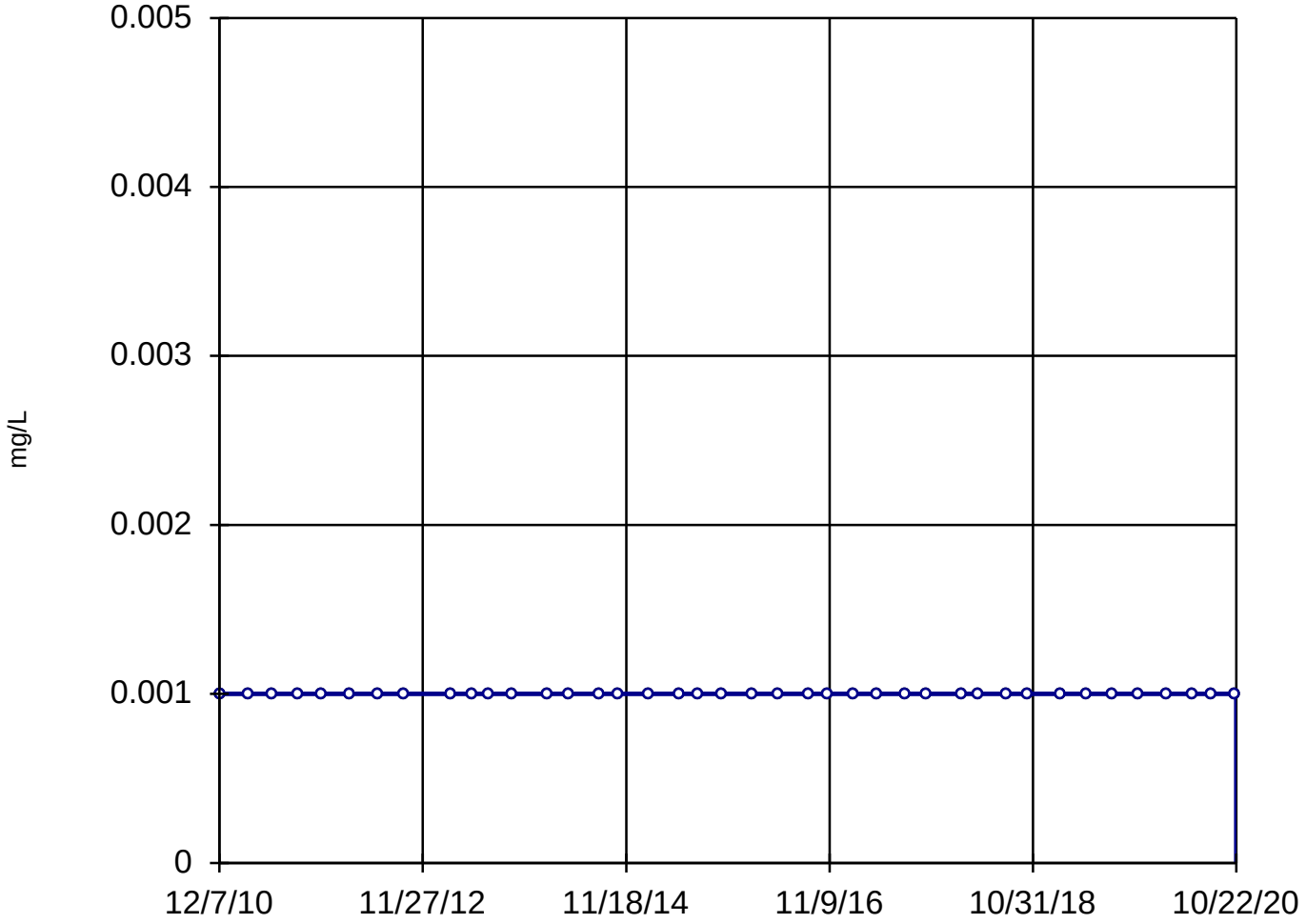
Constituent: Beryllium, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

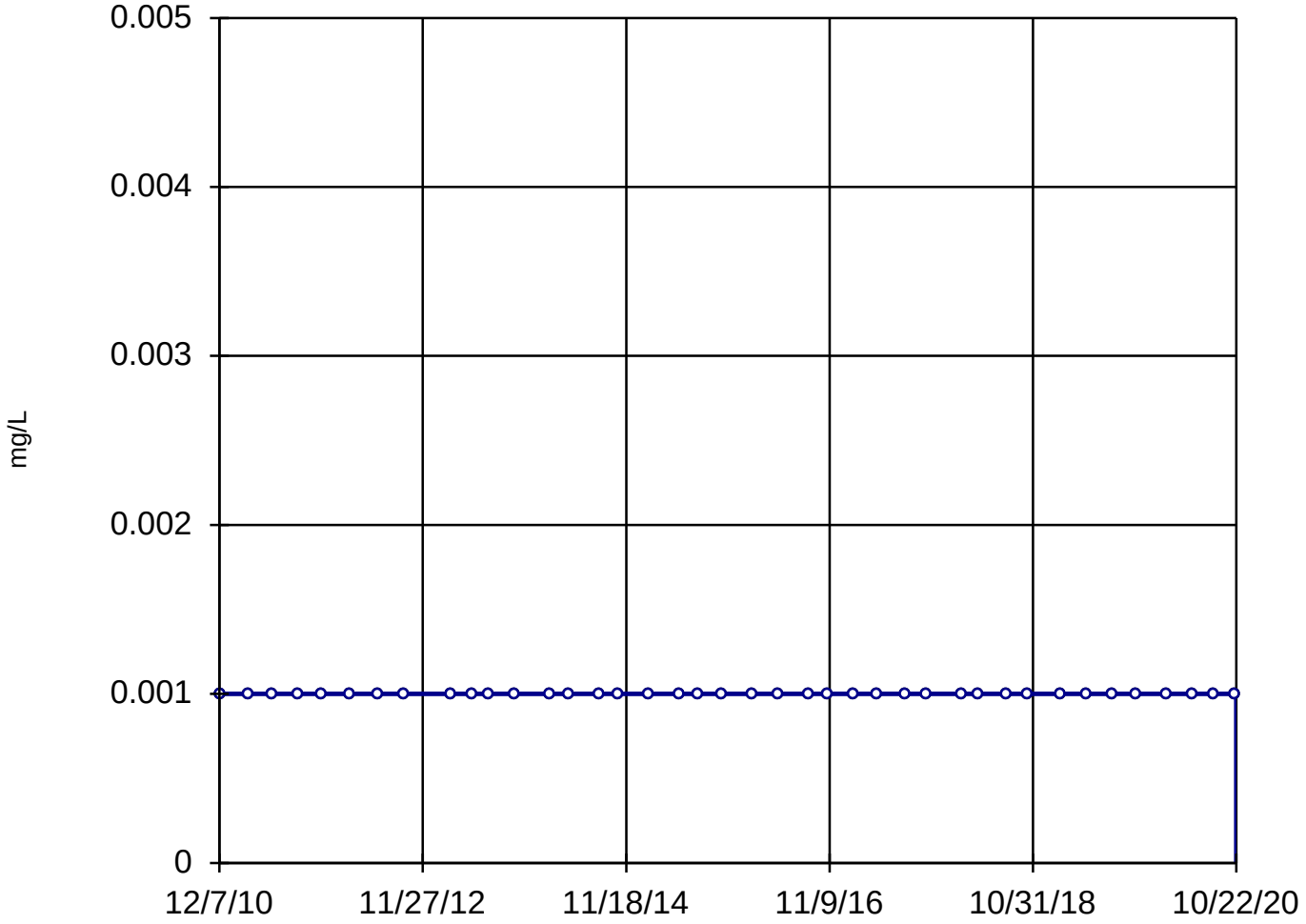
Constituent: Beryllium, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

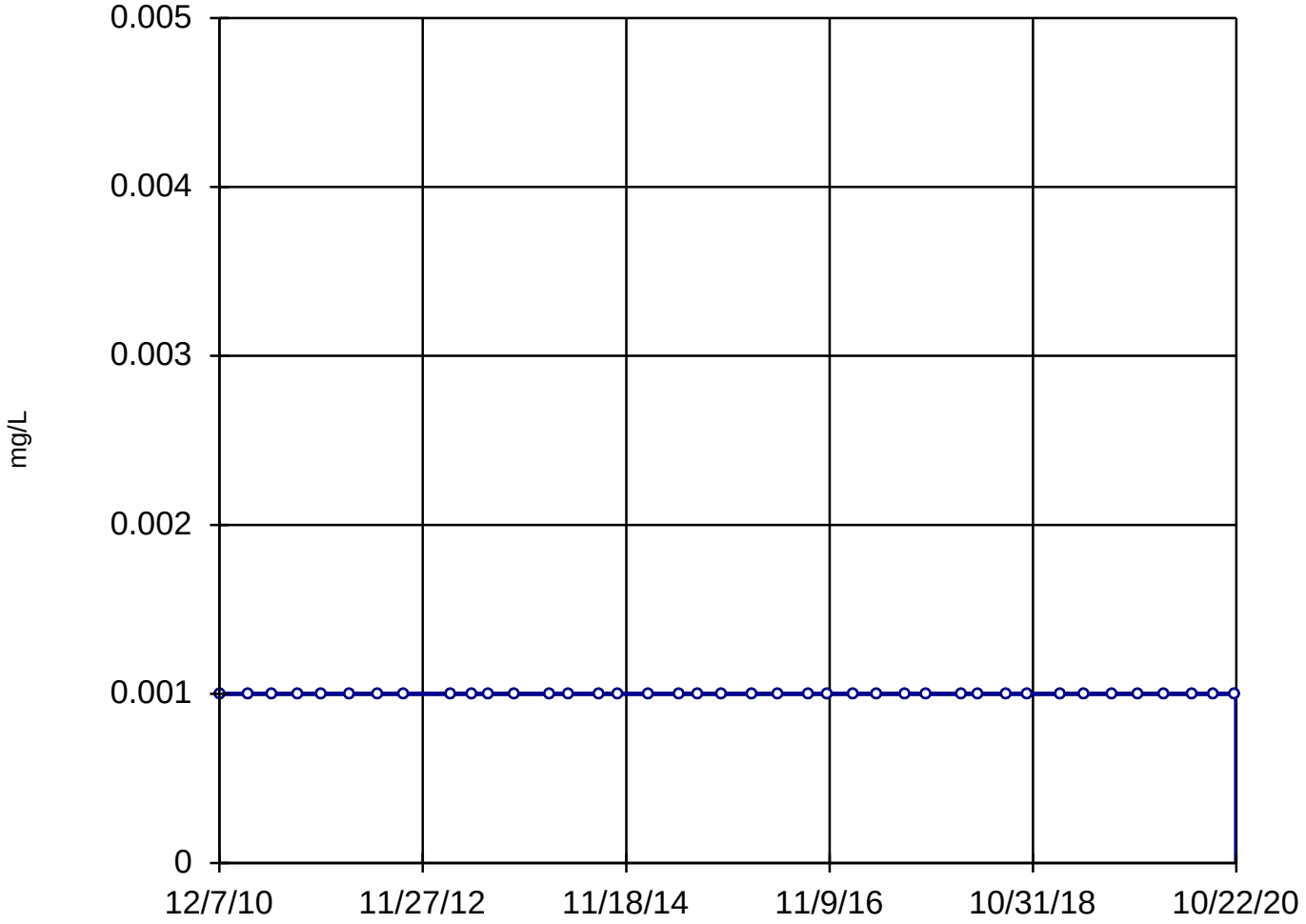
Constituent: Beryllium, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-06



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

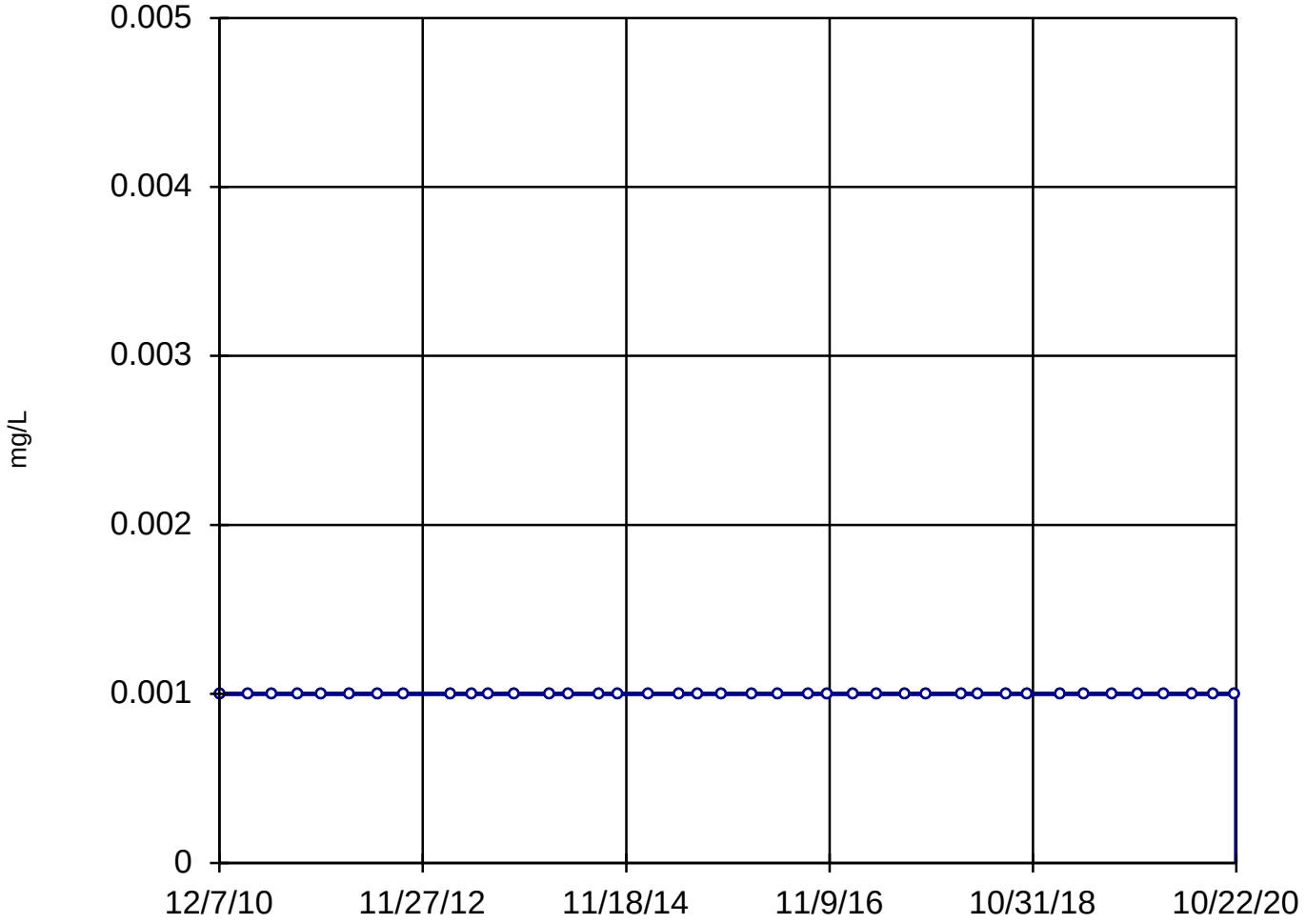
Constituent: Beryllium, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-07



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

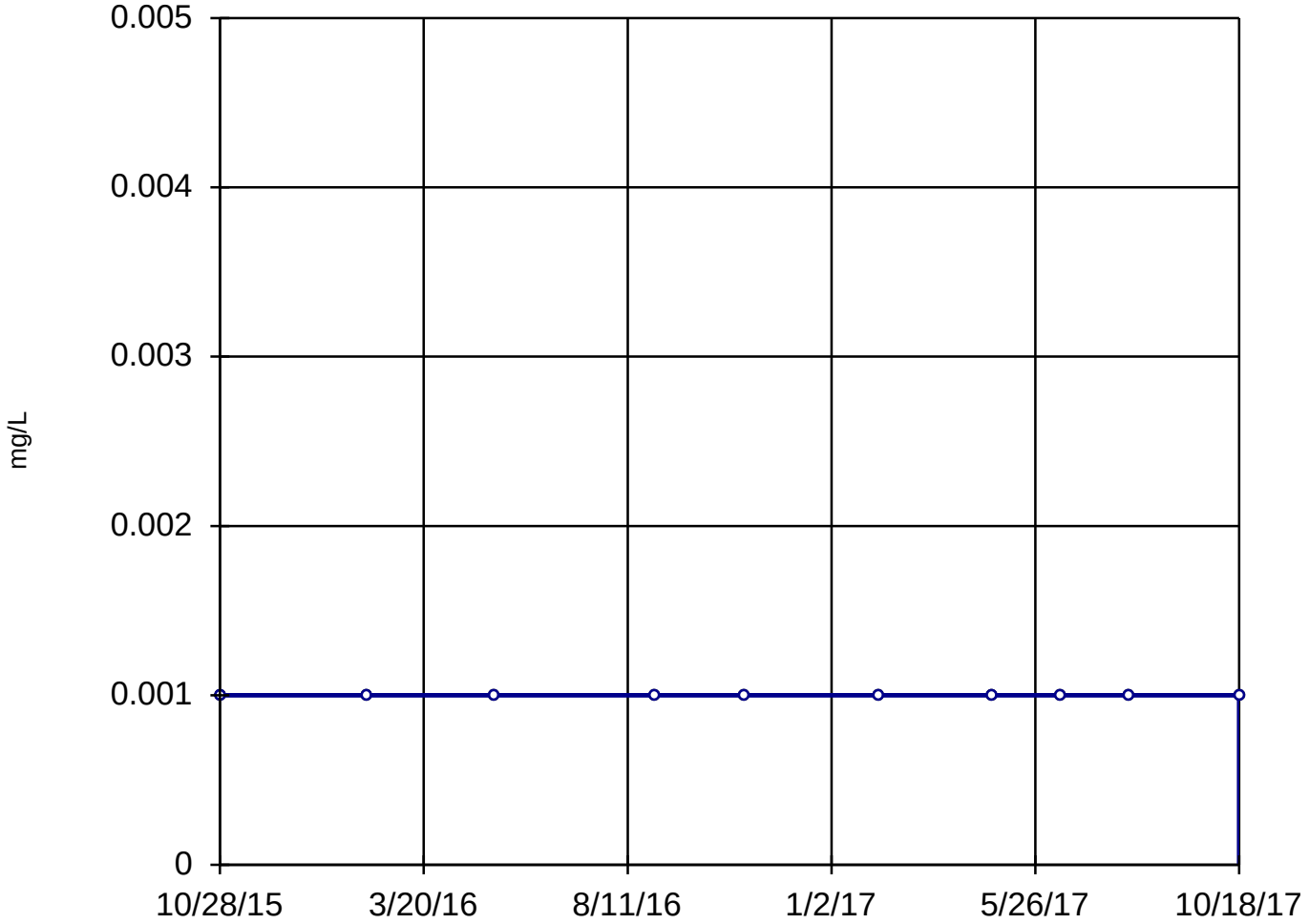
Constituent: Beryllium, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

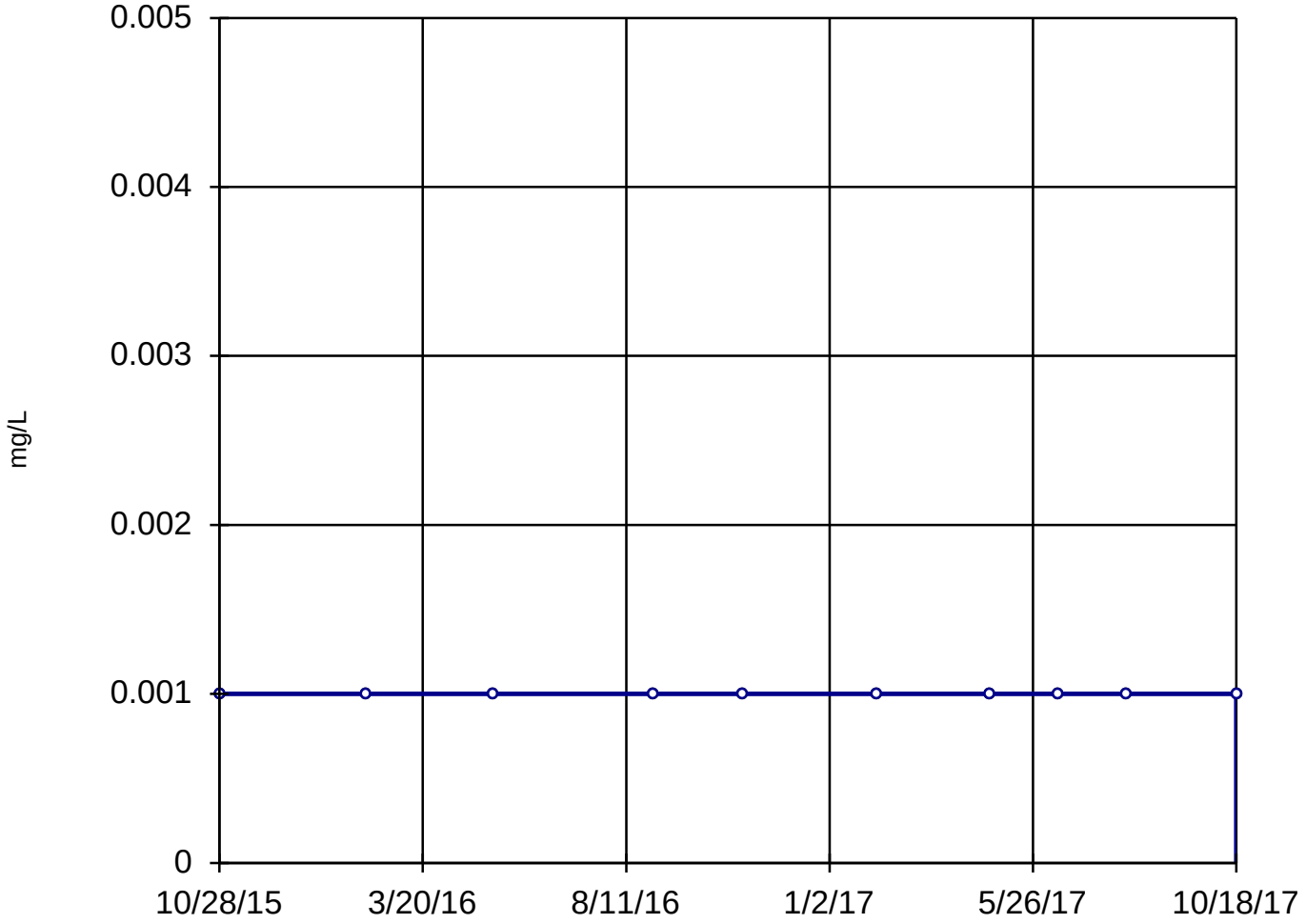
Constituent: Beryllium, Total Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

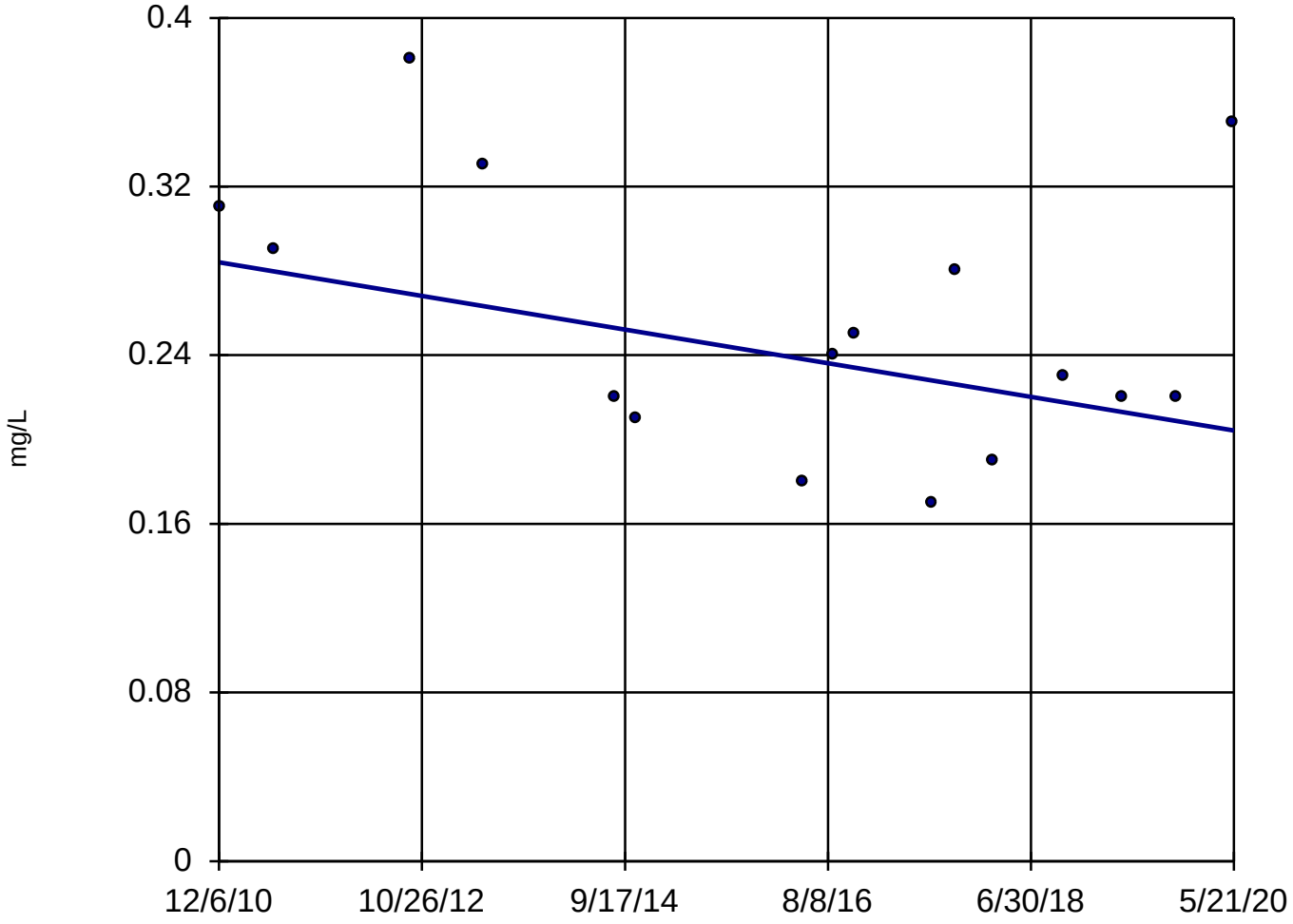
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Beryllium, Total Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-01



n = 16

Slope = -0.008431 units per year.

Mann-Kendall statistic = -25
critical = -58

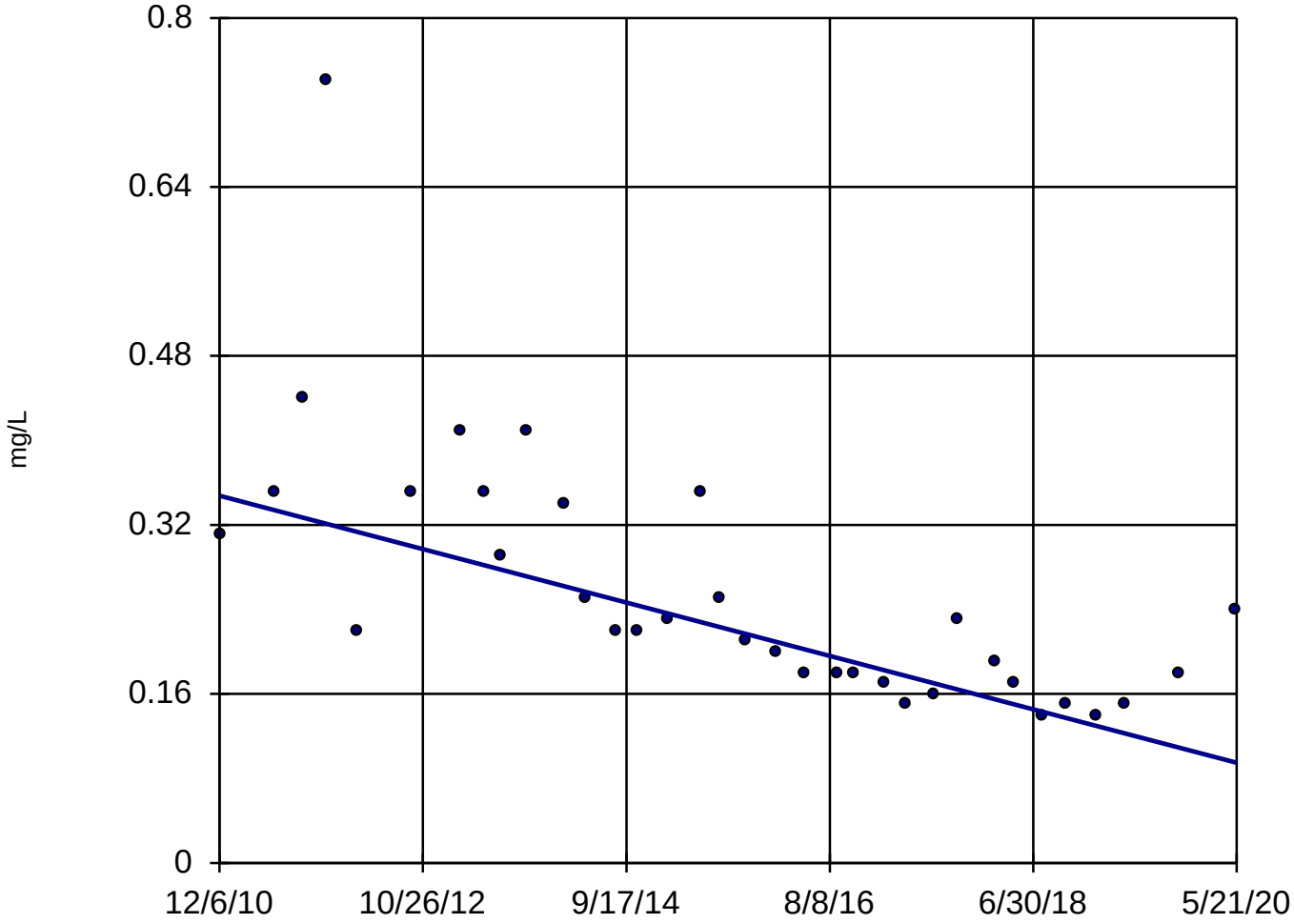
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-02



n = 34

Slope = -0.02673 units per year.

Mann-Kendall statistic = -356
critical = -176

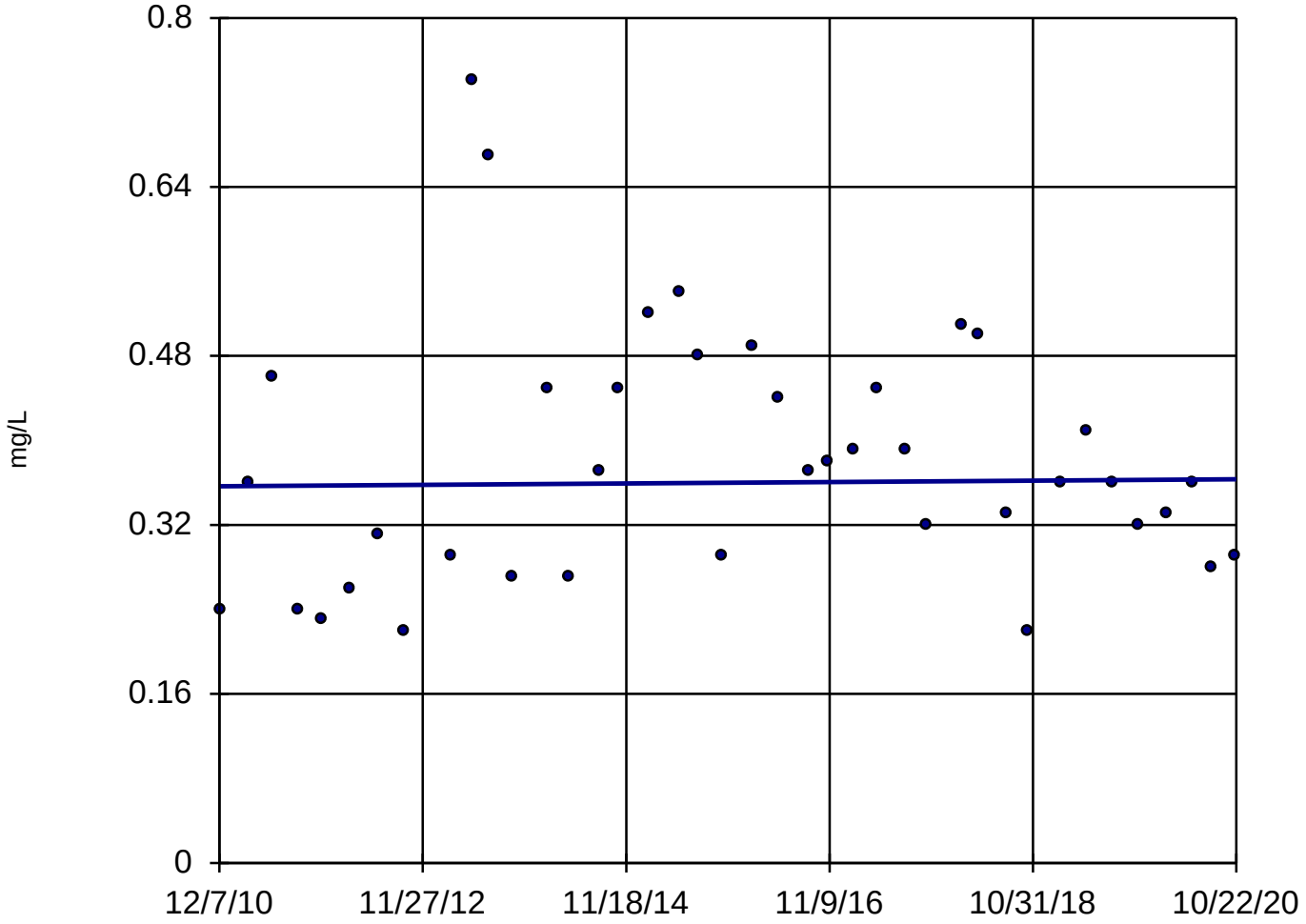
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-03



n = 40

Slope = 0.0006767 units per year.

Mann-Kendall statistic = 19
critical = 223

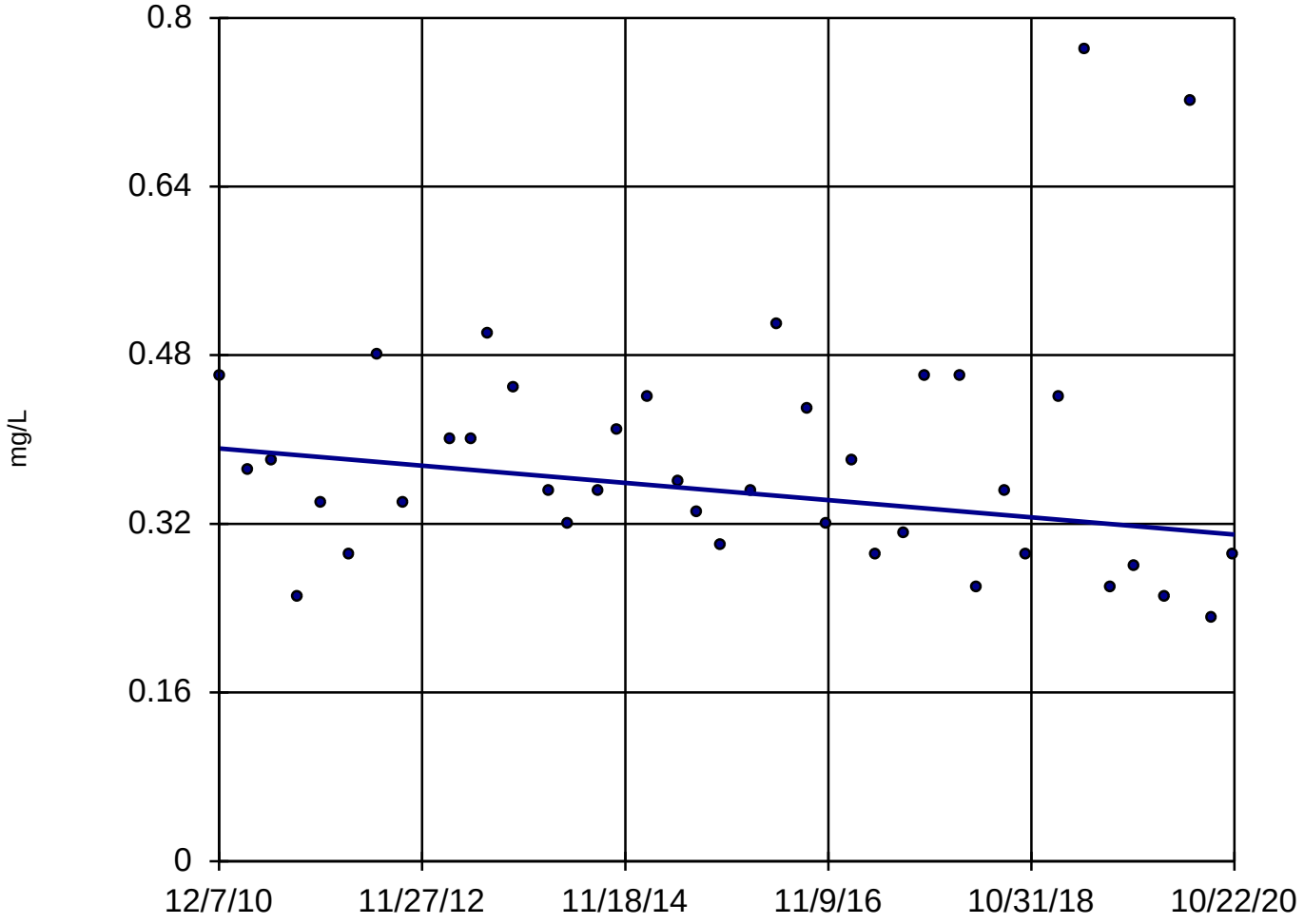
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-04



n = 40

Slope = -0.008279 units per year.

Mann-Kendall statistic = -128
critical = -223

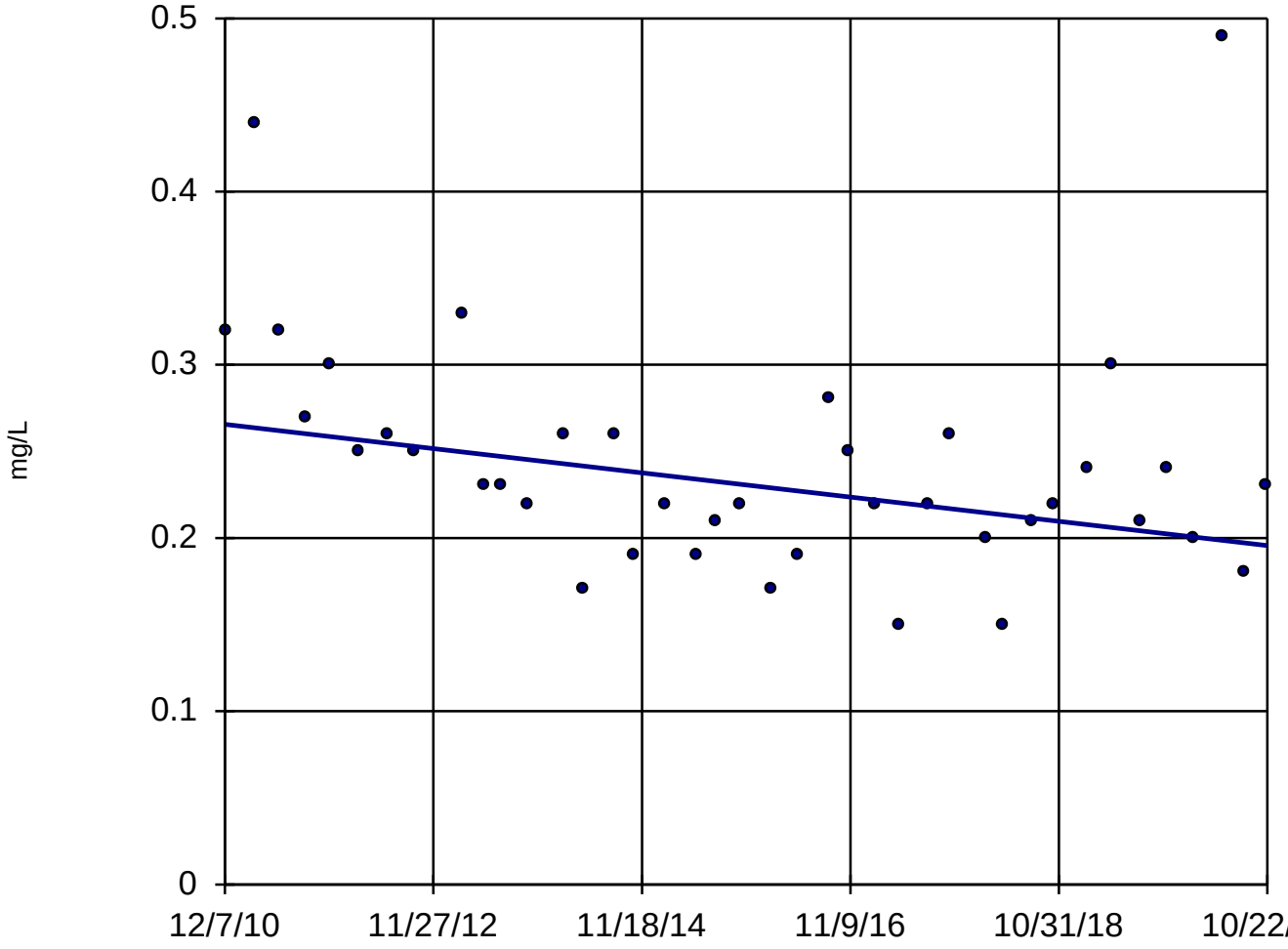
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-06



n = 40

Slope = -0.007079 units per year.

Mann-Kendall statistic = -229
critical = -223

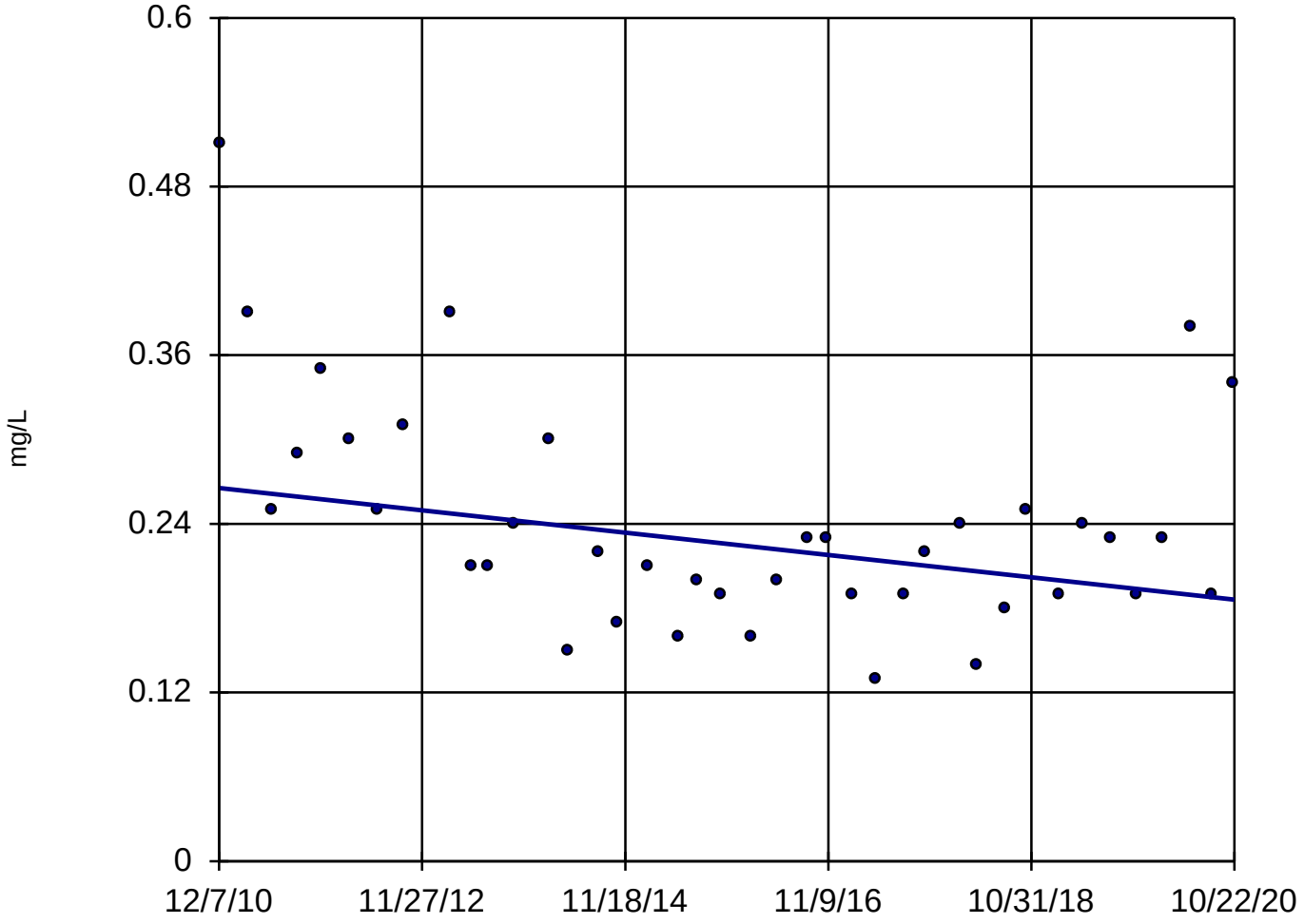
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-07



n = 40

Slope = -0.008027 units per year.

Mann-Kendall statistic = -191
critical = -223

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

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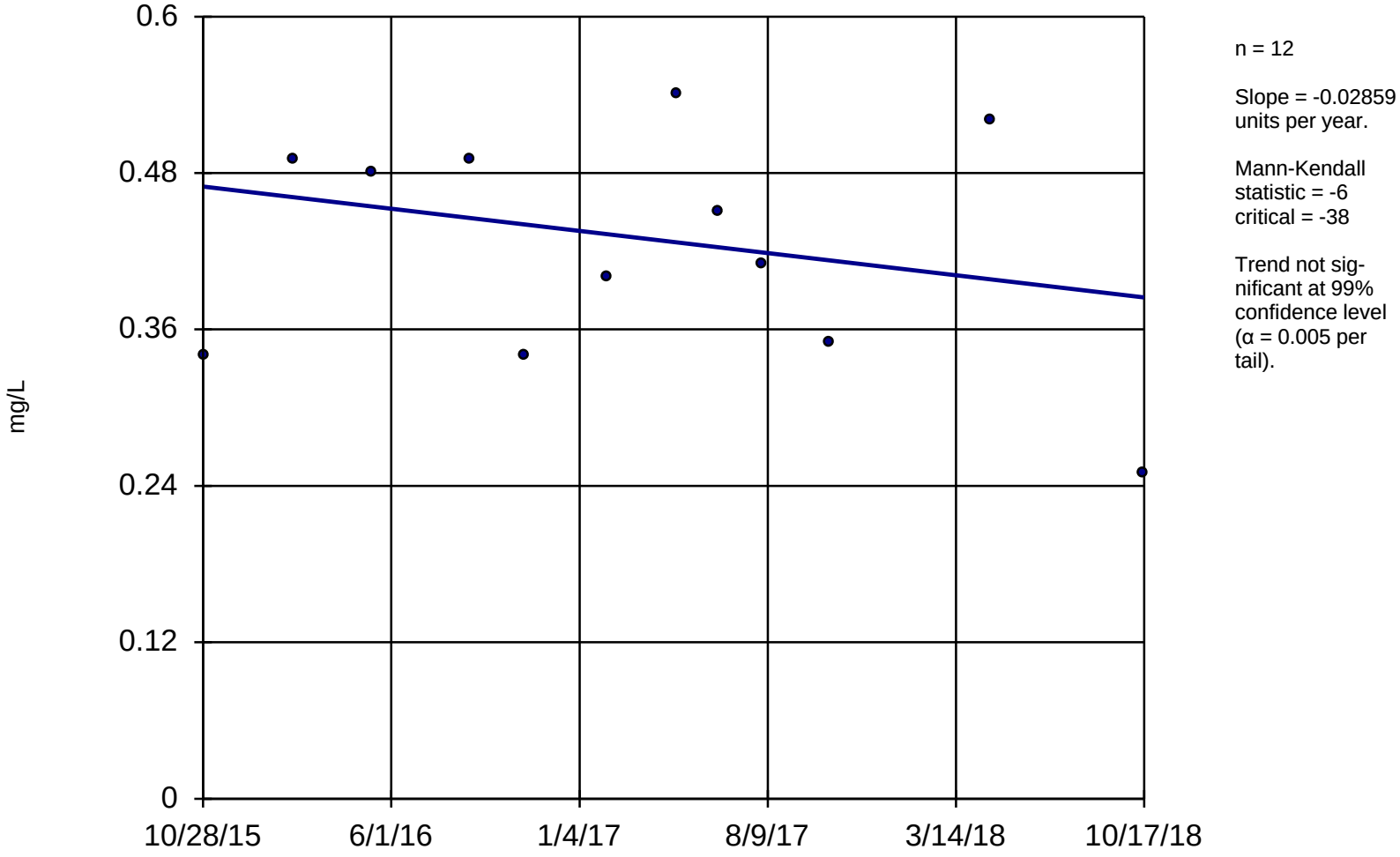
Sen's Slope Estimator

MW-03



n = 12

Slope = -0.02859 units per year.

Mann-Kendall statistic = -6
critical = -38

Trend not significant at 99% confidence level (α = 0.005 per tail).

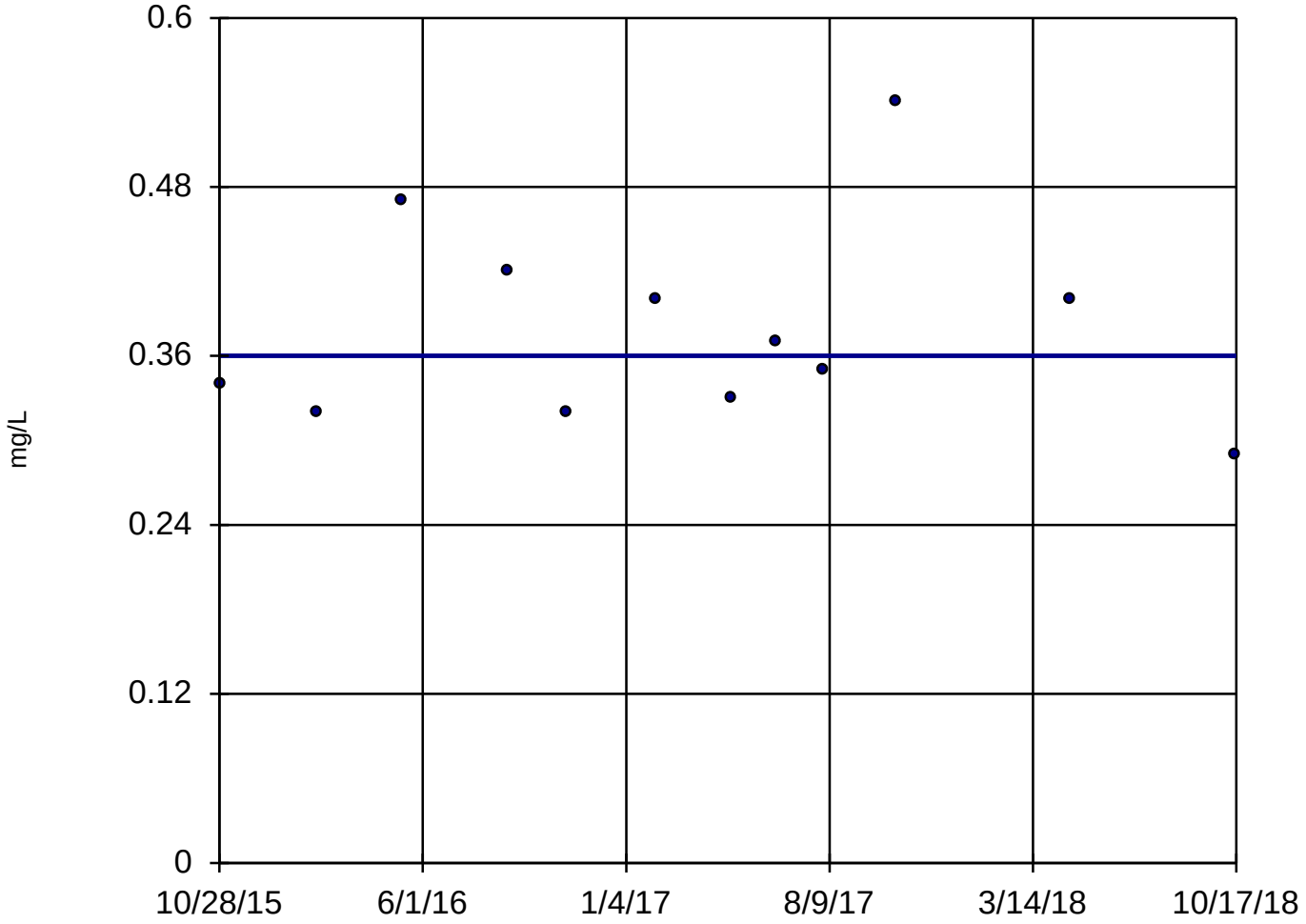
Constituent: Boron, Total Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA

Sen's Slope Estimator

MW-04



n = 12

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 38

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

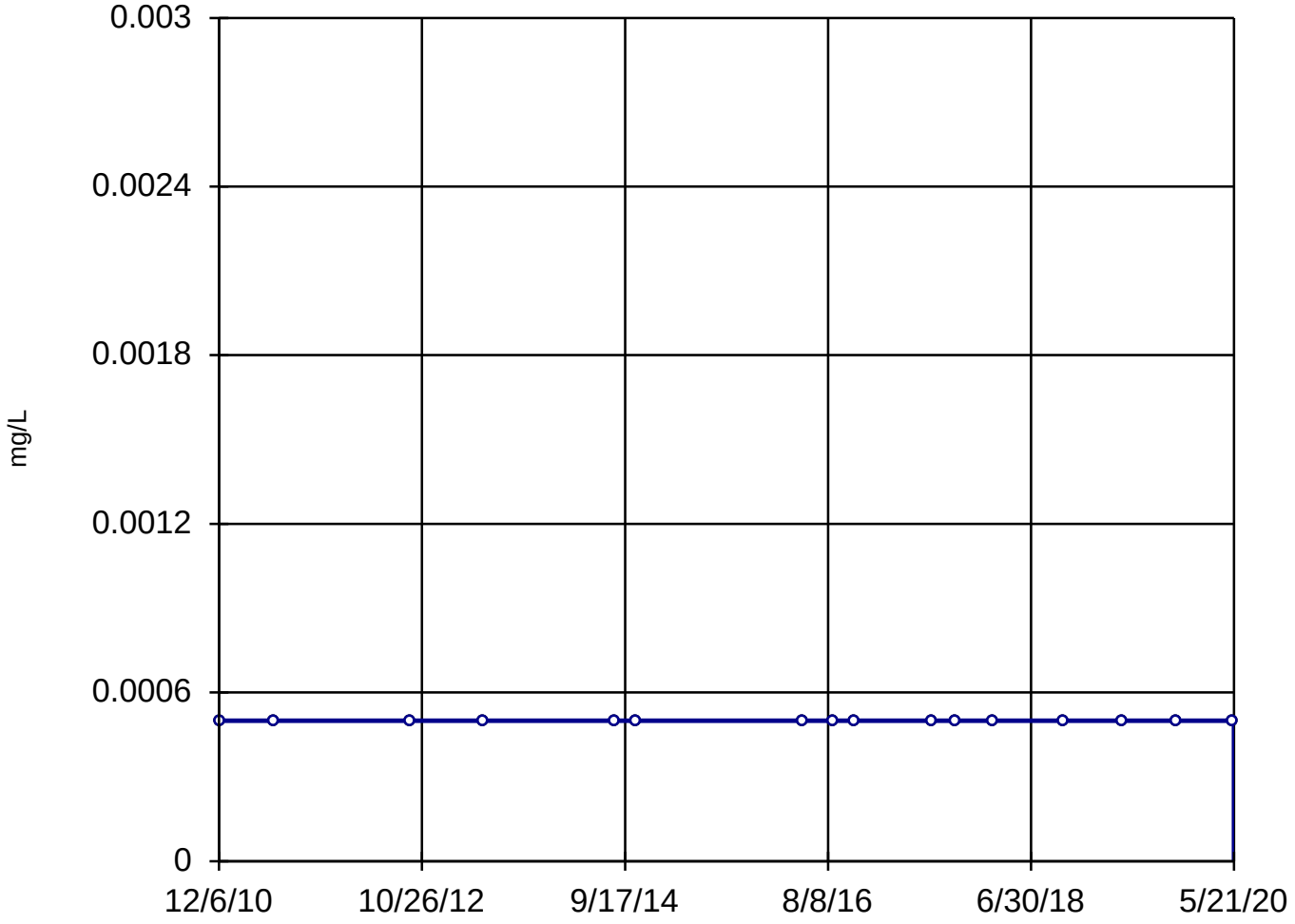
Constituent: Boron, Total Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-01



n = 16

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

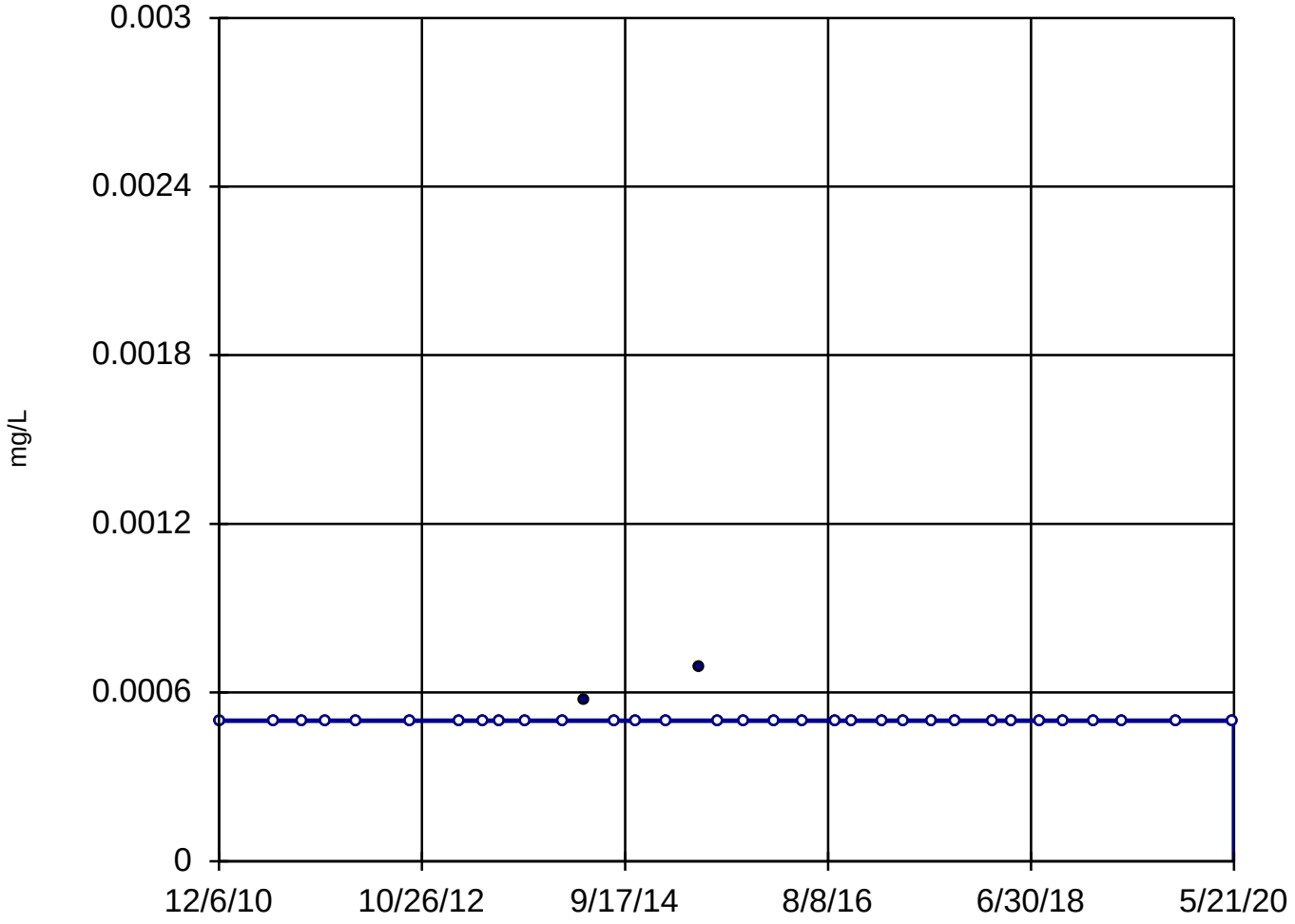
Constituent: Cadmium, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-02



n = 34

Slope = 0
units per year.

Mann-Kendall
statistic = -13
critical = -176

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

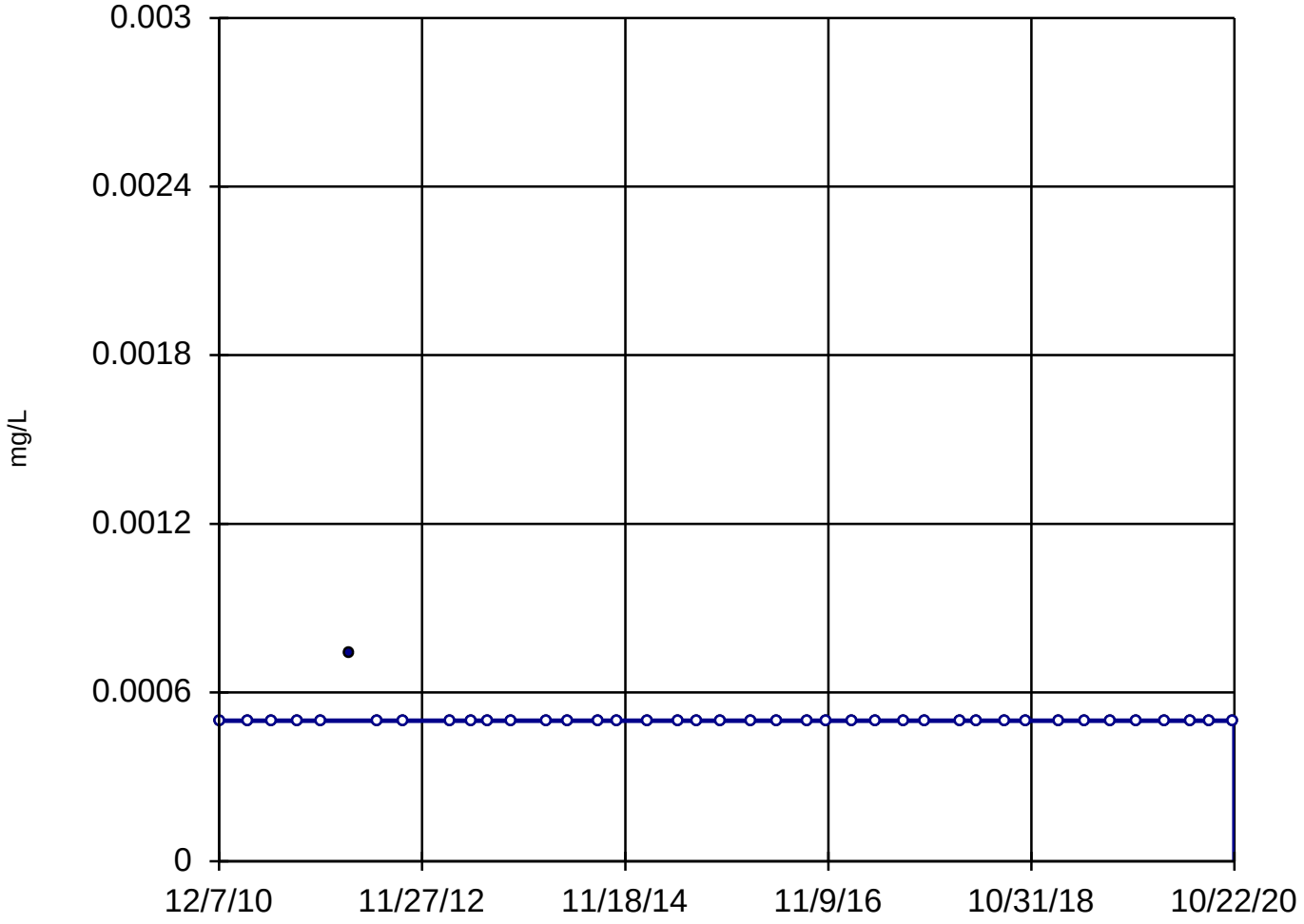
Constituent: Cadmium, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = -29
critical = -223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

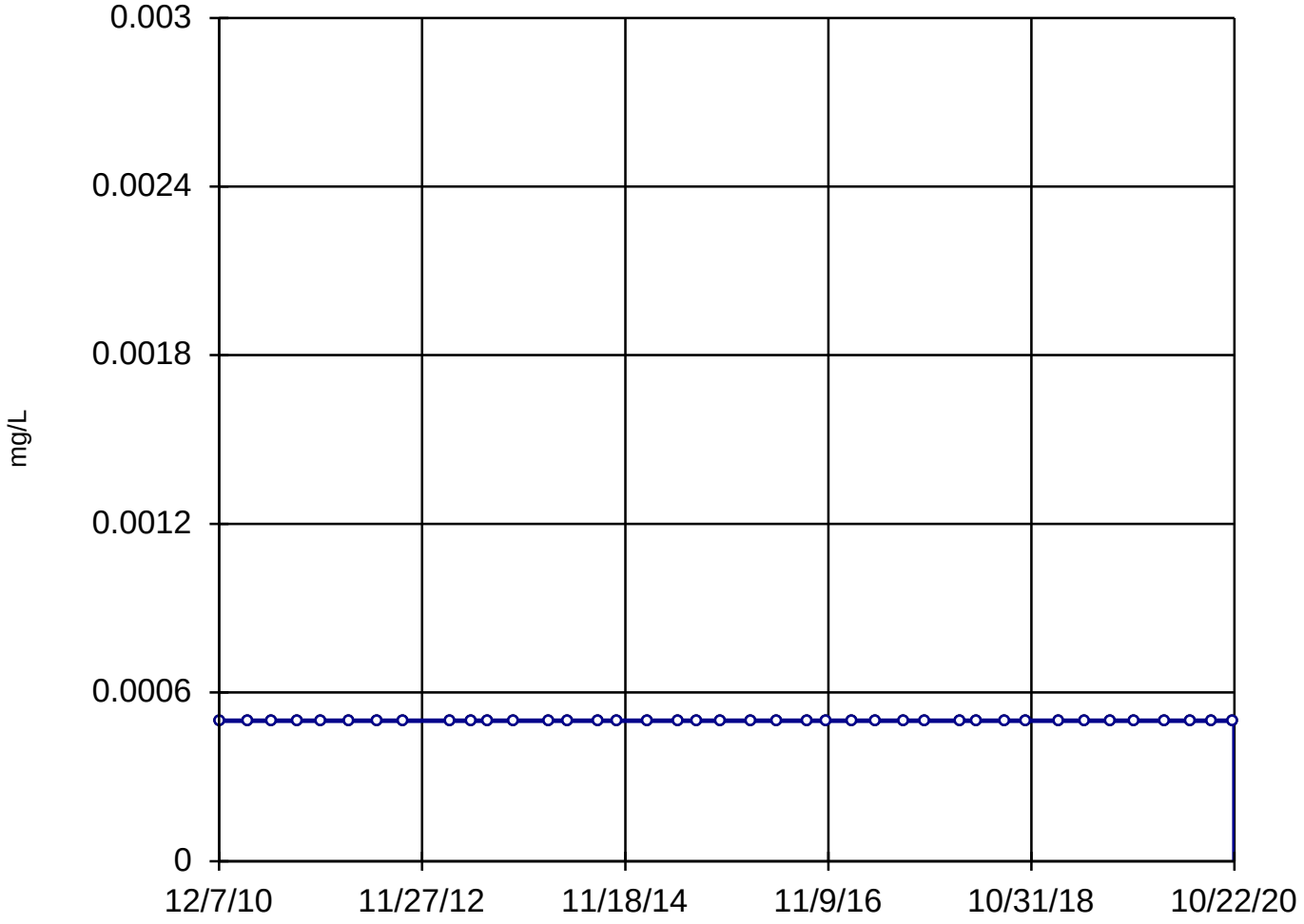
Constituent: Cadmium, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

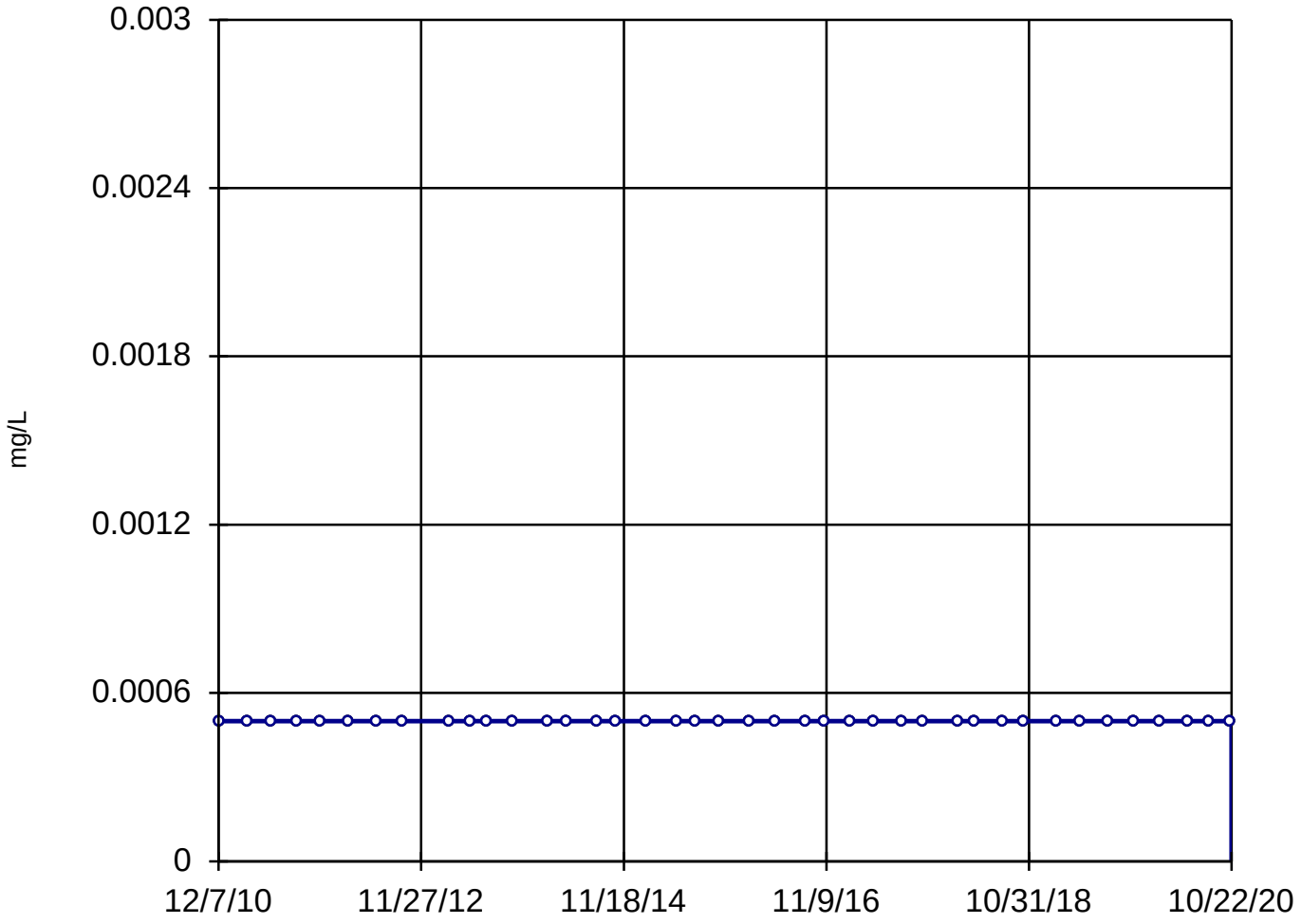
Constituent: Cadmium, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-06



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

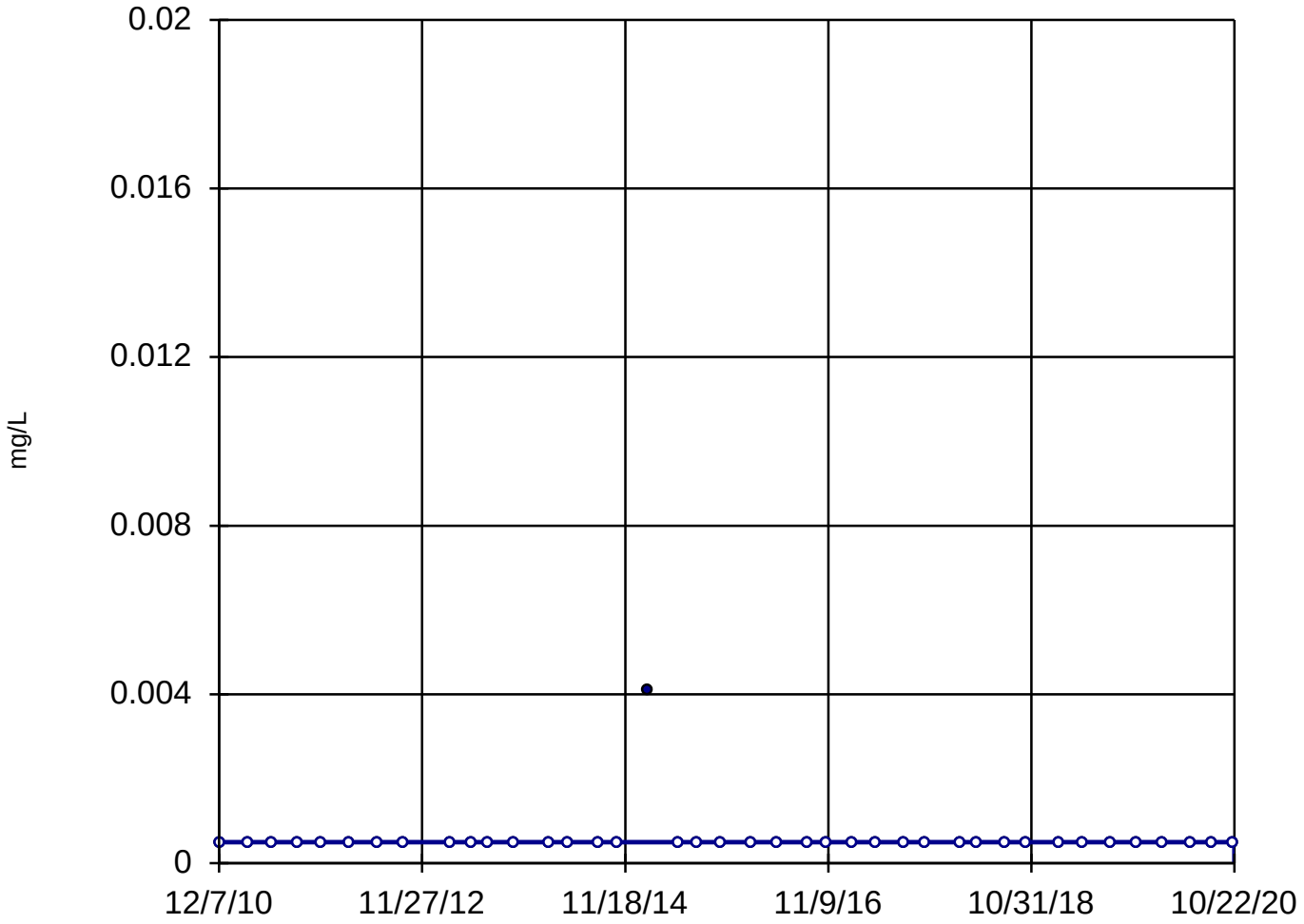
Constituent: Cadmium, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-07



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = -7
critical = -223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

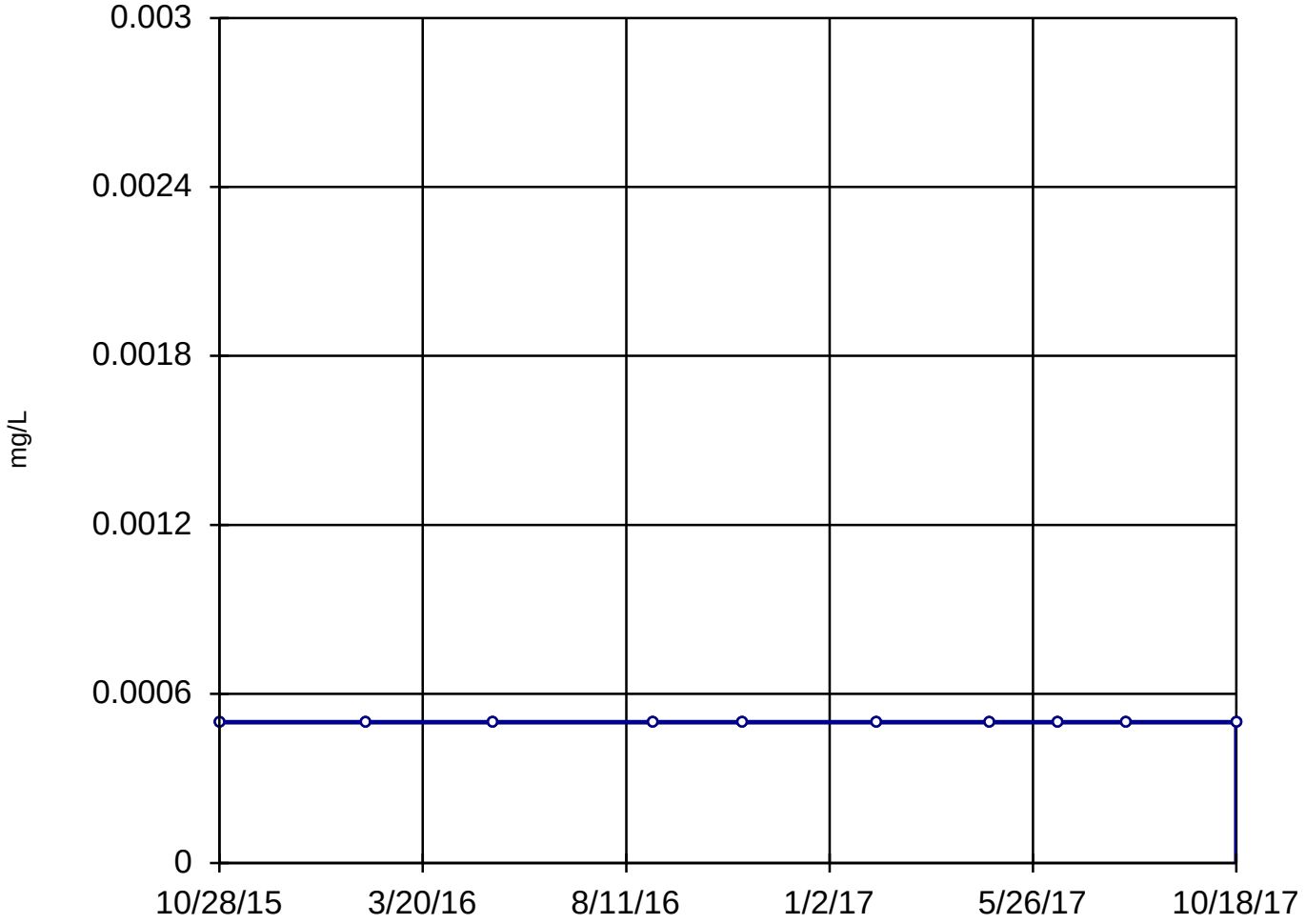
Constituent: Cadmium, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

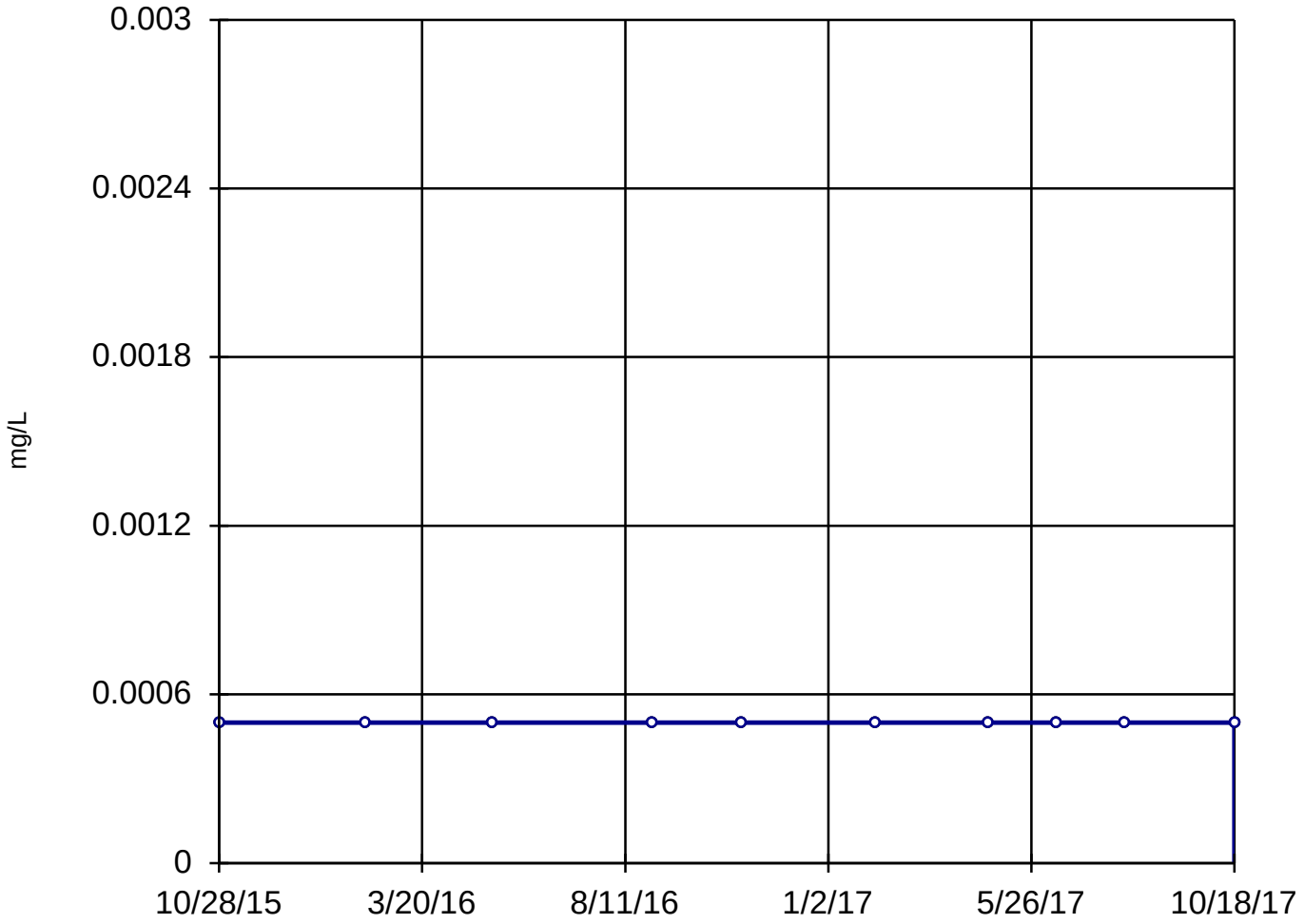
Constituent: Cadmium, Total Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

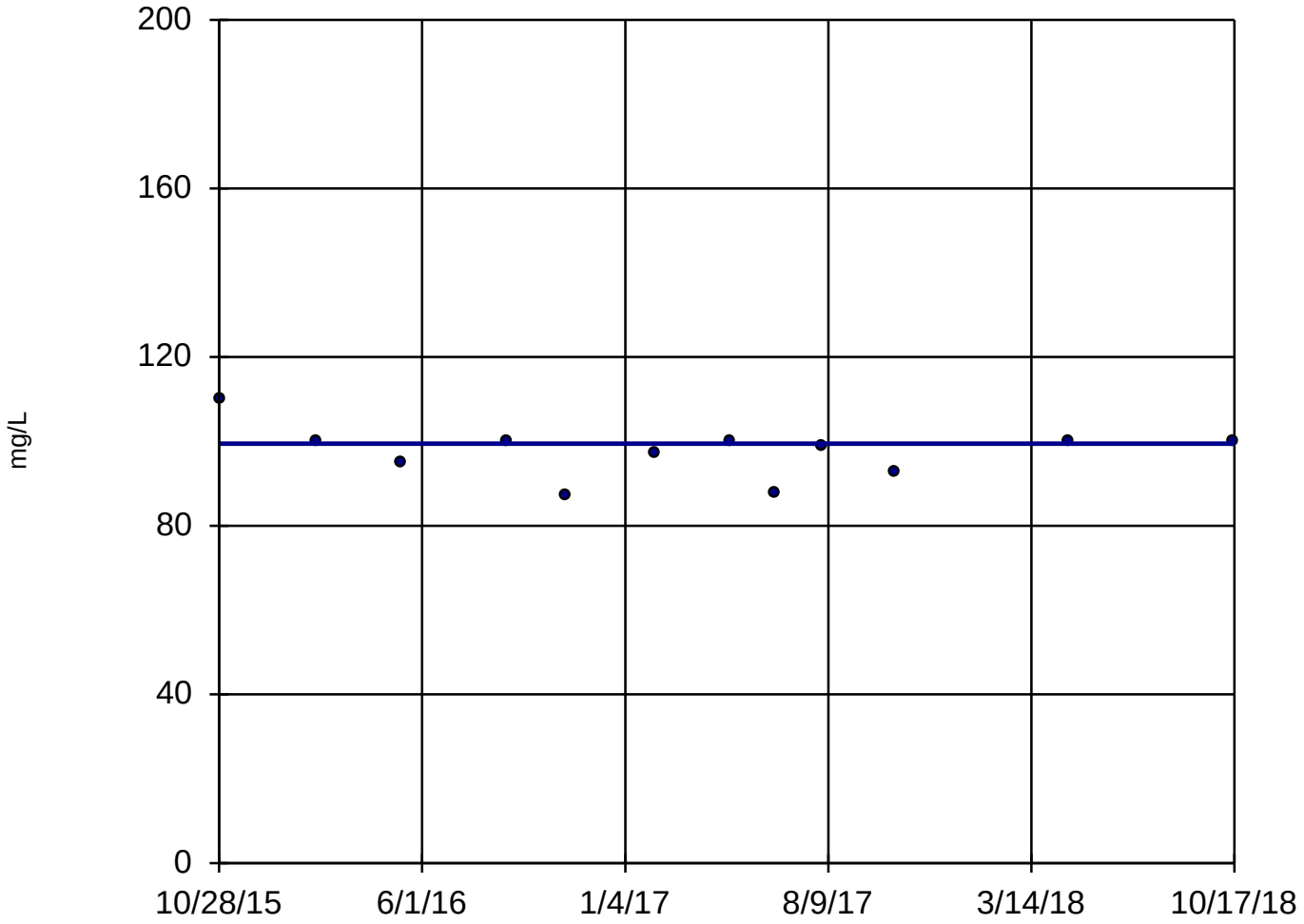
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Cadmium, Total Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-03



n = 12

Slope = 0
units per year.

Mann-Kendall
statistic = -6
critical = -38

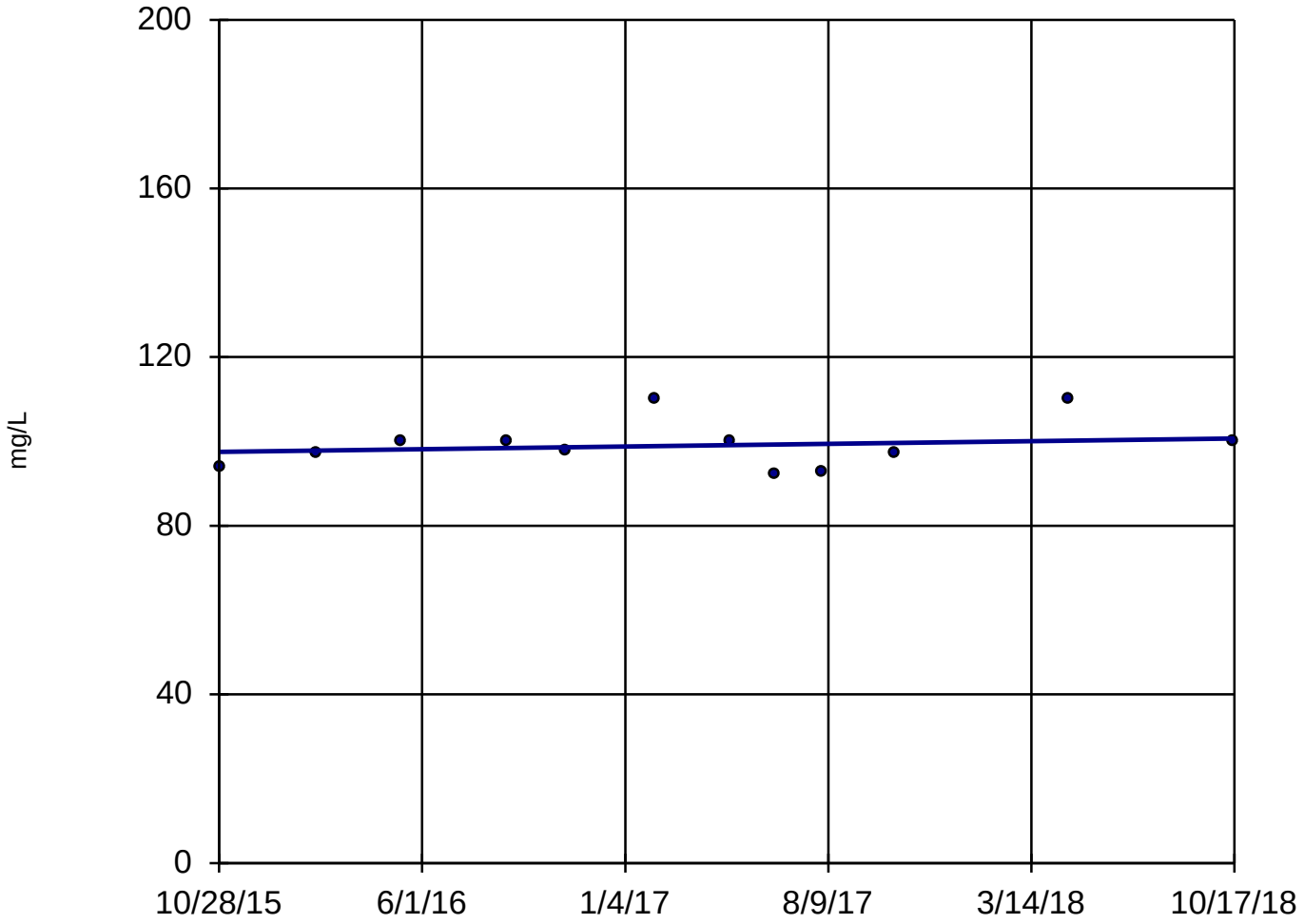
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Calcium, Total Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-04



n = 12

Slope = 1.07 units per year.

Mann-Kendall statistic = 10
critical = 38

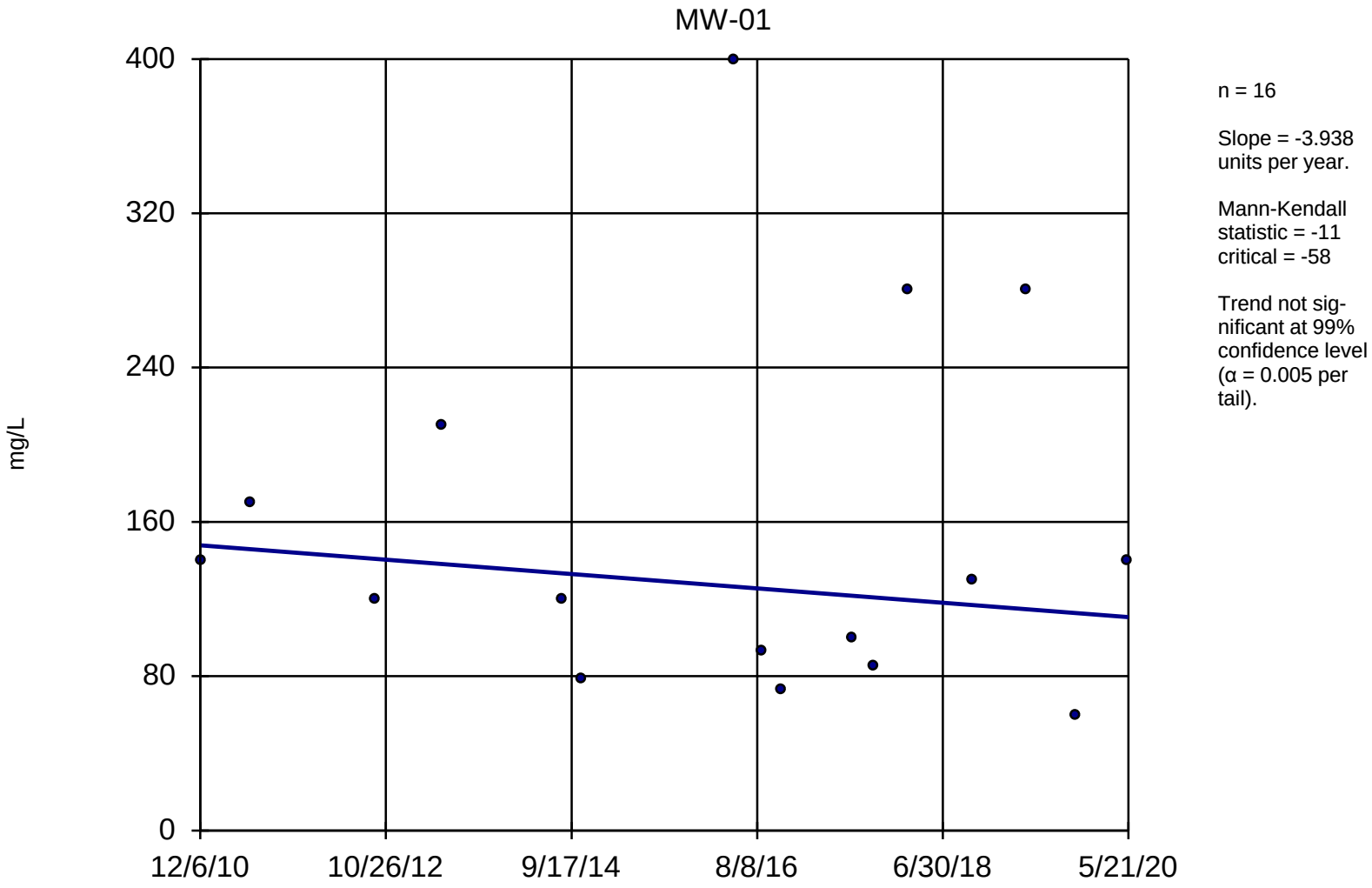
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Calcium, Total Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA

Sen's Slope Estimator



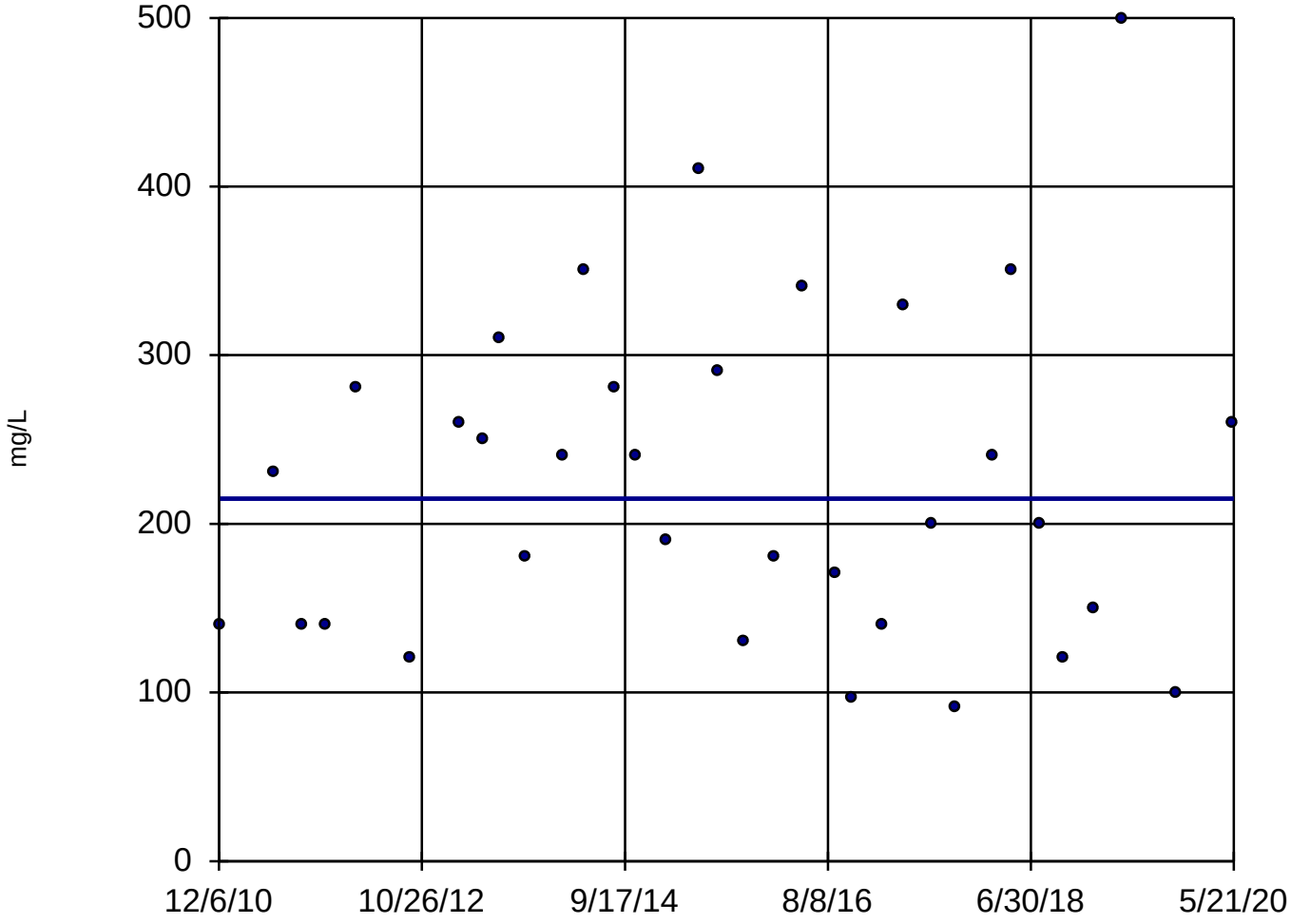
Constituent: Chloride Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA

Sen's Slope Estimator

MW-02



n = 34

Slope = 0
units per year.

Mann-Kendall
statistic = -4
critical = -176

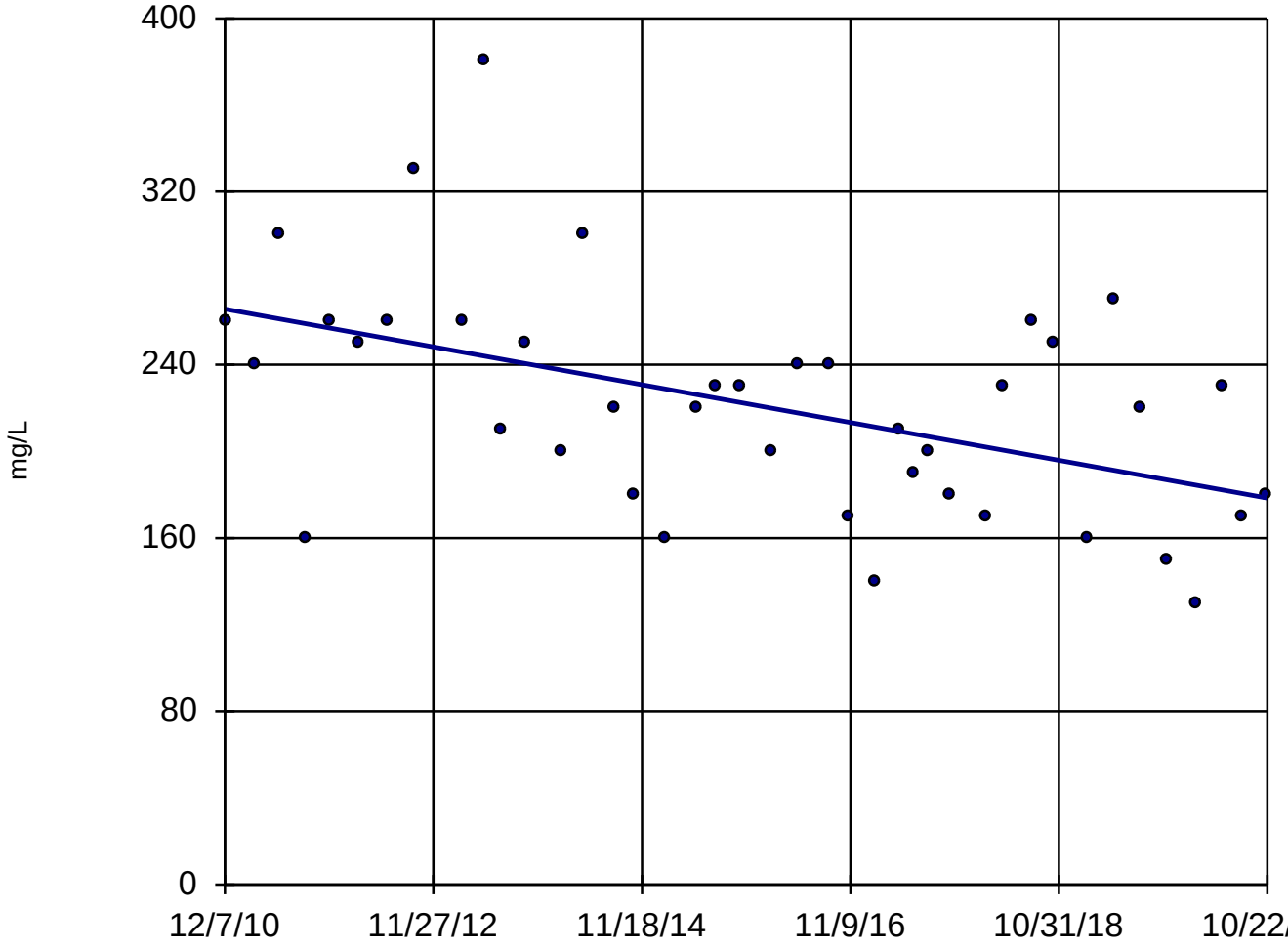
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Chloride Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-03



n = 41

Slope = -8.834 units per year.

Mann-Kendall normal approx. = -3.043
critical = -2.58

Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

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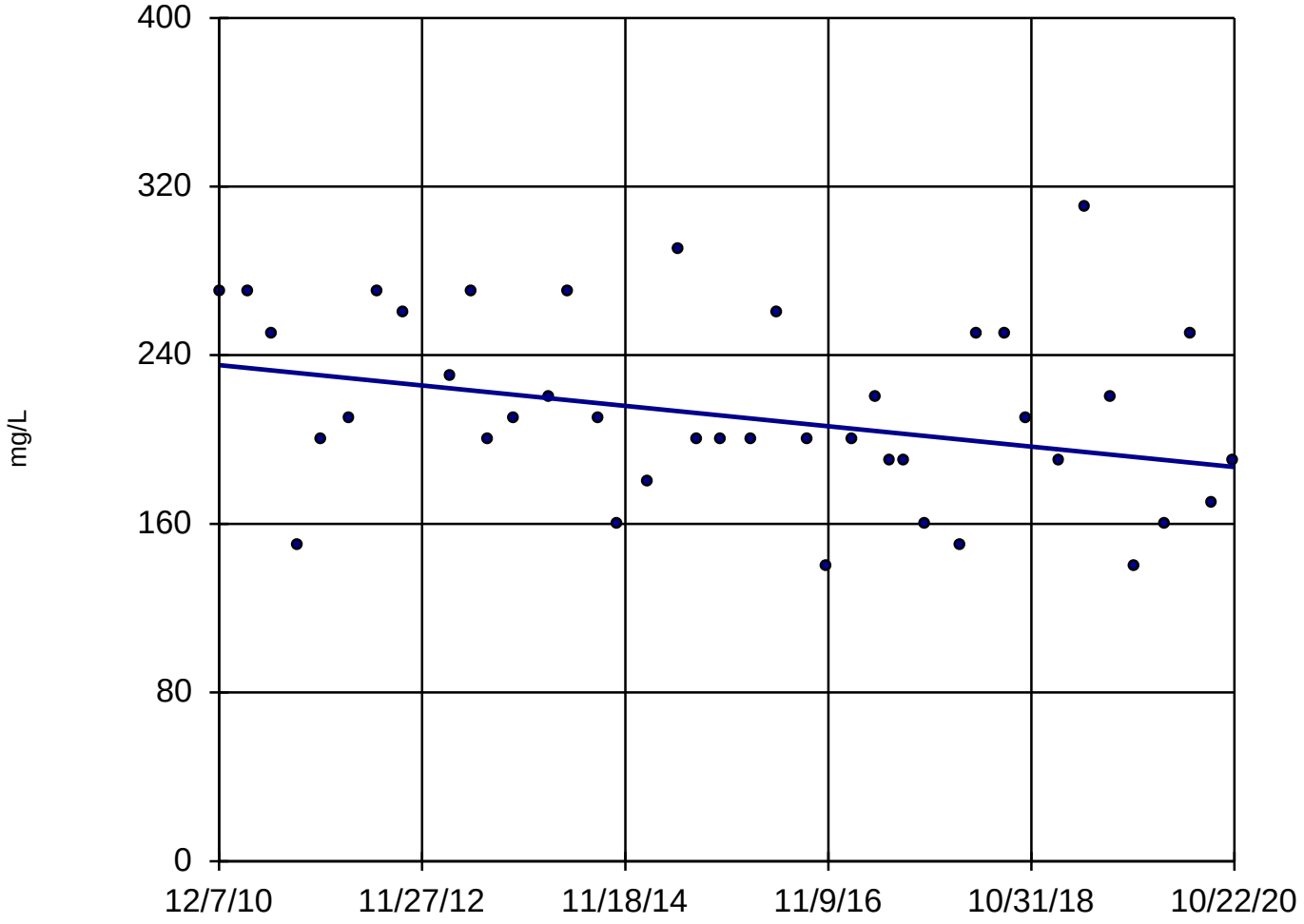
Sen's Slope Estimator

MW-04



n = 41

Slope = -4.891 units per year.

Mann-Kendall normal approx. = -2.294
critical = -2.58

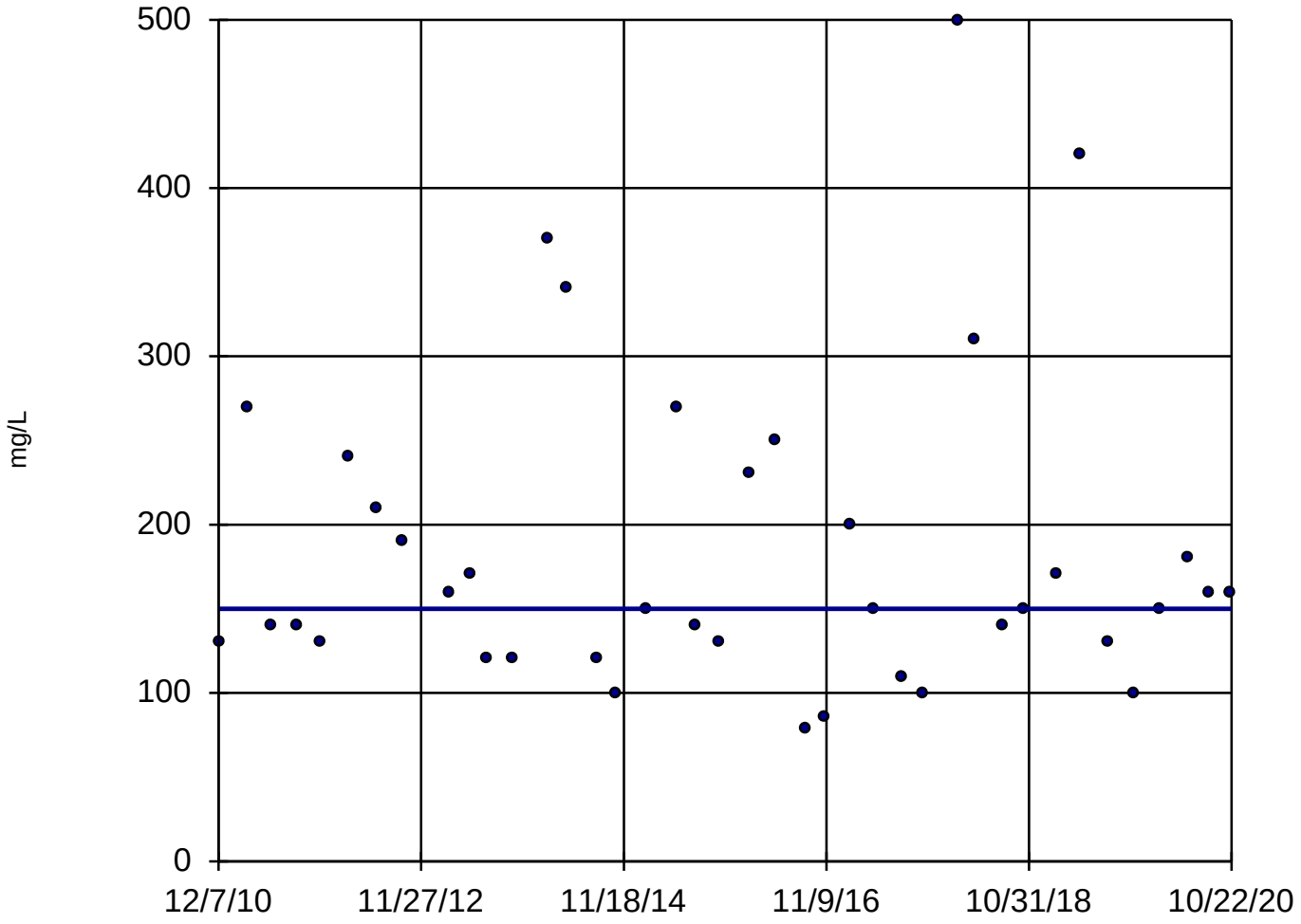
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-06



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = -13
critical = -223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

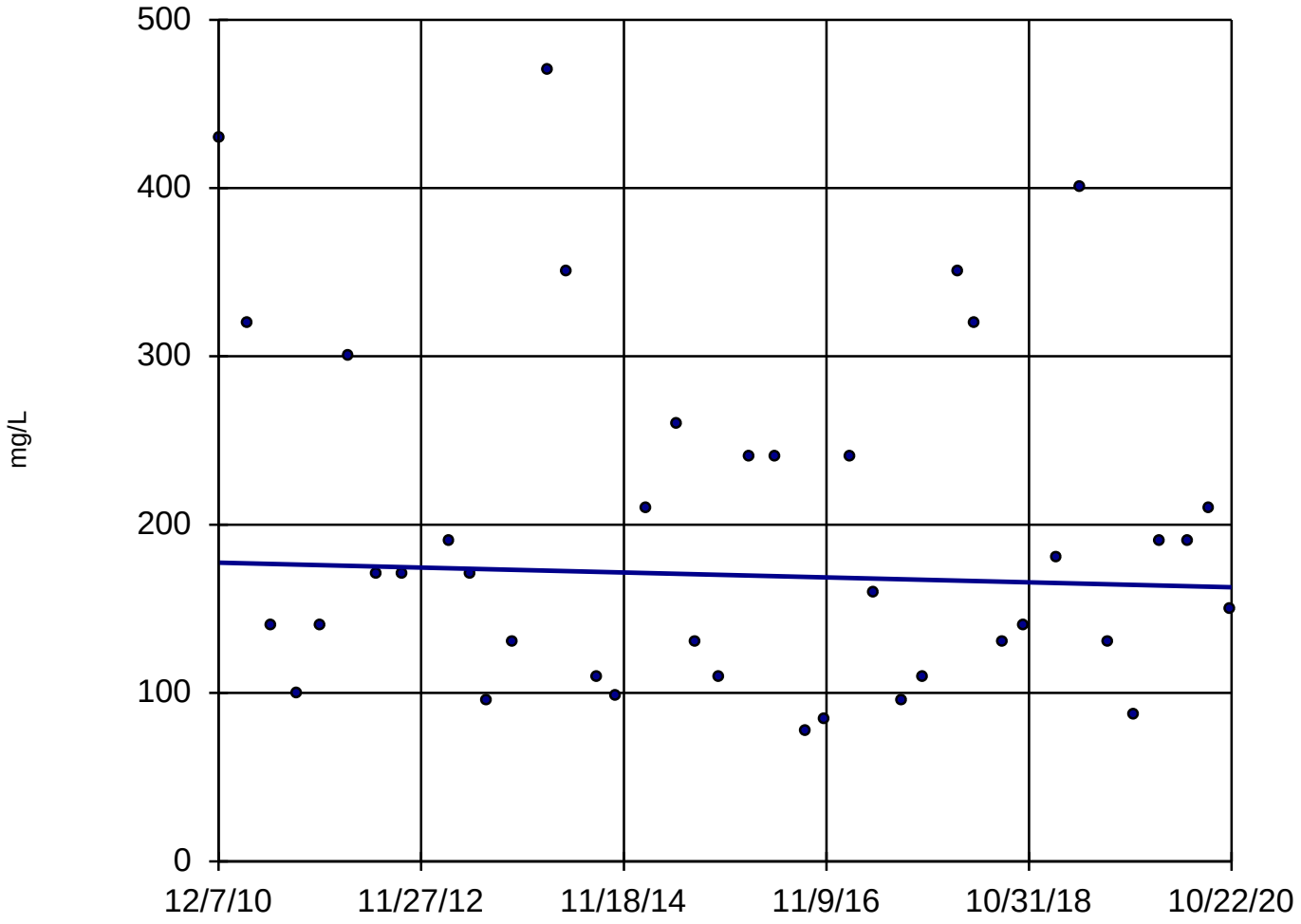
Constituent: Chloride Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA

Sen's Slope Estimator

MW-07



n = 40

Slope = -1.487 units per year.

Mann-Kendall statistic = -40
critical = -223

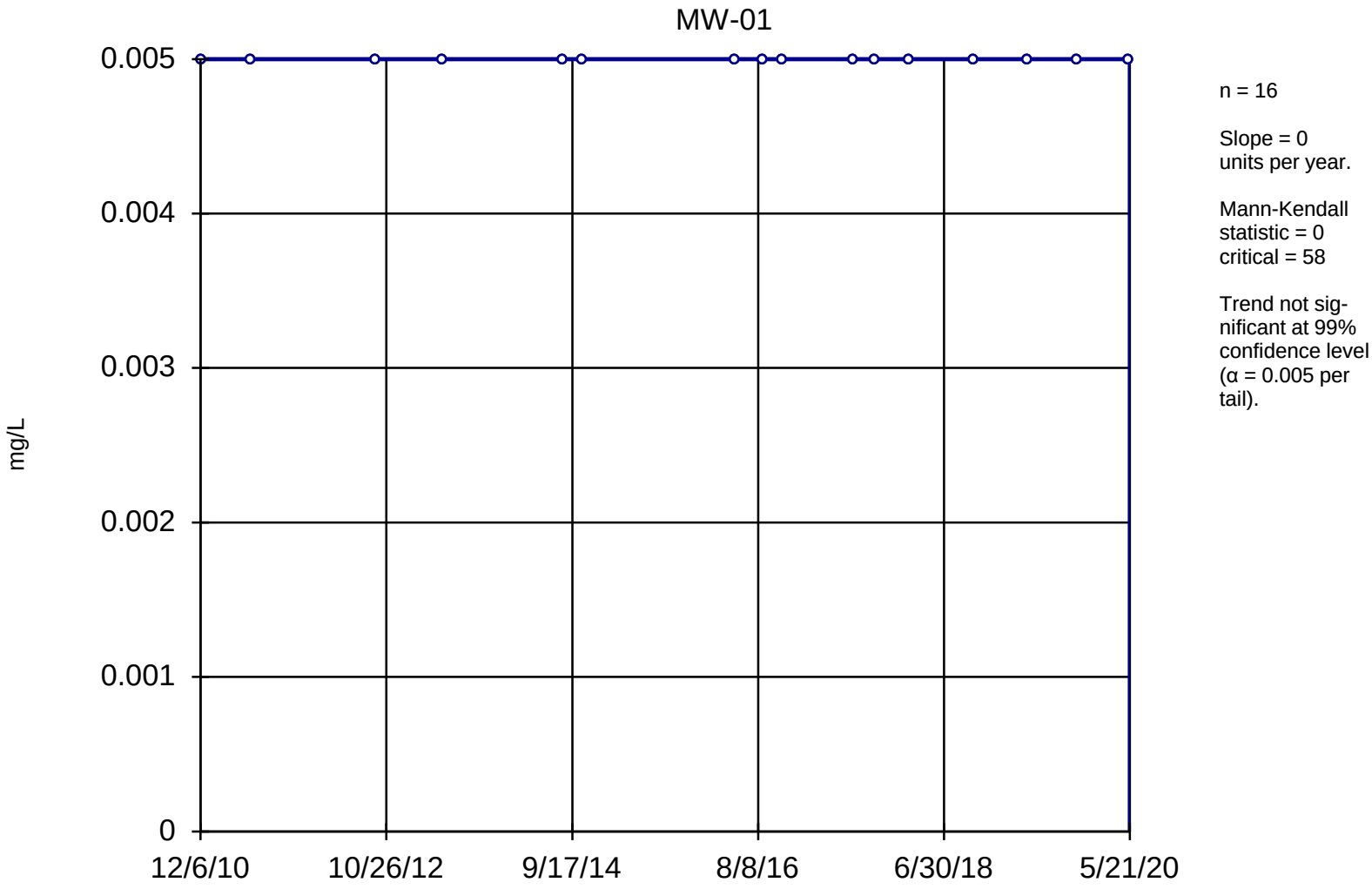
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

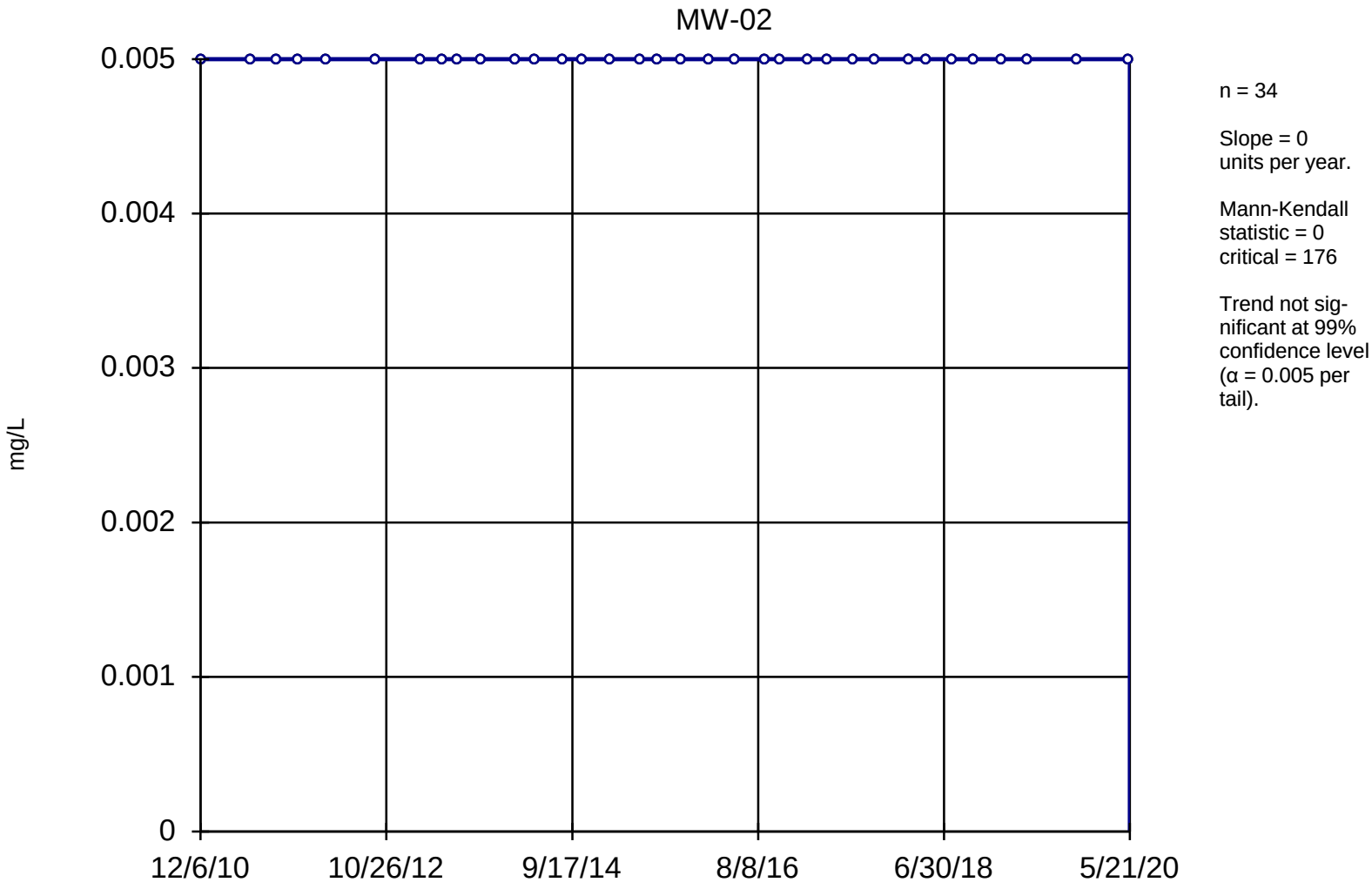


Constituent: Chromium, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

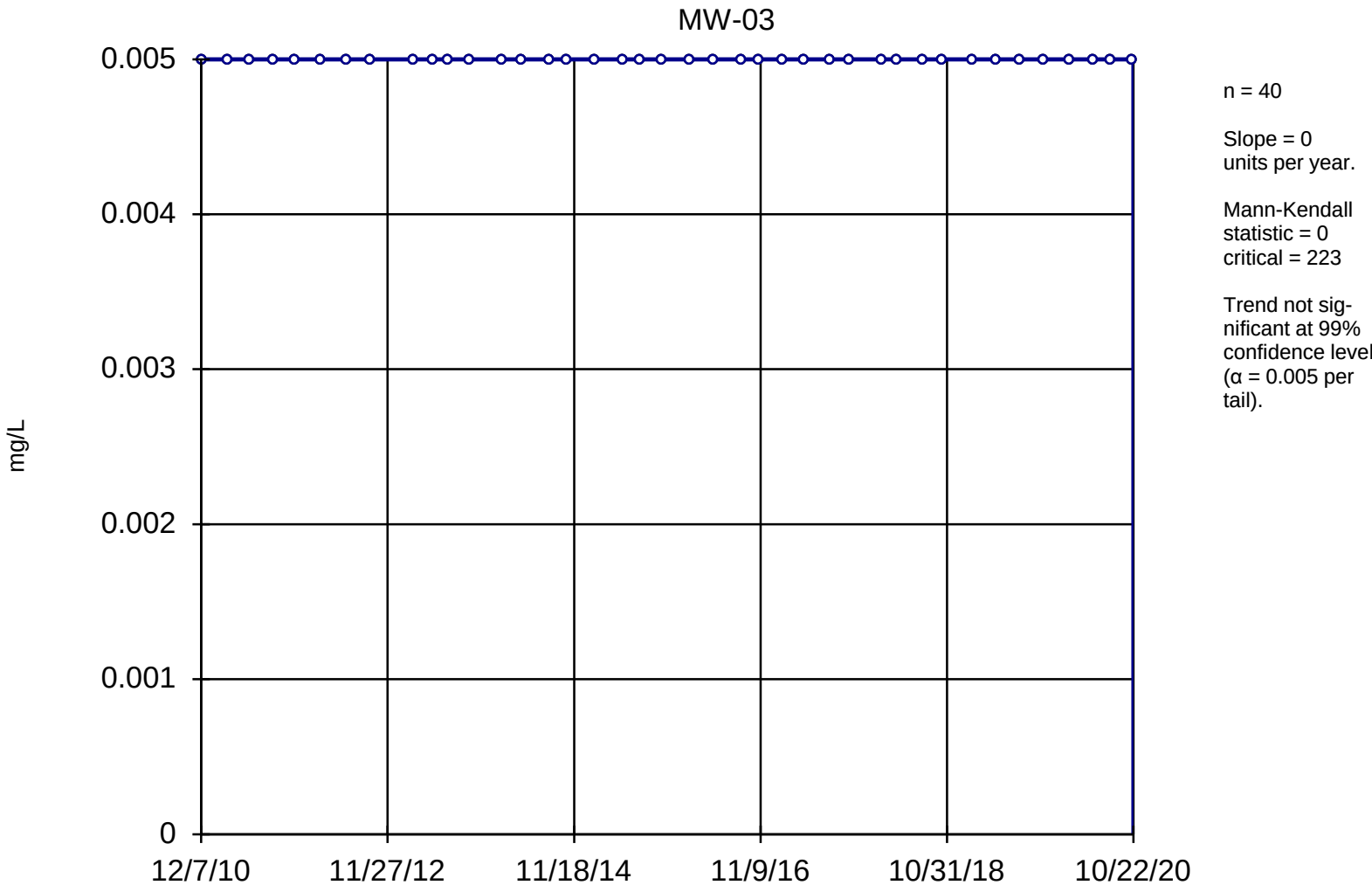


Constituent: Chromium, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator



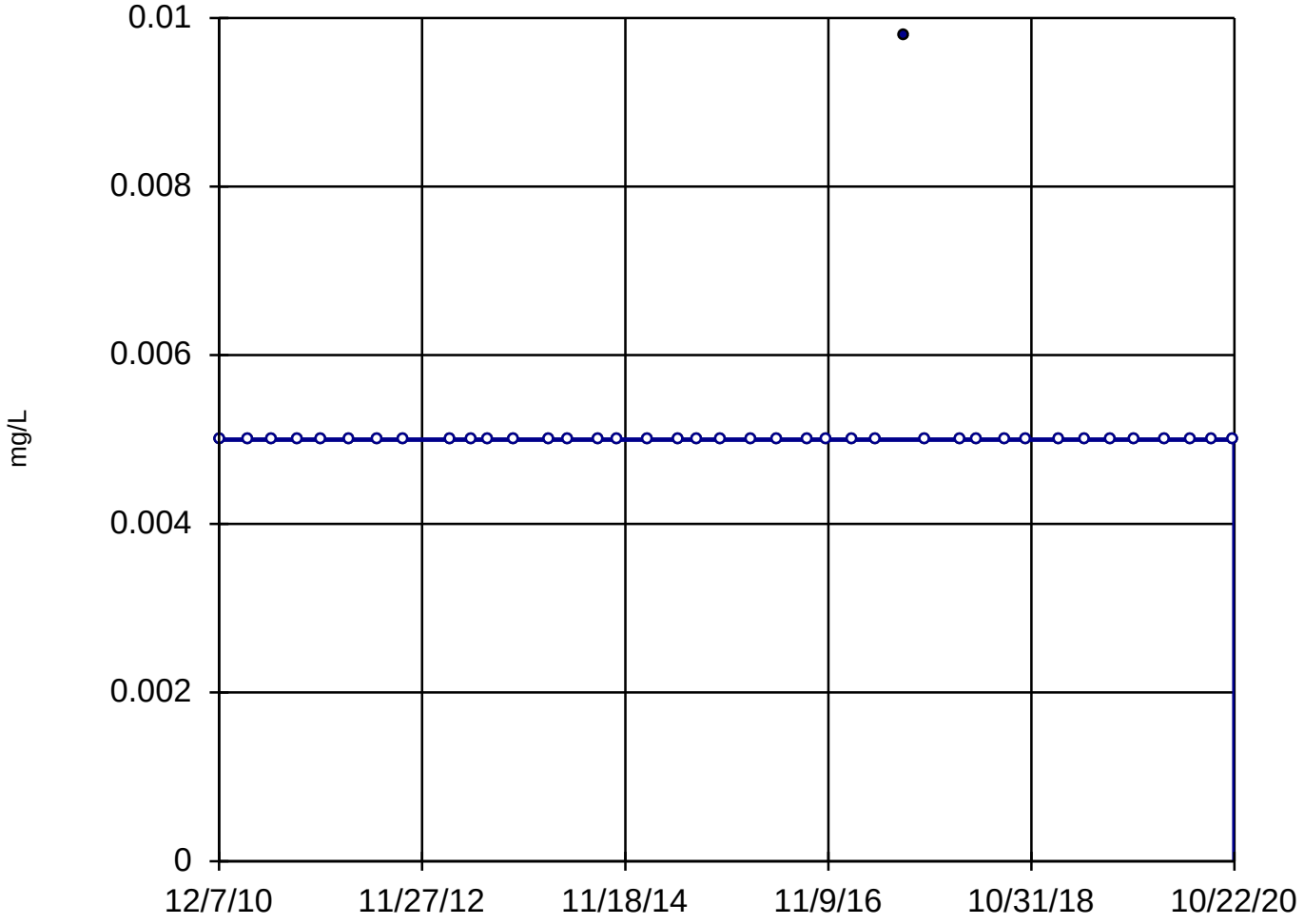
Constituent: Chromium, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = 13
critical = 223

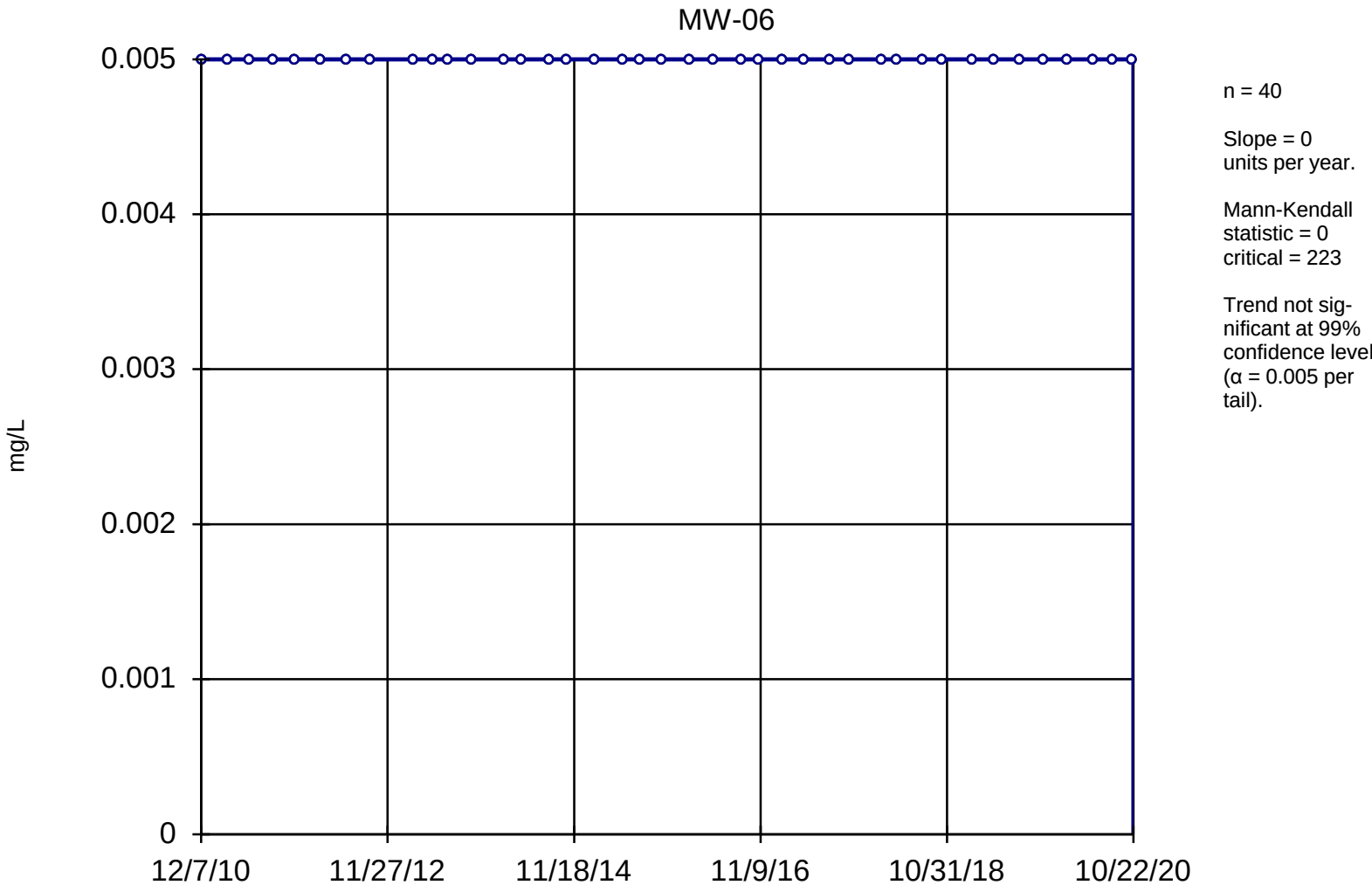
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Chromium, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

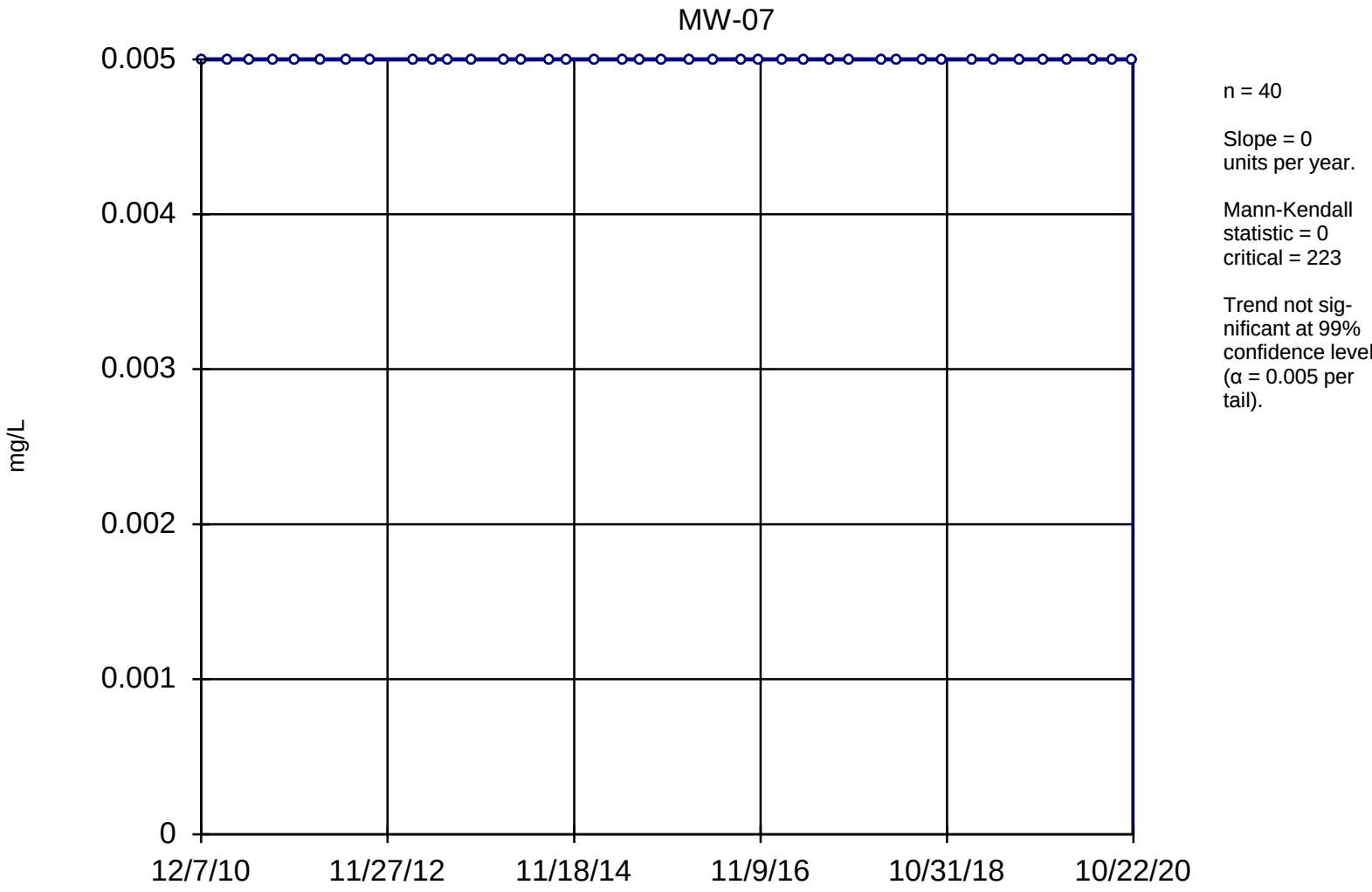


Constituent: Chromium, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator



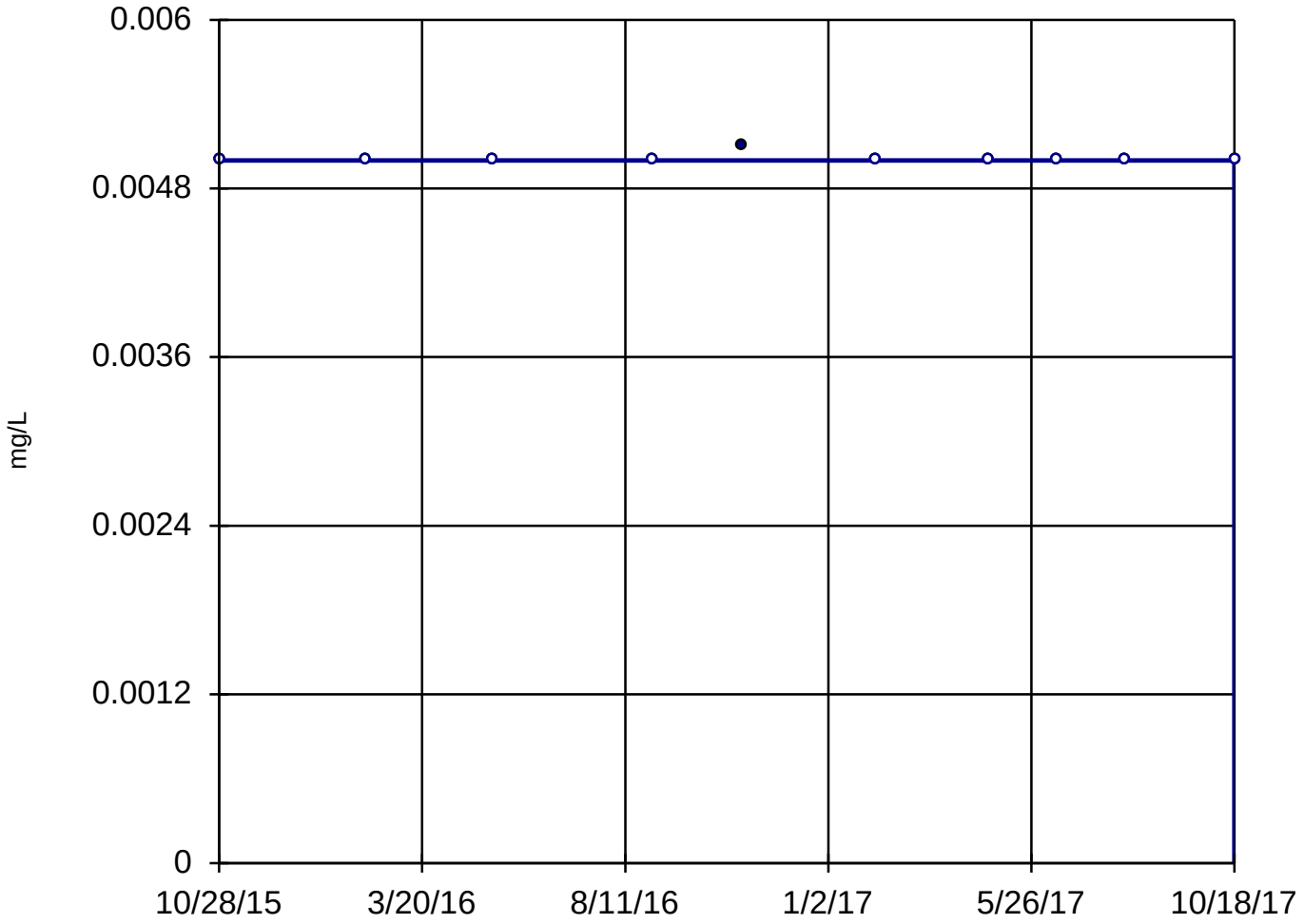
Constituent: Chromium, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = -1
critical = -30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

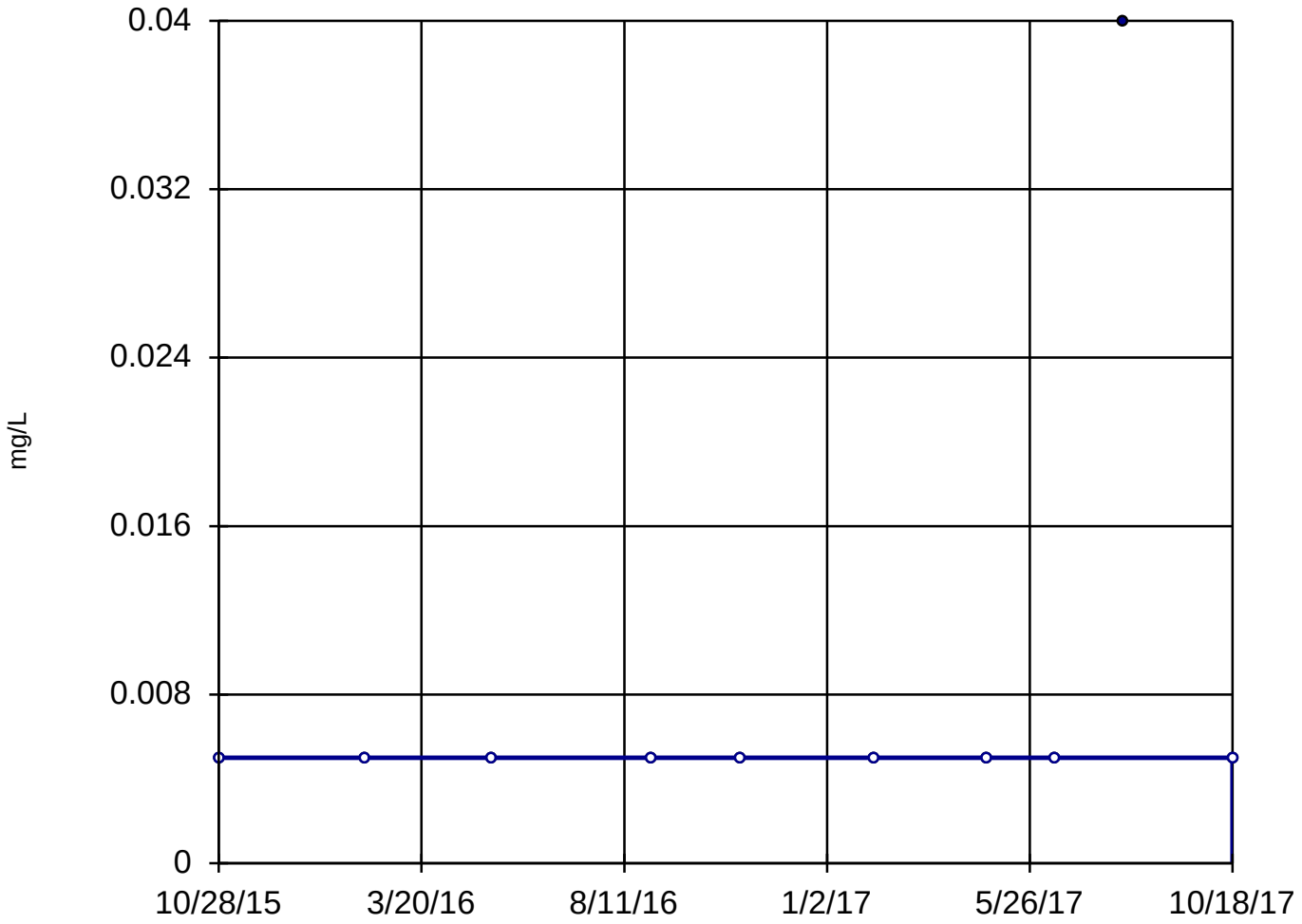
Constituent: Chromium, Total Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 7
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

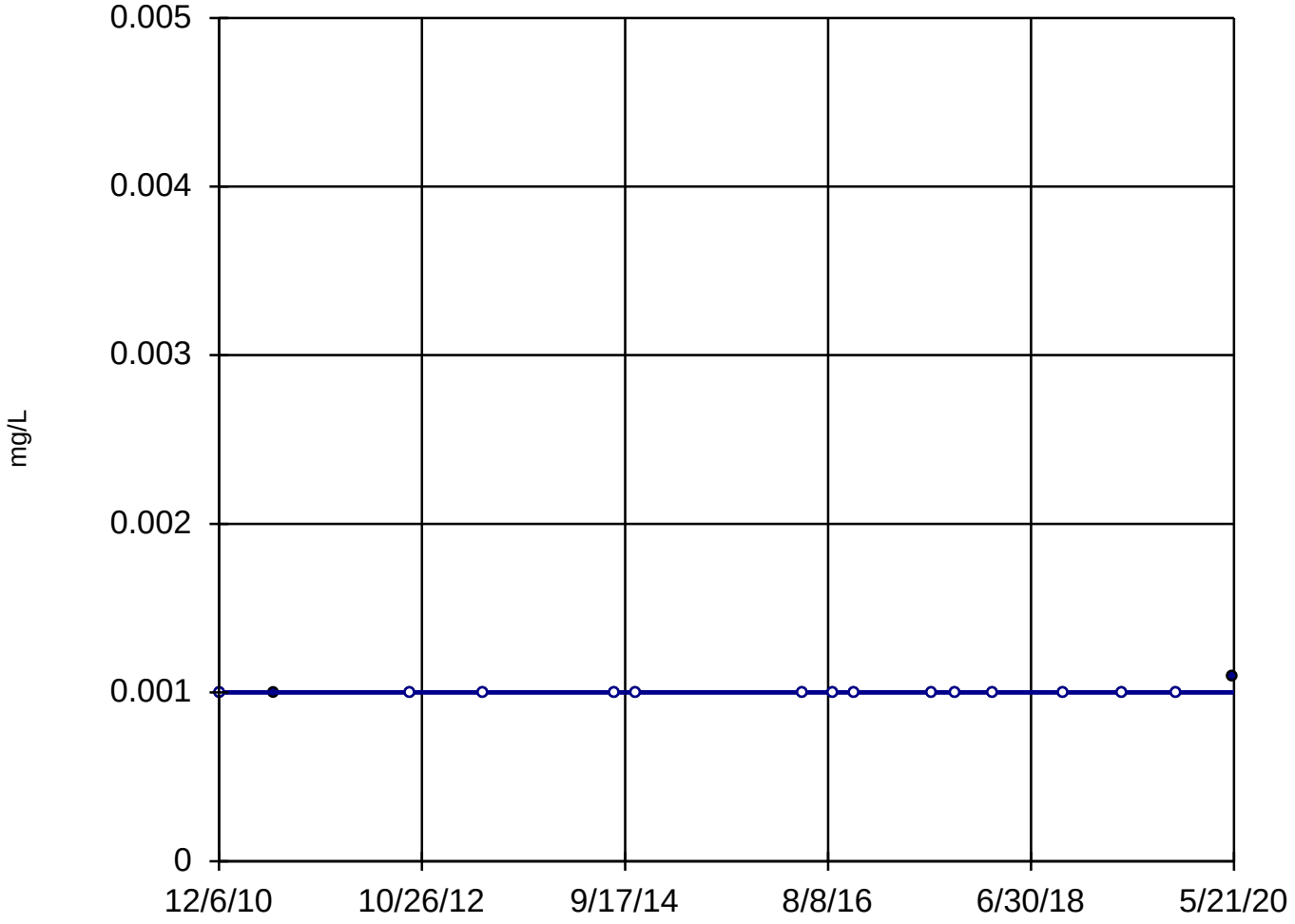
Constituent: Chromium, Total Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-01



n = 16

Slope = 0
units per year.

Mann-Kendall
statistic = 15
critical = 58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

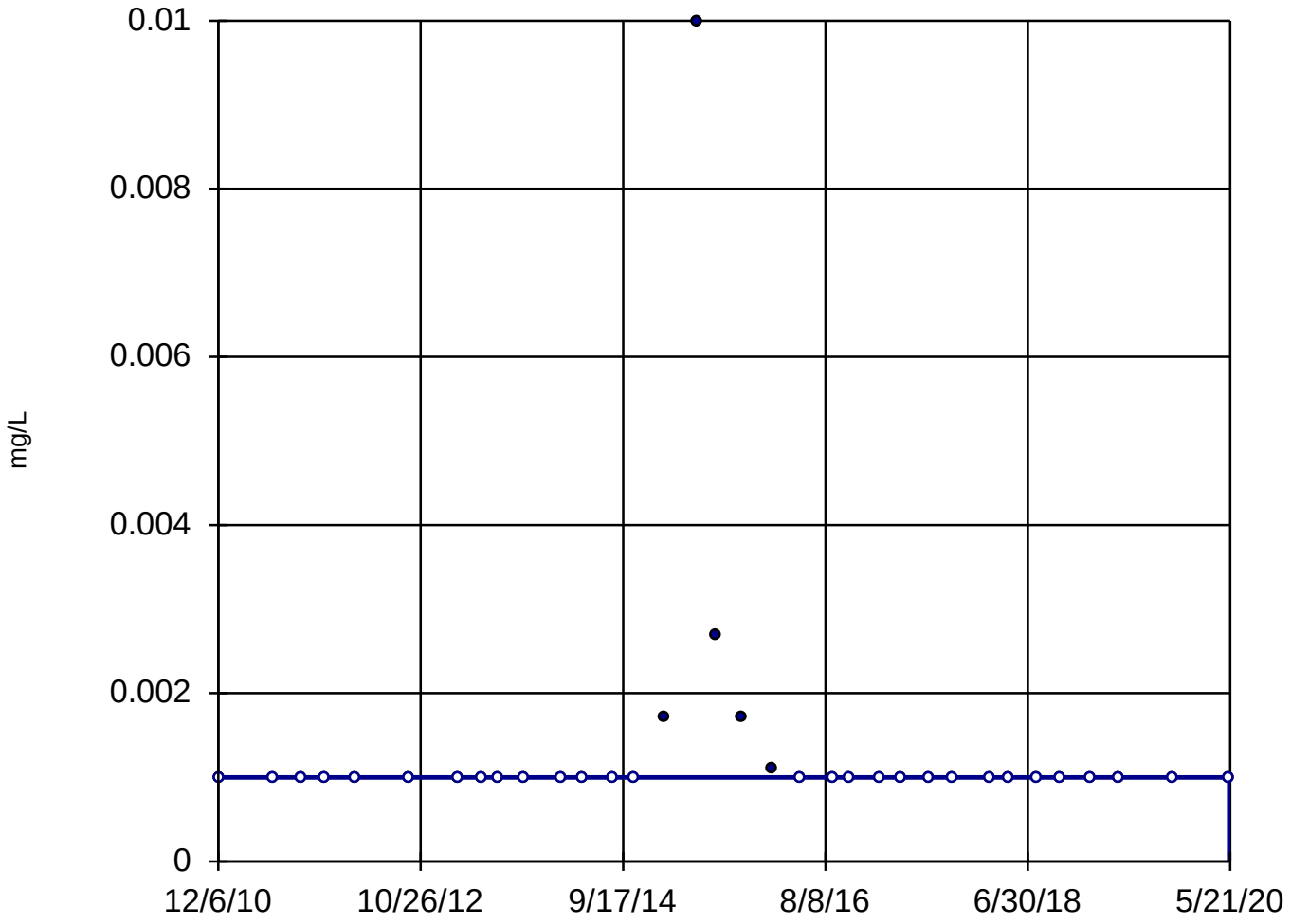
Constituent: Cobalt, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-02



n = 34

Slope = 0
units per year.

Mann-Kendall
statistic = -10
critical = -176

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

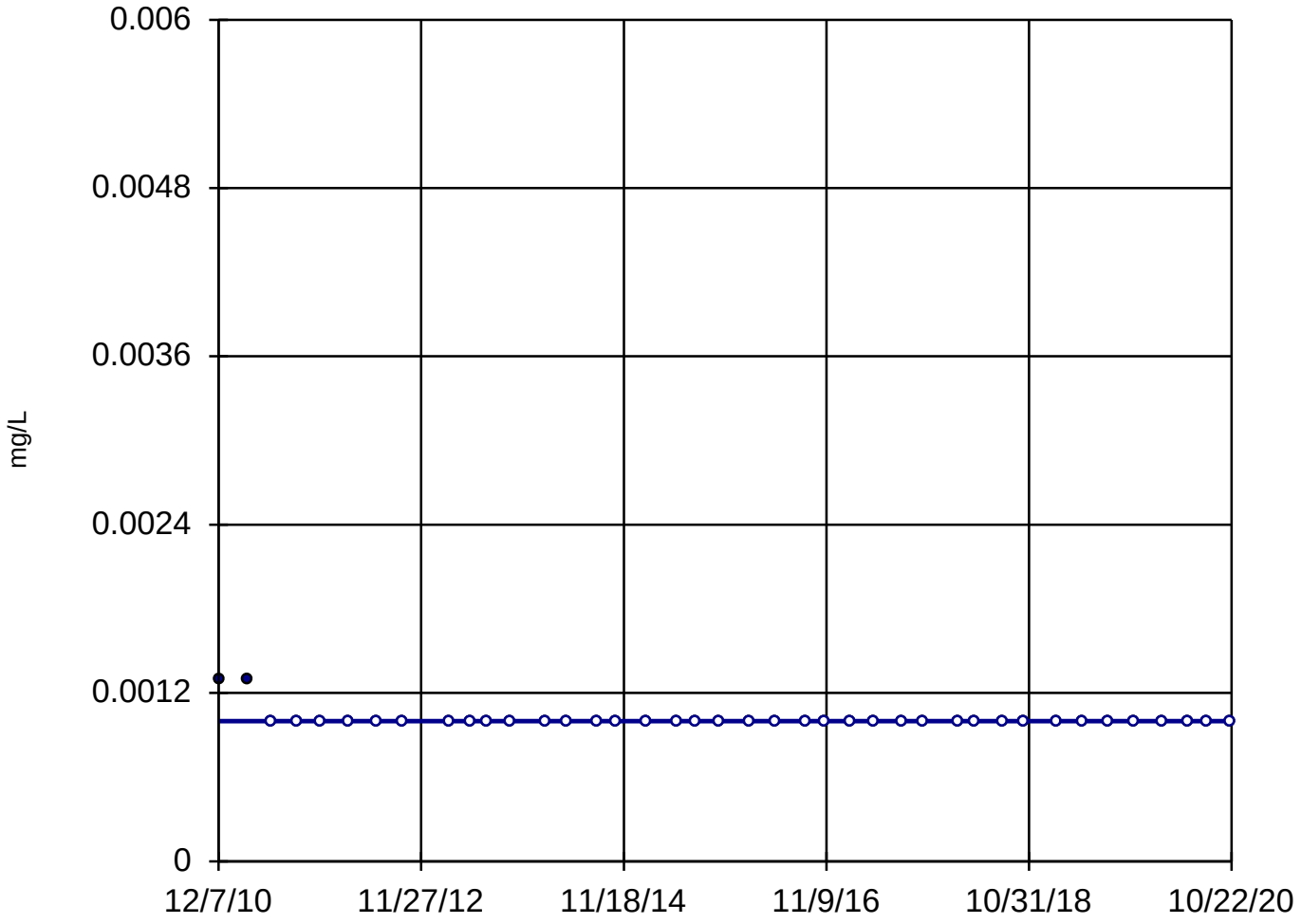
Constituent: Cobalt, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = -76
critical = -223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

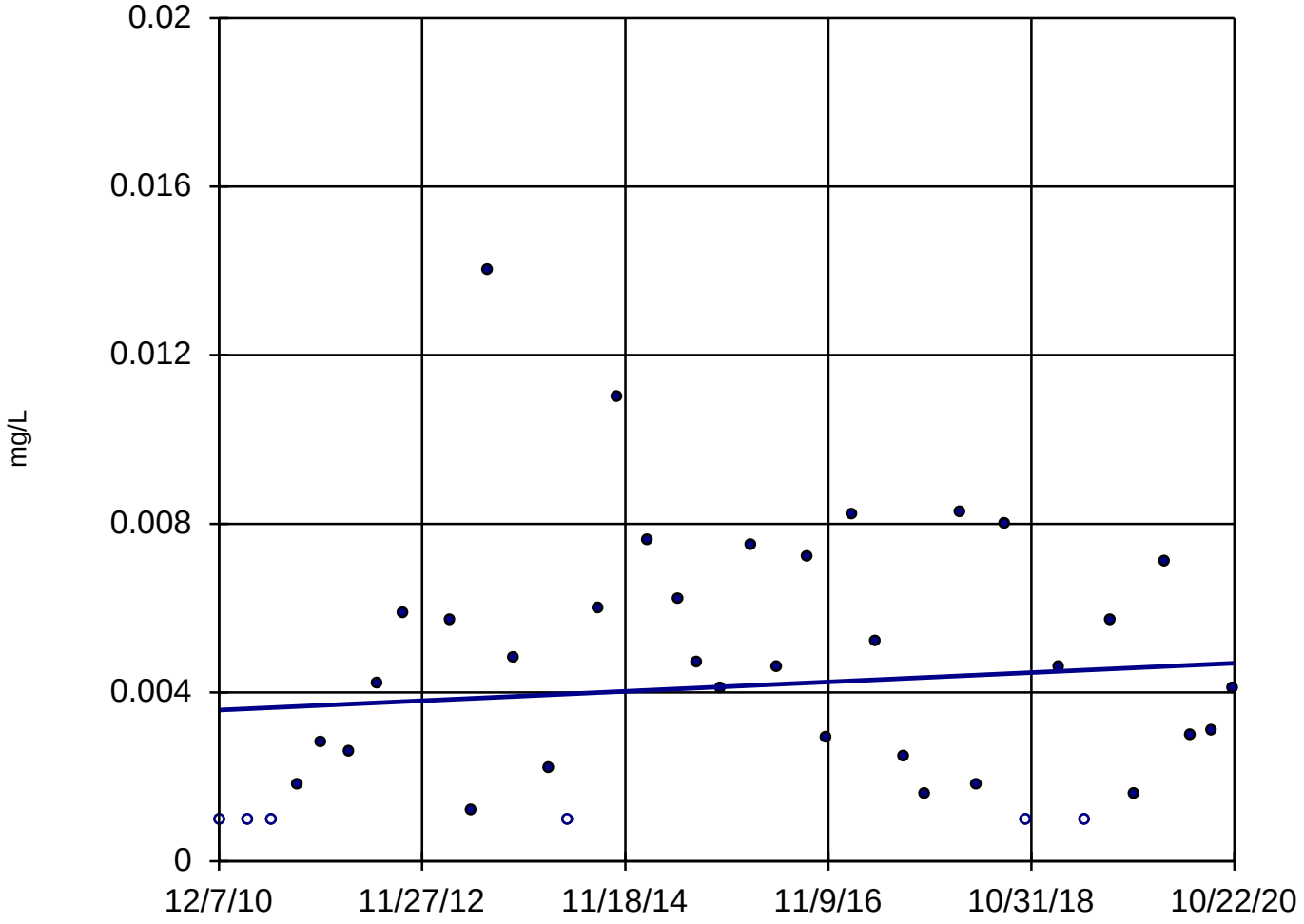
Constituent: Cobalt, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 40

Slope = 0.0001123 units per year.

Mann-Kendall statistic = 74
critical = 223

Trend not significant at 99% confidence level (α = 0.005 per tail).

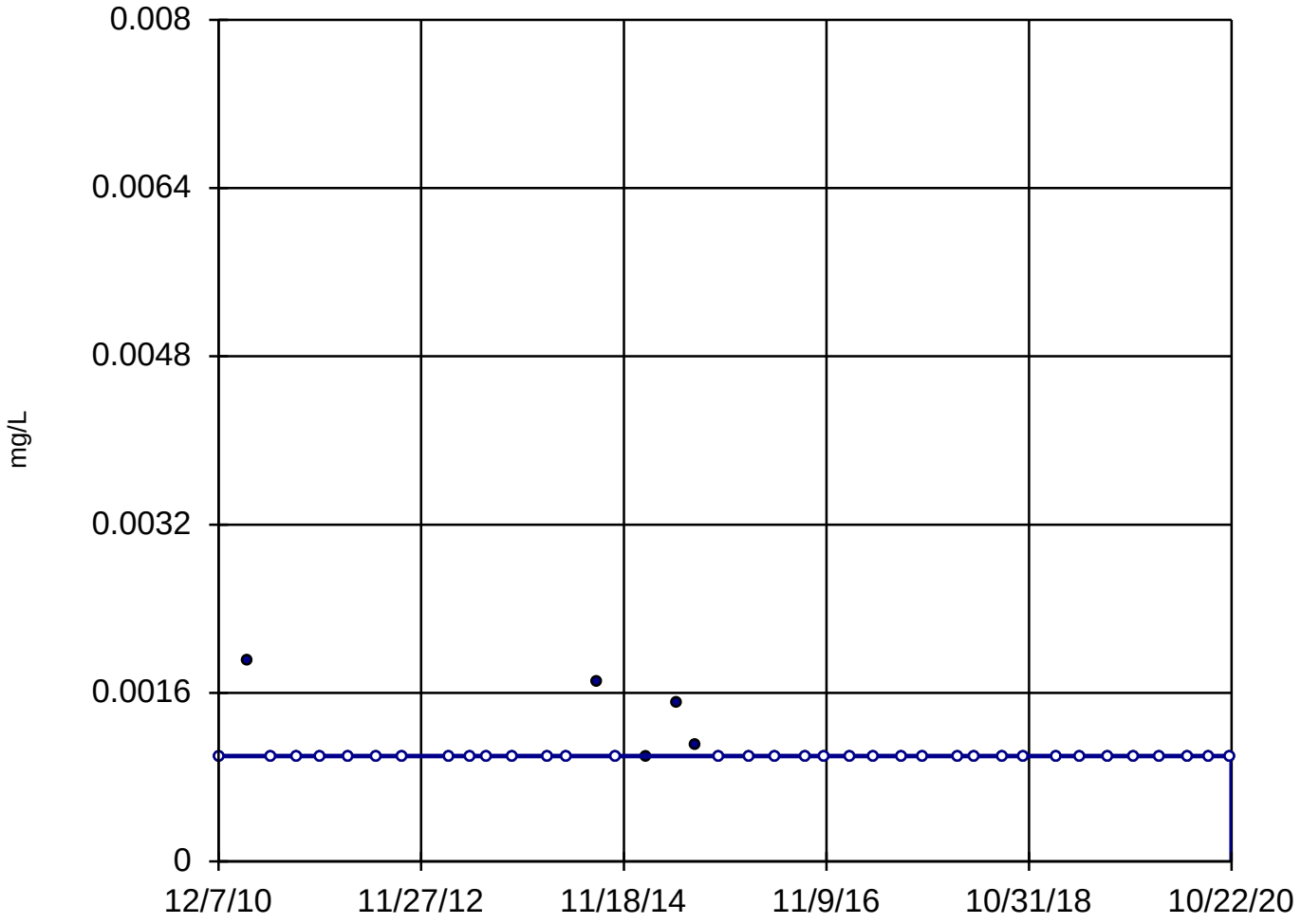
Constituent: Cobalt, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-06



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = -62
critical = -223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

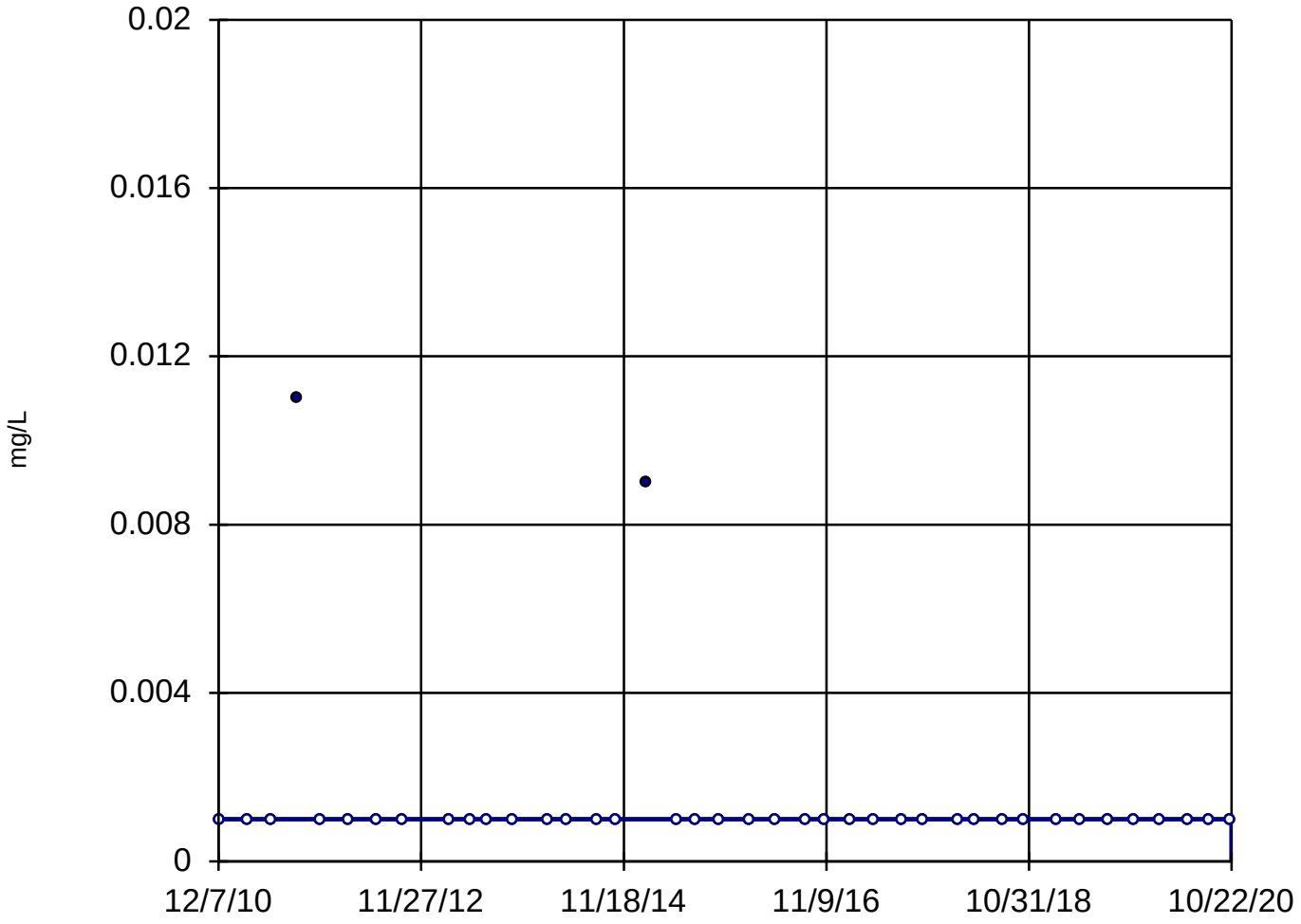
Constituent: Cobalt, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-07



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = -41
critical = -223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

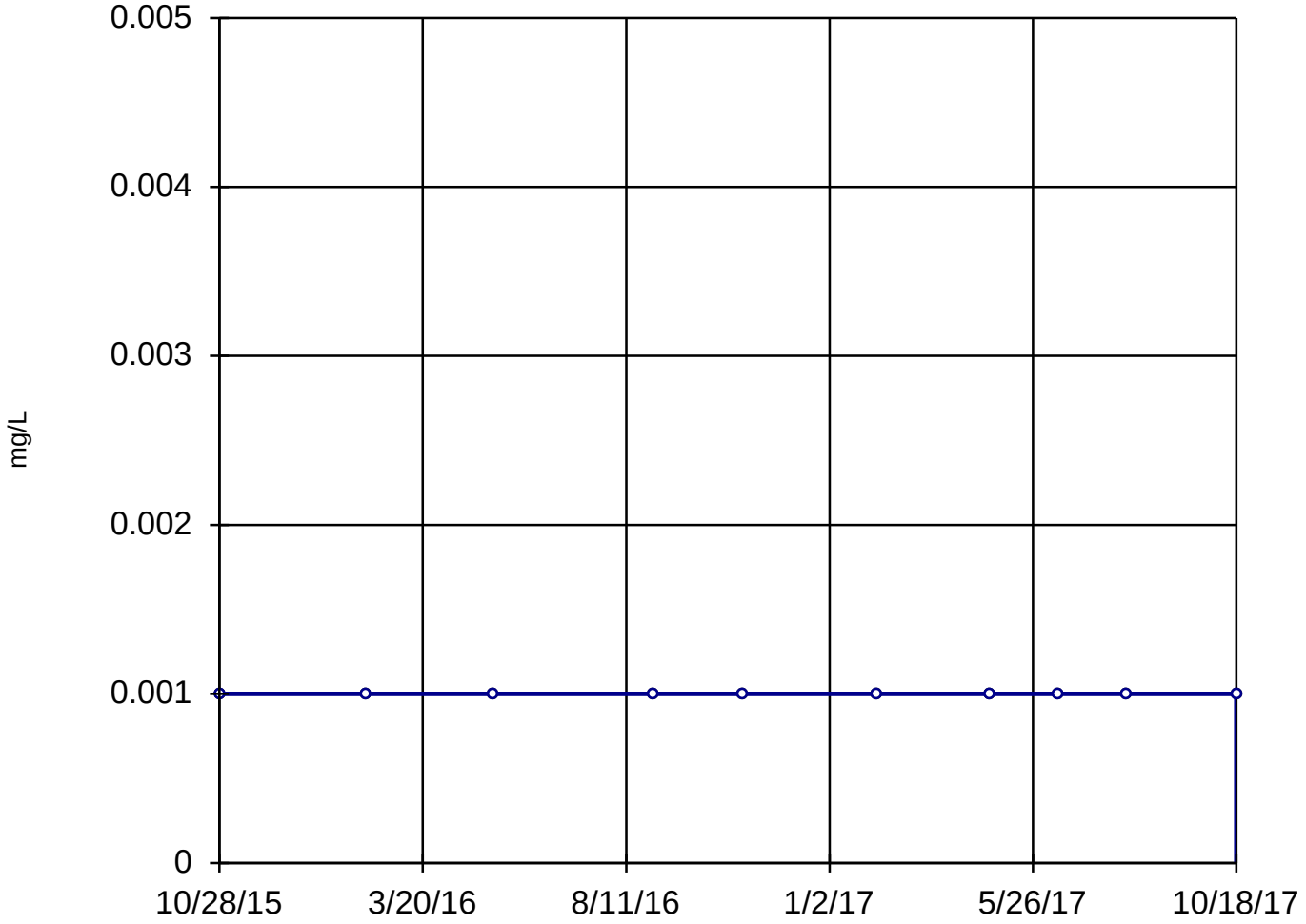
Constituent: Cobalt, Dissolved Analysis Run 4/2/2021 11:01 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

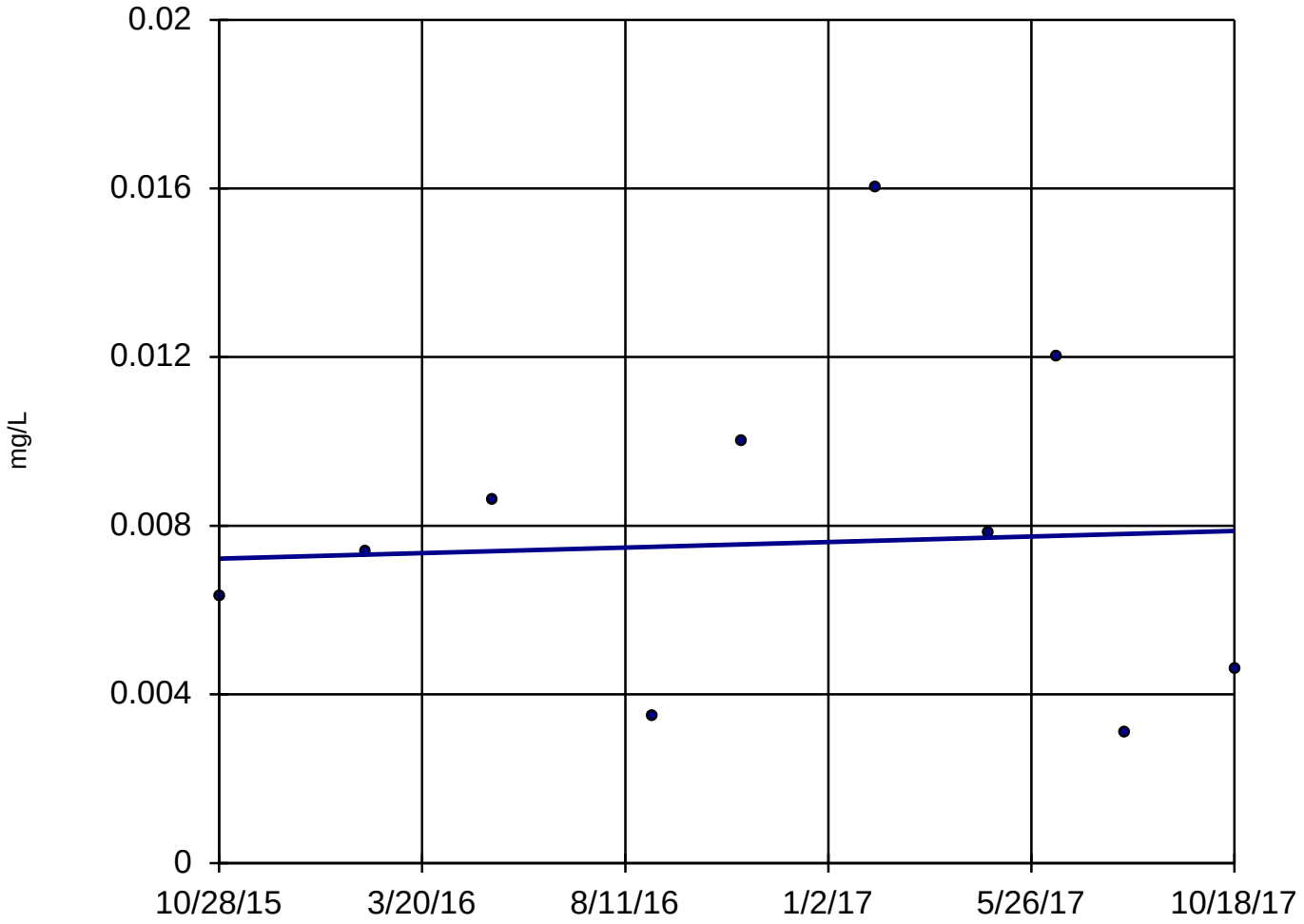
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Cobalt, Total Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-04



n = 10

Slope = 0.0003311 units per year.

Mann-Kendall statistic = 1
critical = 30

Trend not significant at 99% confidence level (α = 0.005 per tail).

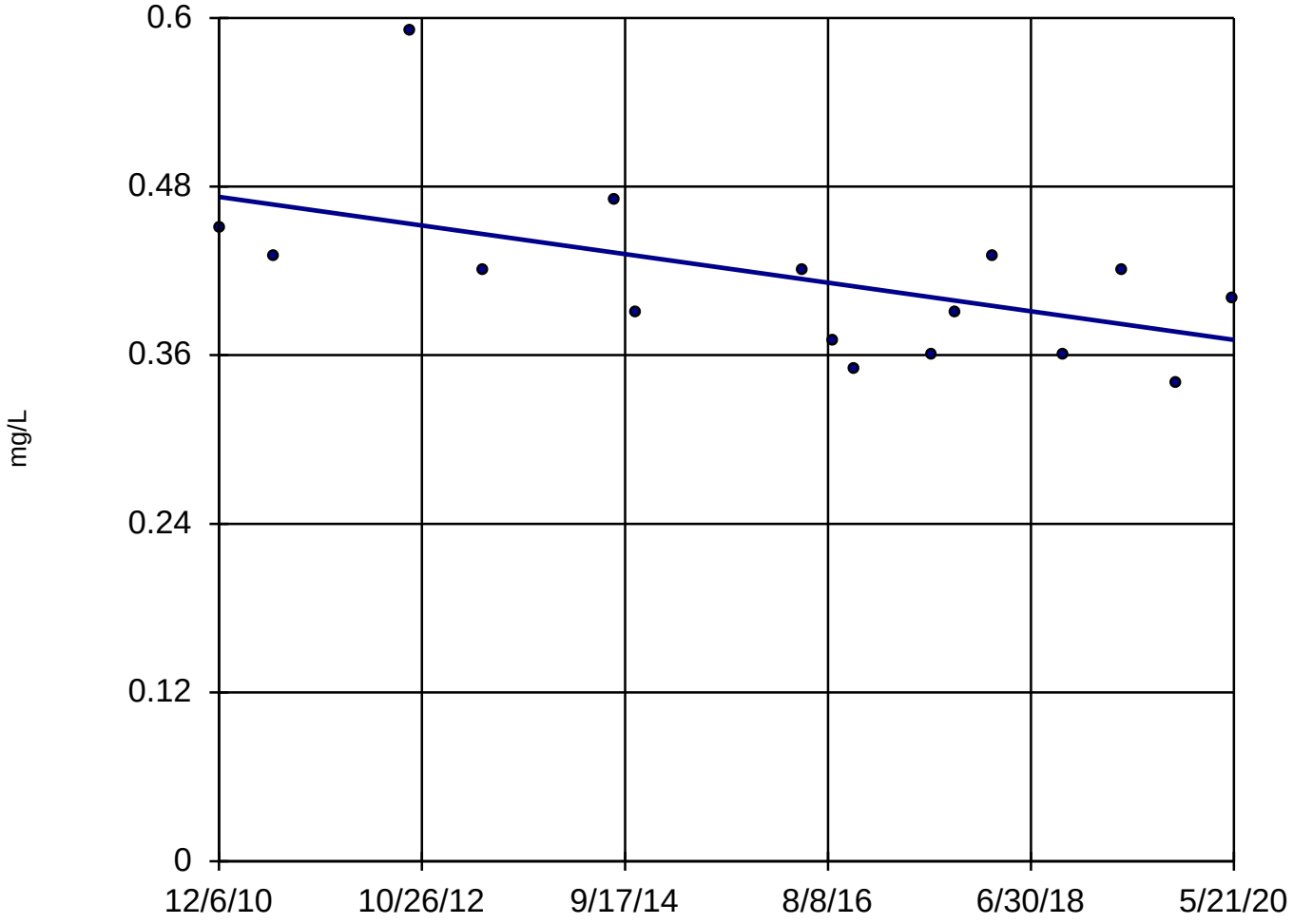
Constituent: Cobalt, Total Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA

Sen's Slope Estimator

MW-01



n = 16

Slope = -0.01075 units per year.

Mann-Kendall statistic = -52
critical = -58

Trend not significant at 99% confidence level (α = 0.005 per tail).

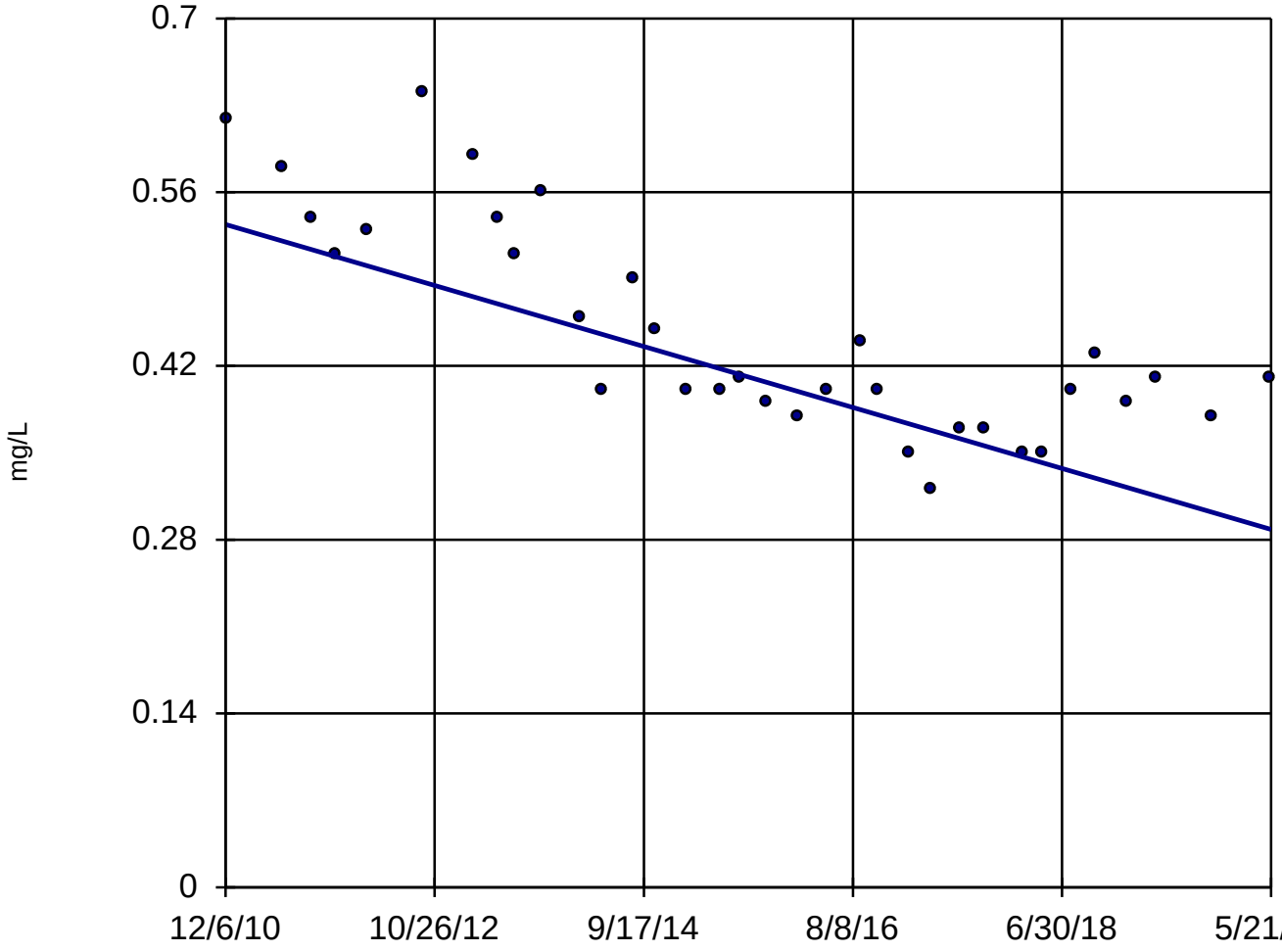
Constituent: Fluoride Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA

Sen's Slope Estimator

MW-02



n = 34

Slope = -0.02597 units per year.

Mann-Kendall statistic = -321
critical = -176

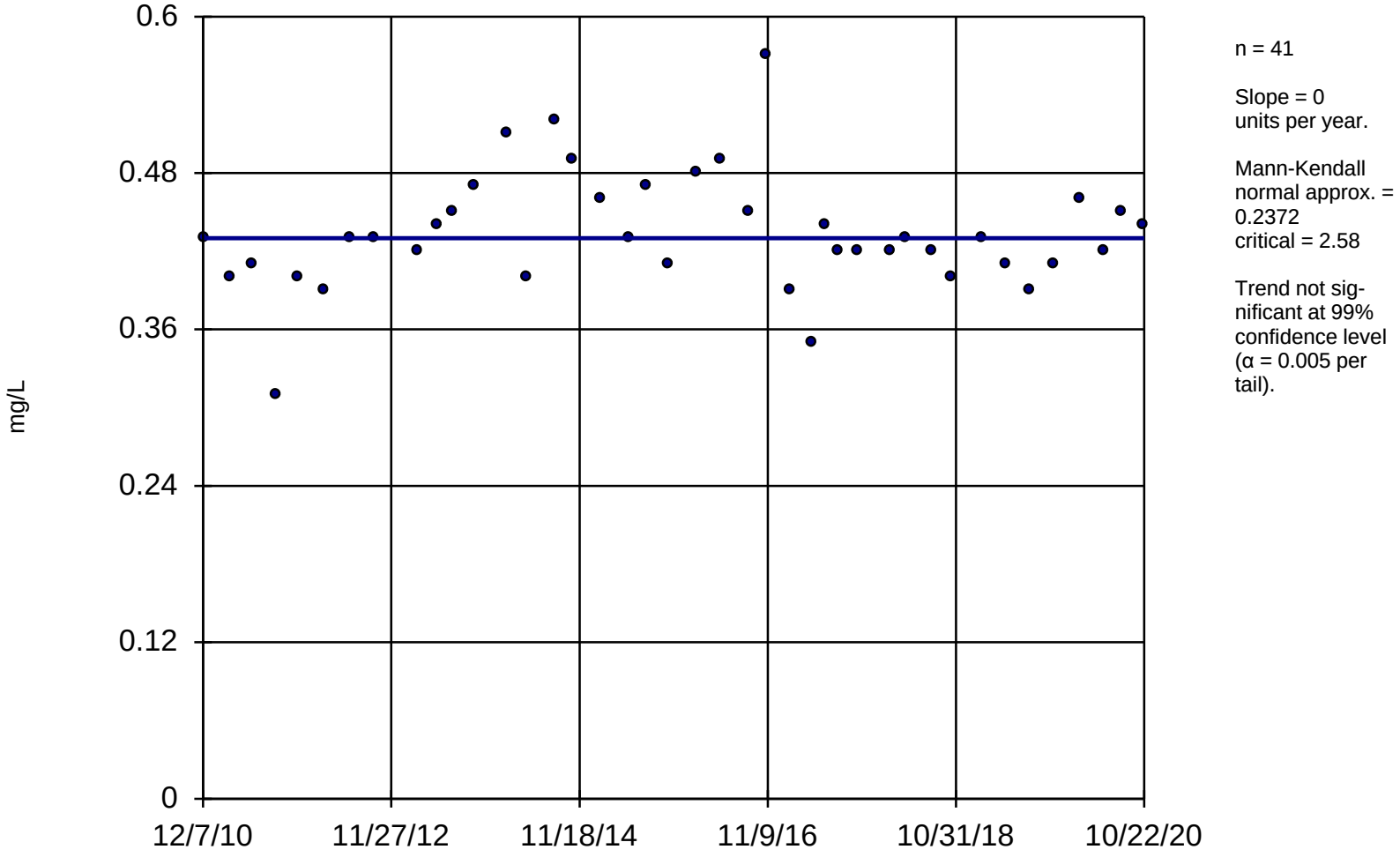
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Fluoride Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-03



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0.2372
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

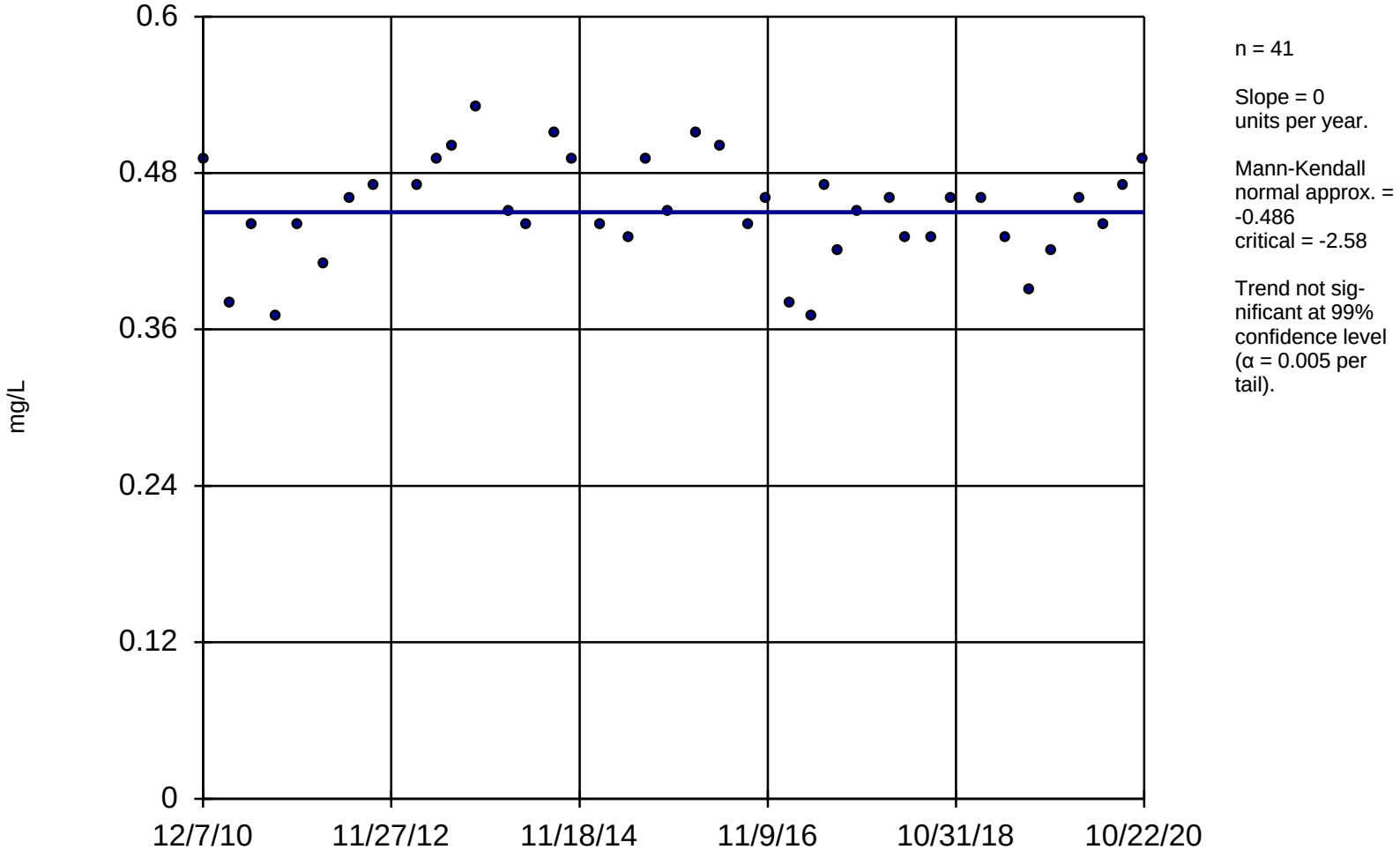
Constituent: Fluoride Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA

Sen's Slope Estimator

MW-04



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
-0.486
critical = -2.58

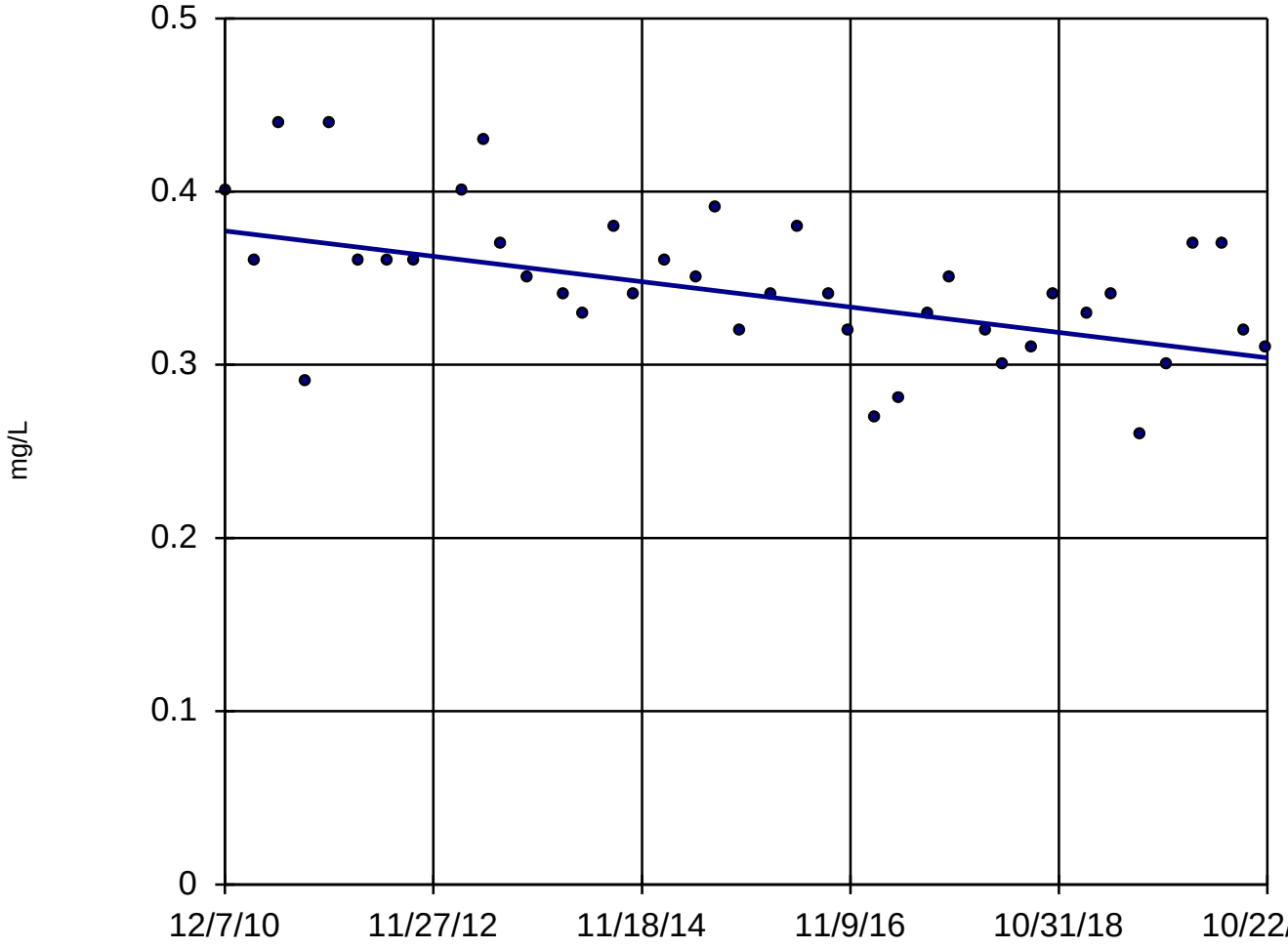
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Fluoride Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-06



n = 40

Slope = -0.0074 units per year.

Mann-Kendall statistic = -315
critical = -223

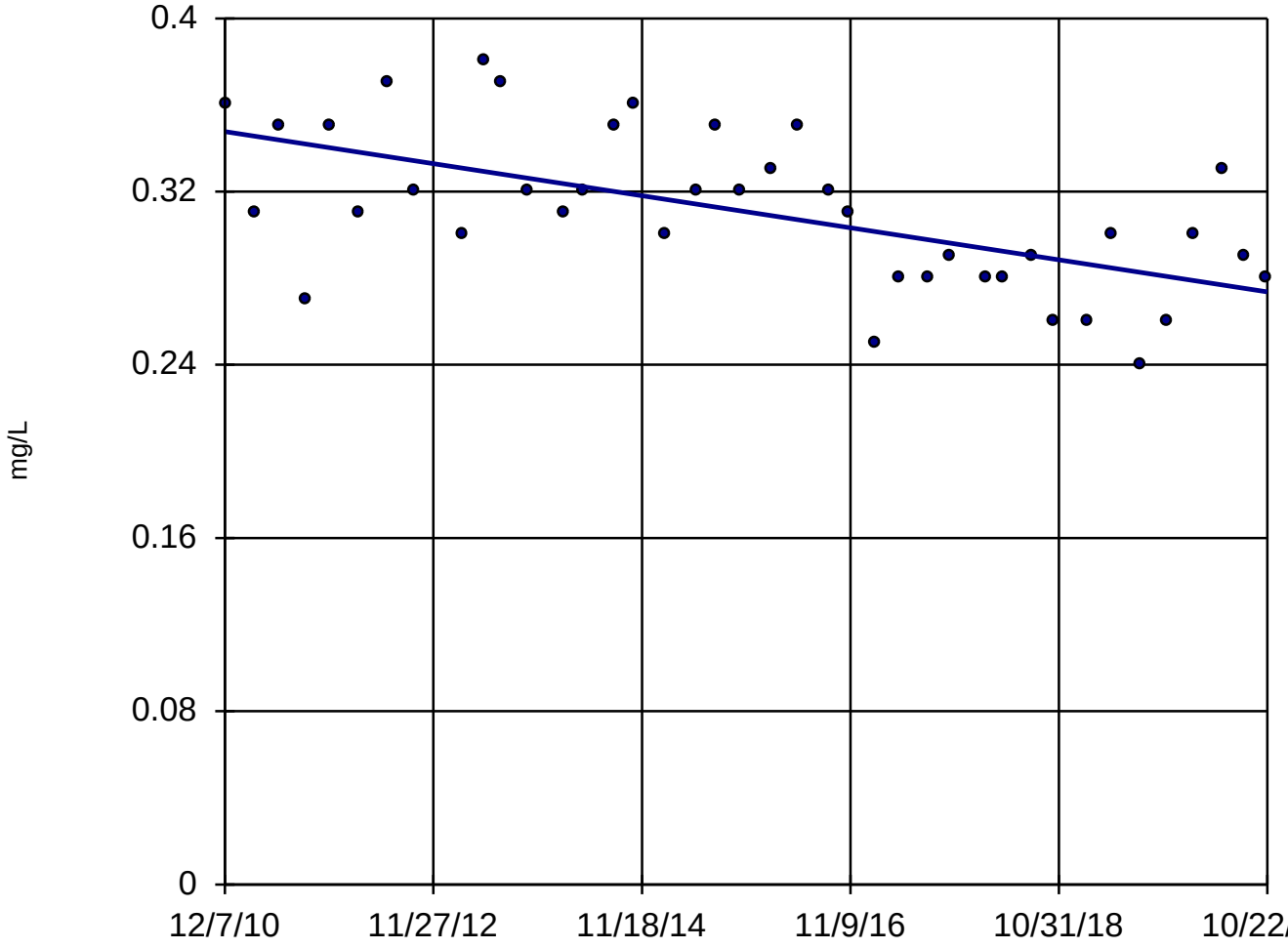
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Fluoride Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-07



n = 40

Slope = -0.007482 units per year.

Mann-Kendall statistic = -320
critical = -223

Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

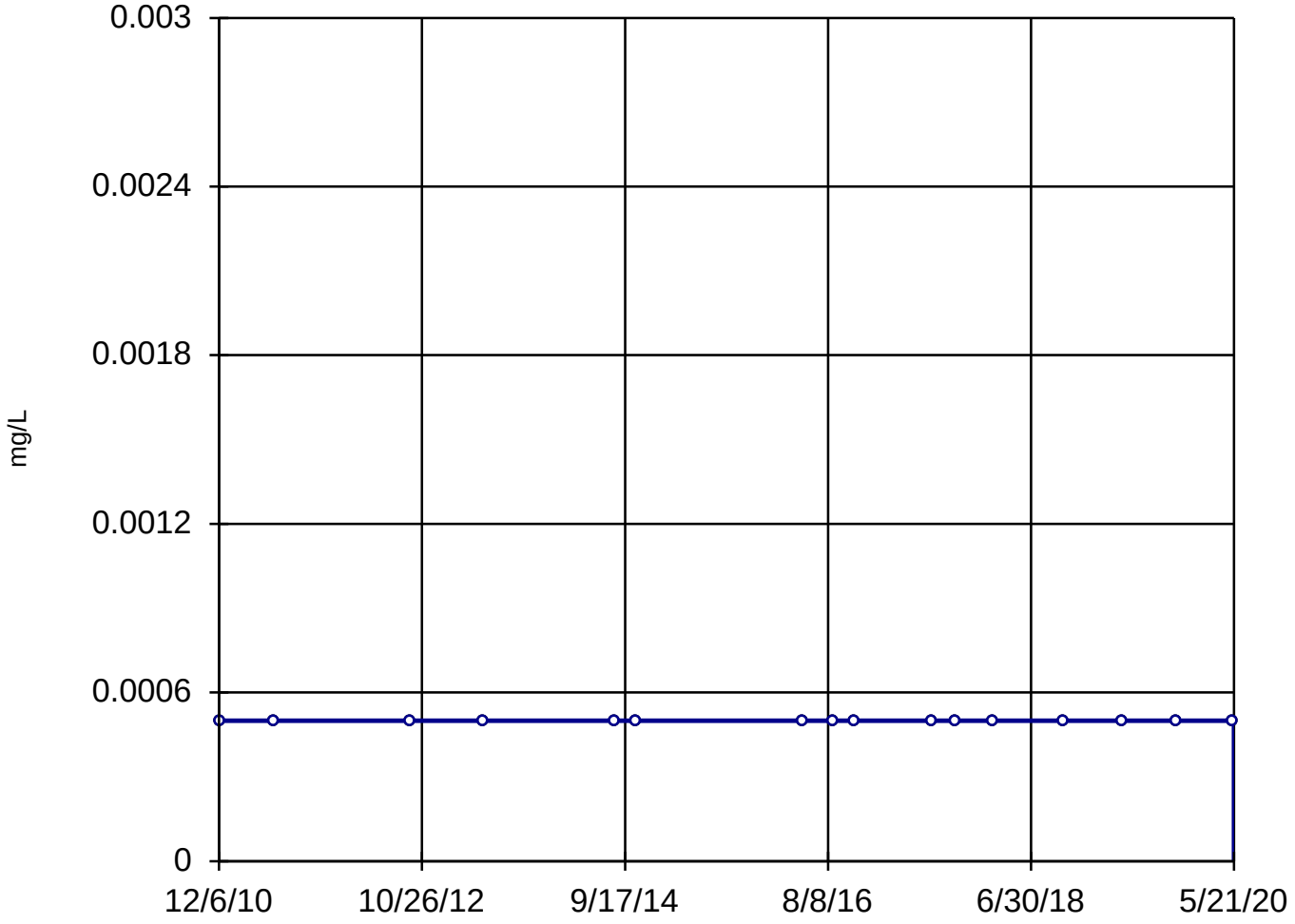
Constituent: Fluoride Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-01



n = 16

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

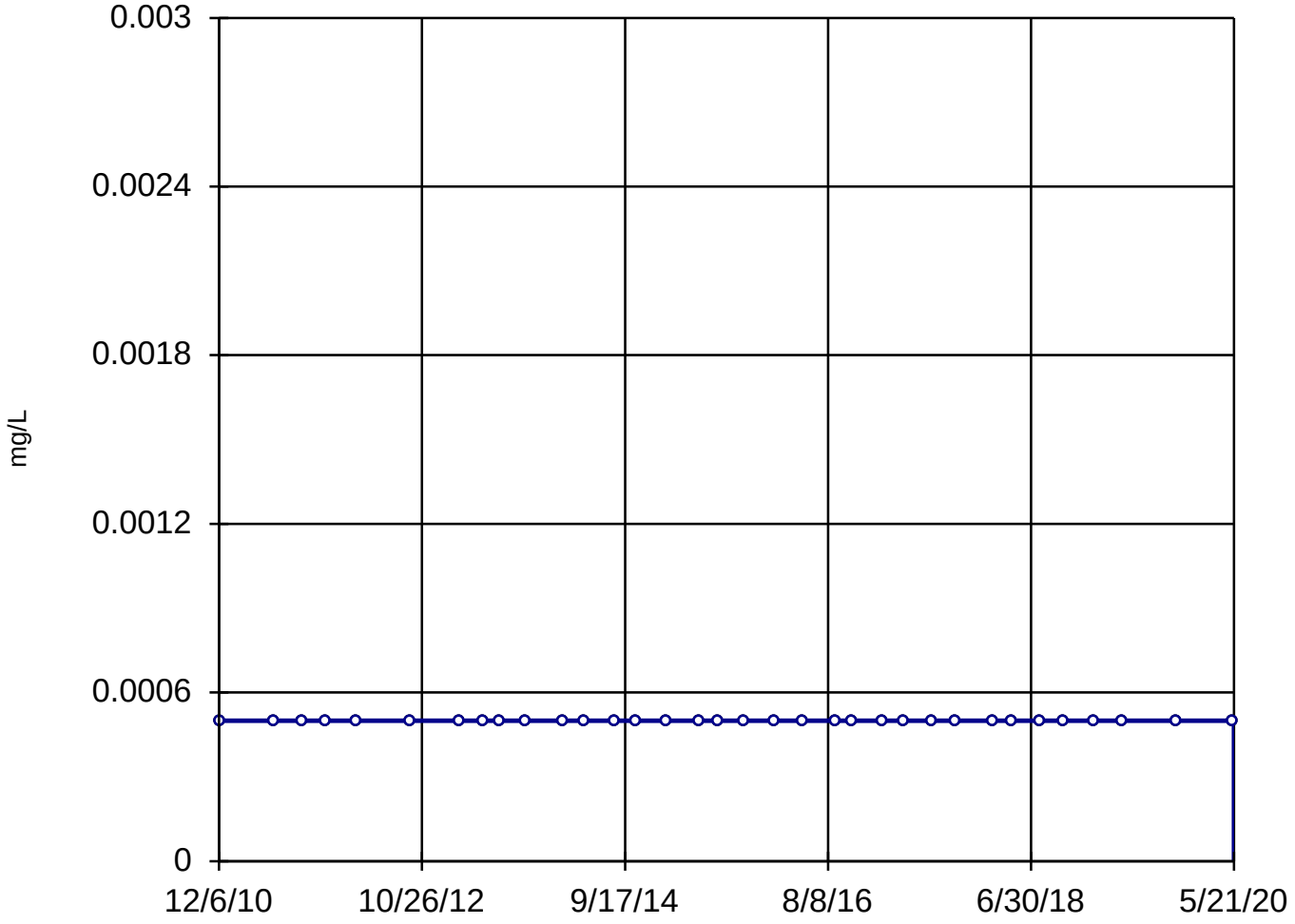
Constituent: Lead, Dissolved Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-02



n = 34

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 176

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

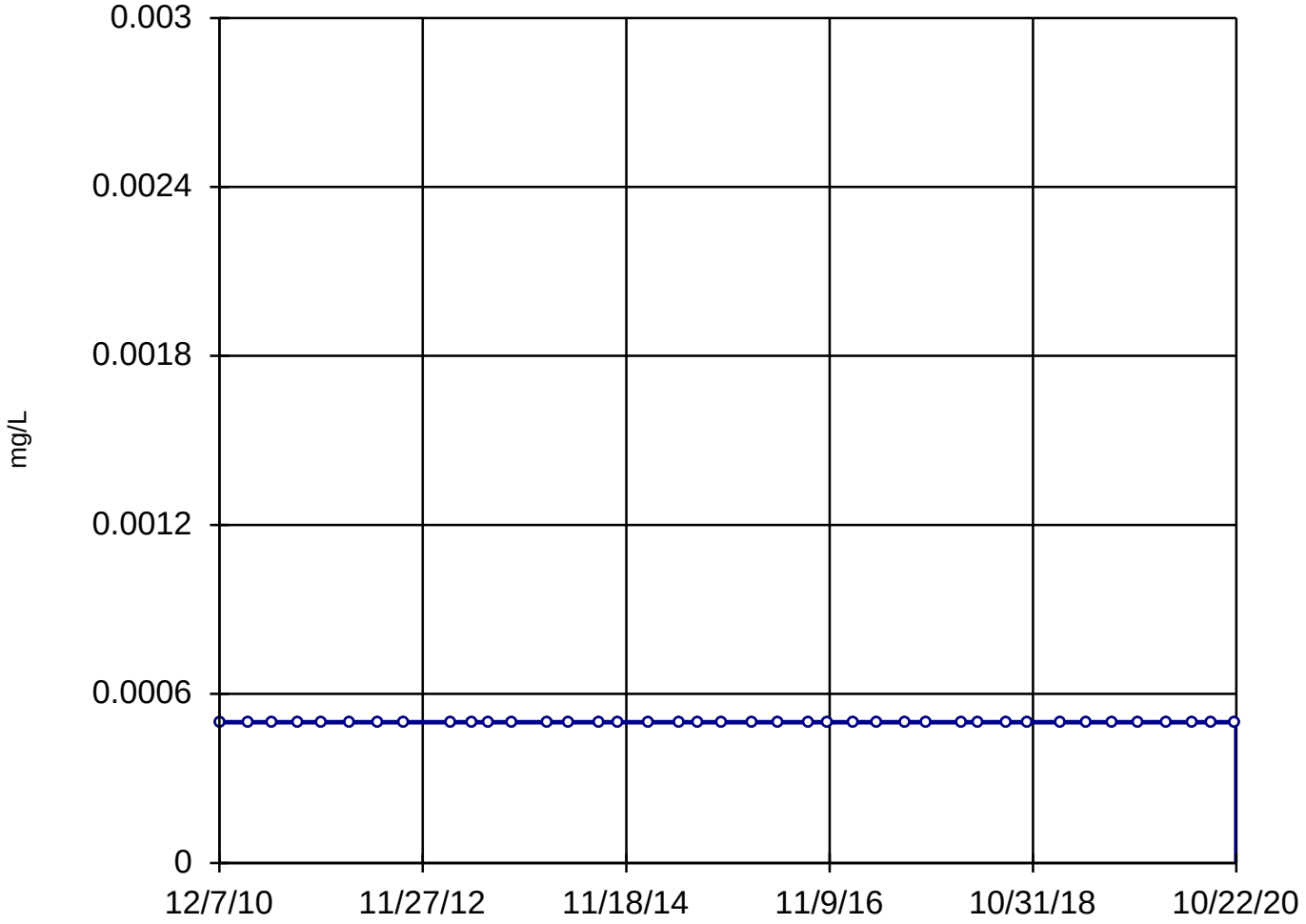
Constituent: Lead, Dissolved Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

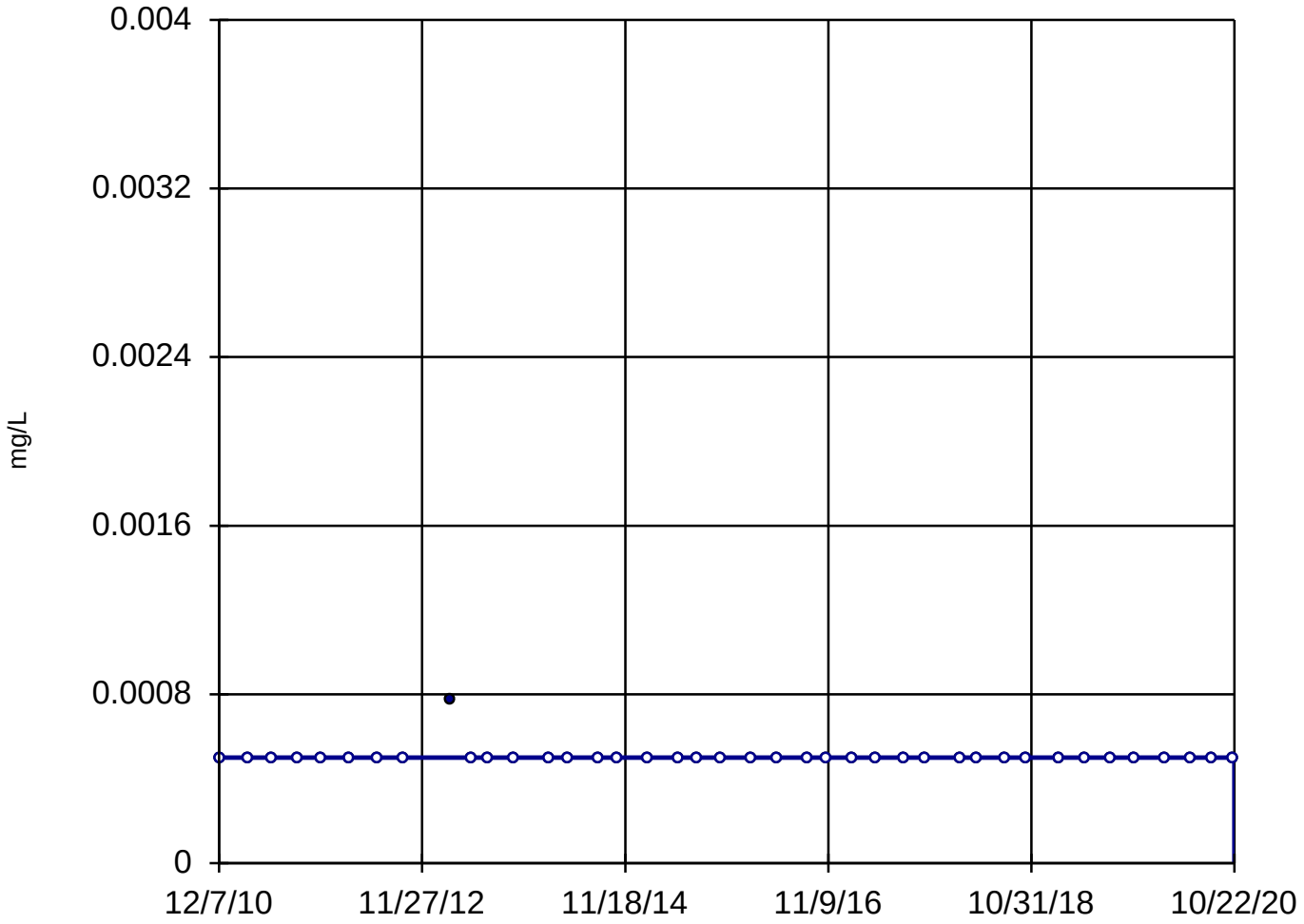
Constituent: Lead, Dissolved Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = -23
critical = -223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

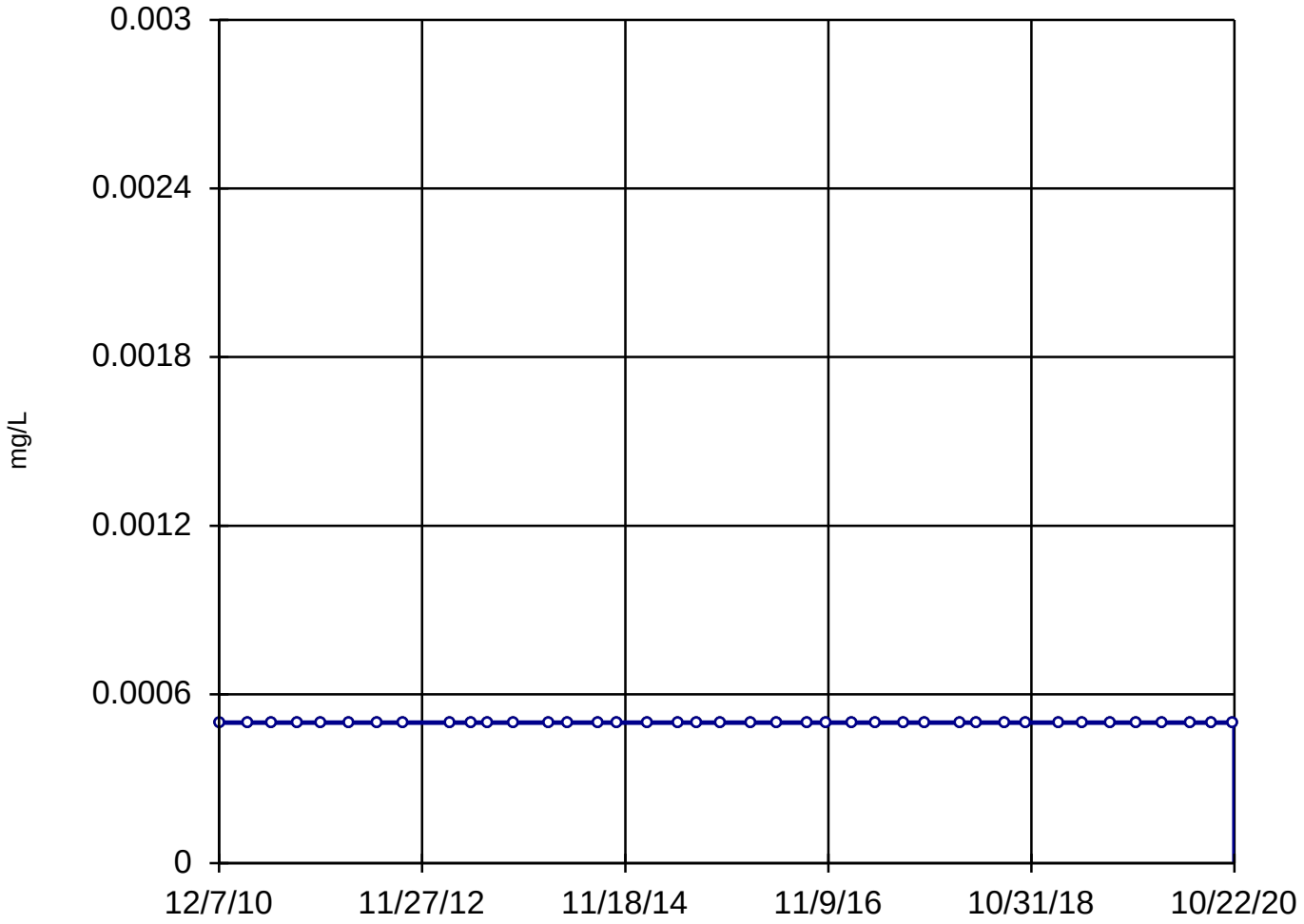
Constituent: Lead, Dissolved Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-06



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

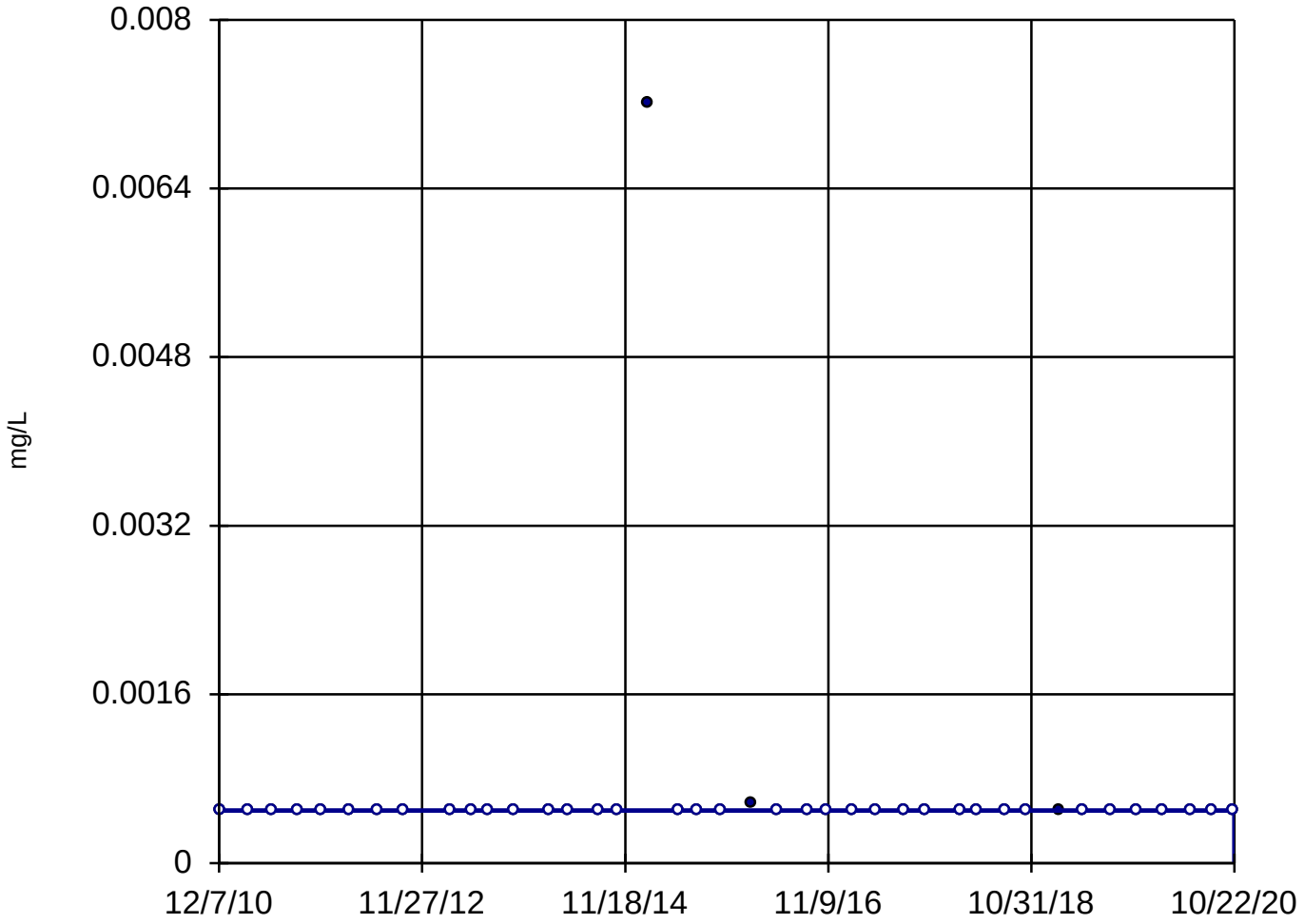
Constituent: Lead, Dissolved Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-07



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = -7
critical = -223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

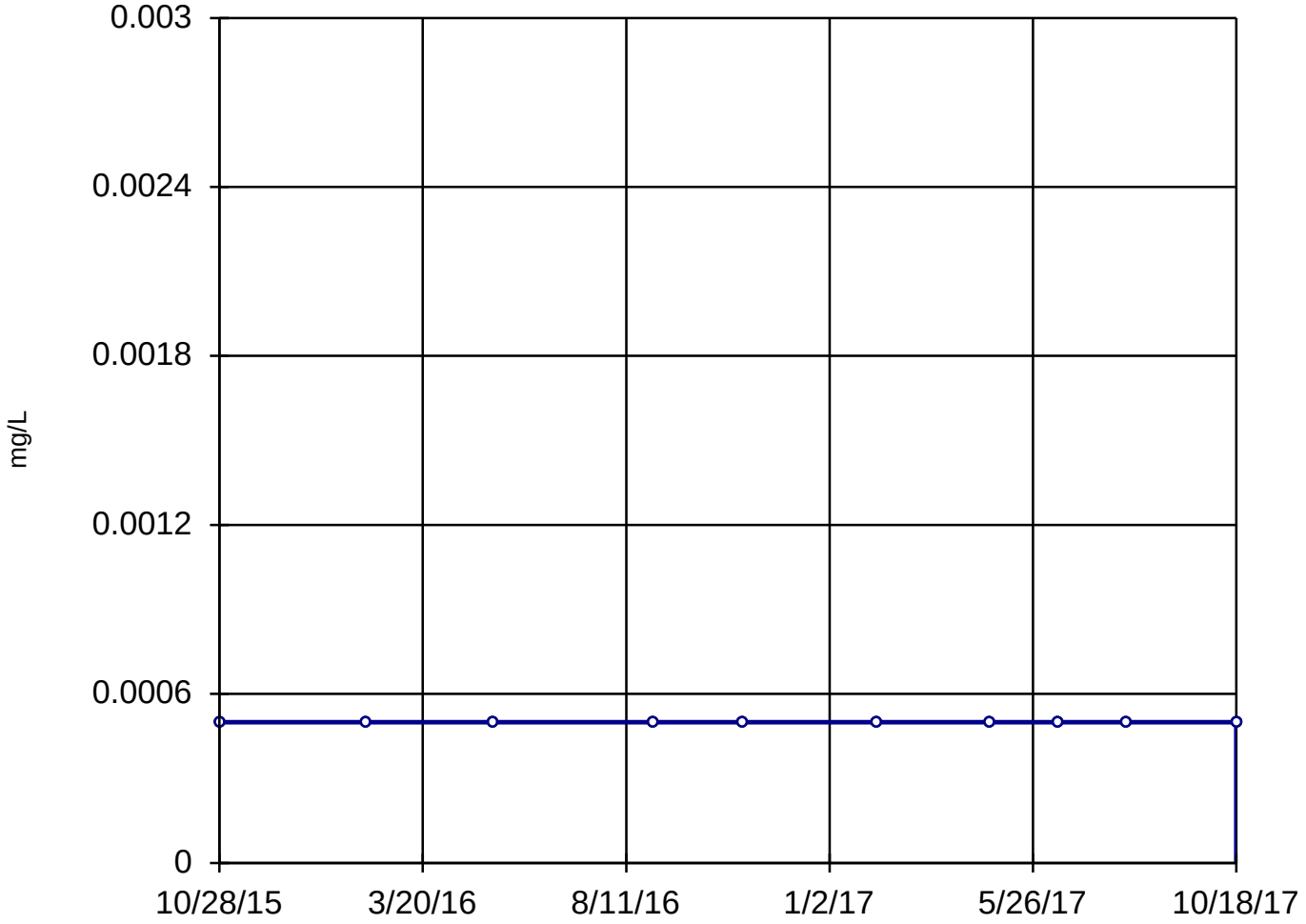
Constituent: Lead, Dissolved Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

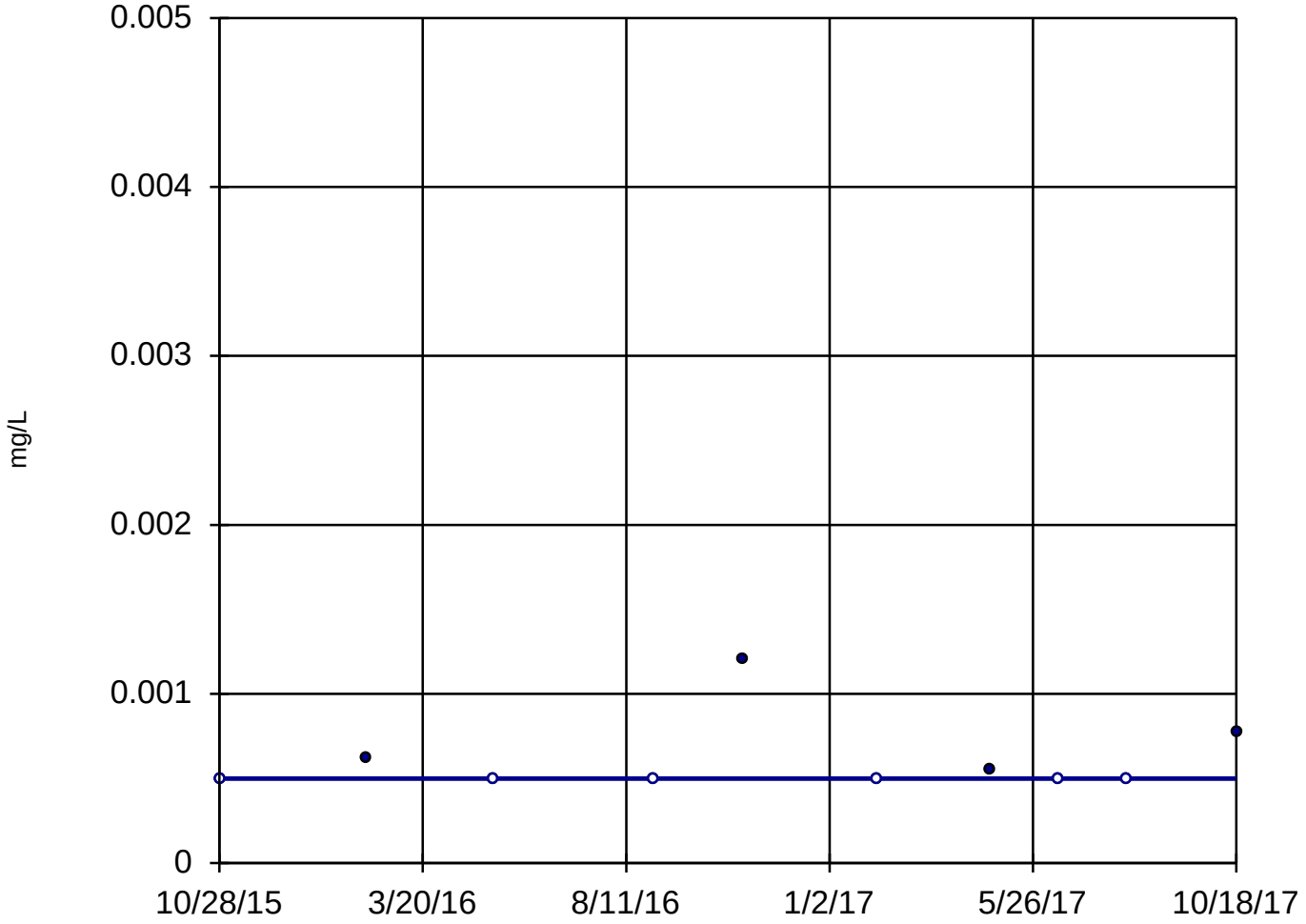
Constituent: Lead, Total Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 4
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

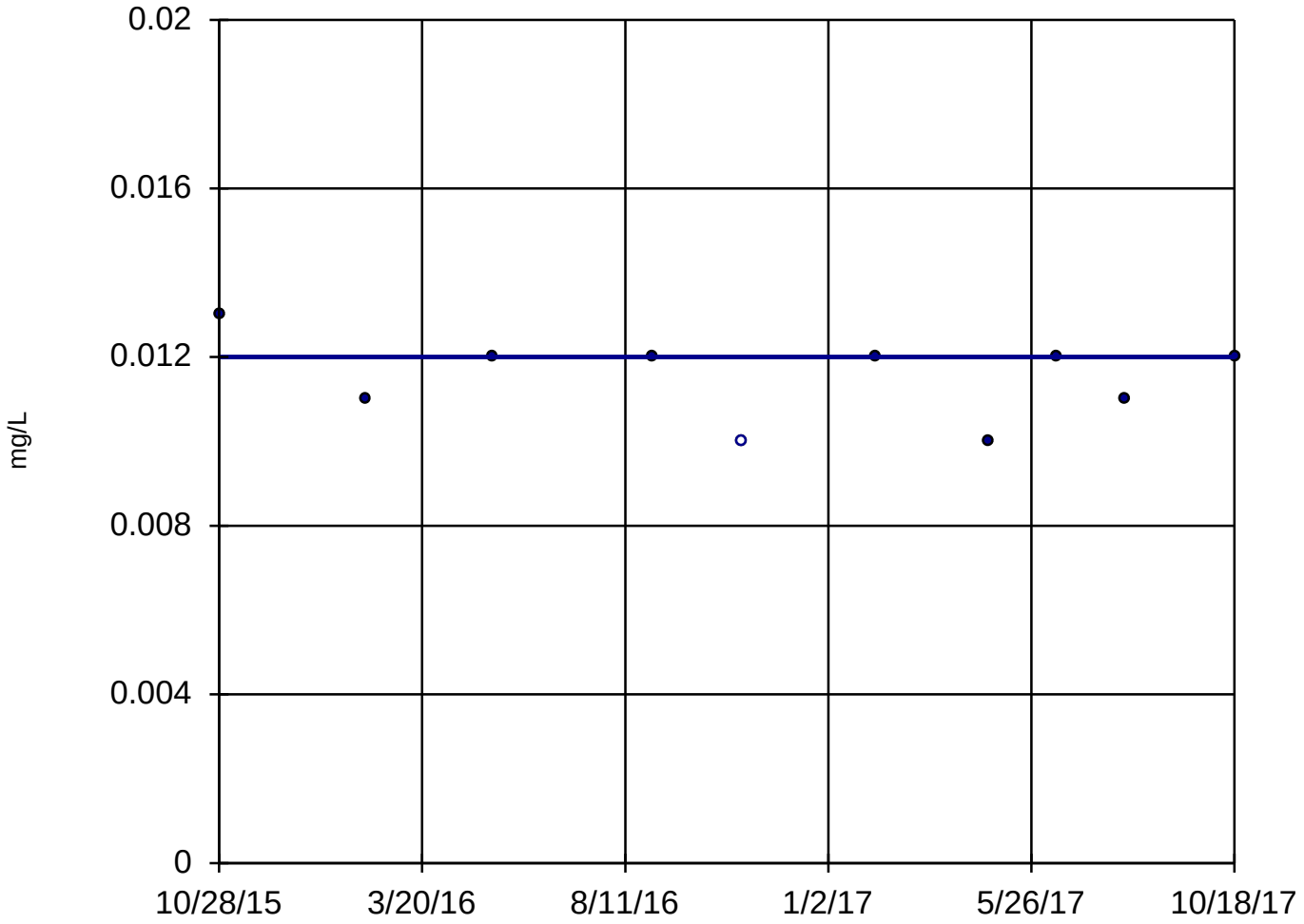
Constituent: Lead, Total Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = -7
critical = -30

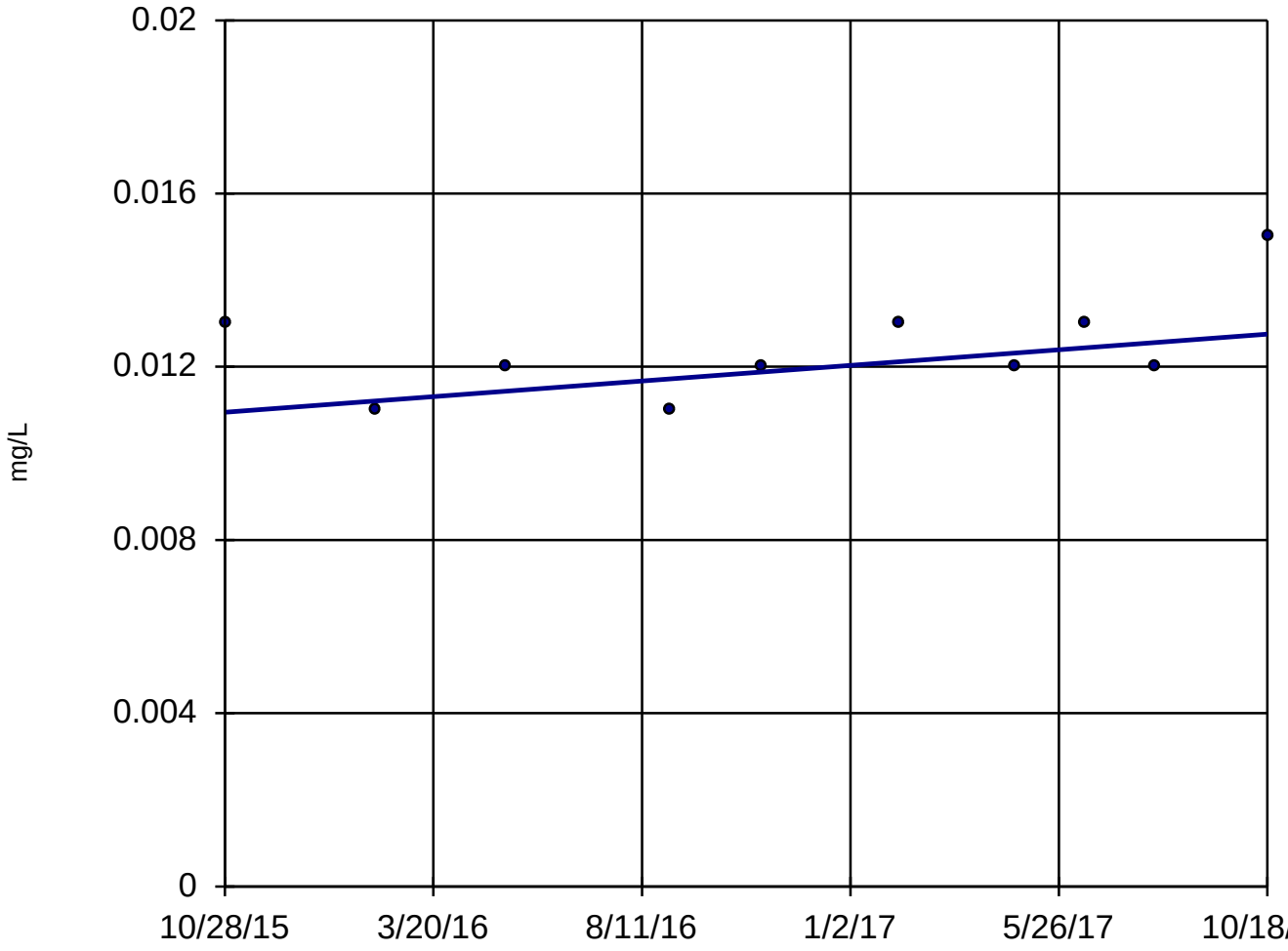
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Lithium, Total Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-04



n = 10

Slope = 0.0009125 units per year.

Mann-Kendall statistic = 15
critical = 30

Trend not significant at 99% confidence level (α = 0.005 per tail).

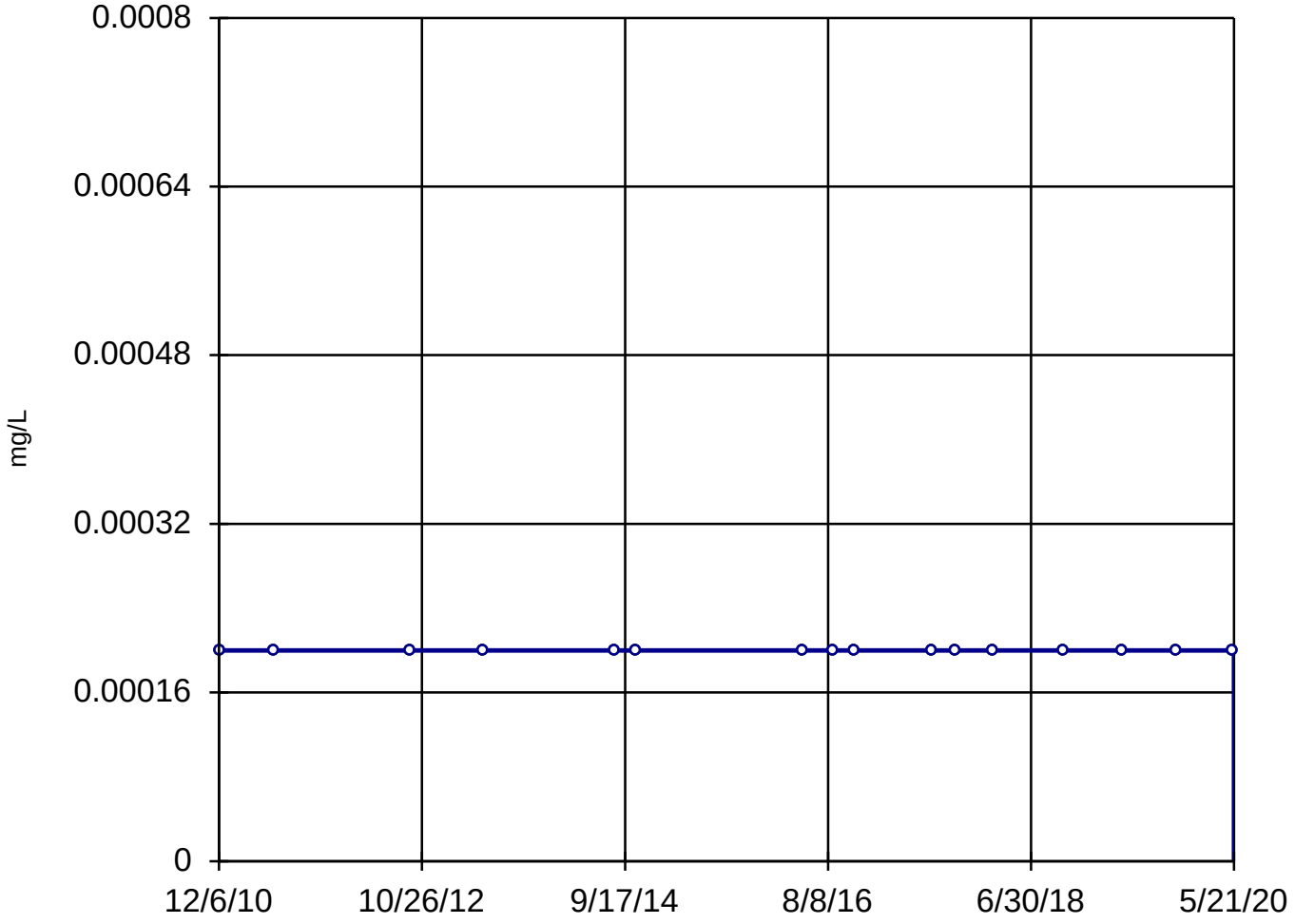
Constituent: Lithium, Total Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-01



n = 16

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

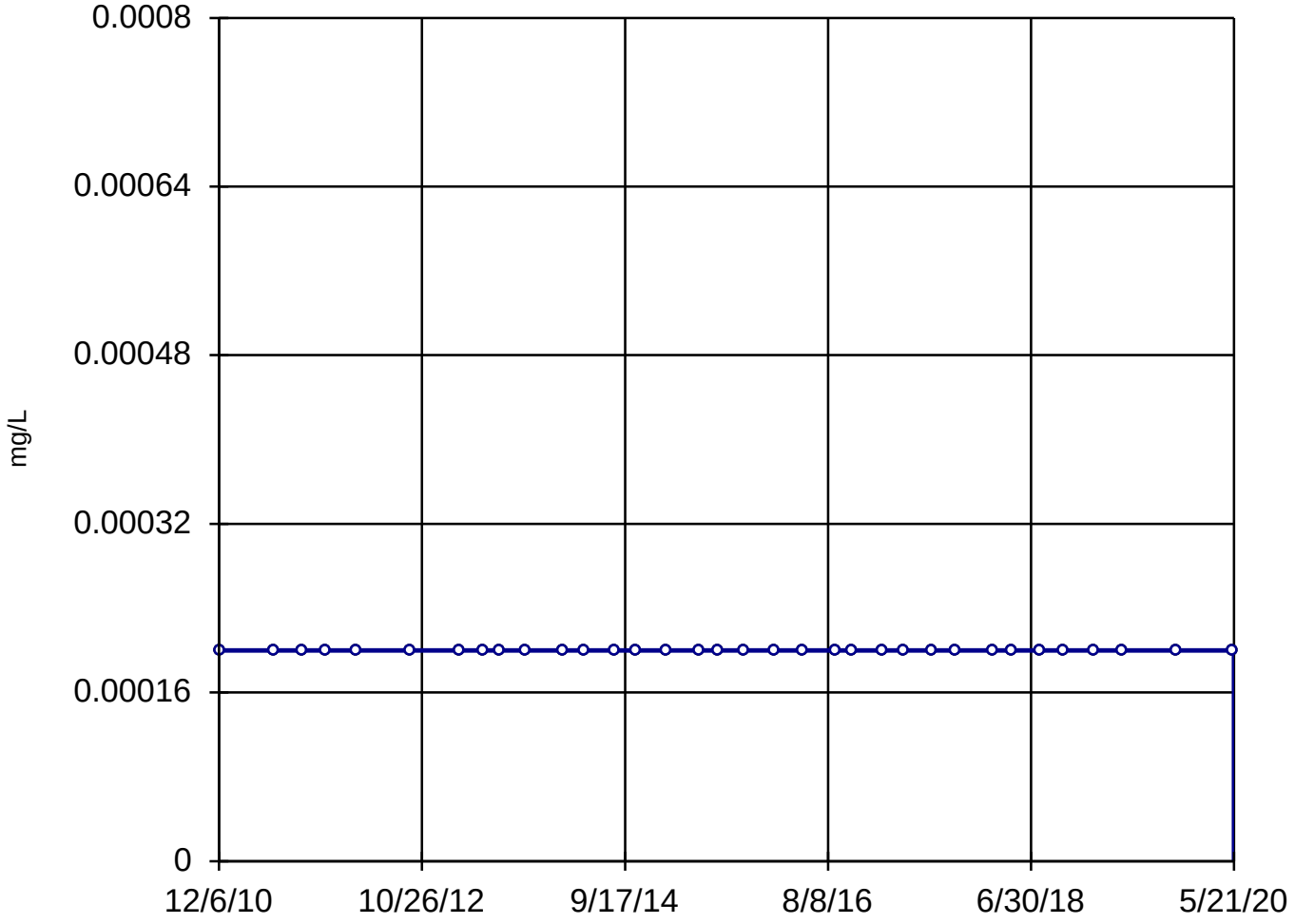
Constituent: Mercury, Dissolved Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-02



n = 34

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 176

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

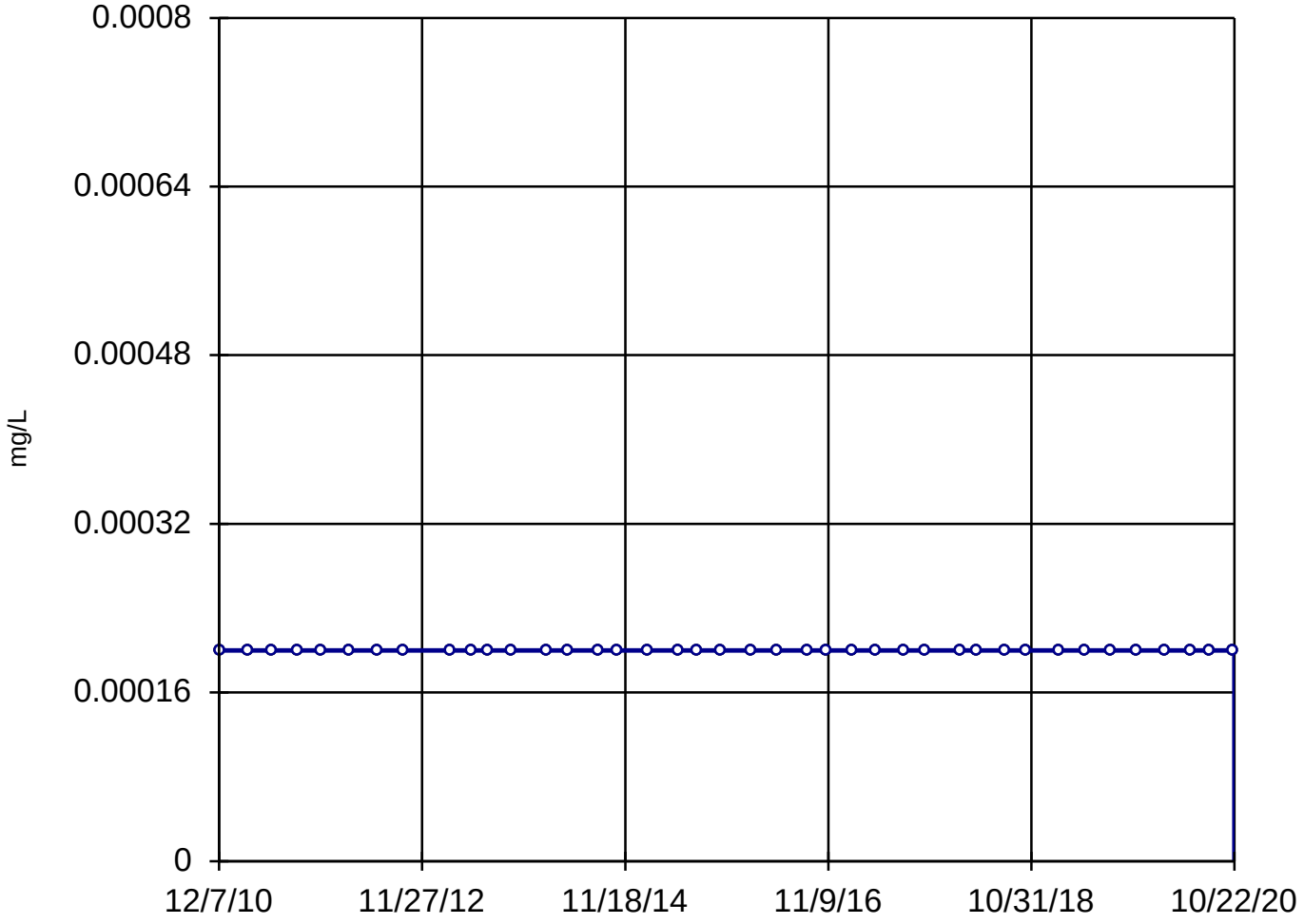
Constituent: Mercury, Dissolved Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

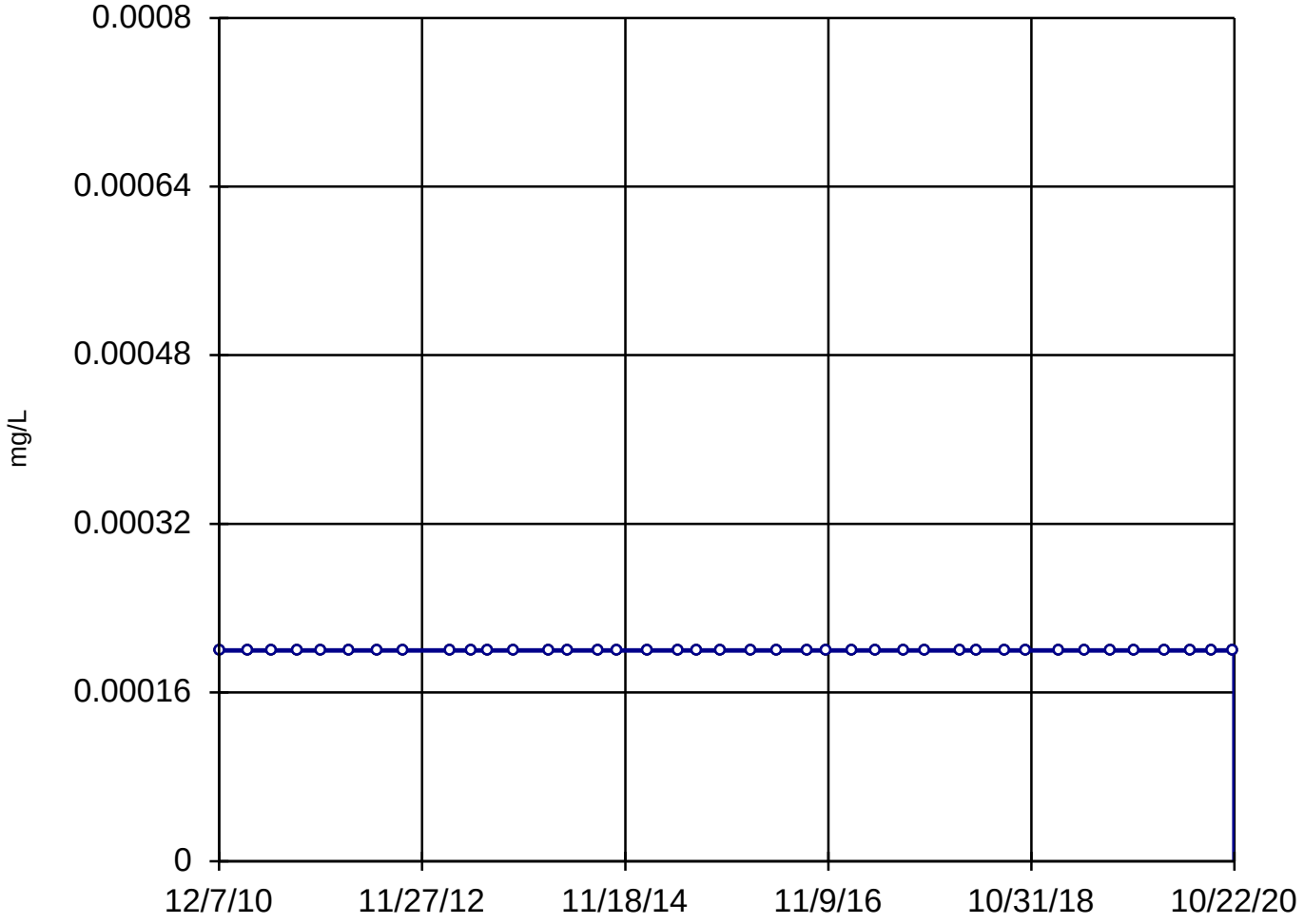
Constituent: Mercury, Dissolved Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

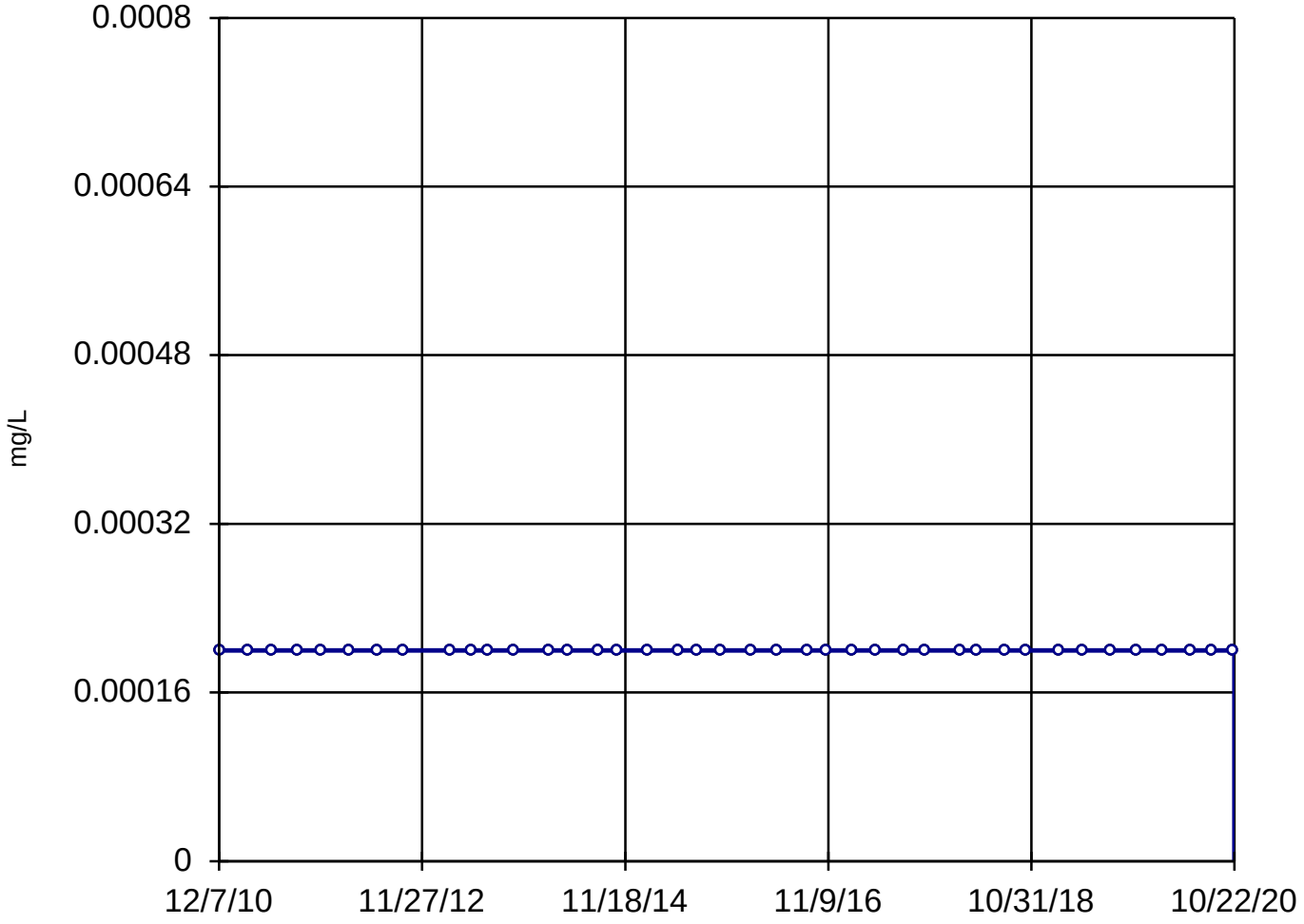
Constituent: Mercury, Dissolved Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-06



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

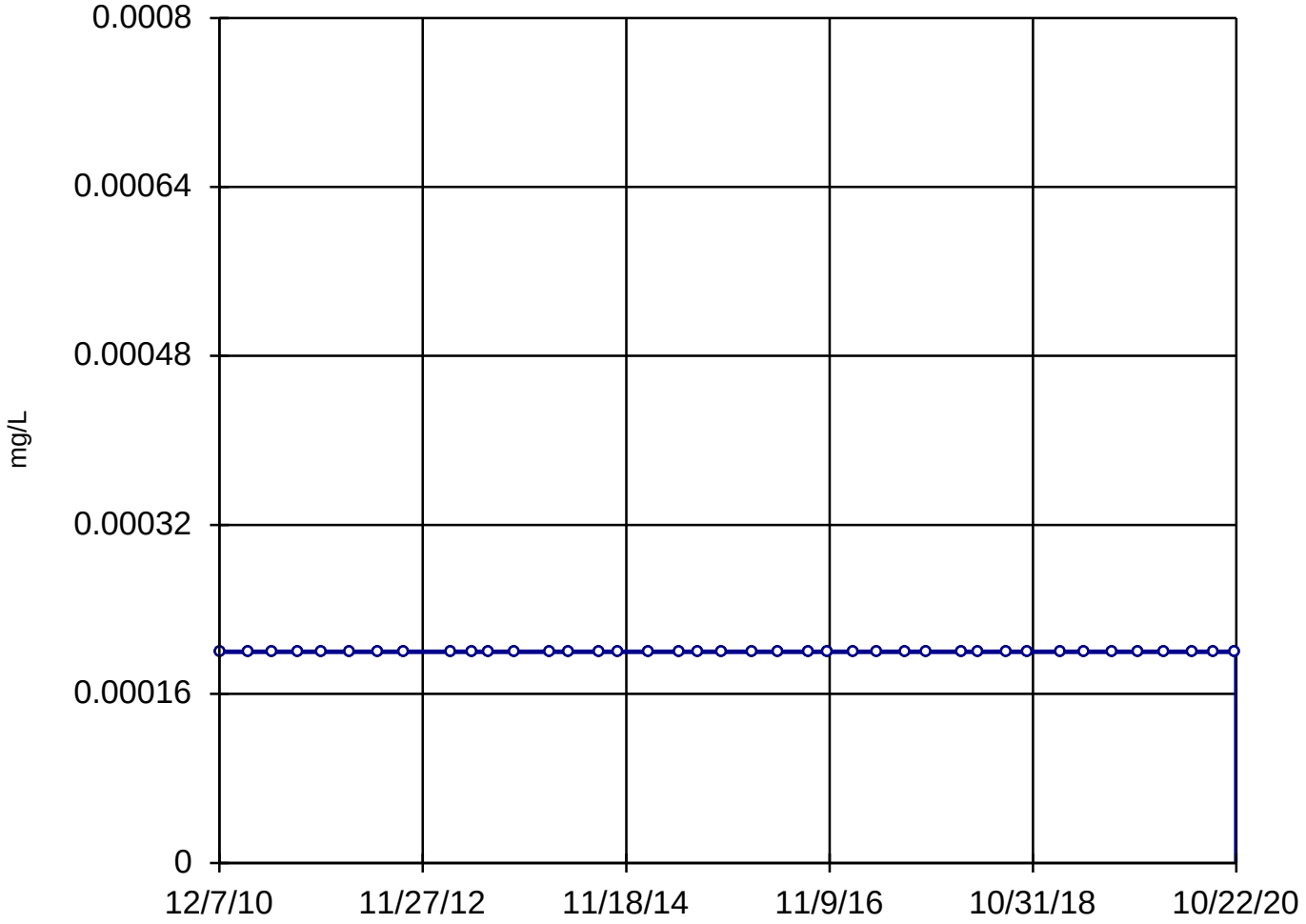
Constituent: Mercury, Dissolved Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-07



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

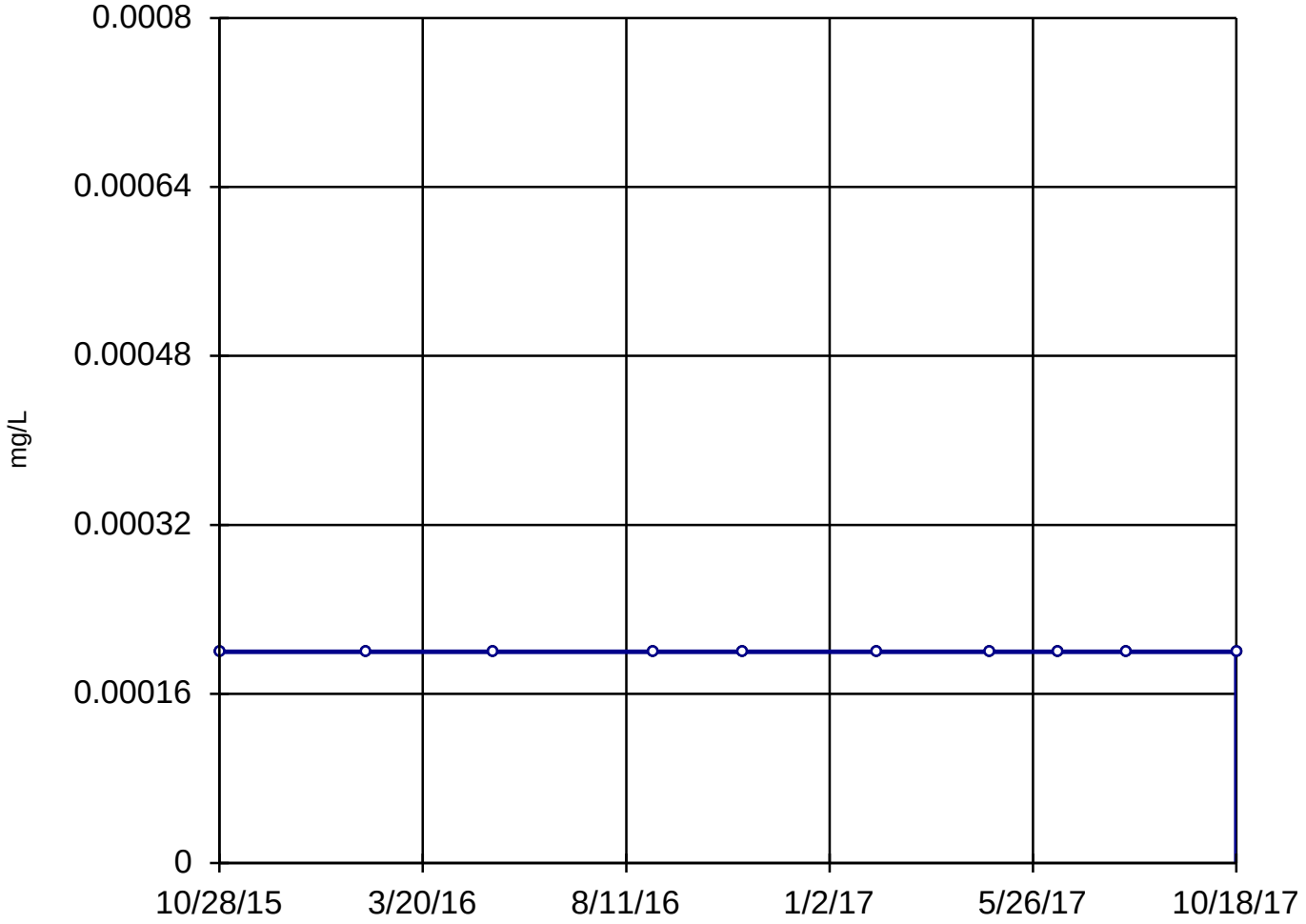
Constituent: Mercury, Dissolved Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

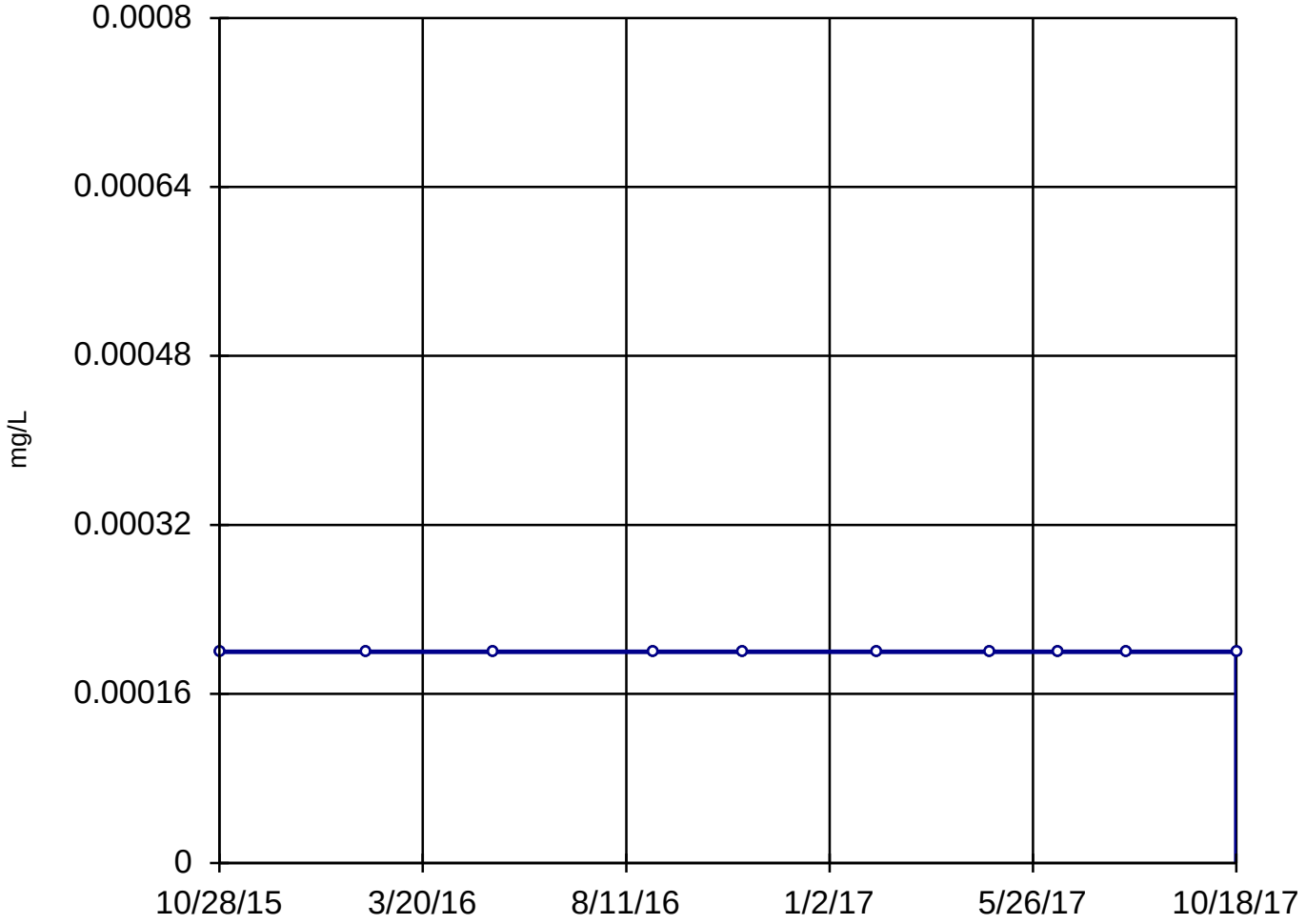
Constituent: Mercury, Total Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

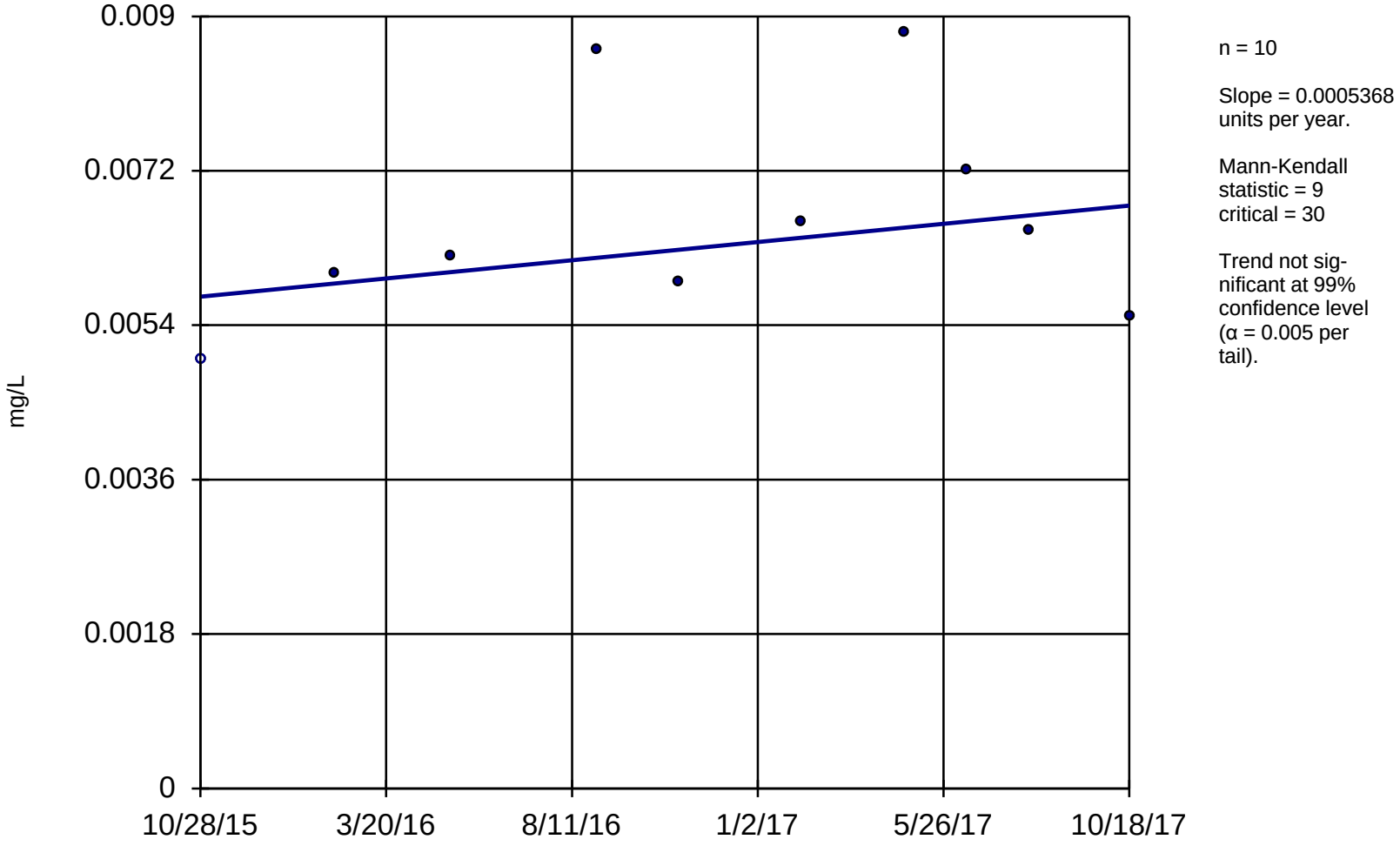
Constituent: Mercury, Total Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 10

Slope = 0.0005368 units per year.

Mann-Kendall statistic = 9
critical = 30

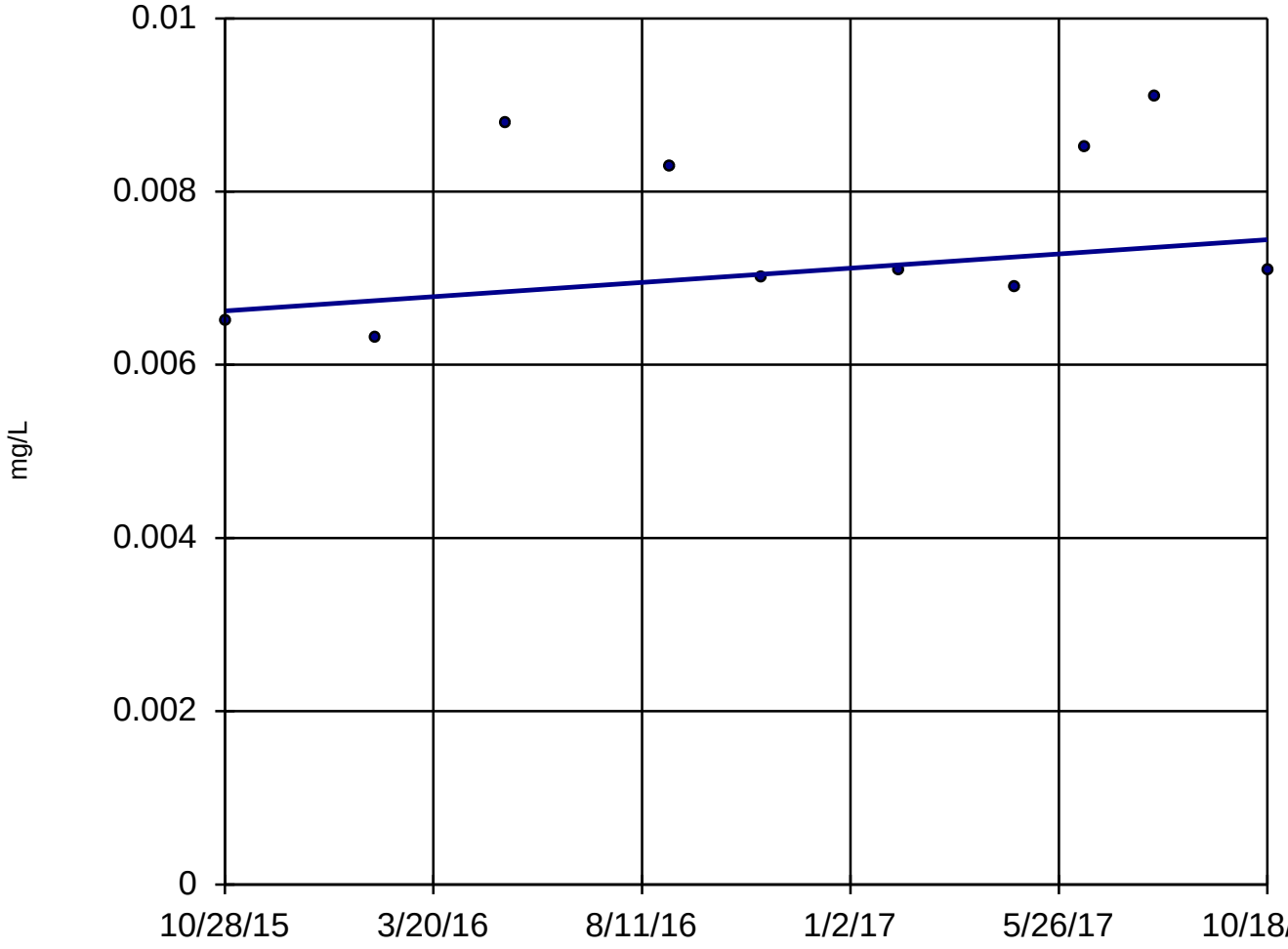
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Molybdenum, Total Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-04



n = 10

Slope = 0.0004171 units per year.

Mann-Kendall statistic = 14
critical = 30

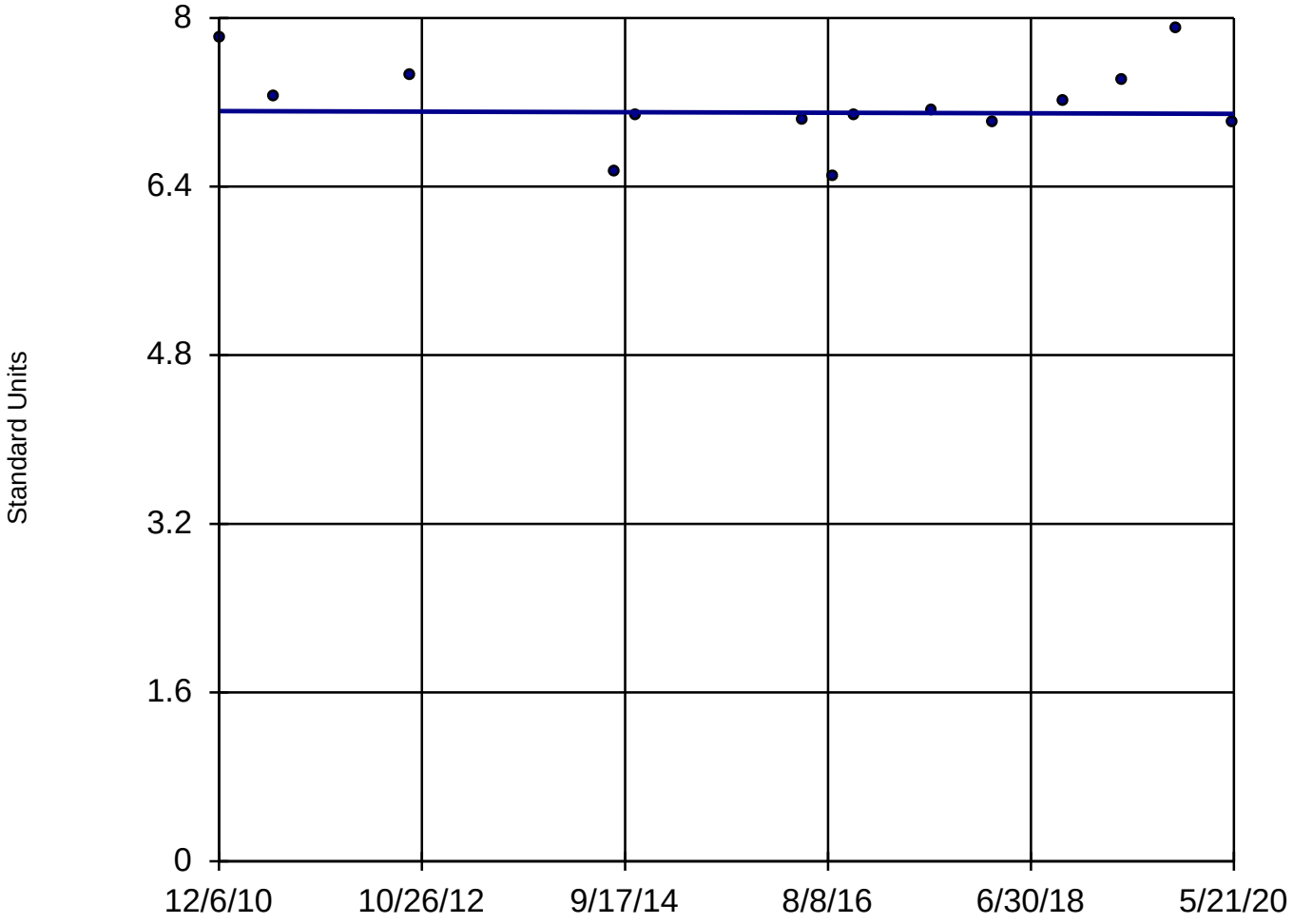
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Molybdenum, Total Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-01



n = 14

Slope = -0.002481 units per year.

Mann-Kendall statistic = -2
critical = -48

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: pH, Field Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

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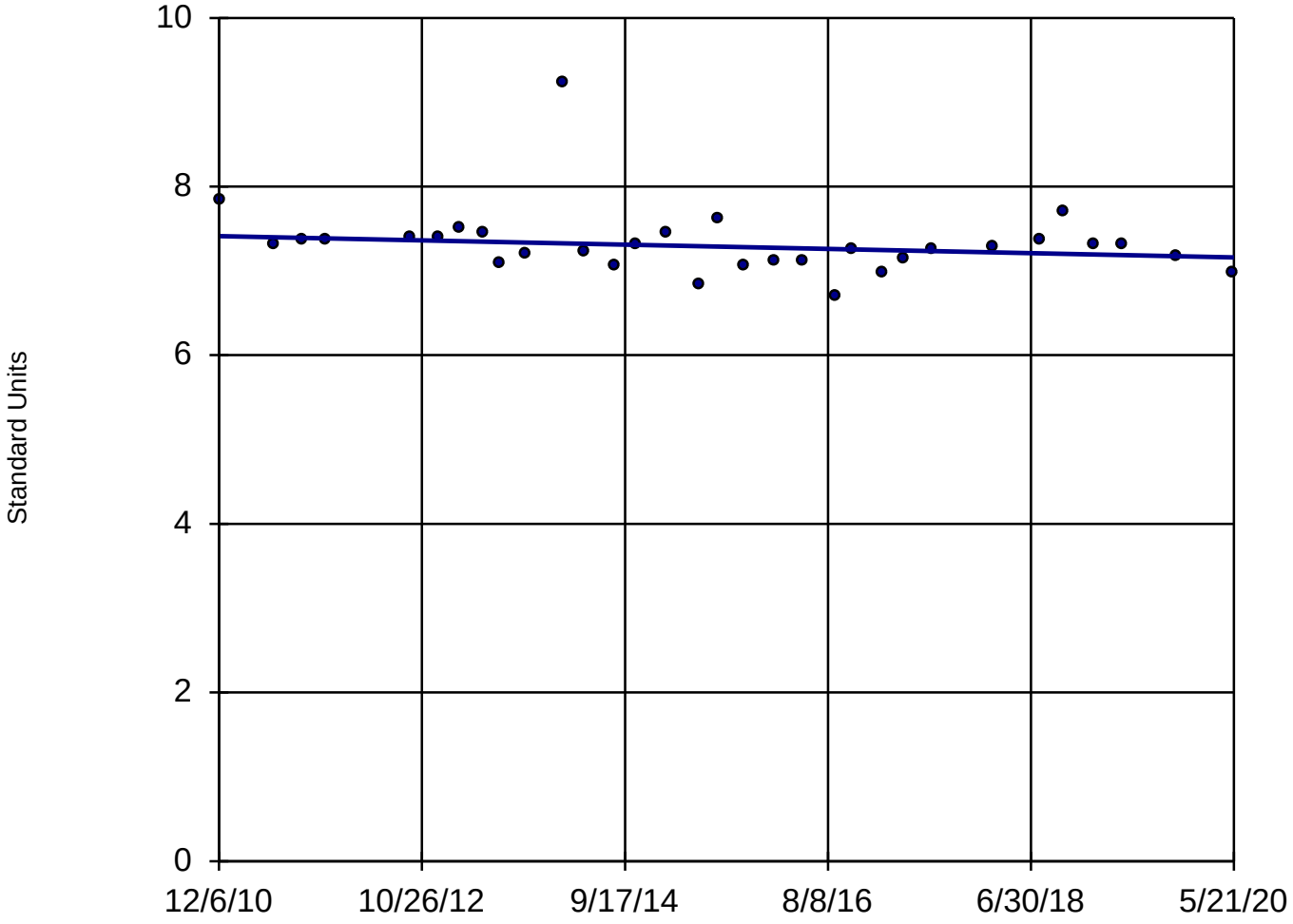
Sen's Slope Estimator

MW-02



n = 32

Slope = -0.02686 units per year.

Mann-Kendall statistic = -99
critical = -161

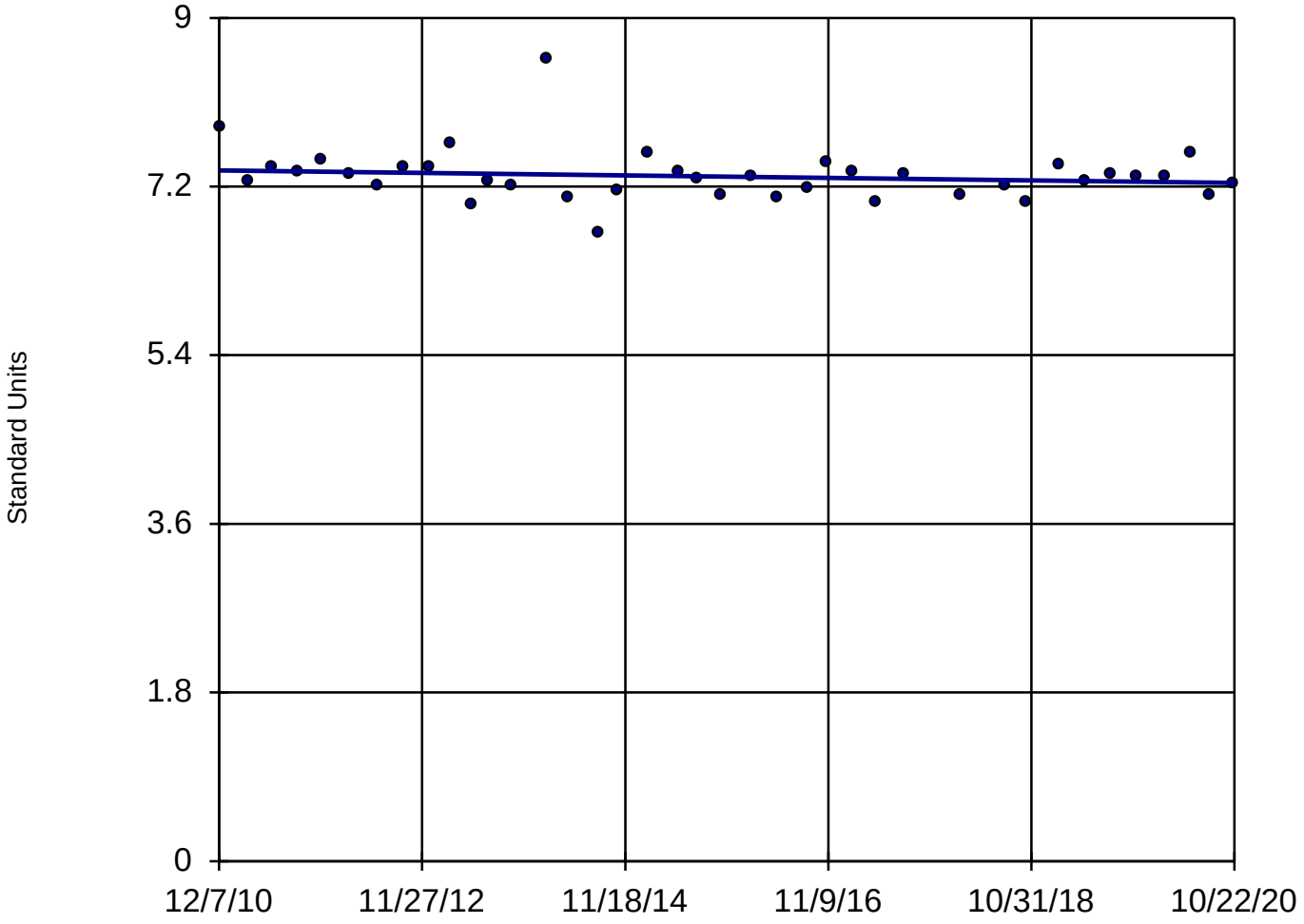
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: pH, Field Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-03



n = 39

Slope = -0.0136 units per year.

Mann-Kendall statistic = -113
critical = -214

Trend not significant at 99% confidence level (α = 0.005 per tail).

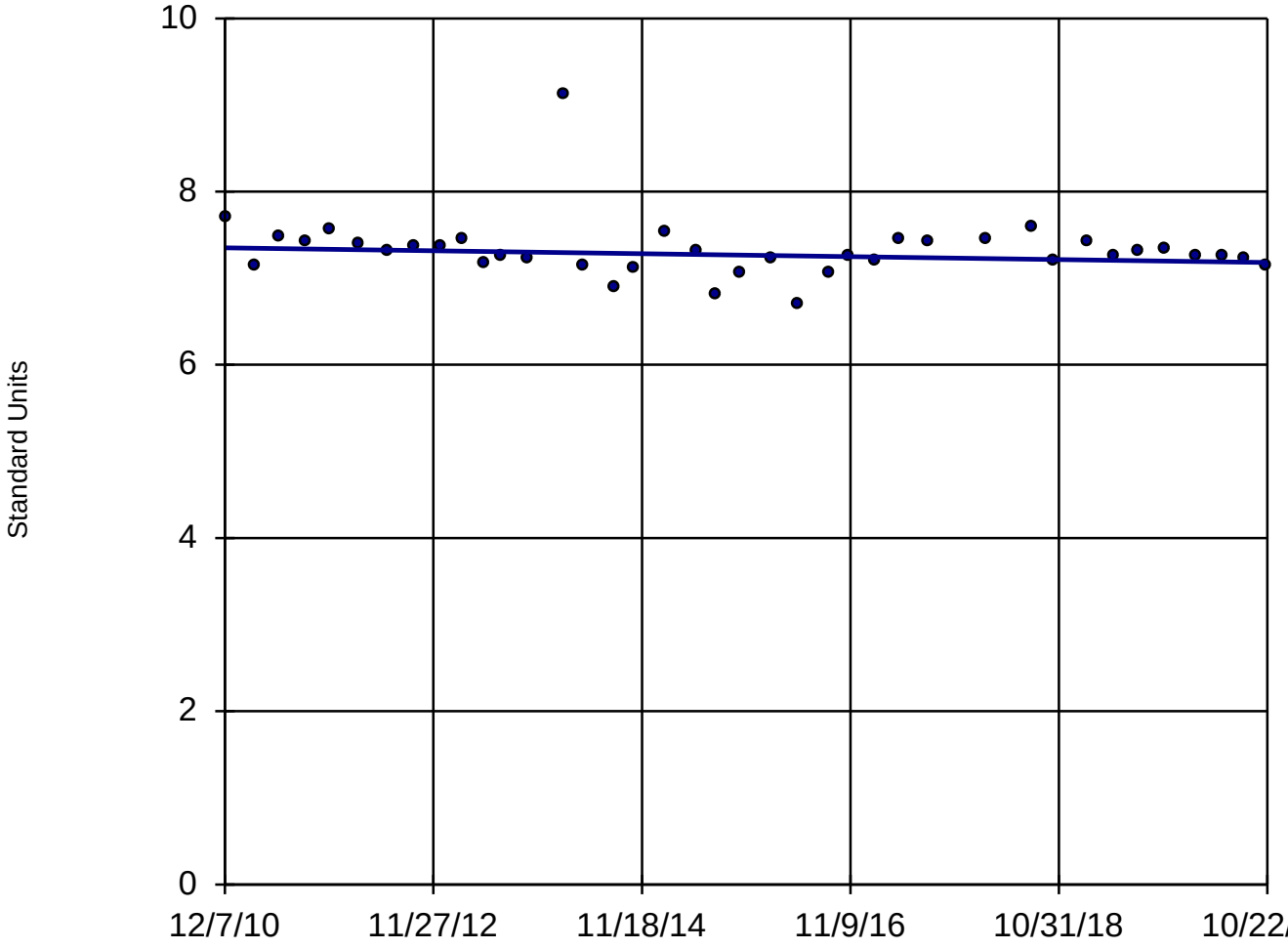
Constituent: pH, Field Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA

Sen's Slope Estimator

MW-04



n = 39

Slope = -0.01699 units per year.

Mann-Kendall statistic = -116
critical = -214

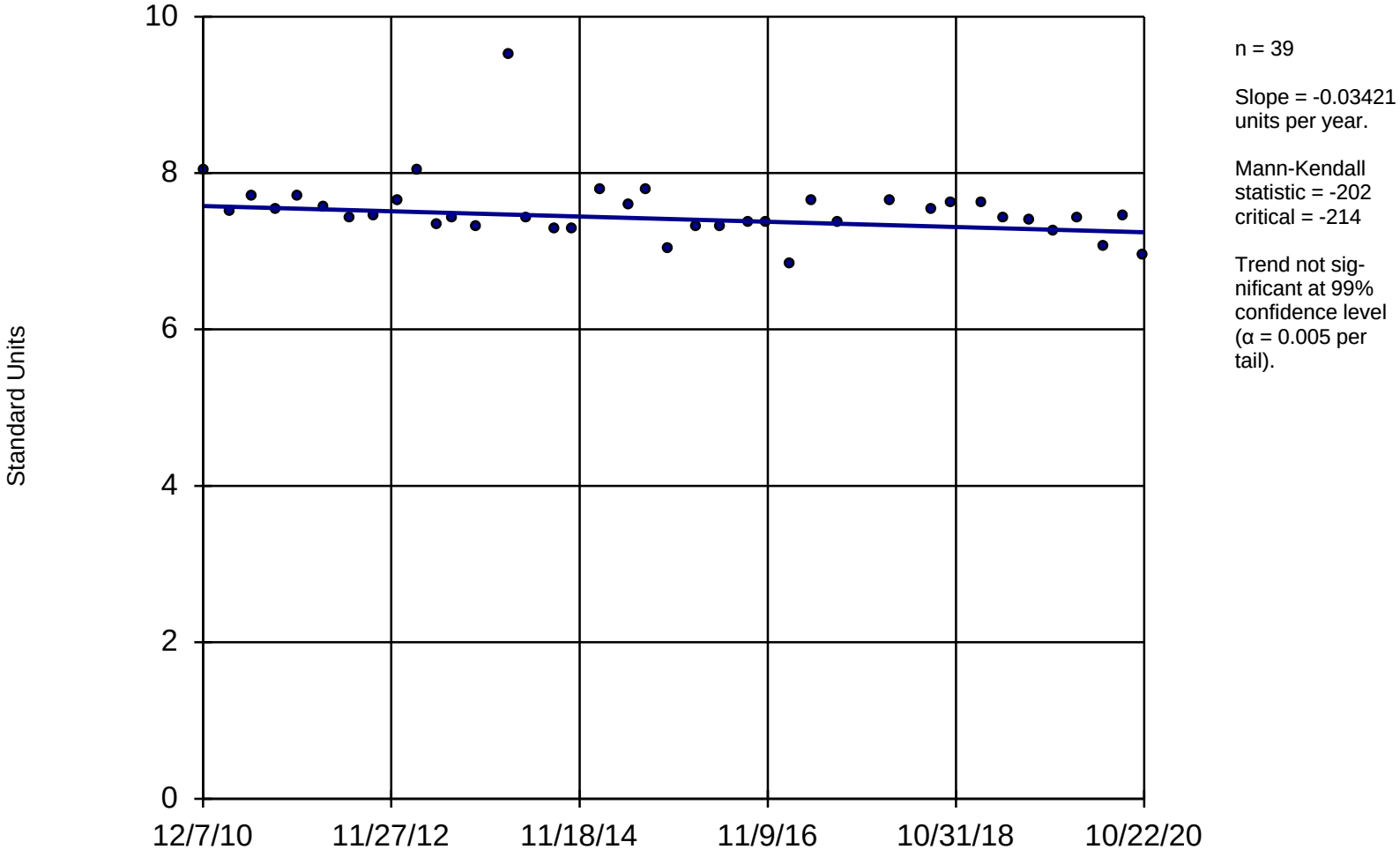
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: pH, Field Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-06



n = 39

Slope = -0.03421 units per year.

Mann-Kendall statistic = -202
critical = -214

Trend not significant at 99% confidence level (α = 0.005 per tail).

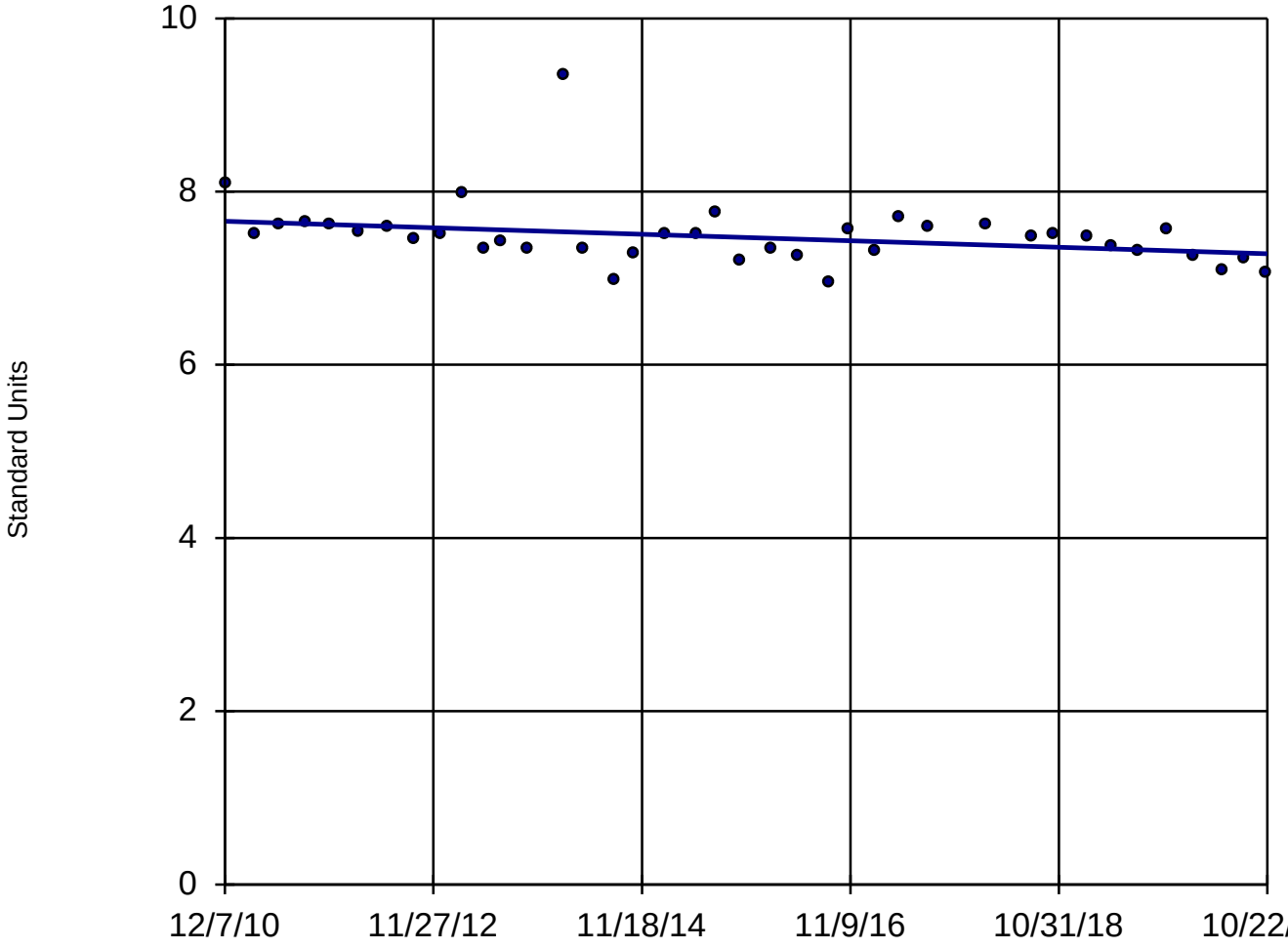
Constituent: pH, Field Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA

Sen's Slope Estimator

MW-07



n = 39

Slope = -0.03777 units per year.

Mann-Kendall statistic = -246
critical = -214

Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

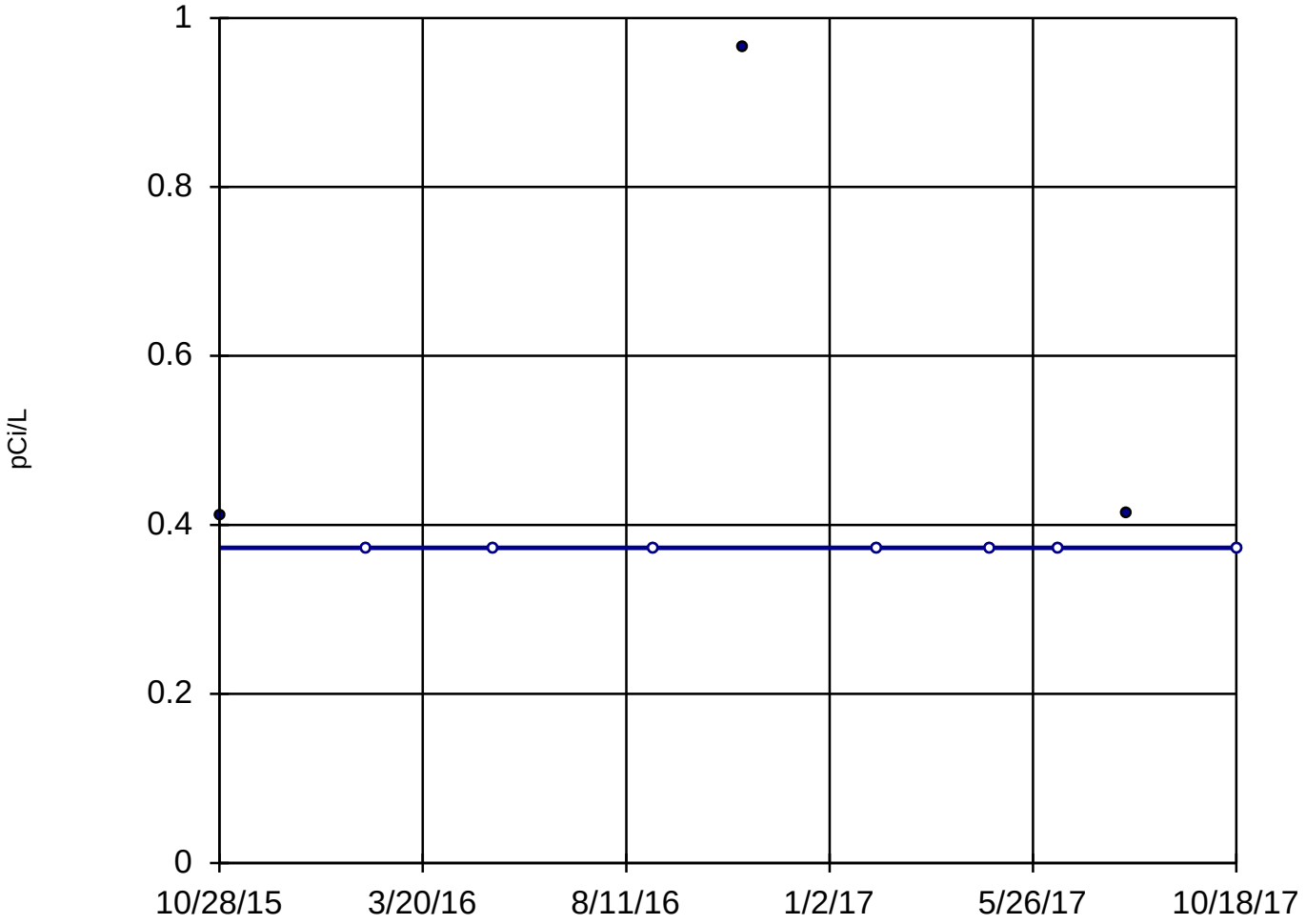
Constituent: pH, Field Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = -2
critical = -30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

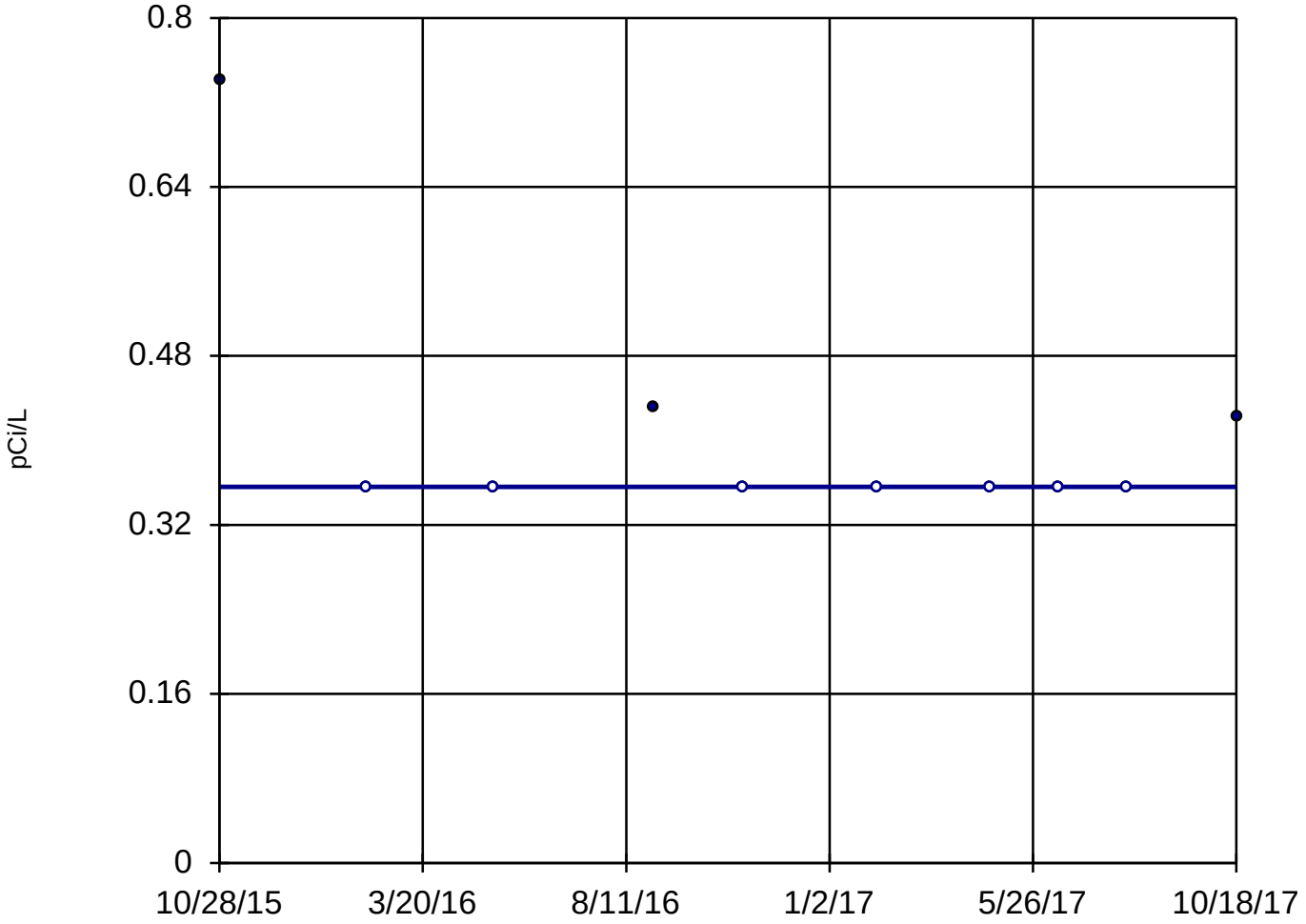
Constituent: Radium 226 + Radium 228, Combined Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = -6
critical = -30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

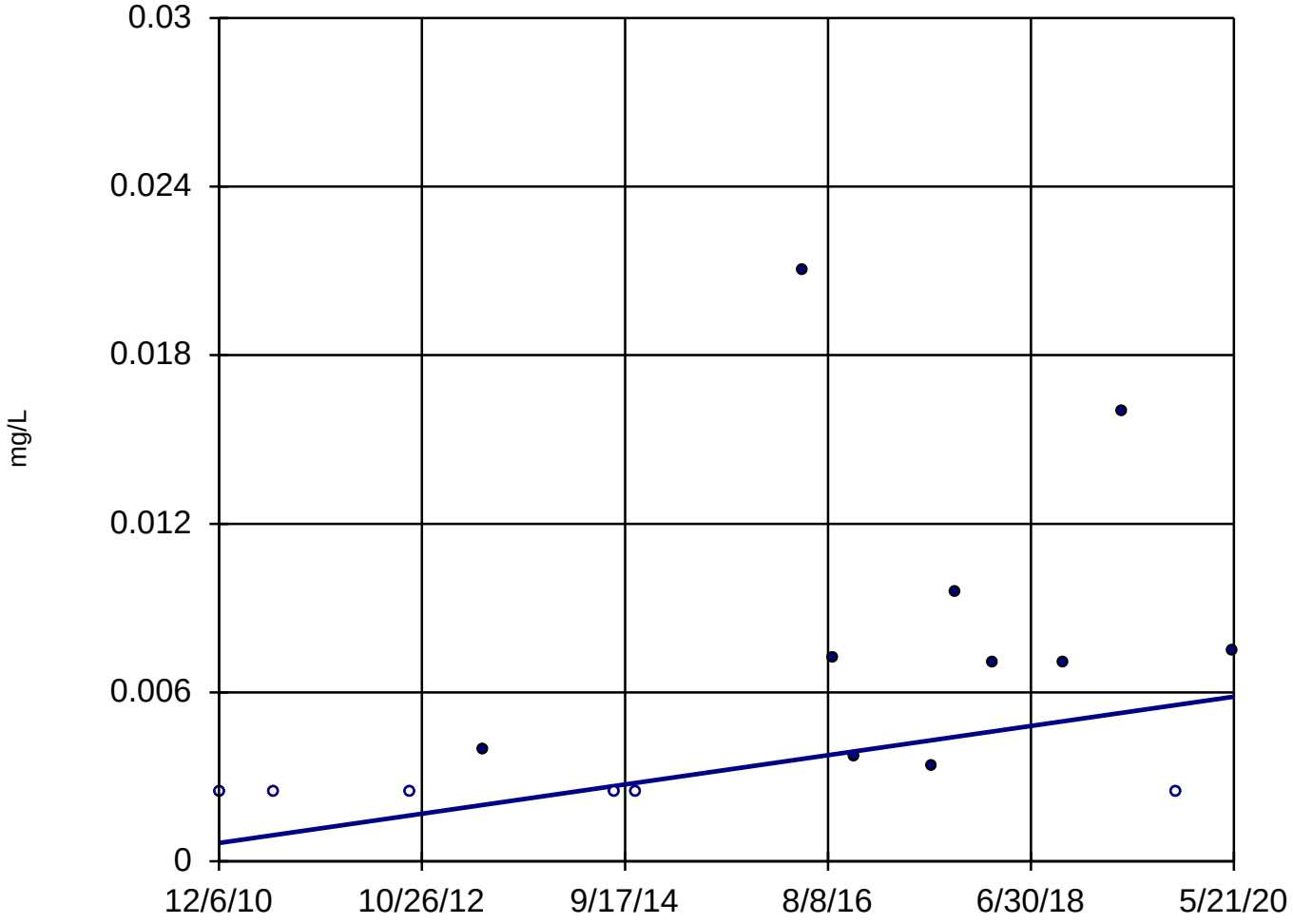
Constituent: Radium 226 + Radium 228, Combined Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-01



n = 16

Slope = 0.0005506 units per year.

Mann-Kendall statistic = 44
critical = 58

Trend not significant at 99% confidence level (α = 0.005 per tail).

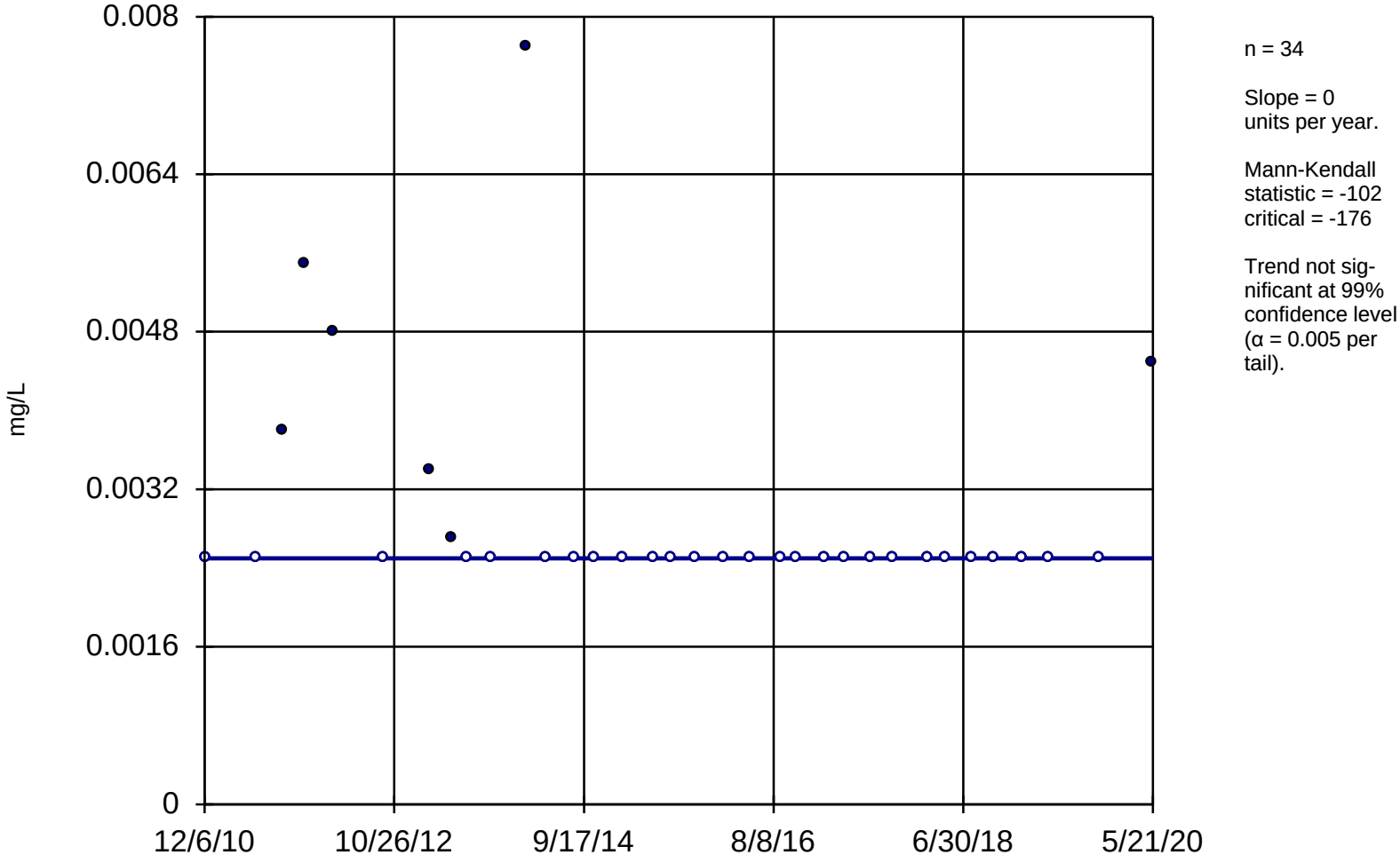
Constituent: Selenium, Dissolved Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-02



n = 34

Slope = 0
units per year.

Mann-Kendall
statistic = -102
critical = -176

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

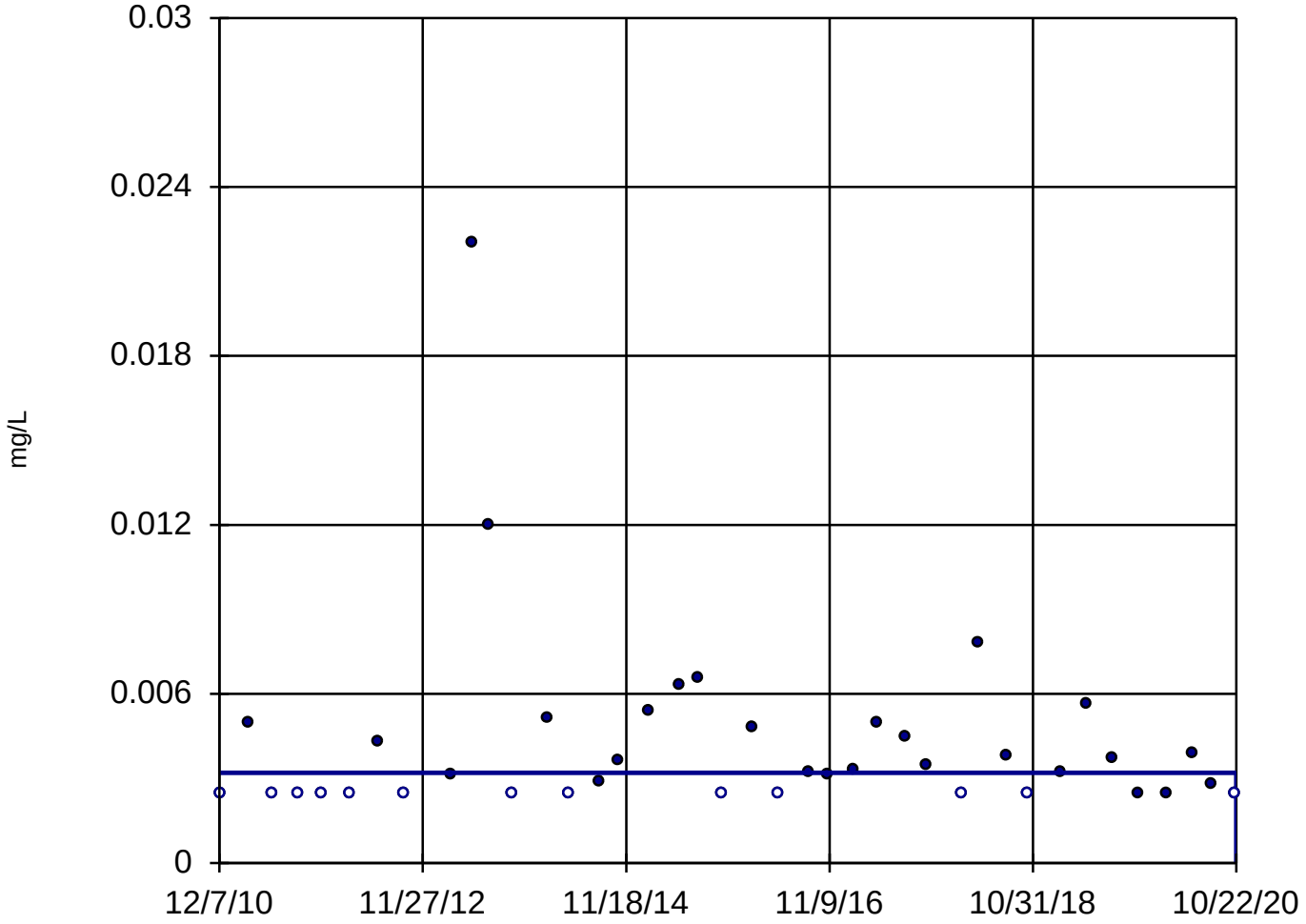
Constituent: Selenium, Dissolved Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = 26
critical = 223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

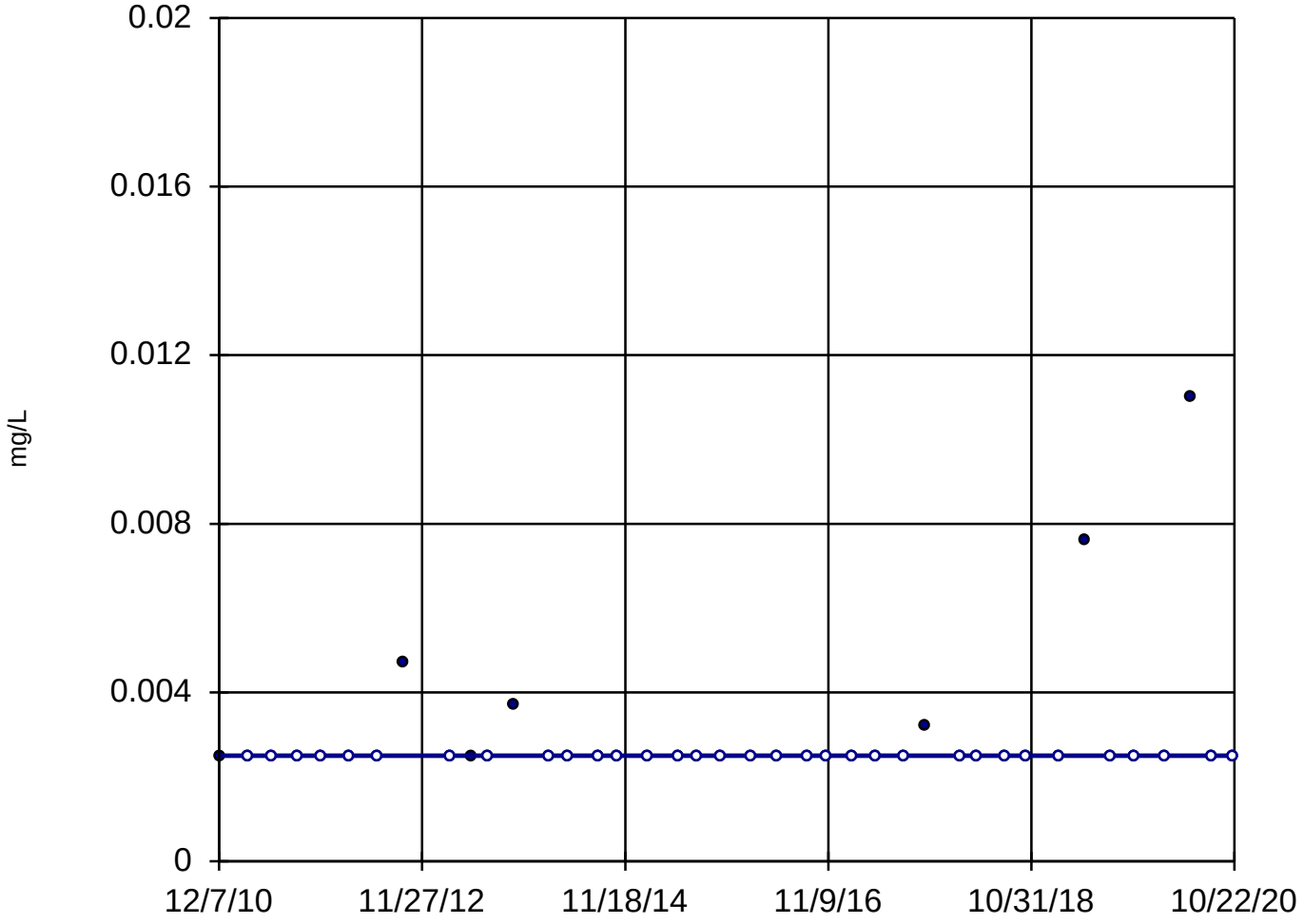
Constituent: Selenium, Dissolved Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = 39
critical = 223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

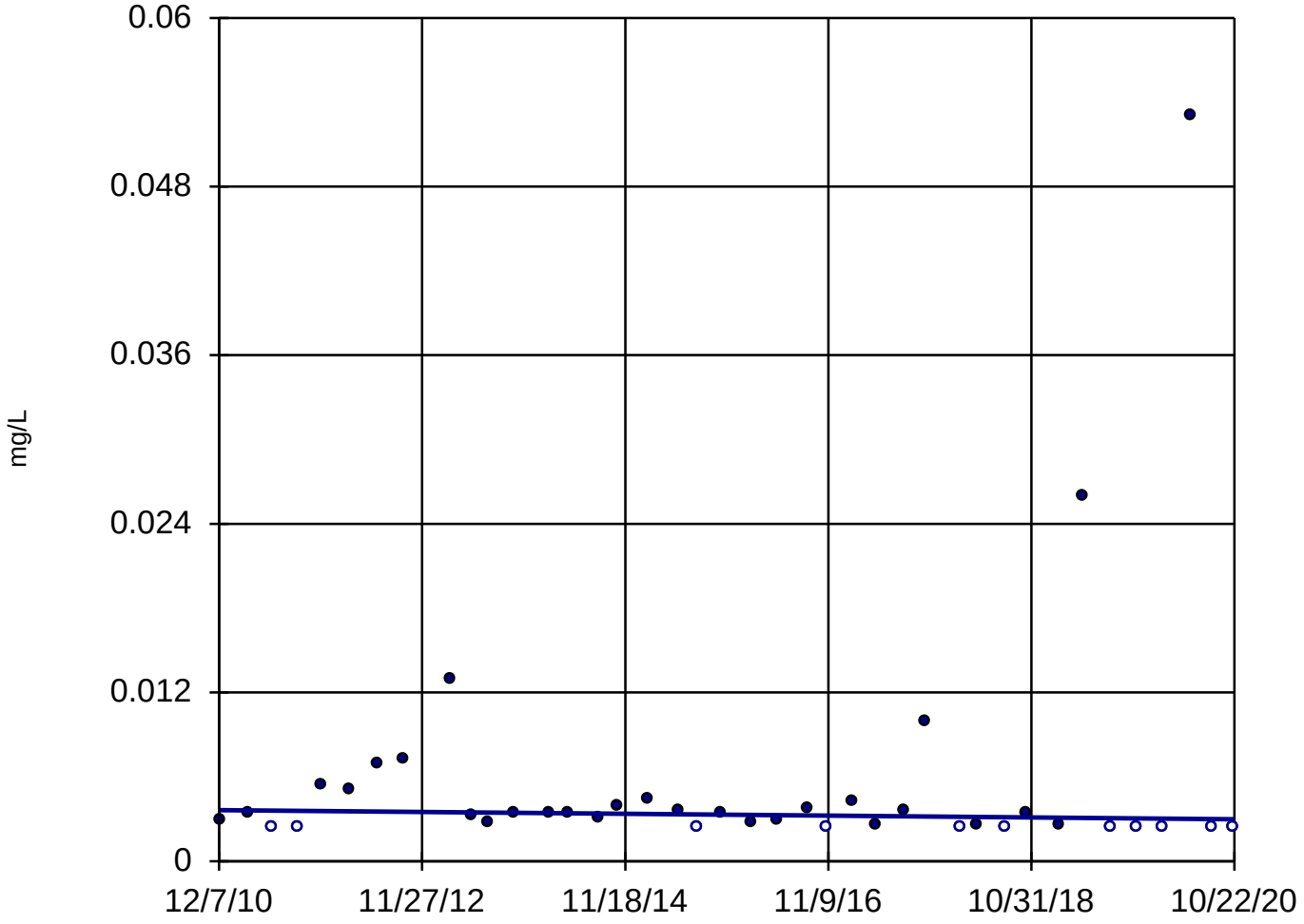
Constituent: Selenium, Dissolved Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-06



n = 40

Slope = -0.00006728 units per year.

Mann-Kendall statistic = -155
critical = -223

Trend not significant at 99% confidence level (α = 0.005 per tail).

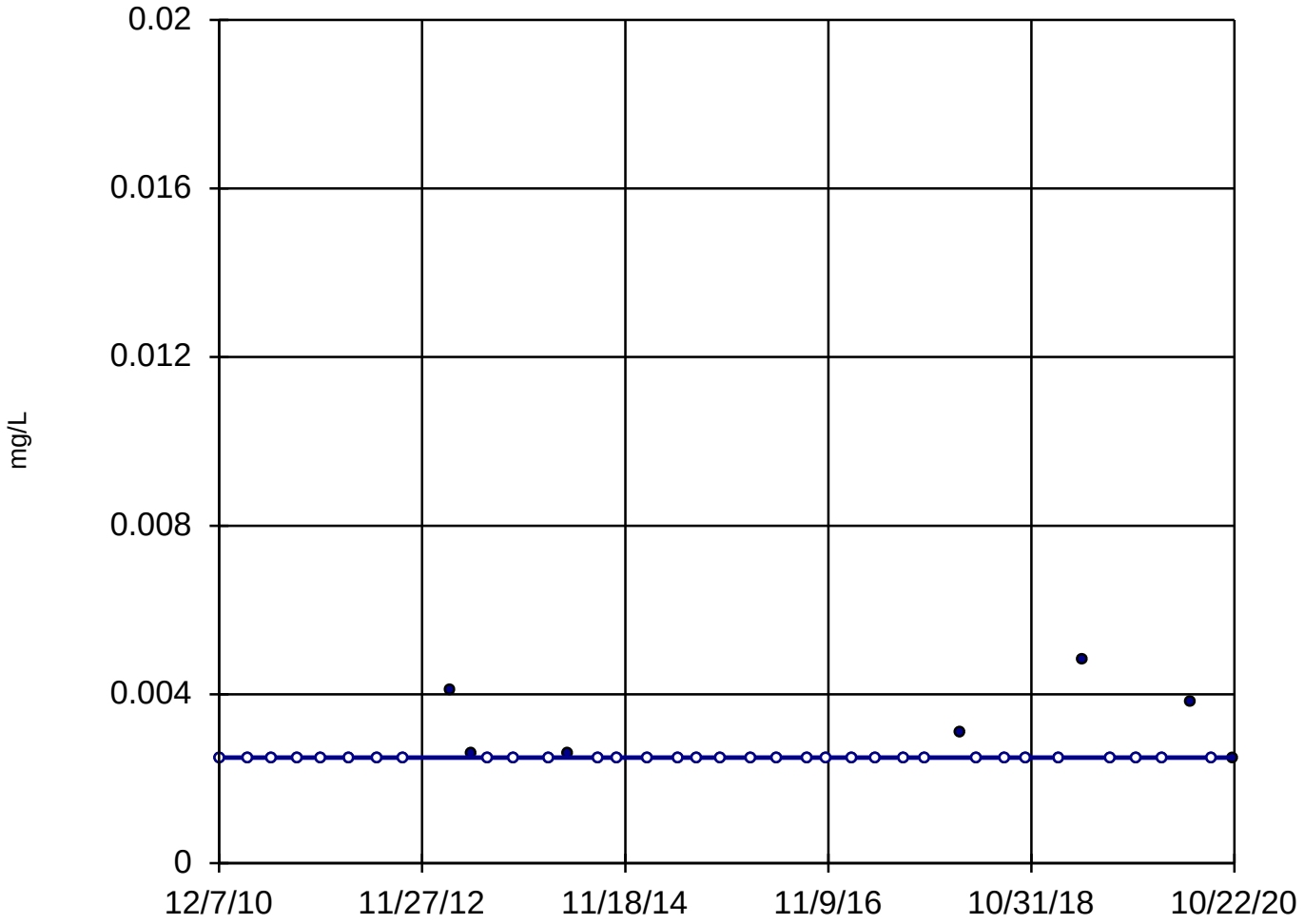
Constituent: Selenium, Dissolved Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-07



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = 26
critical = 223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

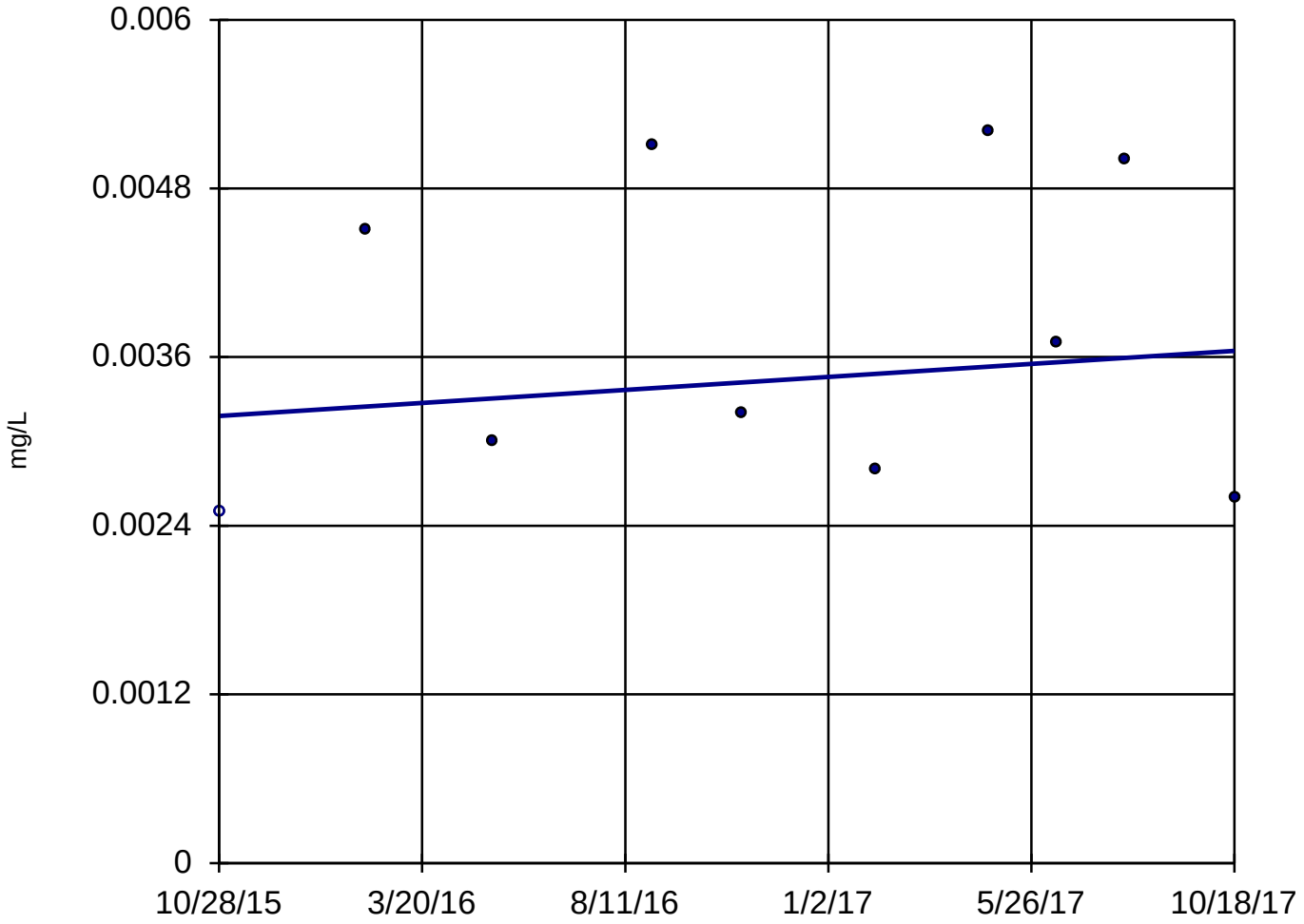
Constituent: Selenium, Dissolved Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 10

Slope = 0.0002345 units per year.

Mann-Kendall statistic = 5
critical = 30

Trend not significant at 99% confidence level (α = 0.005 per tail).

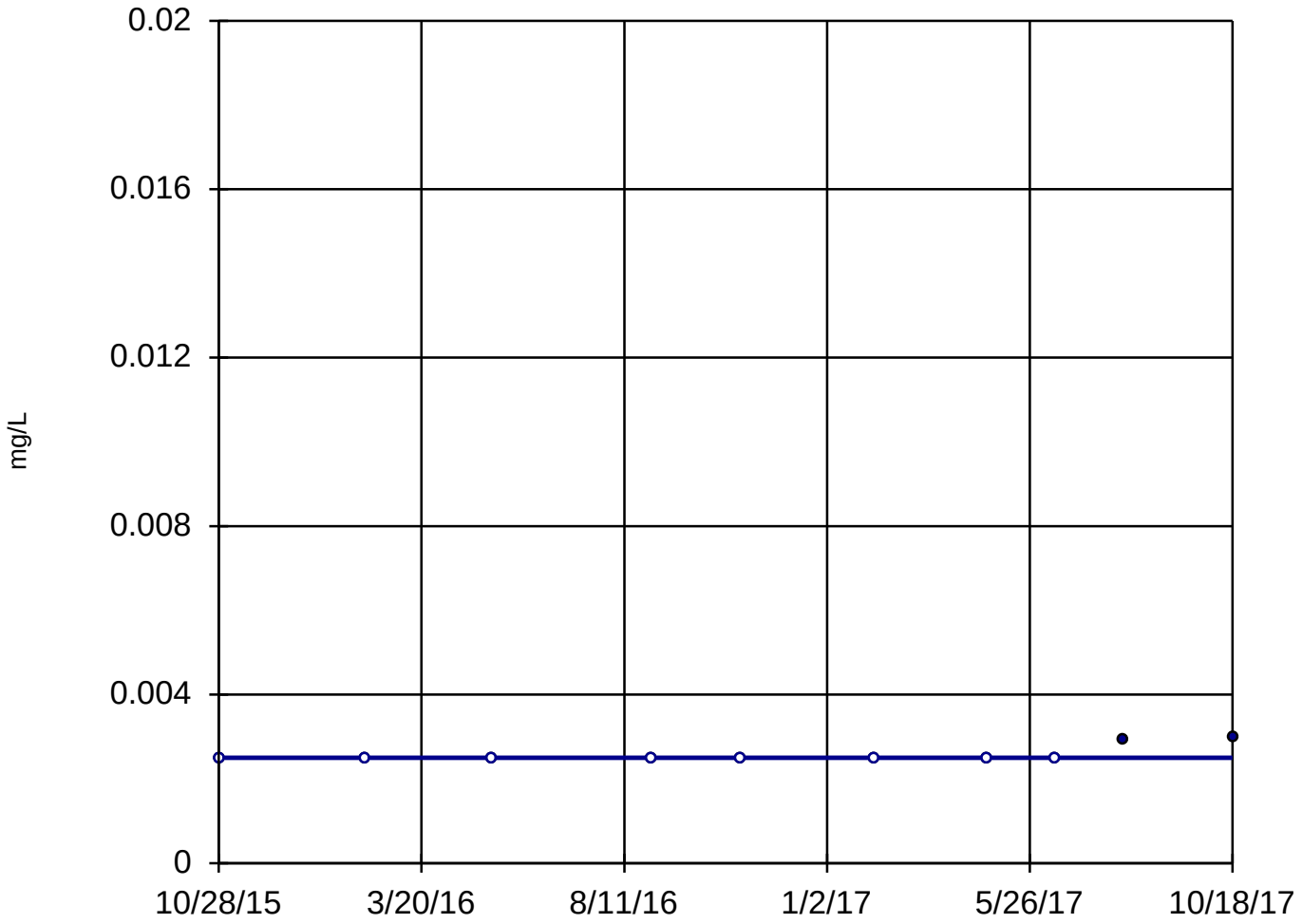
Constituent: Selenium, Total Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 17
critical = 30

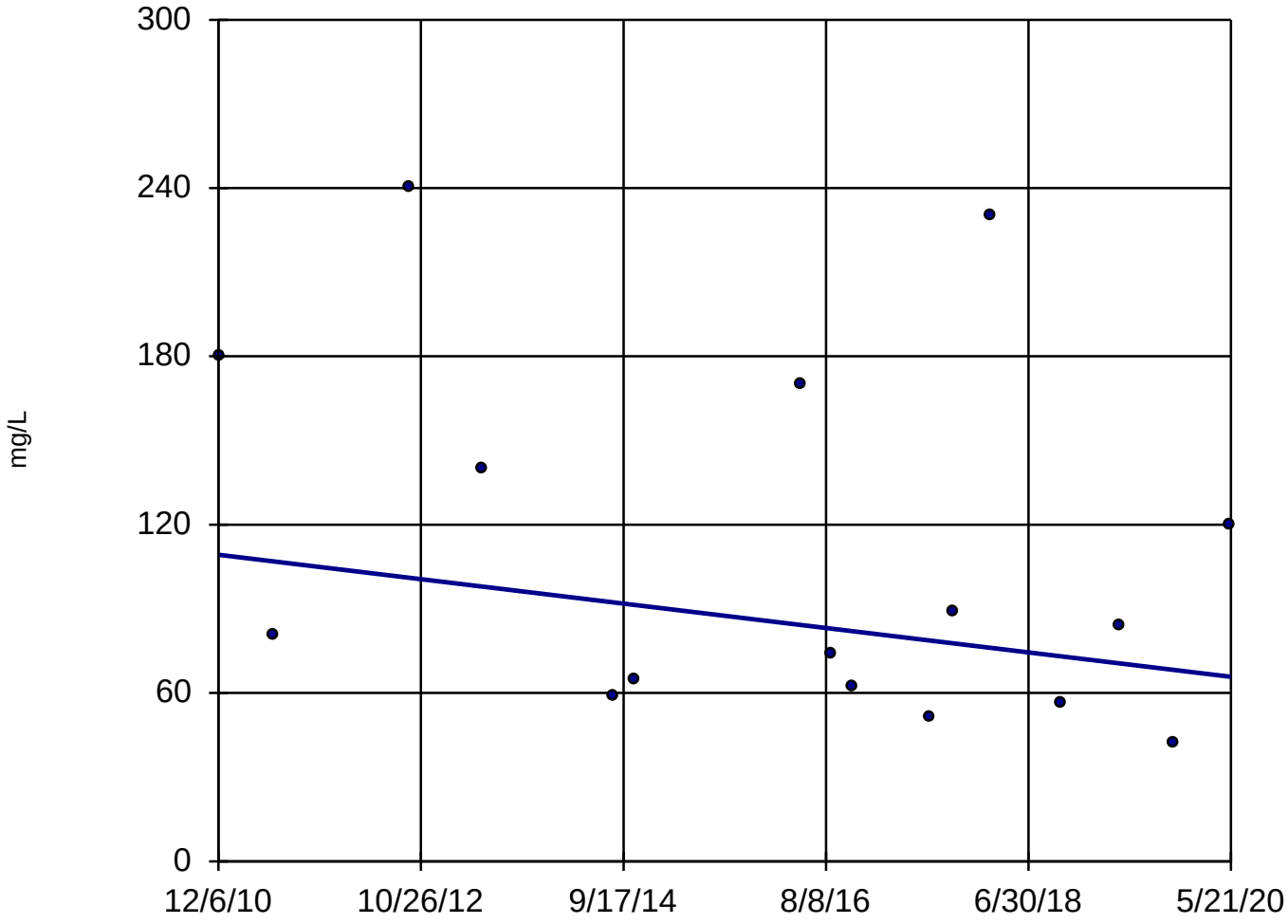
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Selenium, Total Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-01



n = 16

Slope = -4.6 units per year.

Mann-Kendall statistic = -30
critical = -58

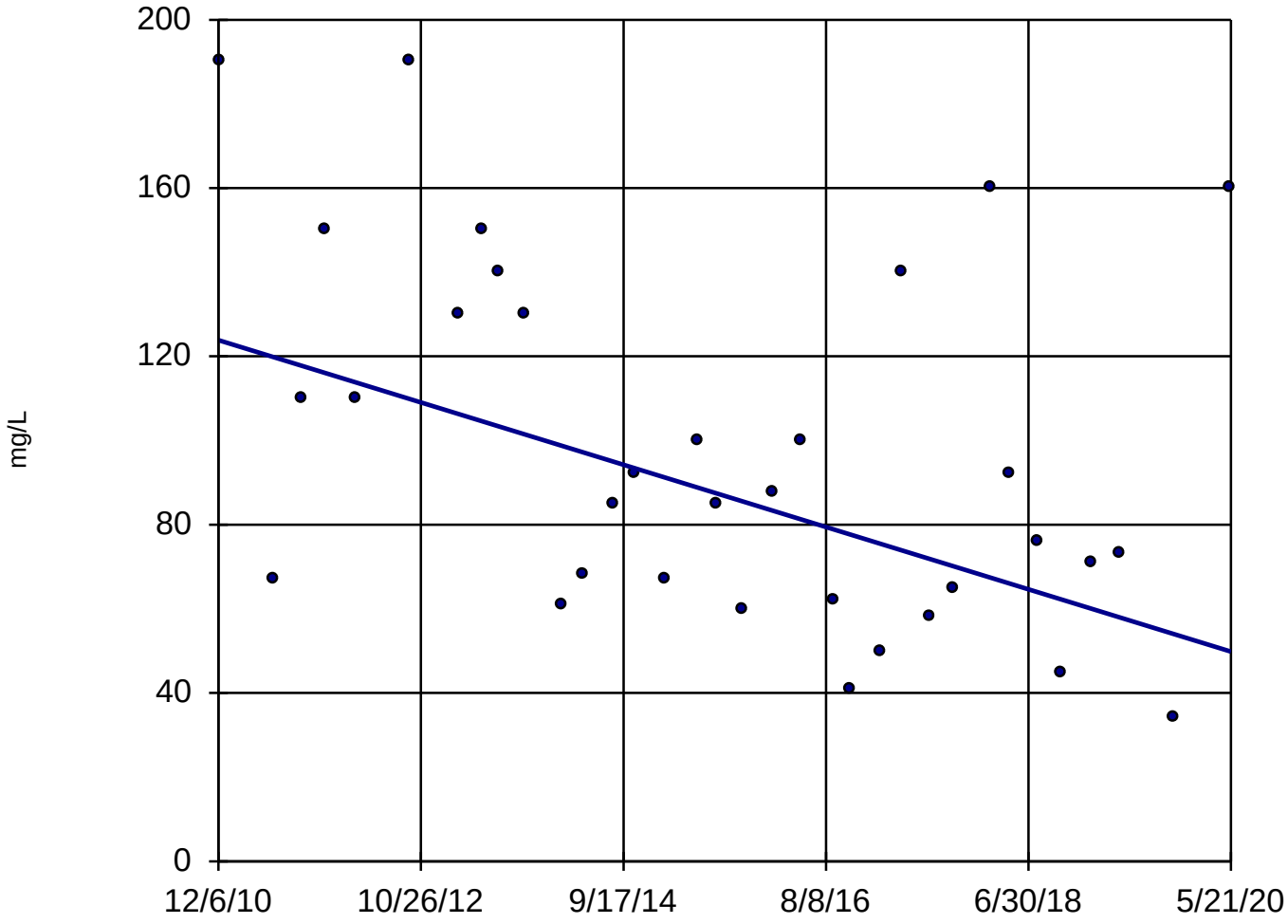
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Sulfate Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-02



n = 34

Slope = -7.826 units per year.

Mann-Kendall statistic = -175
critical = -176

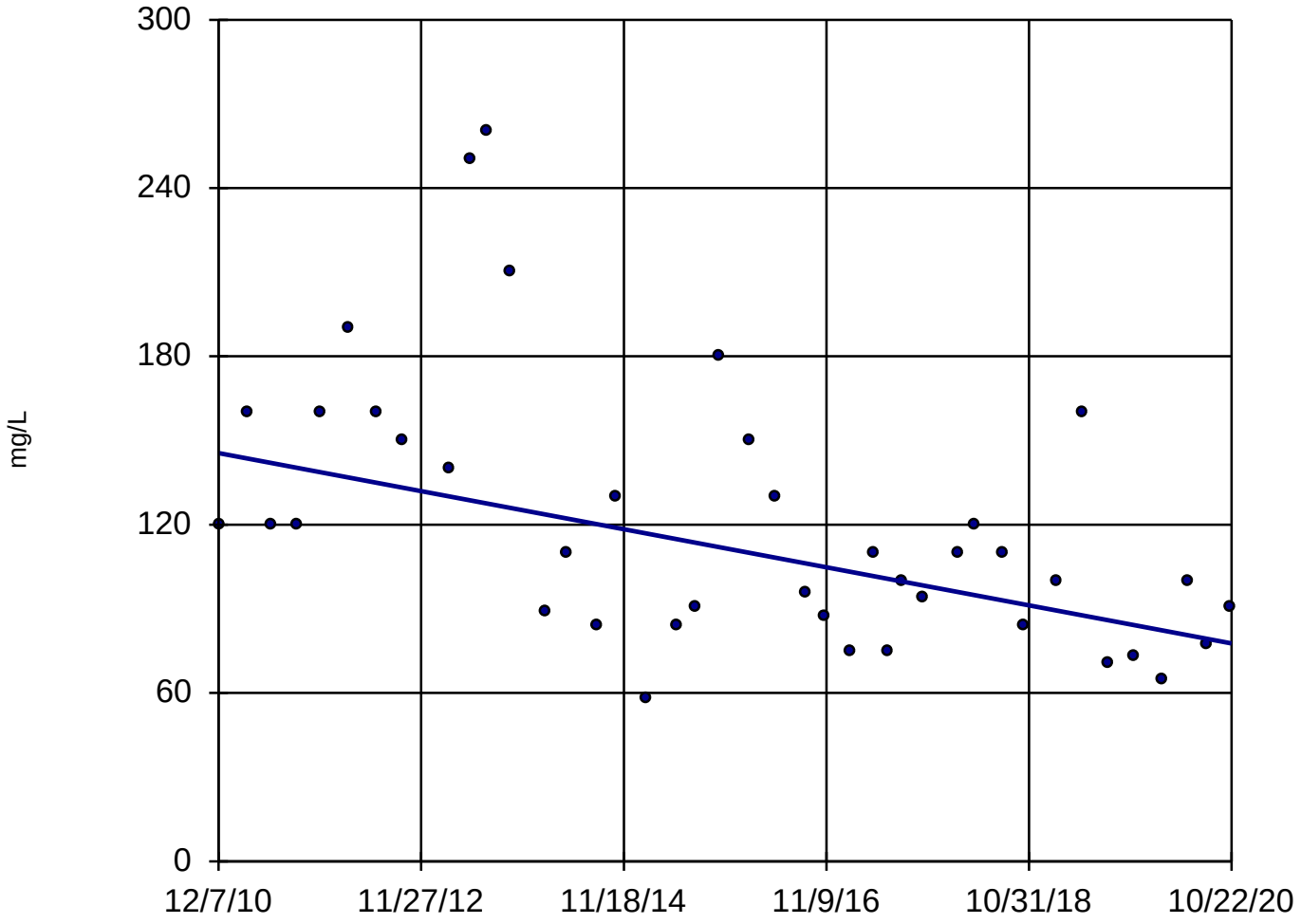
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Sulfate Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-03



n = 41

Slope = -6.868 units per year.

Mann-Kendall normal approx. = -3.501
critical = -2.58

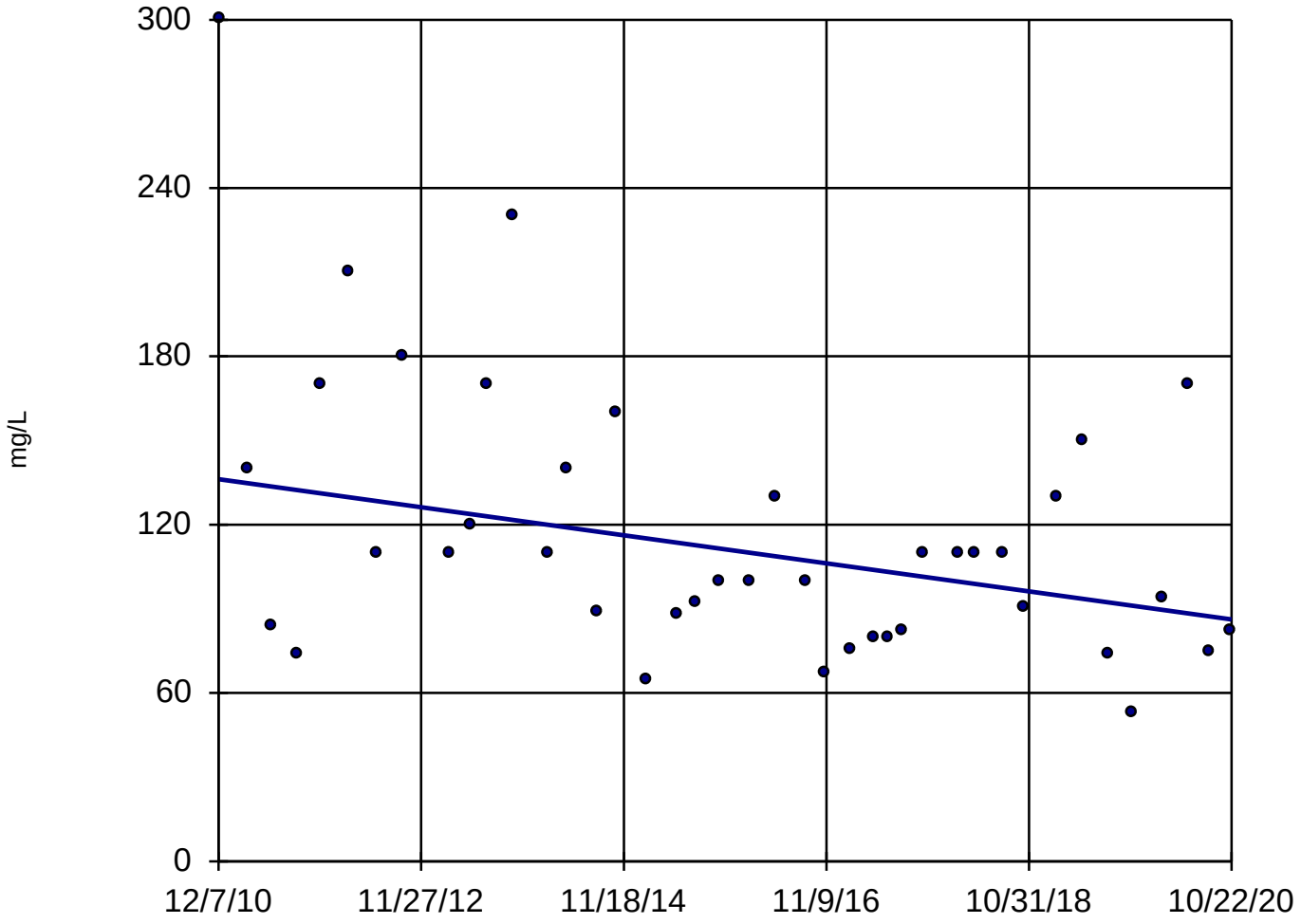
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Sulfate Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-04



n = 41

Slope = -5.06 units per year.

Mann-Kendall normal approx. = -2.356
critical = -2.58

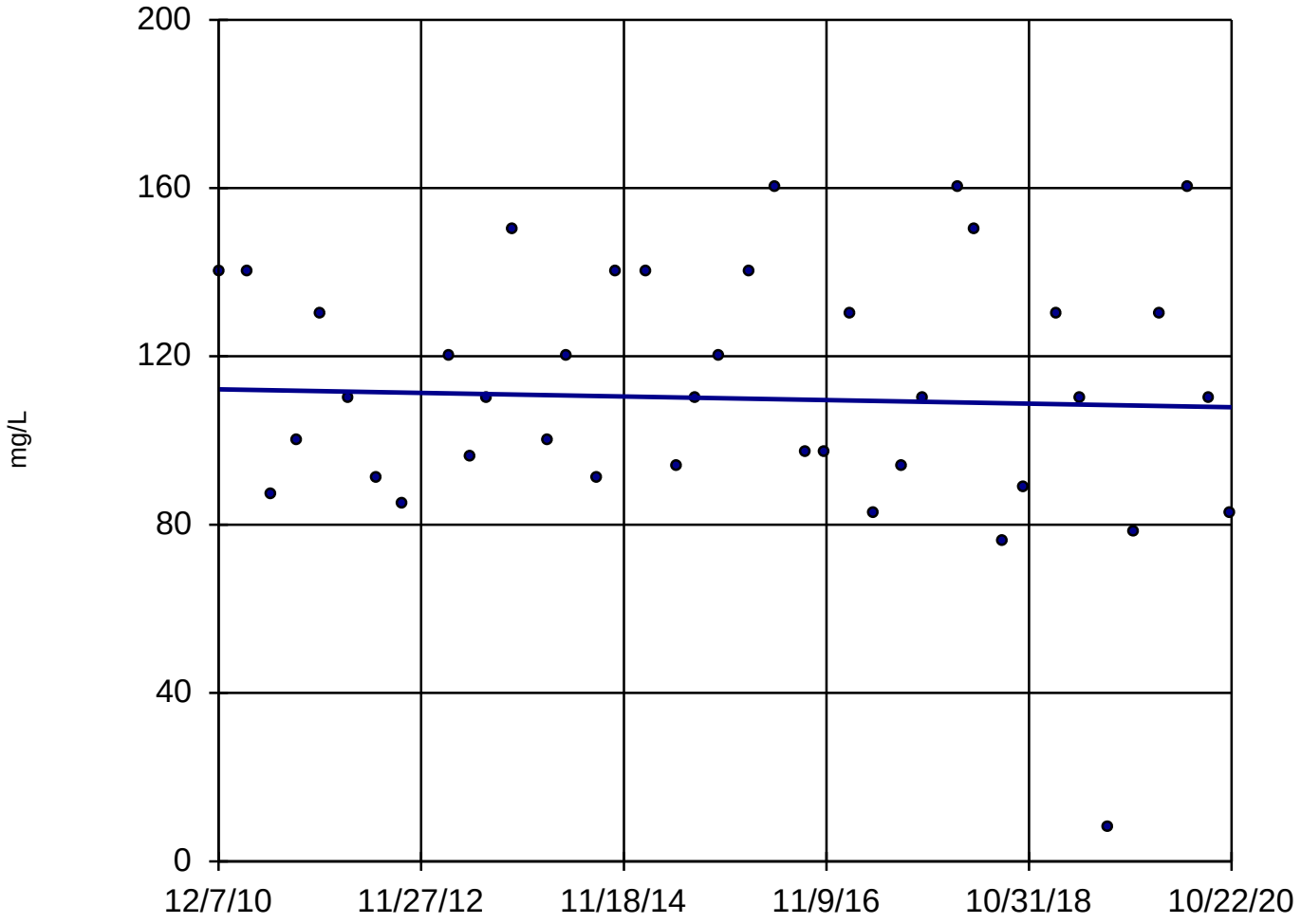
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Sulfate Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-06



n = 40

Slope = -0.4307 units per year.

Mann-Kendall statistic = -49
critical = -223

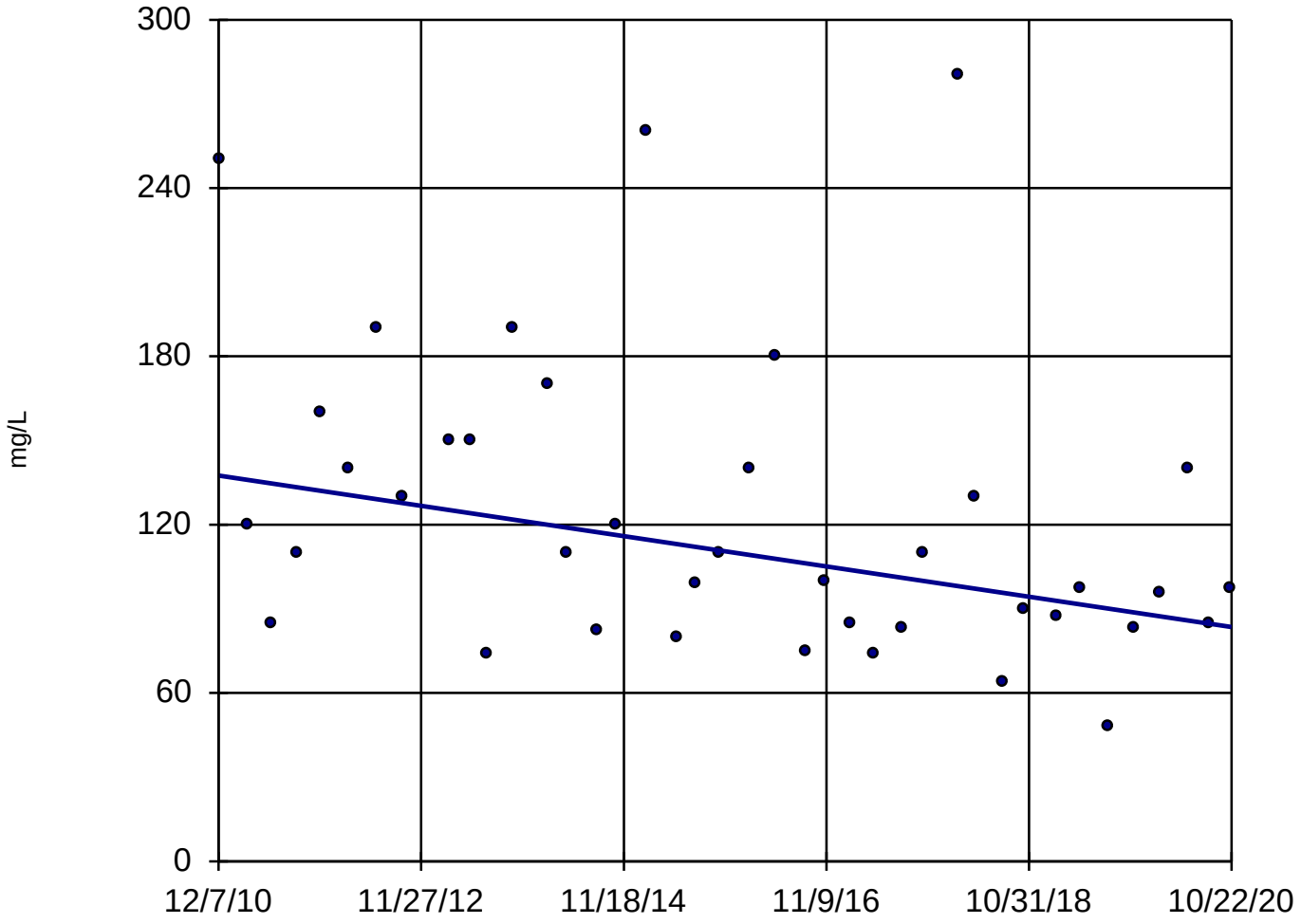
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Sulfate Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-07



n = 40

Slope = -5.456 units per year.

Mann-Kendall statistic = -215
critical = -223

Trend not significant at 99% confidence level (α = 0.005 per tail).

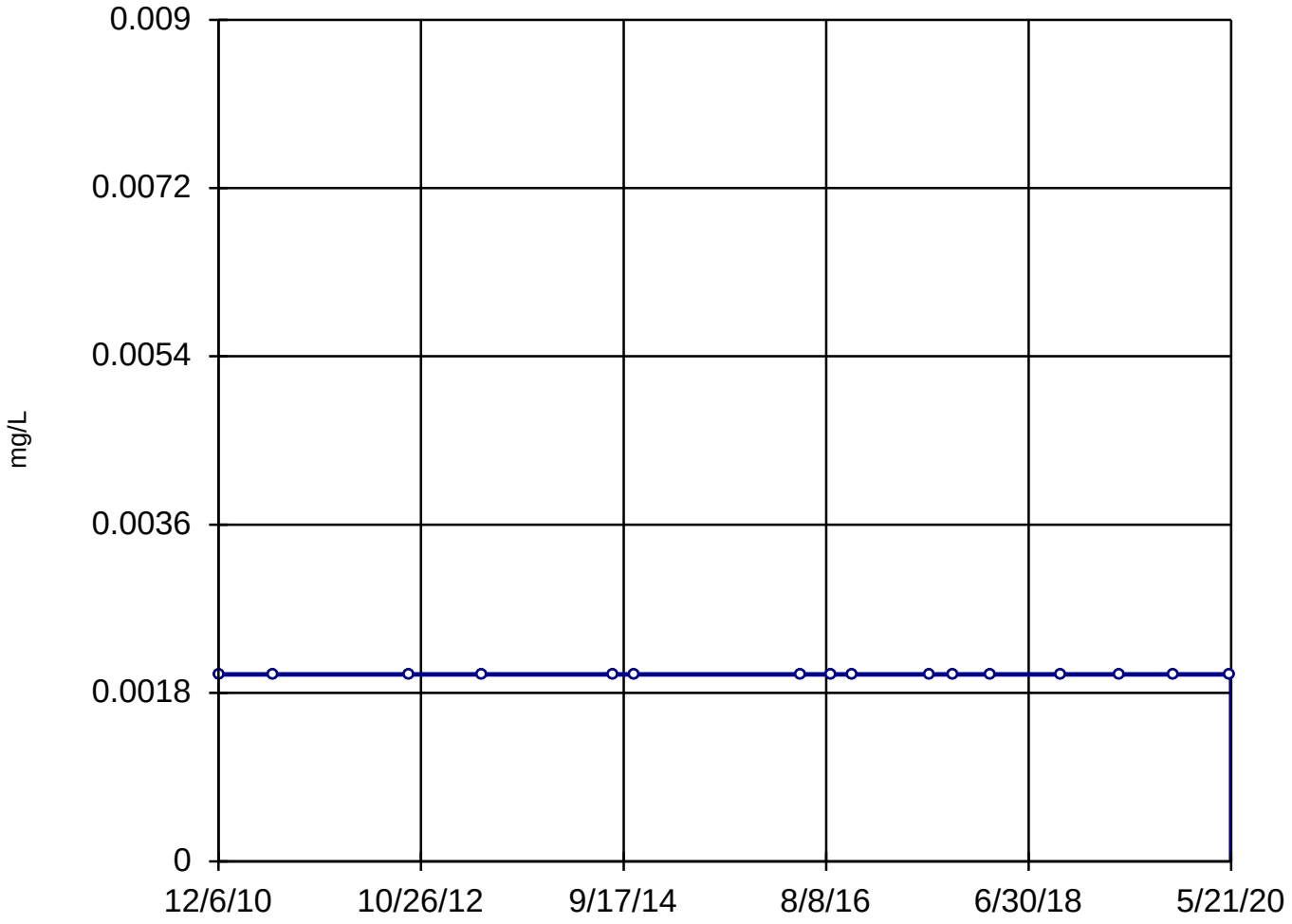
Constituent: Sulfate Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-01



n = 16

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

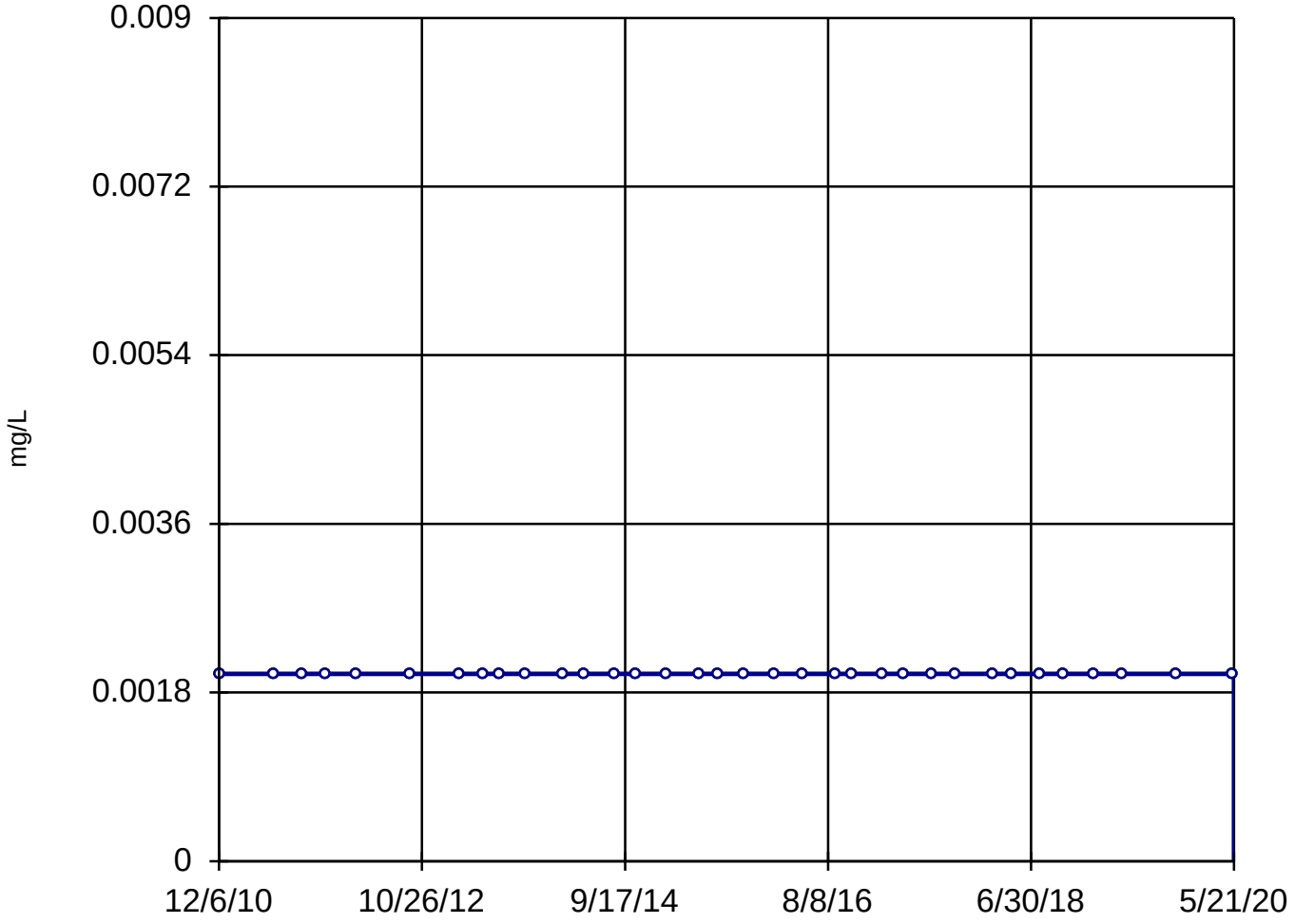
Constituent: Thallium, Dissolved Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-02



n = 34

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 176

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

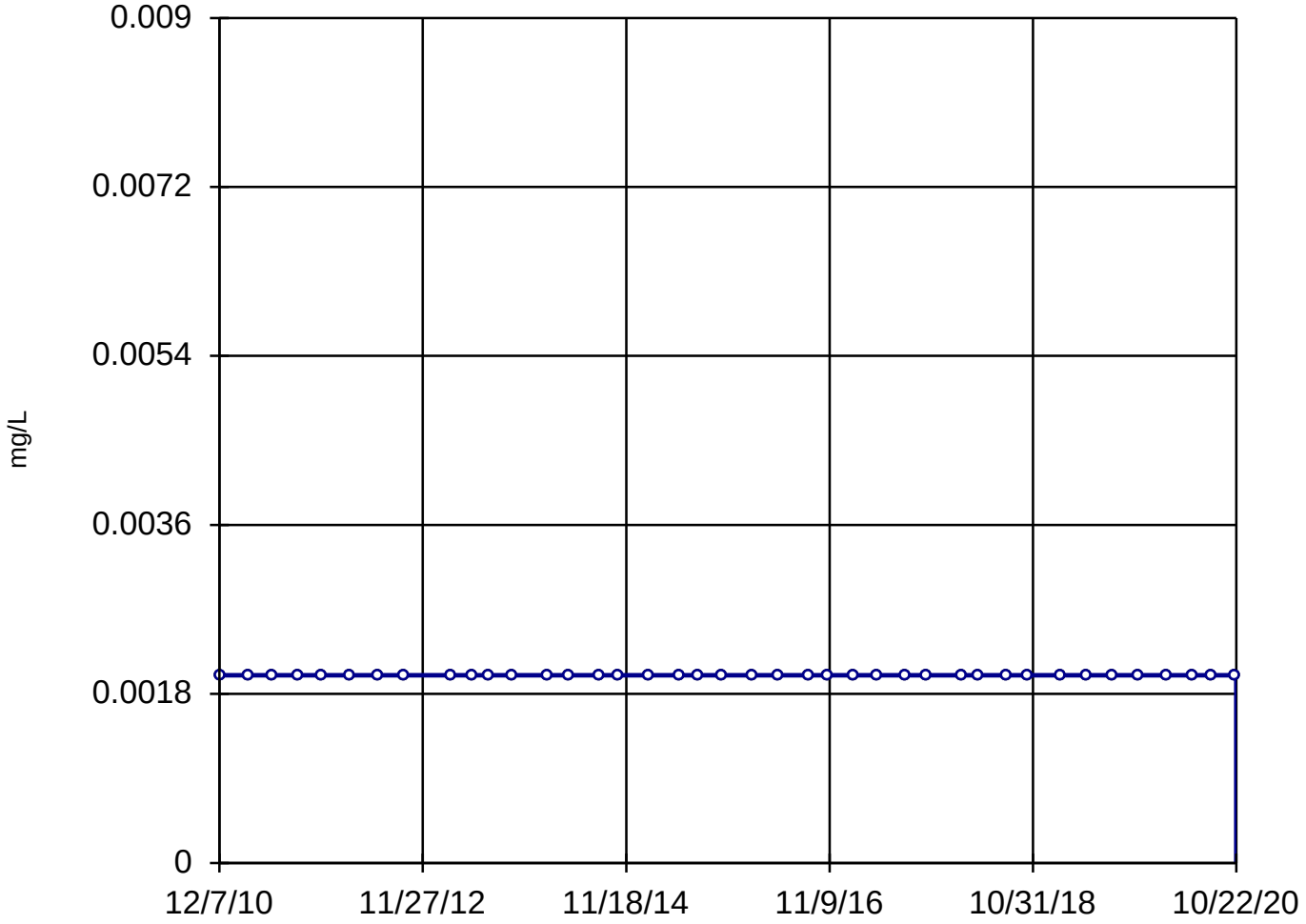
Constituent: Thallium, Dissolved Analysis Run 4/2/2021 11:02 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

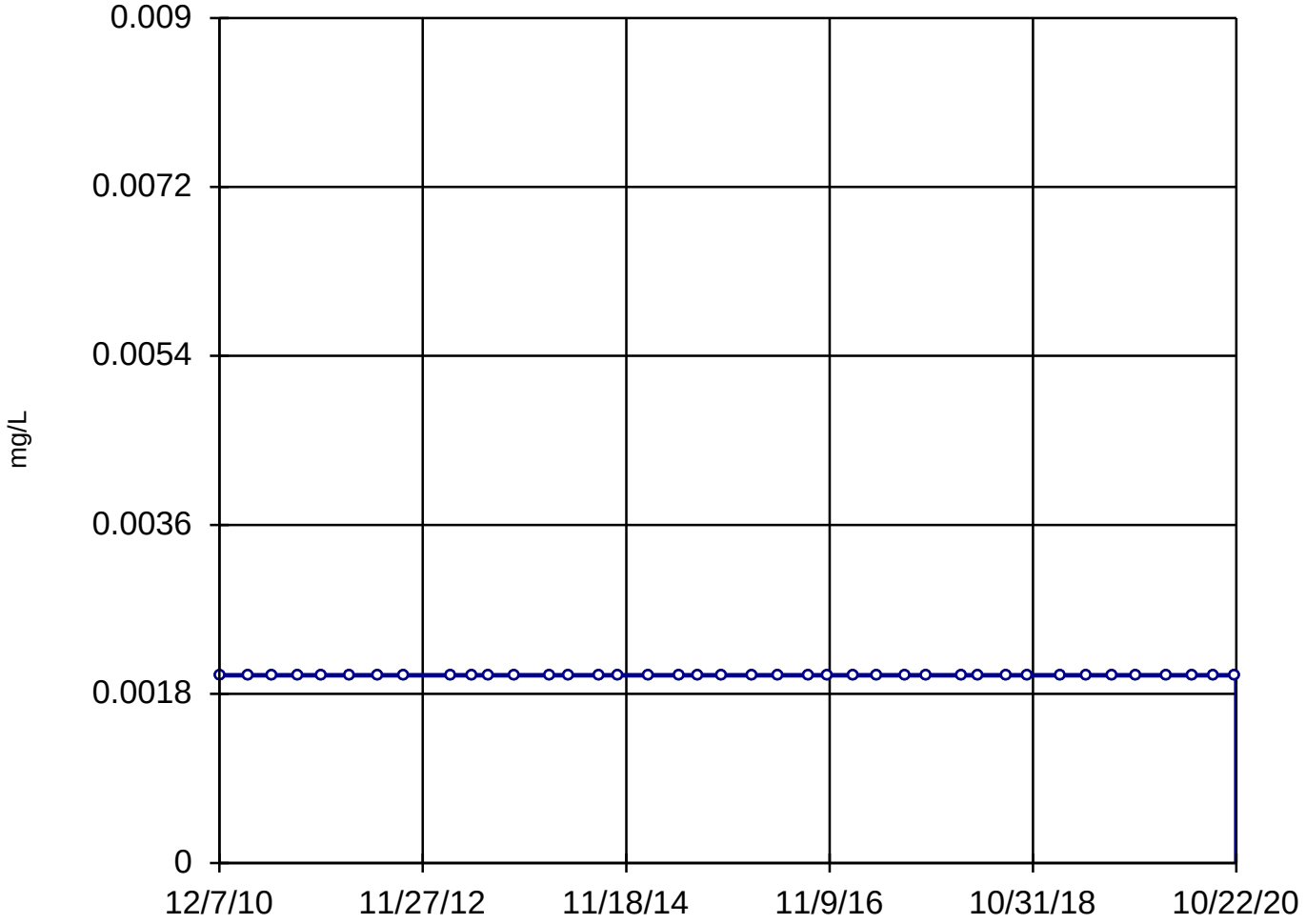
Constituent: Thallium, Dissolved Analysis Run 4/2/2021 11:03 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

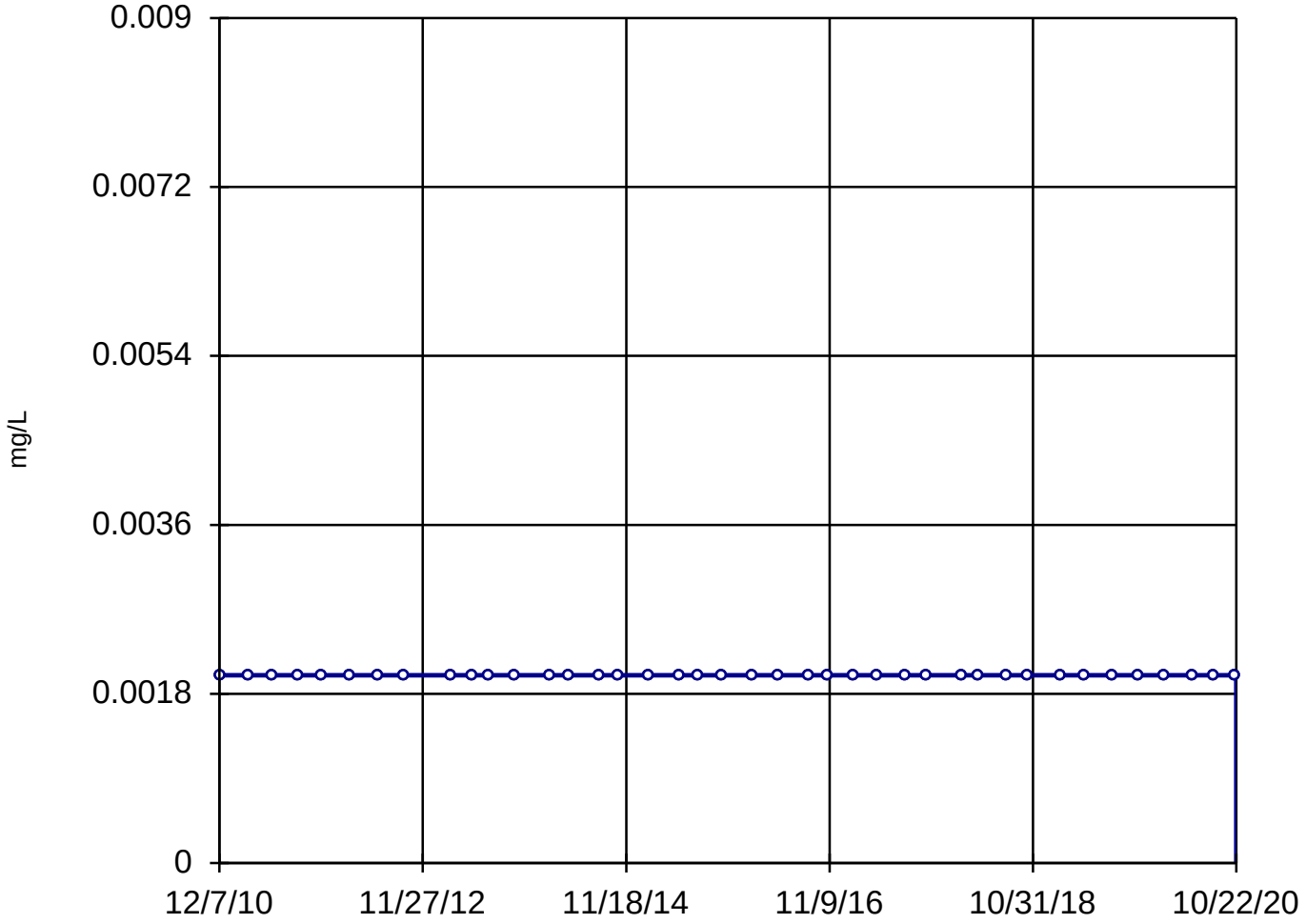
Constituent: Thallium, Dissolved Analysis Run 4/2/2021 11:03 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-06



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

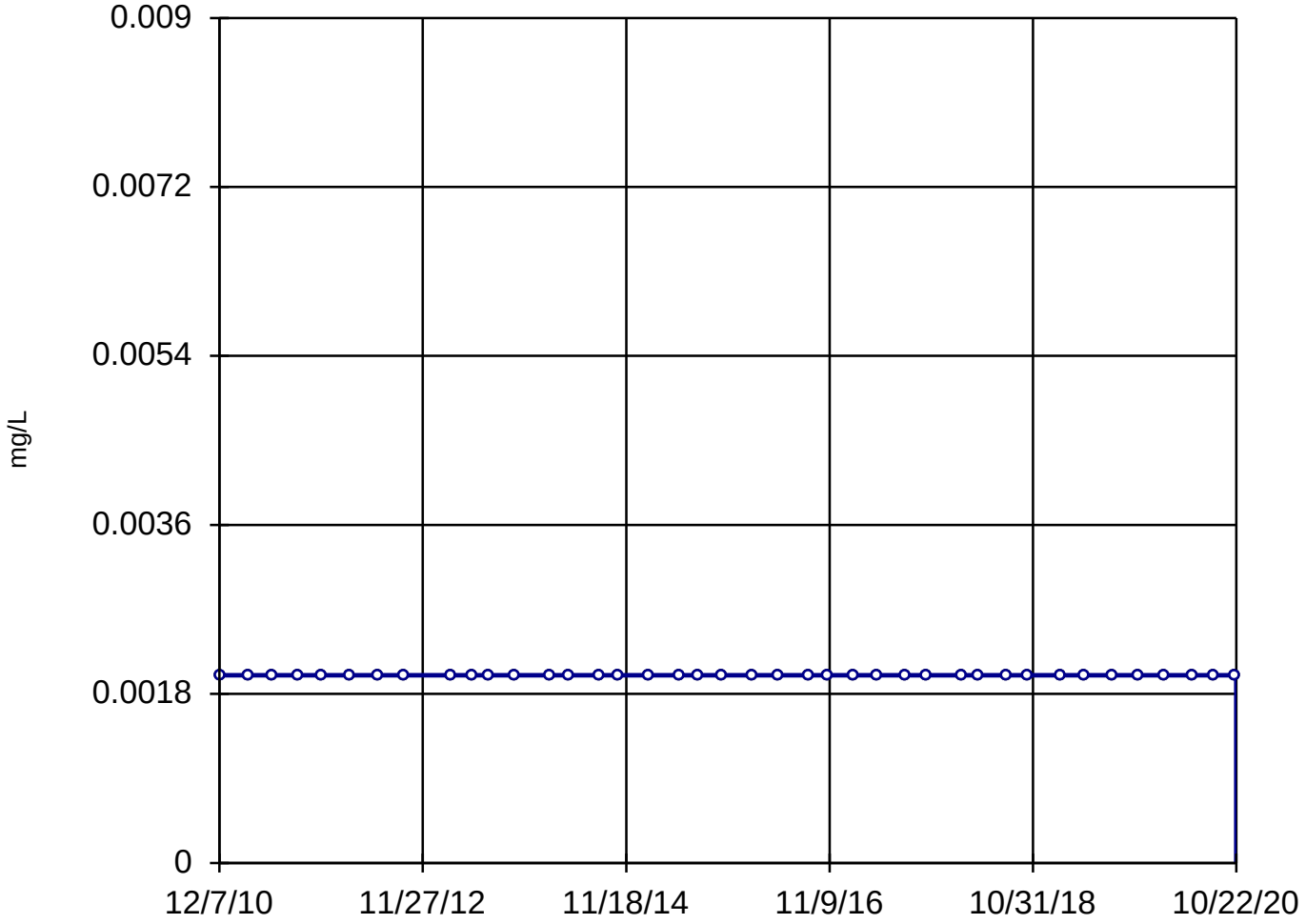
Constituent: Thallium, Dissolved Analysis Run 4/2/2021 11:03 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-07



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 223

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

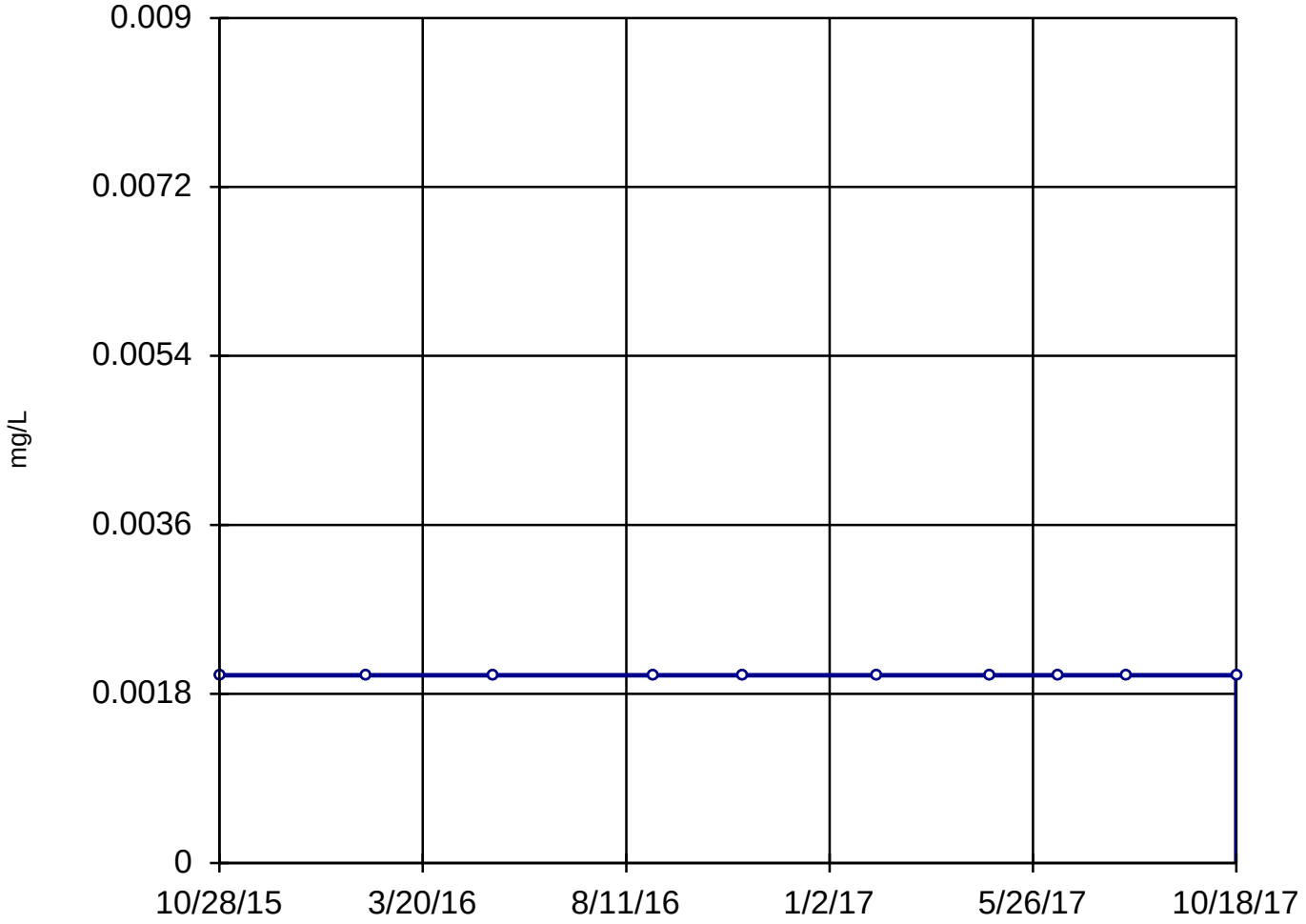
Constituent: Thallium, Dissolved Analysis Run 4/2/2021 11:03 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

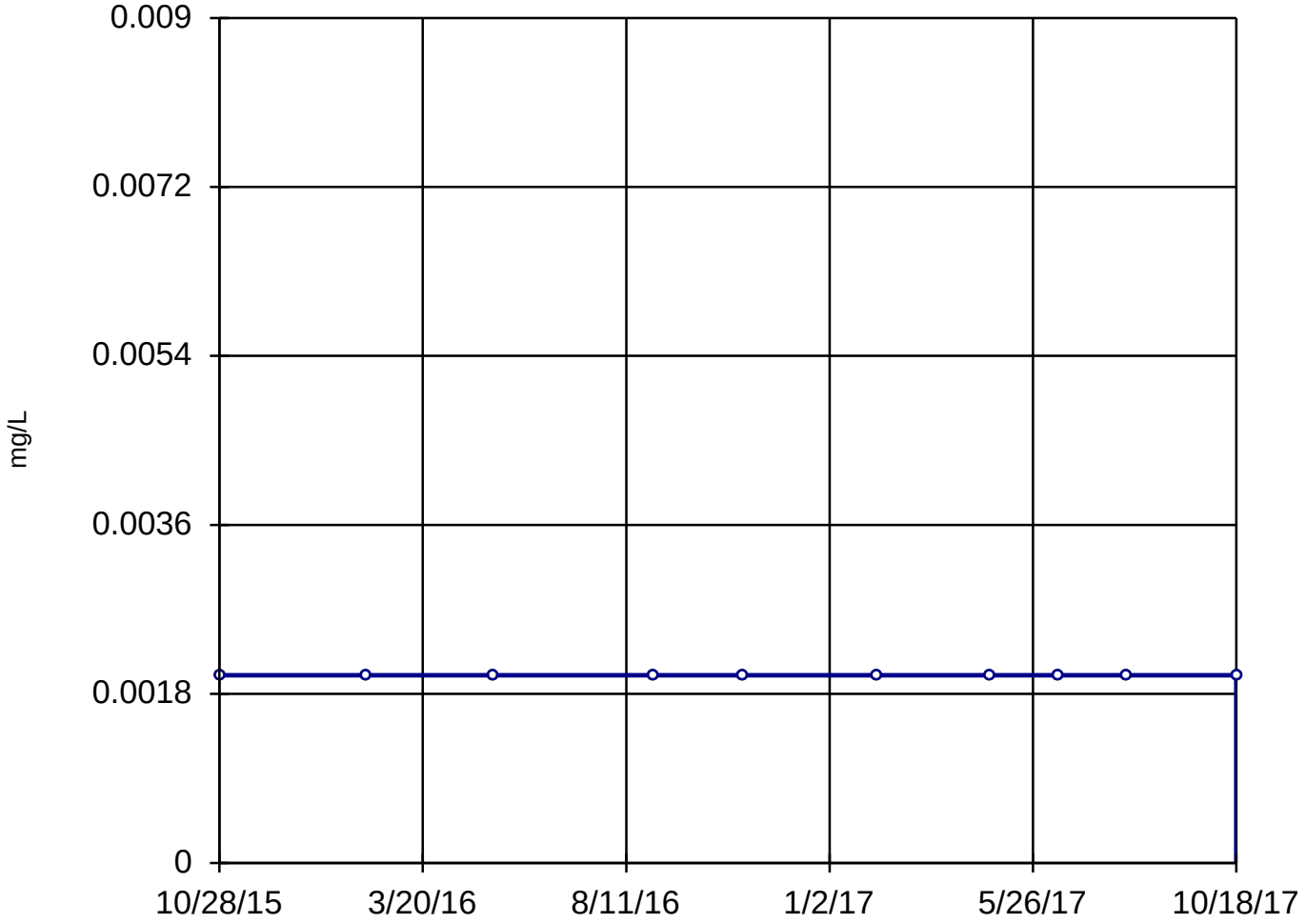
Constituent: Thallium, Total Analysis Run 4/2/2021 11:03 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

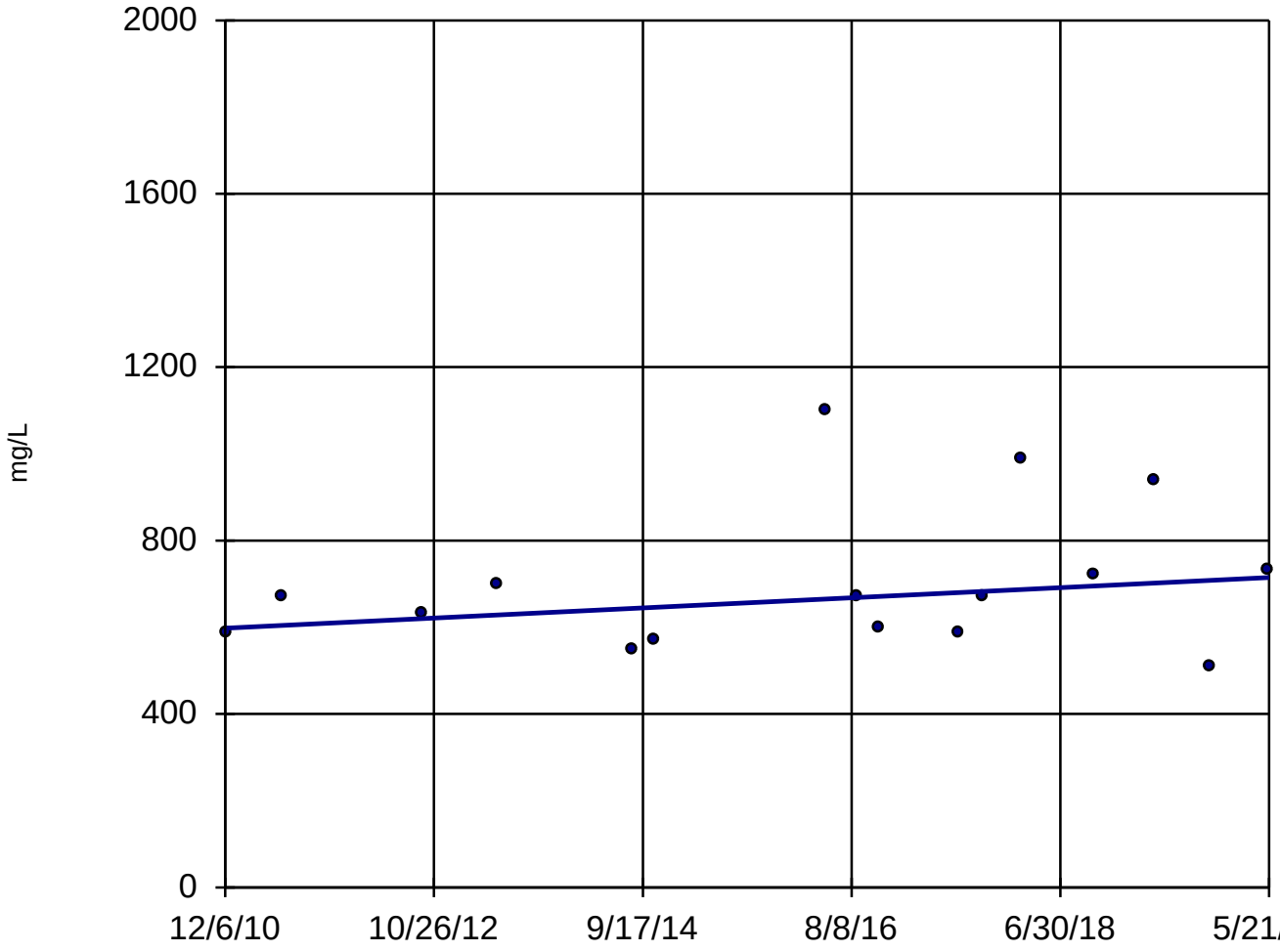
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Thallium, Total Analysis Run 4/2/2021 11:03 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-01



n = 16

Slope = 12.34 units per year.

Mann-Kendall statistic = 24
critical = 58

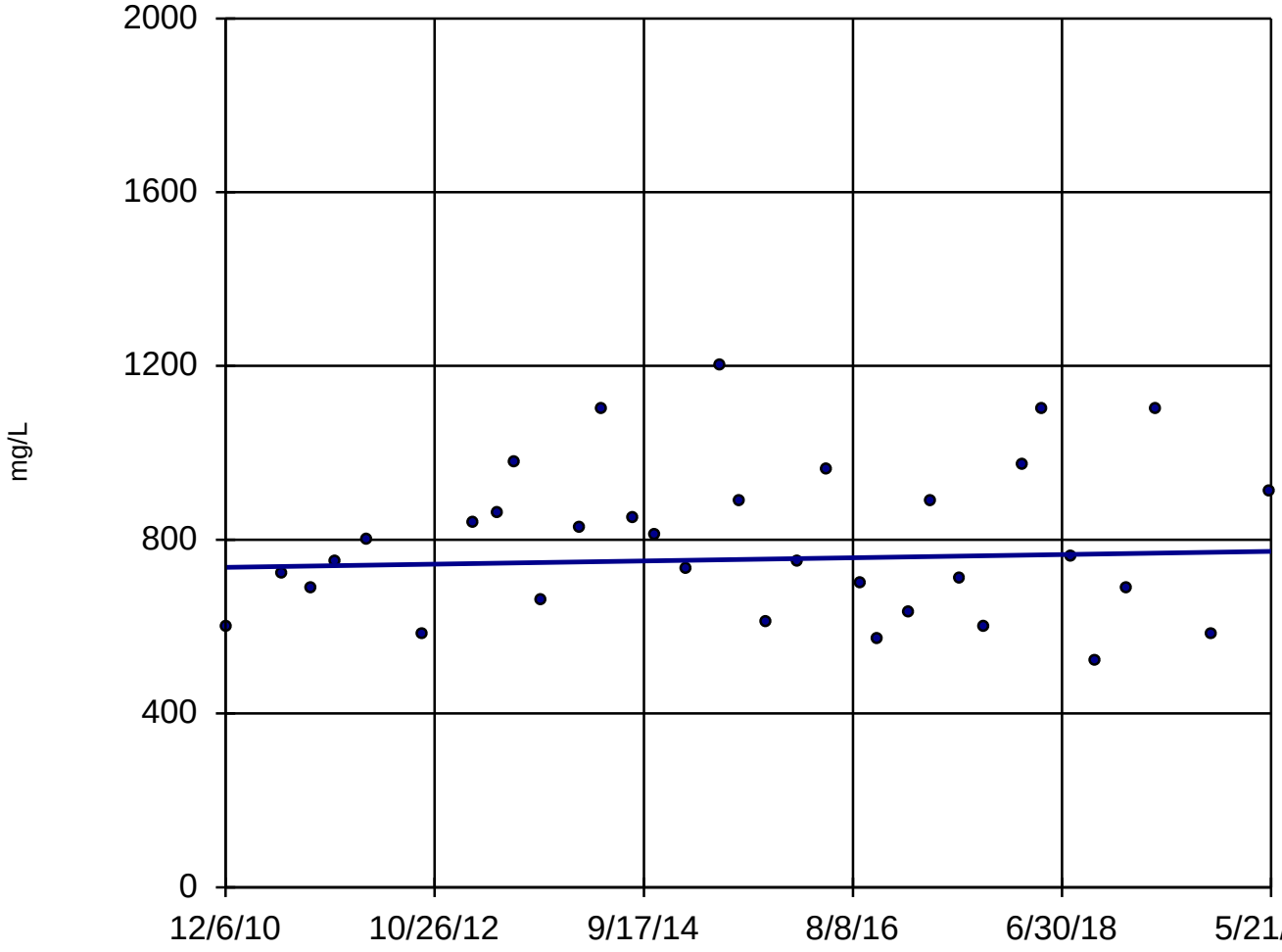
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Total Dissolved Solids Analysis Run 4/2/2021 11:03 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-02



n = 34

Slope = 3.834 units per year.

Mann-Kendall statistic = 21
critical = 176

Trend not significant at 99% confidence level (α = 0.005 per tail).

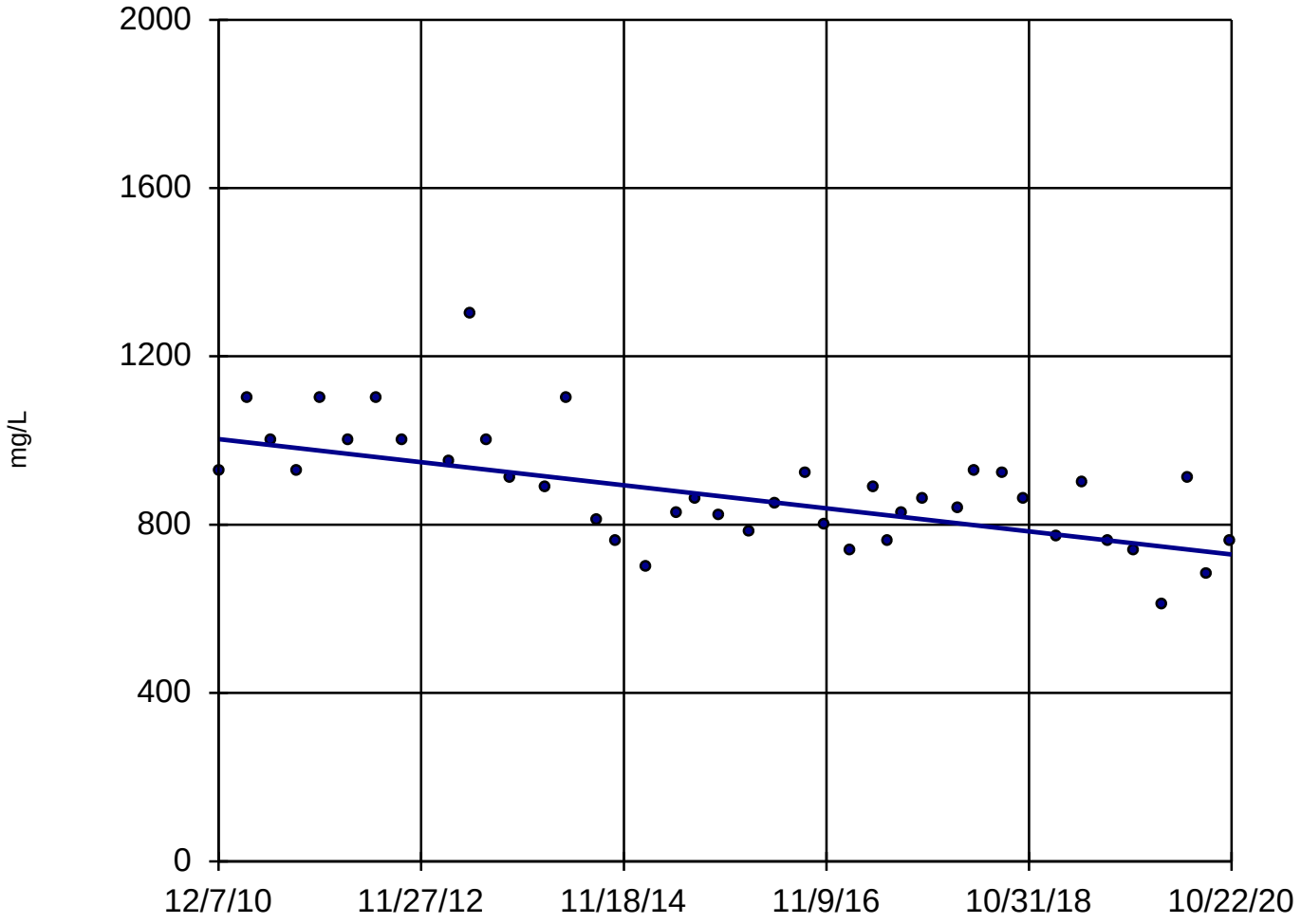
Constituent: Total Dissolved Solids Analysis Run 4/2/2021 11:03 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA

Sen's Slope Estimator

MW-03



n = 41

Slope = -27.74 units per year.

Mann-Kendall normal approx. = -4.189
critical = -2.58

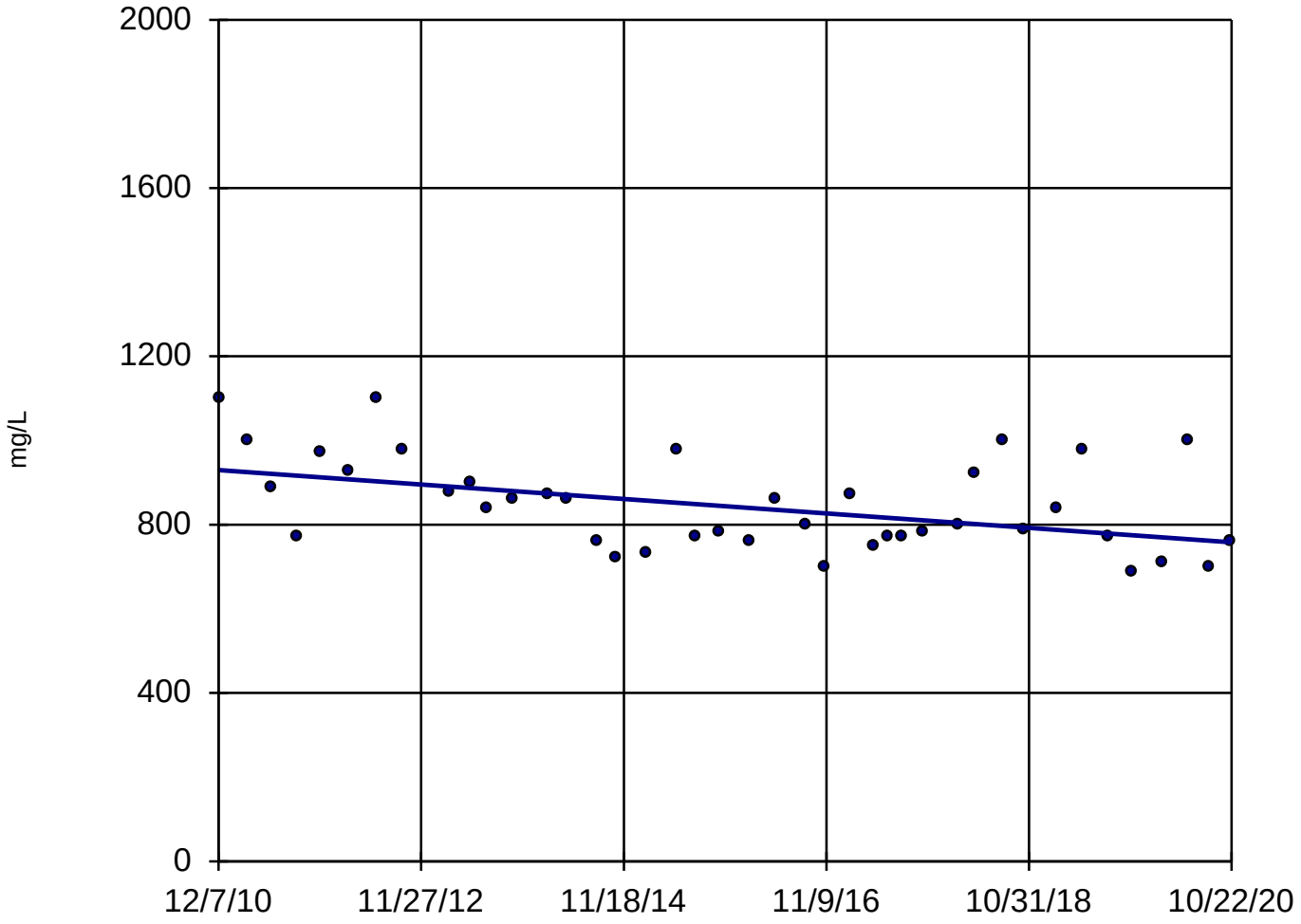
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Total Dissolved Solids Analysis Run 4/2/2021 11:03 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-04



n = 41

Slope = -17.39 units per year.

Mann-Kendall normal approx. = -2.826
critical = -2.58

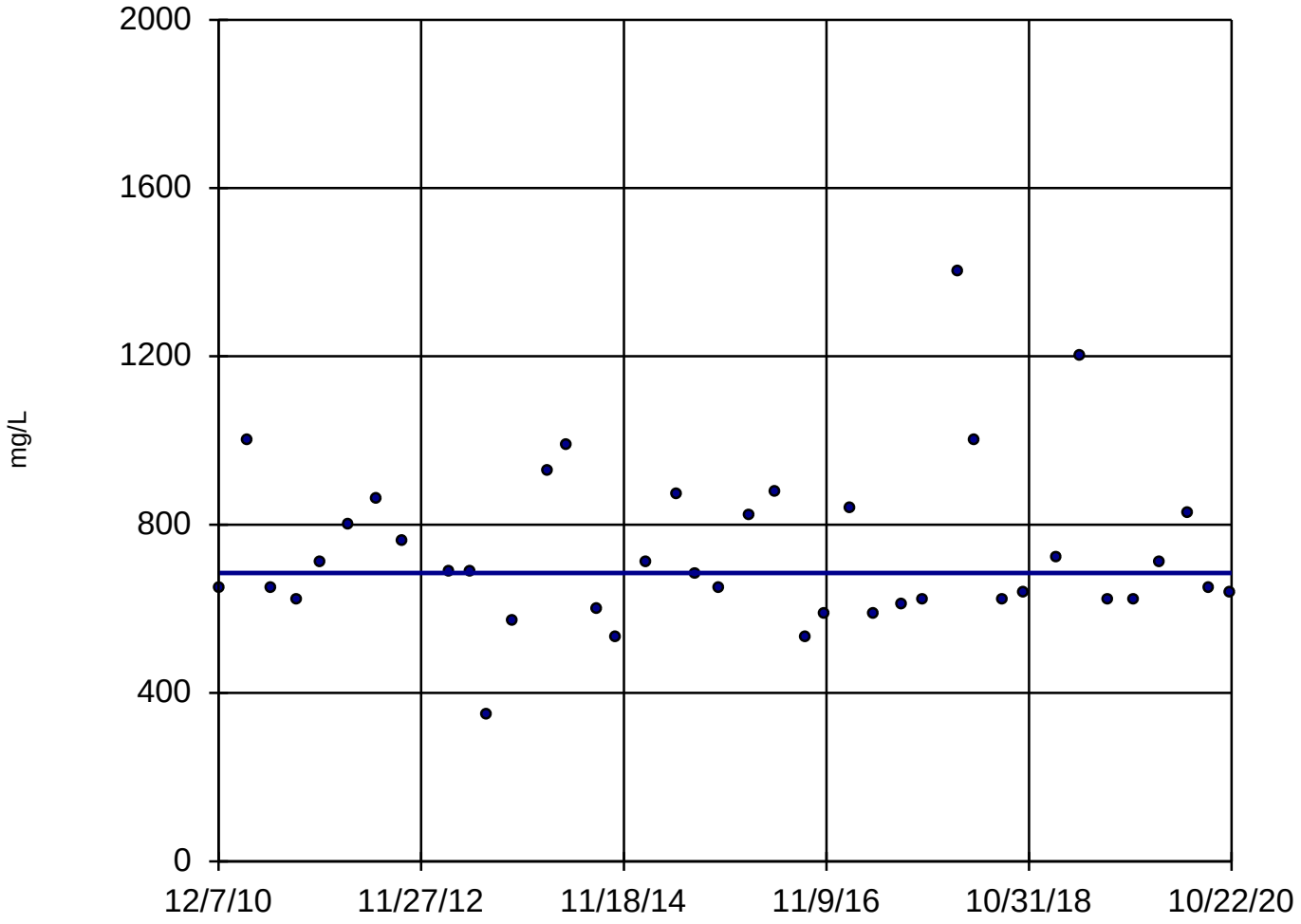
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Total Dissolved Solids Analysis Run 4/2/2021 11:03 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-06



n = 40

Slope = 0
units per year.

Mann-Kendall
statistic = -4
critical = -223

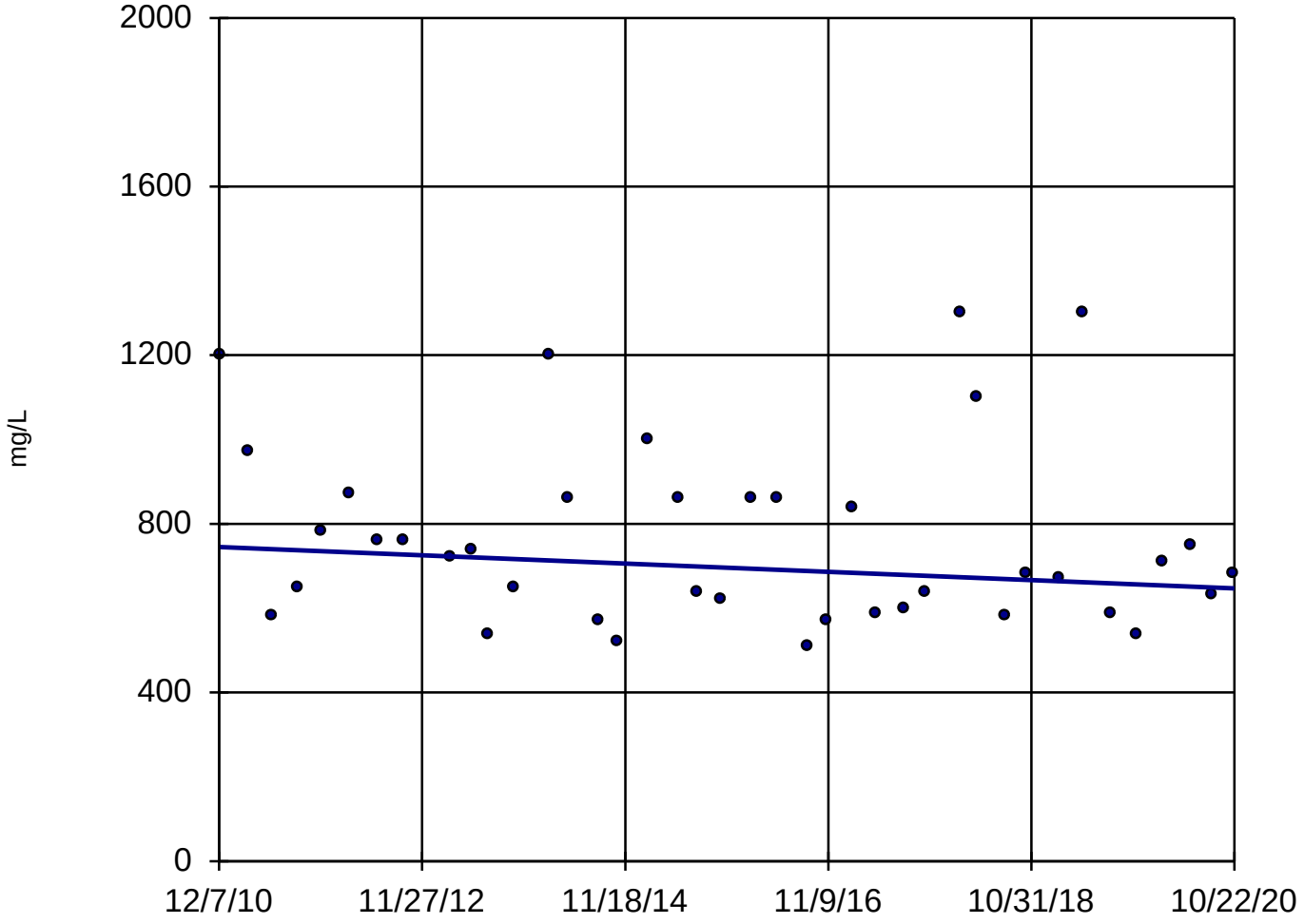
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Total Dissolved Solids Analysis Run 4/2/2021 11:03 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Sen's Slope Estimator

MW-07



n = 40

Slope = -9.923 units per year.

Mann-Kendall statistic = -96
critical = -223

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Total Dissolved Solids Analysis Run 4/2/2021 11:03 AM

Utility Site J Client: Weaver Consultants Group Data: Joliet 29 Sanitas Database

Trend Test

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database Printed 4/2/2021, 11:48 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Antimony, Dissolved (mg/L)	MW-03	0	-22	-214	No	39	97.44	n/a	n/a	0.01	NP
Antimony, Dissolved (mg/L)	MW-04	0	0	214	No	39	100	n/a	n/a	0.01	NP
Antimony, Dissolved (mg/L)	MW-05	0	0	214	No	39	100	n/a	n/a	0.01	NP
Antimony, Dissolved (mg/L)	MW-06	0	0	214	No	39	100	n/a	n/a	0.01	NP
Antimony, Dissolved (mg/L)	MW-07	0	0	214	No	39	100	n/a	n/a	0.01	NP
Antimony, Dissolved (mg/L)	MW-08	0	0	206	No	38	100	n/a	n/a	0.01	NP
Antimony, Dissolved (mg/L)	MW-13	0	0	199	No	37	100	n/a	n/a	0.01	NP
Antimony, Dissolved (mg/L)	MW-14	0	0	199	No	37	100	n/a	n/a	0.01	NP
Antimony, Dissolved (mg/L)	MW-15	0	0	199	No	37	100	n/a	n/a	0.01	NP
Antimony, Total (mg/L)	MW-03	0	0	21	No	8	100	n/a	n/a	0.01	NP
Antimony, Total (mg/L)	MW-04	0	0	21	No	8	100	n/a	n/a	0.01	NP
Antimony, Total (mg/L)	MW-05	0	0	34	No	11	100	n/a	n/a	0.01	NP
Antimony, Total (mg/L)	MW-08	0	0	43	No	13	100	n/a	n/a	0.01	NP
Antimony, Total (mg/L)	MW-15	0	0	43	No	13	100	n/a	n/a	0.01	NP
Arsenic, Dissolved (mg/L)	MW-03	0	-183	-214	No	39	64.1	n/a	n/a	0.01	NP
Arsenic, Dissolved (mg/L)	MW-04	0	-49	-214	No	39	94.87	n/a	n/a	0.01	NP
Arsenic, Dissolved (mg/L)	MW-05	0	-24	-214	No	39	94.87	n/a	n/a	0.01	NP
Arsenic, Dissolved (mg/L)	**MW-06**	**-0.00...**	**-267**	**-214**	**Yes**	**39**	**28.21**	**n/a**	**n/a**	**0.01**	**NP**
Arsenic, Dissolved (mg/L)	MW-07	-0.00145	-42	-214	No	39	2.564	n/a	n/a	0.01	NP
Arsenic, Dissolved (mg/L)	**MW-08**	**-0.00...**	**-365**	**-206**	**Yes**	**38**	**23.68**	**n/a**	**n/a**	**0.01**	**NP**
Arsenic, Dissolved (mg/L)	MW-13	-0.00...	-89	-199	No	37	0	n/a	n/a	0.01	NP
Arsenic, Dissolved (mg/L)	**MW-14**	**-0.00...**	**-282**	**-199**	**Yes**	**37**	**24.32**	**n/a**	**n/a**	**0.01**	**NP**
Arsenic, Dissolved (mg/L)	**MW-15**	**-0.00...**	**-353**	**-199**	**Yes**	**37**	**16.22**	**n/a**	**n/a**	**0.01**	**NP**
Arsenic, Total (mg/L)	MW-03	3.9e-11	5	25	No	9	11.11	n/a	n/a	0.01	NP
Arsenic, Total (mg/L)	MW-04	0	0	25	No	9	88.89	n/a	n/a	0.01	NP
Arsenic, Total (mg/L)	MW-05	0	0	38	No	12	91.67	n/a	n/a	0.01	NP
Arsenic, Total (mg/L)	MW-08	-0.00...	-6	-53	No	15	0	n/a	n/a	0.01	NP
Arsenic, Total (mg/L)	MW-15	-0.00...	-42	-53	No	15	0	n/a	n/a	0.01	NP
Barium, Dissolved (mg/L)	MW-03	0	11	214	No	39	0	n/a	n/a	0.01	NP
Barium, Dissolved (mg/L)	**MW-04**	**-0.00...**	**-268**	**-214**	**Yes**	**39**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Barium, Dissolved (mg/L)	MW-05	-0.00...	-129	-214	No	39	2.564	n/a	n/a	0.01	NP
Barium, Dissolved (mg/L)	**MW-06**	**-0.00...**	**-431**	**-214**	**Yes**	**39**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Barium, Dissolved (mg/L)	MW-07	-0.00...	-102	-214	No	39	0	n/a	n/a	0.01	NP
Barium, Dissolved (mg/L)	**MW-08**	**-0.00...**	**-282**	**-206**	**Yes**	**38**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Barium, Dissolved (mg/L)	MW-13	0	-7	-199	No	37	0	n/a	n/a	0.01	NP
Barium, Dissolved (mg/L)	MW-14	0.000...	79	199	No	37	0	n/a	n/a	0.01	NP
Barium, Dissolved (mg/L)	MW-15	-0.00...	-171	-199	No	37	0	n/a	n/a	0.01	NP
Barium, Total (mg/L)	MW-03	0	1	25	No	9	0	n/a	n/a	0.01	NP
Barium, Total (mg/L)	MW-04	-0.00...	-11	-25	No	9	0	n/a	n/a	0.01	NP
Barium, Total (mg/L)	MW-05	-0.00...	-10	-38	No	12	0	n/a	n/a	0.01	NP
Barium, Total (mg/L)	MW-08	-0.00...	-33	-53	No	15	0	n/a	n/a	0.01	NP
Barium, Total (mg/L)	MW-15	-0.00...	-7	-53	No	15	0	n/a	n/a	0.01	NP
Beryllium, Dissolved (mg/L)	MW-03	0	0	214	No	39	100	n/a	n/a	0.01	NP
Beryllium, Dissolved (mg/L)	MW-04	0	0	214	No	39	100	n/a	n/a	0.01	NP
Beryllium, Dissolved (mg/L)	MW-05	0	0	214	No	39	100	n/a	n/a	0.01	NP
Beryllium, Dissolved (mg/L)	MW-06	0	0	214	No	39	100	n/a	n/a	0.01	NP
Beryllium, Dissolved (mg/L)	MW-07	0	0	214	No	39	100	n/a	n/a	0.01	NP
Beryllium, Dissolved (mg/L)	MW-08	0	0	206	No	38	100	n/a	n/a	0.01	NP

Trend Test

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database Printed 4/2/2021, 11:48 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Beryllium, Dissolved (mg/L)	MW-15	0	0	199	No	37	100	n/a	n/a	0.01	NP
Beryllium, Total (mg/L)	MW-03	0	0	21	No	8	100	n/a	n/a	0.01	NP
Beryllium, Total (mg/L)	MW-04	0	0	21	No	8	100	n/a	n/a	0.01	NP
Beryllium, Total (mg/L)	MW-05	0	0	34	No	11	100	n/a	n/a	0.01	NP
Beryllium, Total (mg/L)	MW-08	0	0	43	No	13	100	n/a	n/a	0.01	NP
Beryllium, Total (mg/L)	MW-15	0	0	43	No	13	100	n/a	n/a	0.01	NP
Boron, Dissolved (mg/L)	MW-03	-0.01931	-132	-214	No	39	2.564	n/a	n/a	0.01	NP
Boron, Dissolved (mg/L)	**MW-04**	**-0.04286**	**-267**	**-214**	**Yes**	**39**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Boron, Dissolved (mg/L)	**MW-05**	**-0.03687**	**-377**	**-214**	**Yes**	**39**	**2.564**	**n/a**	**n/a**	**0.01**	**NP**
Boron, Dissolved (mg/L)	**MW-06**	**-0.0247**	**-339**	**-214**	**Yes**	**39**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Boron, Dissolved (mg/L)	MW-07	0	11	214	No	39	0	n/a	n/a	0.01	NP
Boron, Dissolved (mg/L)	MW-08	0	12	206	No	38	0	n/a	n/a	0.01	NP
Boron, Dissolved (mg/L)	MW-13	-0.0693	-146	-199	No	37	0	n/a	n/a	0.01	NP
Boron, Dissolved (mg/L)	MW-14	0	37	199	No	37	0	n/a	n/a	0.01	NP
Boron, Dissolved (mg/L)	MW-15	0.04385	150	199	No	37	0	n/a	n/a	0.01	NP
Boron, Total (mg/L)	MW-03	-0.04515	-16	-25	No	9	0	n/a	n/a	0.01	NP
Boron, Total (mg/L)	MW-04	-0.03816	-4	-25	No	9	0	n/a	n/a	0.01	NP
Boron, Total (mg/L)	**MW-05**	**-0.05707**	**-45**	**-38**	**Yes**	**12**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Boron, Total (mg/L)	**MW-08**	**-0.1821**	**-61**	**-53**	**Yes**	**15**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Boron, Total (mg/L)	MW-15	-0.02899	-11	-53	No	15	0	n/a	n/a	0.01	NP
Cadmium, Dissolved (mg/L)	MW-03	0	0	214	No	39	100	n/a	n/a	0.01	NP
Cadmium, Dissolved (mg/L)	MW-04	0	0	214	No	39	100	n/a	n/a	0.01	NP
Cadmium, Dissolved (mg/L)	MW-05	0	16	214	No	39	94.87	n/a	n/a	0.01	NP
Cadmium, Dissolved (mg/L)	MW-06	0	0	214	No	39	100	n/a	n/a	0.01	NP
Cadmium, Dissolved (mg/L)	MW-07	0	-36	-214	No	39	97.44	n/a	n/a	0.01	NP
Cadmium, Dissolved (mg/L)	MW-08	0	0	206	No	38	100	n/a	n/a	0.01	NP
Cadmium, Dissolved (mg/L)	MW-13	0	0	199	No	37	100	n/a	n/a	0.01	NP
Cadmium, Dissolved (mg/L)	MW-14	0	109	199	No	37	56.76	n/a	n/a	0.01	NP
Cadmium, Dissolved (mg/L)	MW-15	0	0	199	No	37	100	n/a	n/a	0.01	NP
Cadmium, Total (mg/L)	MW-03	0	0	21	No	8	100	n/a	n/a	0.01	NP
Cadmium, Total (mg/L)	MW-04	0	0	21	No	8	100	n/a	n/a	0.01	NP
Cadmium, Total (mg/L)	MW-05	0	0	34	No	11	100	n/a	n/a	0.01	NP
Cadmium, Total (mg/L)	MW-08	0	-12	-53	No	15	93.33	n/a	n/a	0.01	NP
Cadmium, Total (mg/L)	MW-15	0	-18	-53	No	15	73.33	n/a	n/a	0.01	NP
Calcium, Total (mg/L)	MW-03	0	0	25	No	9	0	n/a	n/a	0.01	NP
Calcium, Total (mg/L)	MW-04	-4.423	-6	-25	No	9	0	n/a	n/a	0.01	NP
Calcium, Total (mg/L)	MW-05	0	9	38	No	12	0	n/a	n/a	0.01	NP
Calcium, Total (mg/L)	**MW-08**	**-10.81**	**-69**	**-53**	**Yes**	**15**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Calcium, Total (mg/L)	MW-15	-16.29	-53	-53	No	15	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-03	-0.6472	-1.283	-2.58	No	41	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-04	-1.503	-105	-223	No	40	0	n/a	n/a	0.01	NP
Chloride (mg/L)	**MW-05**	**-5.086**	**-249**	**-223**	**Yes**	**40**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Chloride (mg/L)	**MW-06**	**-5.6**	**-215**	**-214**	**Yes**	**39**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Chloride (mg/L)	**MW-07**	**3.37**	**265**	**214**	**Yes**	**39**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Chloride (mg/L)	MW-08	-6.84	-1.249	-2.58	No	41	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-13	-2.917	-169	-199	No	37	0	n/a	n/a	0.01	NP
Chloride (mg/L)	**MW-14**	**-6.008**	**-305**	**-199**	**Yes**	**37**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Chloride (mg/L)	MW-15	-2.471	-133	-206	No	38	0	n/a	n/a	0.01	NP

Trend Test

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database Printed 4/2/2021, 11:48 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Chromium, Dissolved (mg/L)	MW-05	0	-25	-214	No	39	92.31	n/a	n/a	0.01	NP
Chromium, Dissolved (mg/L)	MW-06	0	-129	-214	No	39	84.62	n/a	n/a	0.01	NP
Chromium, Dissolved (mg/L)	MW-07	0	-106	-214	No	39	87.18	n/a	n/a	0.01	NP
Chromium, Dissolved (mg/L)	MW-08	0	-191	-206	No	38	84.21	n/a	n/a	0.01	NP
Chromium, Dissolved (mg/L)	MW-13	0	-53	-199	No	37	89.19	n/a	n/a	0.01	NP
Chromium, Dissolved (mg/L)	MW-14	0	-127	-199	No	37	83.78	n/a	n/a	0.01	NP
Chromium, Dissolved (mg/L)	MW-15	0	-188	-199	No	37	83.78	n/a	n/a	0.01	NP
Chromium, Total (mg/L)	MW-03	0	0	25	No	9	100	n/a	n/a	0.01	NP
Chromium, Total (mg/L)	MW-04	0	0	25	No	9	100	n/a	n/a	0.01	NP
Chromium, Total (mg/L)	MW-05	0	0	38	No	12	100	n/a	n/a	0.01	NP
Chromium, Total (mg/L)	MW-08	0	0	43	No	13	100	n/a	n/a	0.01	NP
Chromium, Total (mg/L)	MW-15	0	0	43	No	13	100	n/a	n/a	0.01	NP
Cobalt, Dissolved (mg/L)	MW-03	0	0	214	No	39	100	n/a	n/a	0.01	NP
Cobalt, Dissolved (mg/L)	MW-04	0	-38	-214	No	39	97.44	n/a	n/a	0.01	NP
Cobalt, Dissolved (mg/L)	MW-05	0	-205	-214	No	39	82.05	n/a	n/a	0.01	NP
Cobalt, Dissolved (mg/L)	MW-06	0	-23	-214	No	39	94.87	n/a	n/a	0.01	NP
Cobalt, Dissolved (mg/L)	MW-07	-0.00...	-189	-214	No	39	5.128	n/a	n/a	0.01	NP
Cobalt, Dissolved (mg/L)	MW-08	0	0	206	No	38	100	n/a	n/a	0.01	NP
Cobalt, Dissolved (mg/L)	MW-13	0	-101	-199	No	37	91.89	n/a	n/a	0.01	NP
Cobalt, Dissolved (mg/L)	MW-14	0	19	199	No	37	94.59	n/a	n/a	0.01	NP
Cobalt, Dissolved (mg/L)	MW-15	0	0	199	No	37	100	n/a	n/a	0.01	NP
Cobalt, Total (mg/L)	MW-03	0	0	25	No	9	100	n/a	n/a	0.01	NP
Cobalt, Total (mg/L)	MW-04	0	0	25	No	9	100	n/a	n/a	0.01	NP
Cobalt, Total (mg/L)	MW-05	0	0	38	No	12	100	n/a	n/a	0.01	NP
Cobalt, Total (mg/L)	MW-08	0	0	53	No	15	100	n/a	n/a	0.01	NP
Cobalt, Total (mg/L)	MW-15	0	14	53	No	15	93.33	n/a	n/a	0.01	NP
Fluoride (mg/L)	MW-03	-0.00...	-1.688	-2.58	No	41	7.317	n/a	n/a	0.01	NP
Fluoride (mg/L)	MW-04	-0.00...	-138	-223	No	40	7.5	n/a	n/a	0.01	NP
Fluoride (mg/L)	MW-05	0.004669	134	223	No	40	7.5	n/a	n/a	0.01	NP
Fluoride (mg/L)	MW-06	-0.00...	-90	-214	No	39	0	n/a	n/a	0.01	NP
Fluoride (mg/L)	MW-07	-0.00...	-154	-214	No	39	0	n/a	n/a	0.01	NP
Fluoride (mg/L)	**MW-08**	**-0.04977**	**-4.892**	**-2.58**	**Yes**	**41**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Fluoride (mg/L)	MW-13	-0.00...	-75	-199	No	37	2.703	n/a	n/a	0.01	NP
Fluoride (mg/L)	MW-14	-0.01334	-154	-199	No	37	0	n/a	n/a	0.01	NP
Fluoride (mg/L)	**MW-15**	**-0.02897**	**-382**	**-206**	**Yes**	**38**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Lead, Dissolved (mg/L)	MW-03	0	-14	-214	No	39	97.44	n/a	n/a	0.01	NP
Lead, Dissolved (mg/L)	MW-04	0	0	214	No	39	100	n/a	n/a	0.01	NP
Lead, Dissolved (mg/L)	MW-05	0	0	214	No	39	100	n/a	n/a	0.01	NP
Lead, Dissolved (mg/L)	MW-06	0	-10	-214	No	39	97.44	n/a	n/a	0.01	NP
Lead, Dissolved (mg/L)	MW-07	0	-66	-214	No	39	87.18	n/a	n/a	0.01	NP
Lead, Dissolved (mg/L)	MW-08	0	0	206	No	38	100	n/a	n/a	0.01	NP
Lead, Dissolved (mg/L)	MW-13	0	0	199	No	37	100	n/a	n/a	0.01	NP
Lead, Dissolved (mg/L)	MW-14	0	-39	-199	No	37	94.59	n/a	n/a	0.01	NP
Lead, Dissolved (mg/L)	MW-15	0	-36	-199	No	37	97.3	n/a	n/a	0.01	NP
Lead, Total (mg/L)	MW-03	0	0	25	No	9	100	n/a	n/a	0.01	NP
Lead, Total (mg/L)	MW-04	0	0	25	No	9	100	n/a	n/a	0.01	NP
Lead, Total (mg/L)	MW-05	0	-5	-38	No	12	91.67	n/a	n/a	0.01	NP
Lead, Total (mg/L)	MW-08	0	12	53	No	15	73.33	n/a	n/a	0.01	NP

Trend Test

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database Printed 4/2/2021, 11:48 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Lithium, Total (mg/L)	MW-04	0	0	21	No	8	100	n/a	n/a	0.01	NP
Lithium, Total (mg/L)	MW-05	0	0	34	No	11	100	n/a	n/a	0.01	NP
Lithium, Total (mg/L)	MW-08	0	6	53	No	15	26.67	n/a	n/a	0.01	NP
Lithium, Total (mg/L)	MW-15	-0.00...	-6	-53	No	15	0	n/a	n/a	0.01	NP
Mercury, Dissolved (mg/L)	MW-03	0	0	214	No	39	100	n/a	n/a	0.01	NP
Mercury, Dissolved (mg/L)	MW-04	0	0	214	No	39	100	n/a	n/a	0.01	NP
Mercury, Dissolved (mg/L)	MW-05	0	30	214	No	39	97.44	n/a	n/a	0.01	NP
Mercury, Dissolved (mg/L)	MW-06	0	0	214	No	39	100	n/a	n/a	0.01	NP
Mercury, Dissolved (mg/L)	MW-07	0	-36	-214	No	39	97.44	n/a	n/a	0.01	NP
Mercury, Dissolved (mg/L)	MW-08	0	0	206	No	38	100	n/a	n/a	0.01	NP
Mercury, Dissolved (mg/L)	MW-13	0	0	199	No	37	100	n/a	n/a	0.01	NP
Mercury, Dissolved (mg/L)	MW-14	0	0	199	No	37	100	n/a	n/a	0.01	NP
Mercury, Dissolved (mg/L)	MW-15	0	0	199	No	37	100	n/a	n/a	0.01	NP
Mercury, Total (mg/L)	MW-03	0	0	21	No	8	100	n/a	n/a	0.01	NP
Mercury, Total (mg/L)	MW-04	0	0	21	No	8	100	n/a	n/a	0.01	NP
Mercury, Total (mg/L)	MW-05	0	0	34	No	11	100	n/a	n/a	0.01	NP
Mercury, Total (mg/L)	MW-08	0	0	53	No	15	100	n/a	n/a	0.01	NP
Mercury, Total (mg/L)	MW-15	0	0	53	No	15	100	n/a	n/a	0.01	NP
Molybdenum, Total (mg/L)	MW-03	0	0	25	No	9	100	n/a	n/a	0.01	NP
Molybdenum, Total (mg/L)	MW-04	0	-1	-25	No	9	66.67	n/a	n/a	0.01	NP
Molybdenum, Total (mg/L)	MW-05	0.000...	30	38	No	12	50	n/a	n/a	0.01	NP
Molybdenum, Total (mg/L)	MW-08	-0.00...	-7	-53	No	15	0	n/a	n/a	0.01	NP
Molybdenum, Total (mg/L)	MW-15	-0.00...	-23	-53	No	15	0	n/a	n/a	0.01	NP
pH, Field (Standard Units)	MW-03	-0.01712	-1.063	-2.58	No	50	0	n/a	n/a	0.01	NP
pH, Field (Standard Units)	MW-04	-0.01479	-1.398	-2.58	No	50	0	n/a	n/a	0.01	NP
pH, Field (Standard Units)	MW-05	-0.01654	-1.217	-2.58	No	52	0	n/a	n/a	0.01	NP
pH, Field (Standard Units)	MW-06	-0.01961	-1.472	-2.58	No	41	0	n/a	n/a	0.01	NP
pH, Field (Standard Units)	MW-07	-0.02391	-184	-223	No	40	0	n/a	n/a	0.01	NP
pH, Field (Standard Units)	**MW-08**	**-0.0944**	**-4.543**	**-2.58**	**Yes**	**51**	**0**	**n/a**	**n/a**	**0.01**	**NP**
pH, Field (Standard Units)	MW-13	0.01192	0.6966	2.58	No	41	0	n/a	n/a	0.01	NP
pH, Field (Standard Units)	**MW-14**	**-0.04916**	**-3.382**	**-2.58**	**Yes**	**41**	**0**	**n/a**	**n/a**	**0.01**	**NP**
pH, Field (Standard Units)	MW-15	-0.01994	-1.456	-2.58	No	54	0	n/a	n/a	0.01	NP
Radium 226 + Radium 228, Combin...	MW-03	0	-13	-30	No	10	80	n/a	n/a	0.01	NP
Radium 226 + Radium 228, Combin...	MW-04	0	4	30	No	10	60	n/a	n/a	0.01	NP
Radium 226 + Radium 228, Combin...	MW-05	0.00312	21	38	No	12	58.33	n/a	n/a	0.01	NP
Radium 226 + Radium 228, Combin...	MW-08	0	18	48	No	14	50	n/a	n/a	0.01	NP
Radium 226 + Radium 228, Combin...	MW-15	0	-10	-48	No	14	71.43	n/a	n/a	0.01	NP
Selenium, Dissolved (mg/L)	MW-03	0	-60	-214	No	39	69.23	n/a	n/a	0.01	NP
Selenium, Dissolved (mg/L)	MW-04	0	-96	-214	No	39	69.23	n/a	n/a	0.01	NP
Selenium, Dissolved (mg/L)	MW-05	0	-102	-214	No	39	76.92	n/a	n/a	0.01	NP
Selenium, Dissolved (mg/L)	MW-06	0	72	214	No	39	74.36	n/a	n/a	0.01	NP
Selenium, Dissolved (mg/L)	MW-07	0	36	214	No	39	58.97	n/a	n/a	0.01	NP
Selenium, Dissolved (mg/L)	MW-08	0	21	206	No	38	78.95	n/a	n/a	0.01	NP
Selenium, Dissolved (mg/L)	MW-13	0.000...	65	199	No	37	27.03	n/a	n/a	0.01	NP
Selenium, Dissolved (mg/L)	MW-14	0	34	199	No	37	37.84	n/a	n/a	0.01	NP
Selenium, Dissolved (mg/L)	MW-15	0	20	199	No	37	27.03	n/a	n/a	0.01	NP
Selenium, Total (mg/L)	MW-03	0	8	25	No	9	88.89	n/a	n/a	0.01	NP
Selenium, Total (mg/L)	MW-04	0	-4	-25	No	9	88.89	n/a	n/a	0.01	NP

Trend Test

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database Printed 4/2/2021, 11:48 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Selenium, Total (mg/L)	MW-15	-0.00...	-6	-53	No	15	20	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-03	-2.97	-2.348	-2.58	No	41	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-04	-9.213	-219	-223	No	40	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	**MW-05**	**-9.096**	**-249**	**-223**	**Yes**	**40**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Sulfate (mg/L)	MW-06	0	3	214	No	39	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-07	1.361	73	214	No	39	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	**MW-08**	**-23.74**	**-3.881**	**-2.58**	**Yes**	**41**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Sulfate (mg/L)	**MW-13**	**97.09**	**293**	**199**	**Yes**	**37**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Sulfate (mg/L)	MW-14	0	8	199	No	37	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-15	5.709	28	206	No	38	0	n/a	n/a	0.01	NP
Thallium, Dissolved (mg/L)	MW-03	0	0	214	No	39	100	n/a	n/a	0.01	NP
Thallium, Dissolved (mg/L)	MW-04	0	0	214	No	39	100	n/a	n/a	0.01	NP
Thallium, Dissolved (mg/L)	MW-05	0	0	214	No	39	100	n/a	n/a	0.01	NP
Thallium, Dissolved (mg/L)	MW-06	0	0	214	No	39	100	n/a	n/a	0.01	NP
Thallium, Dissolved (mg/L)	MW-07	0	0	214	No	39	100	n/a	n/a	0.01	NP
Thallium, Dissolved (mg/L)	MW-08	0	0	206	No	38	100	n/a	n/a	0.01	NP
Thallium, Dissolved (mg/L)	MW-13	0	0	199	No	37	100	n/a	n/a	0.01	NP
Thallium, Dissolved (mg/L)	MW-14	0.000...	140	199	No	37	10.81	n/a	n/a	0.01	NP
Thallium, Dissolved (mg/L)	MW-15	0	0	199	No	37	100	n/a	n/a	0.01	NP
Thallium, Total (mg/L)	MW-03	0	0	21	No	8	100	n/a	n/a	0.01	NP
Thallium, Total (mg/L)	MW-04	0	0	21	No	8	100	n/a	n/a	0.01	NP
Thallium, Total (mg/L)	MW-05	0	0	34	No	11	100	n/a	n/a	0.01	NP
Thallium, Total (mg/L)	MW-08	0	0	53	No	15	100	n/a	n/a	0.01	NP
Thallium, Total (mg/L)	MW-15	0	0	53	No	15	100	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-03	-5.995	-2.198	-2.58	No	41	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	**MW-04**	**-19.65**	**-224**	**-223**	**Yes**	**40**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Total Dissolved Solids (mg/L)	MW-05	-21.31	-217	-223	No	40	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-06	-16.96	-167	-214	No	39	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	**MW-07**	**-19.4**	**-257**	**-214**	**Yes**	**39**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Total Dissolved Solids (mg/L)	**MW-08**	**-41.7**	**-2.844**	**-2.58**	**Yes**	**41**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Total Dissolved Solids (mg/L)	**MW-13**	**157.7**	**310**	**199**	**Yes**	**37**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Total Dissolved Solids (mg/L)	MW-14	23.16	93	199	No	37	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-15	11.68	53	206	No	38	0	n/a	n/a	0.01	NP

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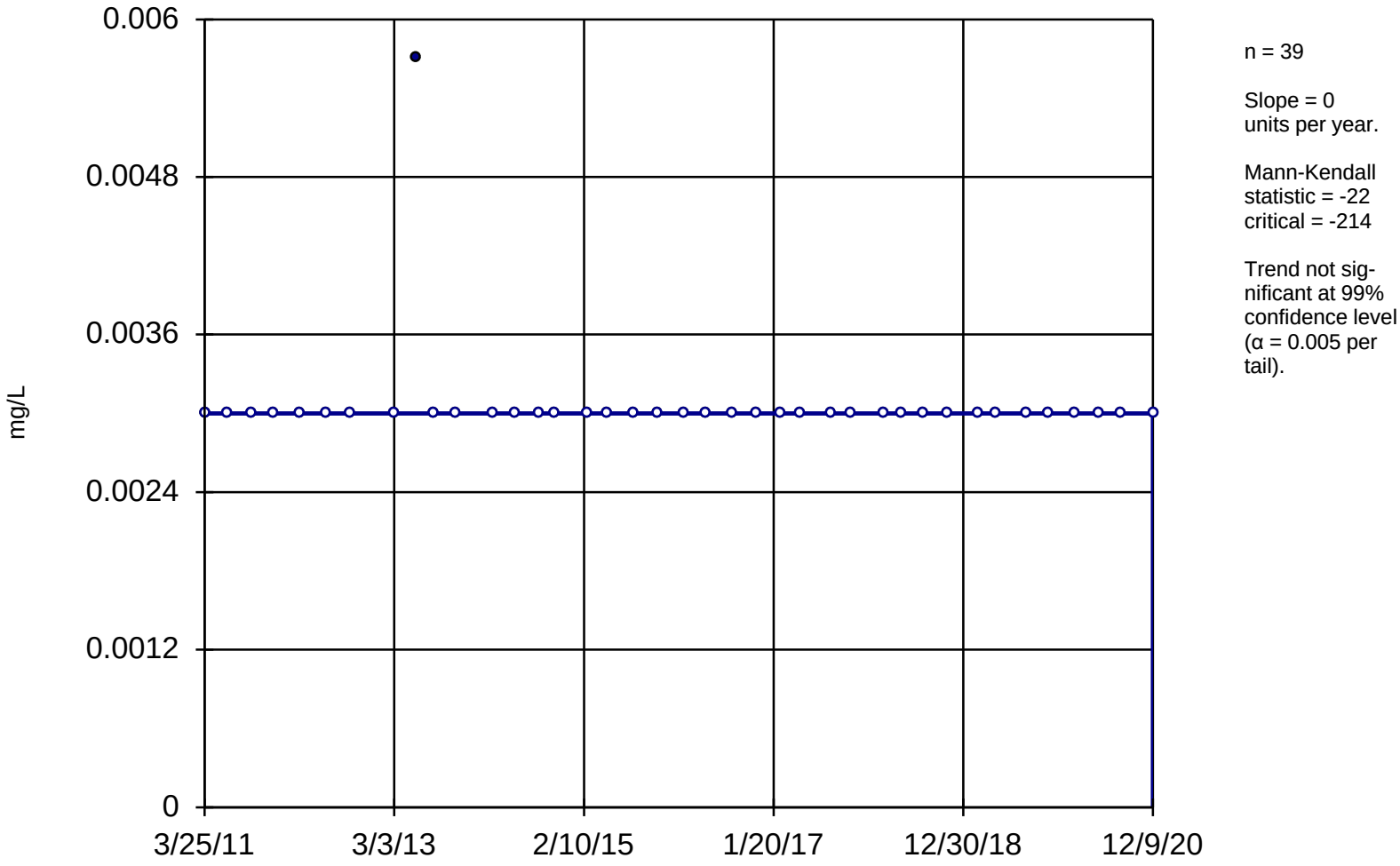
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = -22
critical = -214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Antimony, Dissolved Analysis Run 4/2/2021 11:43 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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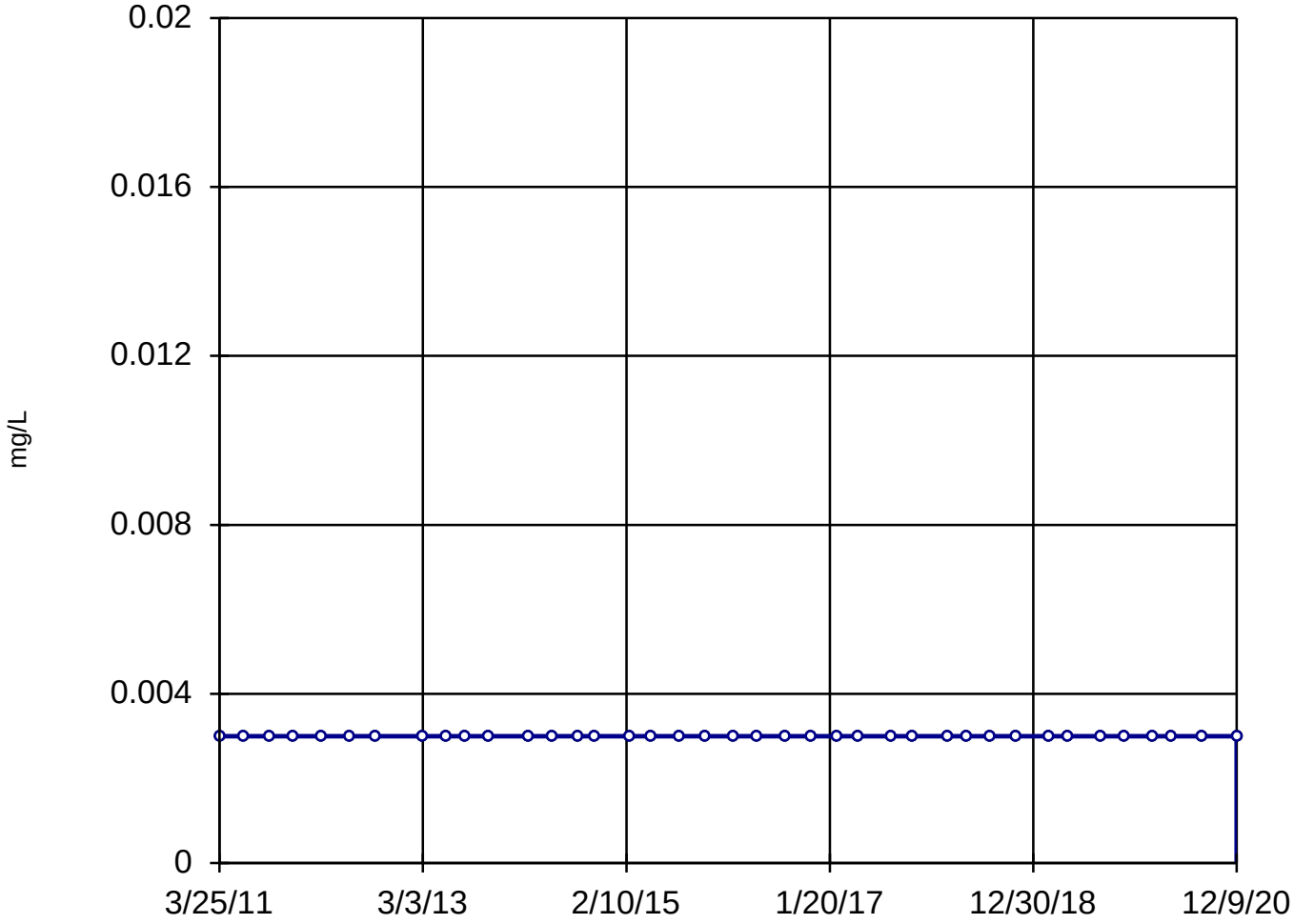
Sen's Slope Estimator

MW-04



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Antimony, Dissolved Analysis Run 4/2/2021 11:43 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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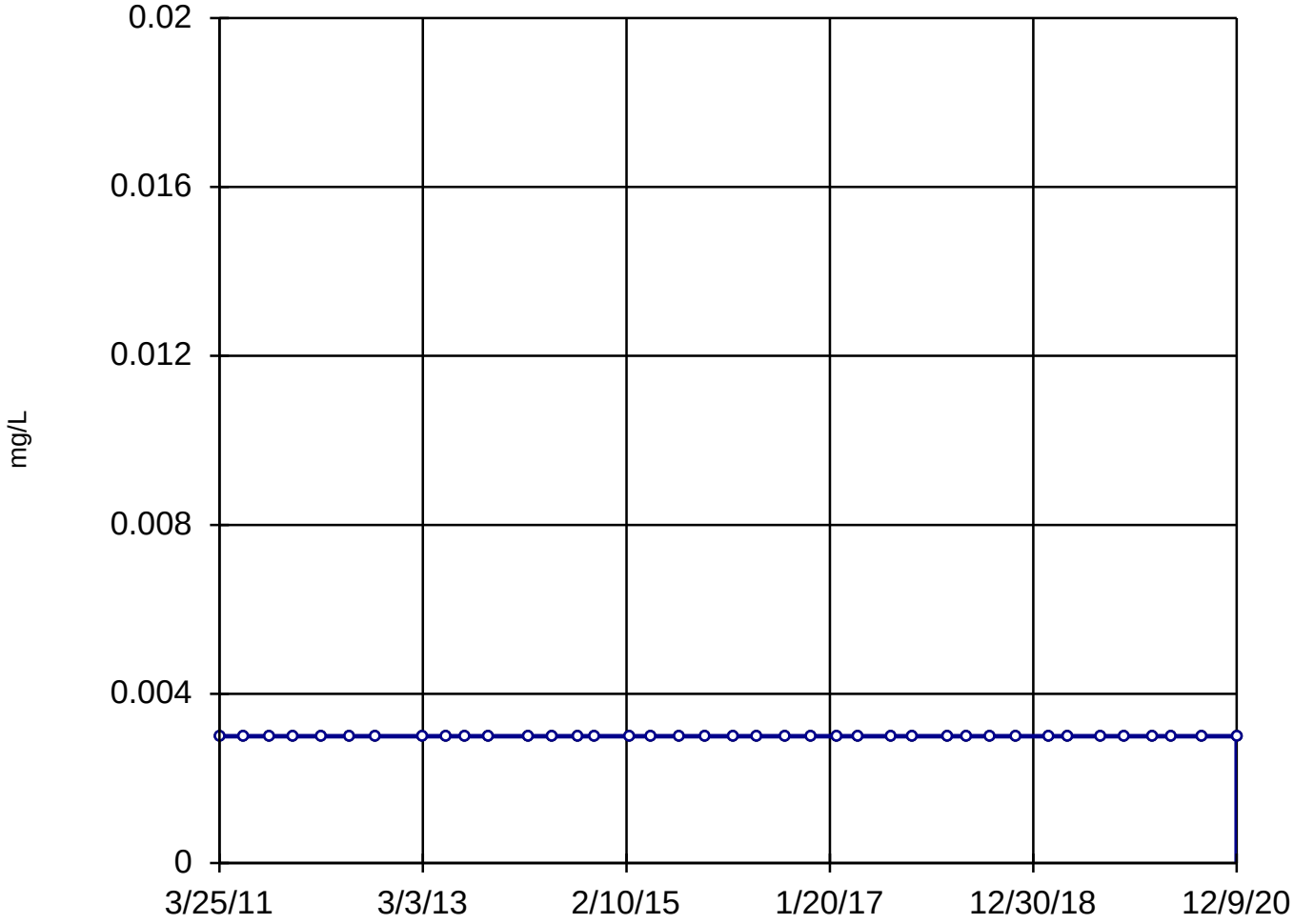
Sen's Slope Estimator

MW-05



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Antimony, Dissolved Analysis Run 4/2/2021 11:43 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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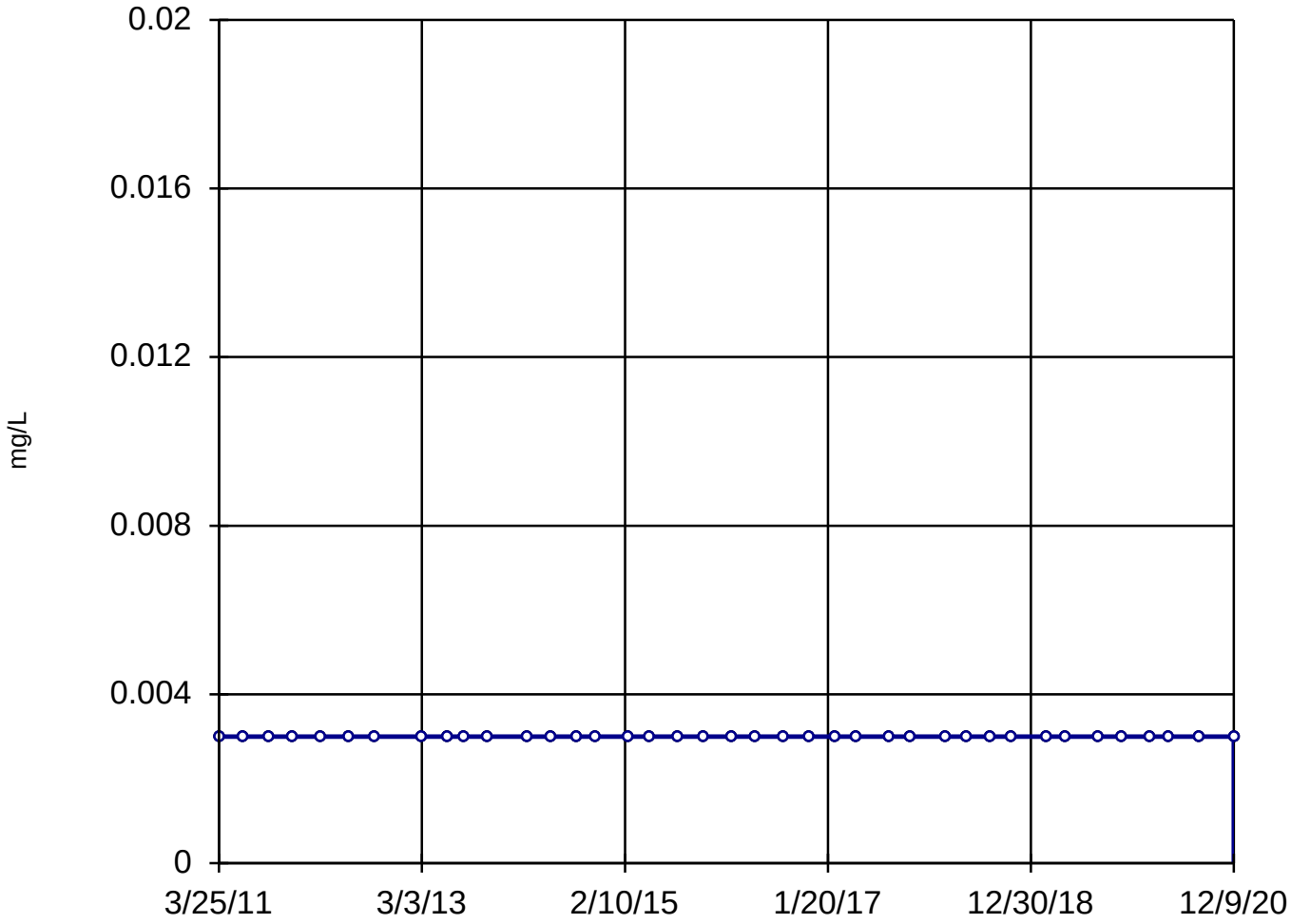
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-06



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Antimony, Dissolved Analysis Run 4/2/2021 11:43 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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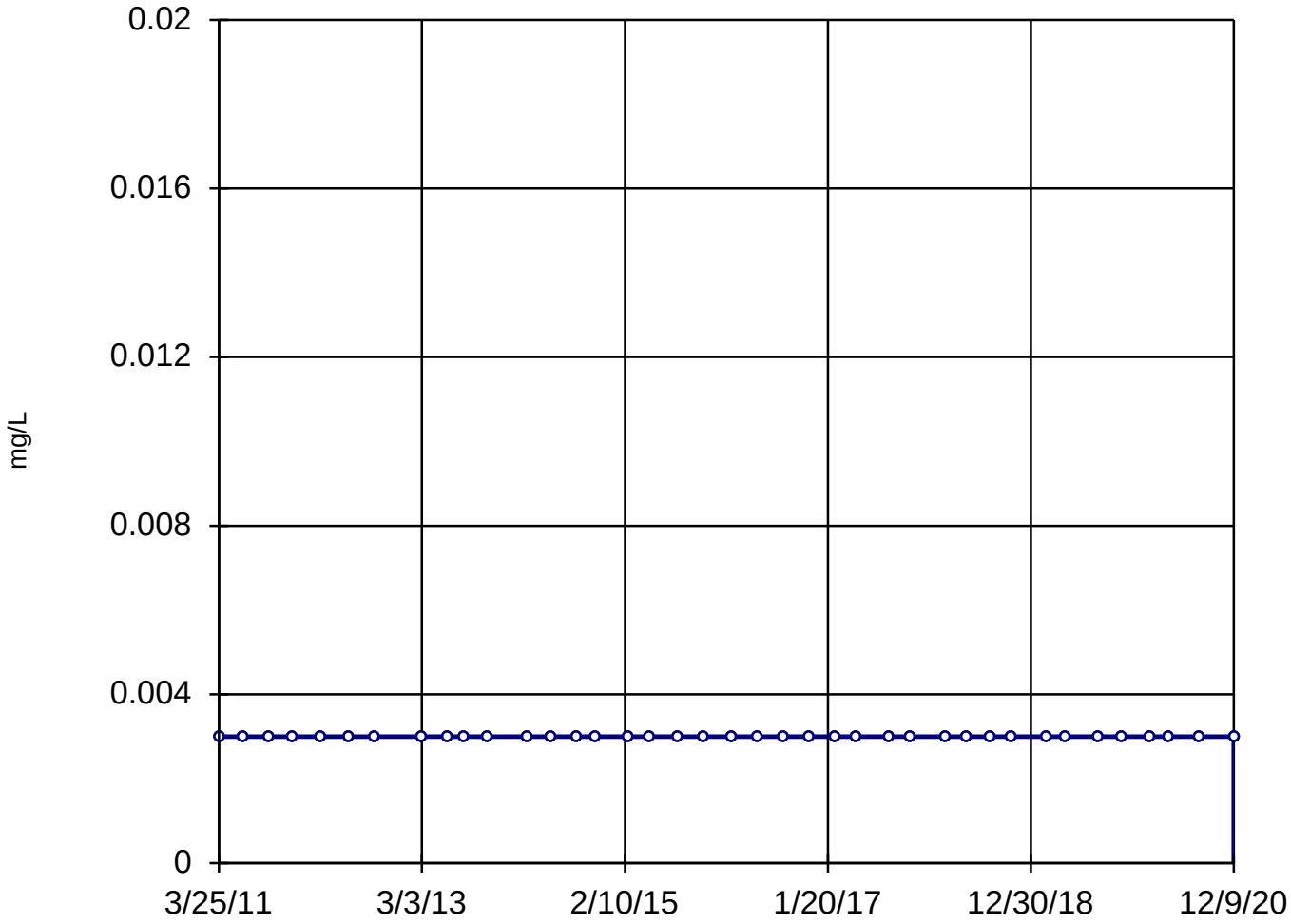
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-07



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Antimony, Dissolved Analysis Run 4/2/2021 11:43 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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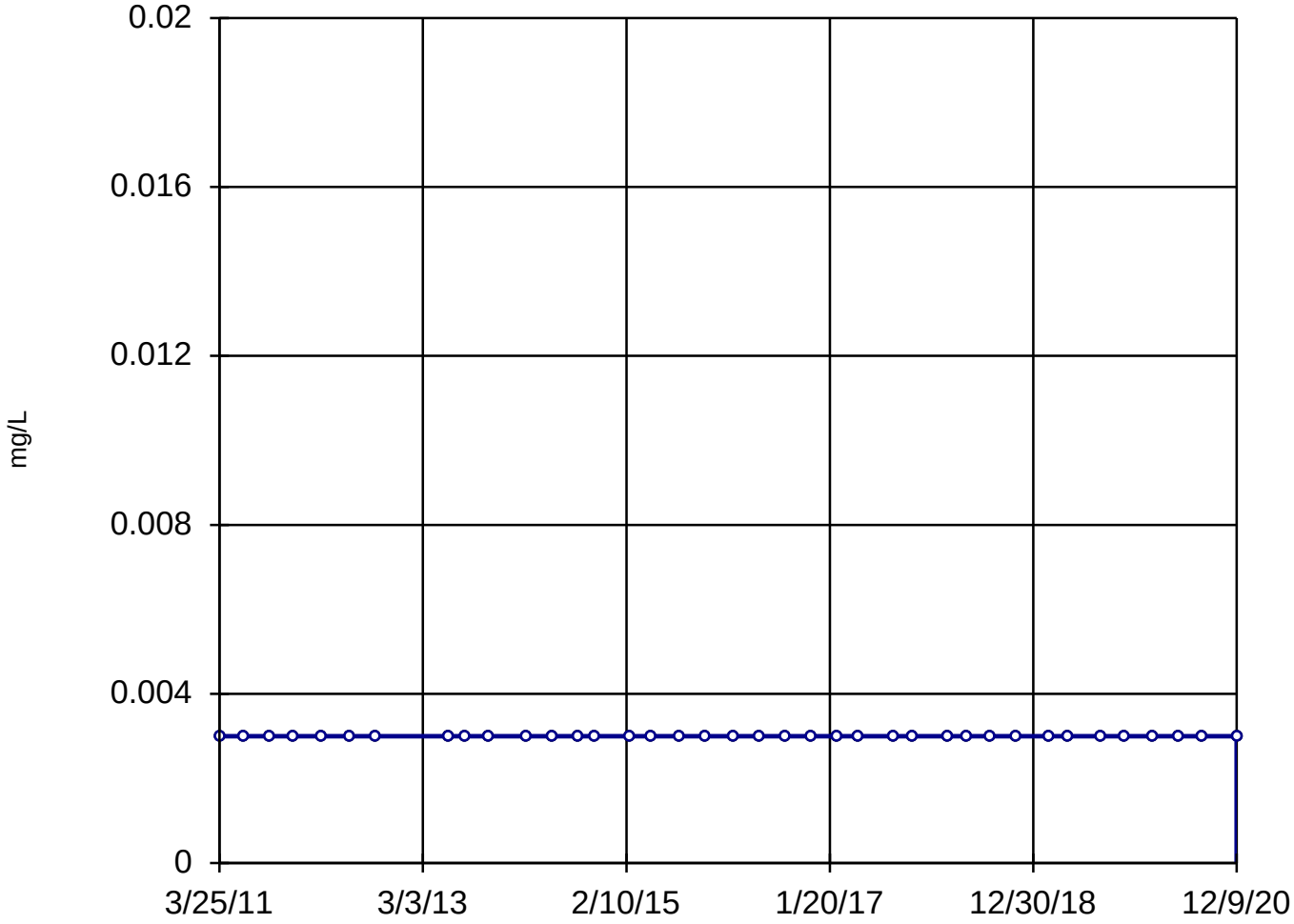
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 38

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 206

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Antimony, Dissolved Analysis Run 4/2/2021 11:43 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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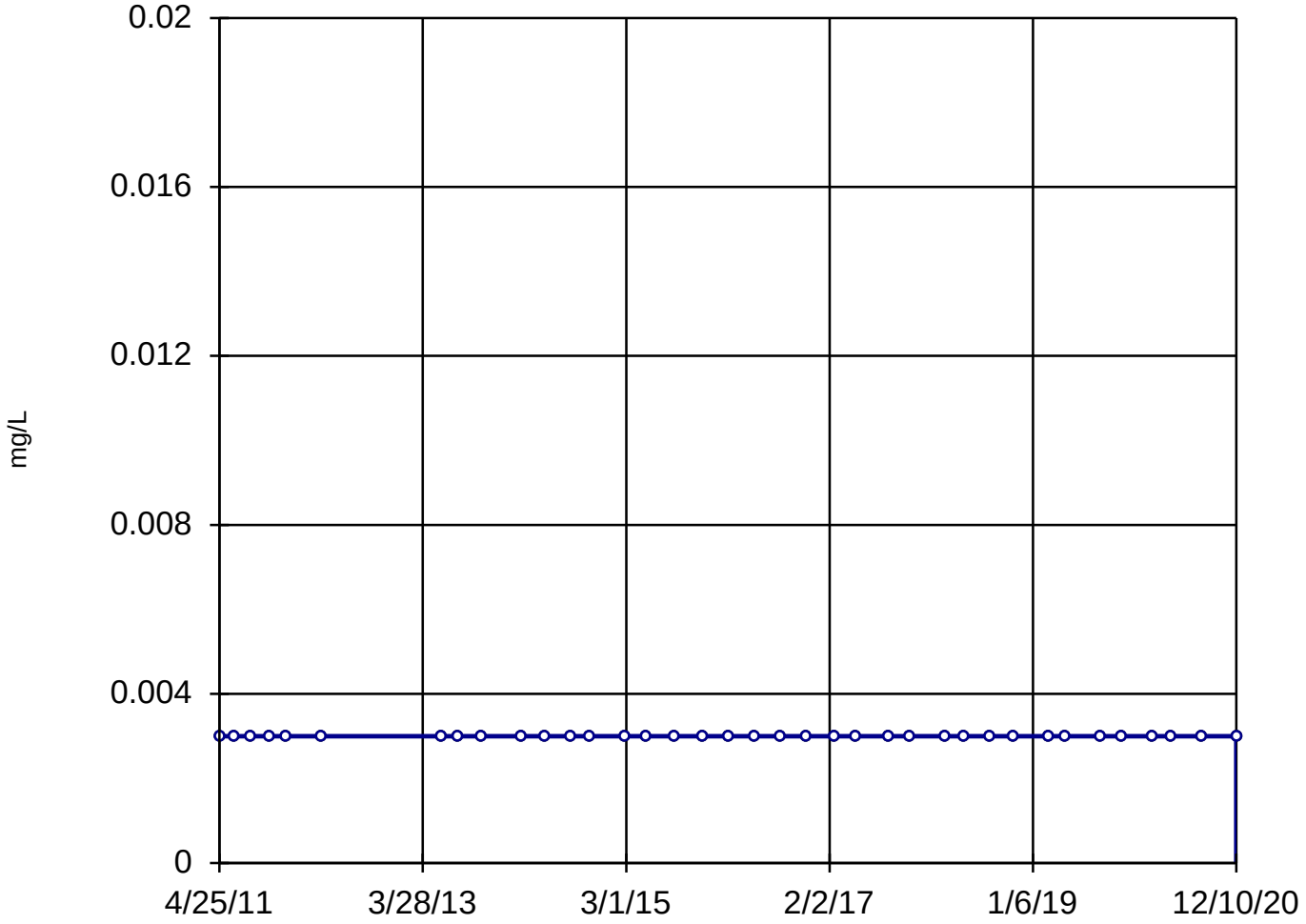
Sen's Slope Estimator

MW-13



n = 37

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 199

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Antimony, Dissolved Analysis Run 4/2/2021 11:43 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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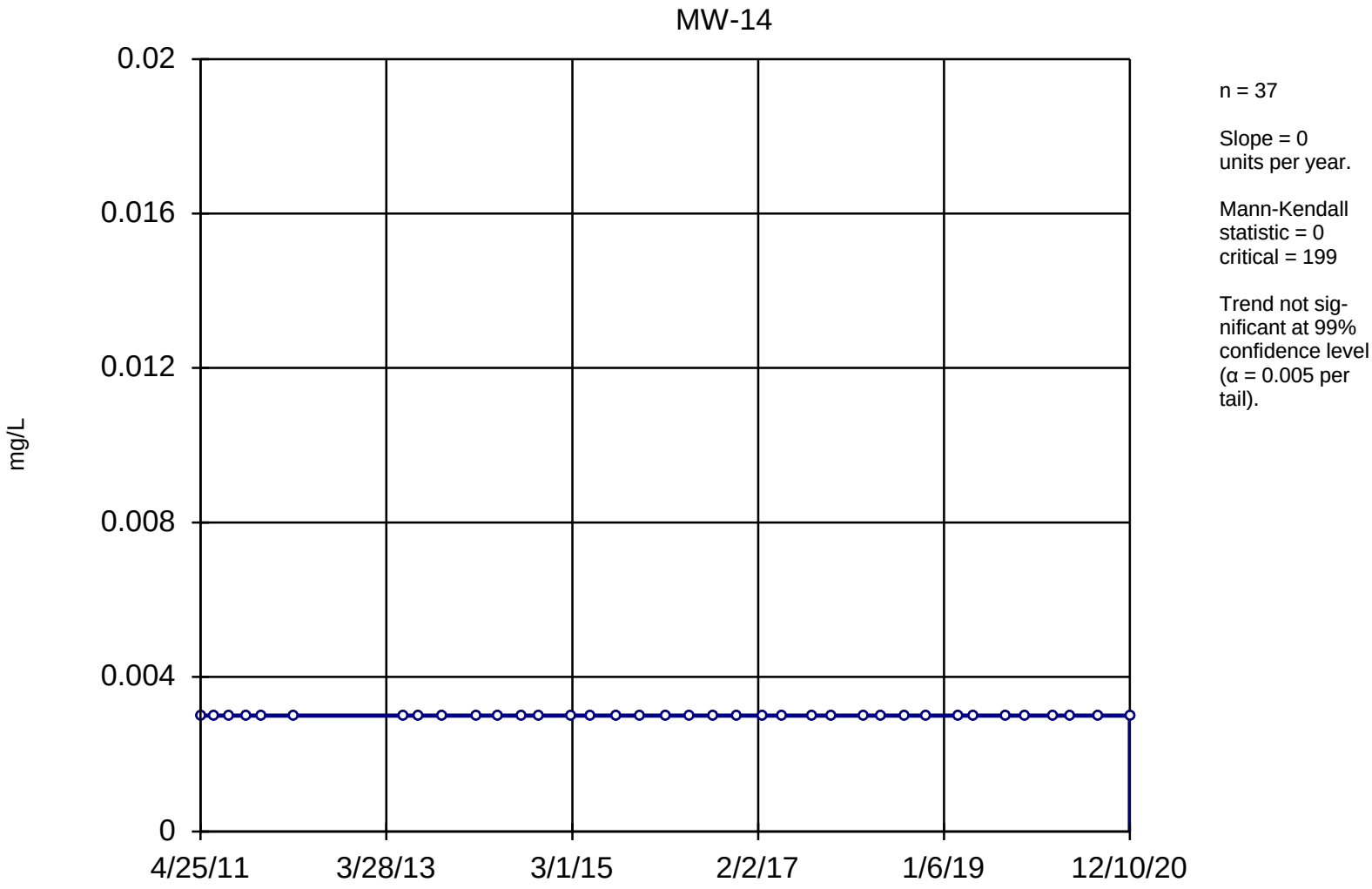
Hollow symbols indicate censored values.

Sen's Slope Estimator



Constituent: Antimony, Dissolved Analysis Run 4/2/2021 11:43 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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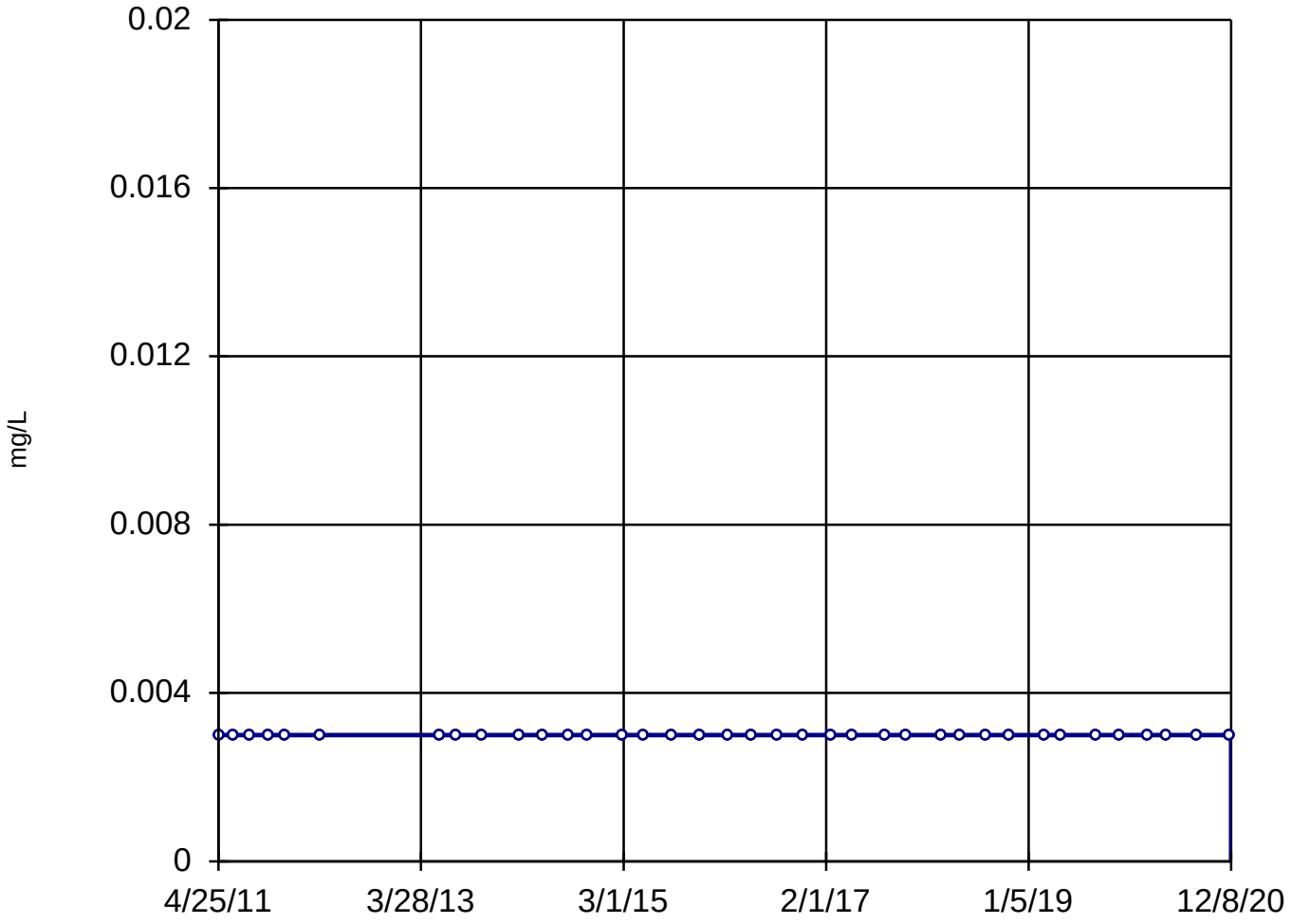
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-15



n = 37

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 199

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Antimony, Dissolved Analysis Run 4/2/2021 11:43 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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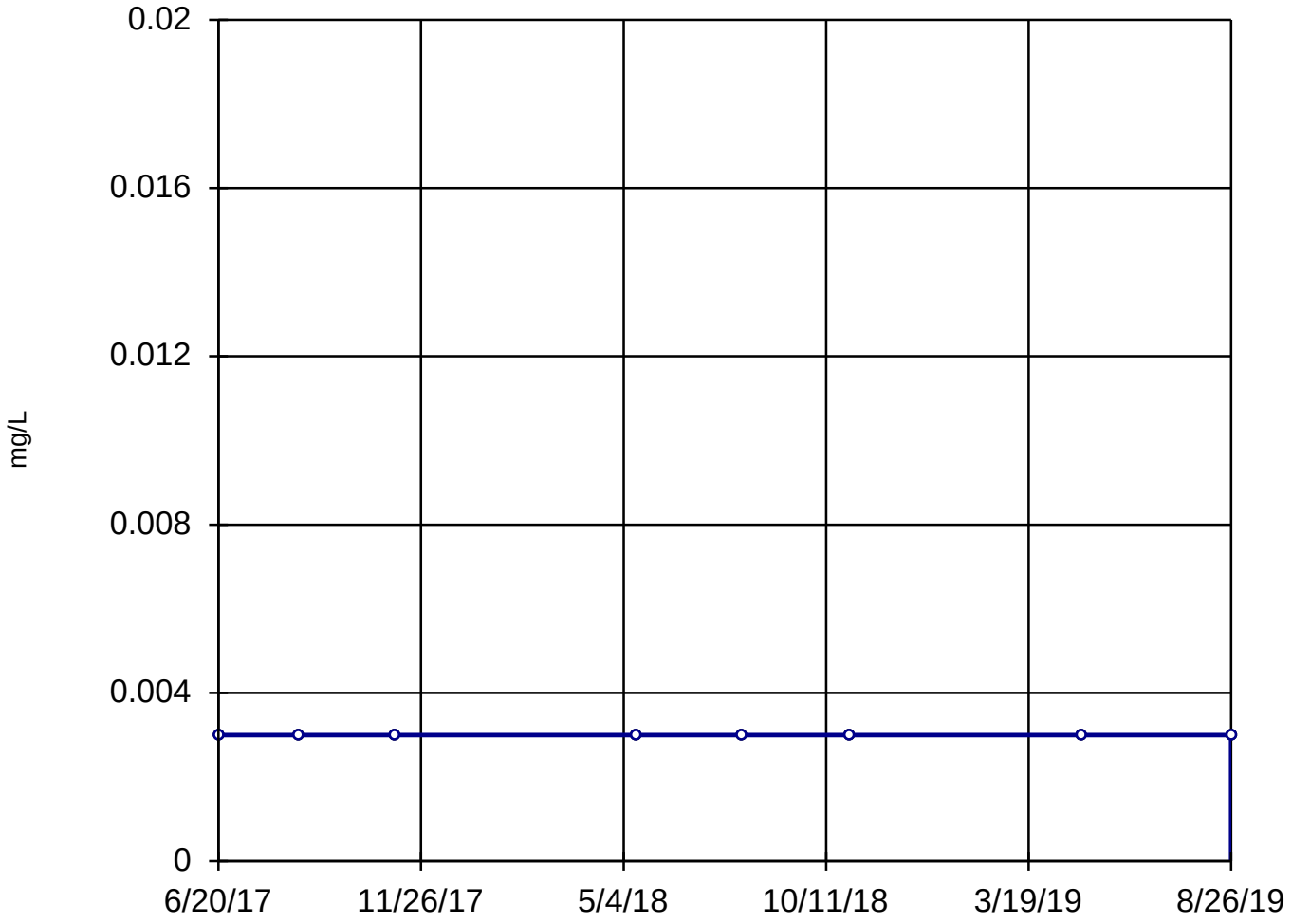
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 8

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 21

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Antimony, Total Analysis Run 4/2/2021 11:43 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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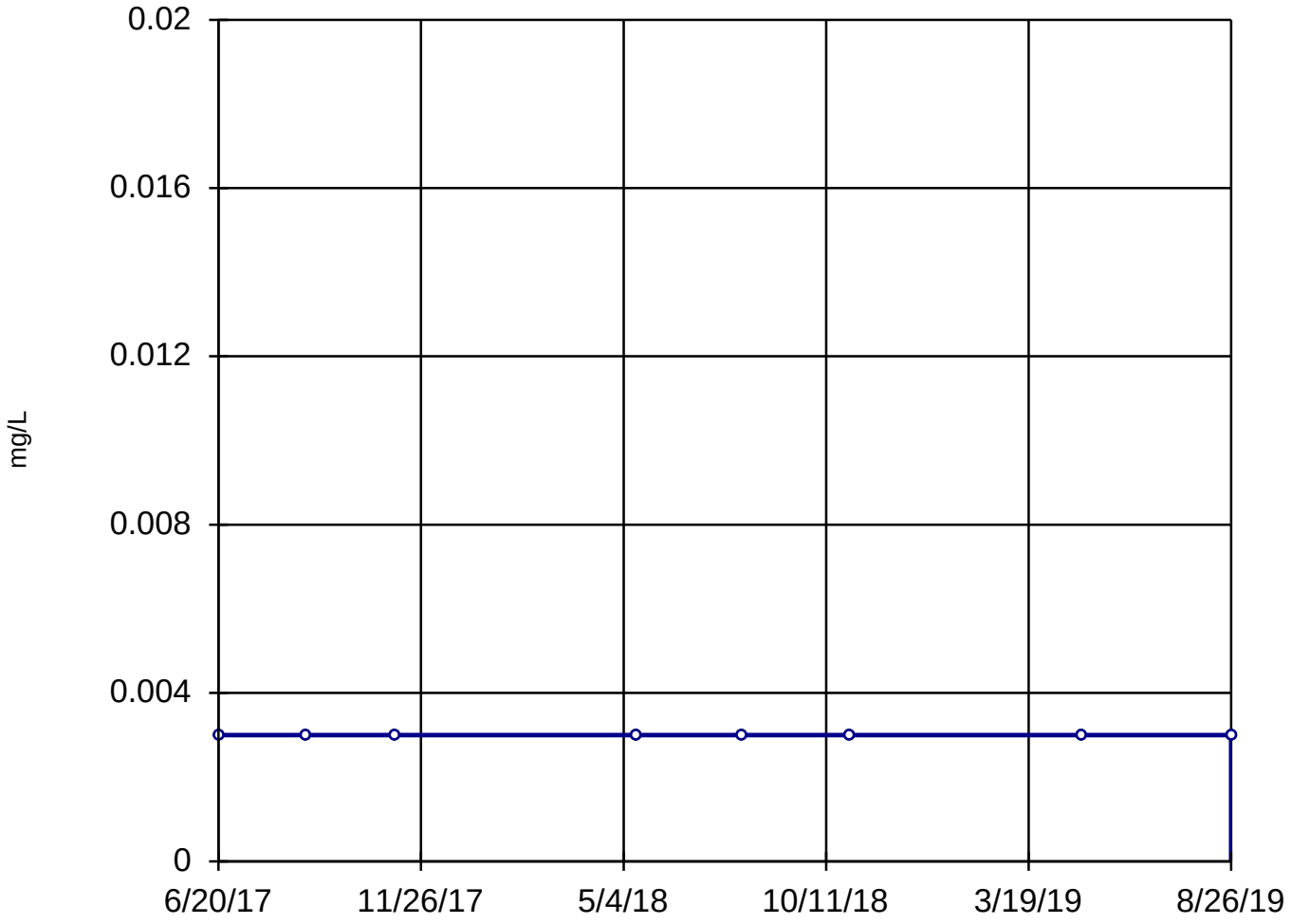
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 8

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 21

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Antimony, Total Analysis Run 4/2/2021 11:43 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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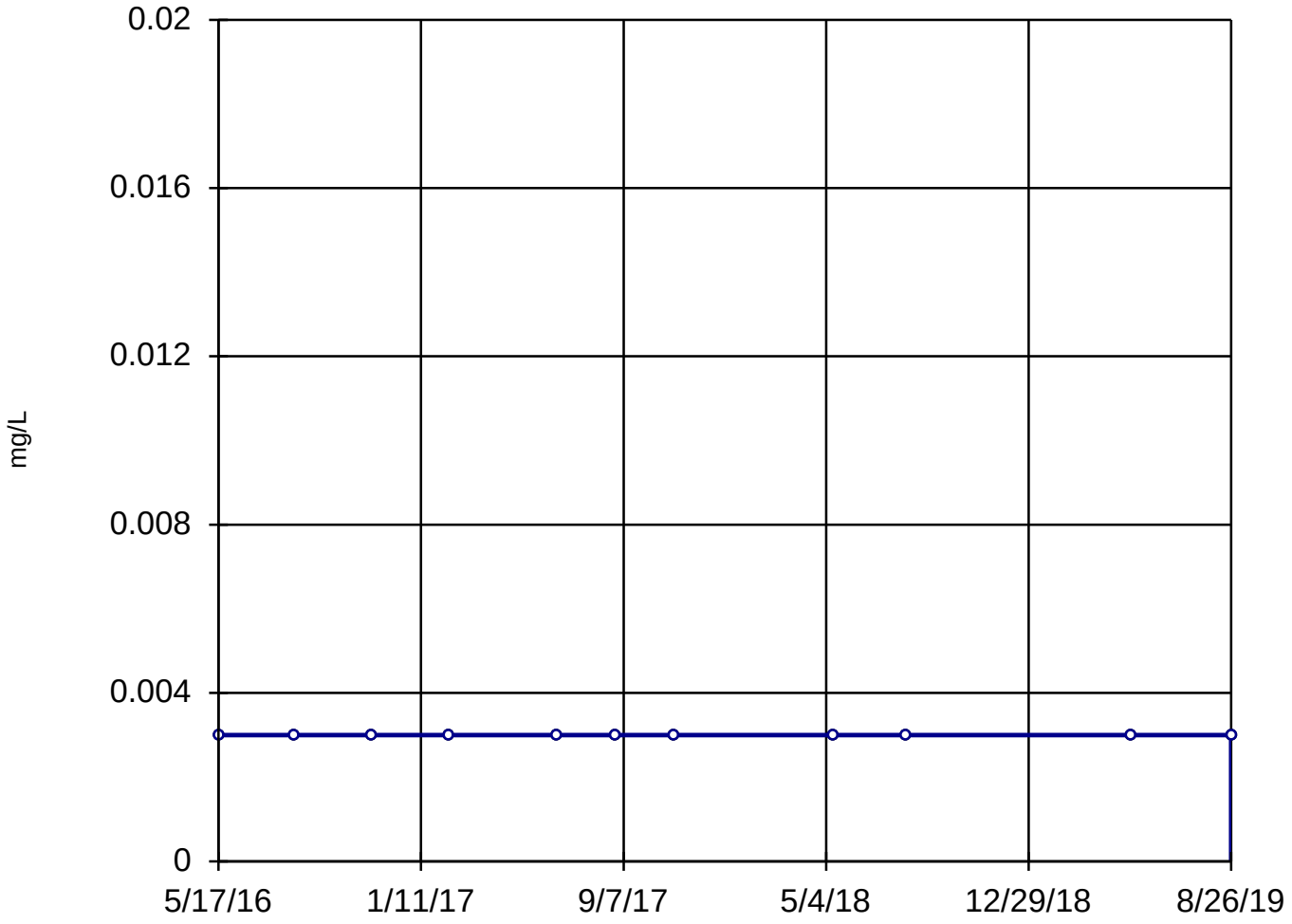
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-05



n = 11

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 34

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Antimony, Total Analysis Run 4/2/2021 11:43 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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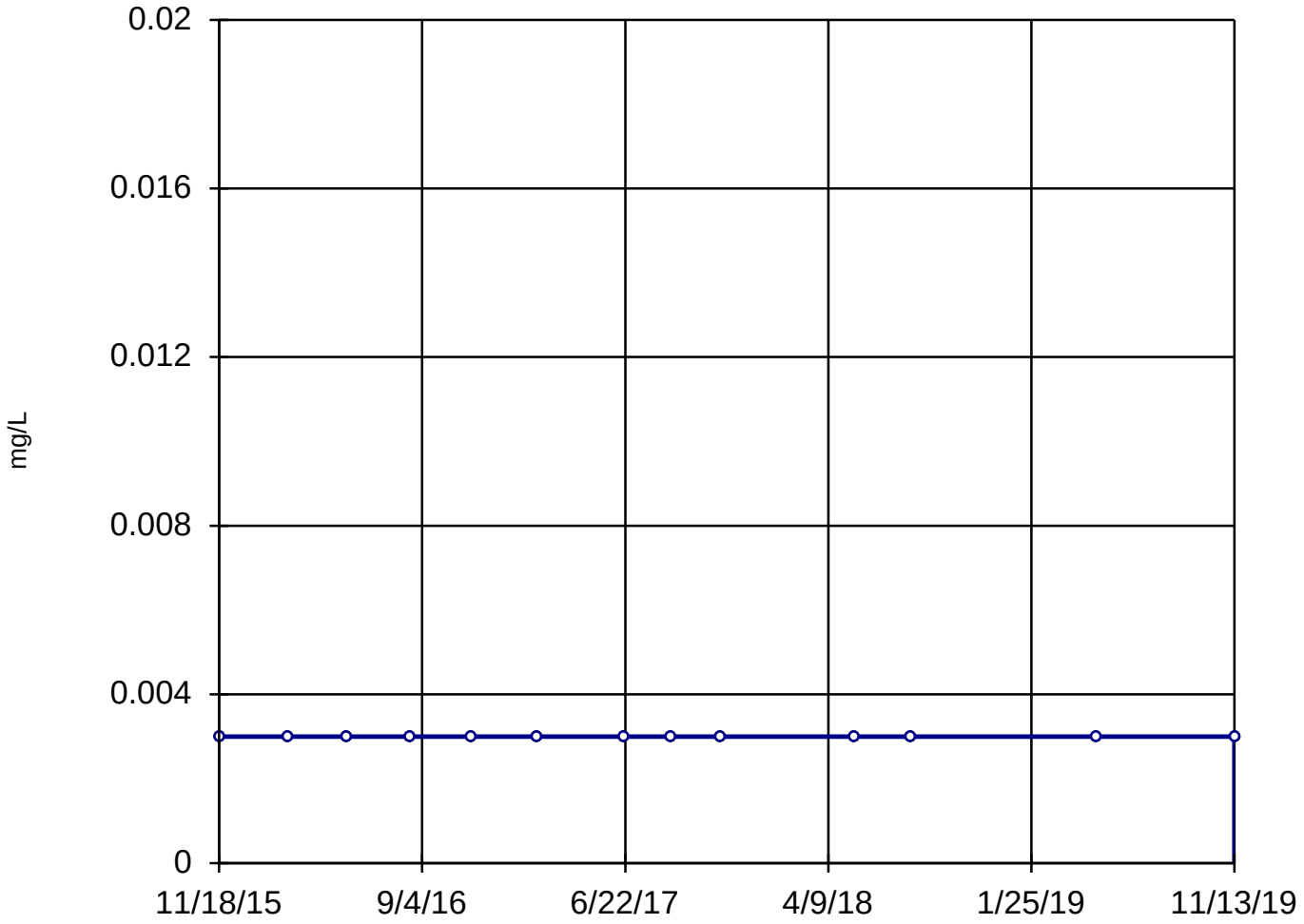
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 13

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 43

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

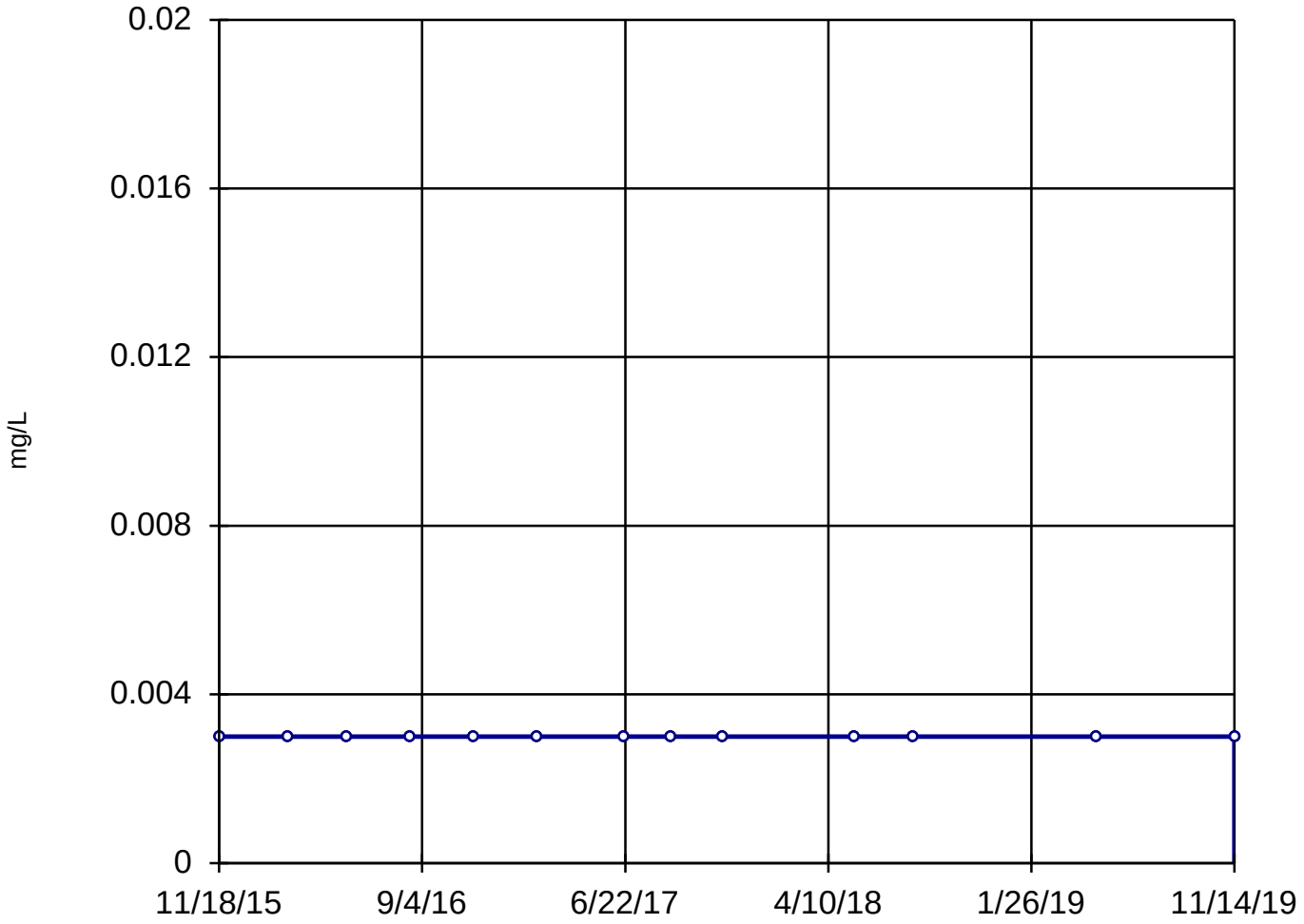
Constituent: Antimony, Total Analysis Run 4/2/2021 11:43 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-15



n = 13

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 43

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

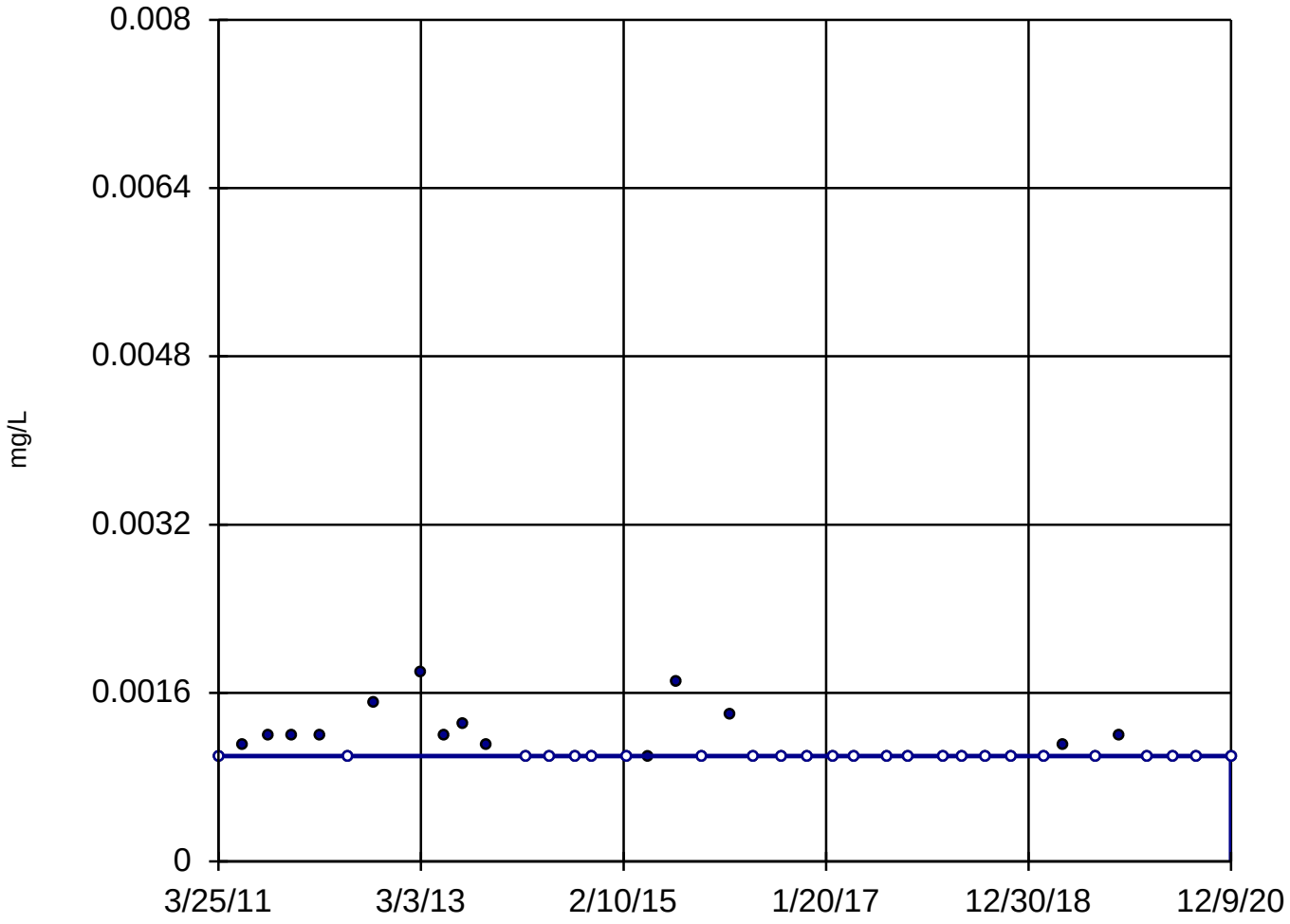
Constituent: Antimony, Total Analysis Run 4/2/2021 11:43 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = -183
critical = -214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

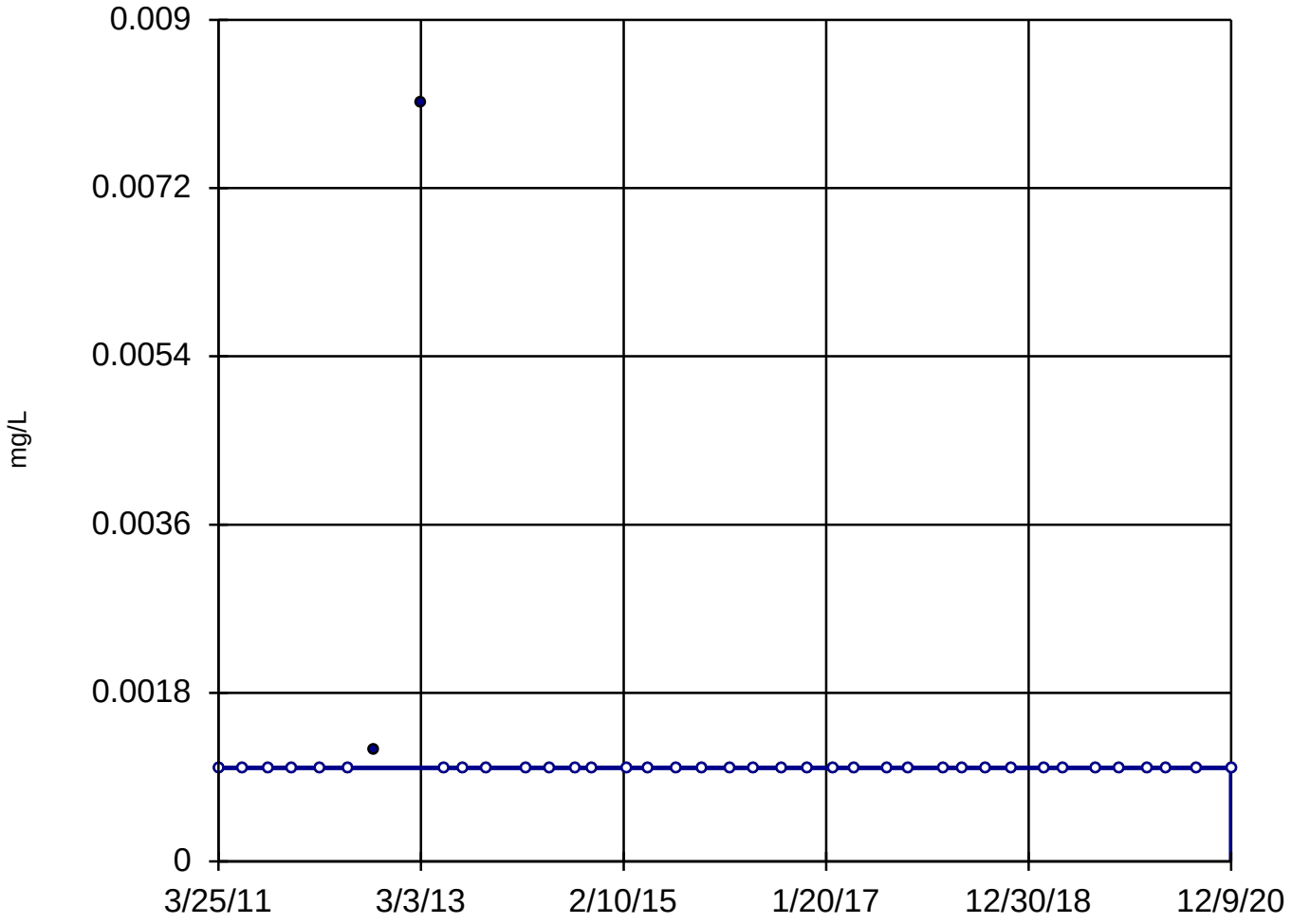
Constituent: Arsenic, Dissolved Analysis Run 4/2/2021 11:43 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = -49
critical = -214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

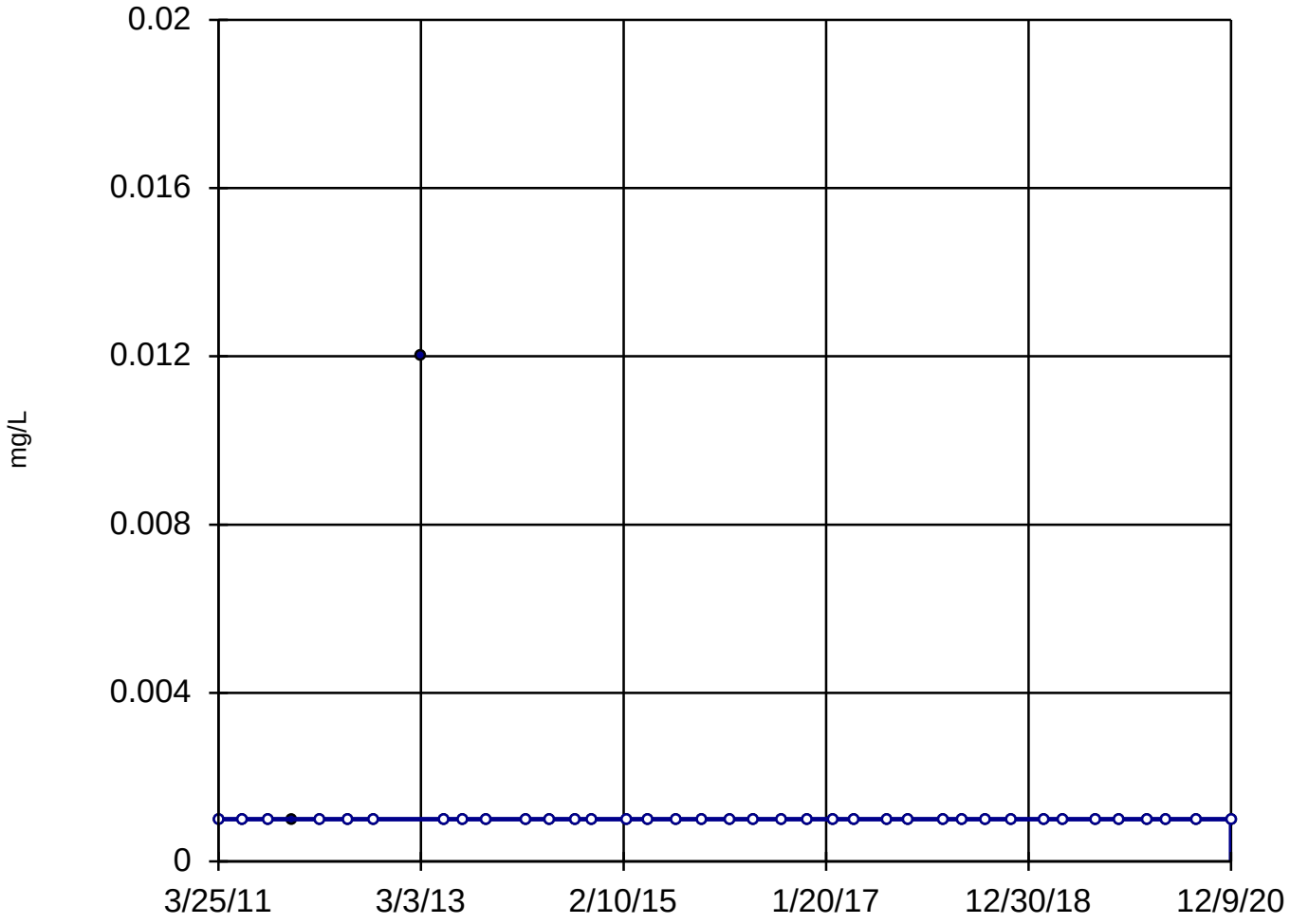
Constituent: Arsenic, Dissolved Analysis Run 4/2/2021 11:43 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-05



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = -24
critical = -214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

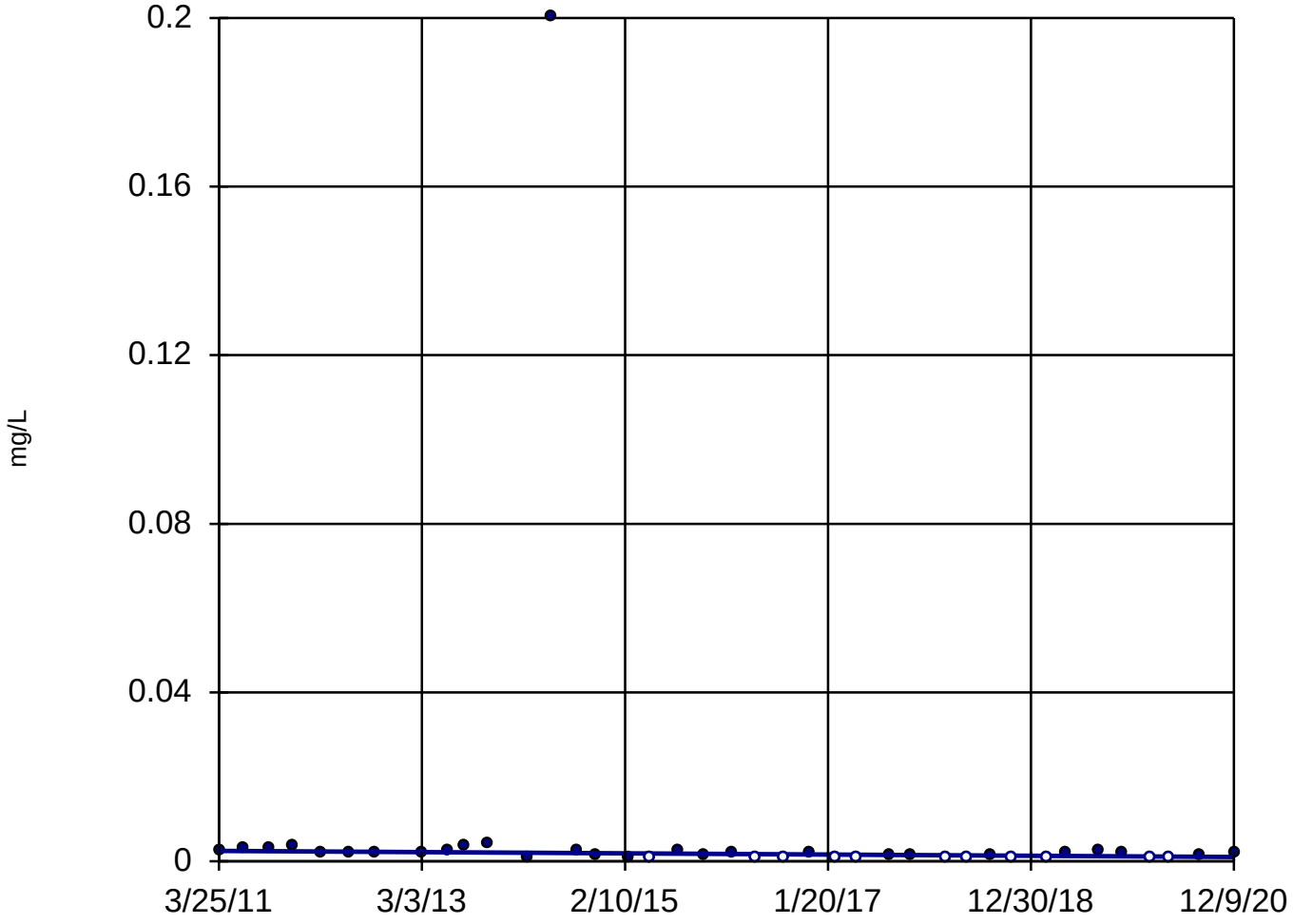
Constituent: Arsenic, Dissolved Analysis Run 4/2/2021 11:43 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-06



n = 39

Slope = -0.0001472 units per year.

Mann-Kendall statistic = -267
critical = -214

Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

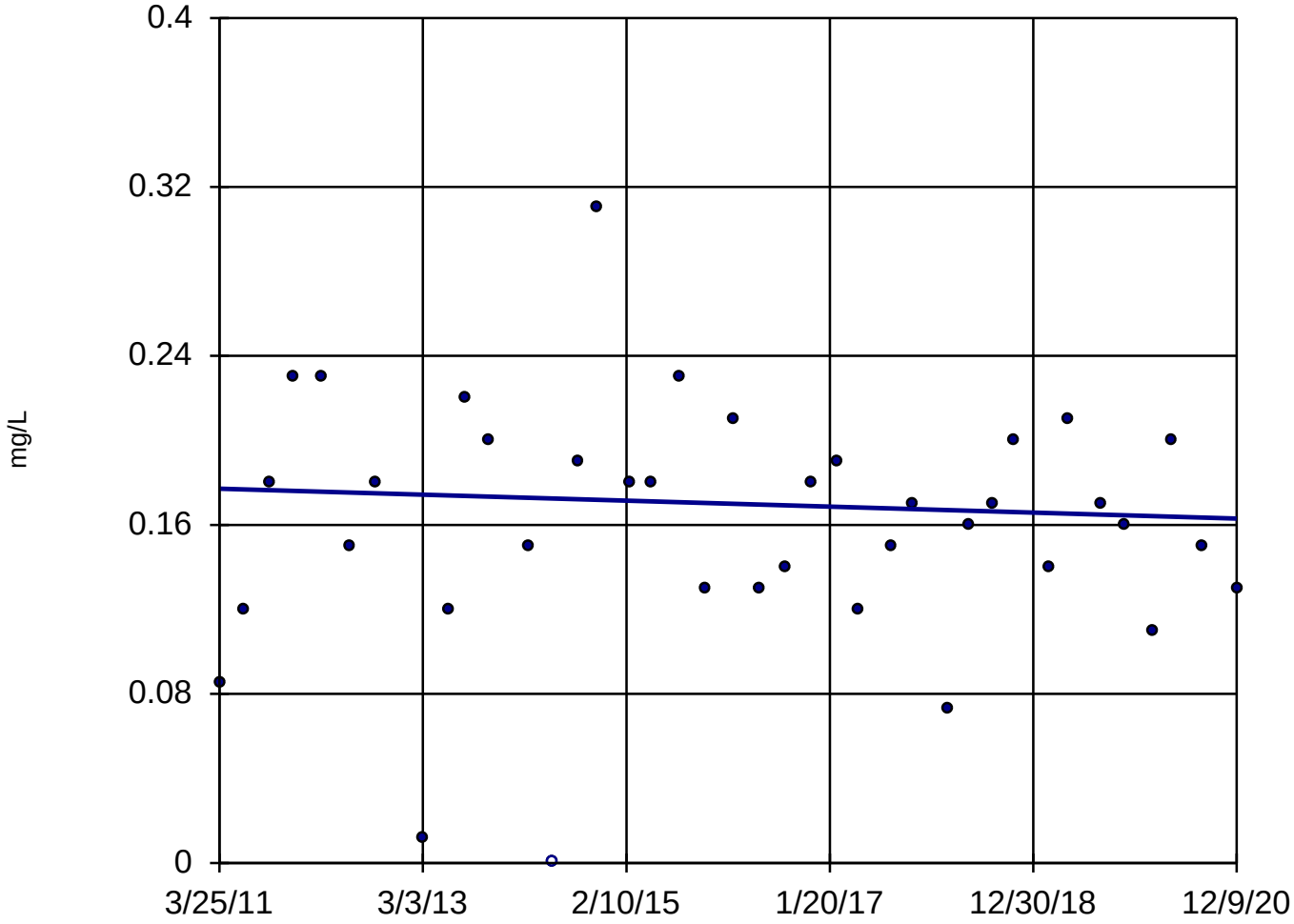
Constituent: Arsenic, Dissolved Analysis Run 4/2/2021 11:43 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-07



n = 39

Slope = -0.00145 units per year.

Mann-Kendall statistic = -42
critical = -214

Trend not significant at 99% confidence level (α = 0.005 per tail).

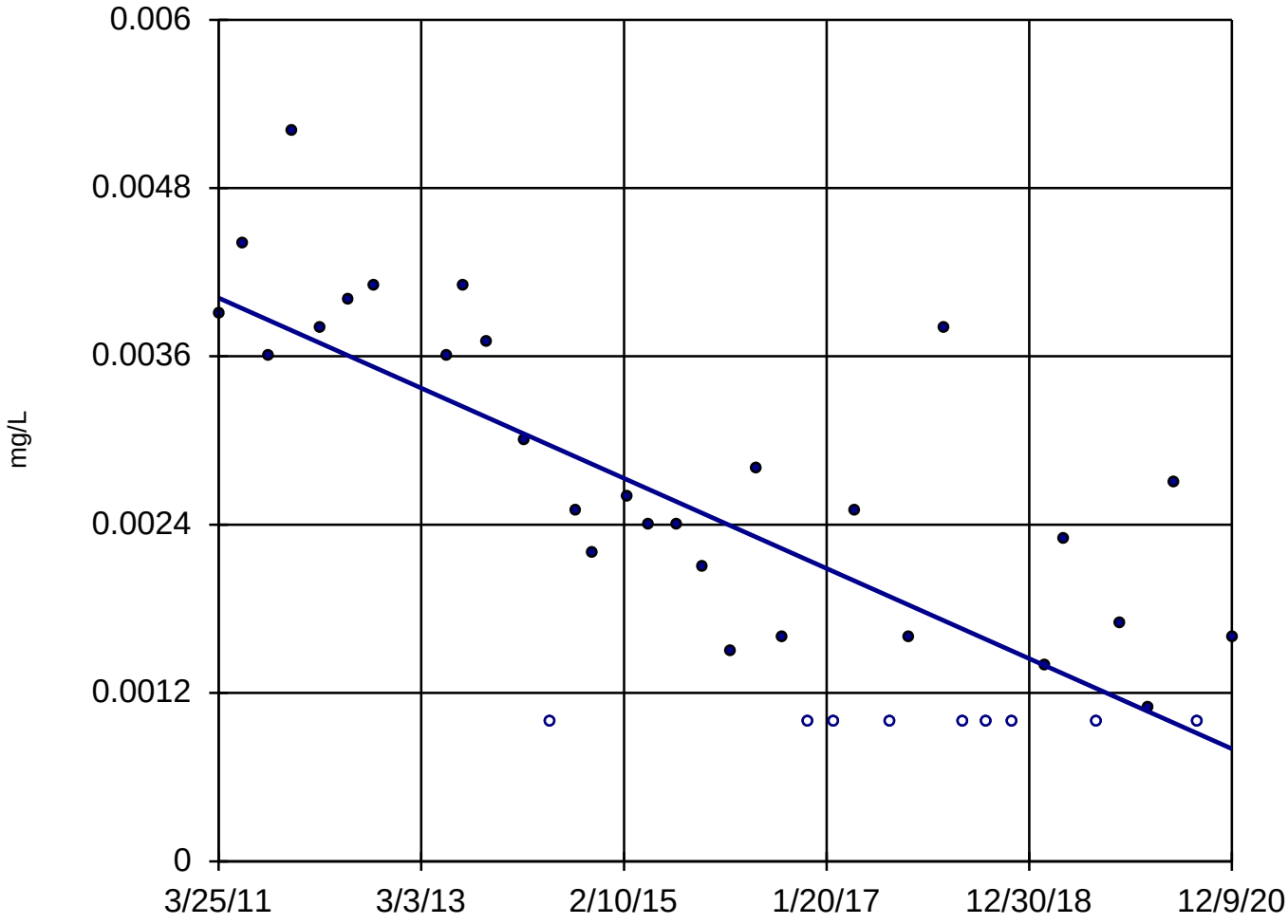
Constituent: Arsenic, Dissolved Analysis Run 4/2/2021 11:43 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 38

Slope = -0.0003309 units per year.

Mann-Kendall statistic = -365
critical = -206

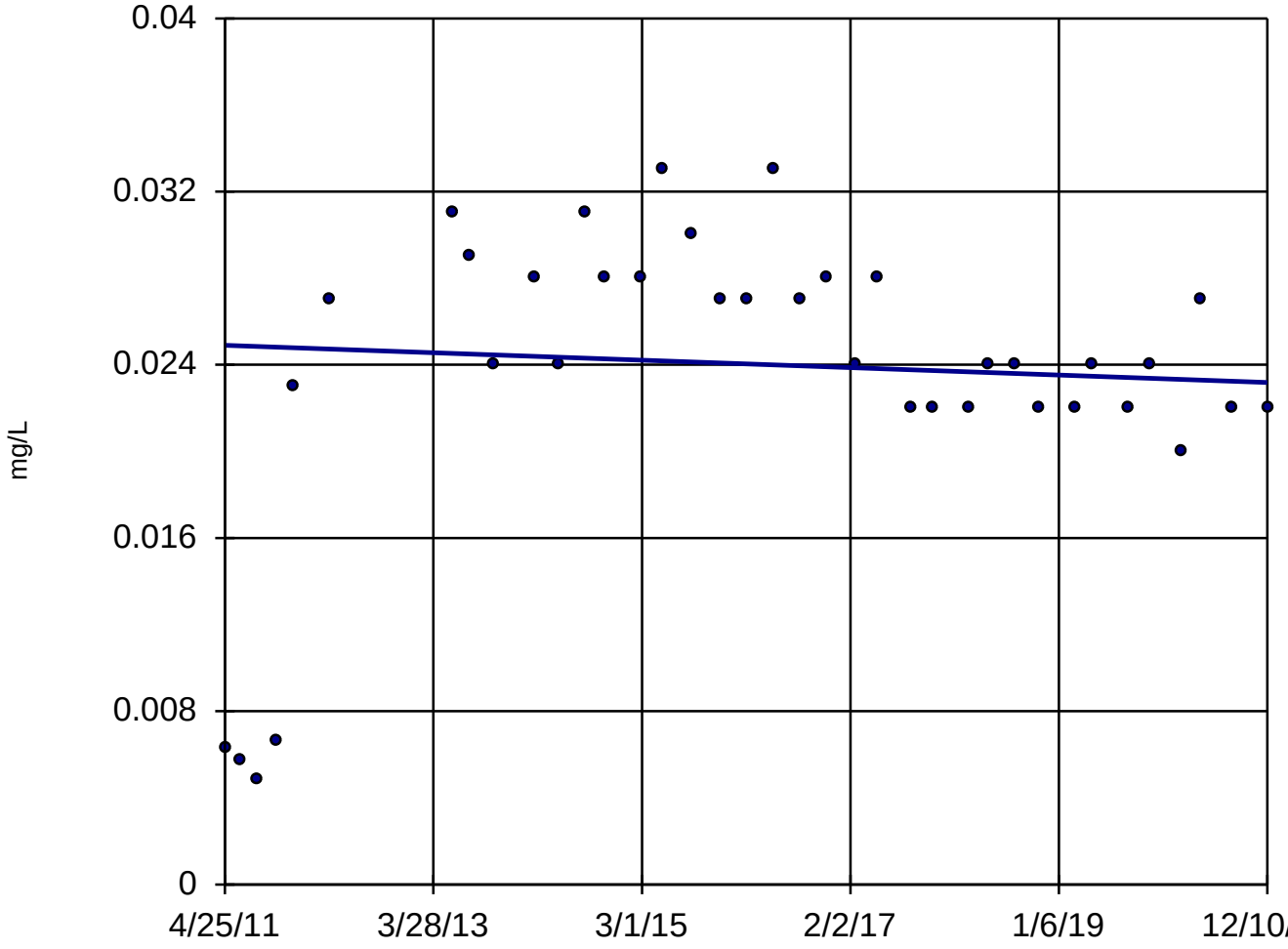
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Arsenic, Dissolved Analysis Run 4/2/2021 11:43 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-13



n = 37

Slope = -0.0001785 units per year.

Mann-Kendall statistic = -89
critical = -199

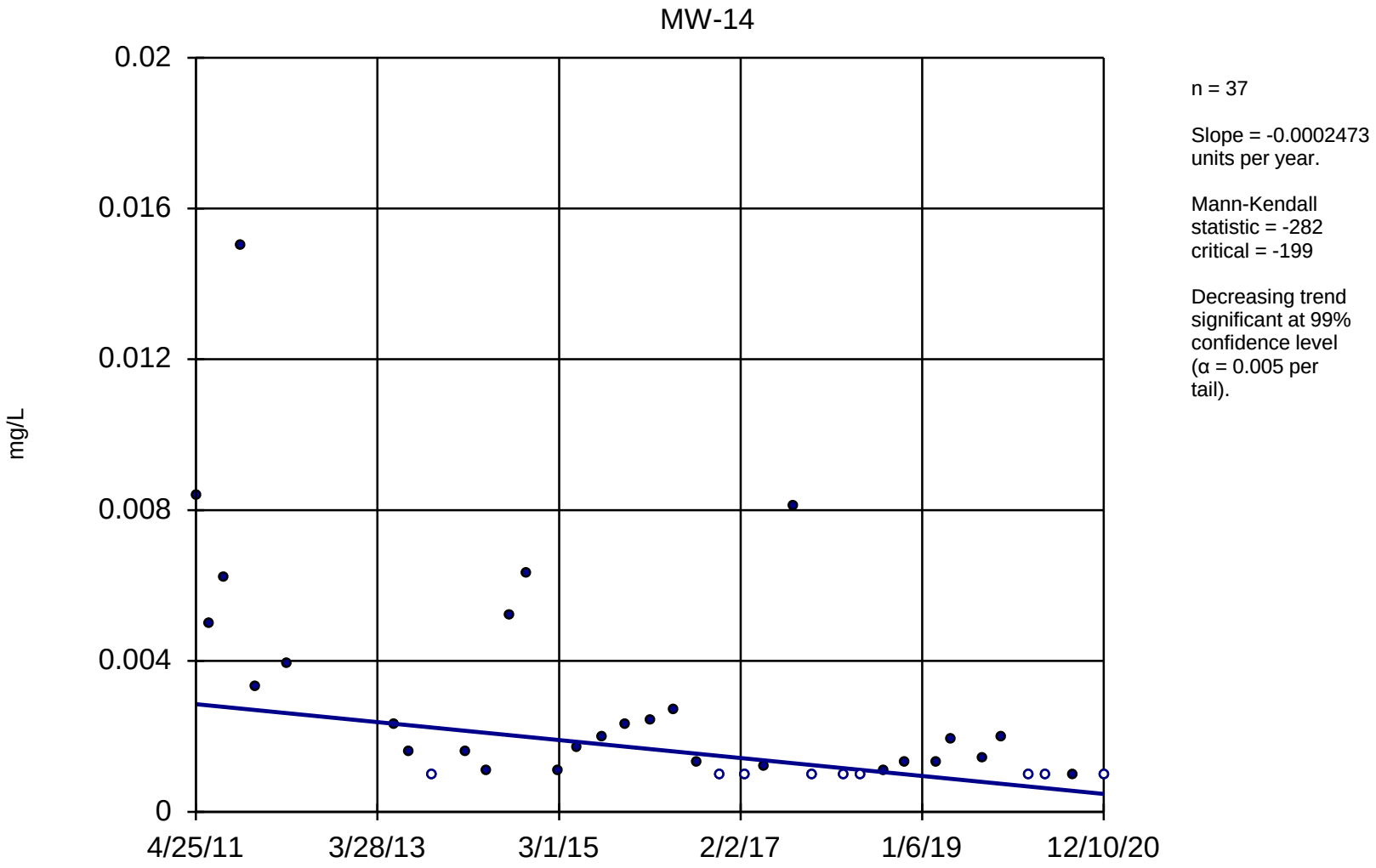
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Arsenic, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator



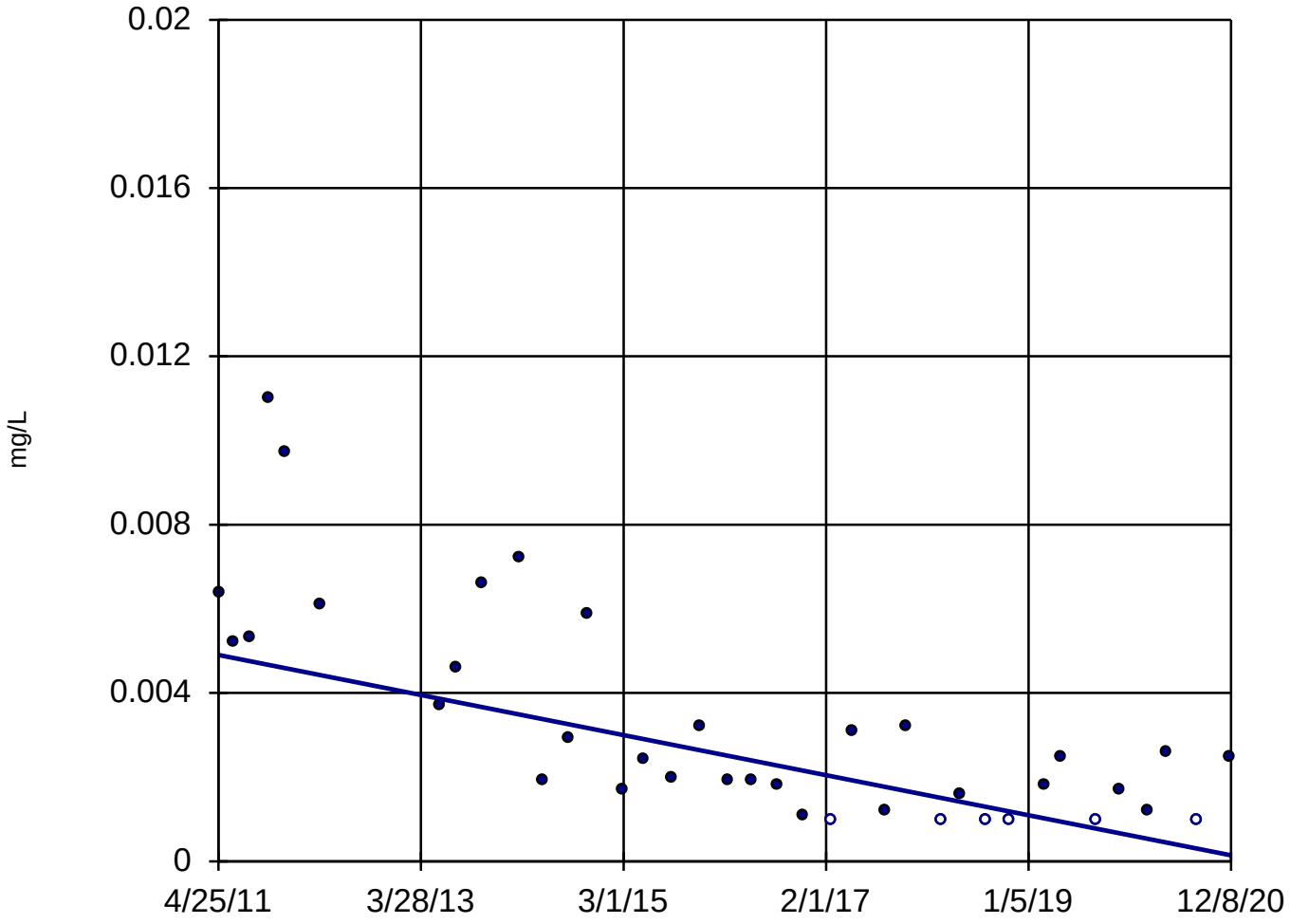
Constituent: Arsenic, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-15



n = 37

Slope = -0.0004945 units per year.

Mann-Kendall statistic = -353
critical = -199

Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

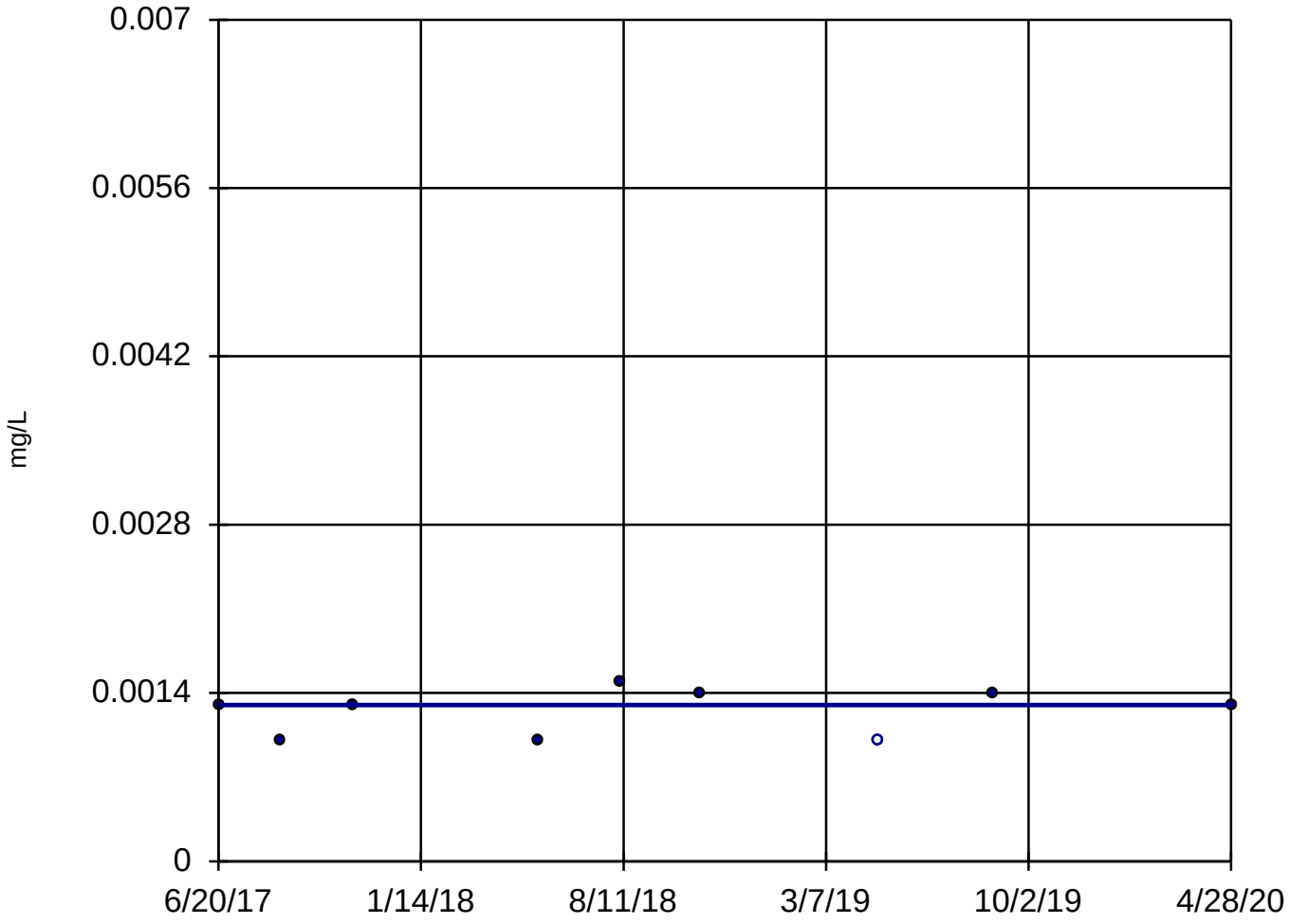
Constituent: Arsenic, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 9

Slope = 3.9e-11 units per year.

Mann-Kendall statistic = 5
critical = 25

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Arsenic, Total Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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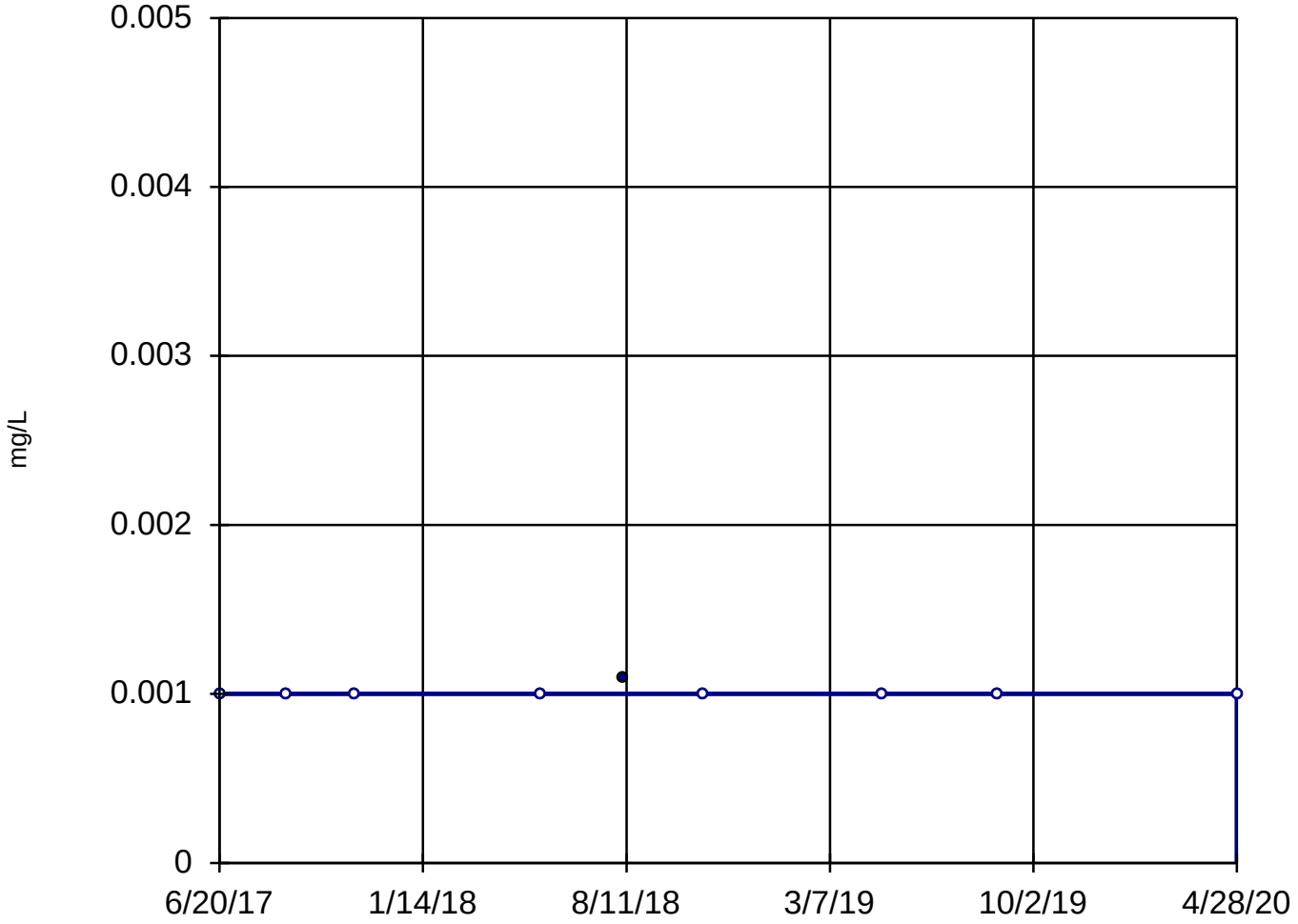
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 25

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

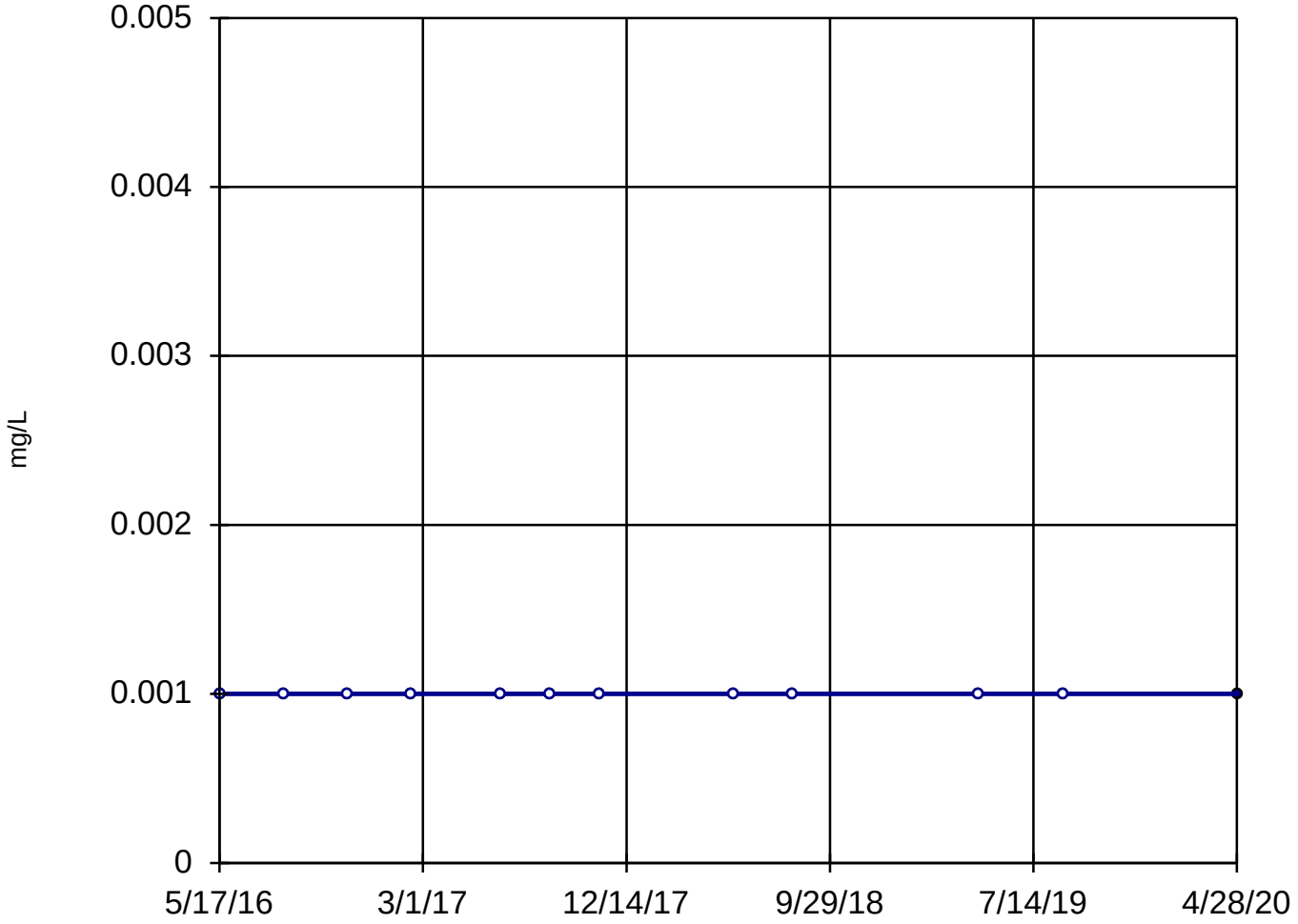
Constituent: Arsenic, Total Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-05



n = 12

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 38

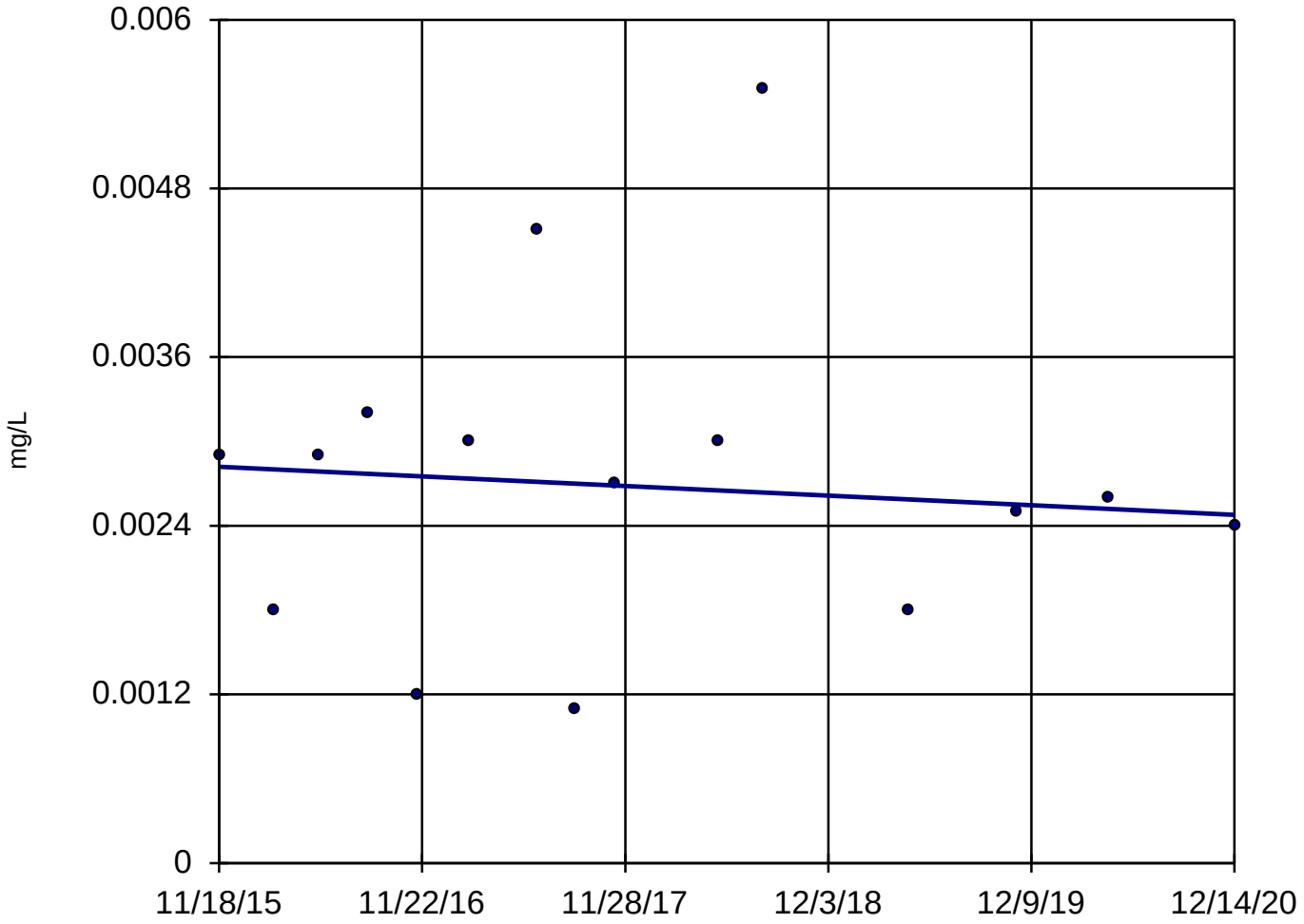
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Arsenic, Total Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-08



n = 15

Slope = -0.00006747 units per year.

Mann-Kendall statistic = -6
critical = -53

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Arsenic, Total Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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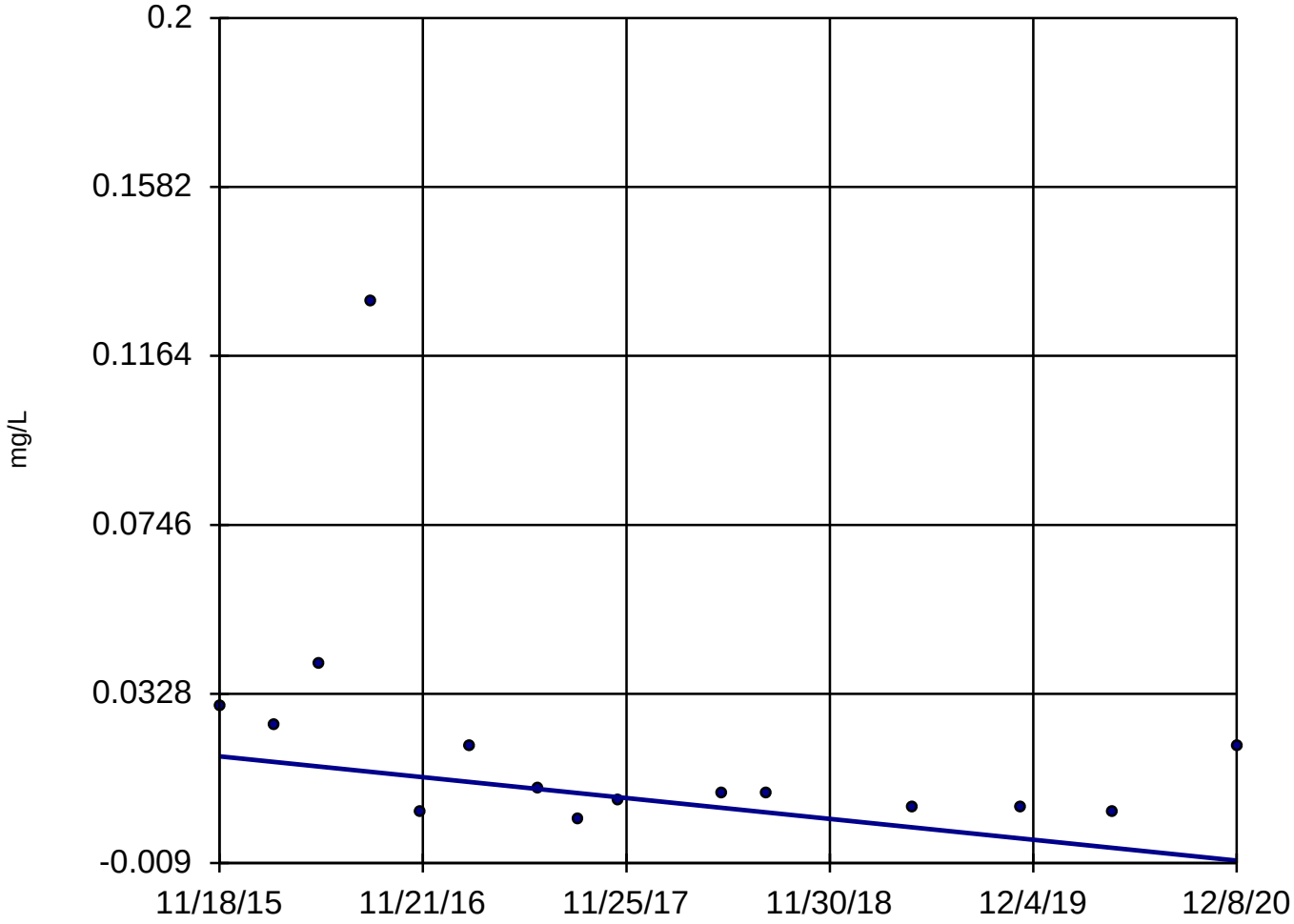
Sen's Slope Estimator

MW-15



n = 15

Slope = -0.005098 units per year.

Mann-Kendall statistic = -42
critical = -53

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Arsenic, Total Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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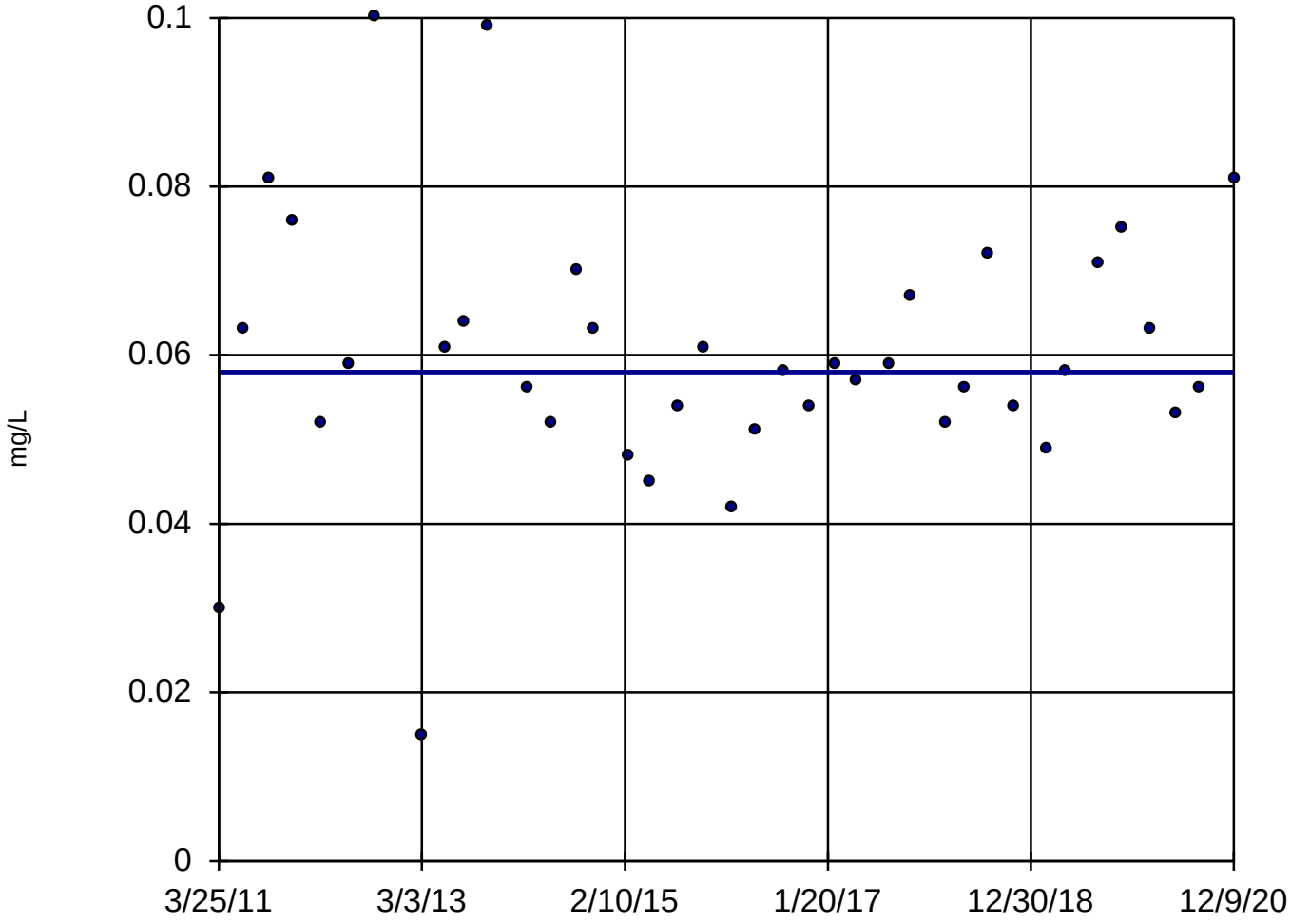
Sen's Slope Estimator

MW-03



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 11
critical = 214

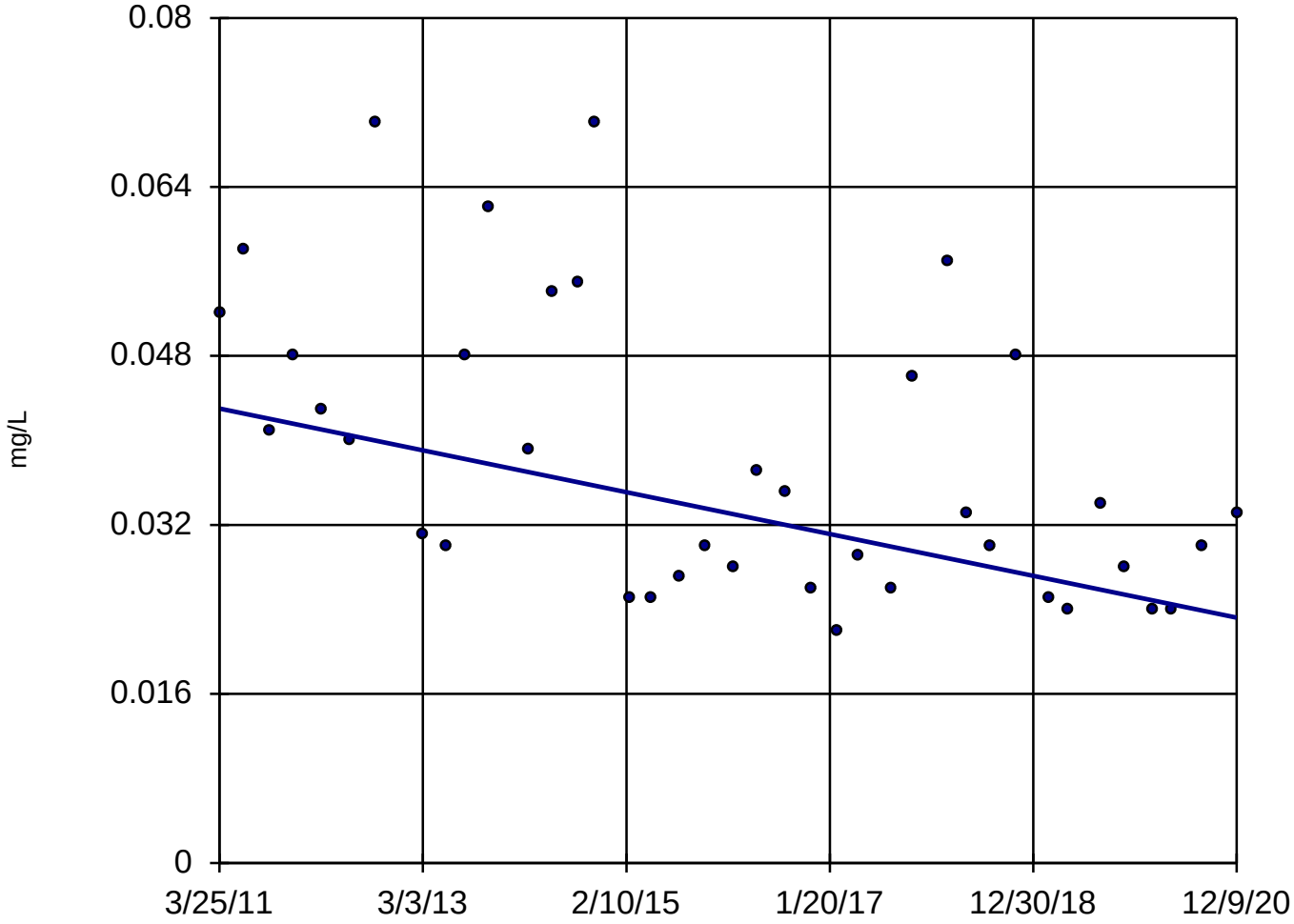
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Barium, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-04



n = 39

Slope = -0.002035 units per year.

Mann-Kendall statistic = -268
critical = -214

Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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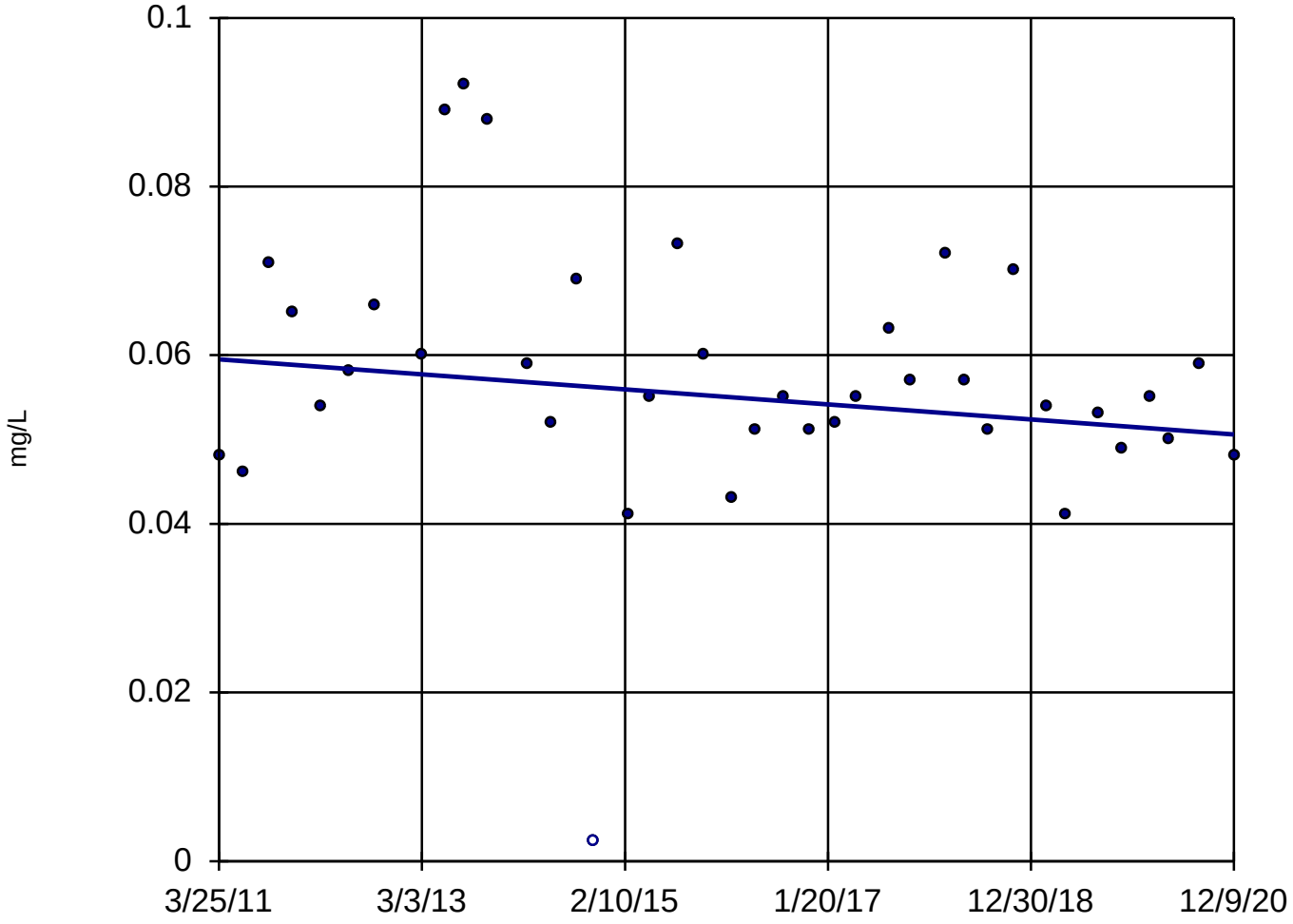
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-05



n = 39

Slope = -0.0009136 units per year.

Mann-Kendall statistic = -129
critical = -214

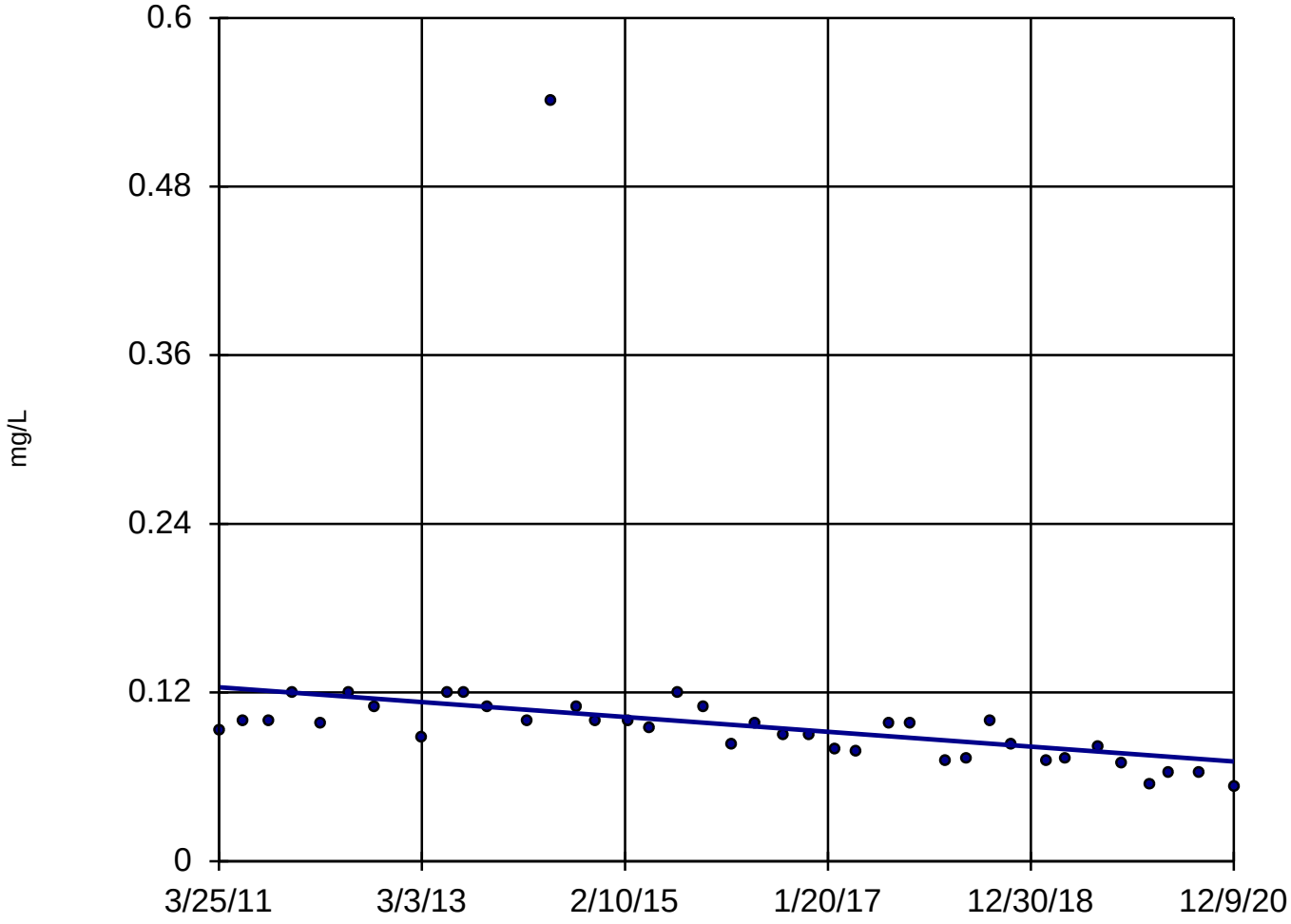
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-06



n = 39

Slope = -0.005435 units per year.

Mann-Kendall statistic = -431
critical = -214

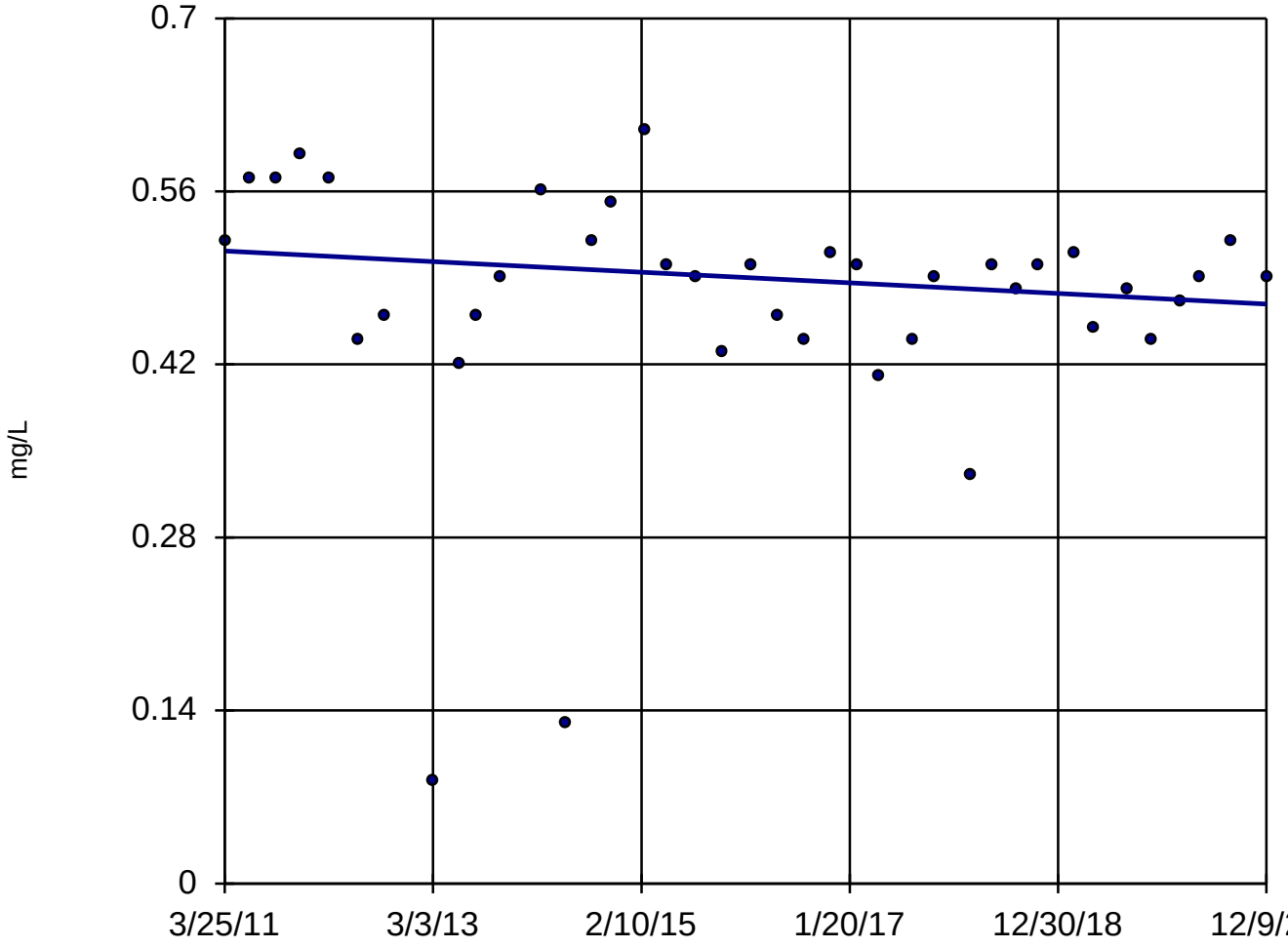
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-07



n = 39

Slope = -0.004419 units per year.

Mann-Kendall statistic = -102
critical = -214

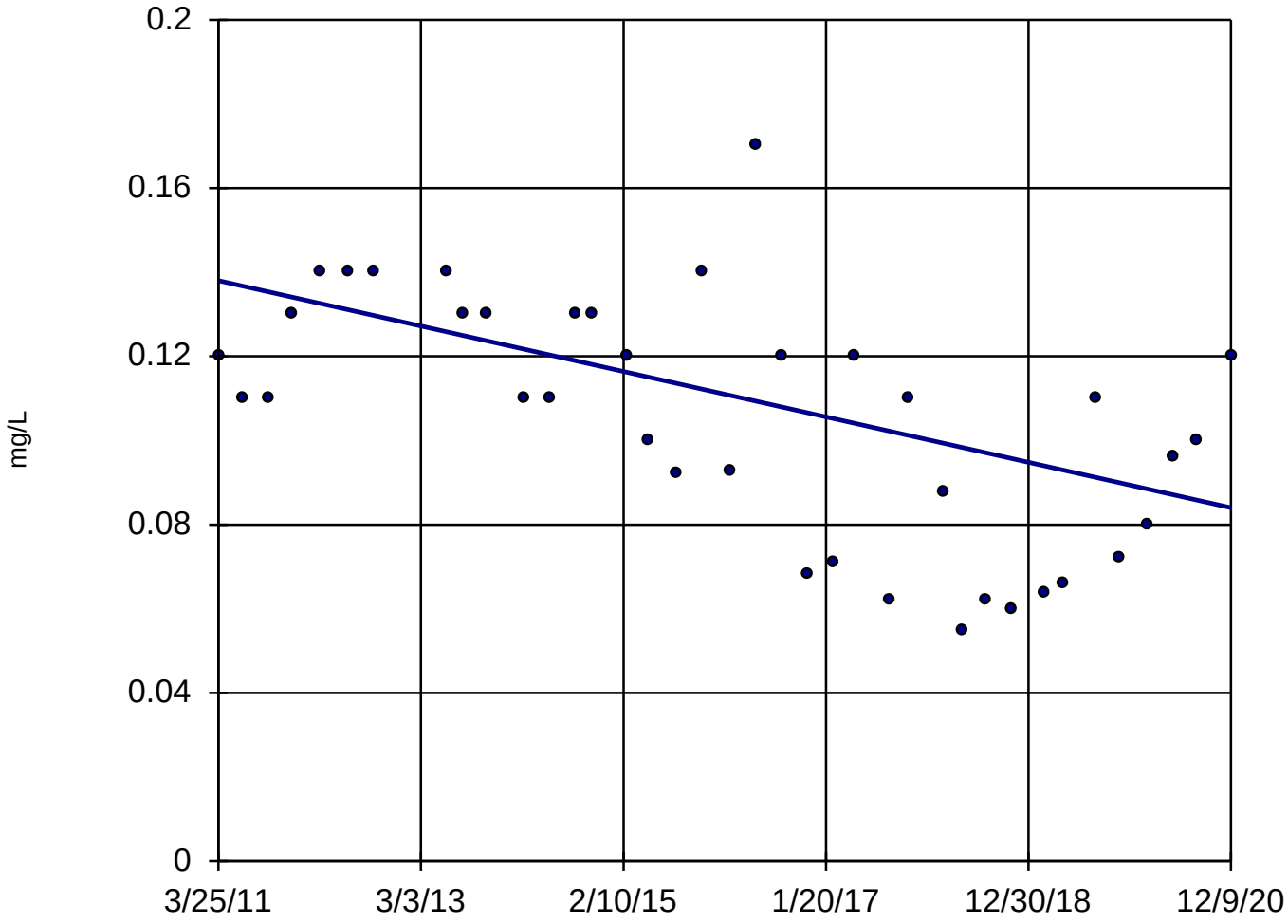
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-08



n = 38

Slope = -0.005551 units per year.

Mann-Kendall statistic = -282
critical = -206

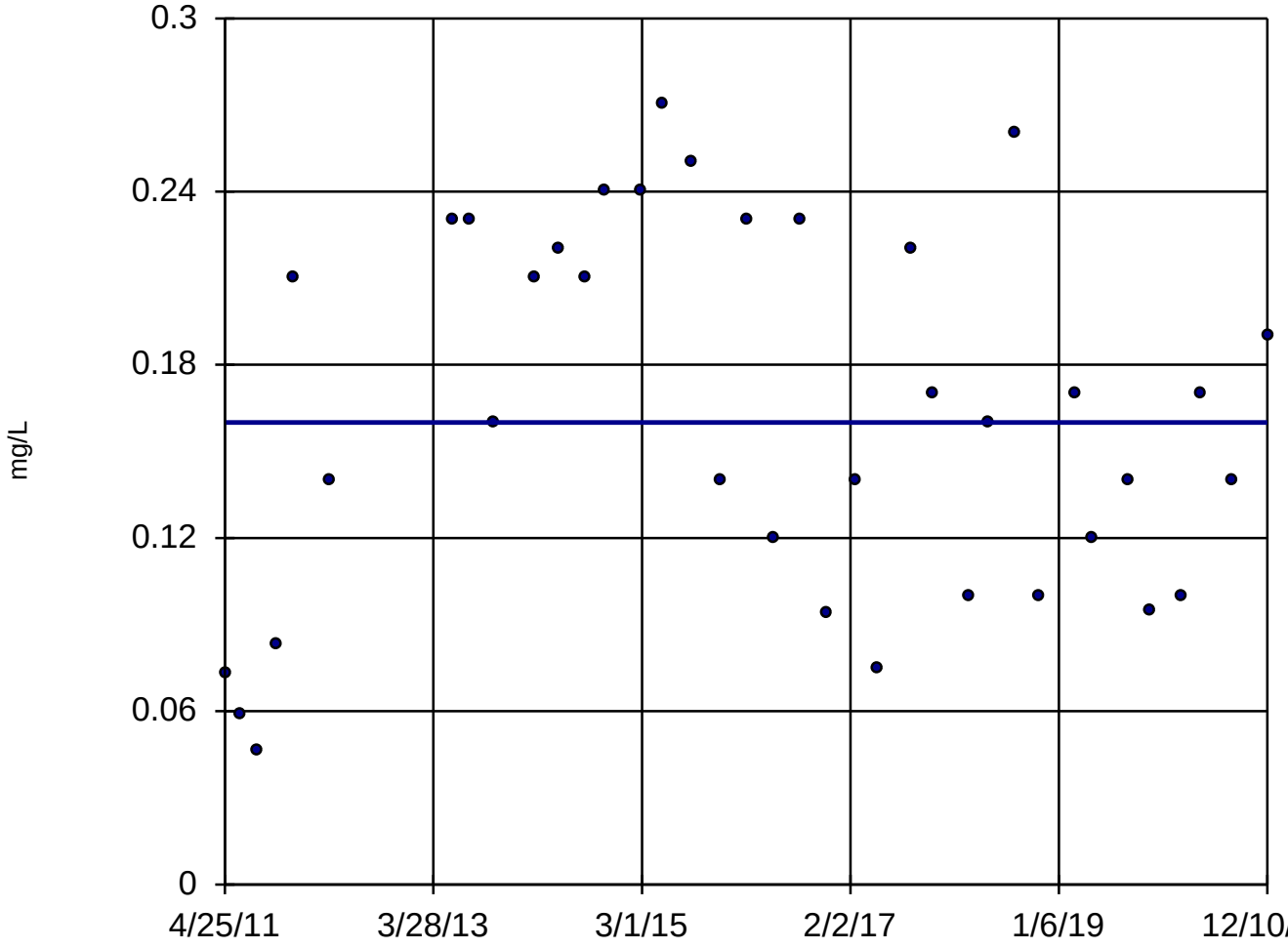
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-13



n = 37

Slope = 0
units per year.

Mann-Kendall
statistic = -7
critical = -199

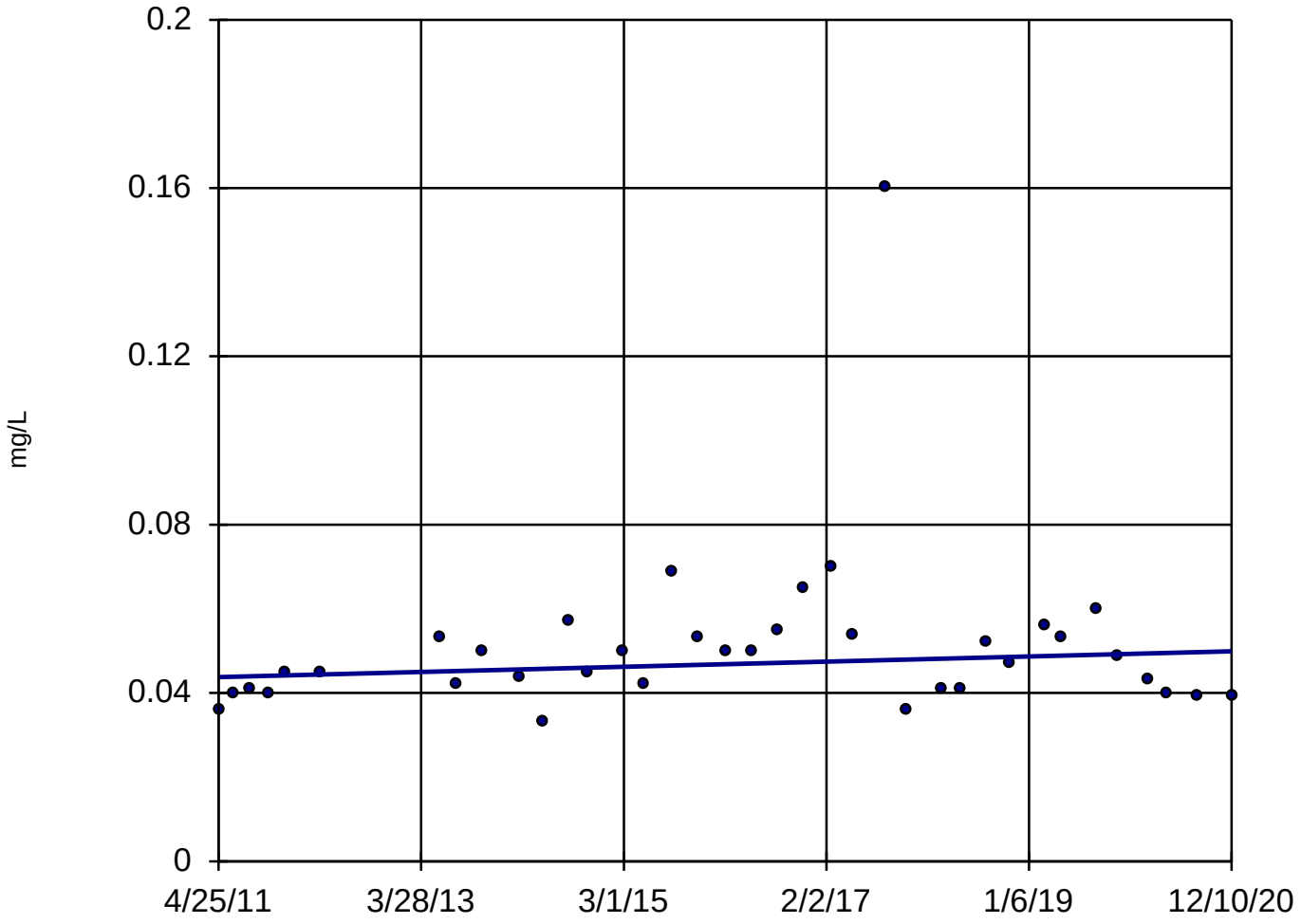
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Barium, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-14



n = 37

Slope = 0.0006321 units per year.

Mann-Kendall statistic = 79
critical = 199

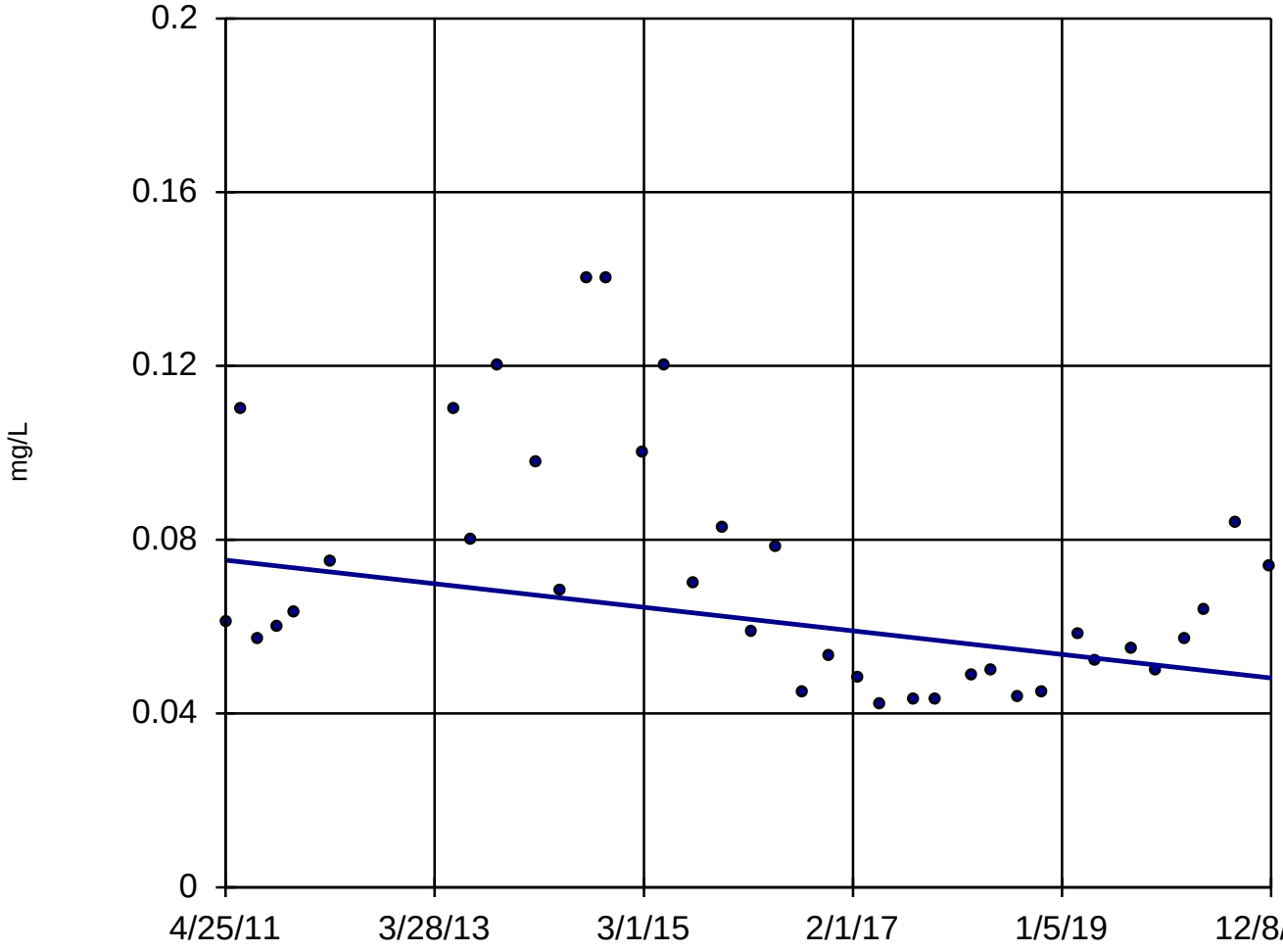
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-15



n = 37

Slope = -0.002815 units per year.

Mann-Kendall statistic = -171
critical = -199

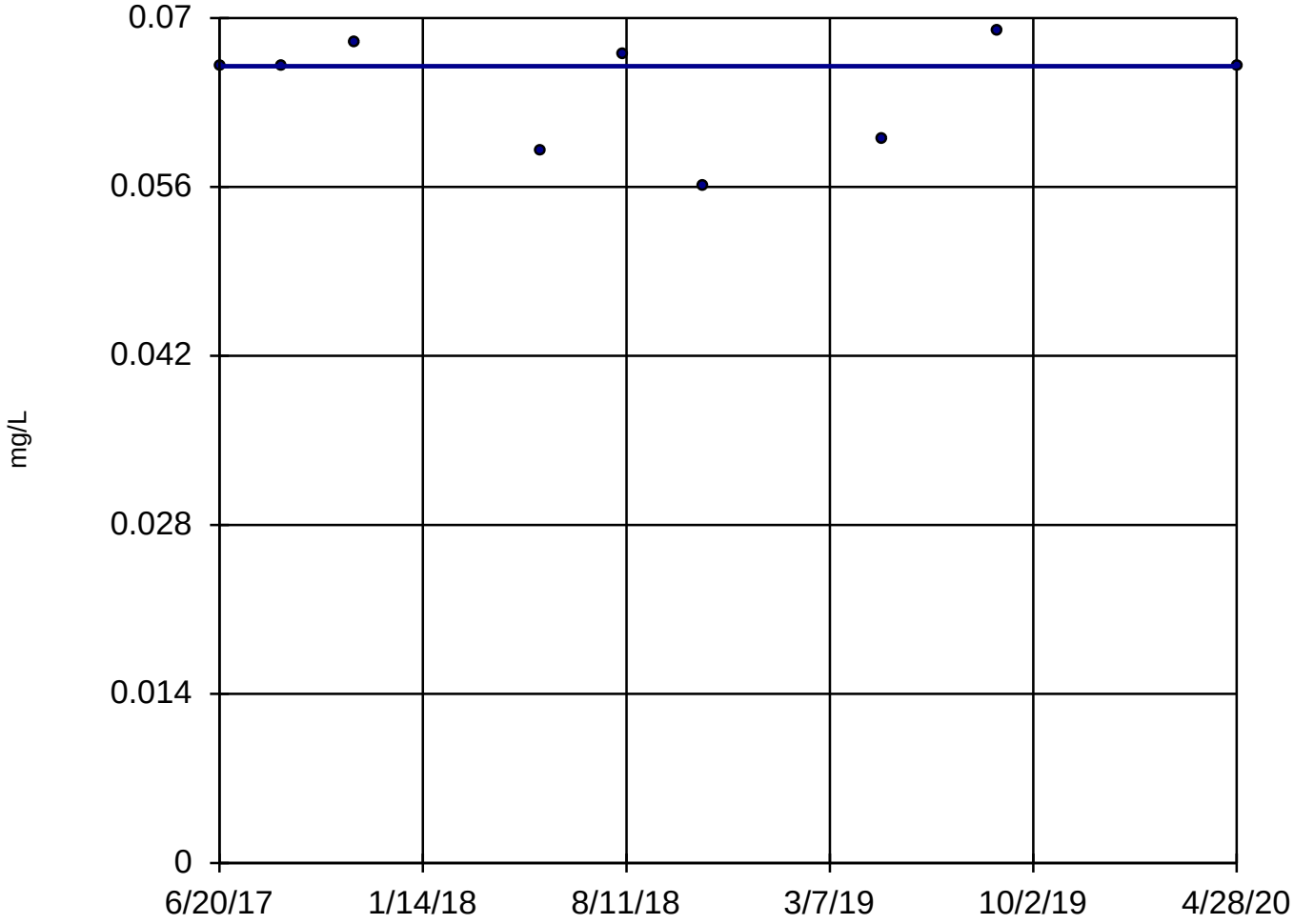
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-03



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 1
critical = 25

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Barium, Total Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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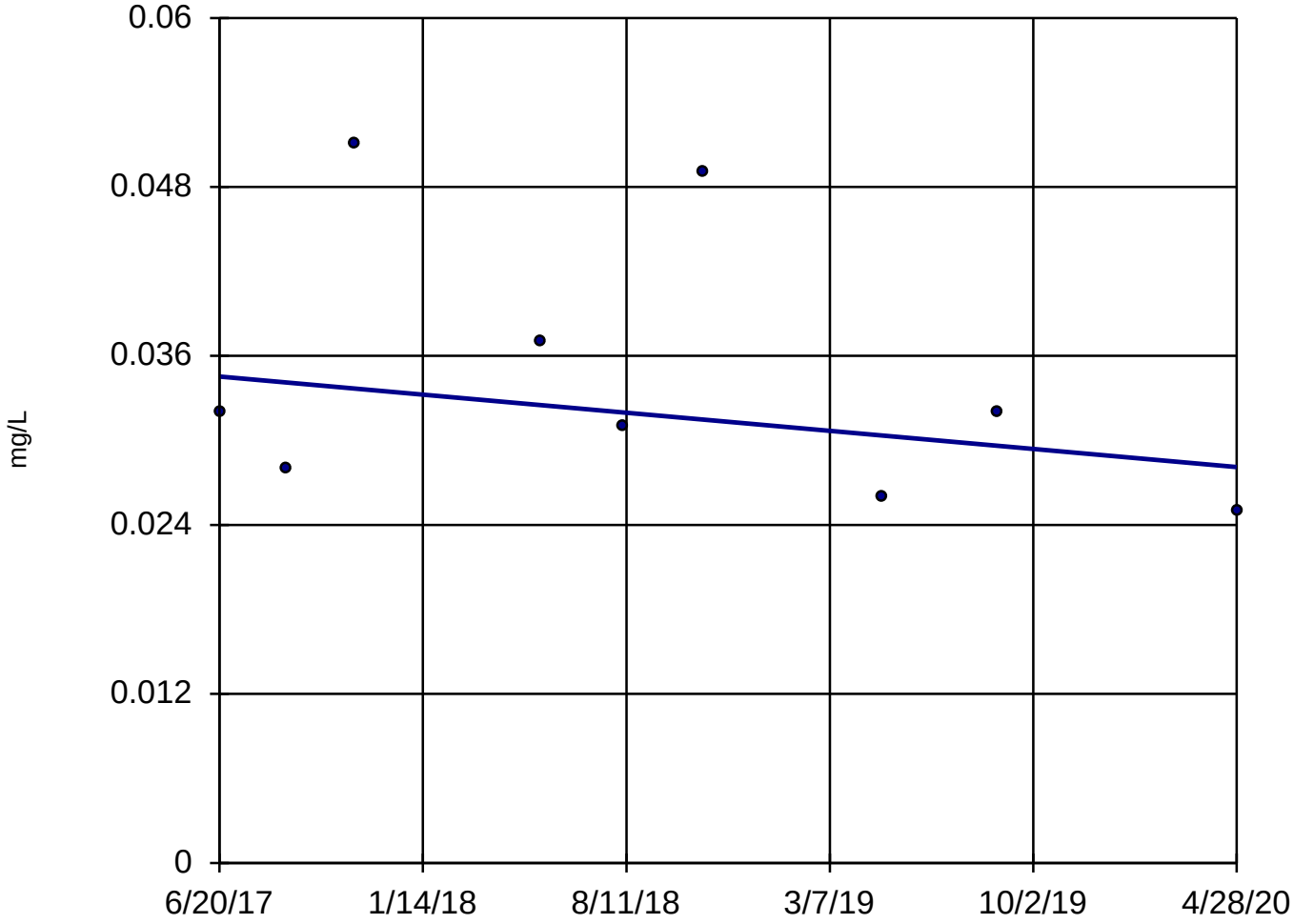
Sen's Slope Estimator

MW-04



n = 9

Slope = -0.002247 units per year.

Mann-Kendall statistic = -11
critical = -25

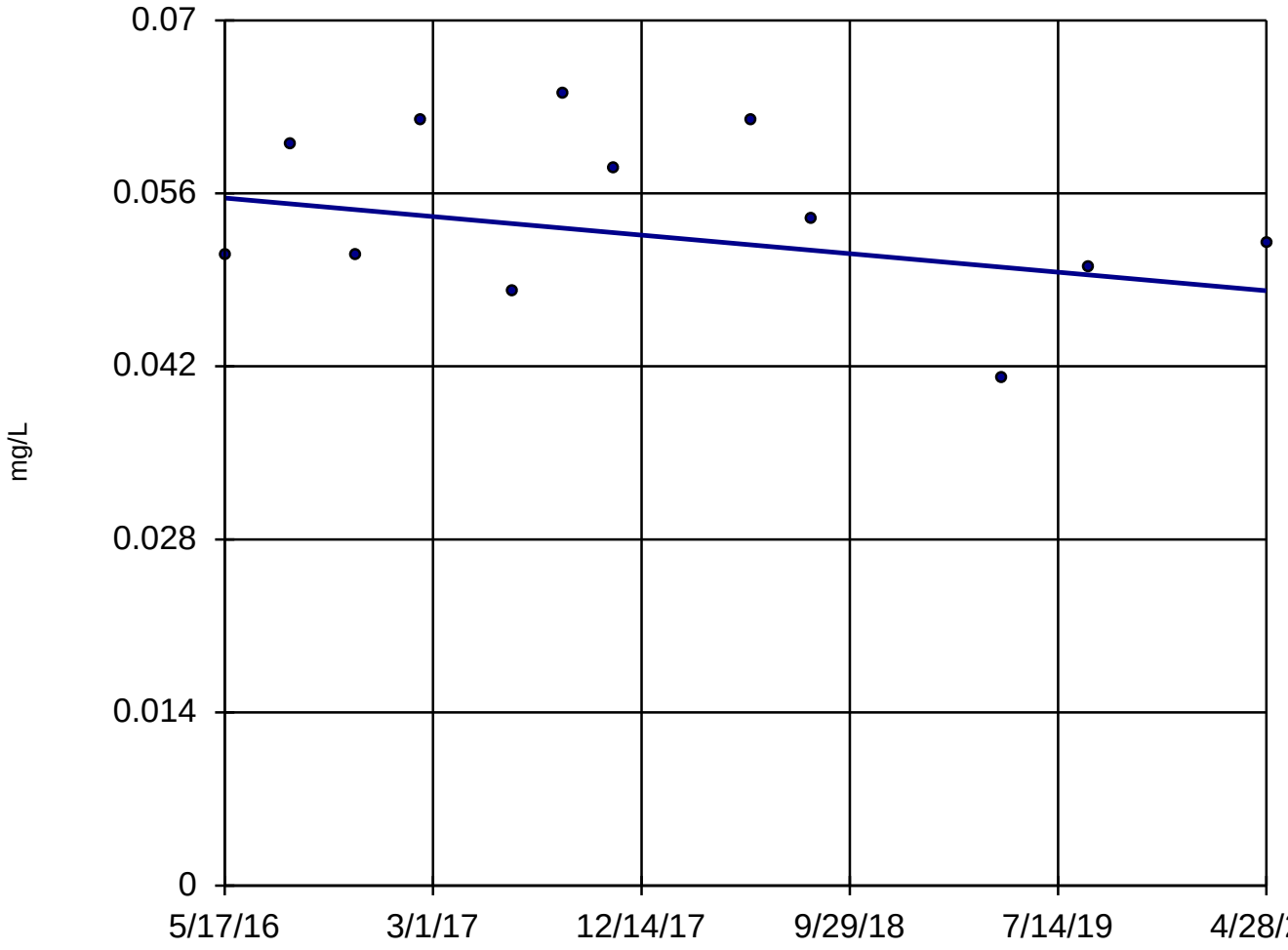
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Total Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-05



n = 12

Slope = -0.001895 units per year.

Mann-Kendall statistic = -10
critical = -38

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Total Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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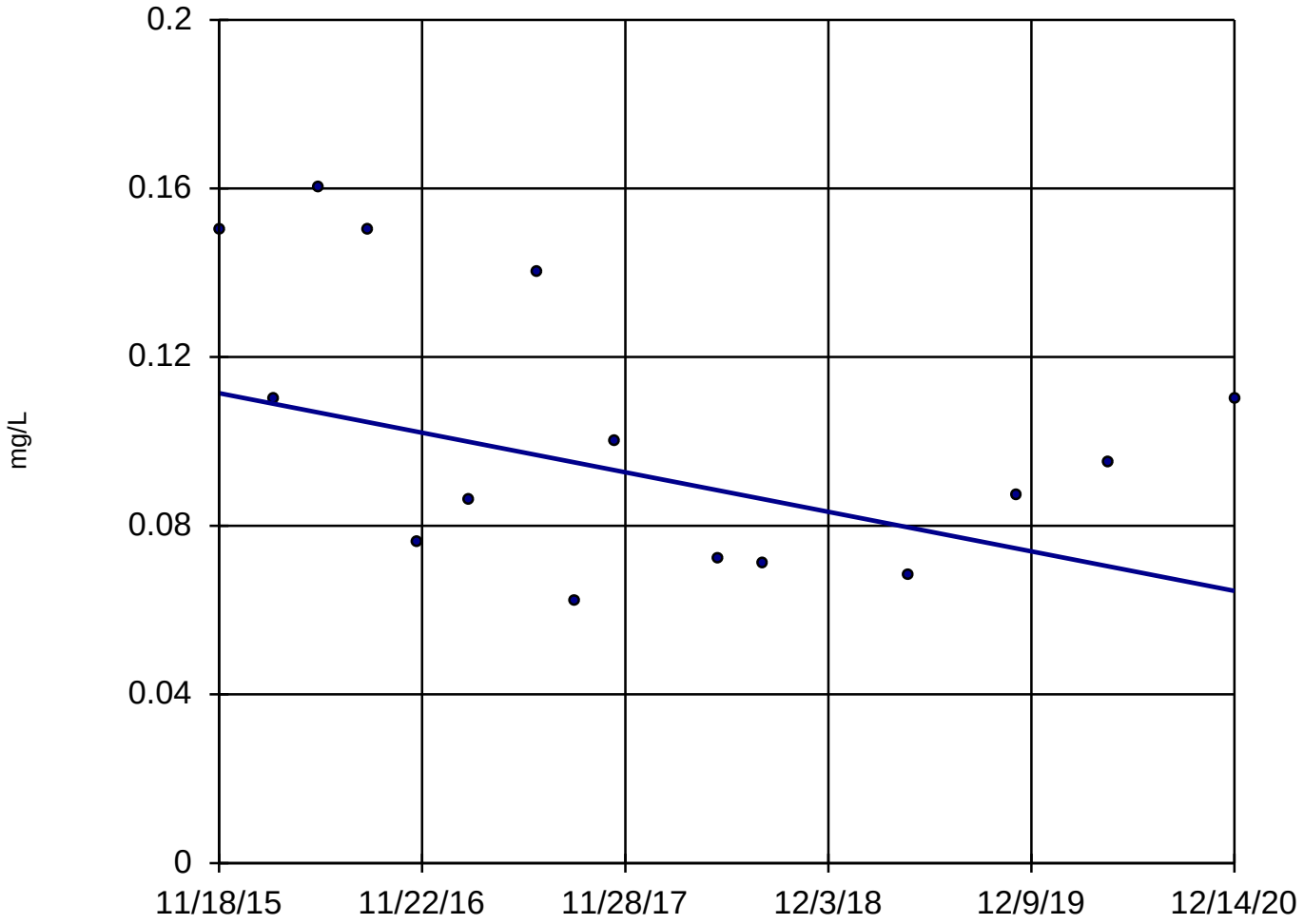
Sen's Slope Estimator

MW-08



n = 15

Slope = -0.009241 units per year.

Mann-Kendall statistic = -33
critical = -53

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Total Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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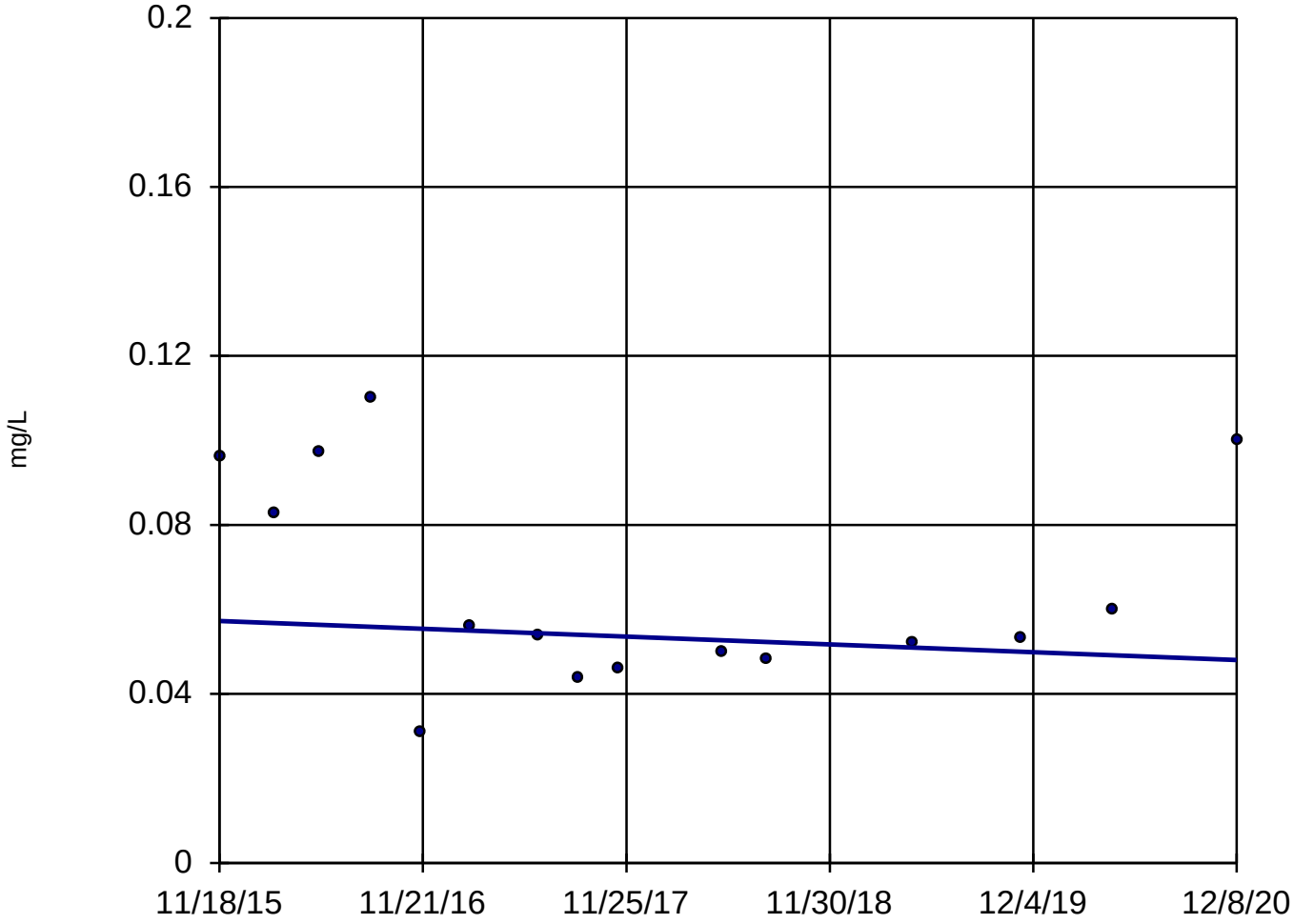
Sen's Slope Estimator

MW-15



n = 15

Slope = -0.001816 units per year.

Mann-Kendall statistic = -7
critical = -53

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Total Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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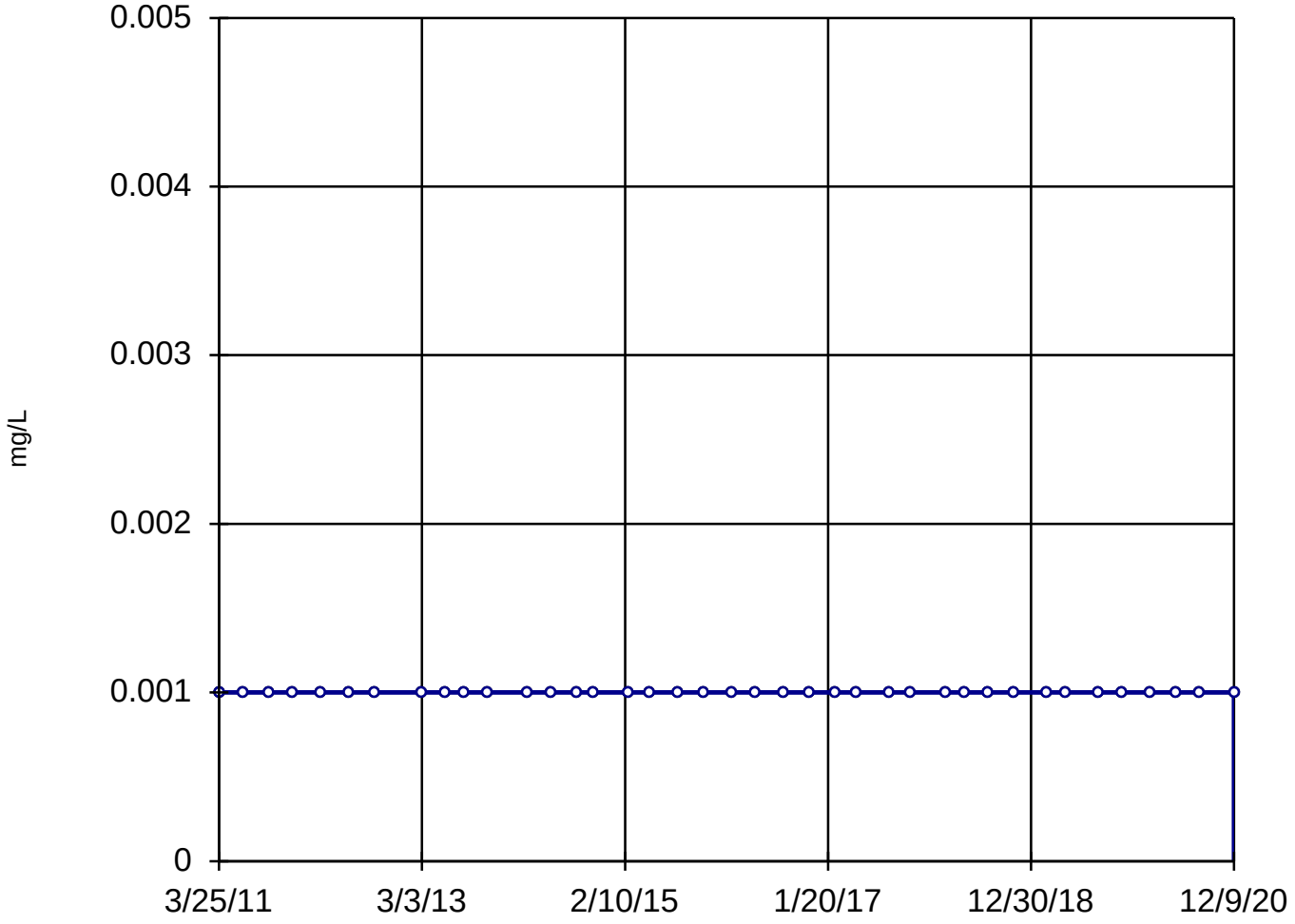
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Beryllium, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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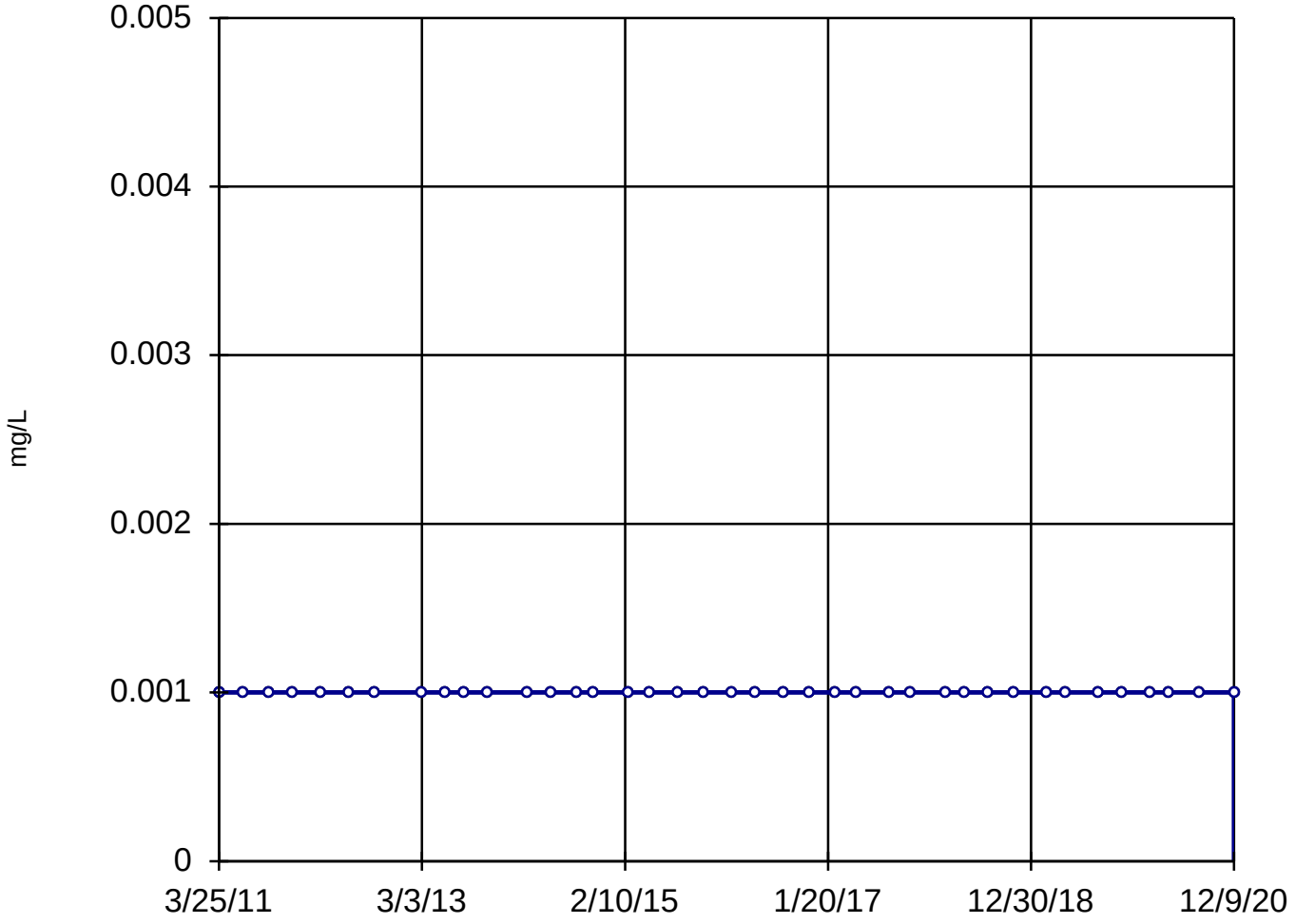
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Beryllium, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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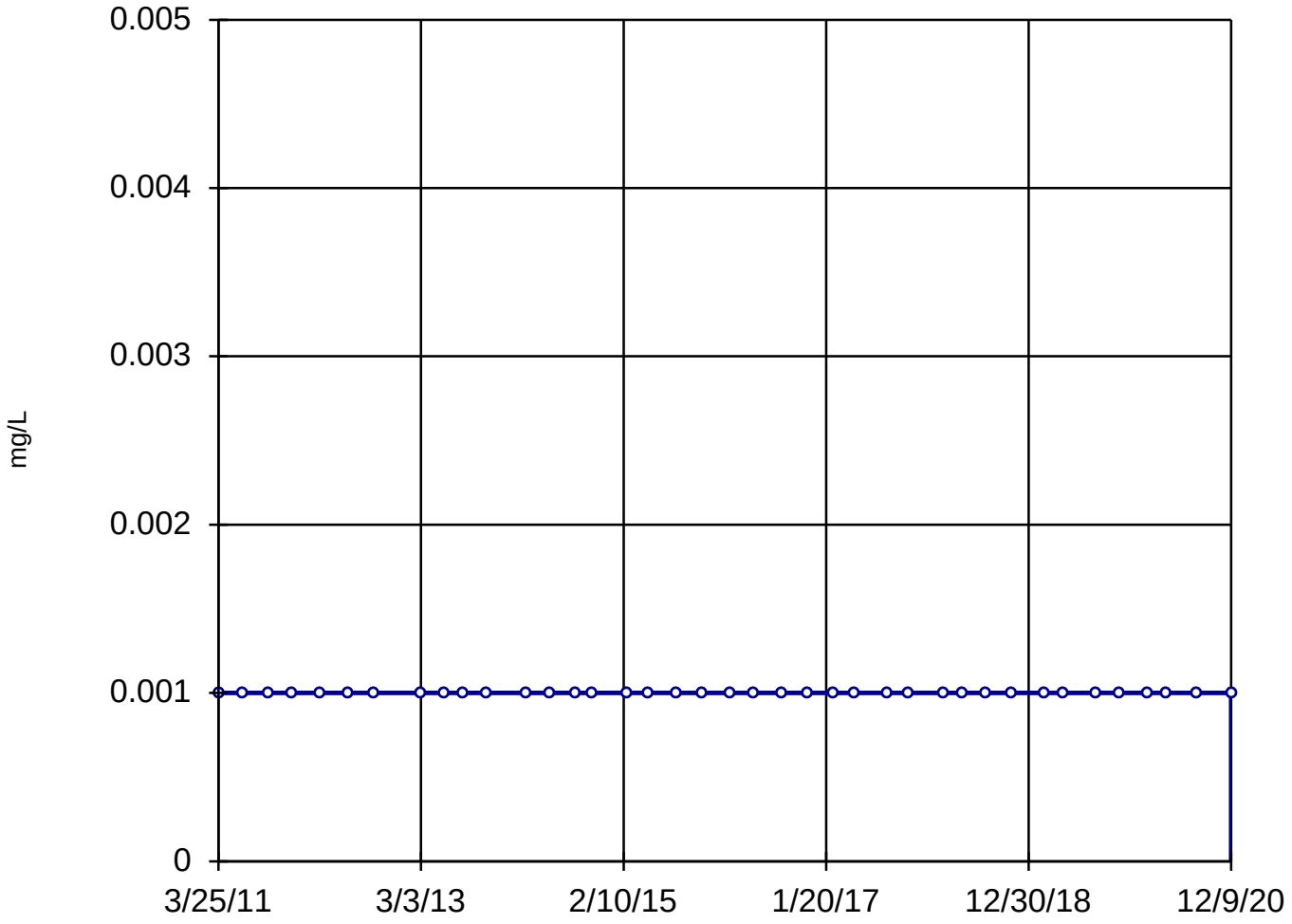
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-05



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

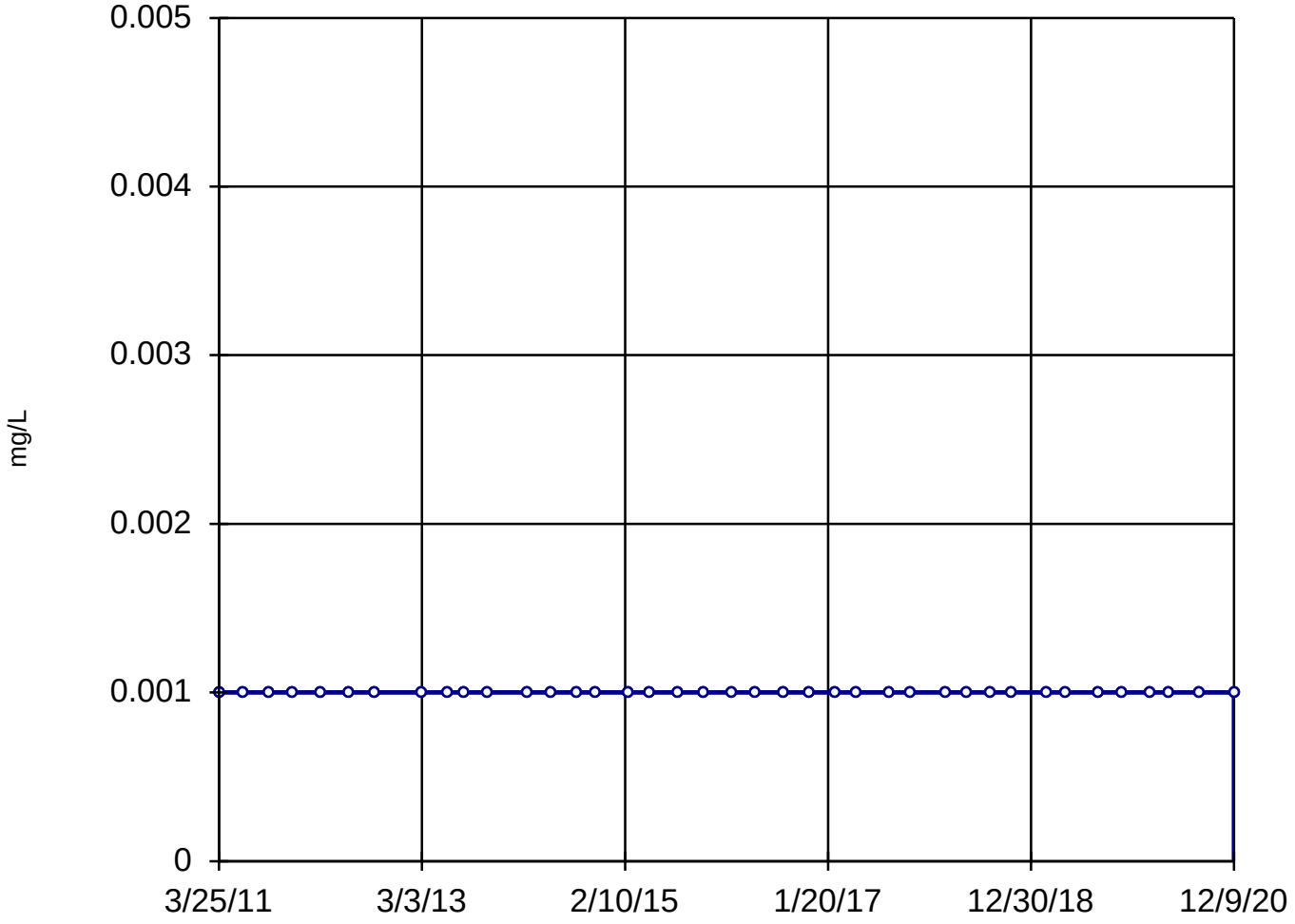
Constituent: Beryllium, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-06



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

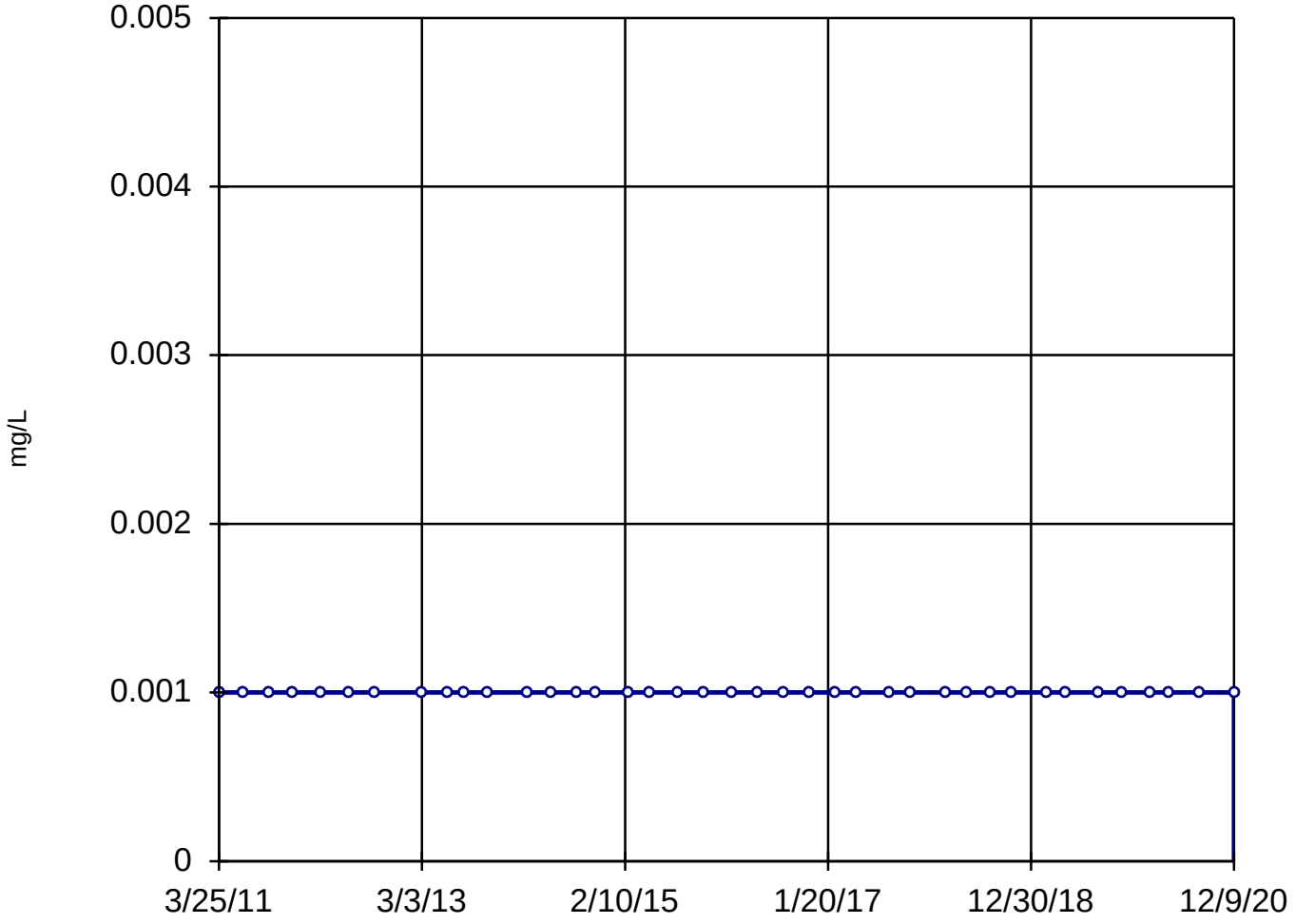
Constituent: Beryllium, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-07



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

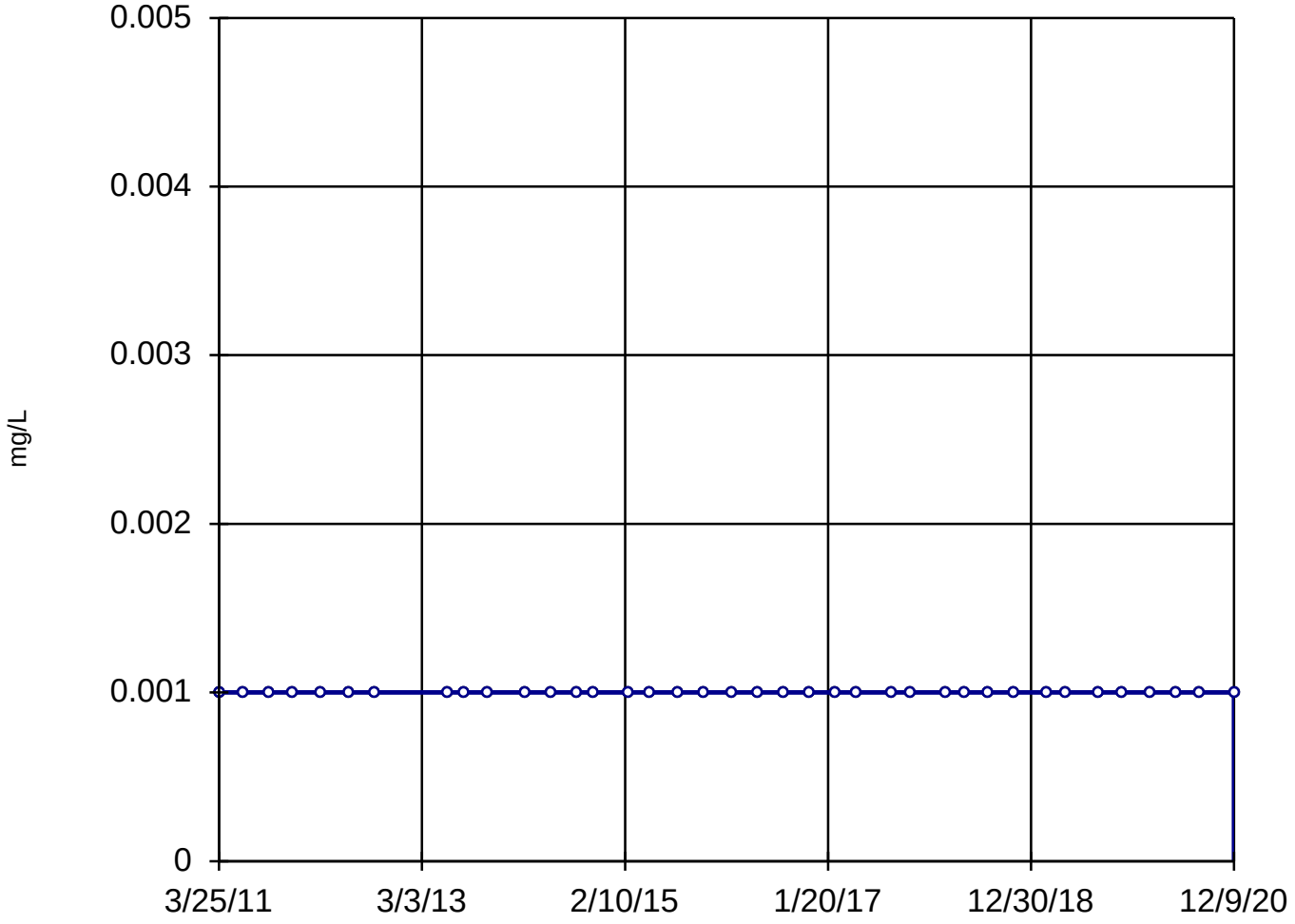
Constituent: Beryllium, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 38

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 206

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Beryllium, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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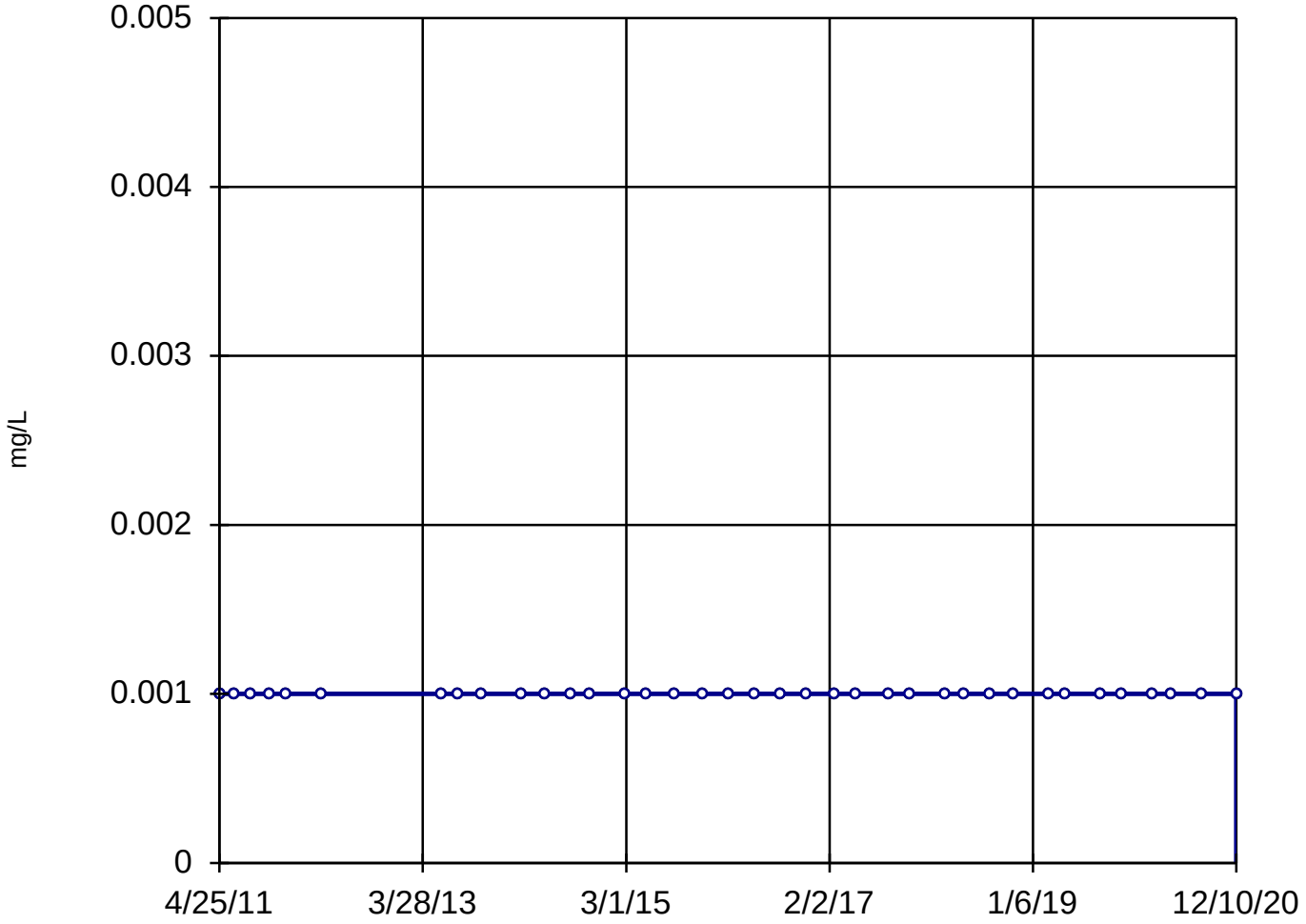
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-13



n = 37

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 199

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

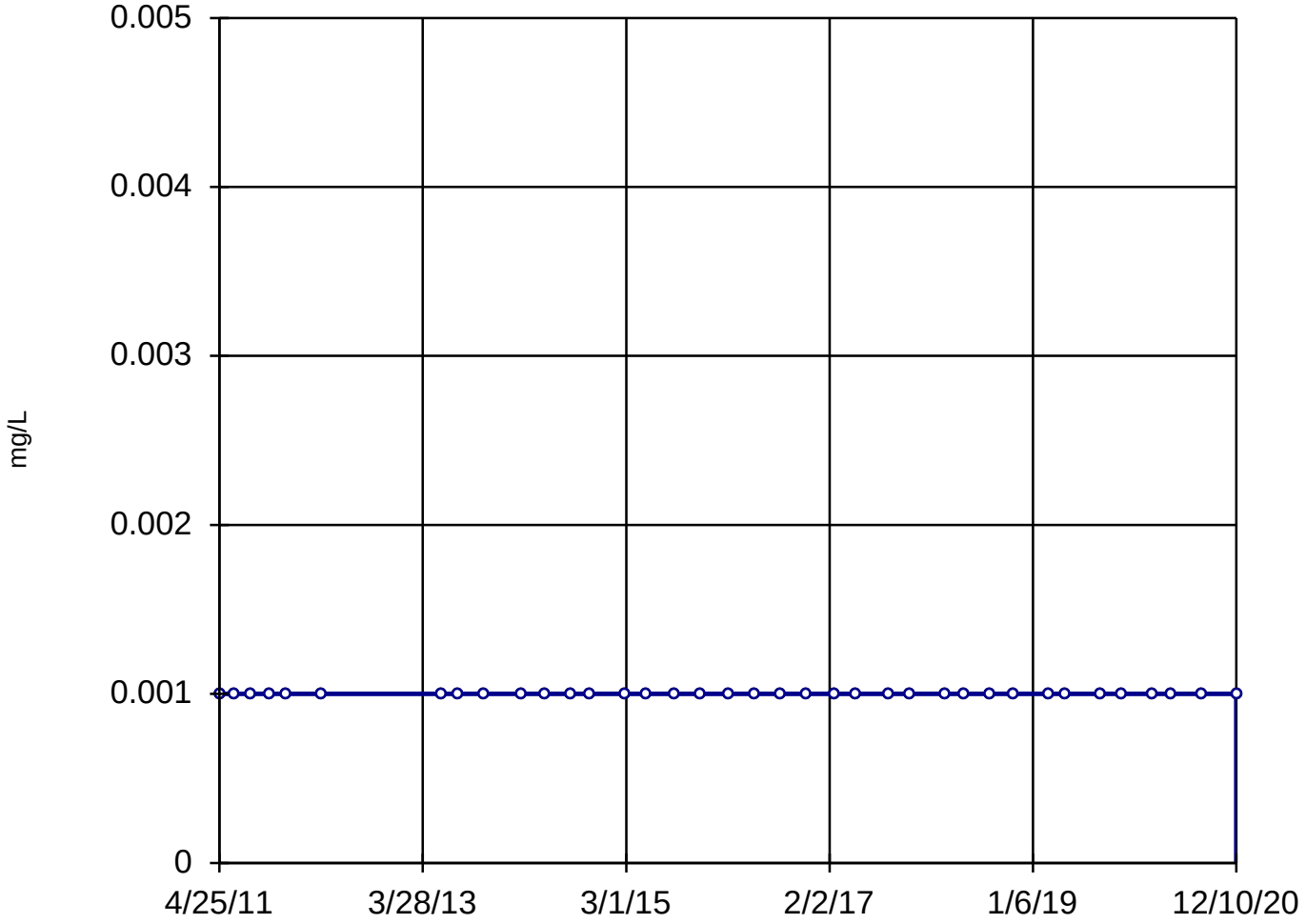
Constituent: Beryllium, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-14



n = 37

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 199

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

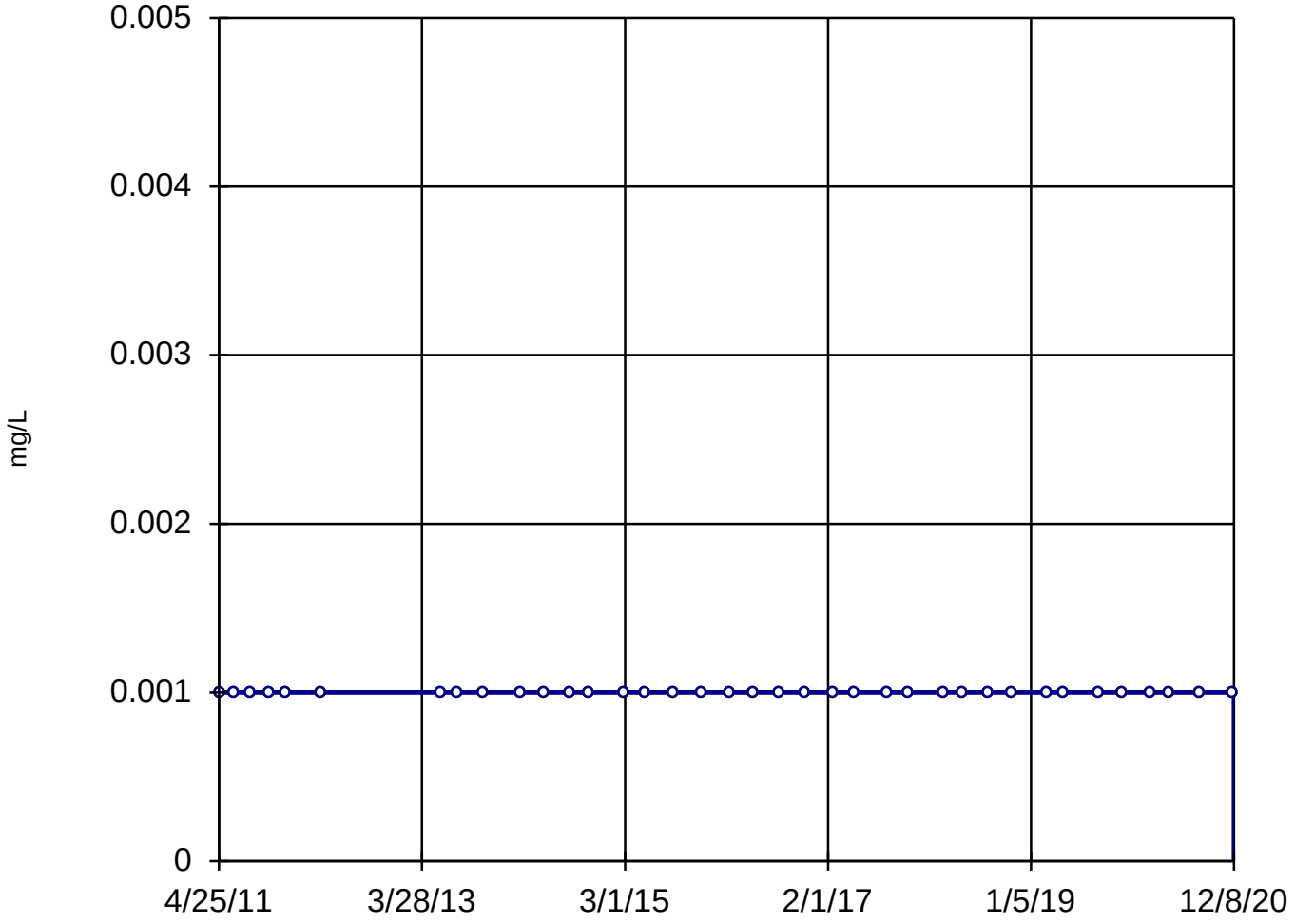
Constituent: Beryllium, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-15



n = 37

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 199

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

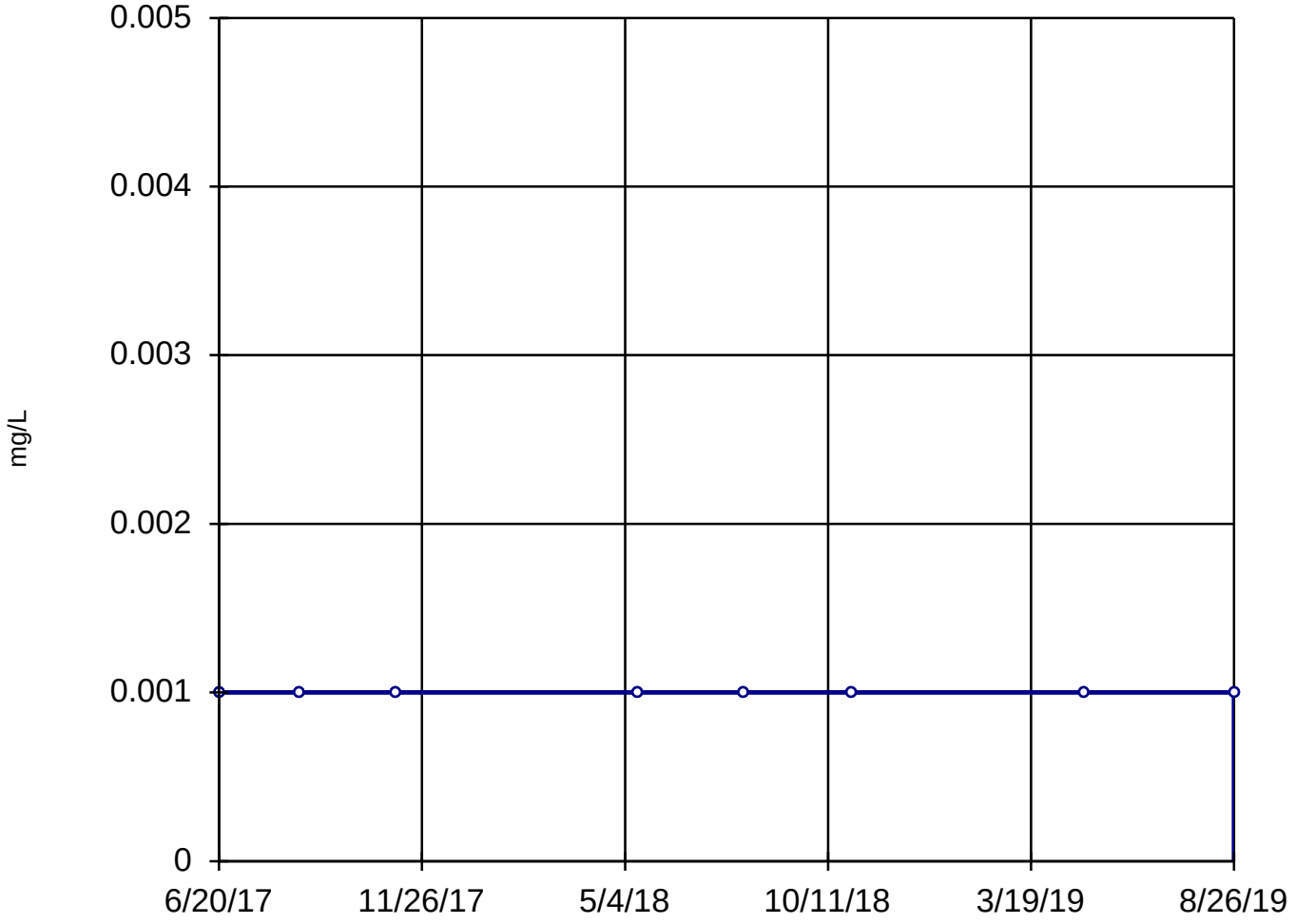
Constituent: Beryllium, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 8

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 21

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

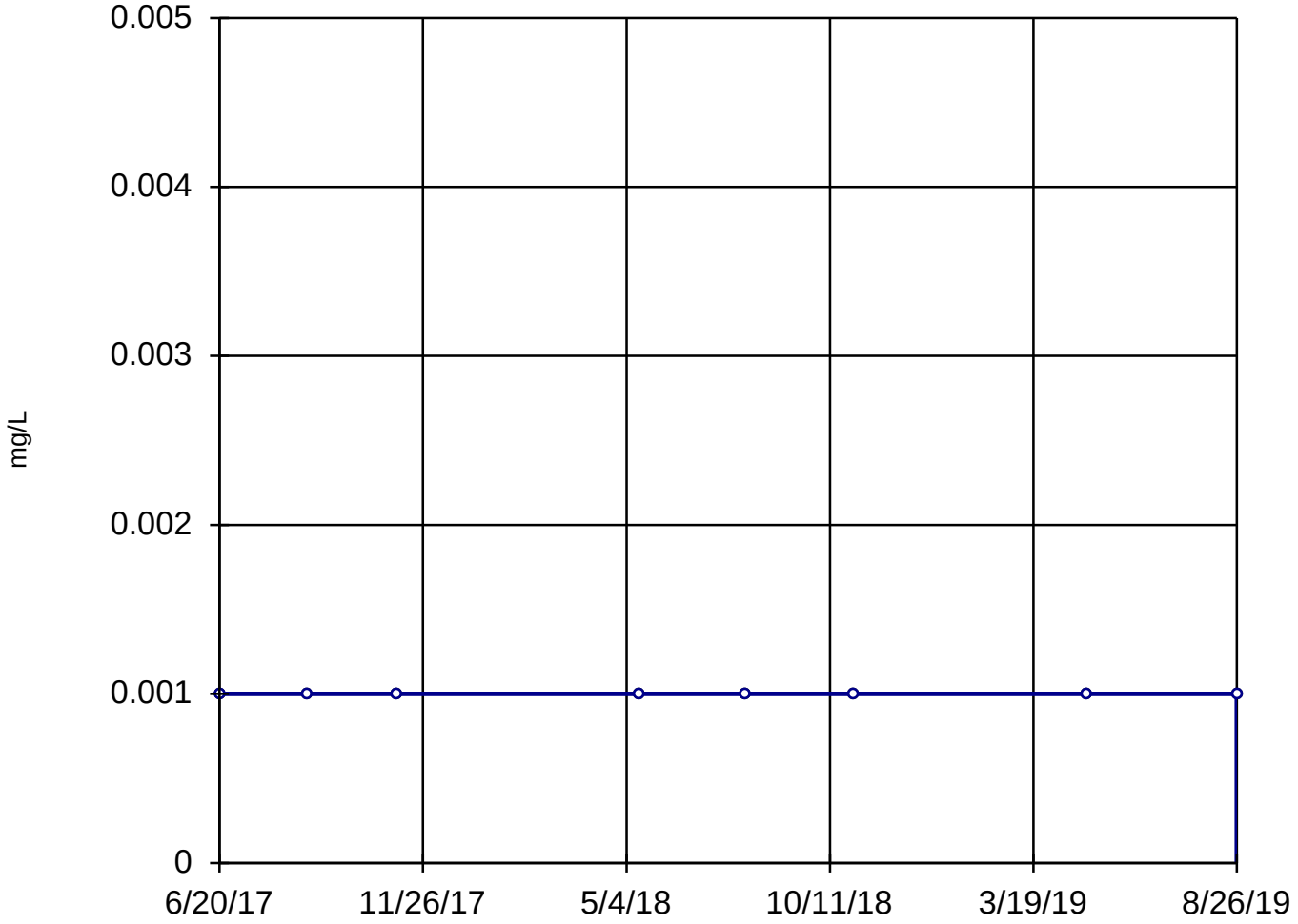
Constituent: Beryllium, Total Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 8

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 21

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

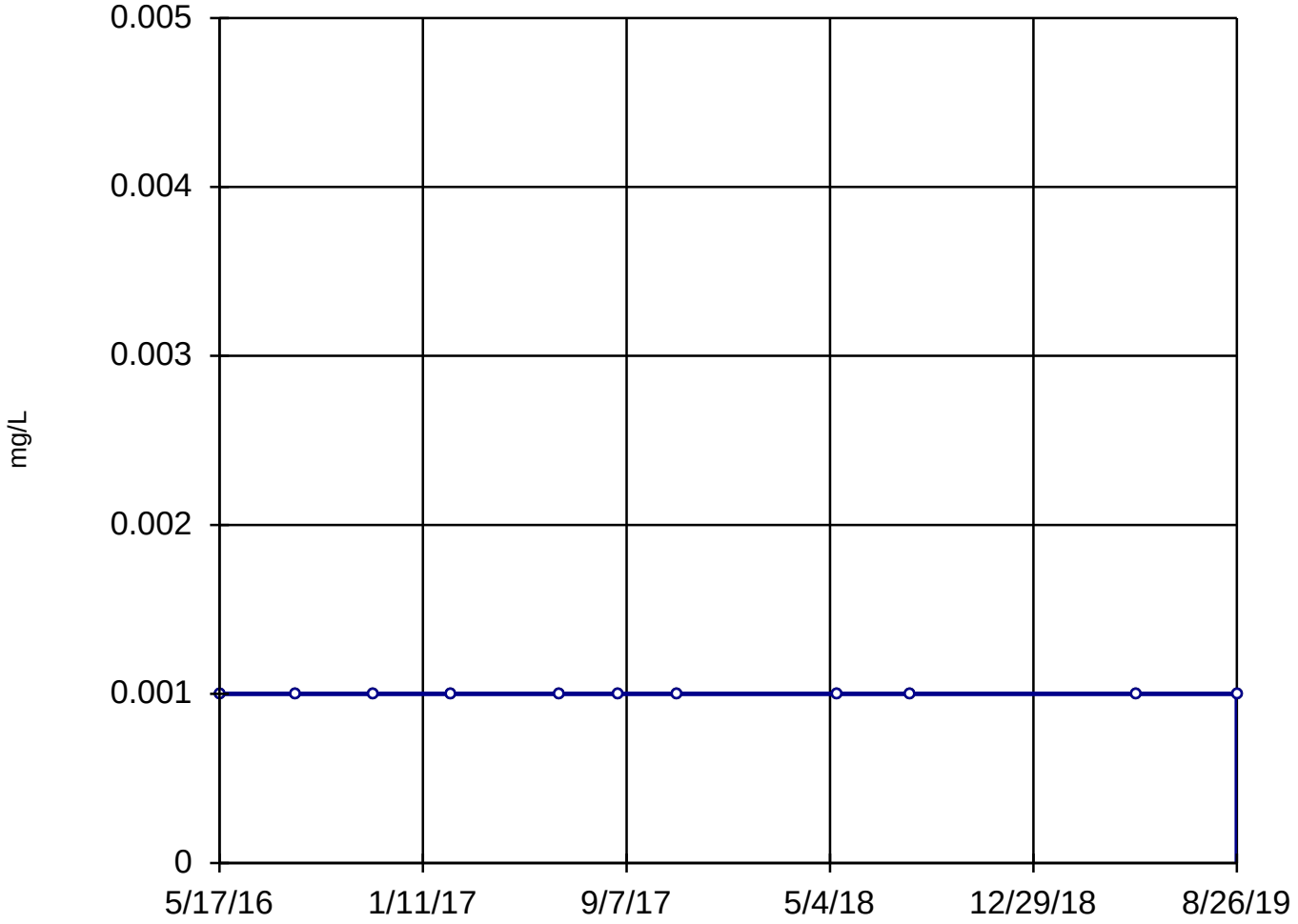
Constituent: Beryllium, Total Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-05



n = 11

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 34

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

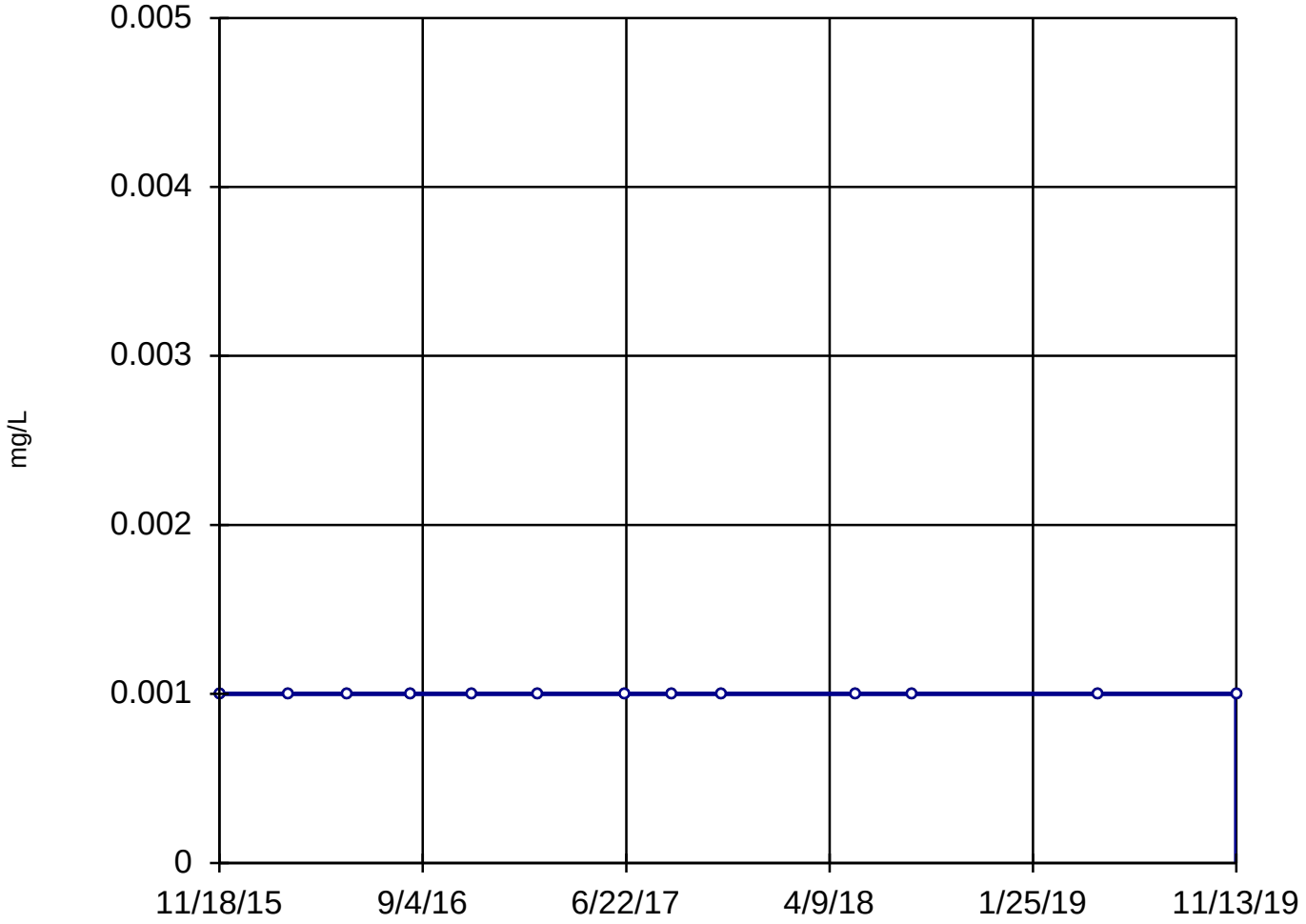
Constituent: Beryllium, Total Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 13

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 43

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

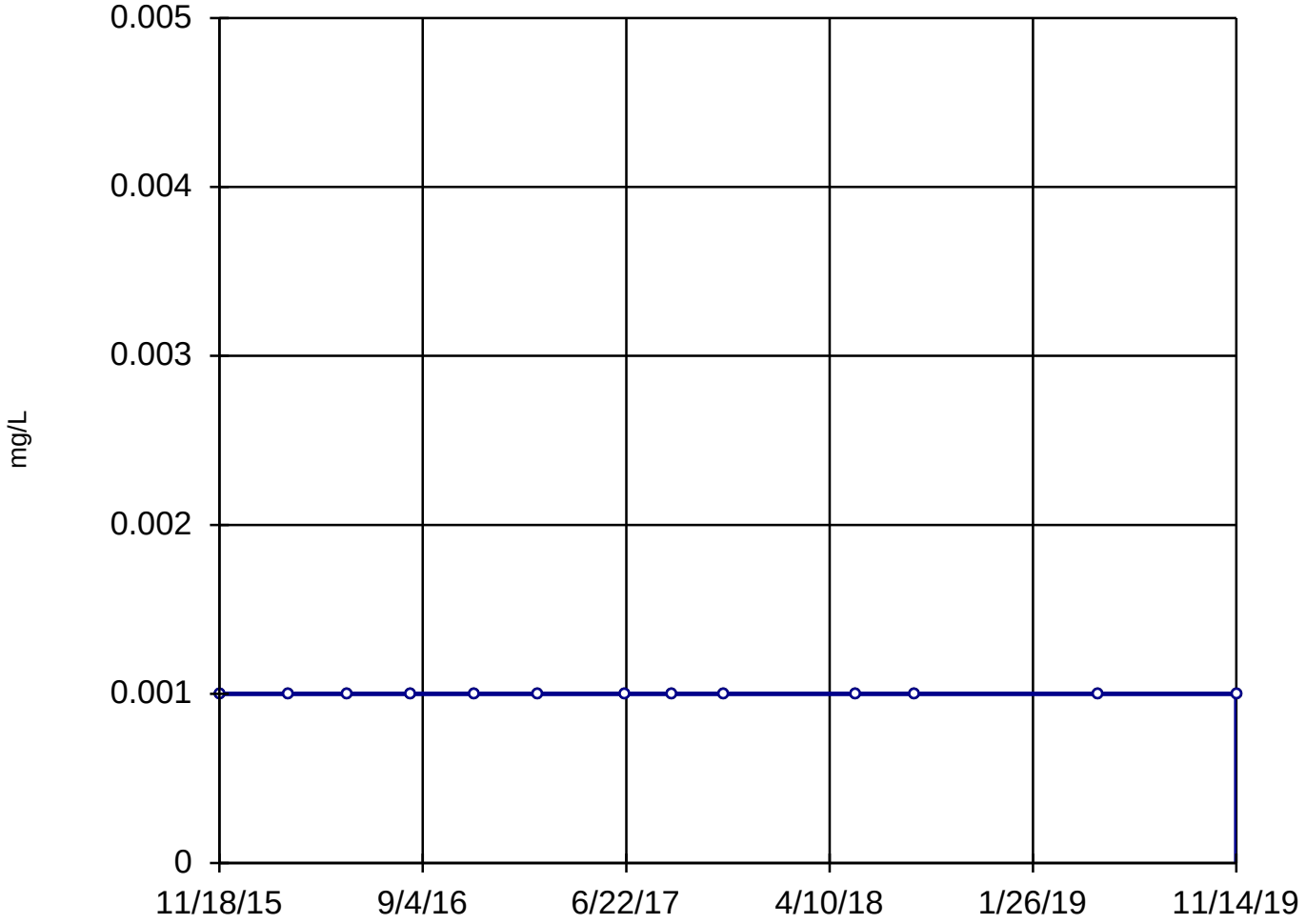
Constituent: Beryllium, Total Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-15



n = 13

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 43

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

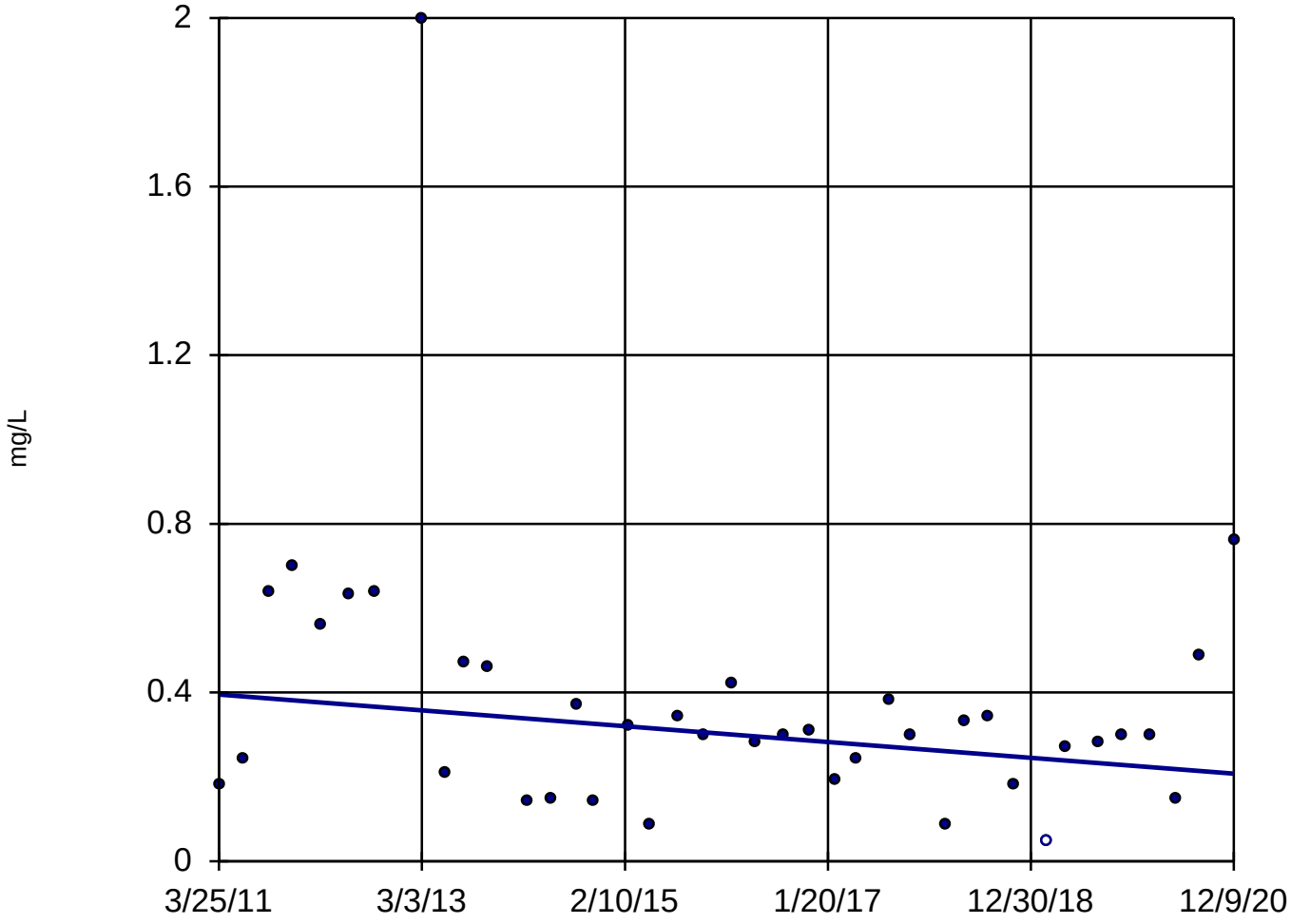
Constituent: Beryllium, Total Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 39

Slope = -0.01931 units per year.

Mann-Kendall statistic = -132
critical = -214

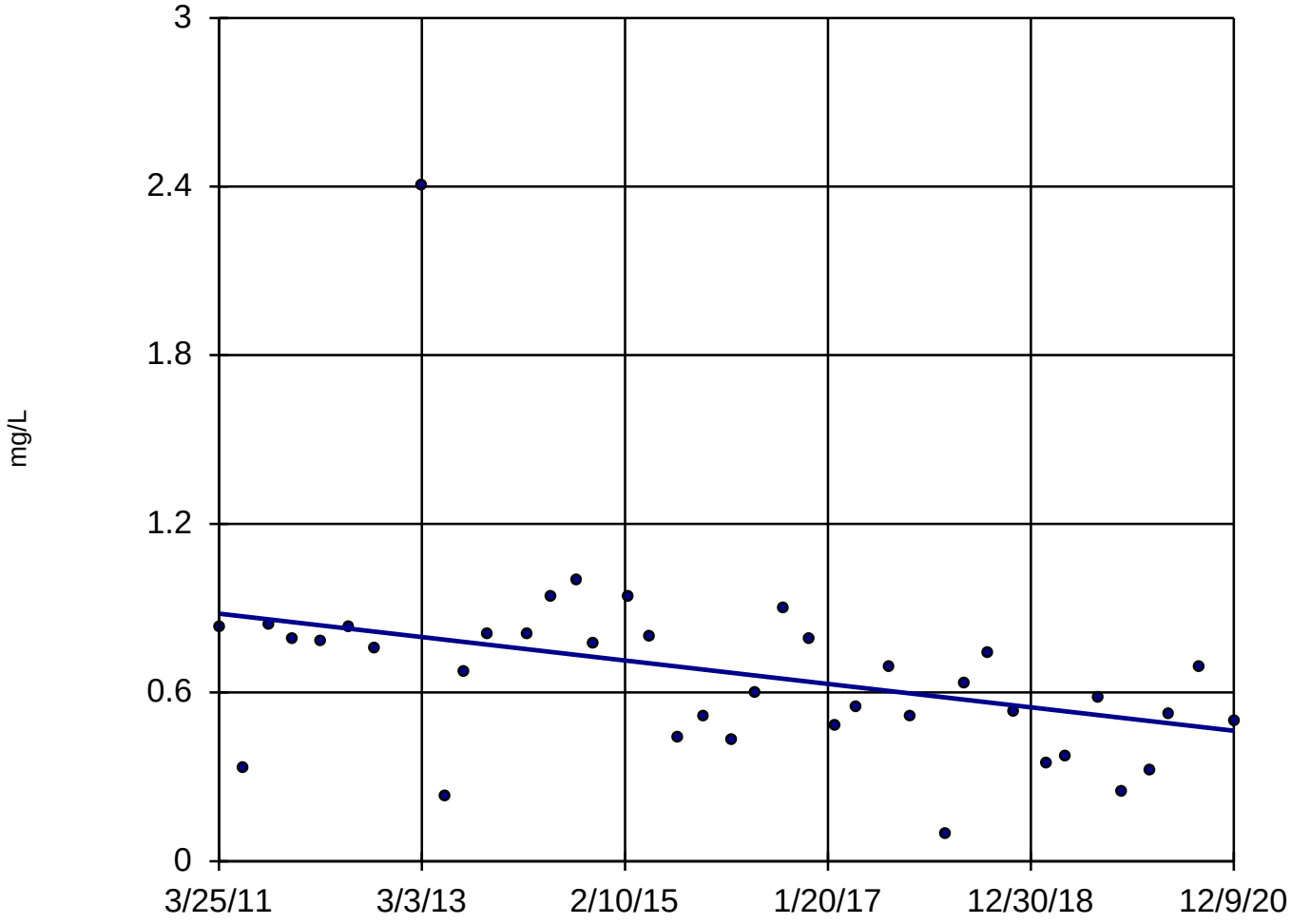
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-04



n = 39

Slope = -0.04286 units per year.

Mann-Kendall statistic = -267
critical = -214

Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

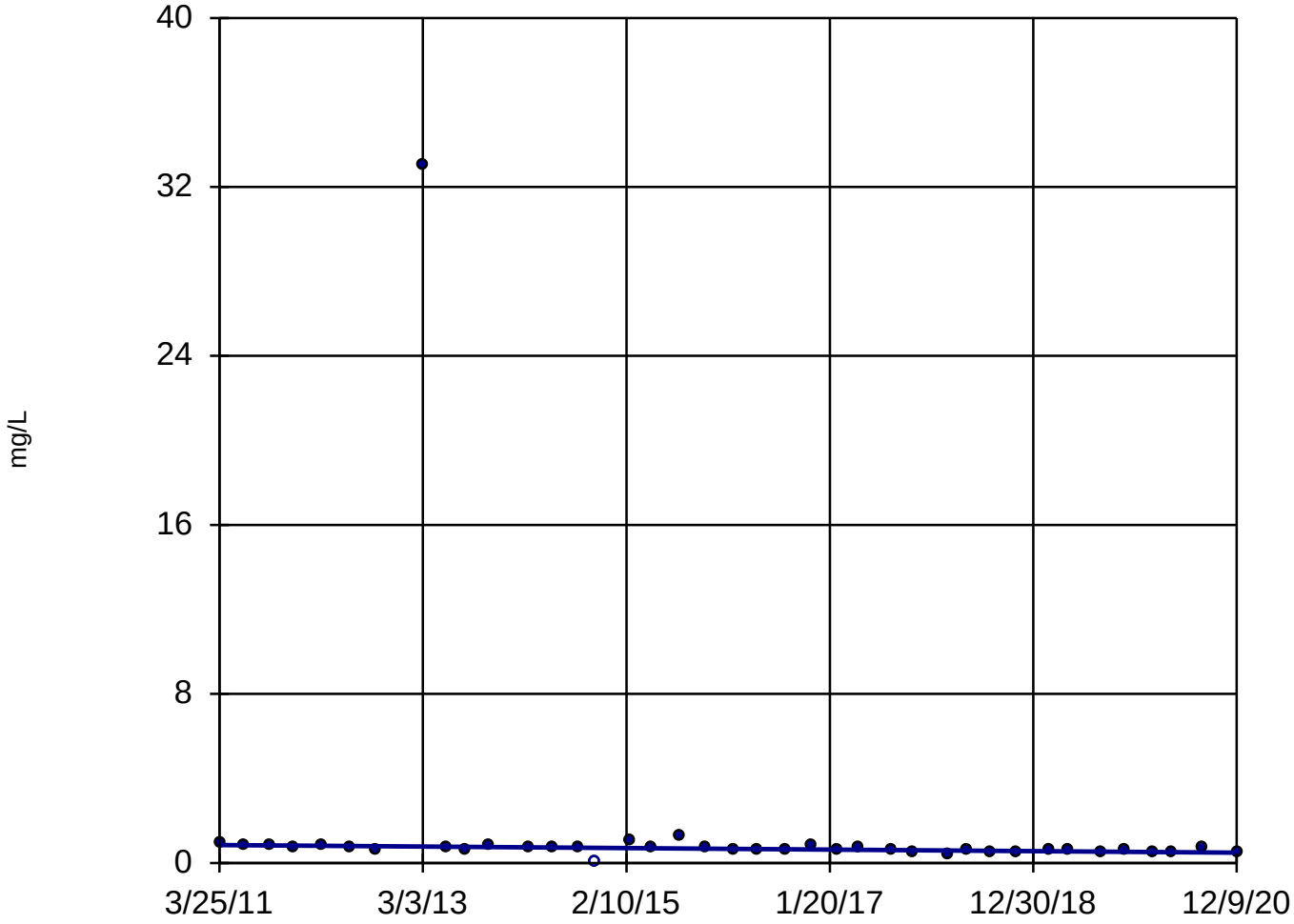
Constituent: Boron, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-05



n = 39

Slope = -0.03687 units per year.

Mann-Kendall statistic = -377
critical = -214

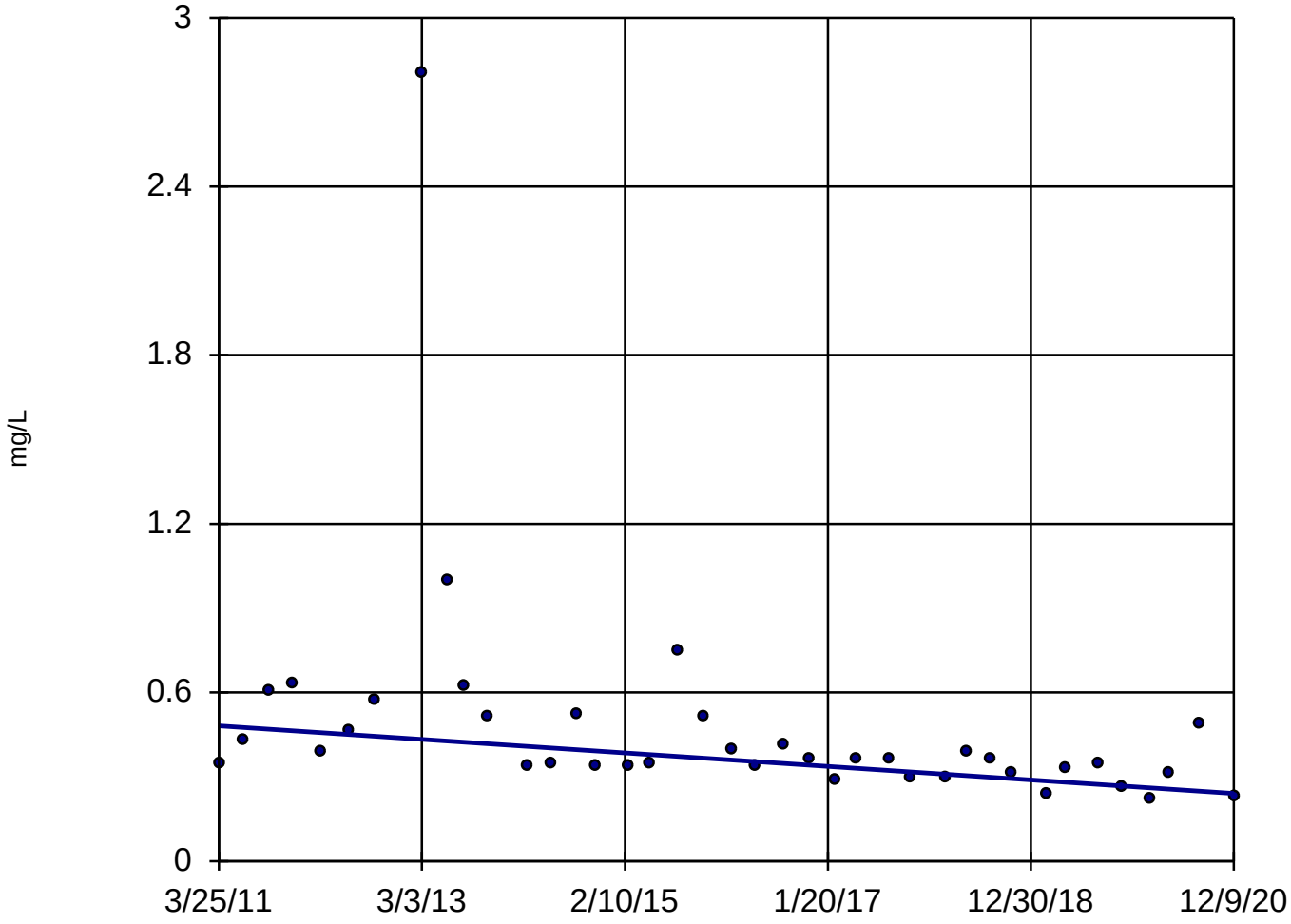
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-06



n = 39

Slope = -0.0247 units per year.

Mann-Kendall statistic = -339
critical = -214

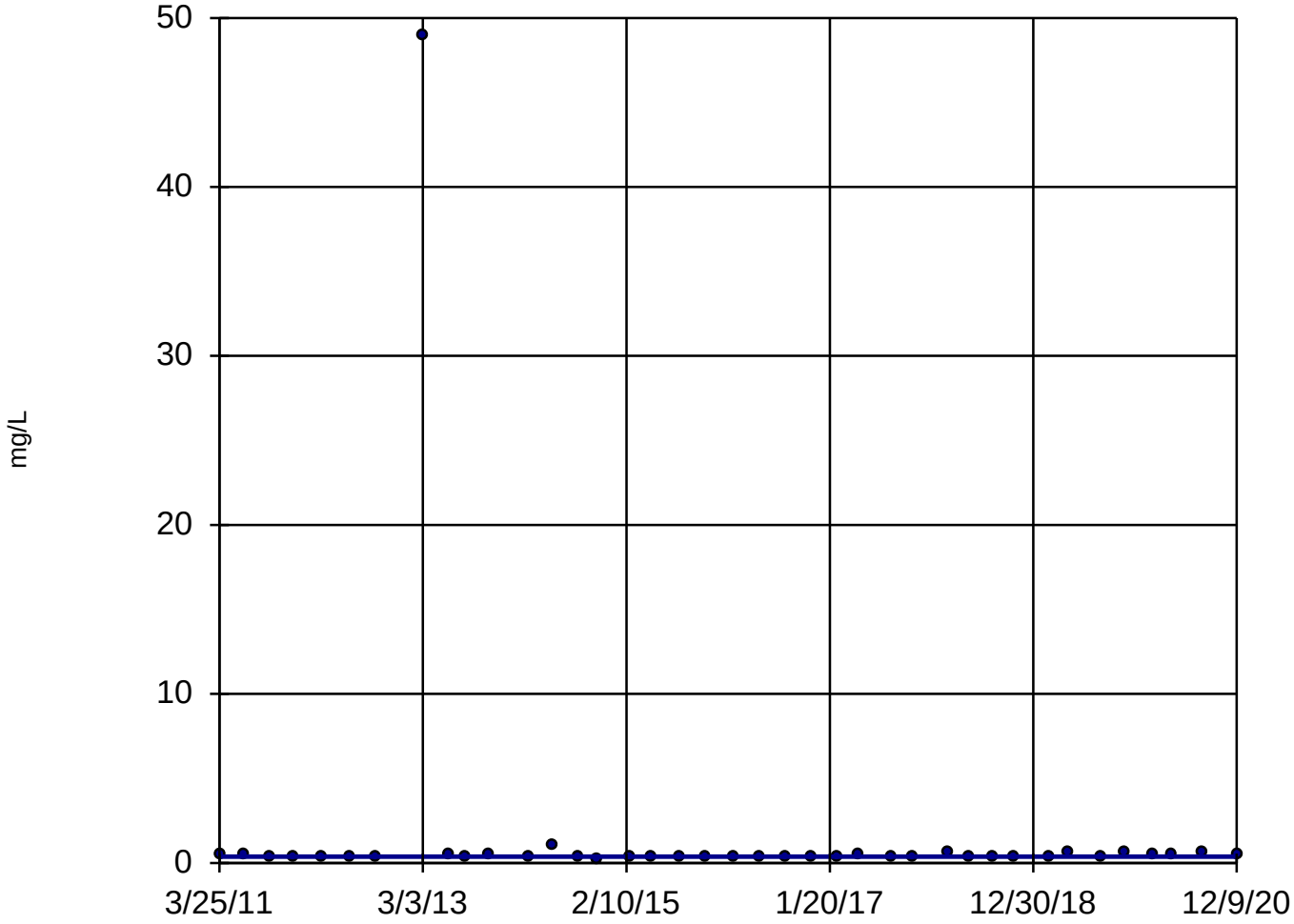
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-07



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 11
critical = 214

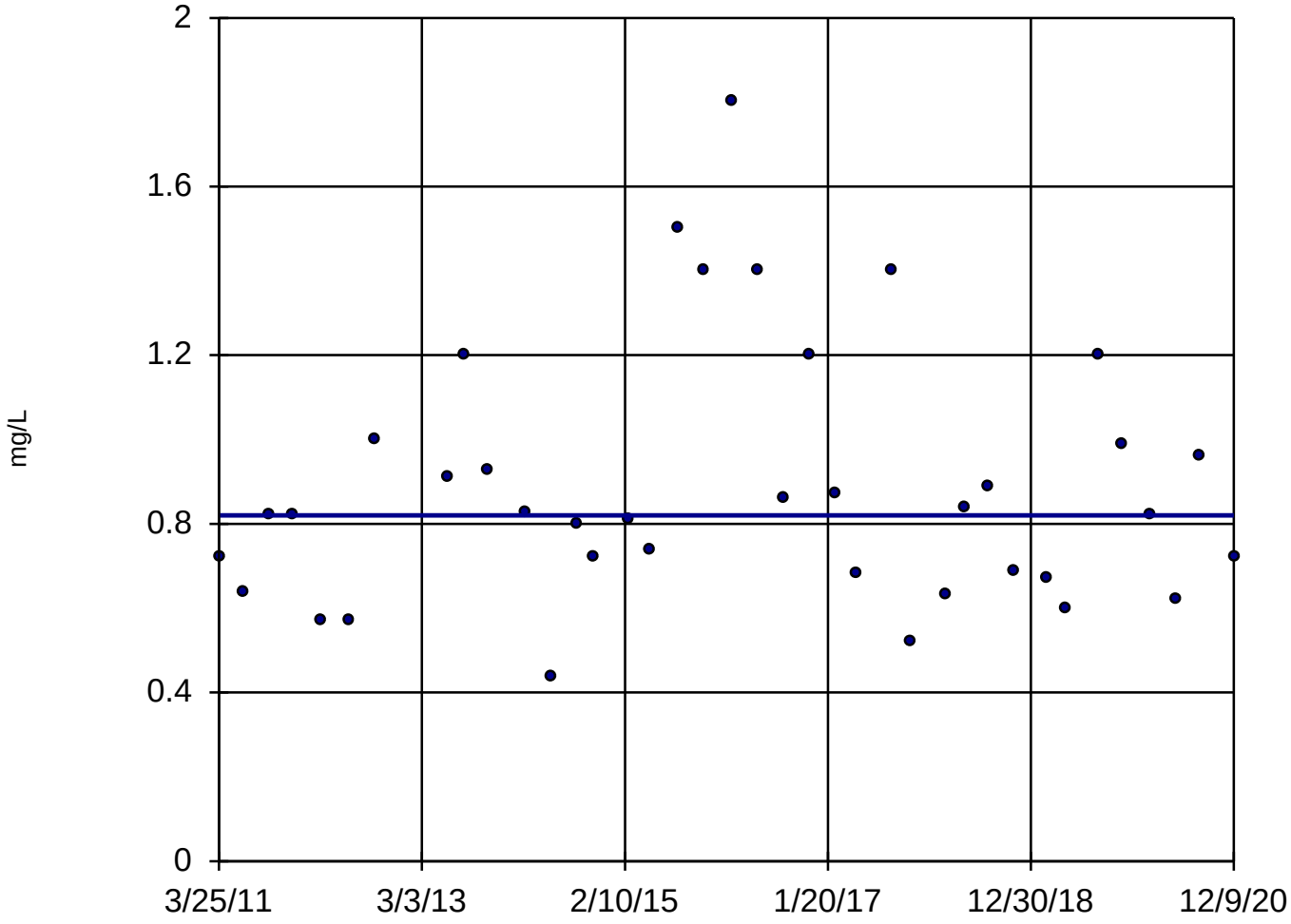
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Boron, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-08



n = 38

Slope = 0
units per year.

Mann-Kendall
statistic = 12
critical = 206

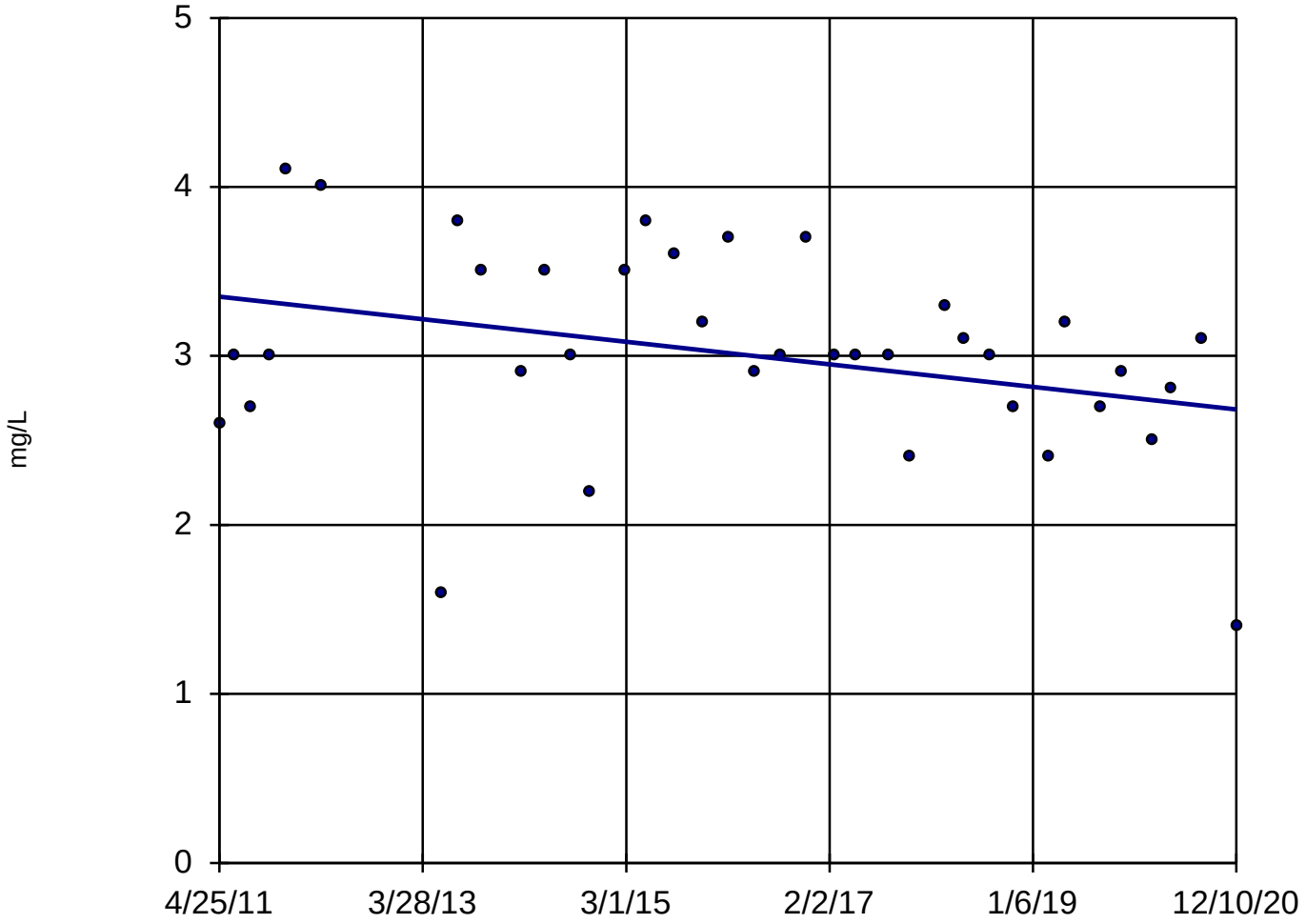
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Boron, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-13



n = 37

Slope = -0.0693 units per year.

Mann-Kendall statistic = -146
critical = -199

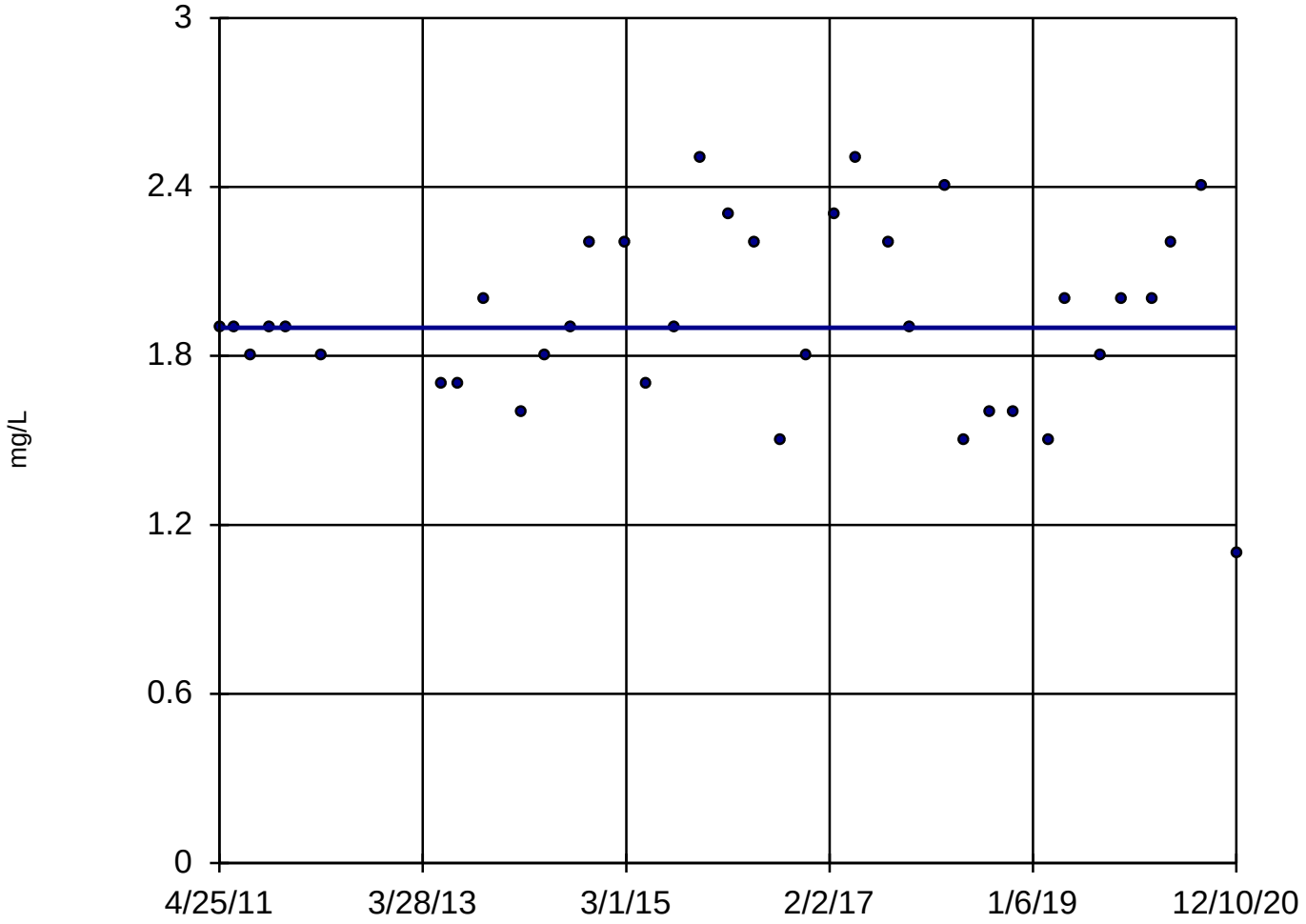
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-14



n = 37

Slope = 0
units per year.

Mann-Kendall
statistic = 37
critical = 199

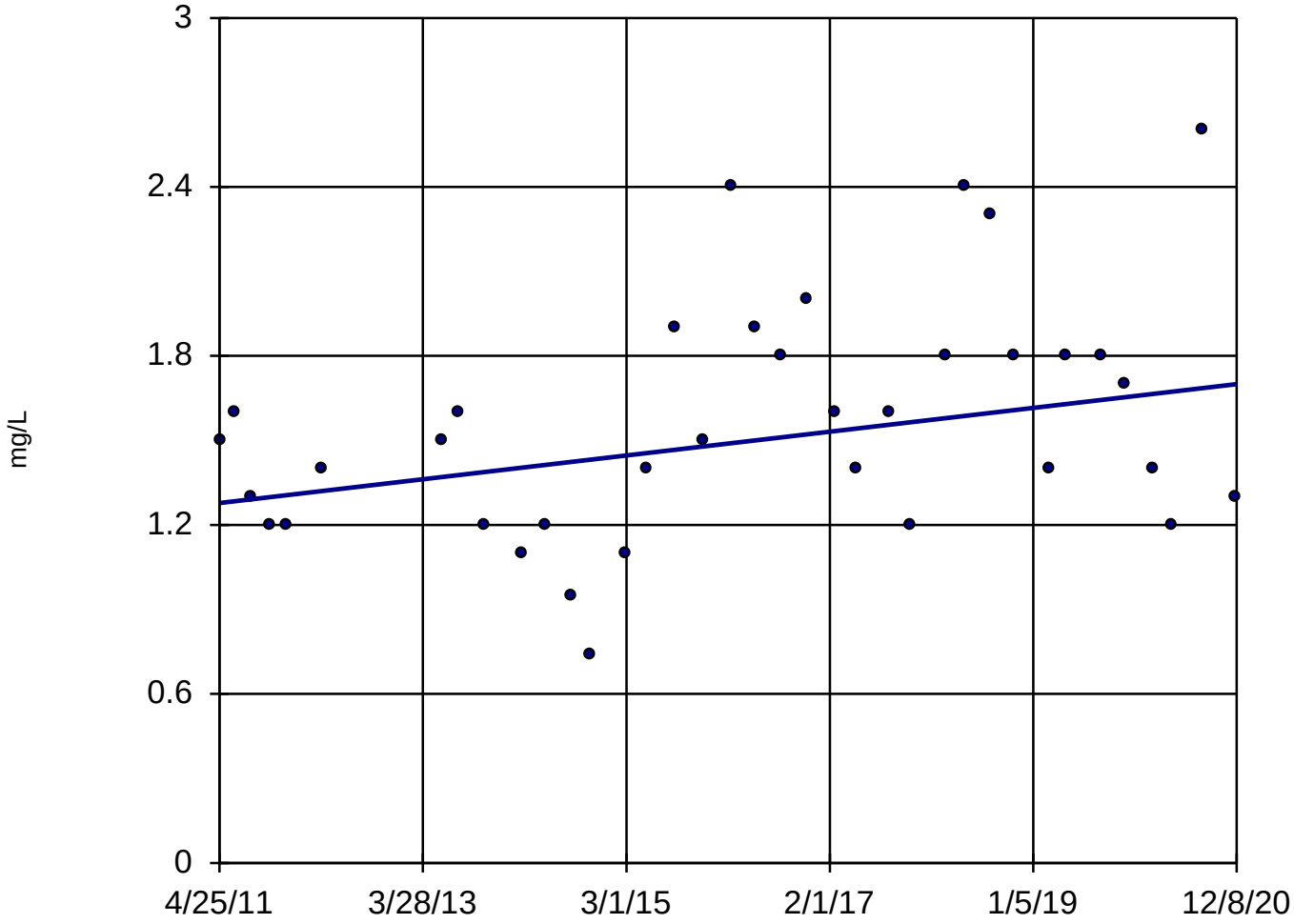
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Boron, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-15



n = 37

Slope = 0.04385 units per year.

Mann-Kendall statistic = 150
critical = 199

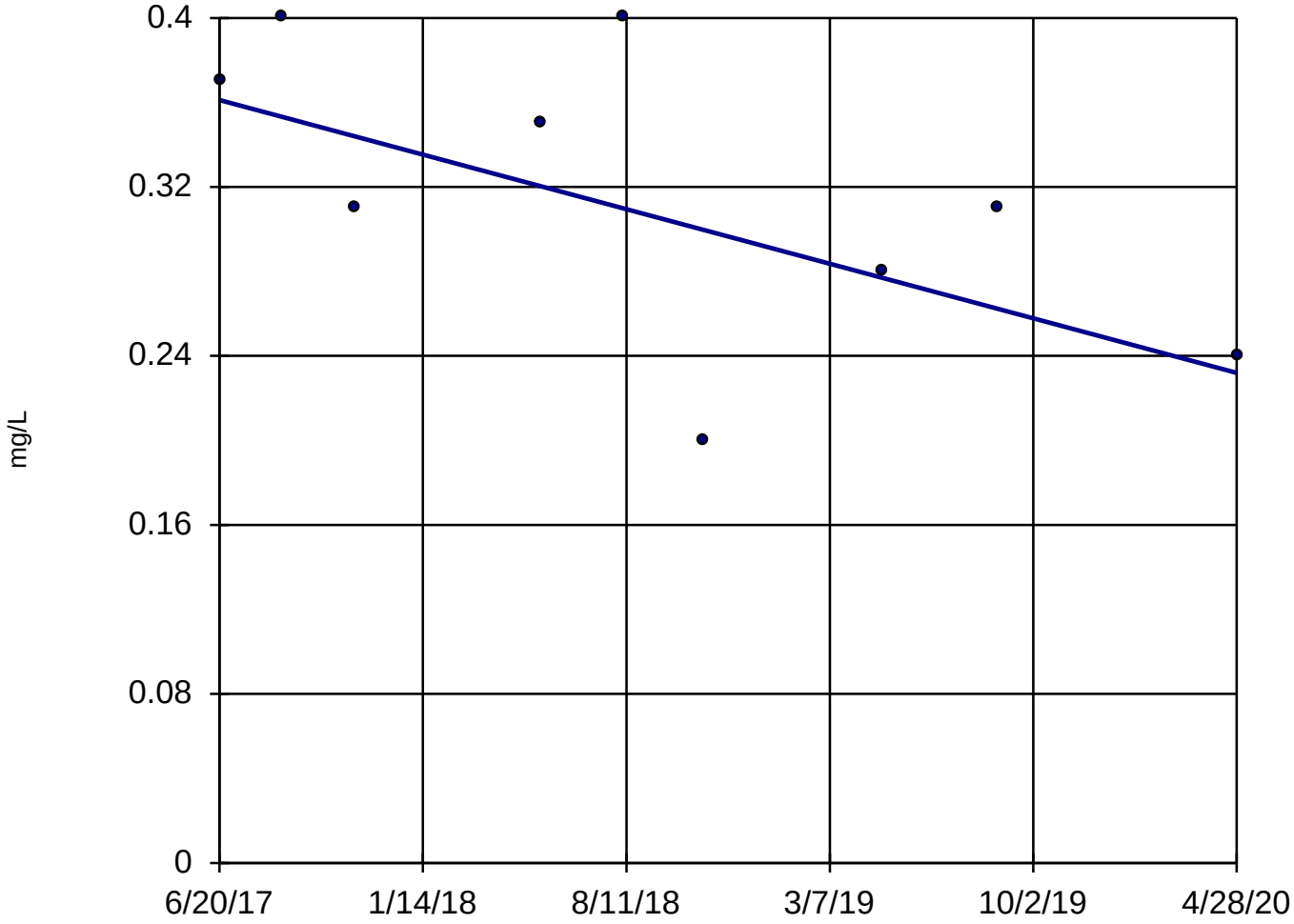
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-03



n = 9

Slope = -0.04515 units per year.

Mann-Kendall statistic = -16
critical = -25

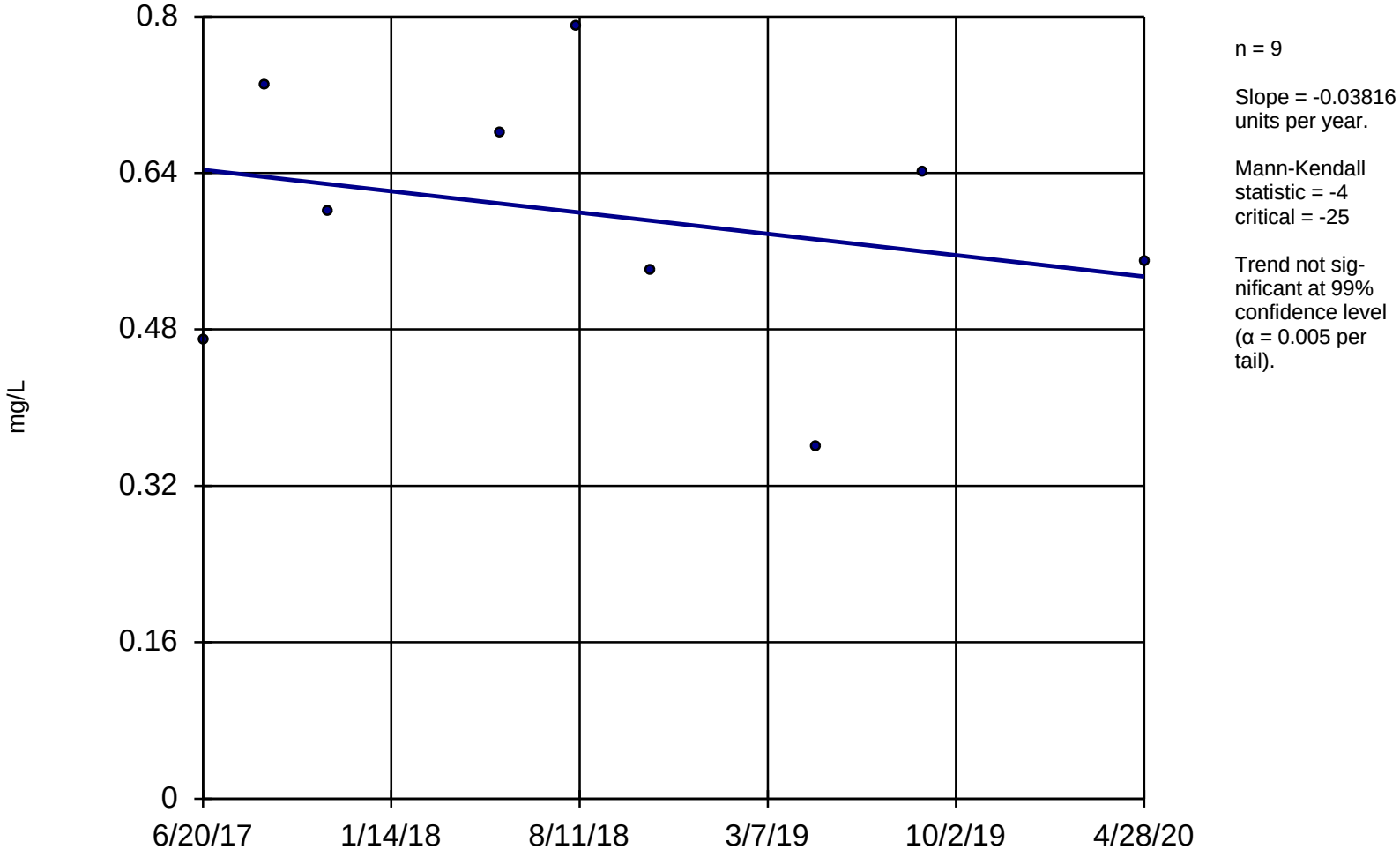
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, Total Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-04



n = 9

Slope = -0.03816 units per year.

Mann-Kendall statistic = -4
critical = -25

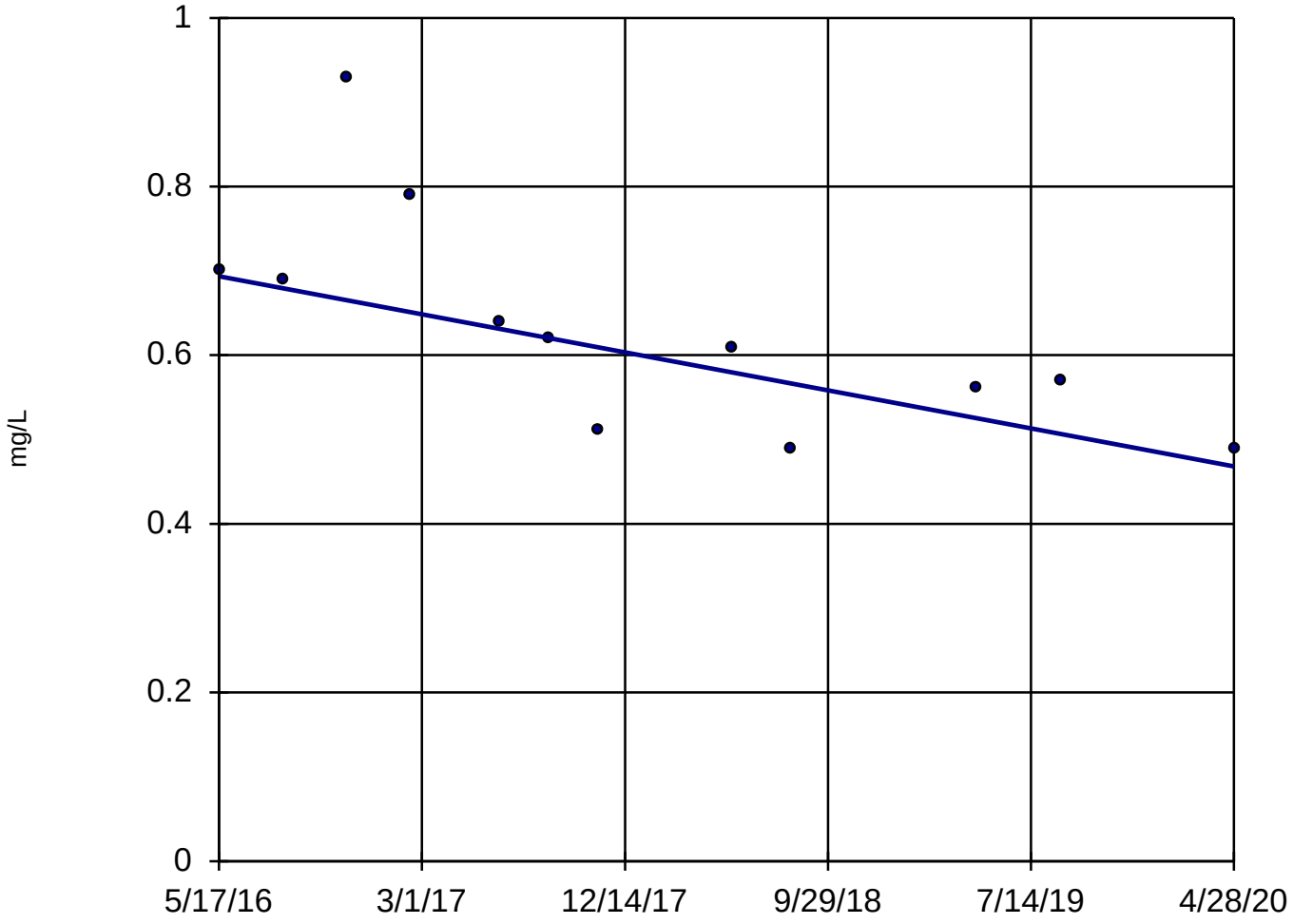
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, Total Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-05



n = 12

Slope = -0.05707 units per year.

Mann-Kendall statistic = -45
critical = -38

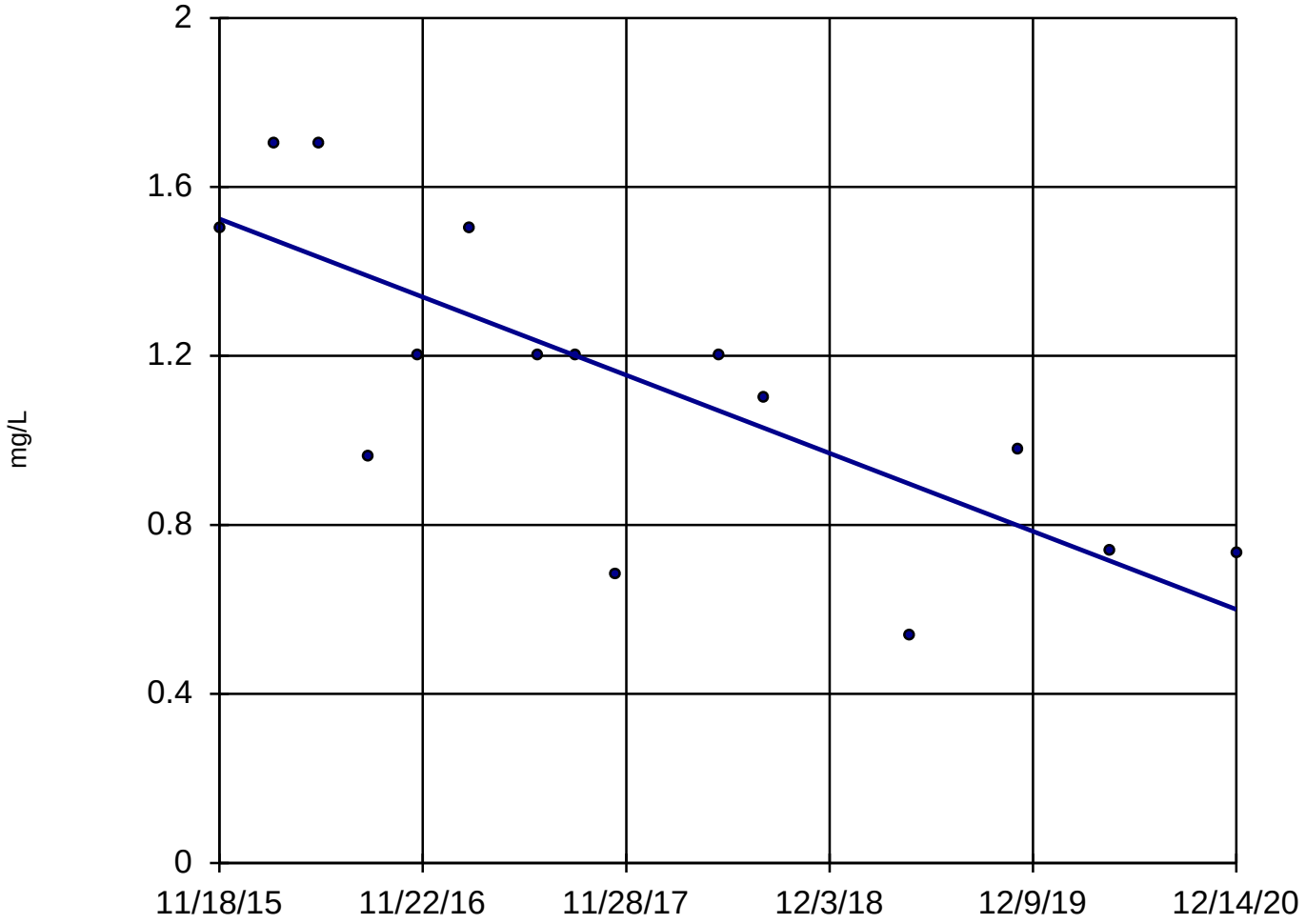
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, Total Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-08



n = 15

Slope = -0.1821 units per year.

Mann-Kendall statistic = -61
critical = -53

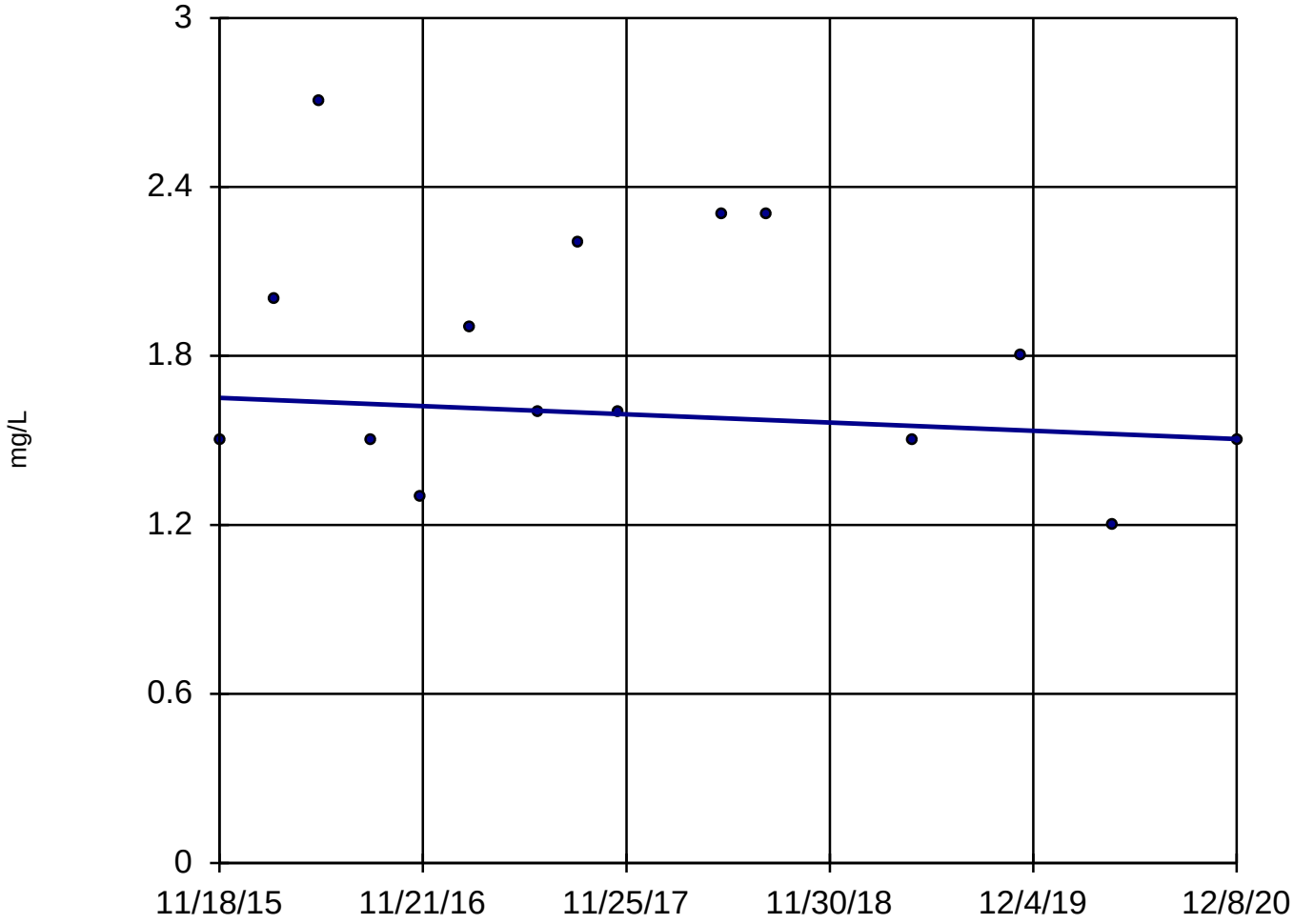
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, Total Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-15



n = 15

Slope = -0.02899 units per year.

Mann-Kendall statistic = -11
critical = -53

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, Total Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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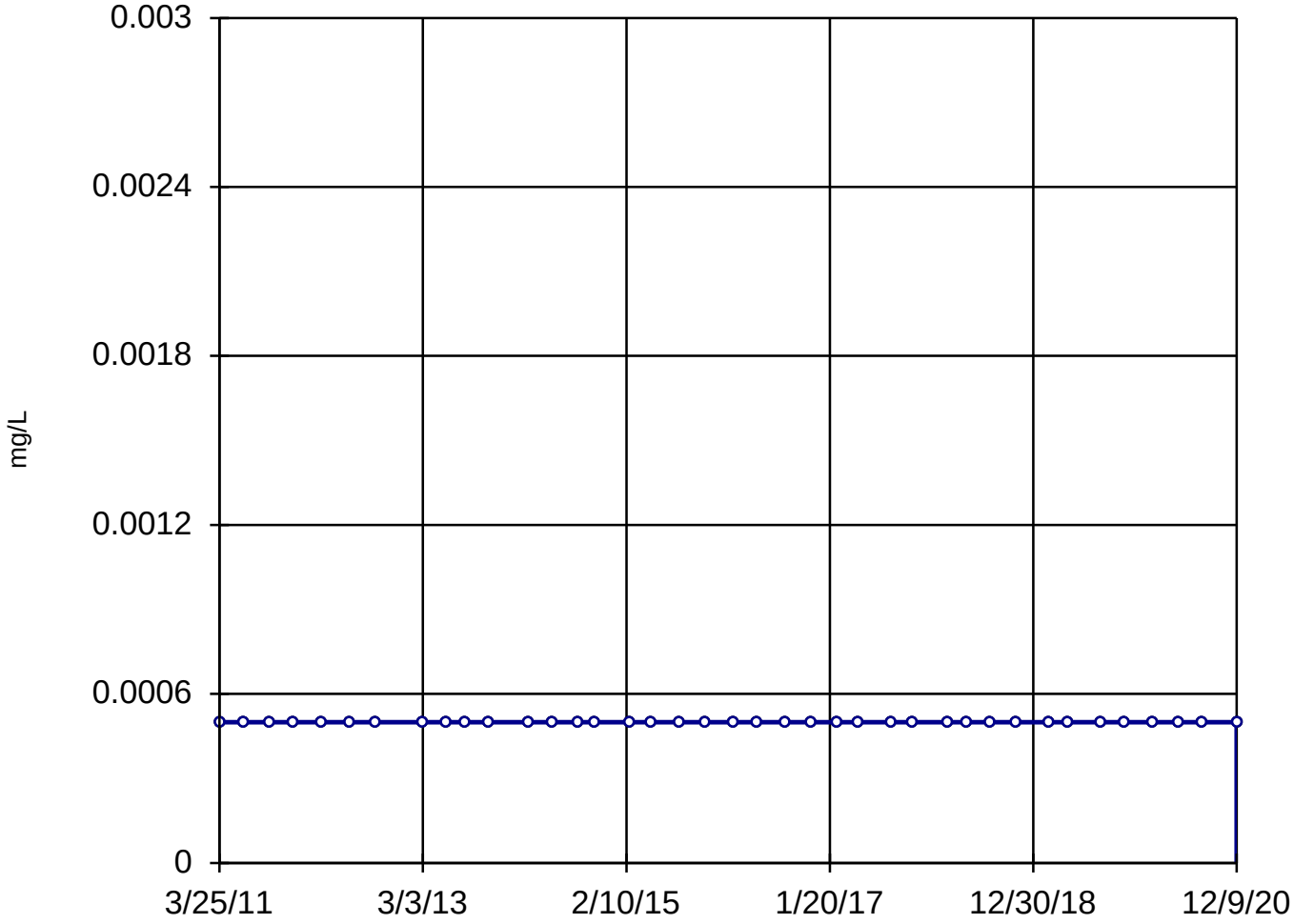
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

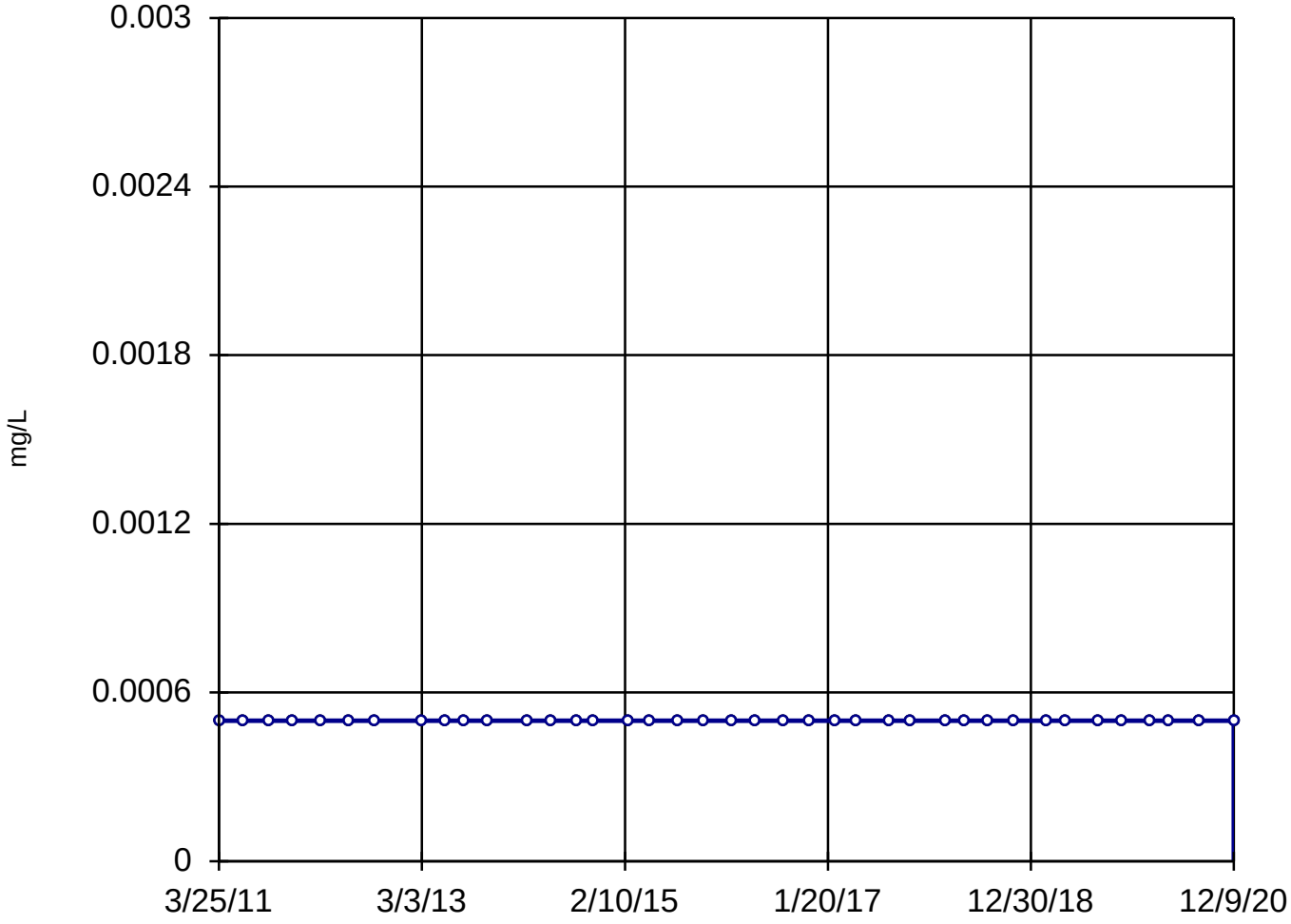
Constituent: Cadmium, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

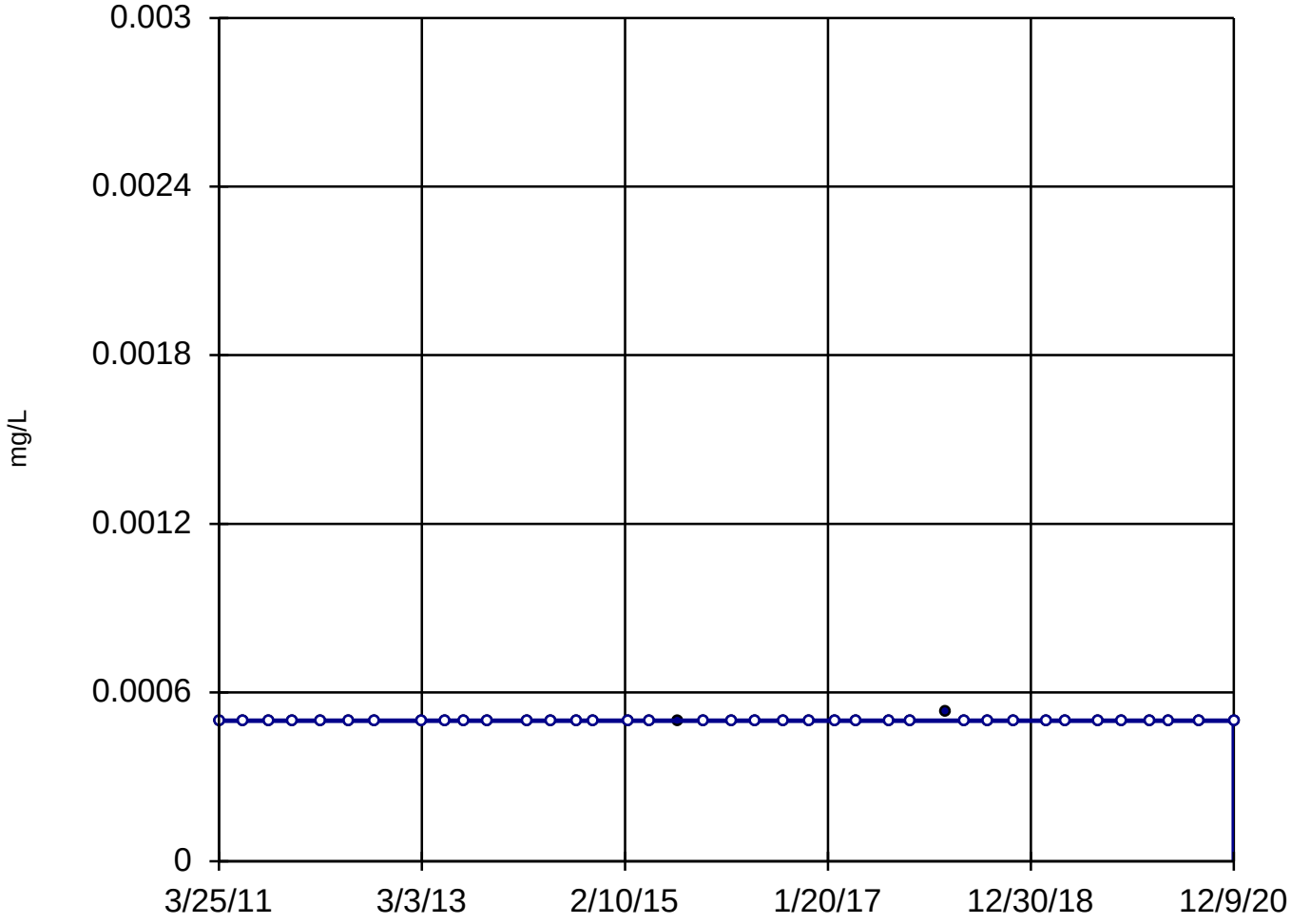
Constituent: Cadmium, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-05



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 16
critical = 214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

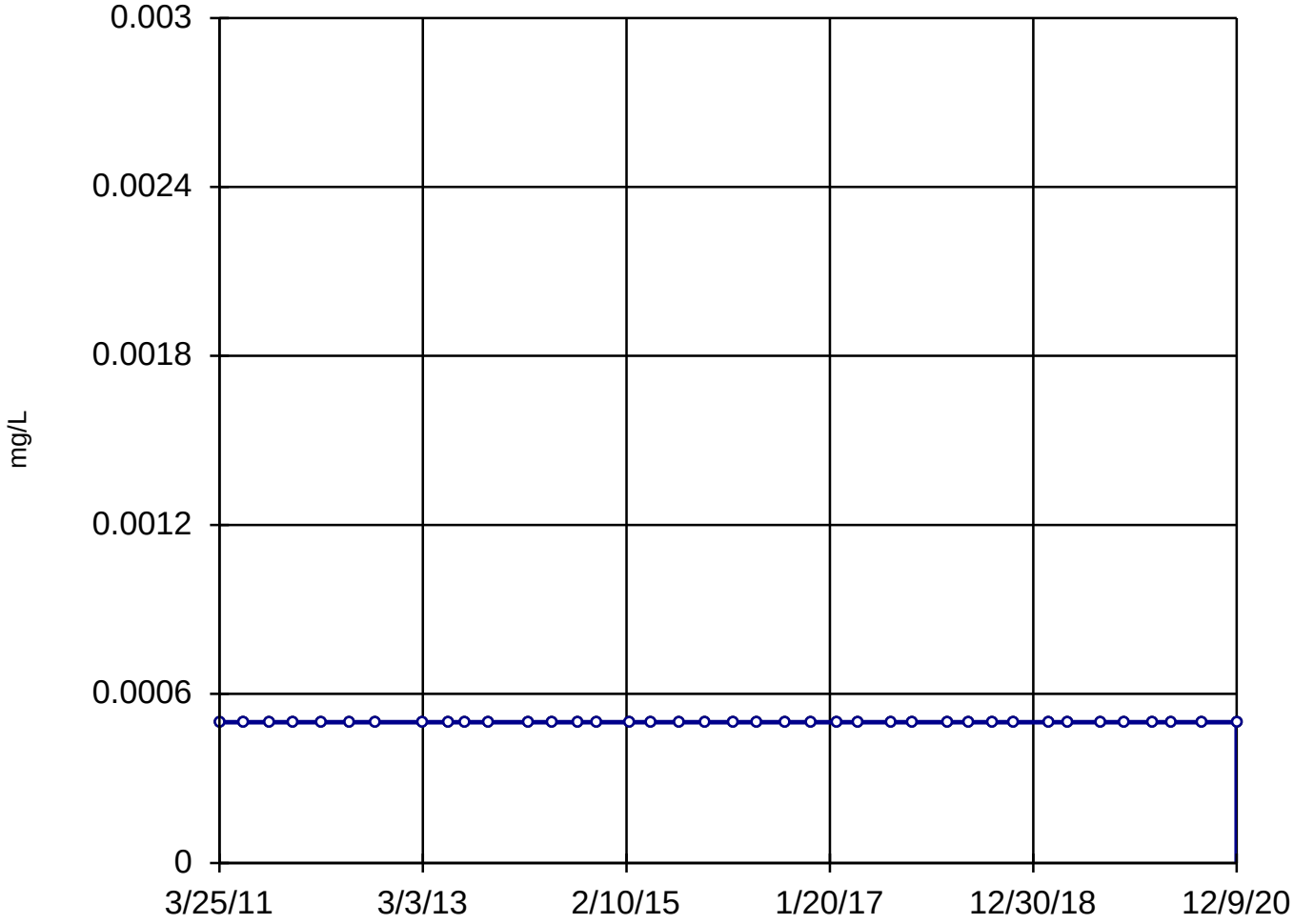
Constituent: Cadmium, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-06



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

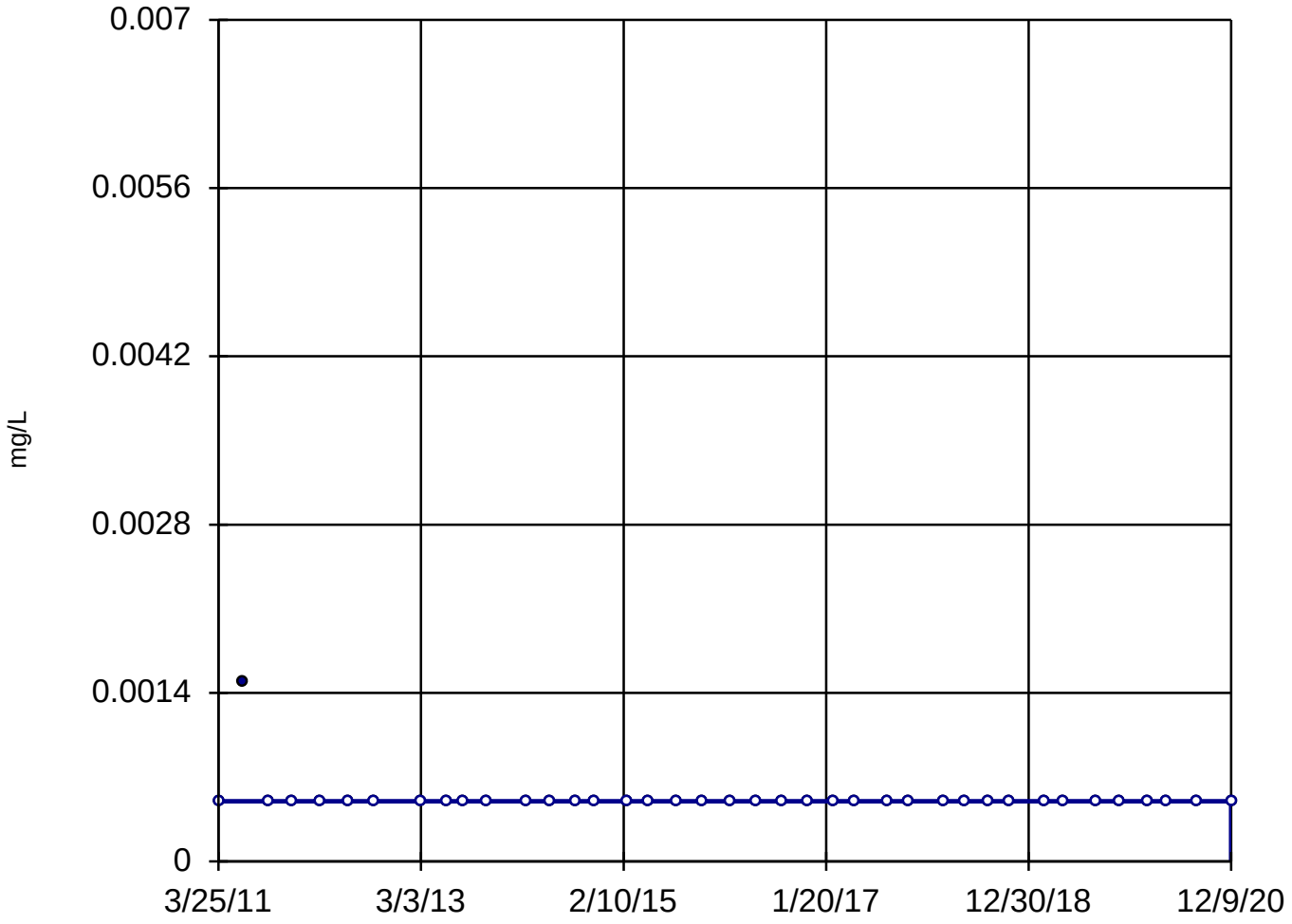
Constituent: Cadmium, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-07



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = -36
critical = -214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

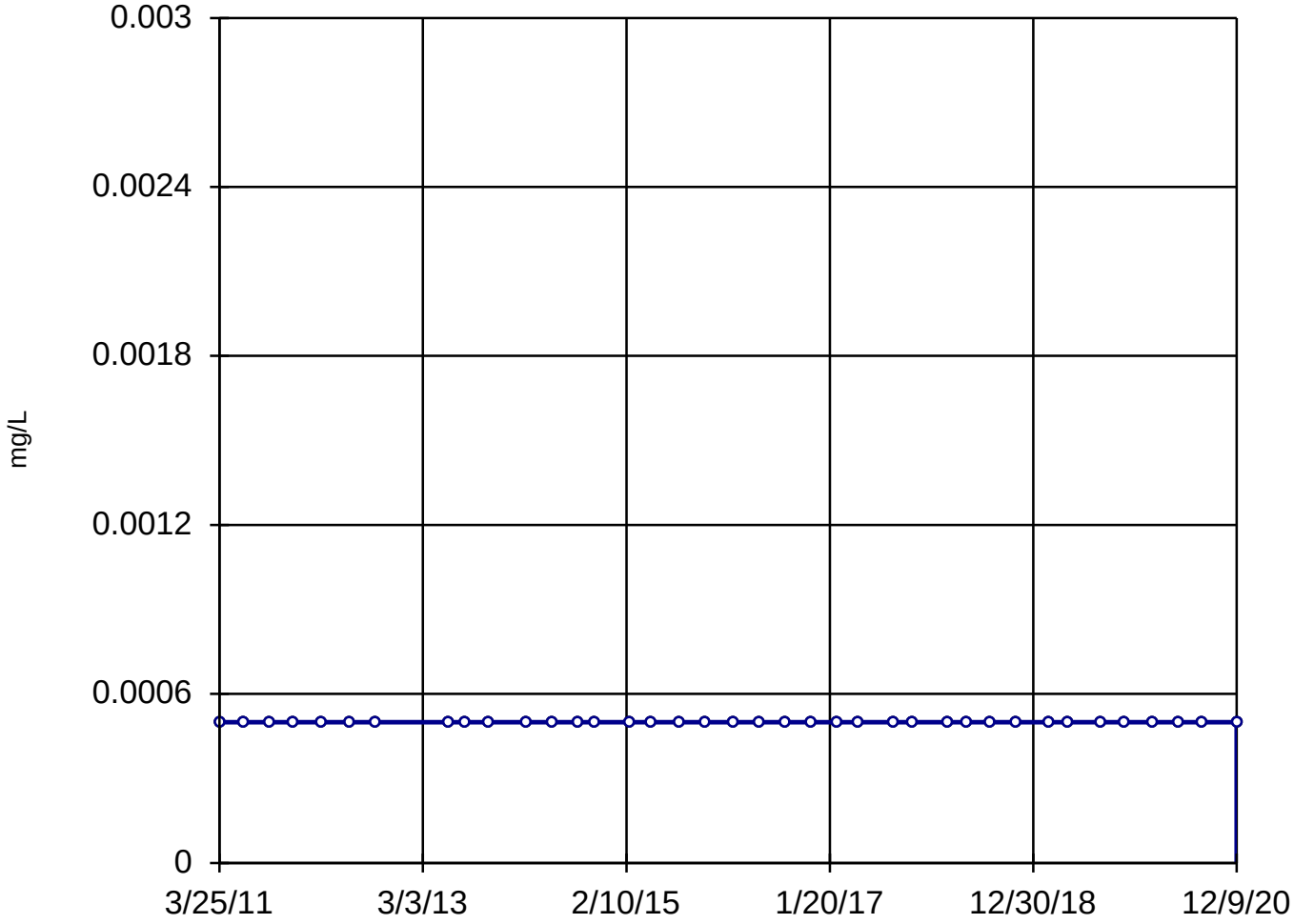
Constituent: Cadmium, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 38

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 206

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

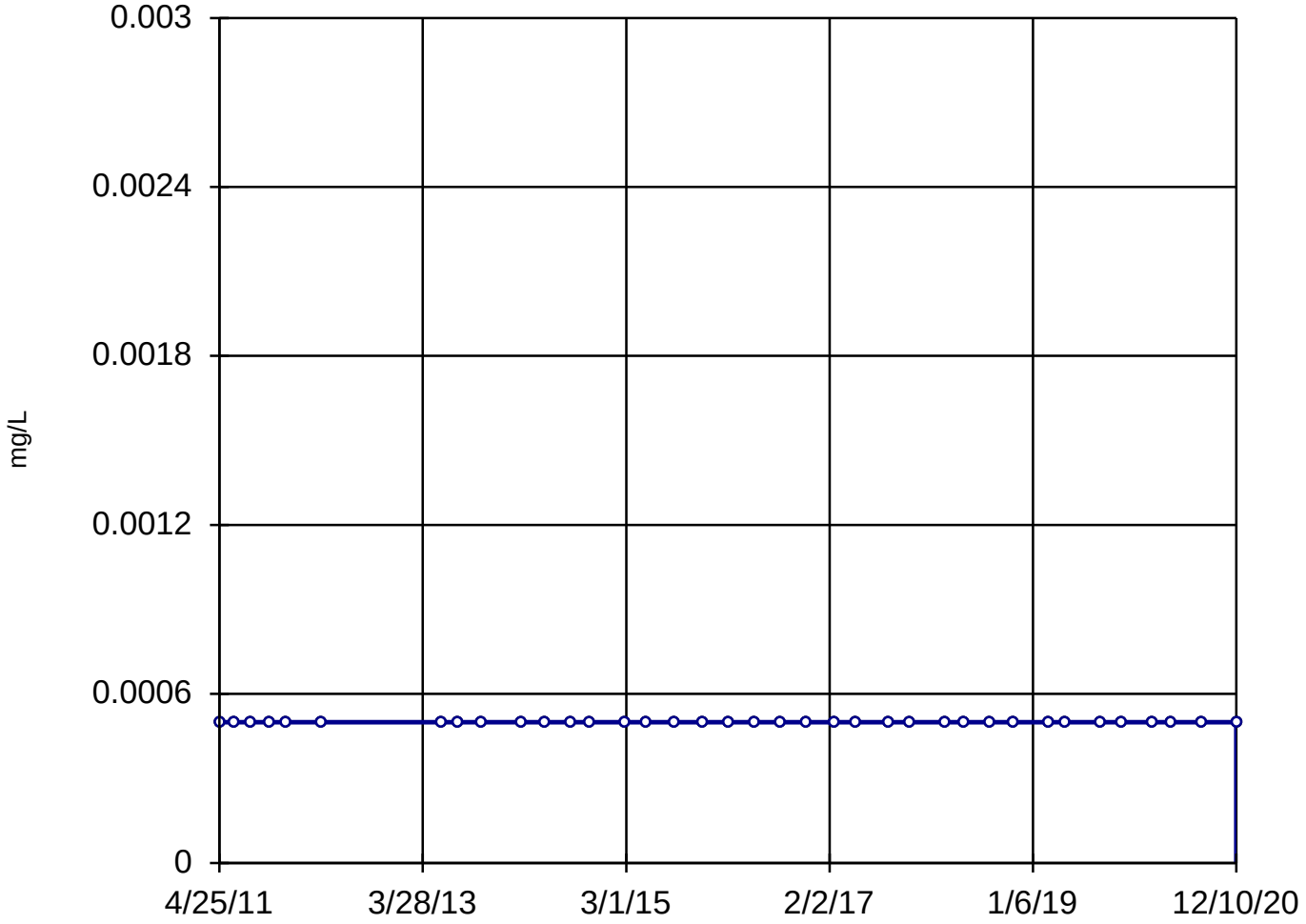
Constituent: Cadmium, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-13



n = 37

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 199

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

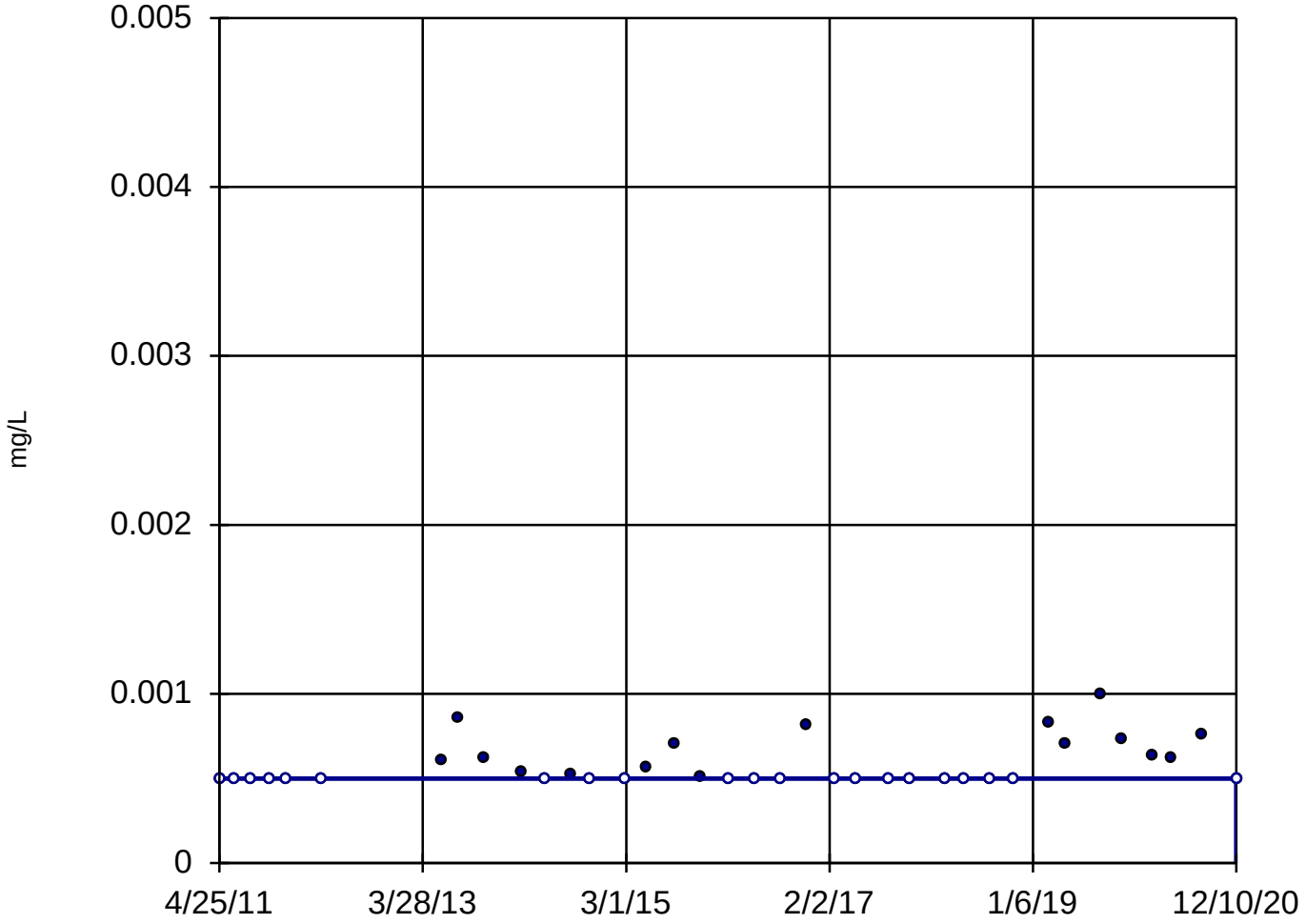
Constituent: Cadmium, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-14



n = 37

Slope = 0
units per year.

Mann-Kendall
statistic = 109
critical = 199

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

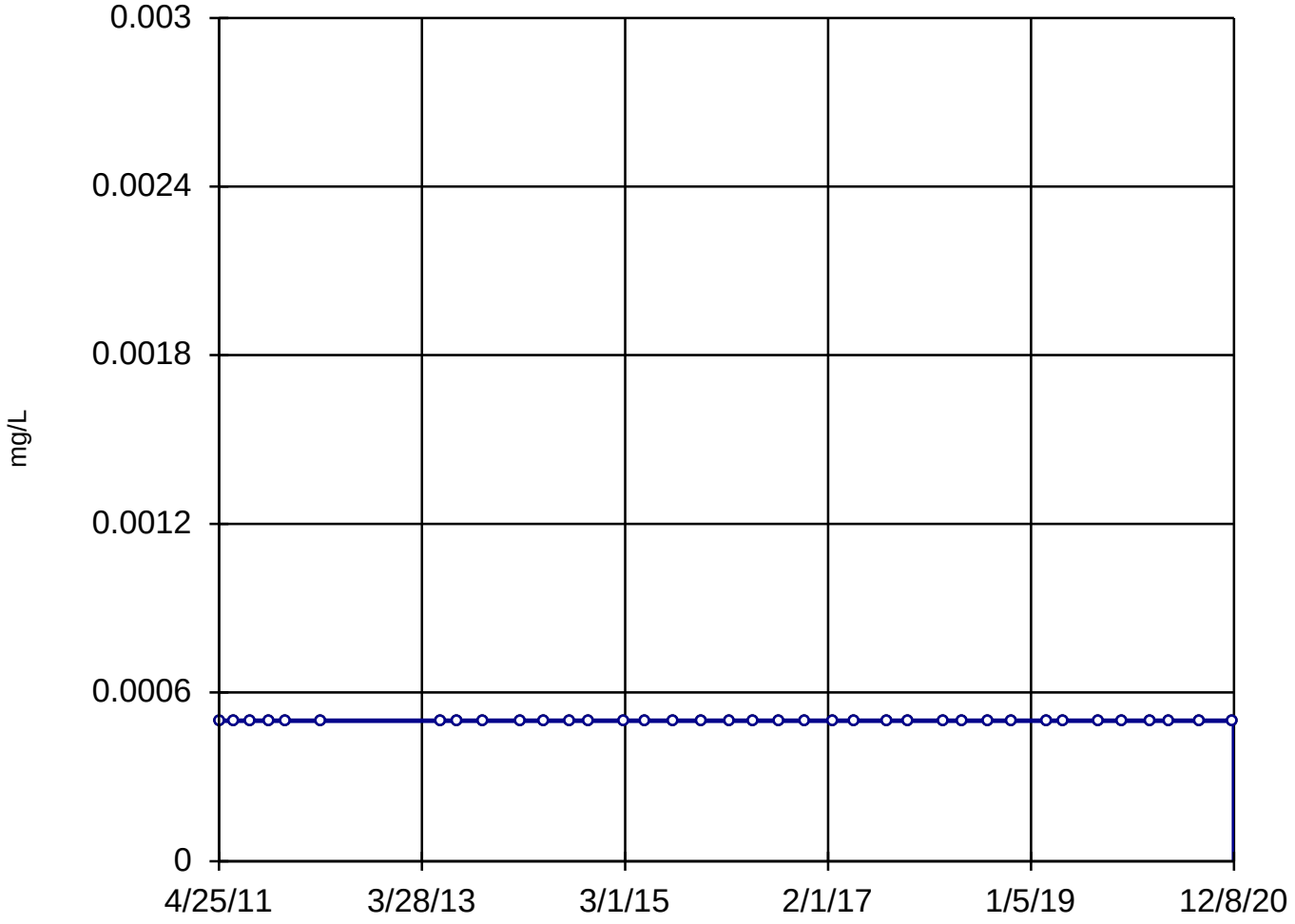
Constituent: Cadmium, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-15



n = 37

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 199

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

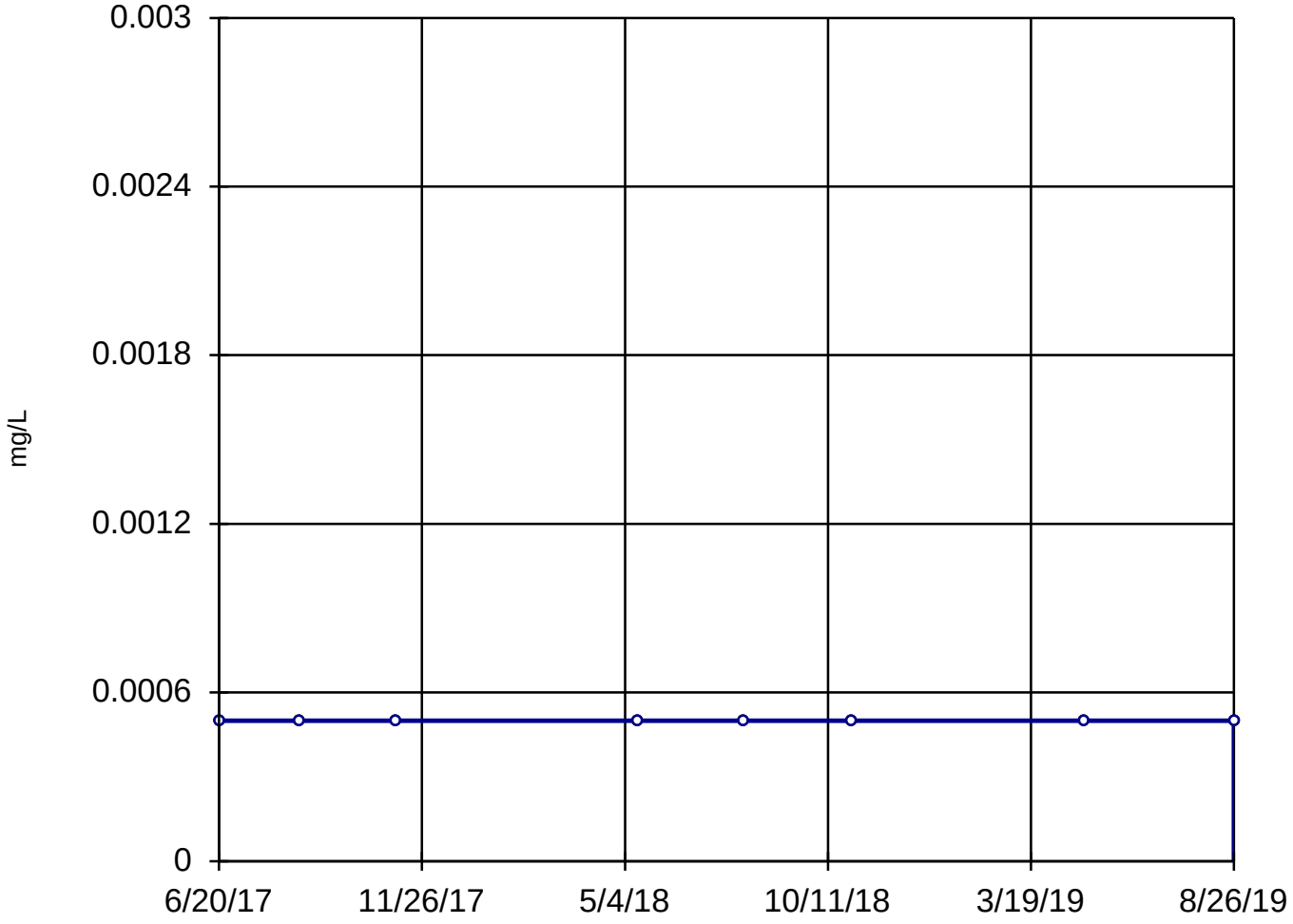
Constituent: Cadmium, Dissolved Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 8

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 21

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

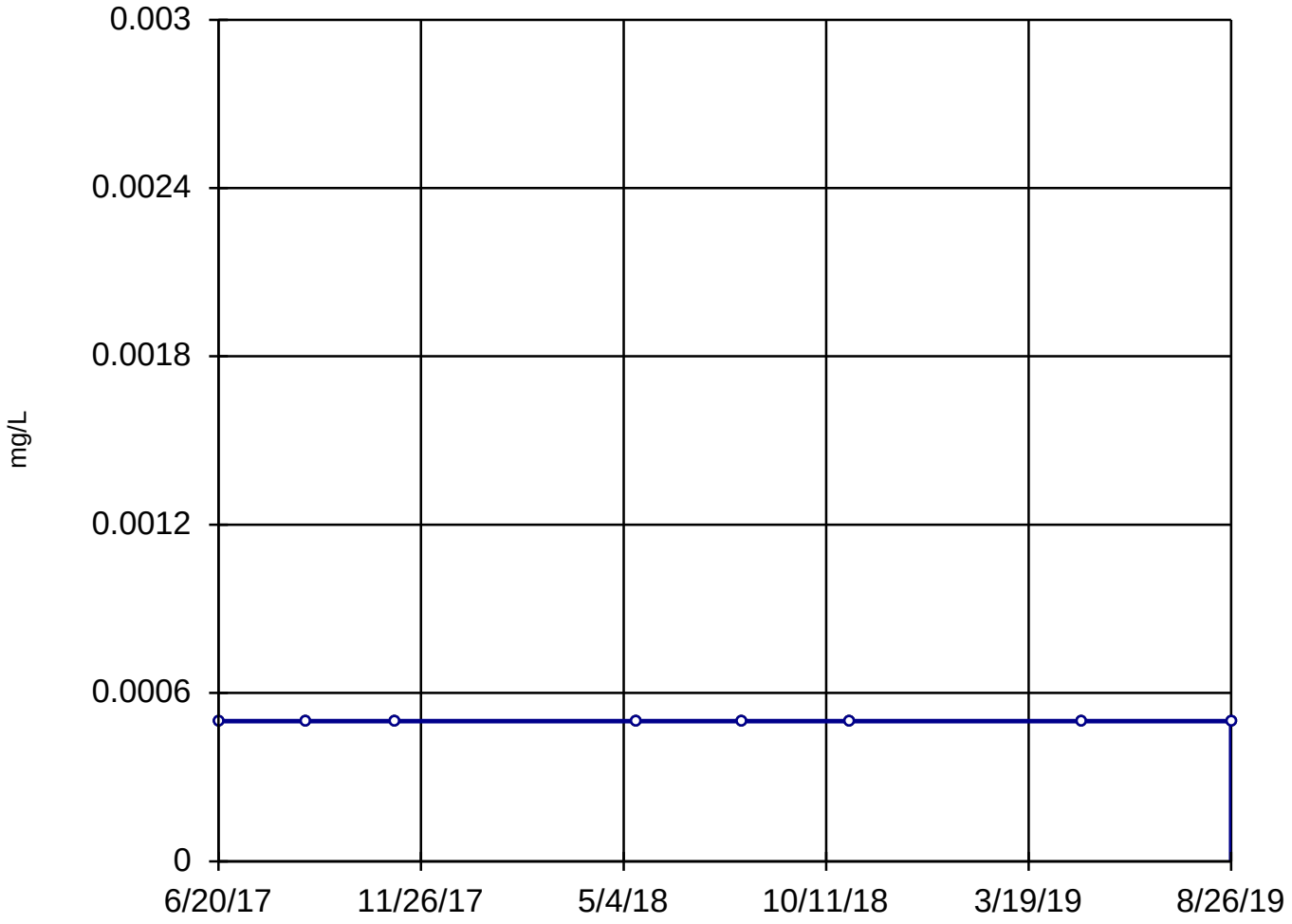
Constituent: Cadmium, Total Analysis Run 4/2/2021 11:44 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 8

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 21

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

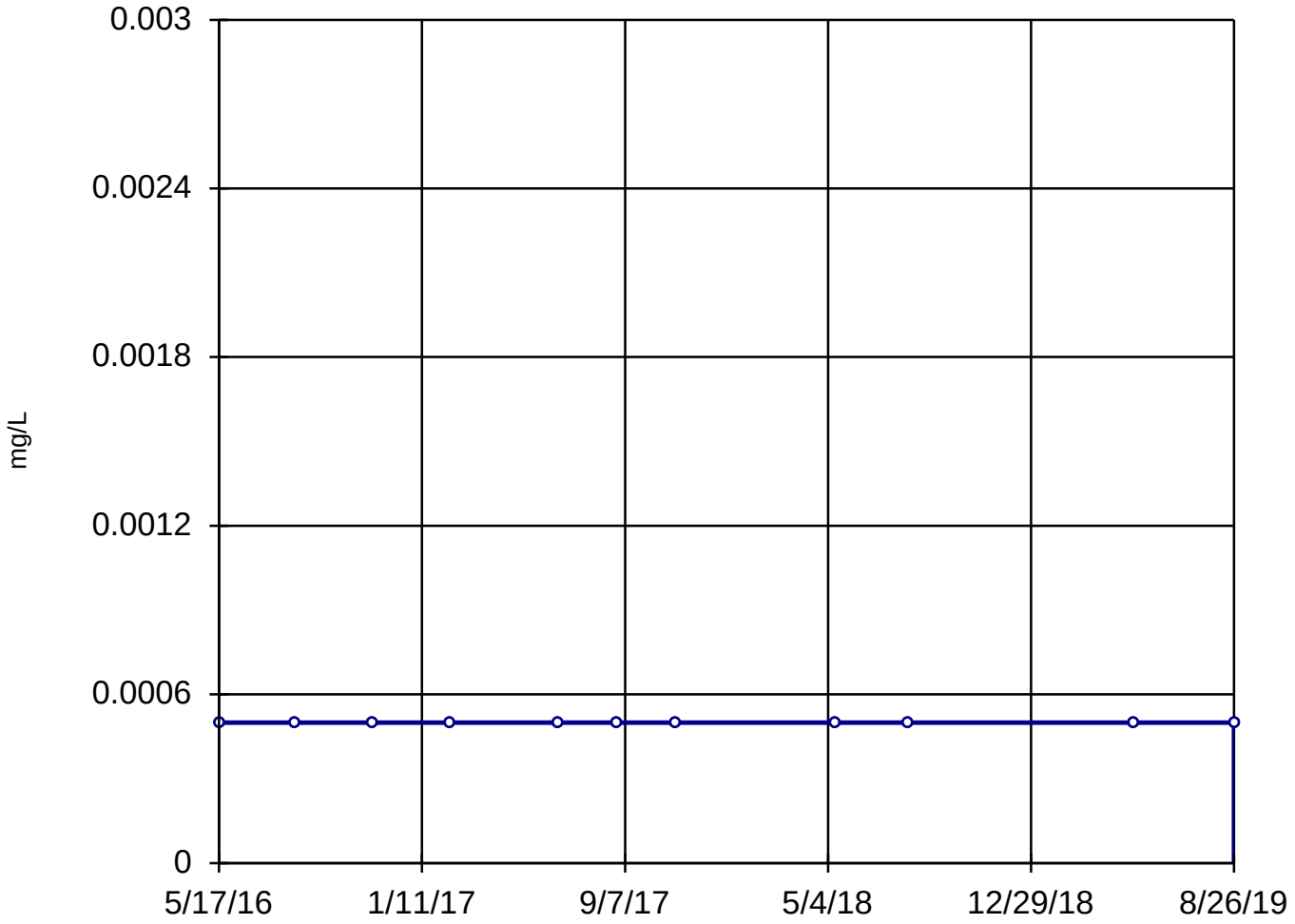
Constituent: Cadmium, Total Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-05



n = 11

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 34

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

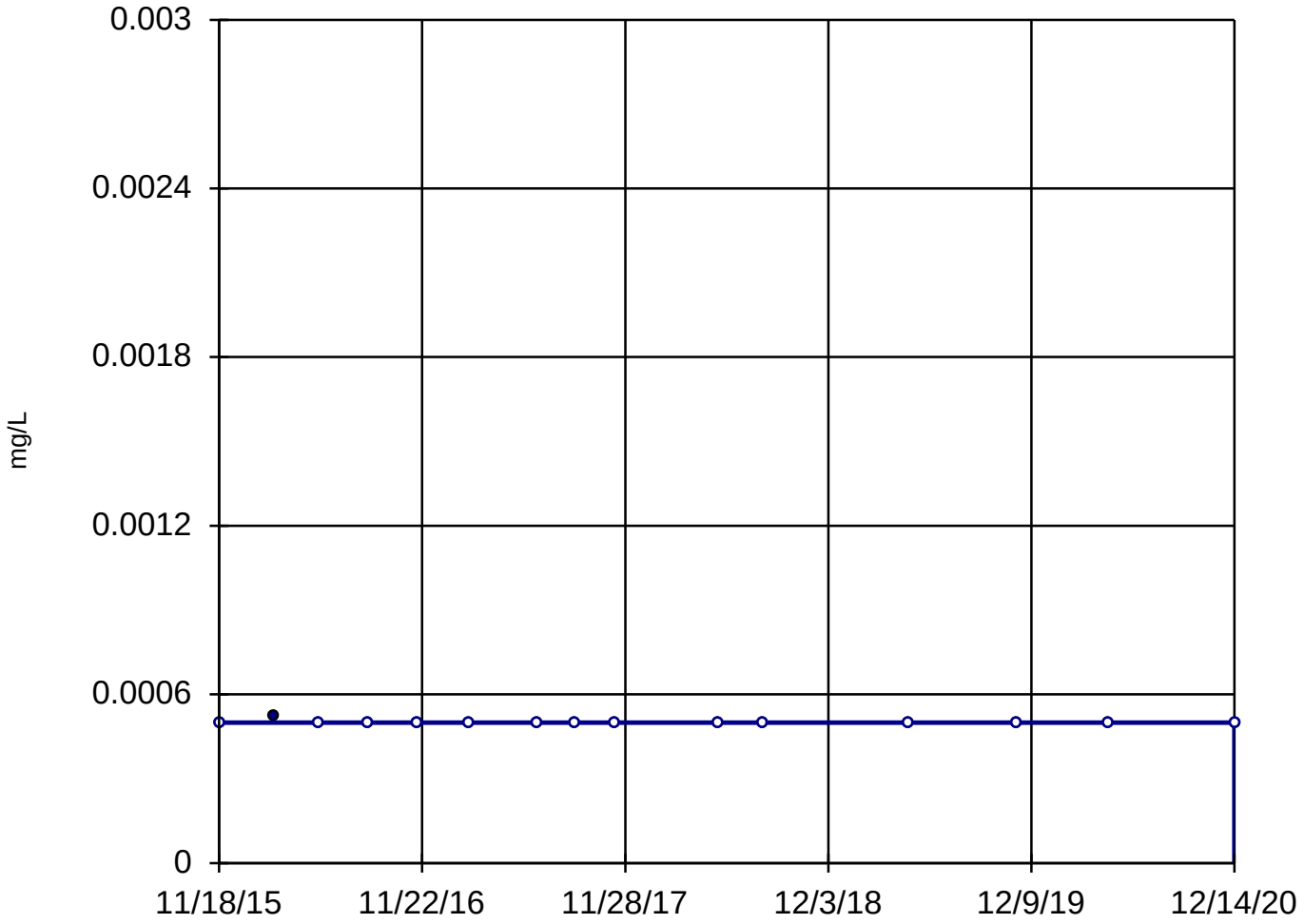
Constituent: Cadmium, Total Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 15

Slope = 0
units per year.

Mann-Kendall
statistic = -12
critical = -53

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

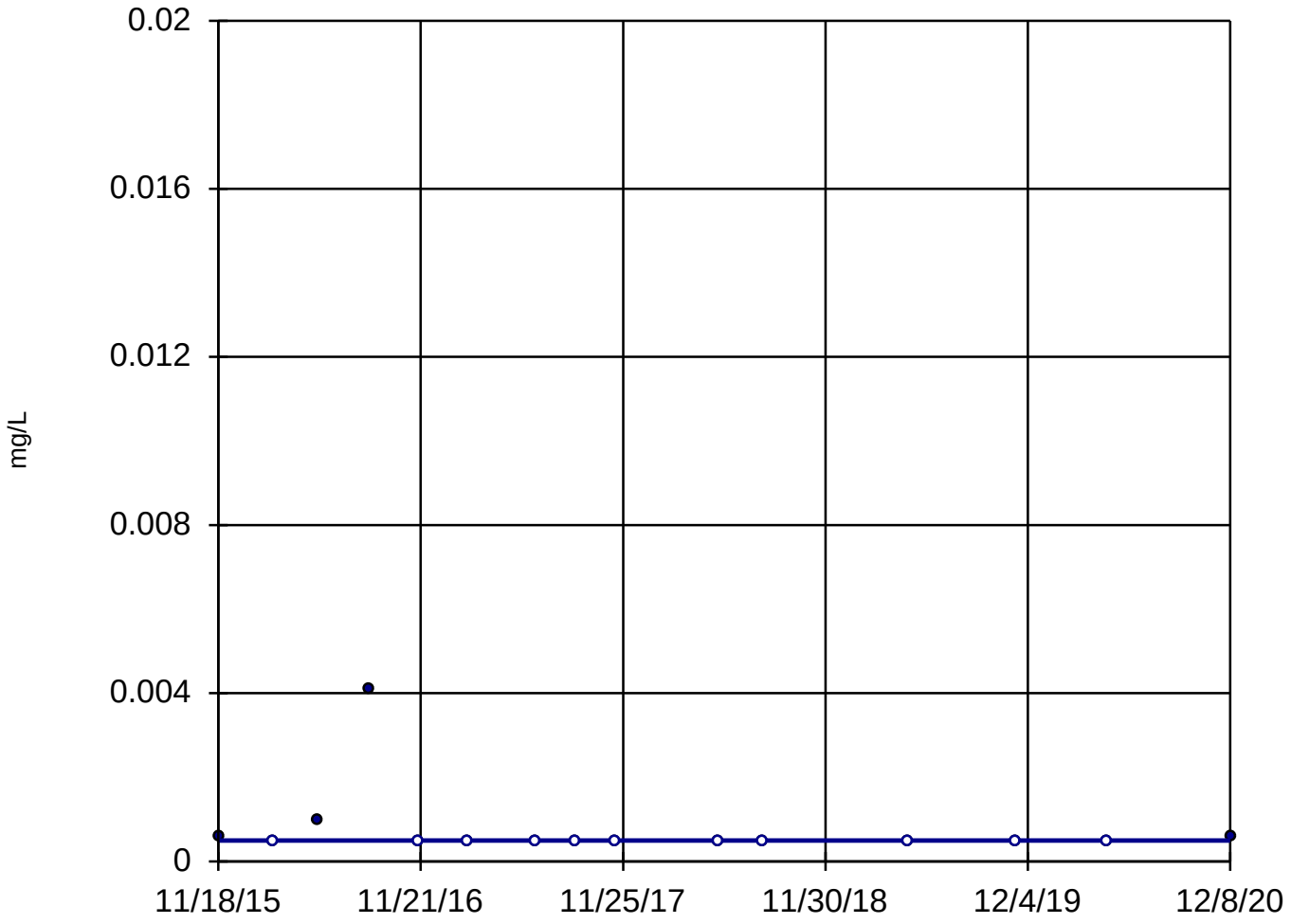
Constituent: Cadmium, Total Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-15



n = 15

Slope = 0
units per year.

Mann-Kendall
statistic = -18
critical = -53

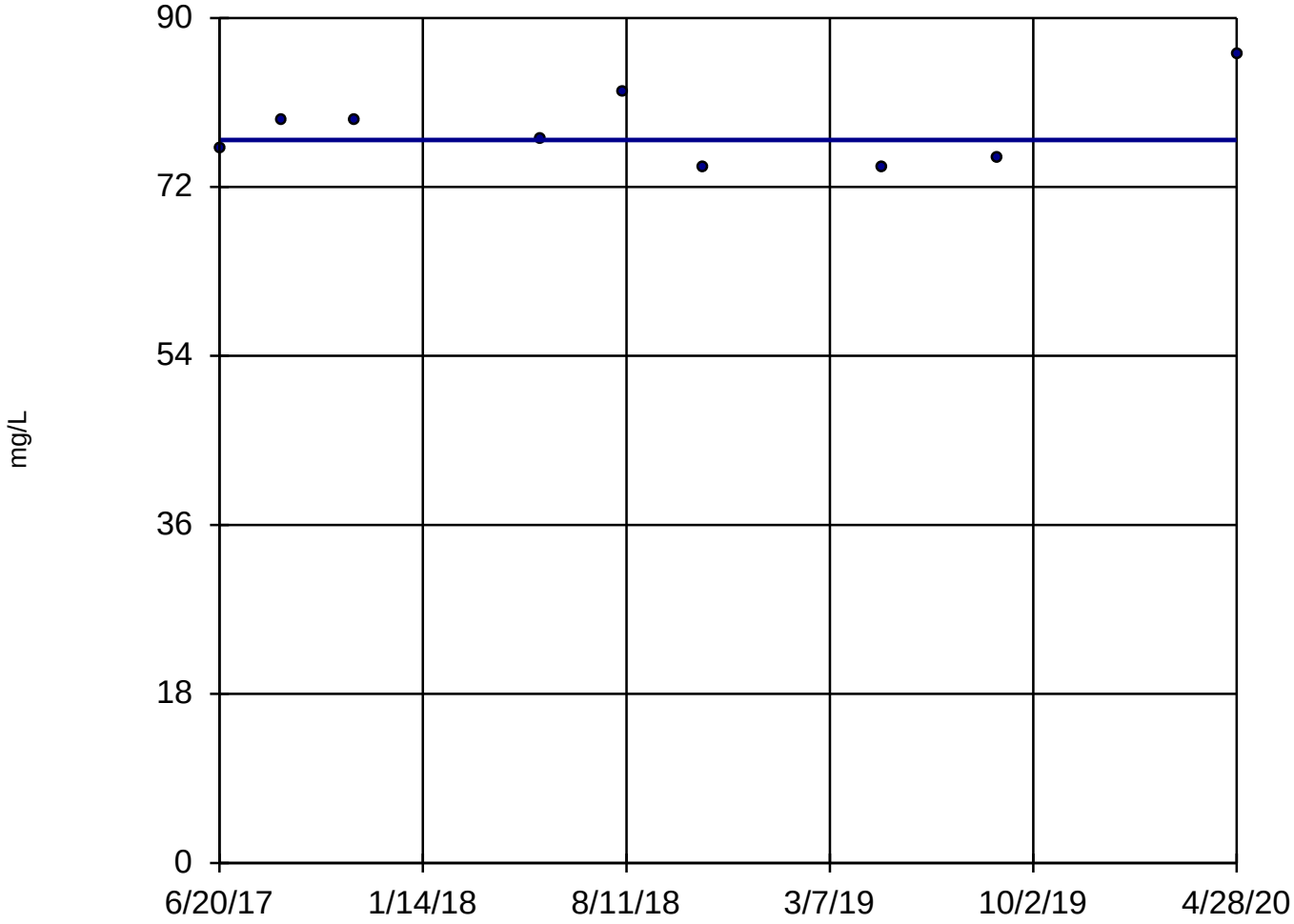
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Cadmium, Total Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-03



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 25

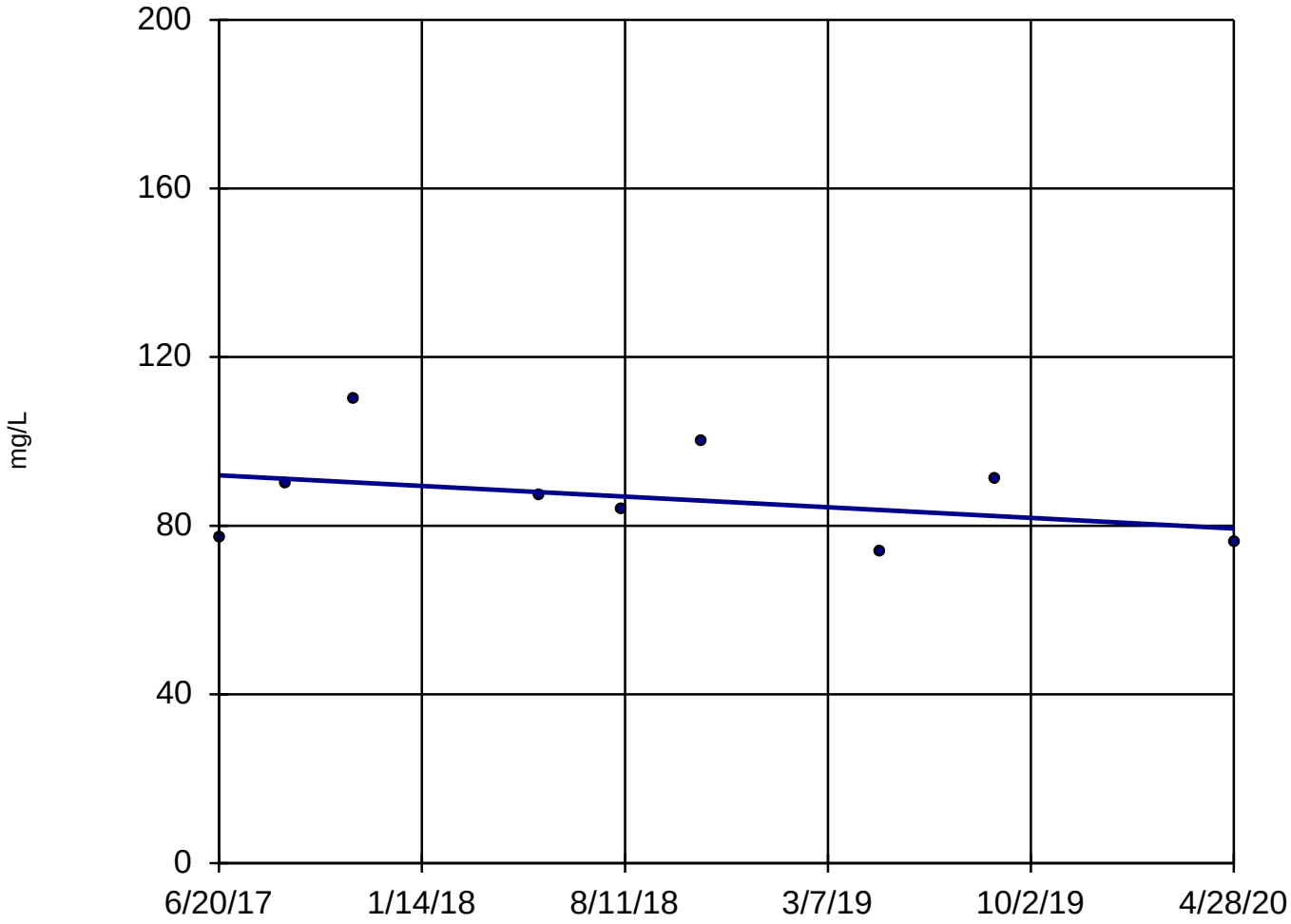
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Calcium, Total Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-04



n = 9

Slope = -4.423 units per year.

Mann-Kendall statistic = -6
critical = -25

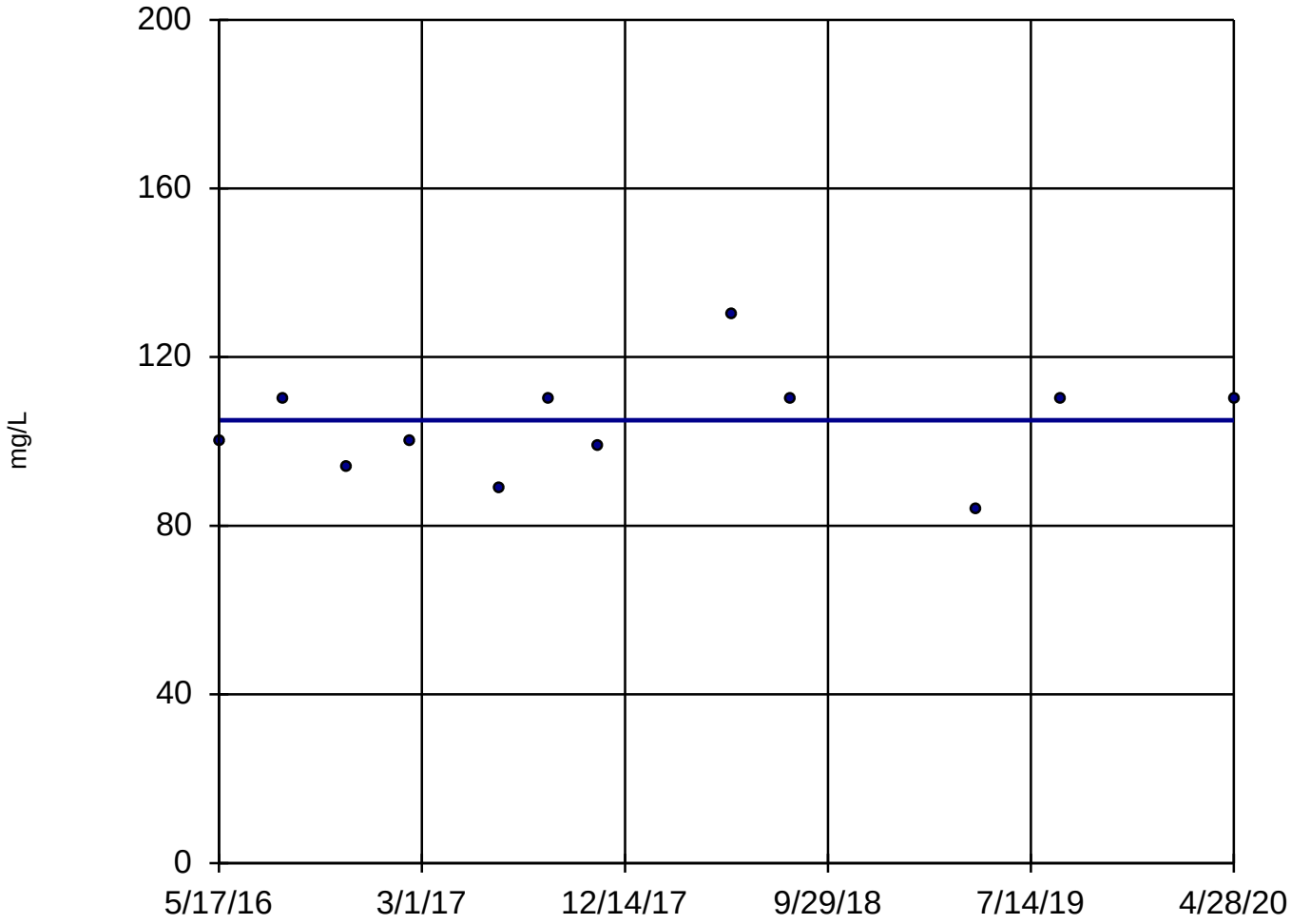
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Calcium, Total Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-05



n = 12

Slope = 0
units per year.

Mann-Kendall
statistic = 9
critical = 38

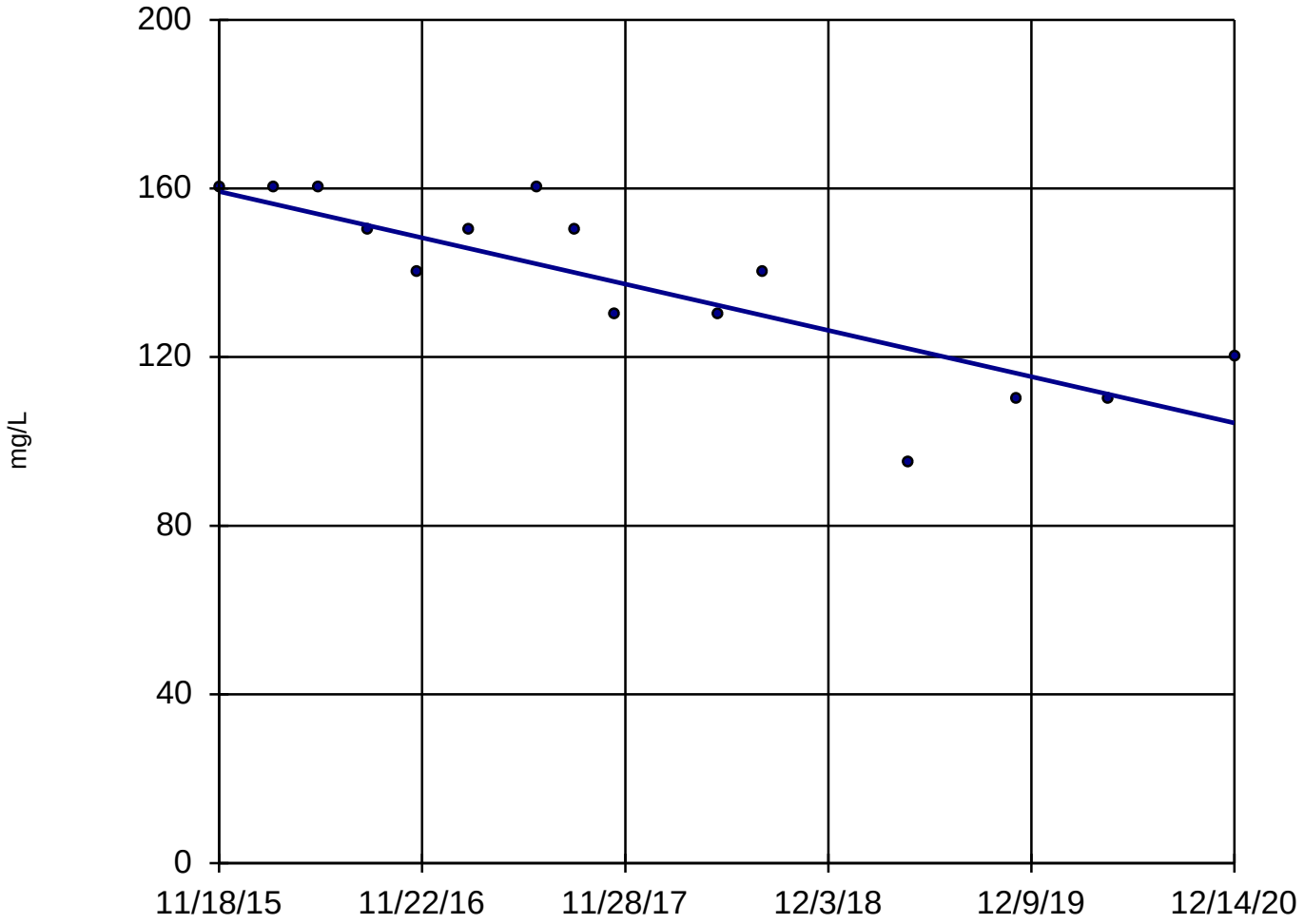
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Calcium, Total Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-08



n = 15

Slope = -10.81 units per year.

Mann-Kendall statistic = -69
critical = -53

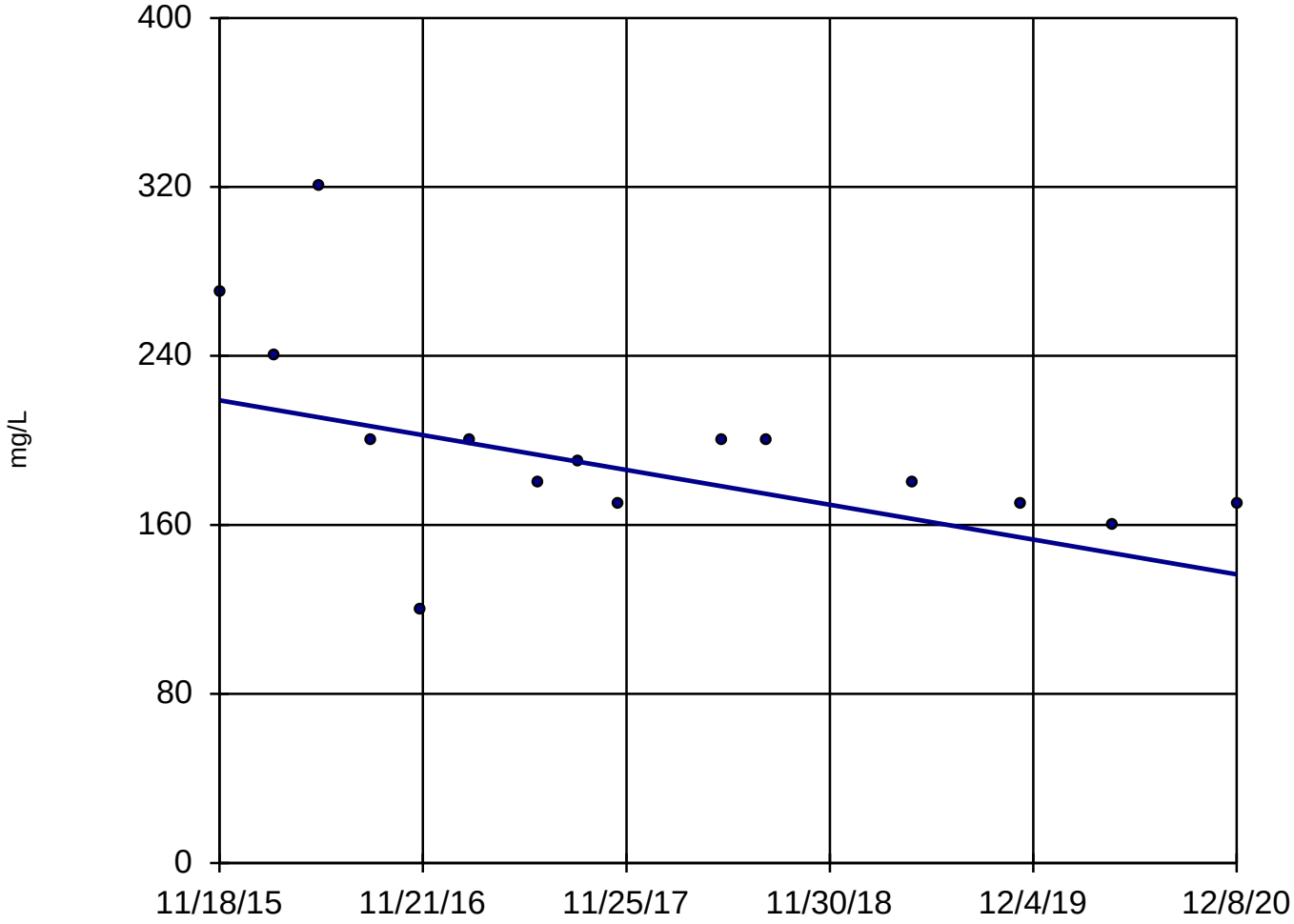
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Calcium, Total Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-15



n = 15

Slope = -16.29 units per year.

Mann-Kendall statistic = -53
critical = -53

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Calcium, Total Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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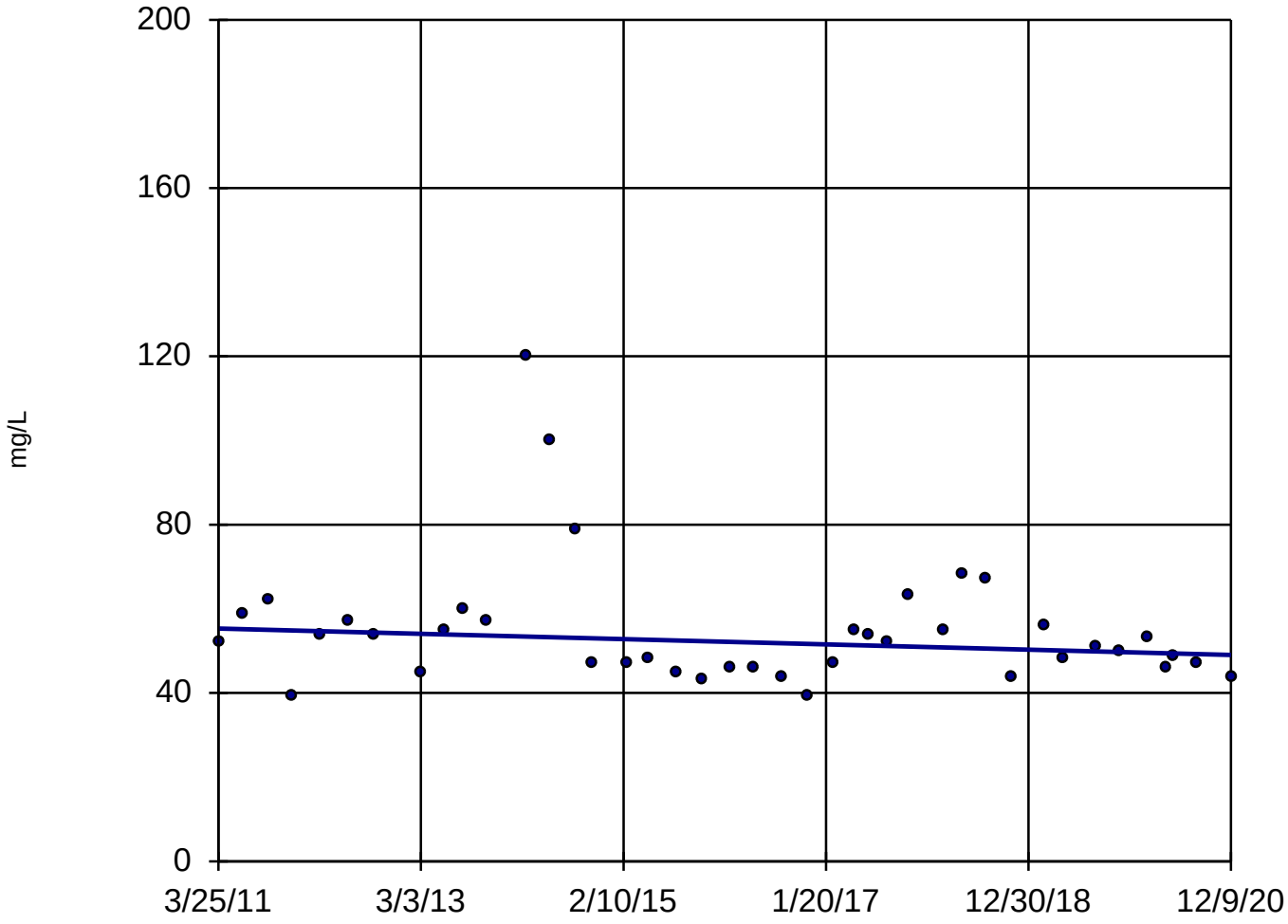
Sen's Slope Estimator

MW-03



n = 41

Slope = -0.6472 units per year.

Mann-Kendall normal approx. = -1.283
critical = -2.58

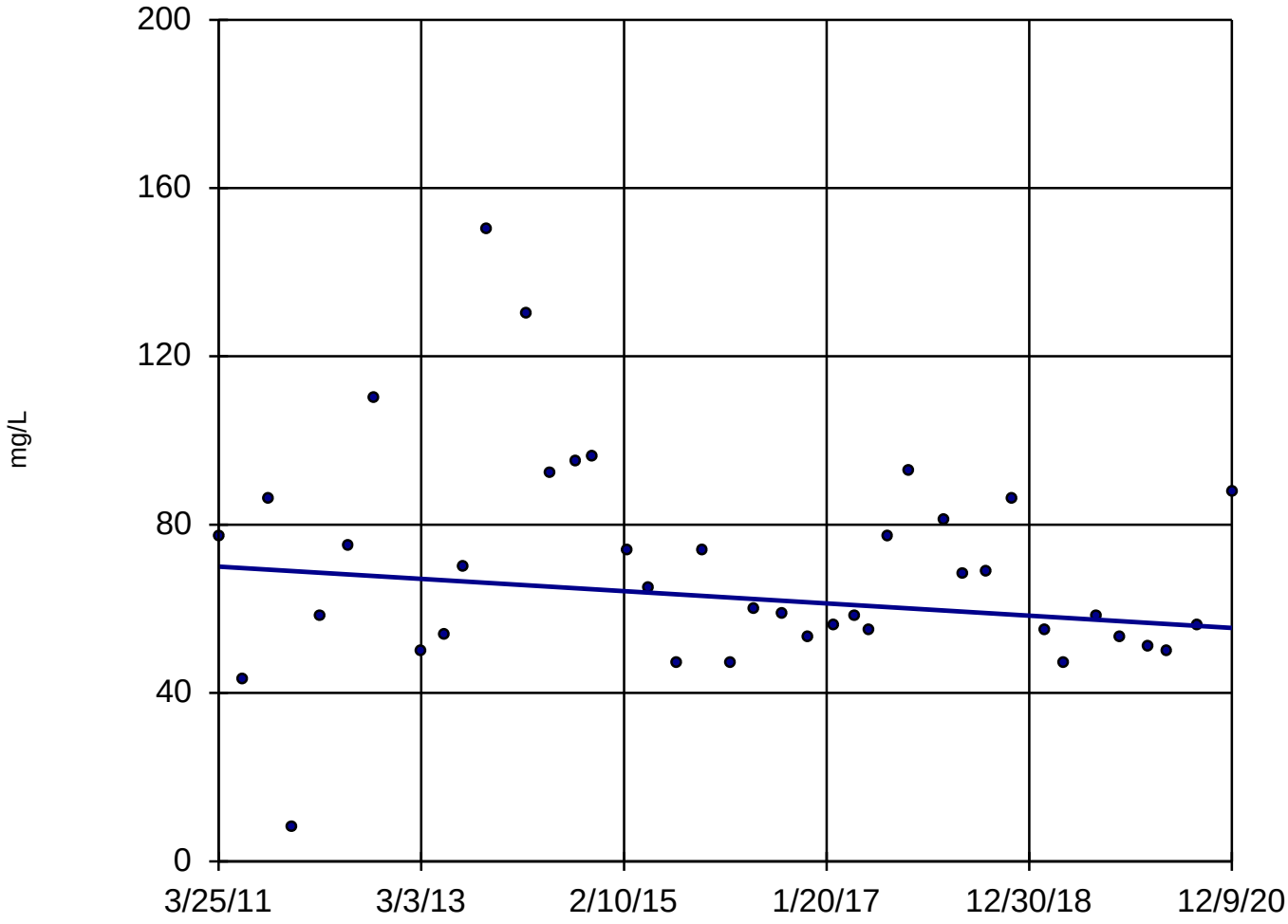
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-04



n = 40

Slope = -1.503 units per year.

Mann-Kendall statistic = -105
critical = -223

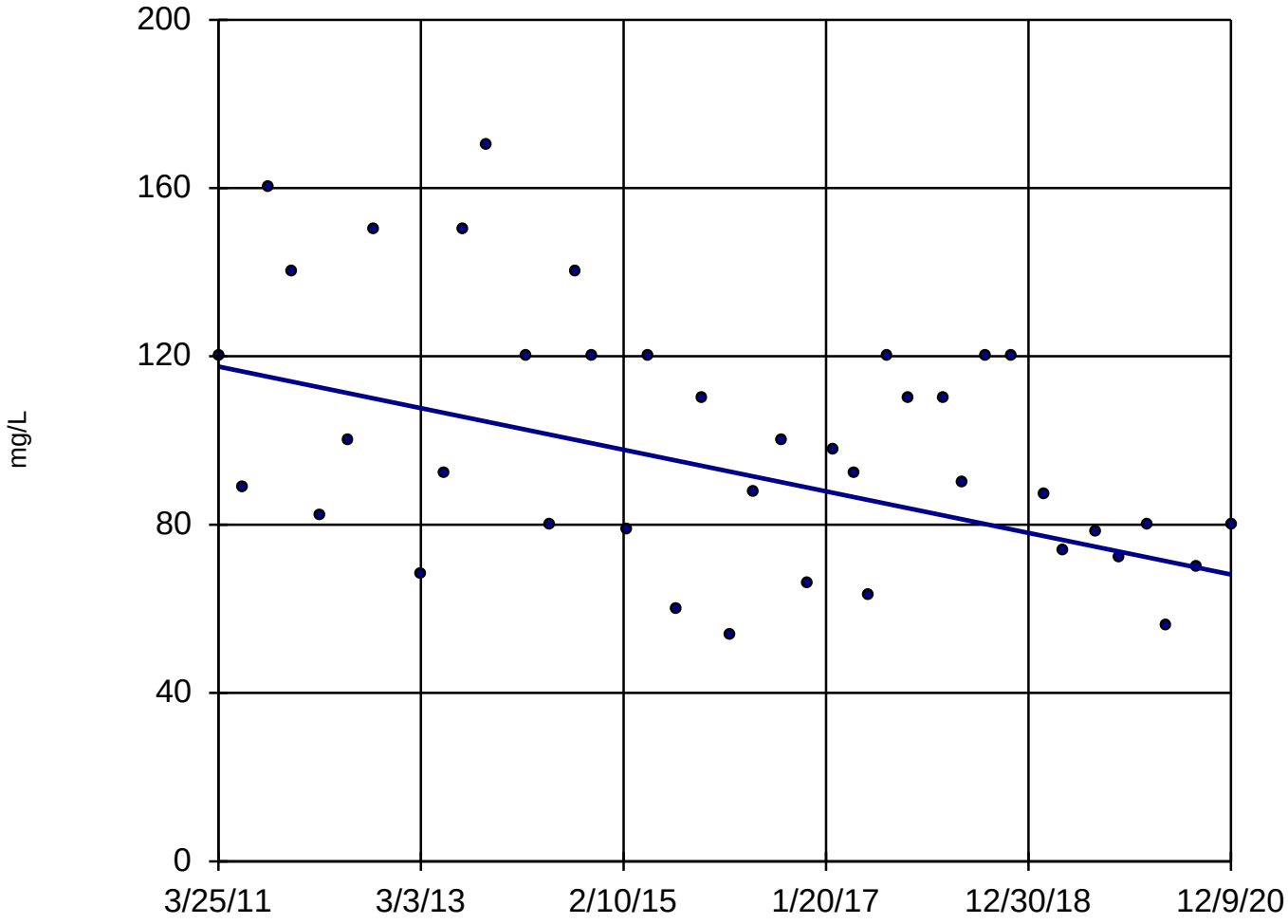
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-05



n = 40

Slope = -5.086 units per year.

Mann-Kendall statistic = -249
critical = -223

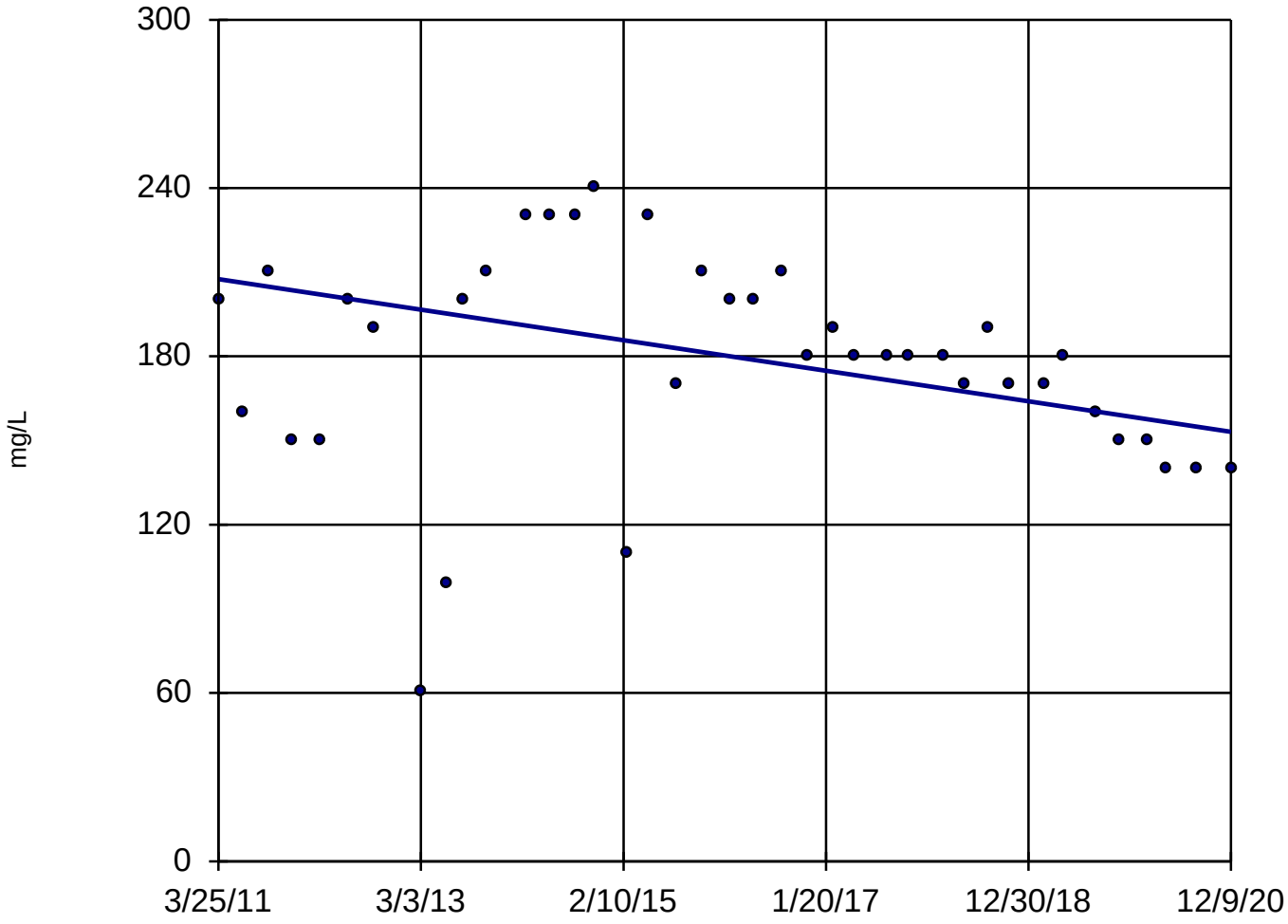
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-06



n = 39

Slope = -5.6 units per year.

Mann-Kendall statistic = -215
critical = -214

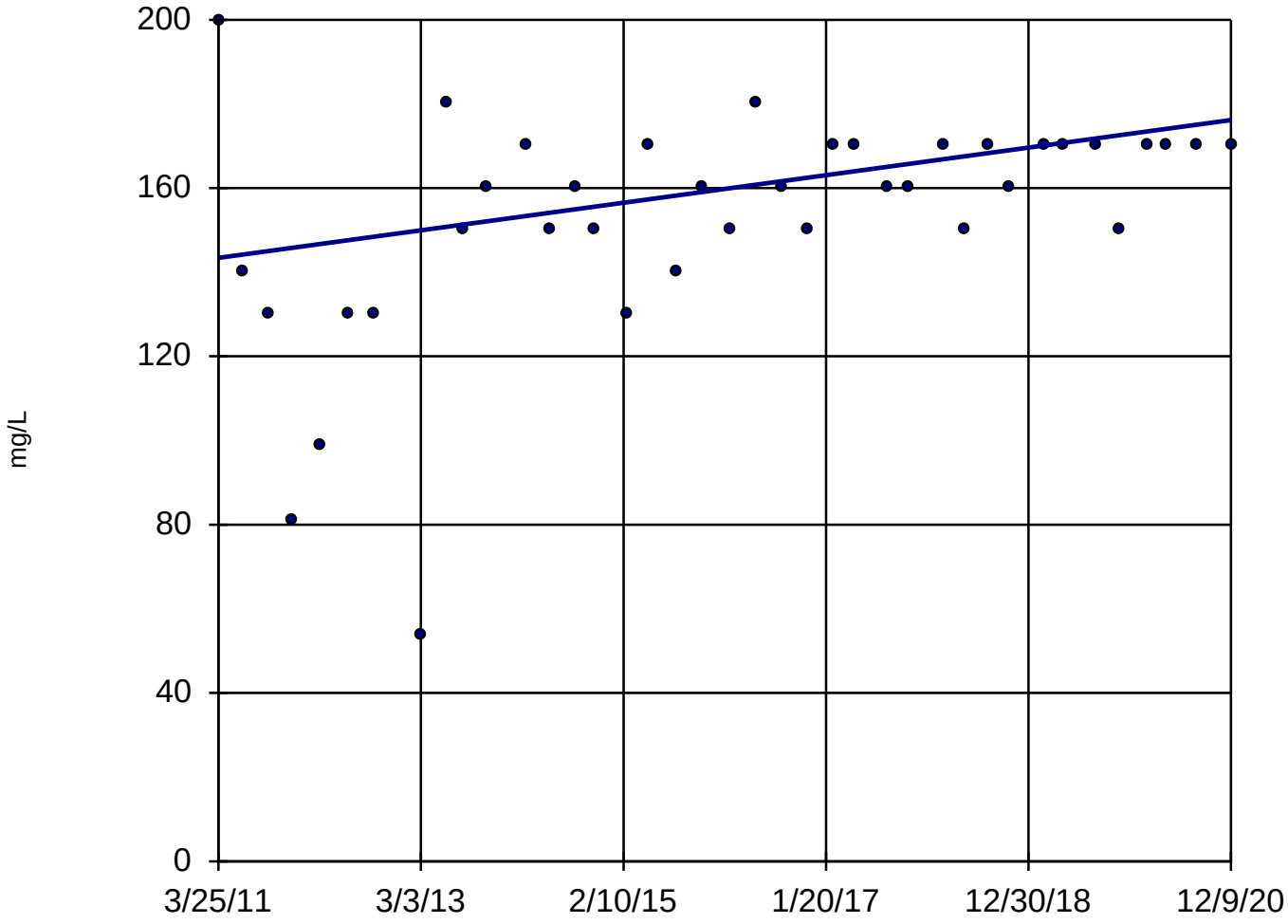
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-07



n = 39

Slope = 3.37 units per year.

Mann-Kendall statistic = 265
critical = 214

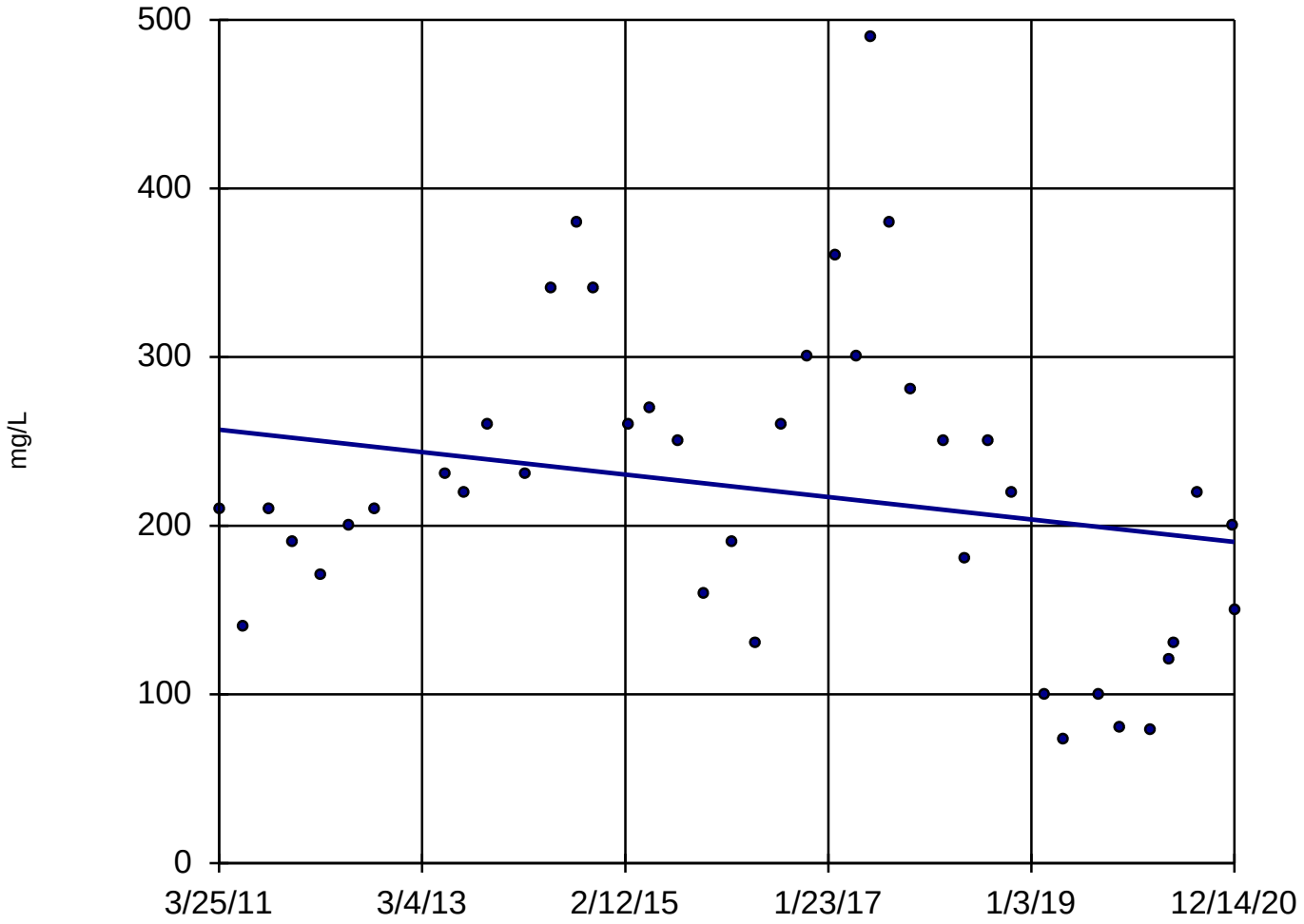
Increasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-08



n = 41

Slope = -6.84 units per year.

Mann-Kendall normal approx. = -1.249
critical = -2.58

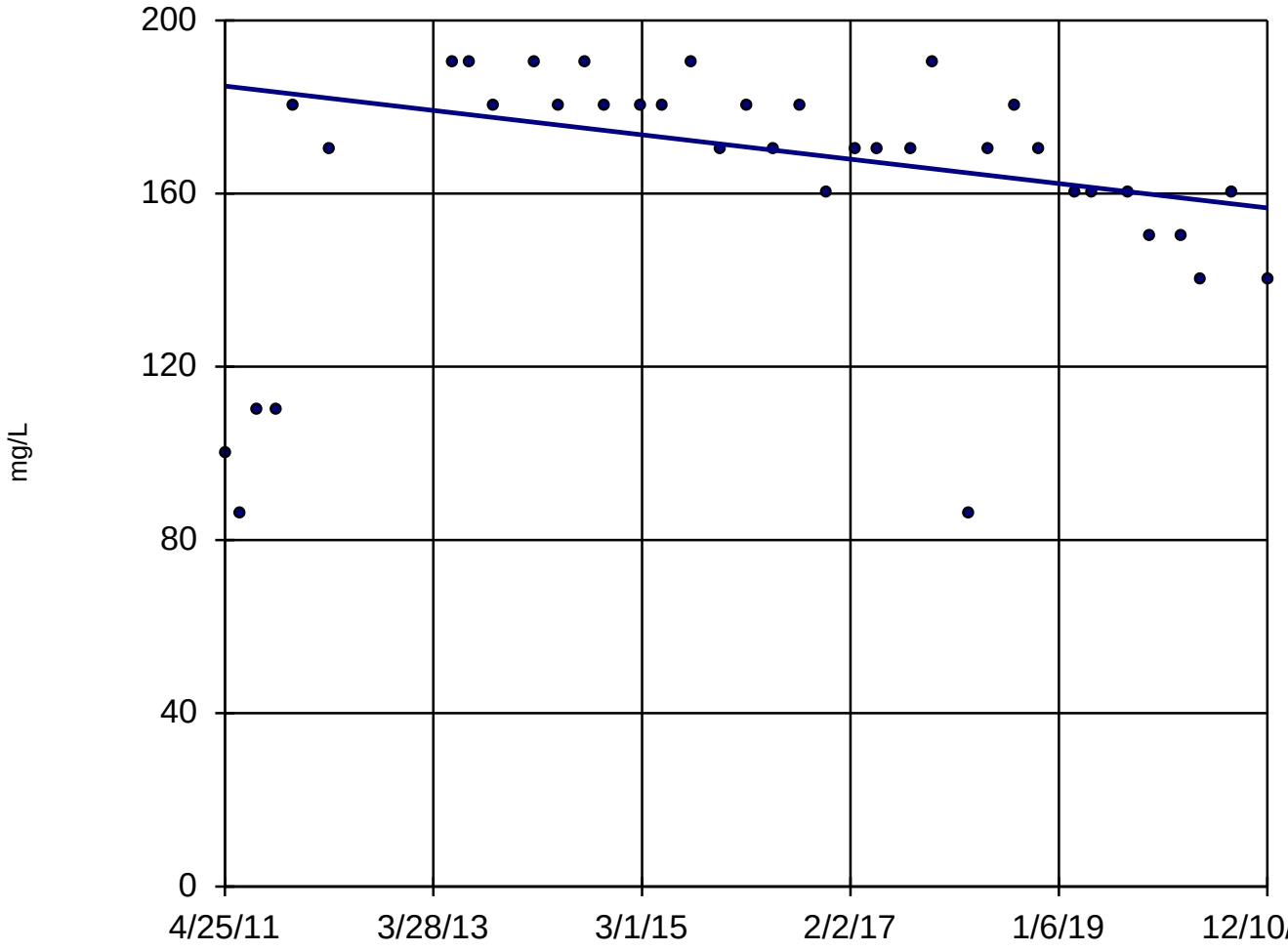
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-13



n = 37

Slope = -2.917 units per year.

Mann-Kendall statistic = -169
critical = -199

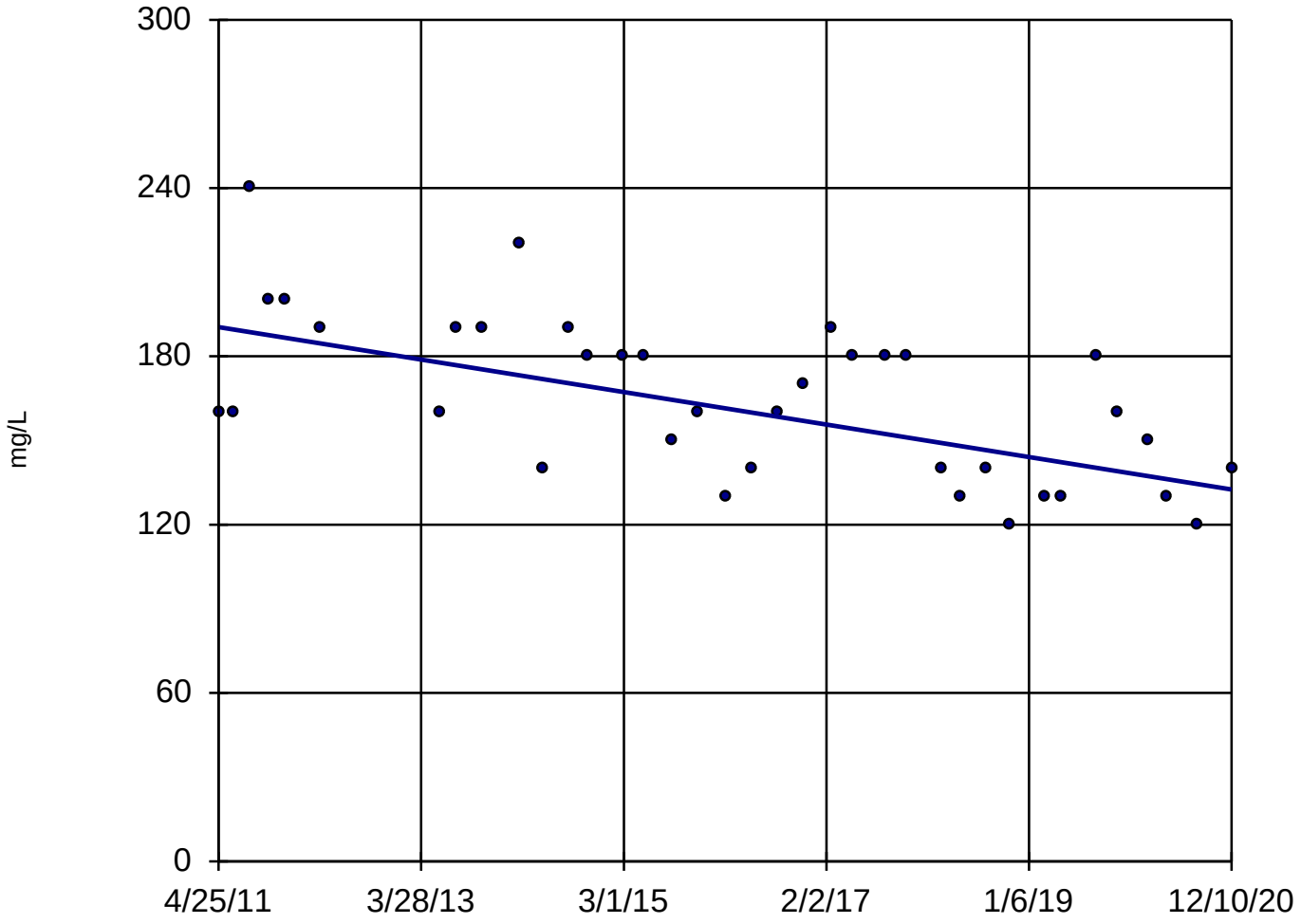
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-14



n = 37

Slope = -6.008 units per year.

Mann-Kendall statistic = -305
critical = -199

Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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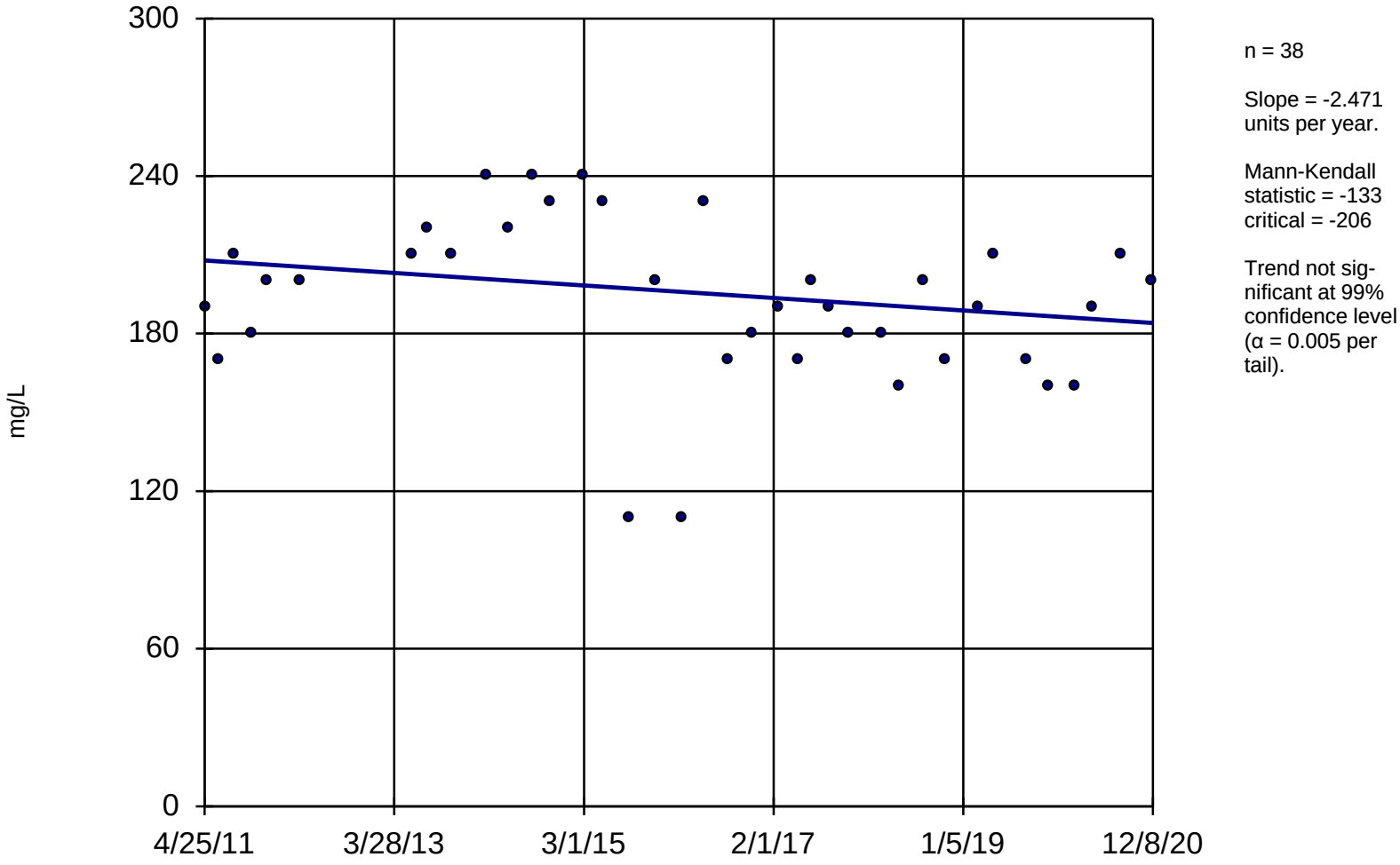
Sen's Slope Estimator

MW-15



n = 38

Slope = -2.471 units per year.

Mann-Kendall statistic = -133
critical = -206

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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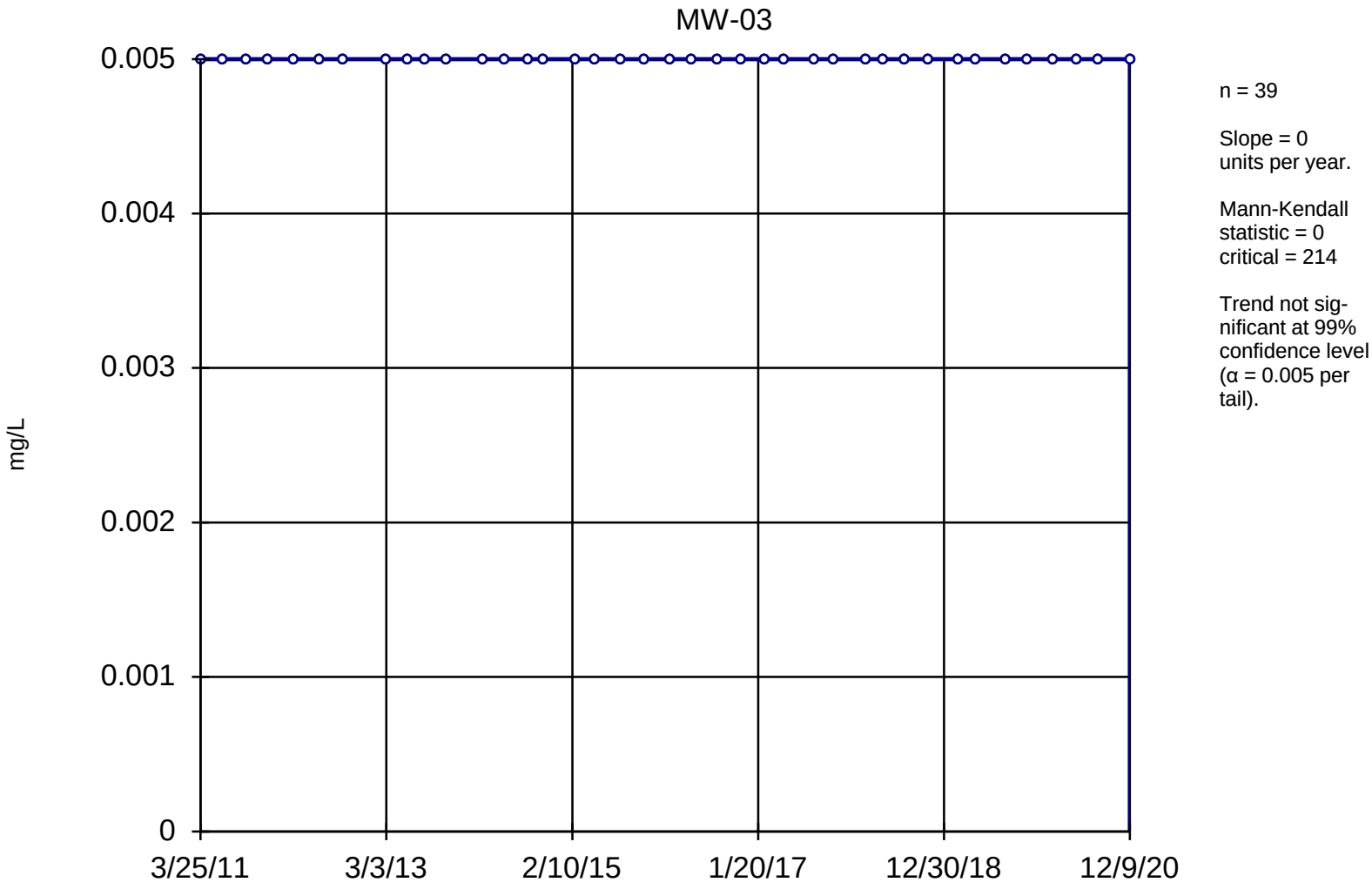
Hollow symbols indicate censored values.

Sen's Slope Estimator

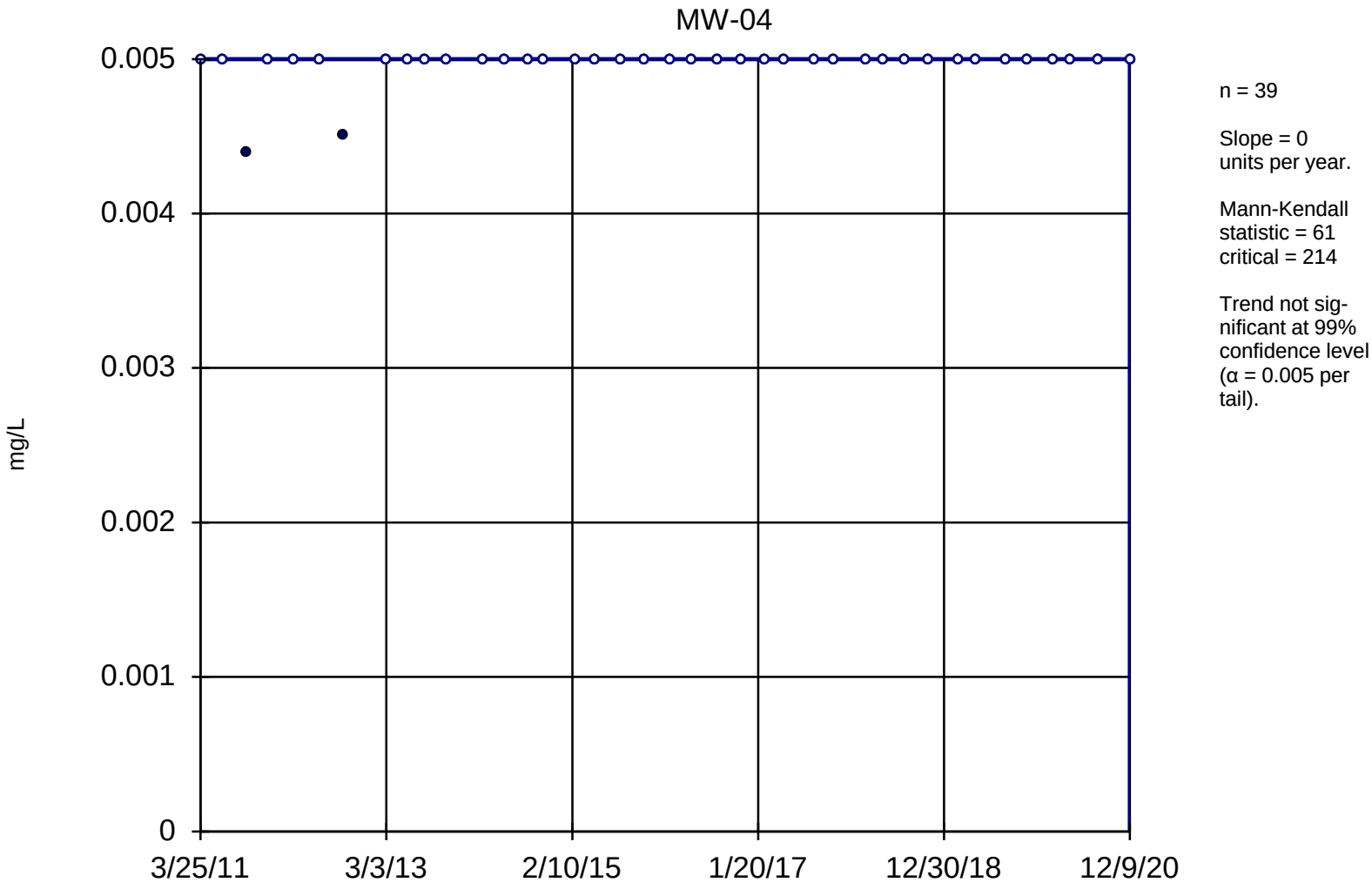


Constituent: Chromium, Dissolved Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator



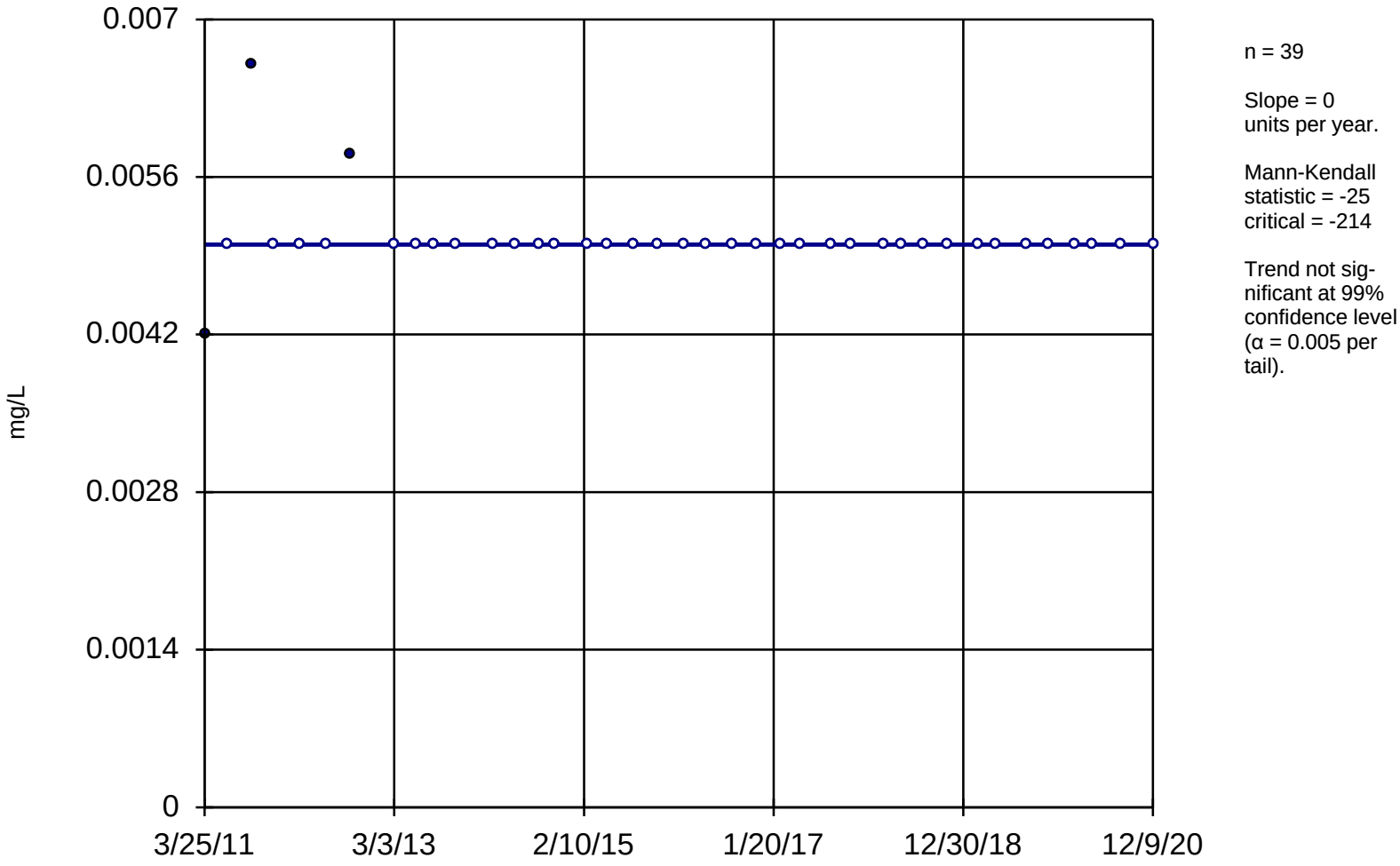
Constituent: Chromium, Dissolved Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-05



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = -25
critical = -214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

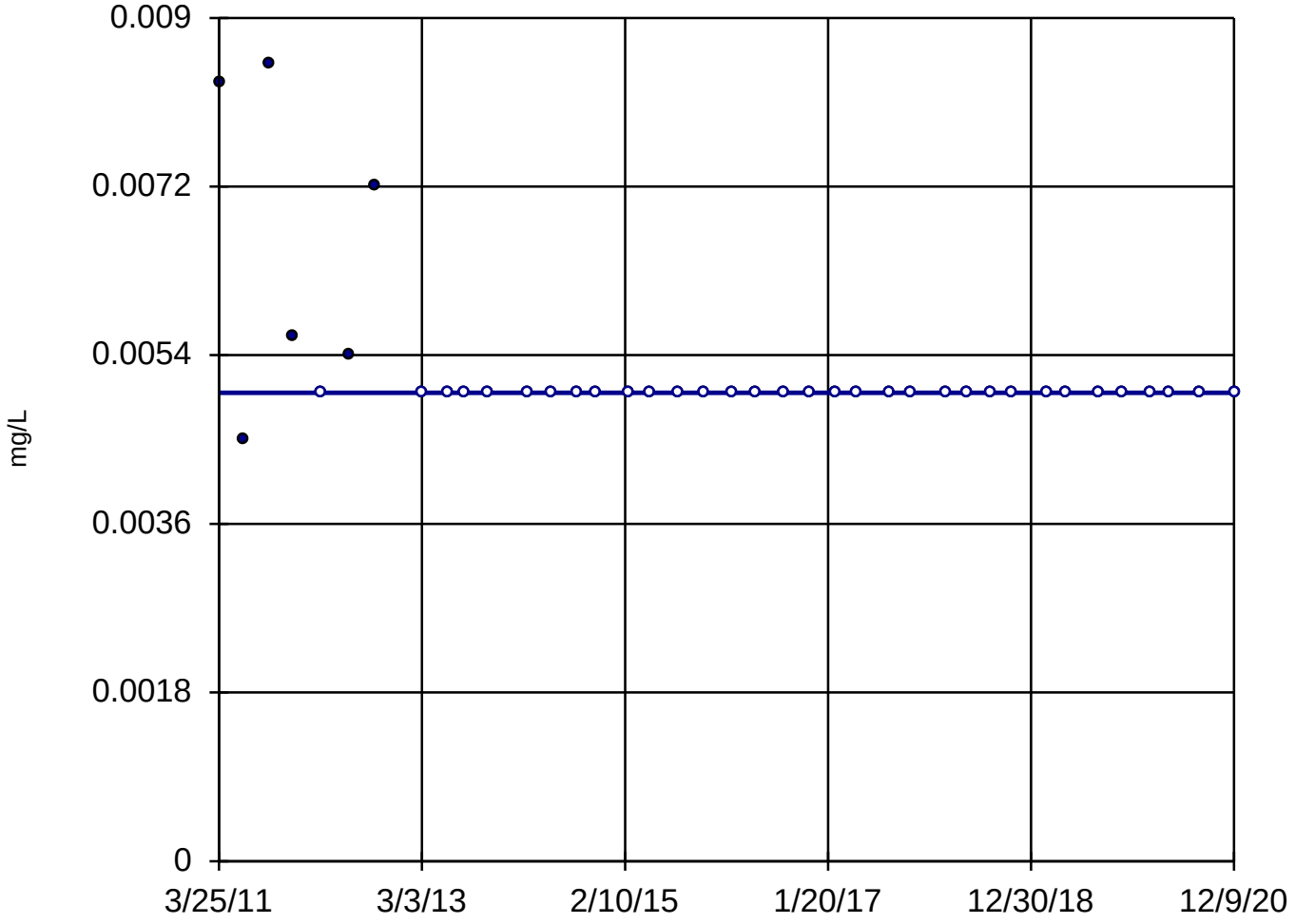
Constituent: Chromium, Dissolved Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-06



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = -129
critical = -214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

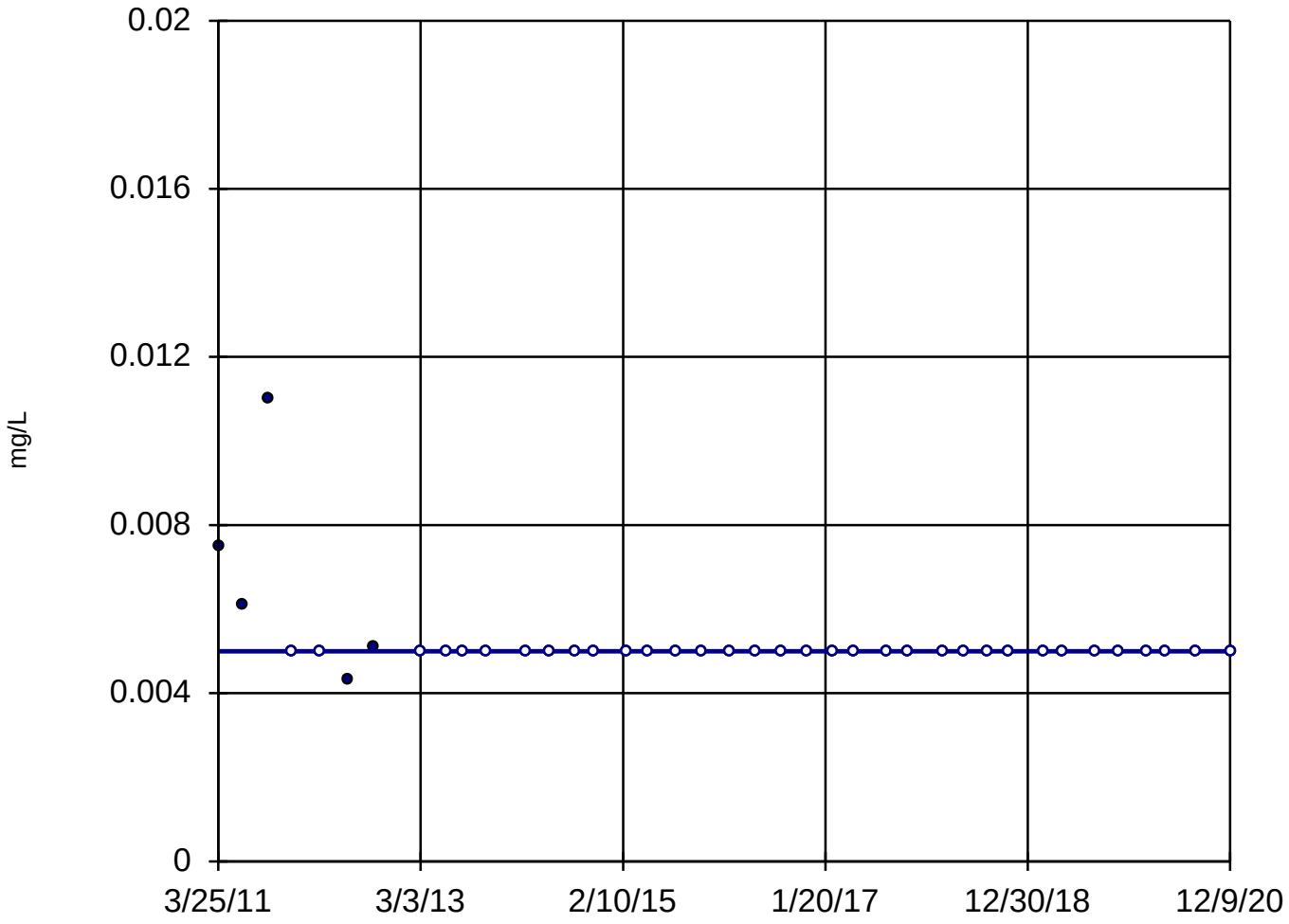
Constituent: Chromium, Dissolved Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-07



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = -106
critical = -214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

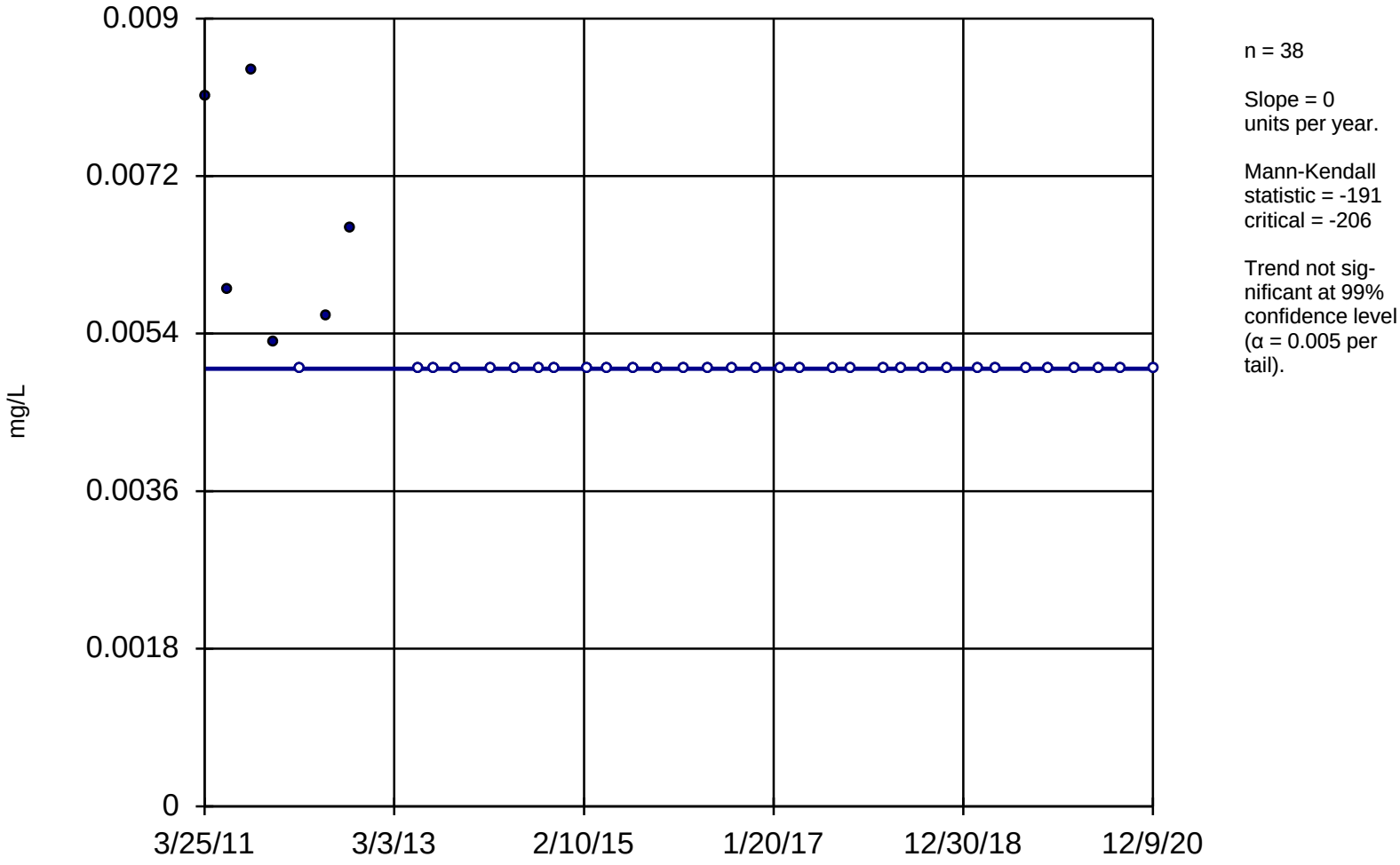
Constituent: Chromium, Dissolved Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 38

Slope = 0
units per year.

Mann-Kendall
statistic = -191
critical = -206

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

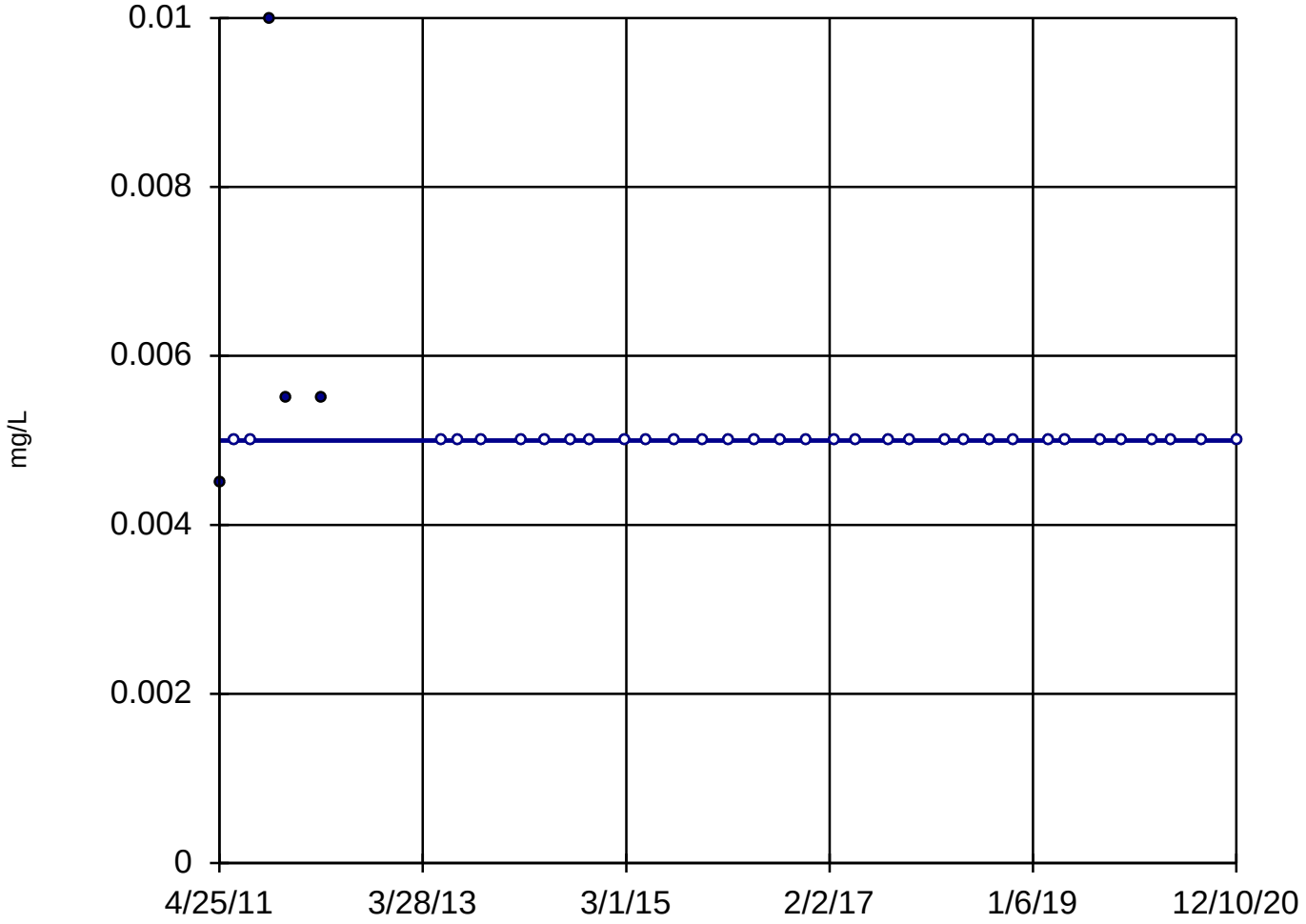
Constituent: Chromium, Dissolved Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-13



n = 37

Slope = 0
units per year.

Mann-Kendall
statistic = -53
critical = -199

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

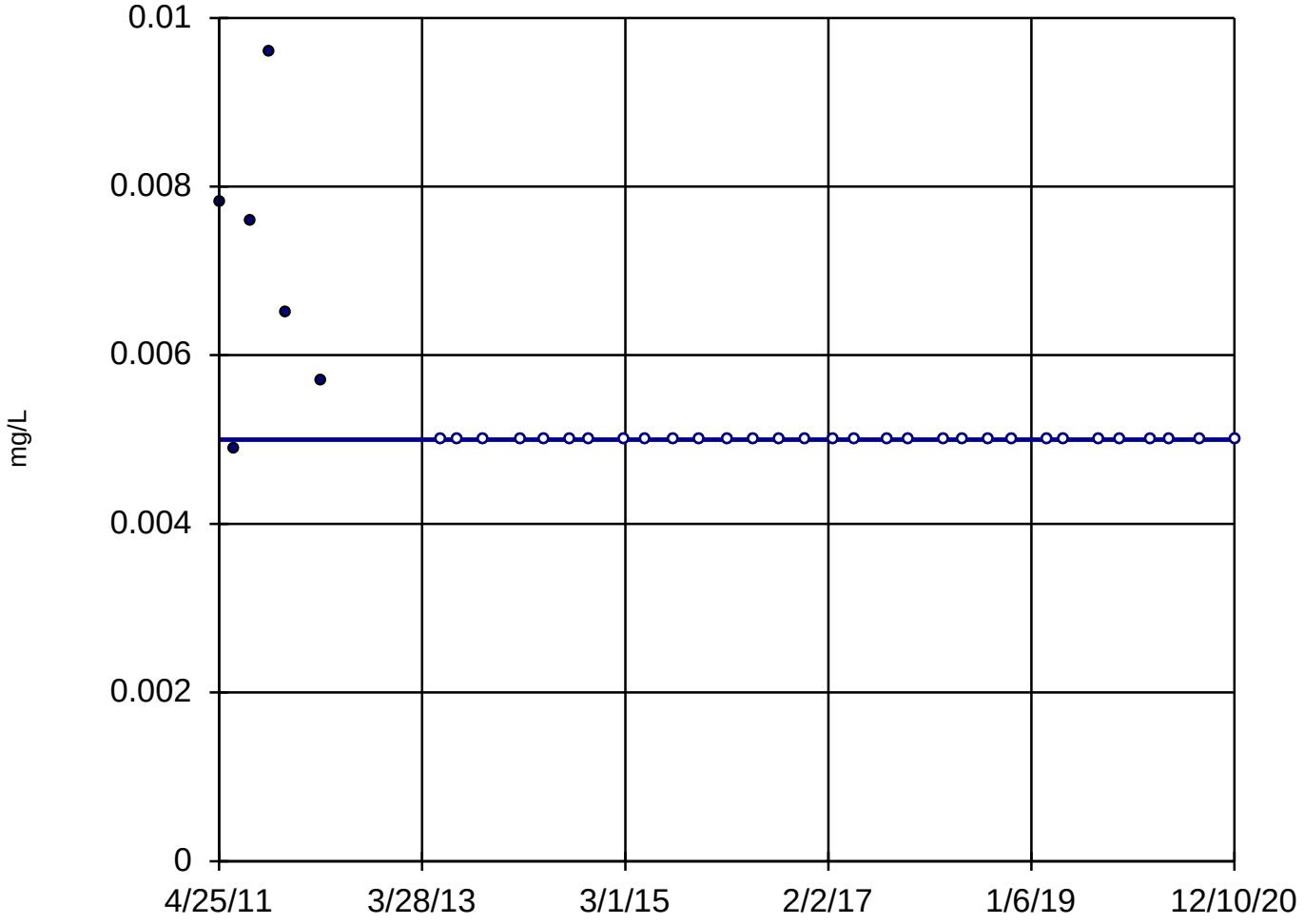
Constituent: Chromium, Dissolved Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-14



n = 37

Slope = 0
units per year.

Mann-Kendall
statistic = -127
critical = -199

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

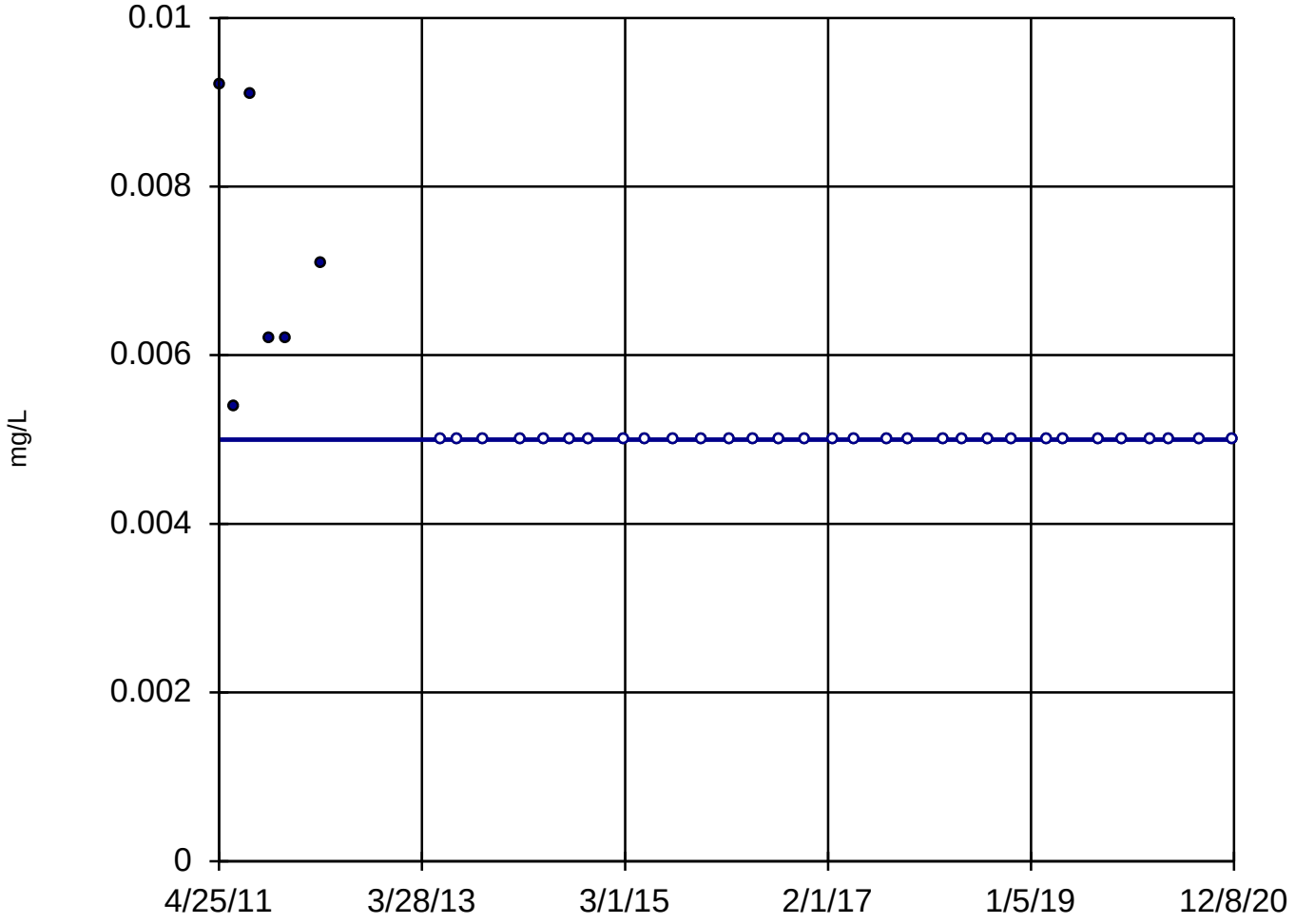
Constituent: Chromium, Dissolved Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-15



n = 37

Slope = 0
units per year.

Mann-Kendall
statistic = -188
critical = -199

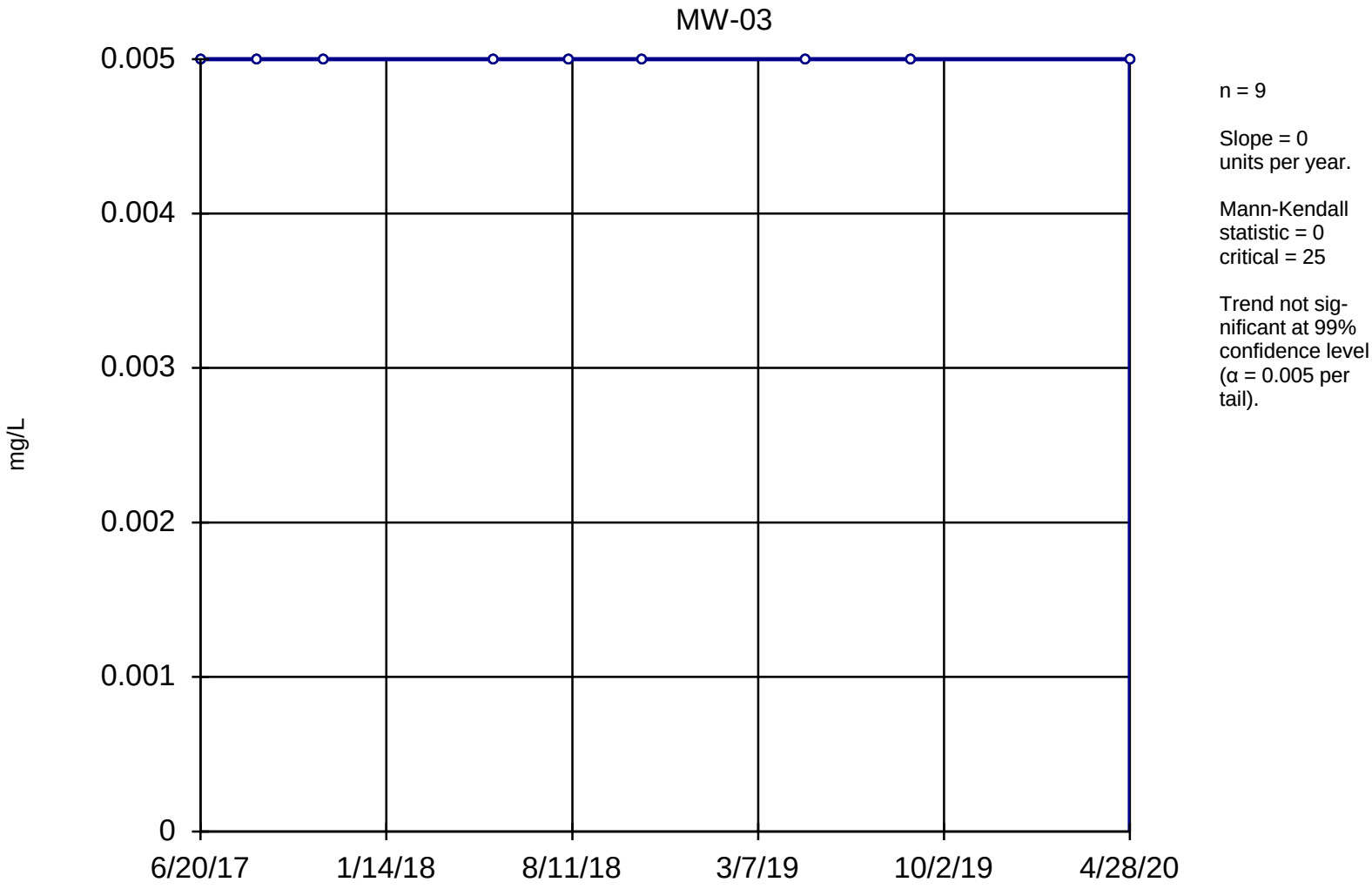
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Chromium, Dissolved Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

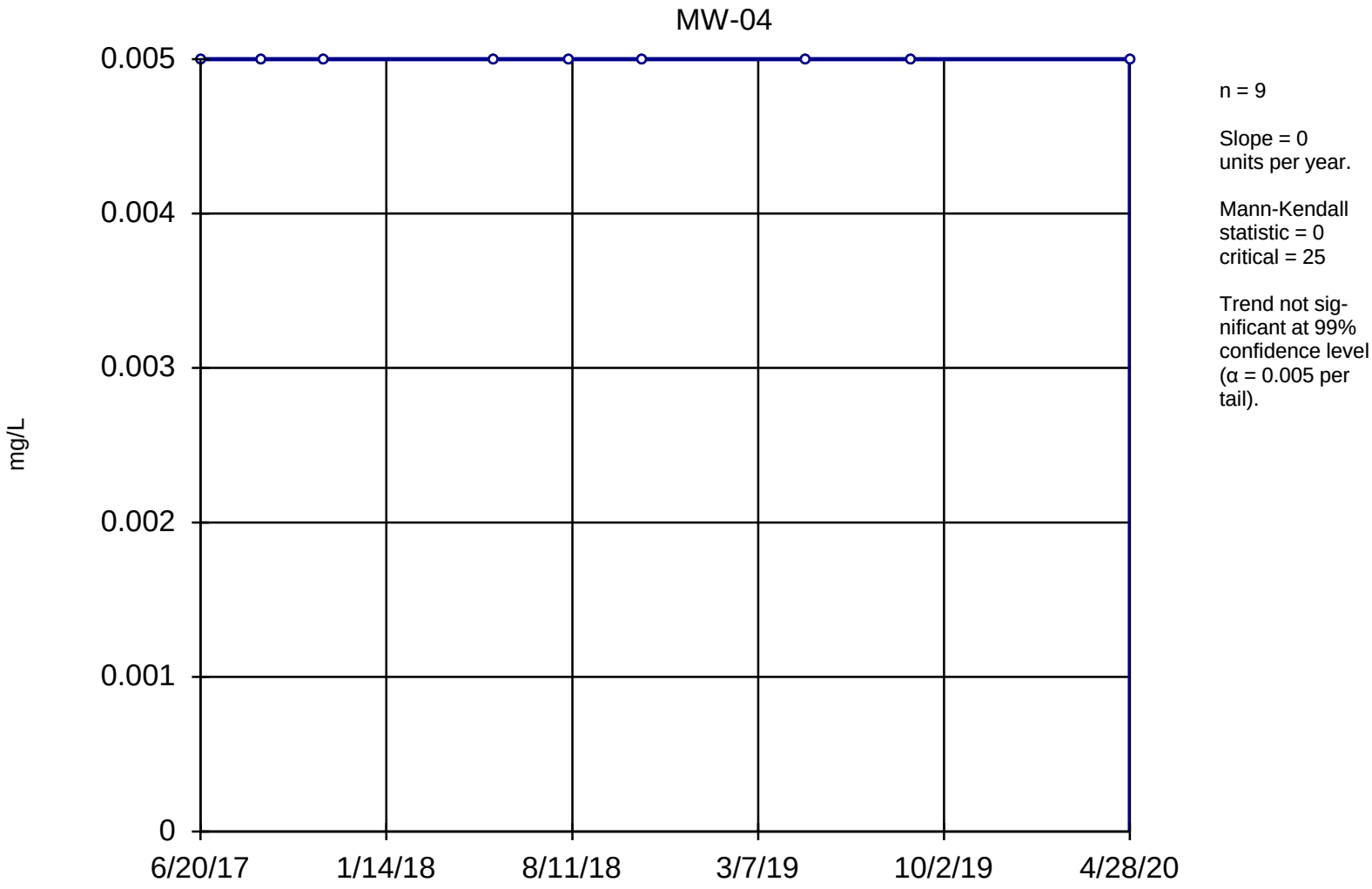


Constituent: Chromium, Total Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

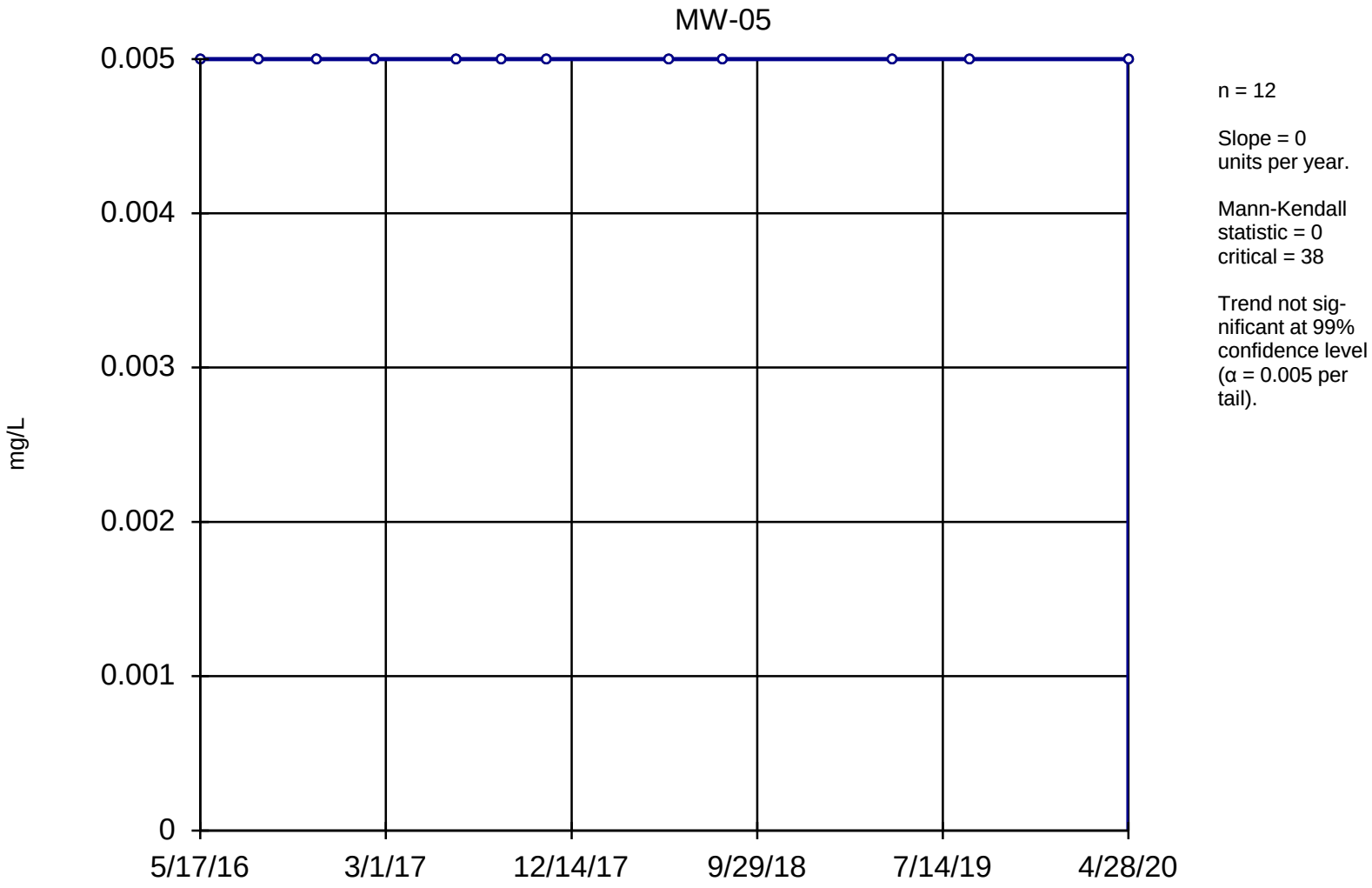


Constituent: Chromium, Total Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator



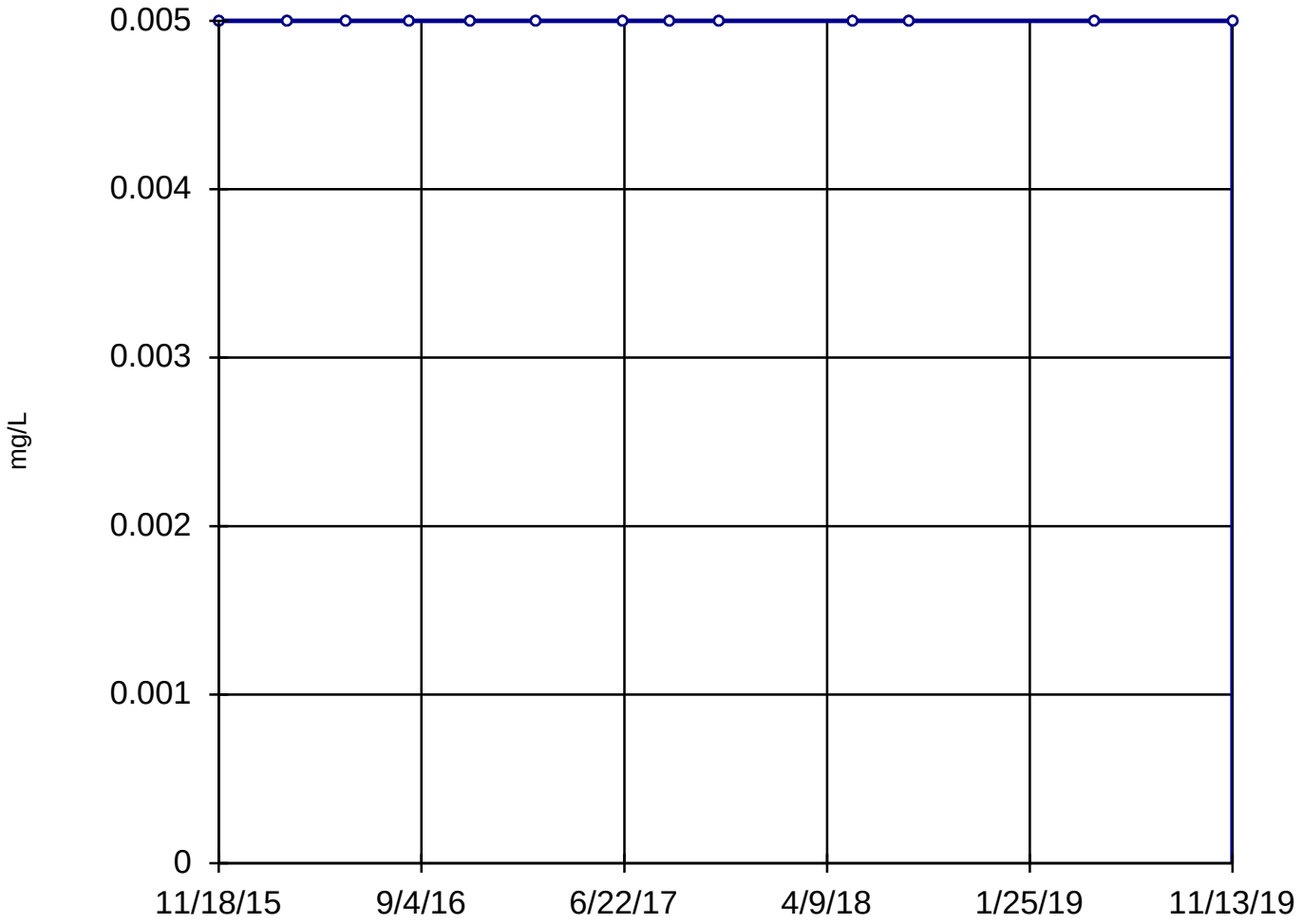
Constituent: Chromium, Total Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 13

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 43

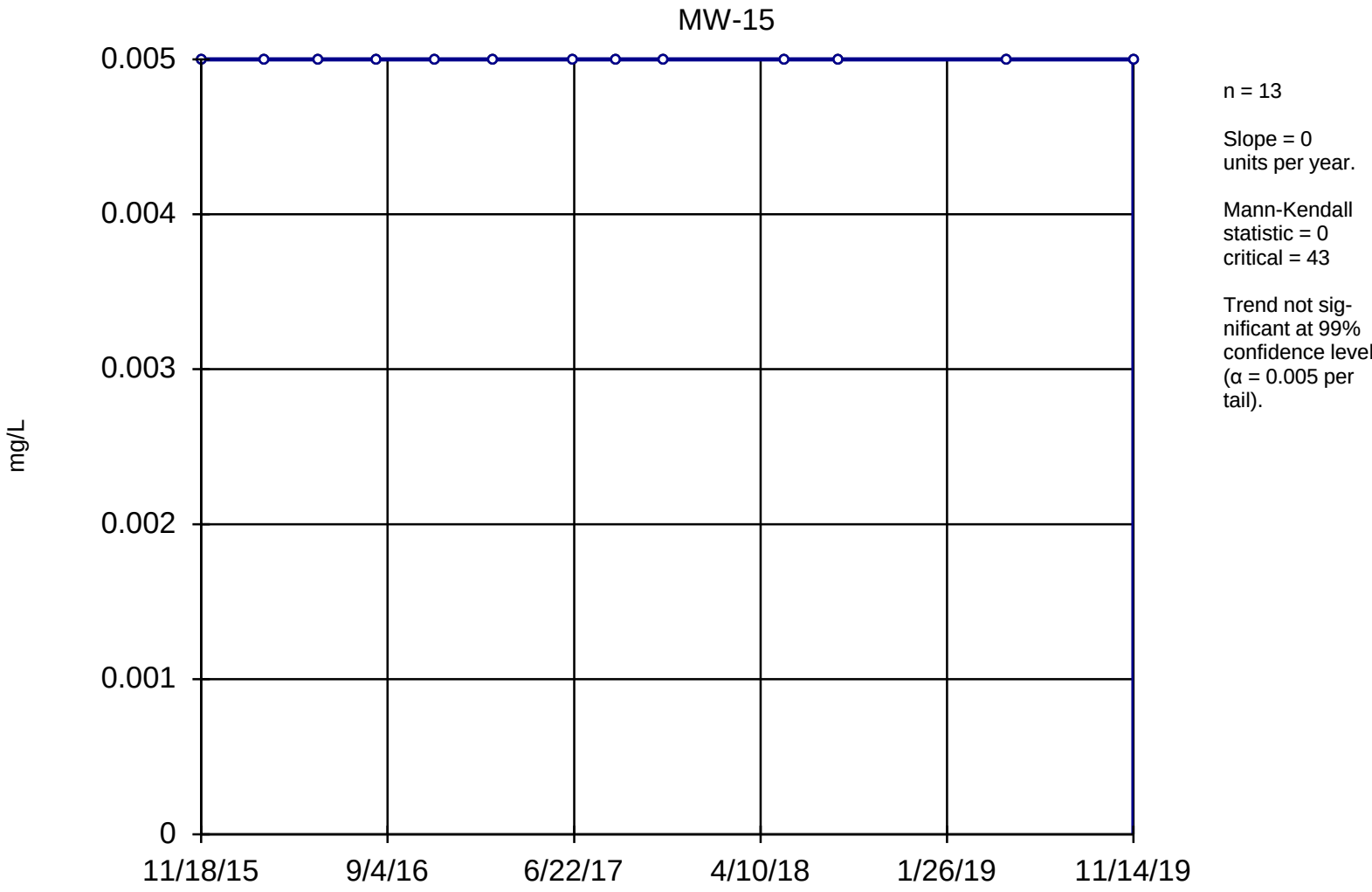
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Chromium, Total Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator



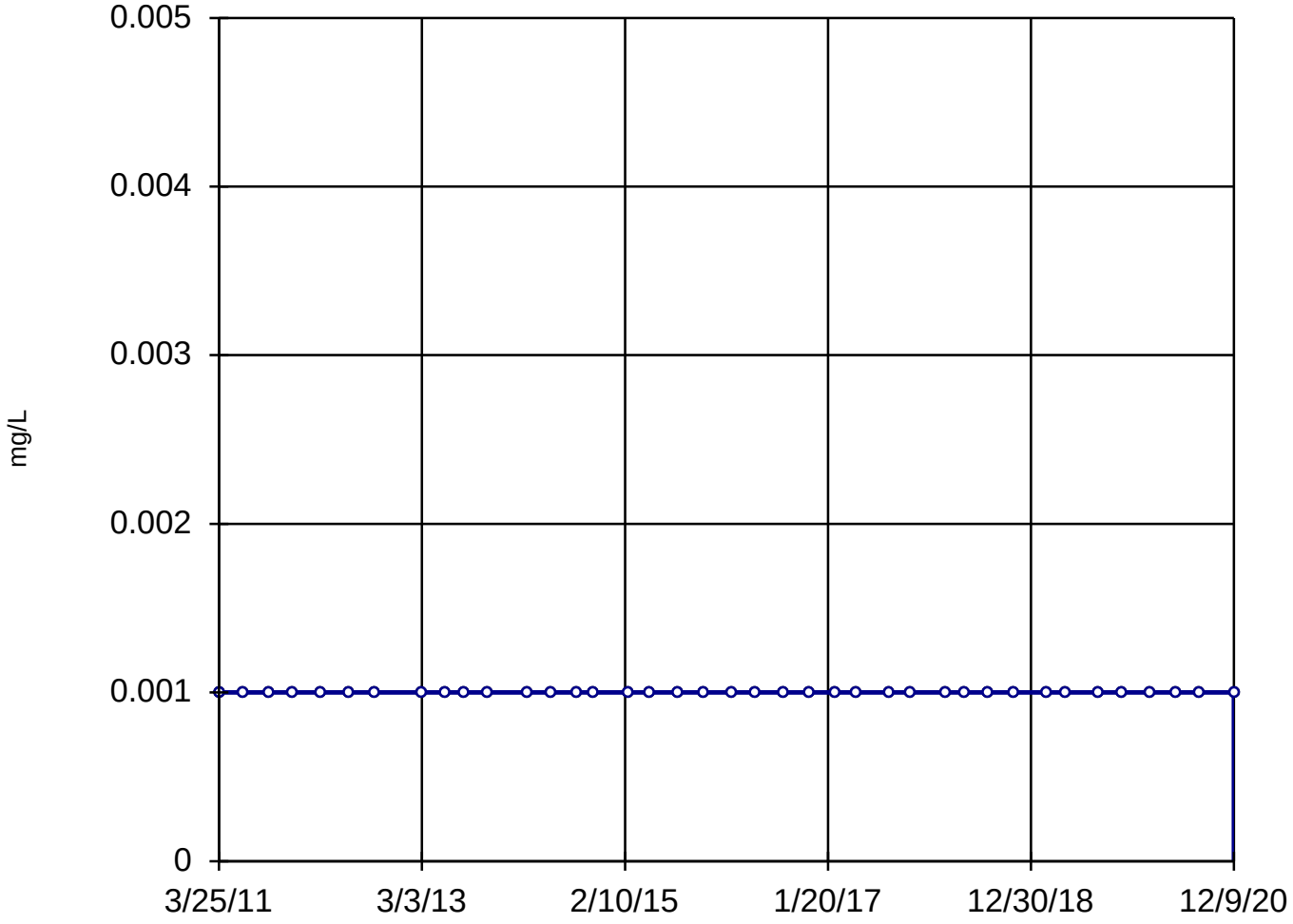
Constituent: Chromium, Total Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

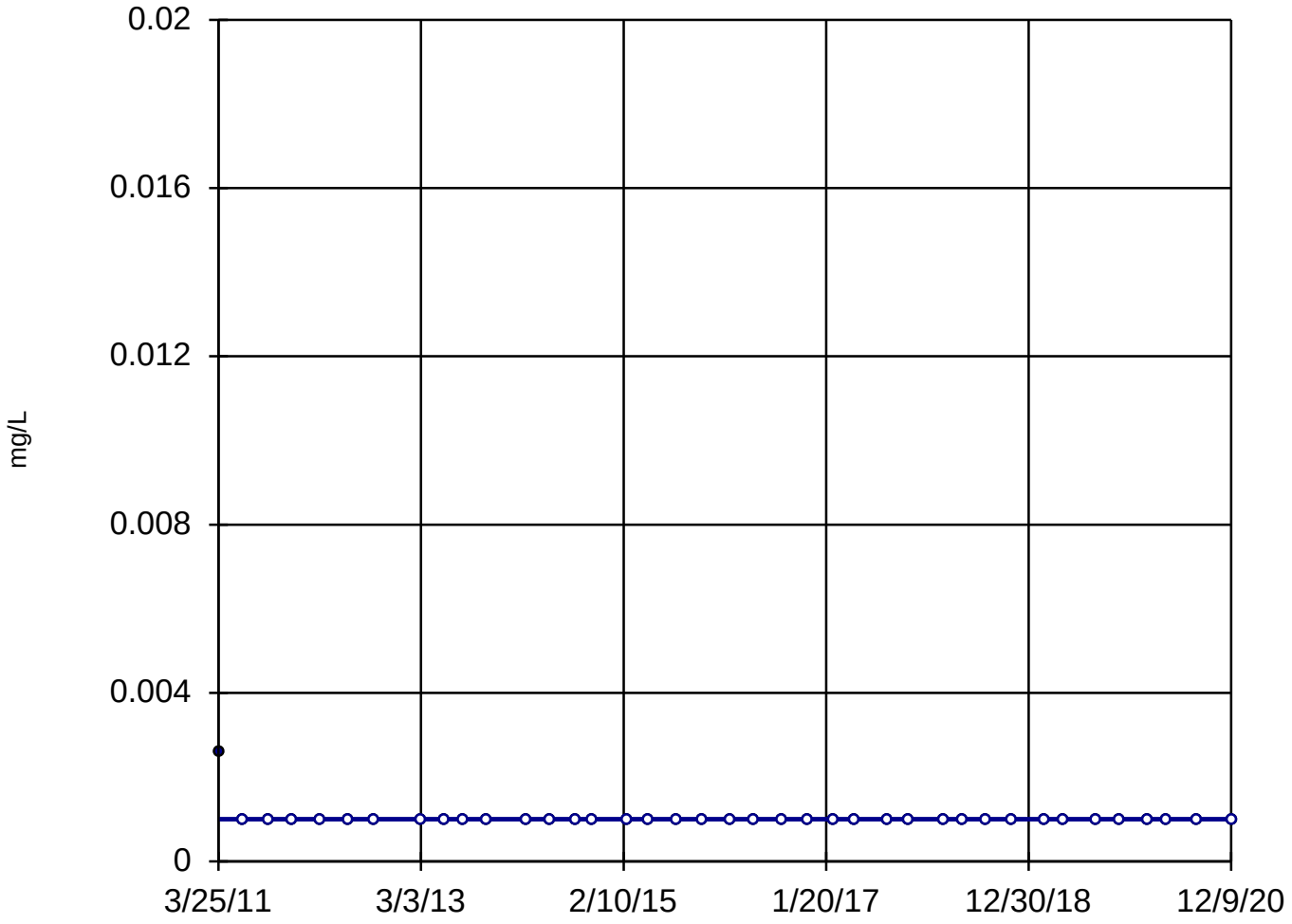
Constituent: Cobalt, Dissolved Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = -38
critical = -214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

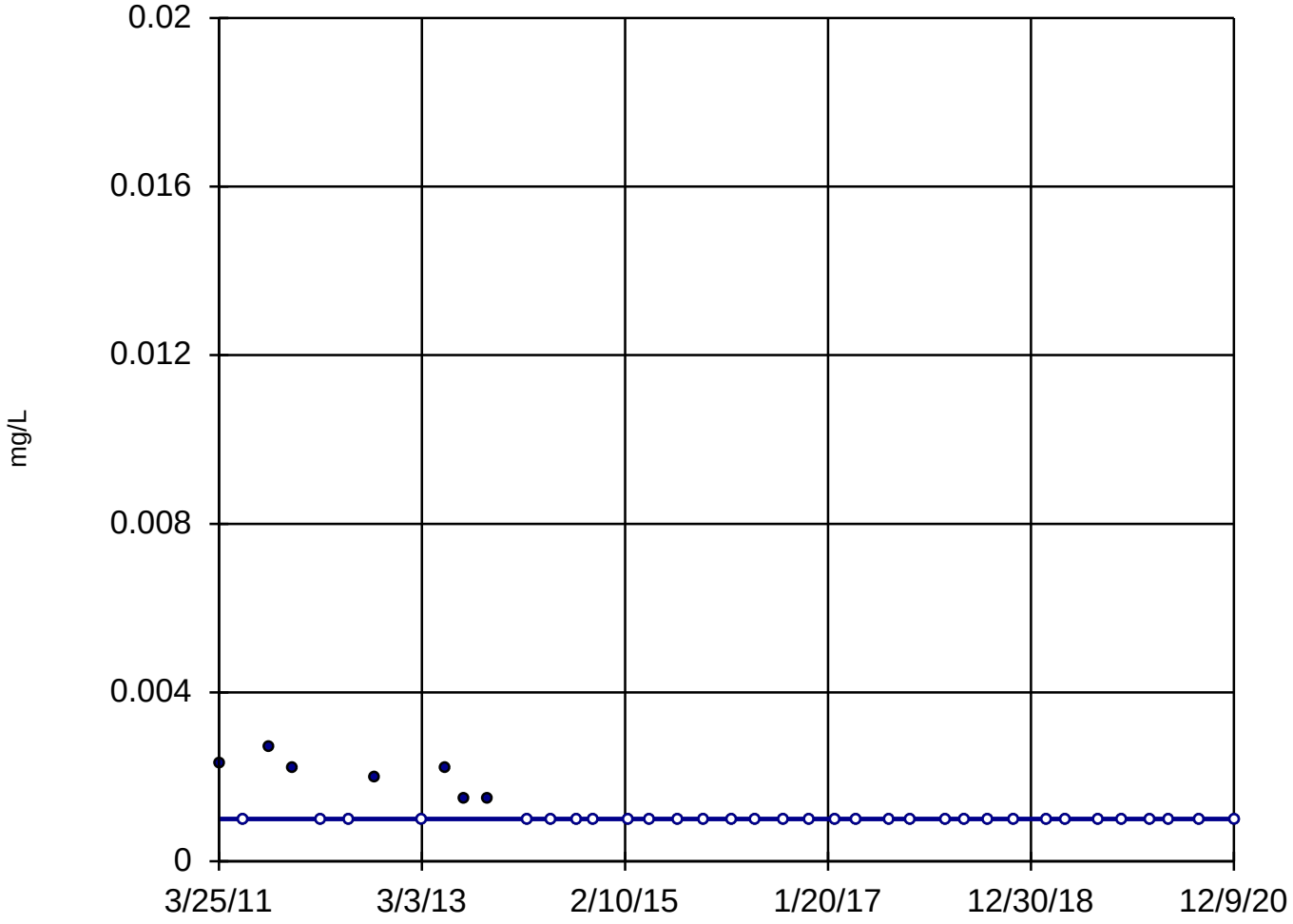
Constituent: Cobalt, Dissolved Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-05



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = -205
critical = -214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

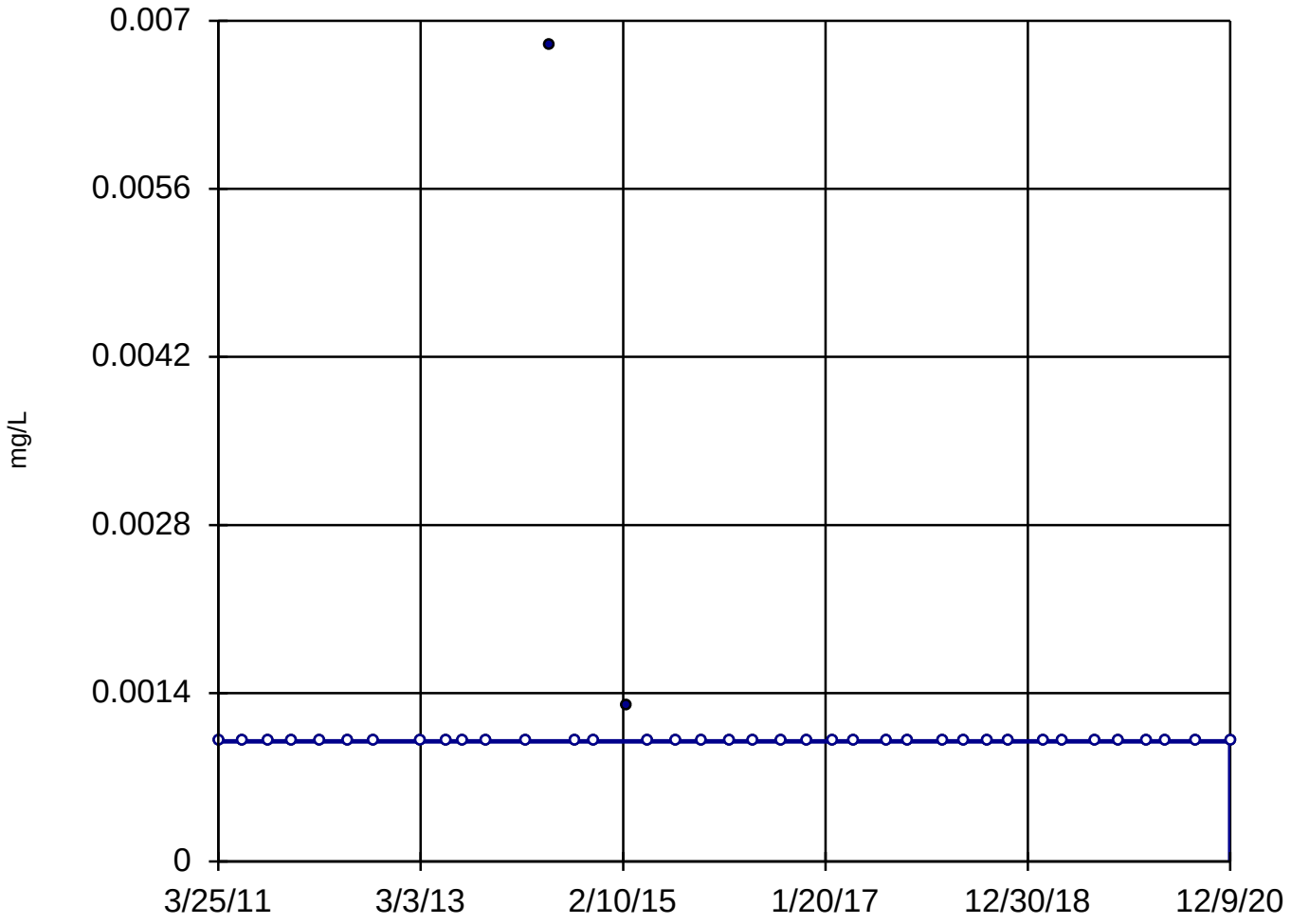
Constituent: Cobalt, Dissolved Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-06



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = -23
critical = -214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

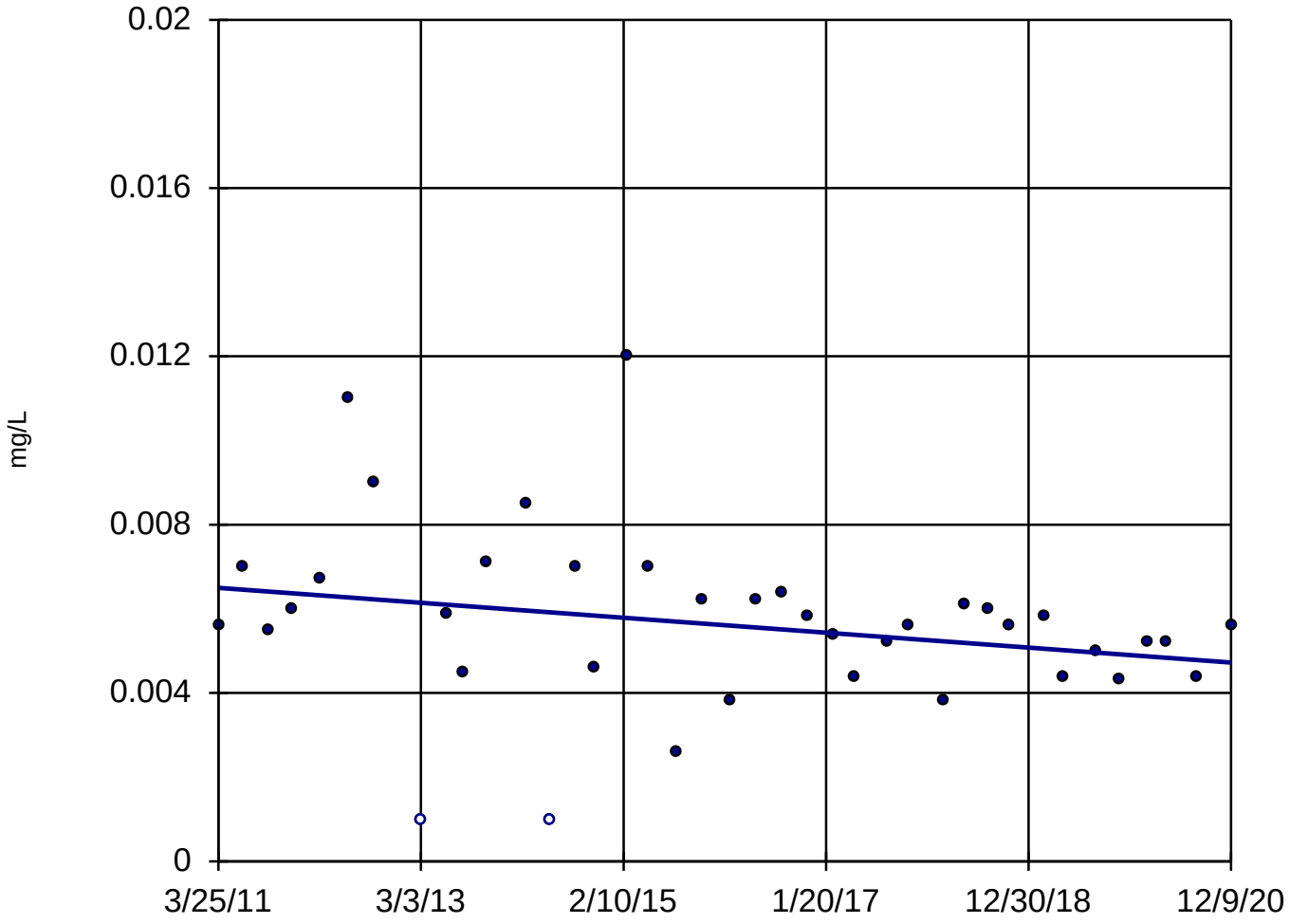
Constituent: Cobalt, Dissolved Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-07



n = 39

Slope = -0.0001831 units per year.

Mann-Kendall statistic = -189
critical = -214

Trend not significant at 99% confidence level (α = 0.005 per tail).

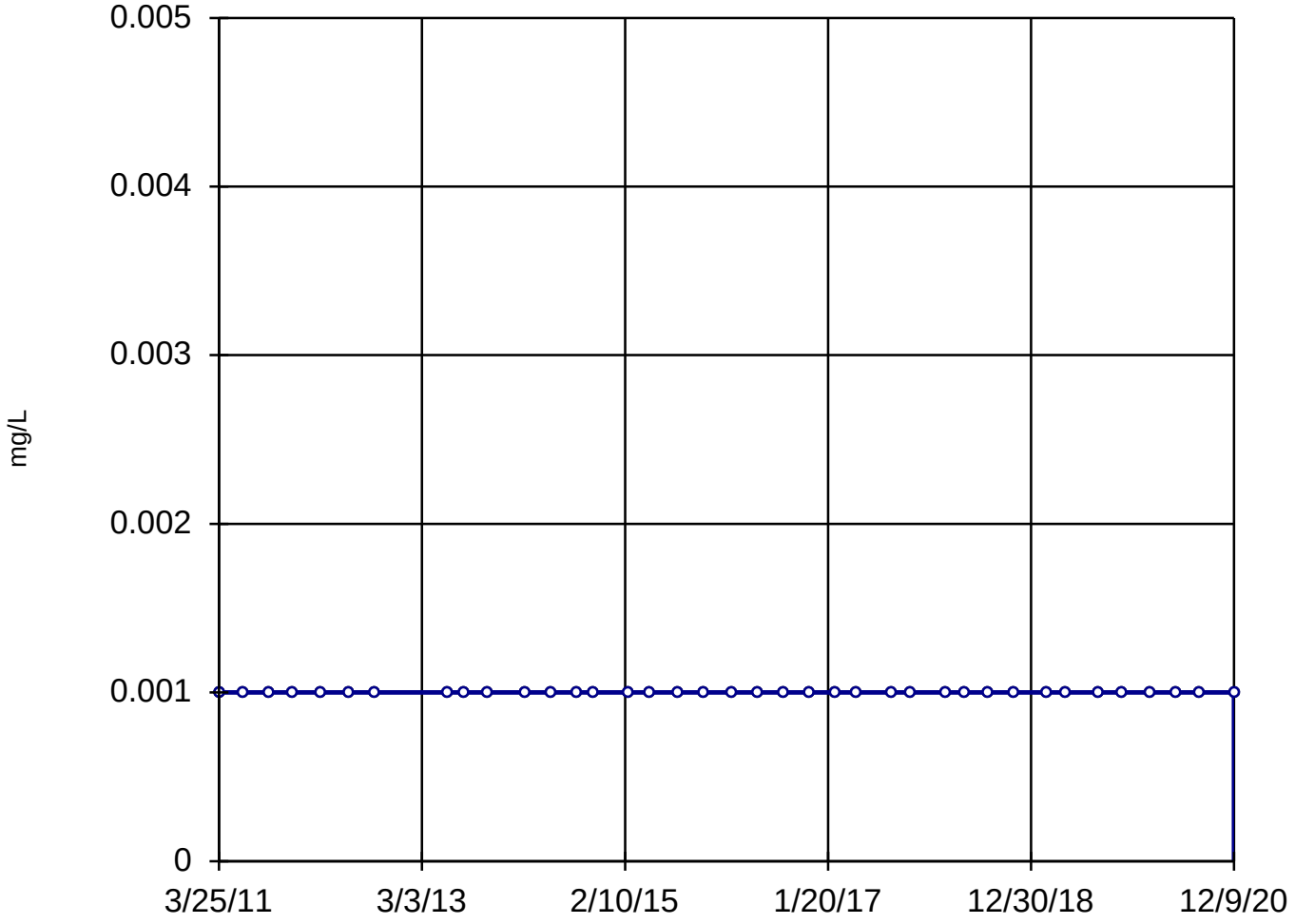
Constituent: Cobalt, Dissolved Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 38

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 206

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

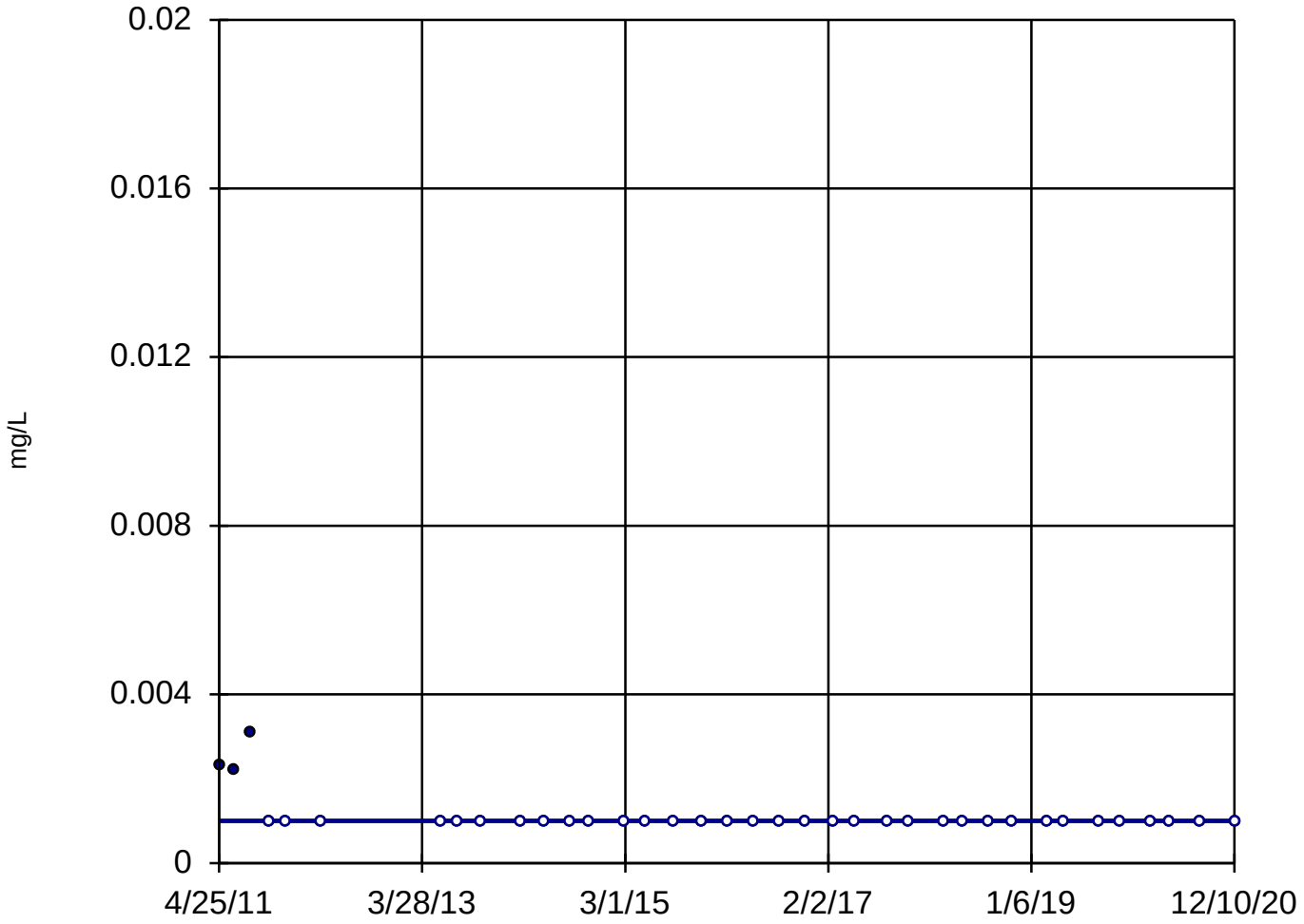
Constituent: Cobalt, Dissolved Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-13



n = 37

Slope = 0
units per year.

Mann-Kendall
statistic = -101
critical = -199

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

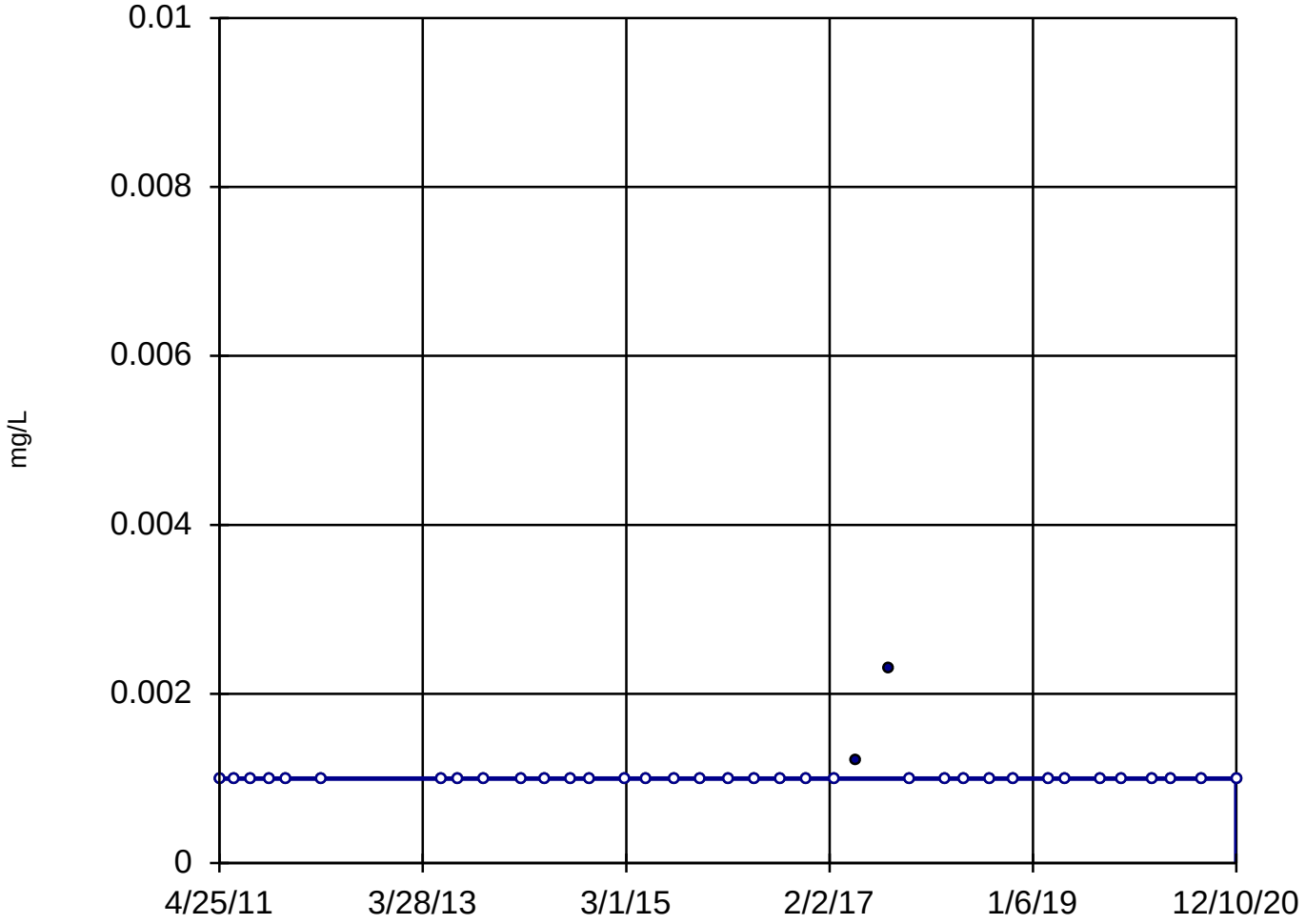
Constituent: Cobalt, Dissolved Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-14



n = 37

Slope = 0
units per year.

Mann-Kendall
statistic = 19
critical = 199

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

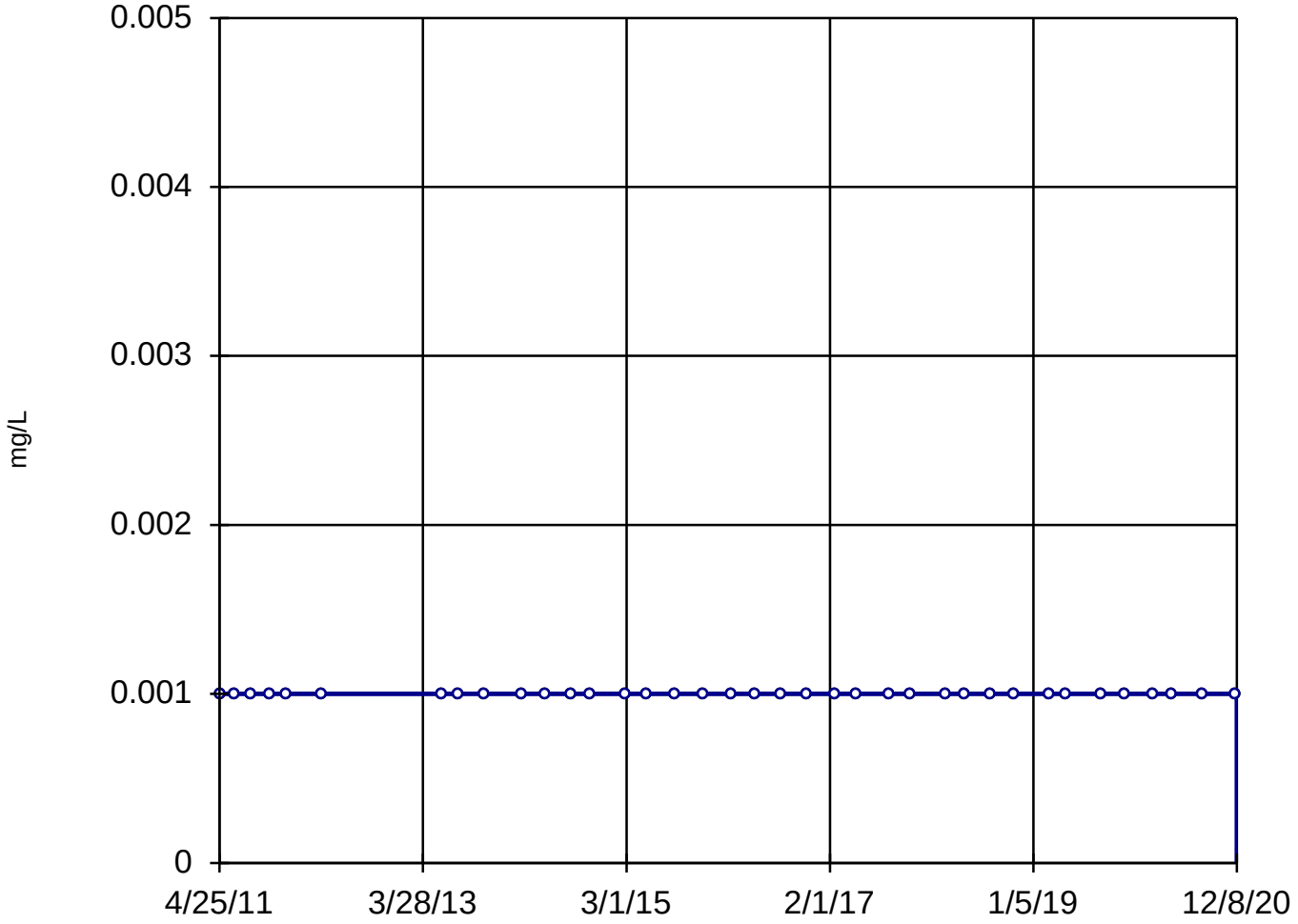
Constituent: Cobalt, Dissolved Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-15



n = 37

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 199

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

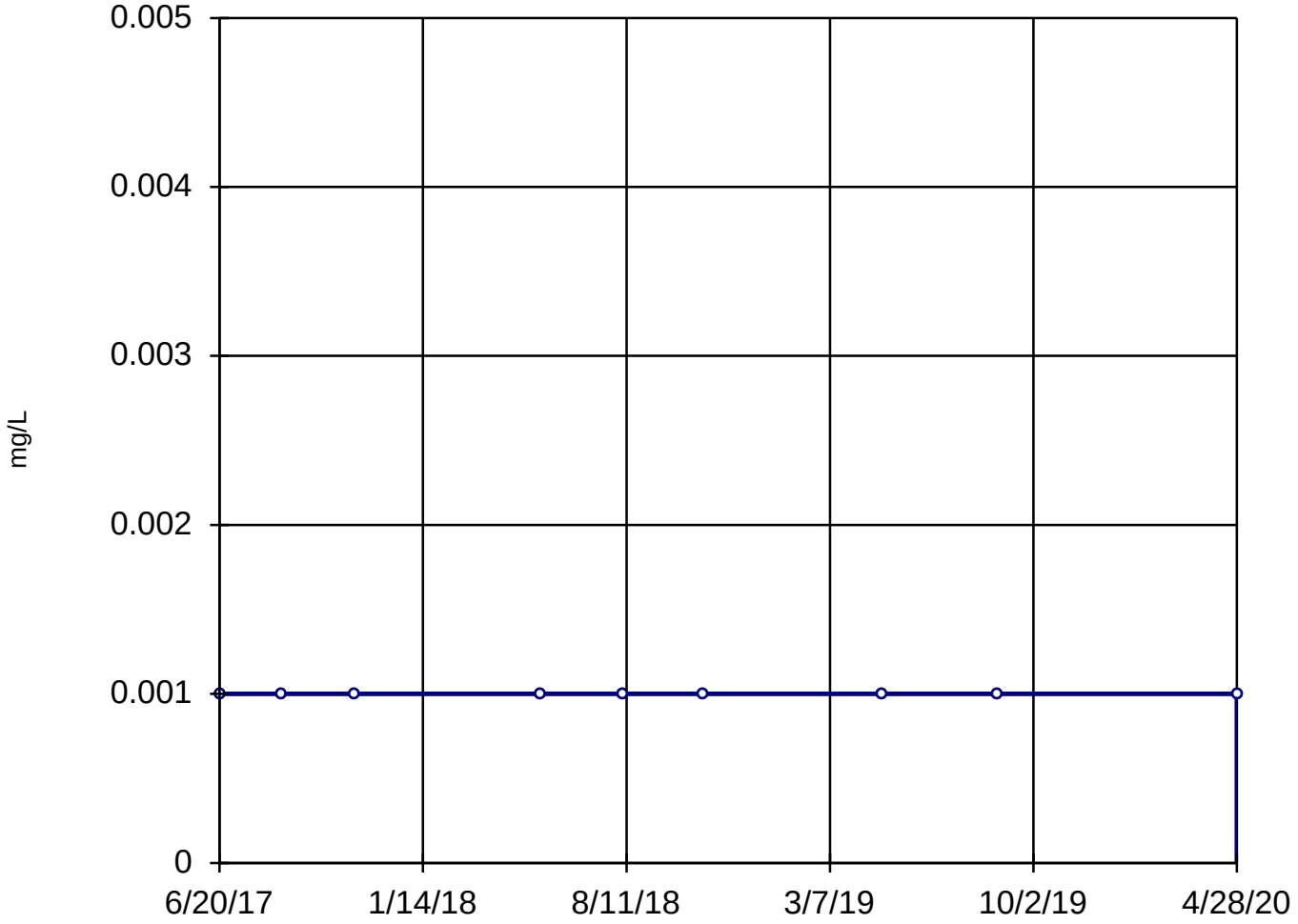
Constituent: Cobalt, Dissolved Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 25

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

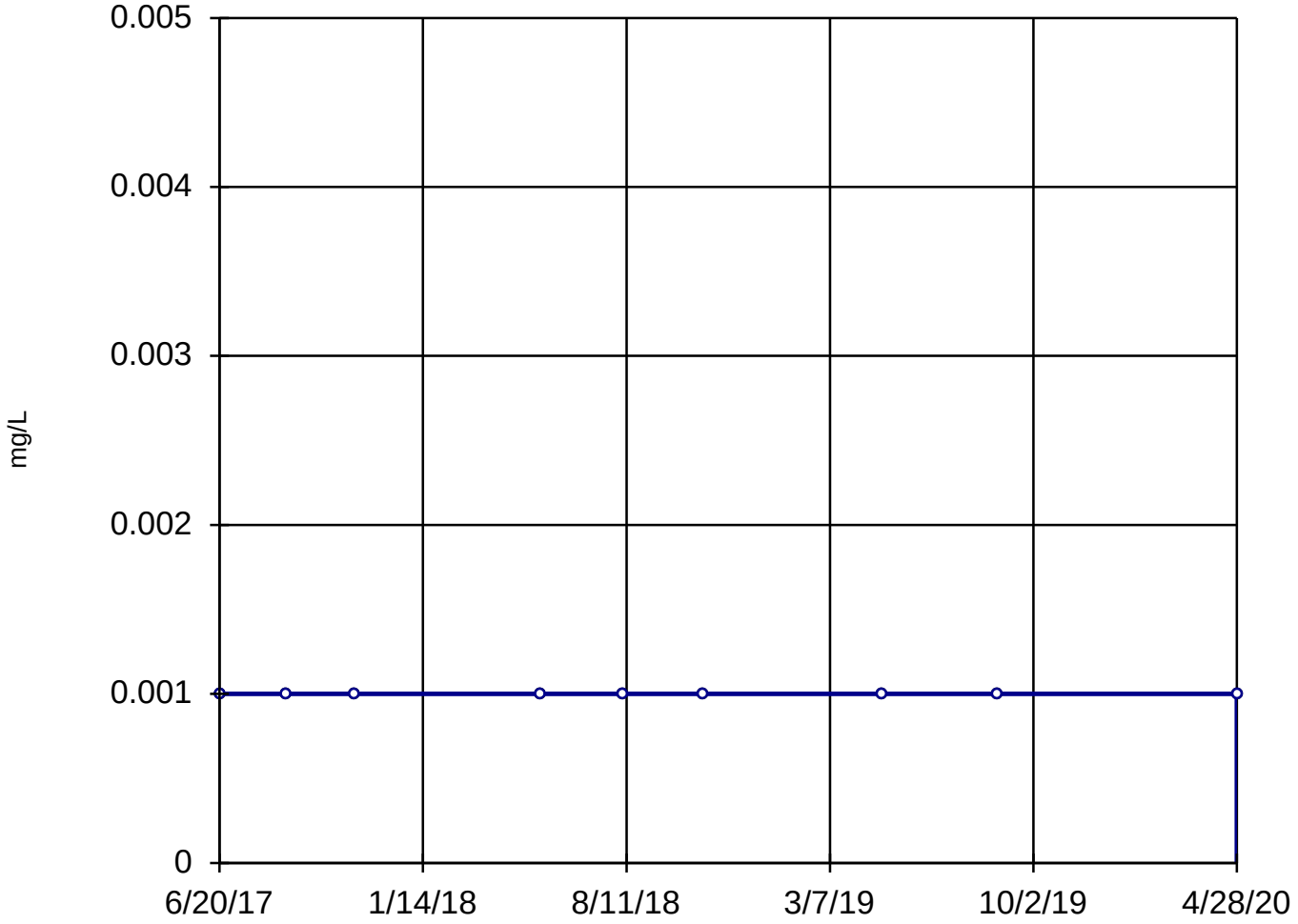
Constituent: Cobalt, Total Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 25

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

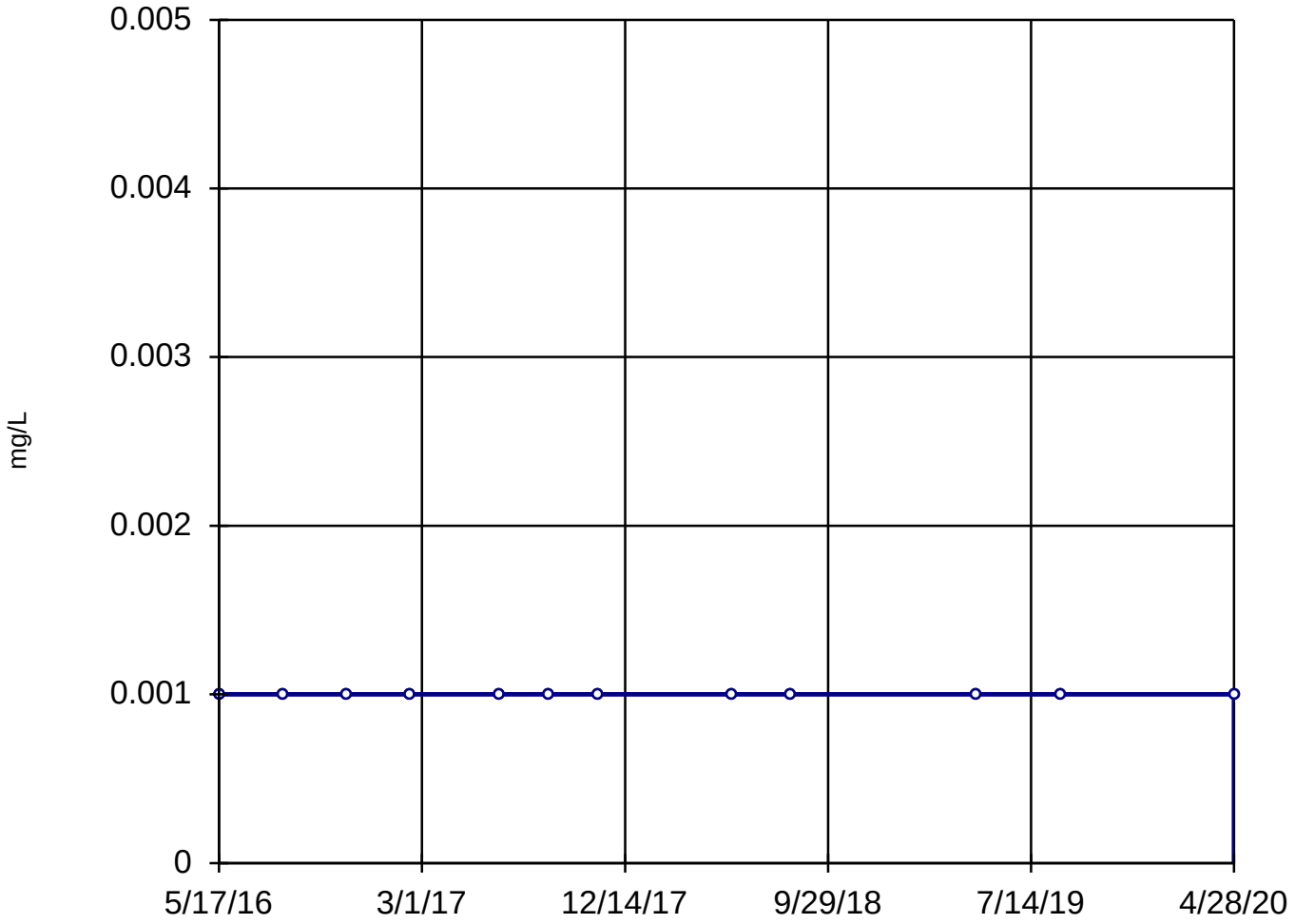
Constituent: Cobalt, Total Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-05



n = 12

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 38

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

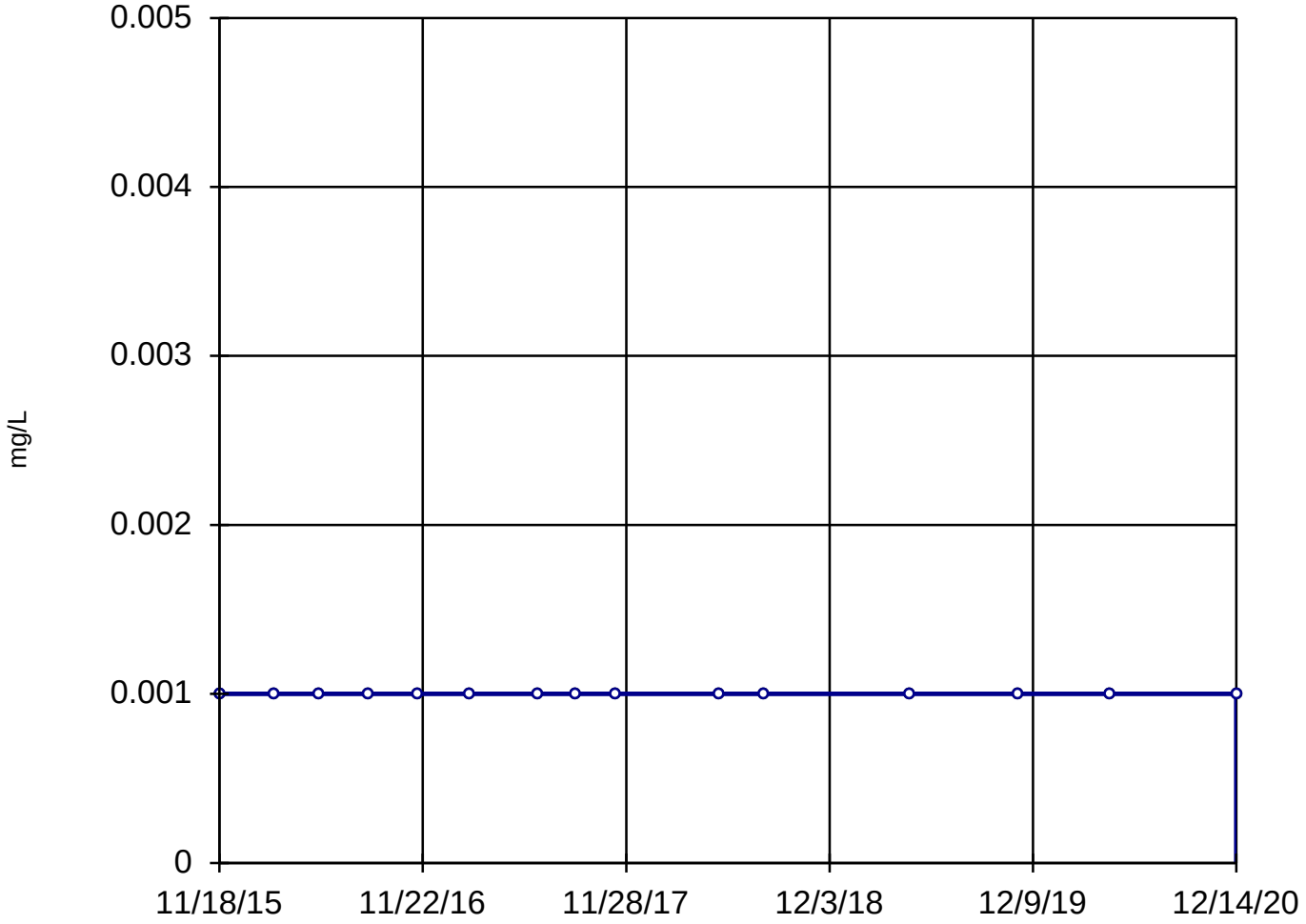
Constituent: Cobalt, Total Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 15

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 53

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

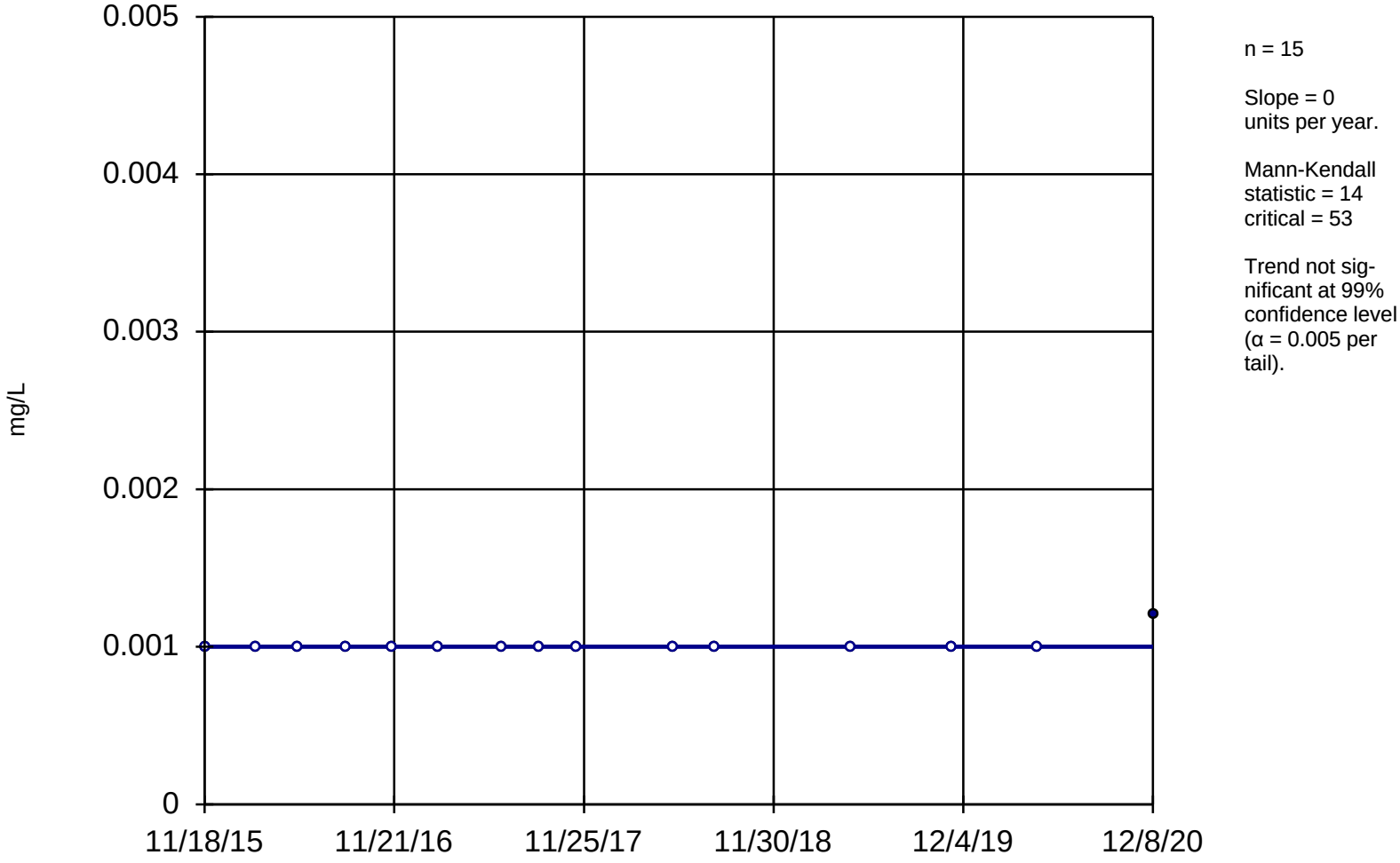
Constituent: Cobalt, Total Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-15



n = 15

Slope = 0
units per year.

Mann-Kendall
statistic = 14
critical = 53

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

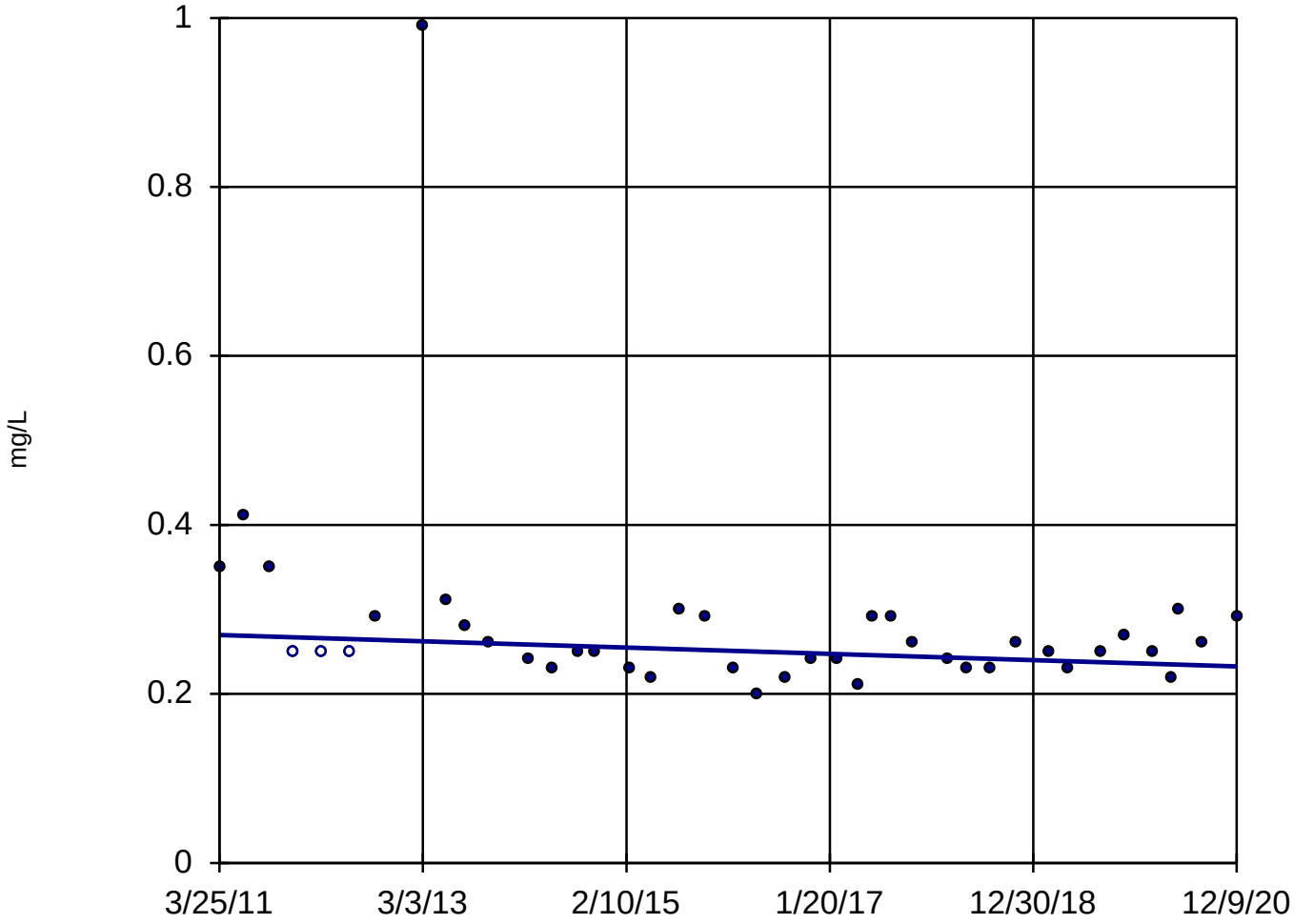
Constituent: Cobalt, Total Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 41

Slope = -0.003816 units per year.

Mann-Kendall normal approx. = -1.688
critical = -2.58

Trend not significant at 99% confidence level (α = 0.005 per tail).

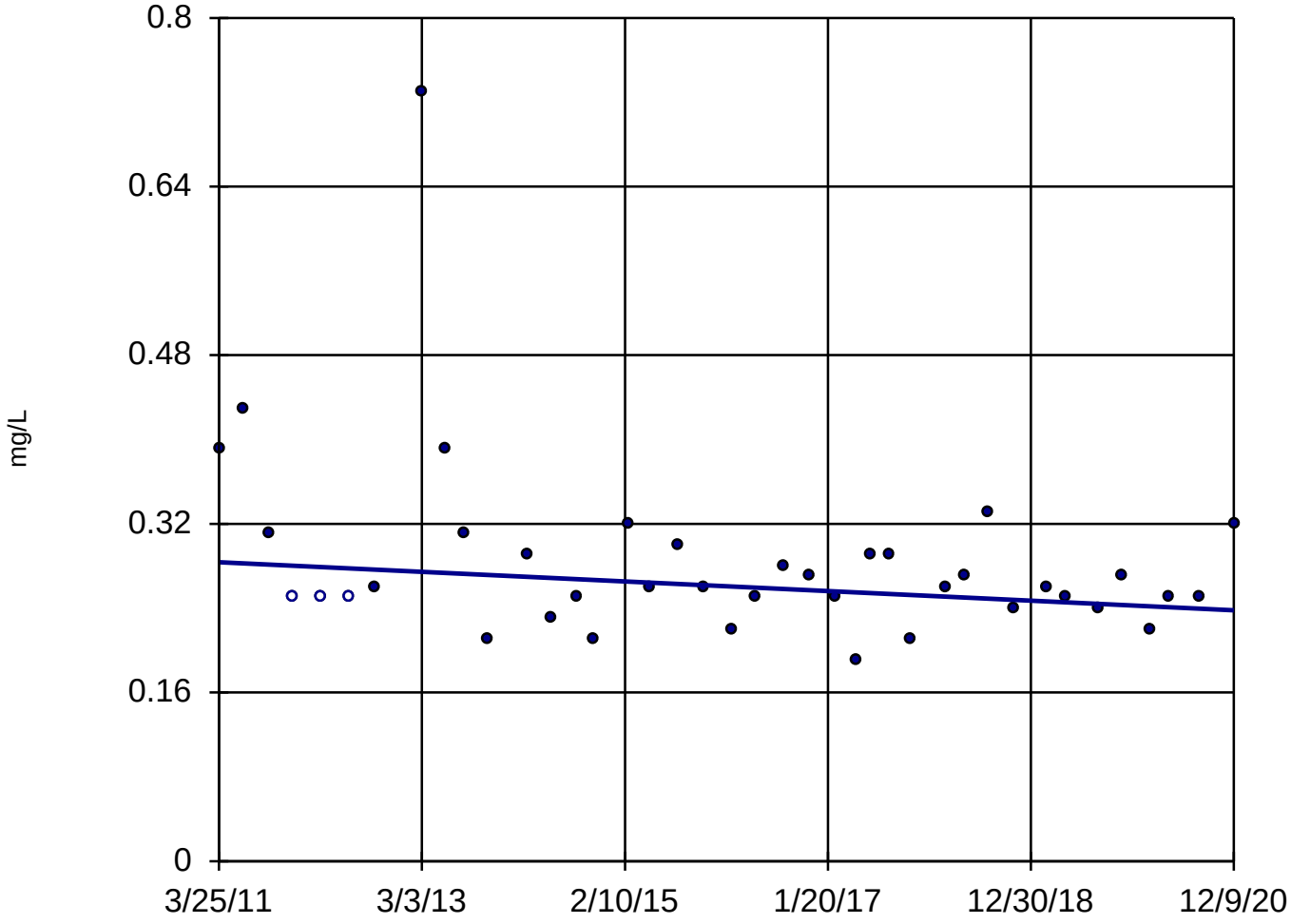
Constituent: Fluoride Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 40

Slope = -0.004713 units per year.

Mann-Kendall statistic = -138
critical = -223

Trend not significant at 99% confidence level (α = 0.005 per tail).

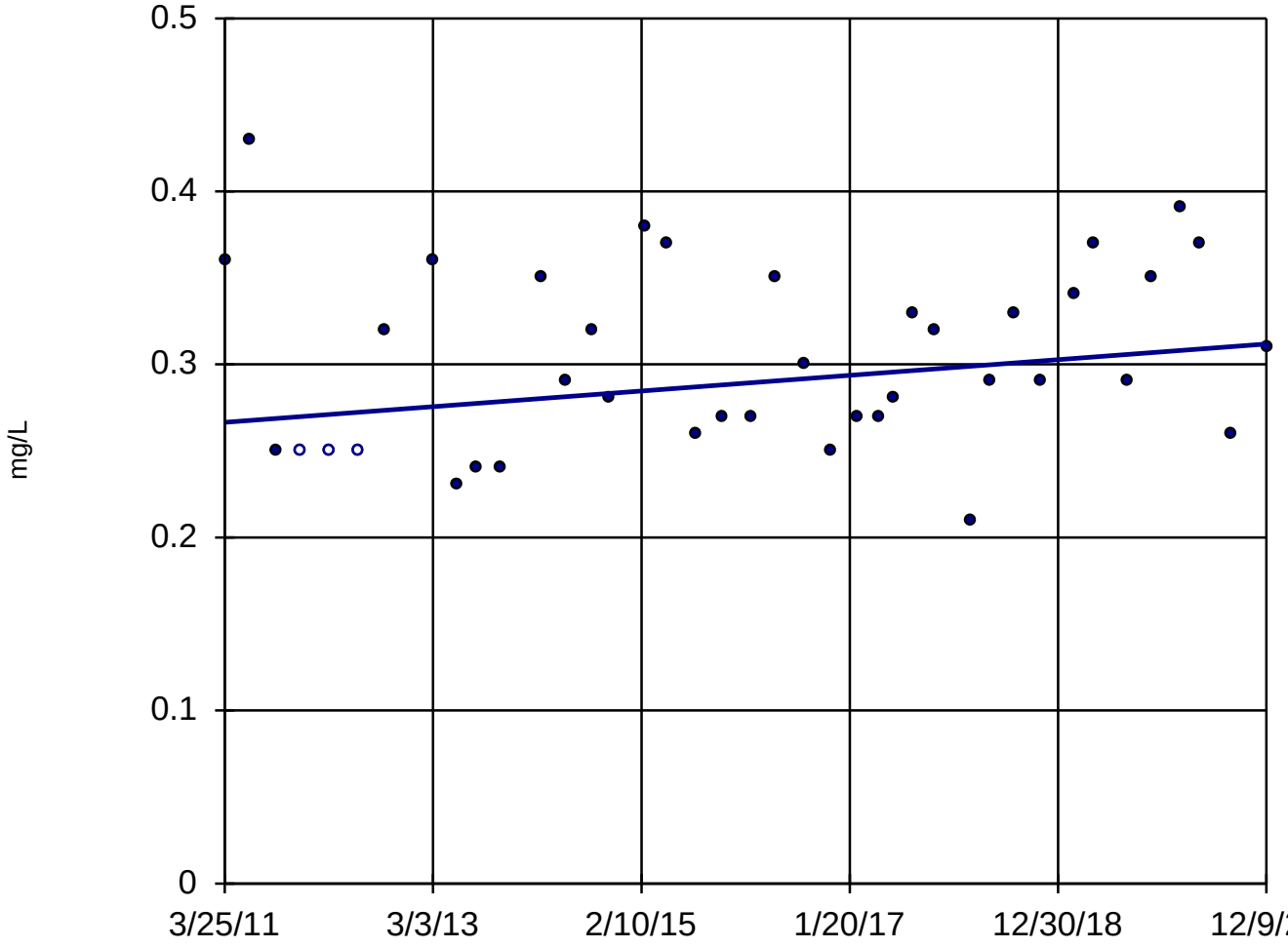
Constituent: Fluoride Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-05



n = 40

Slope = 0.004669 units per year.

Mann-Kendall statistic = 134
critical = 223

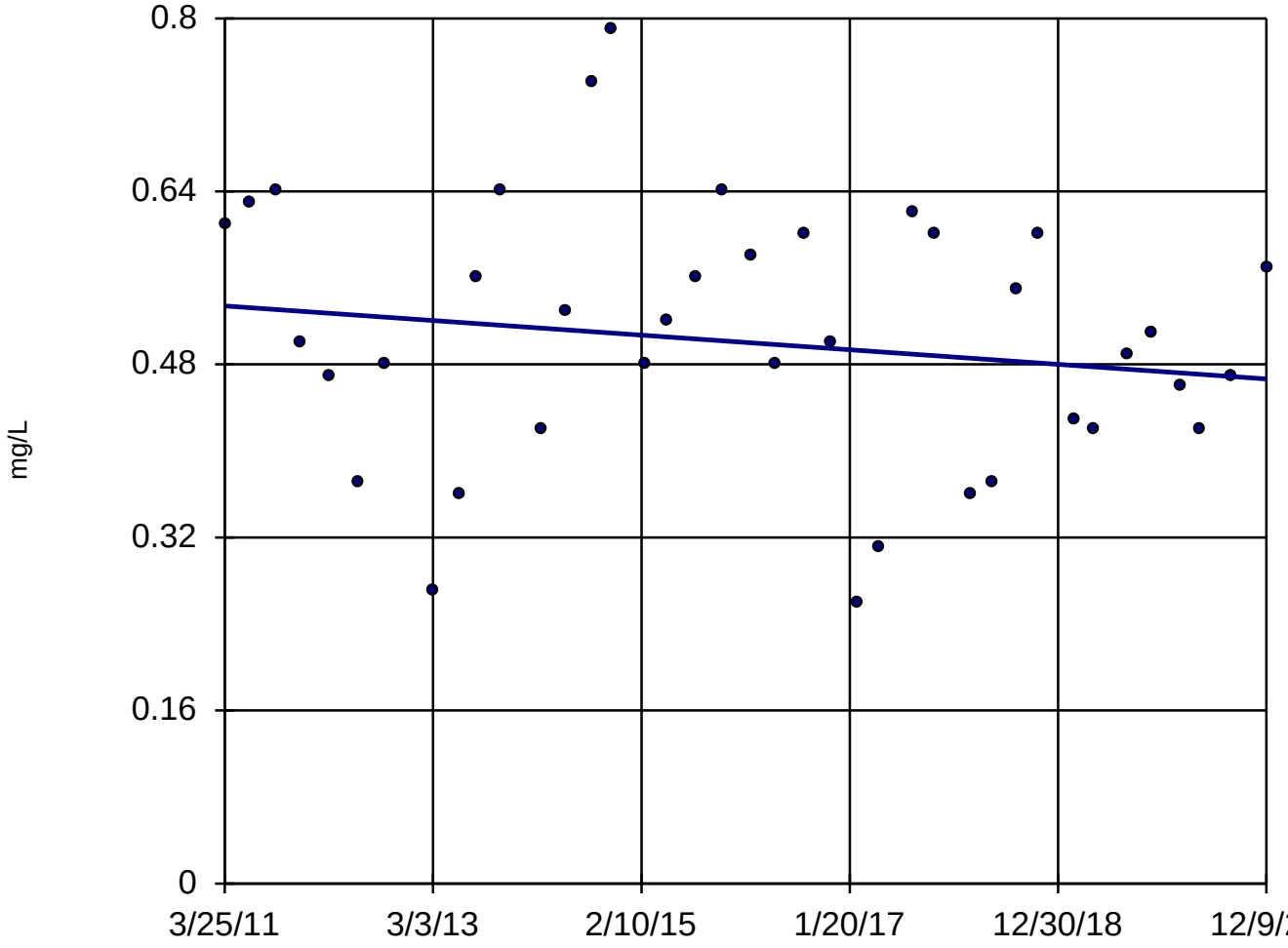
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Fluoride Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-06



n = 39

Slope = -0.006948 units per year.

Mann-Kendall statistic = -90
critical = -214

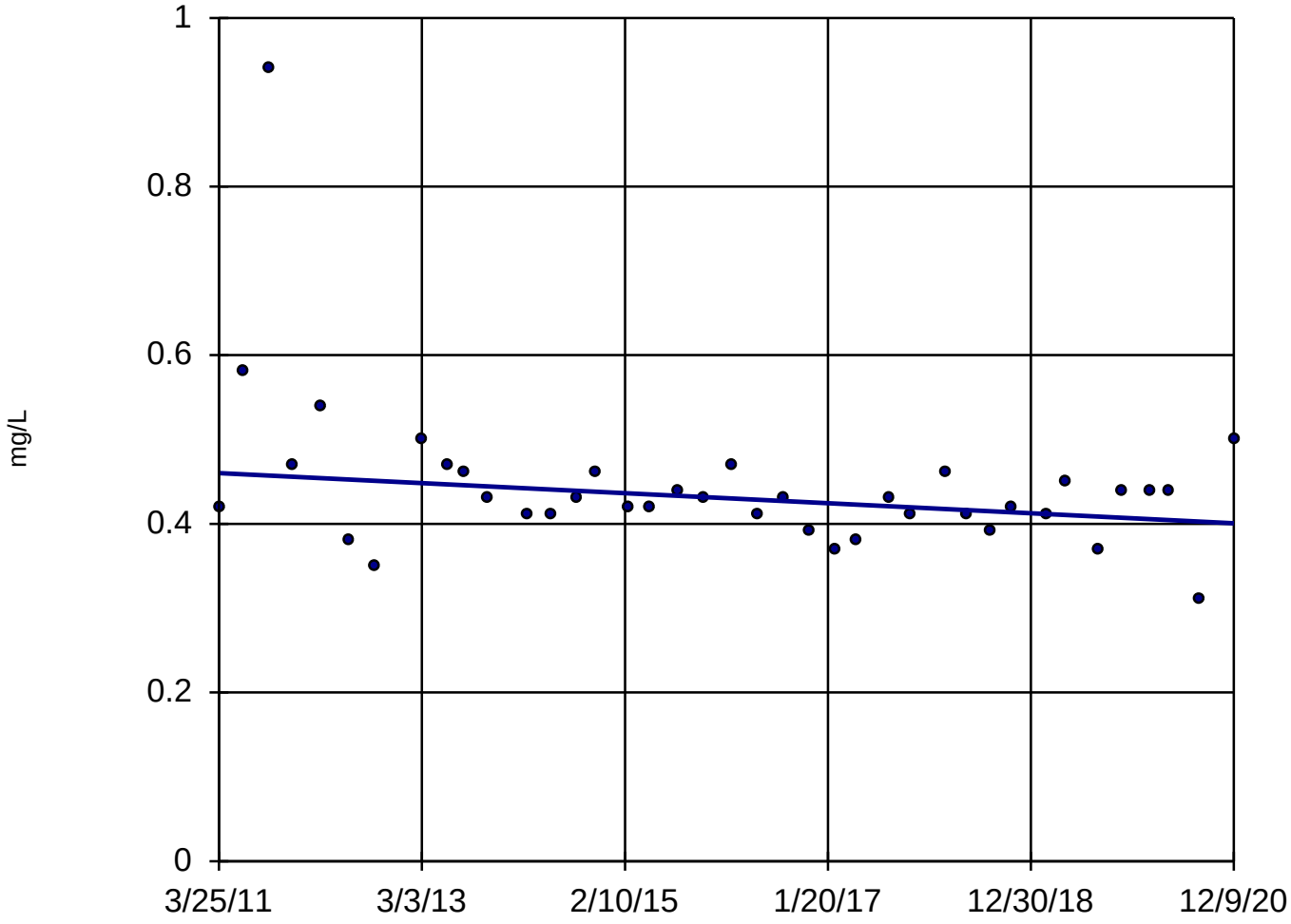
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Fluoride Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-07



n = 39

Slope = -0.006114 units per year.

Mann-Kendall statistic = -154
critical = -214

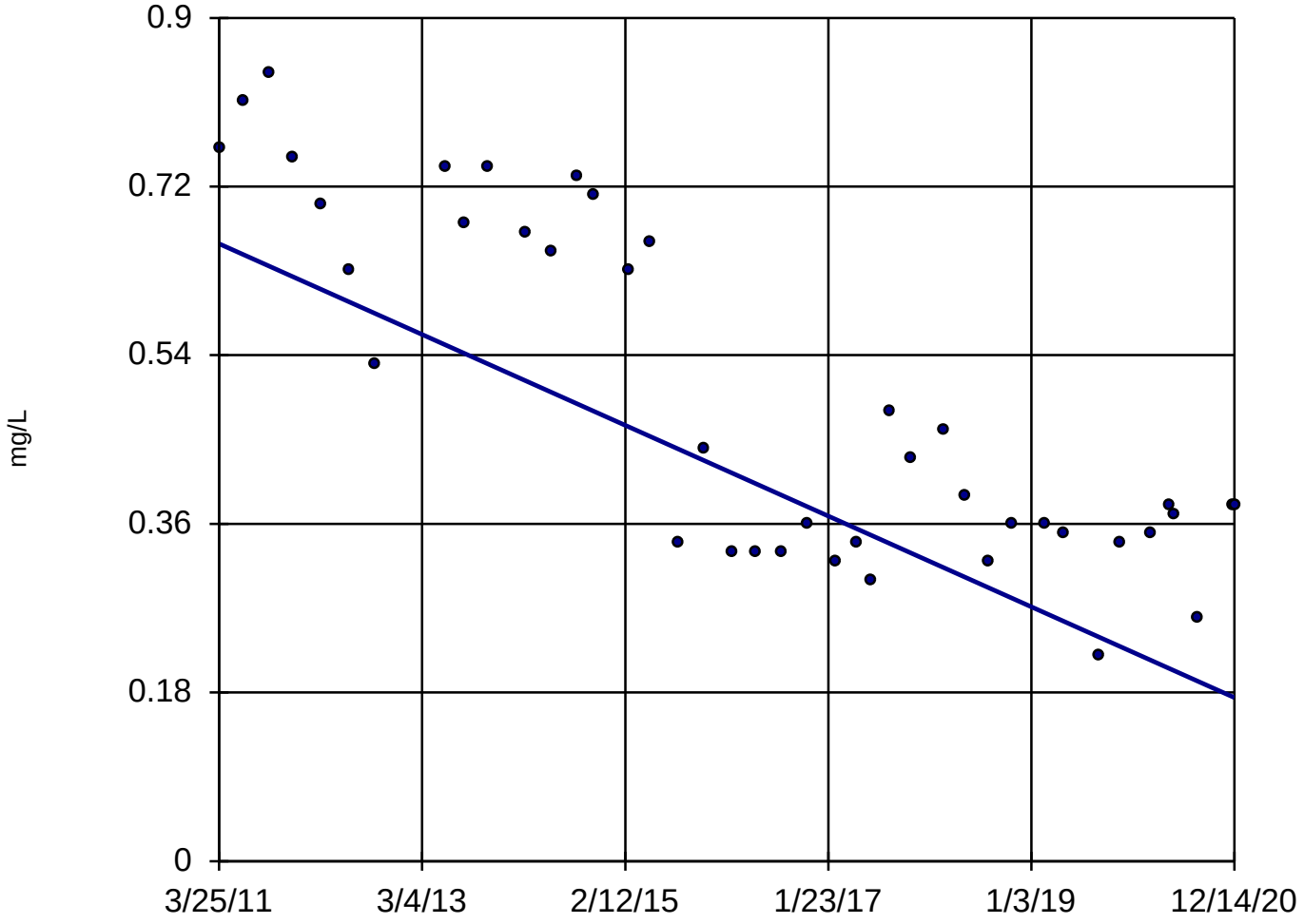
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Fluoride Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-08



n = 41

Slope = -0.04977 units per year.

Mann-Kendall normal approx. = -4.892
critical = -2.58

Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Fluoride Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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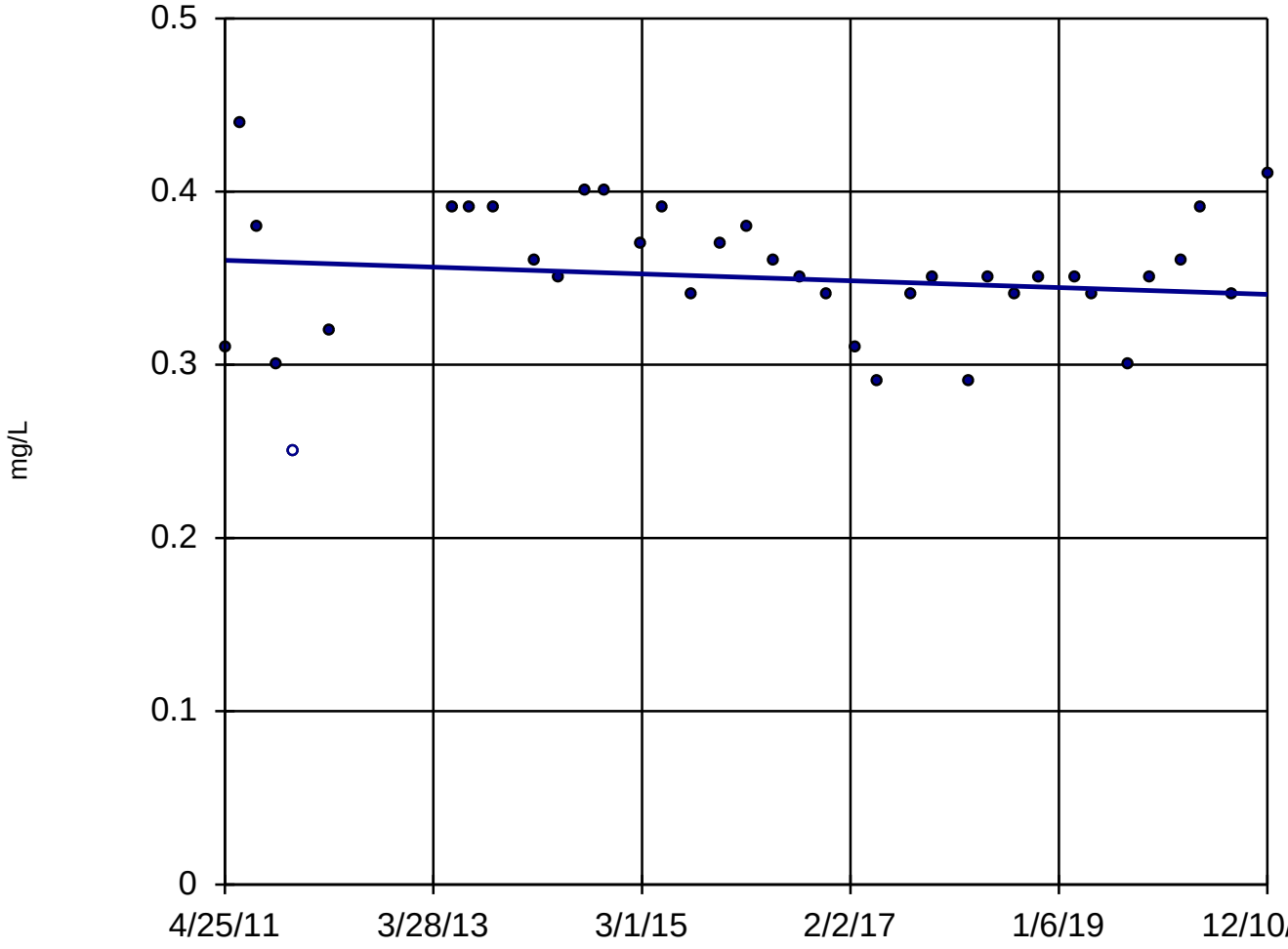
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-13



n = 37

Slope = -0.002043 units per year.

Mann-Kendall statistic = -75
critical = -199

Trend not significant at 99% confidence level (α = 0.005 per tail).

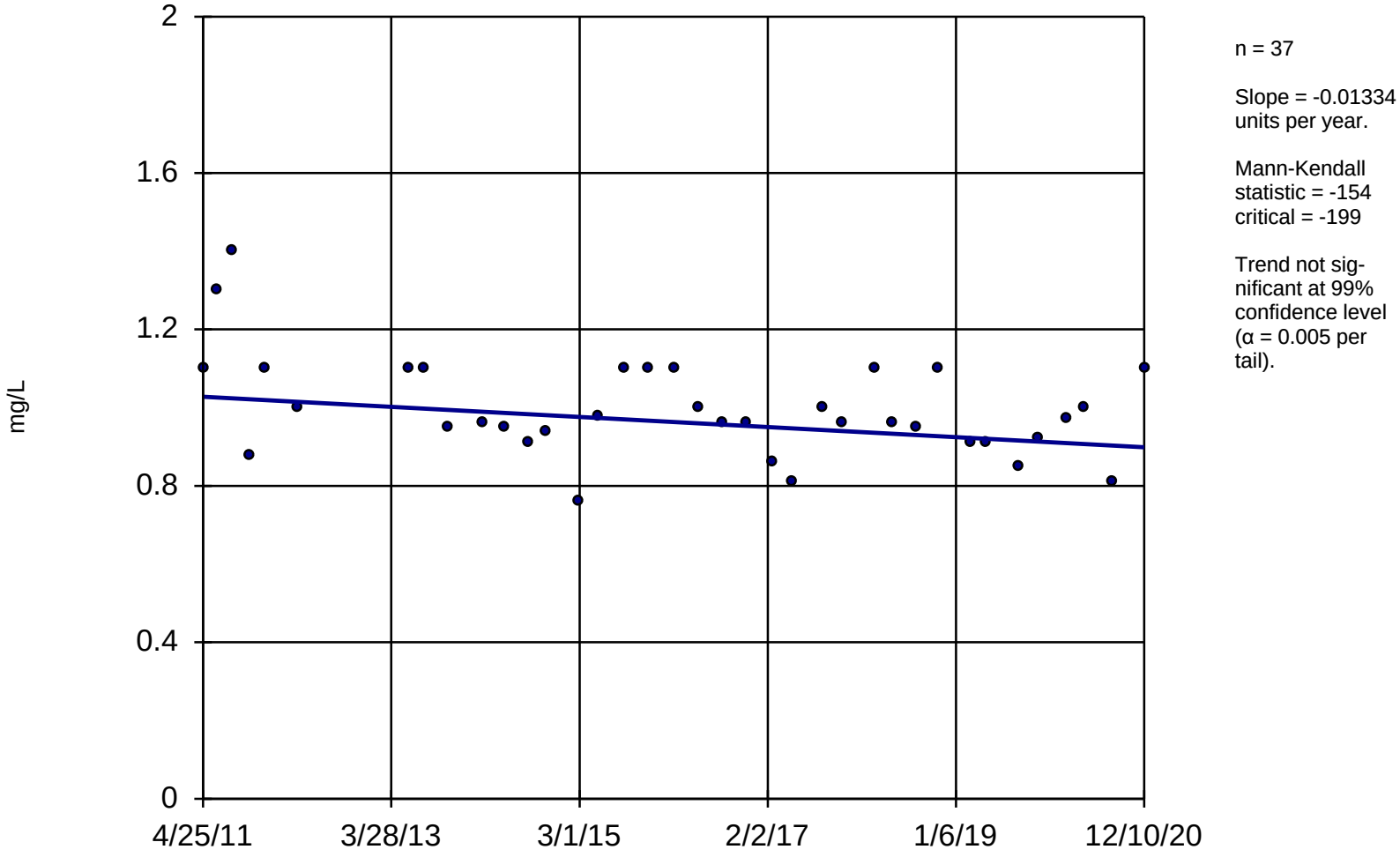
Constituent: Fluoride Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA

Sen's Slope Estimator

MW-14



n = 37

Slope = -0.01334 units per year.

Mann-Kendall statistic = -154
critical = -199

Trend not significant at 99% confidence level (α = 0.005 per tail).

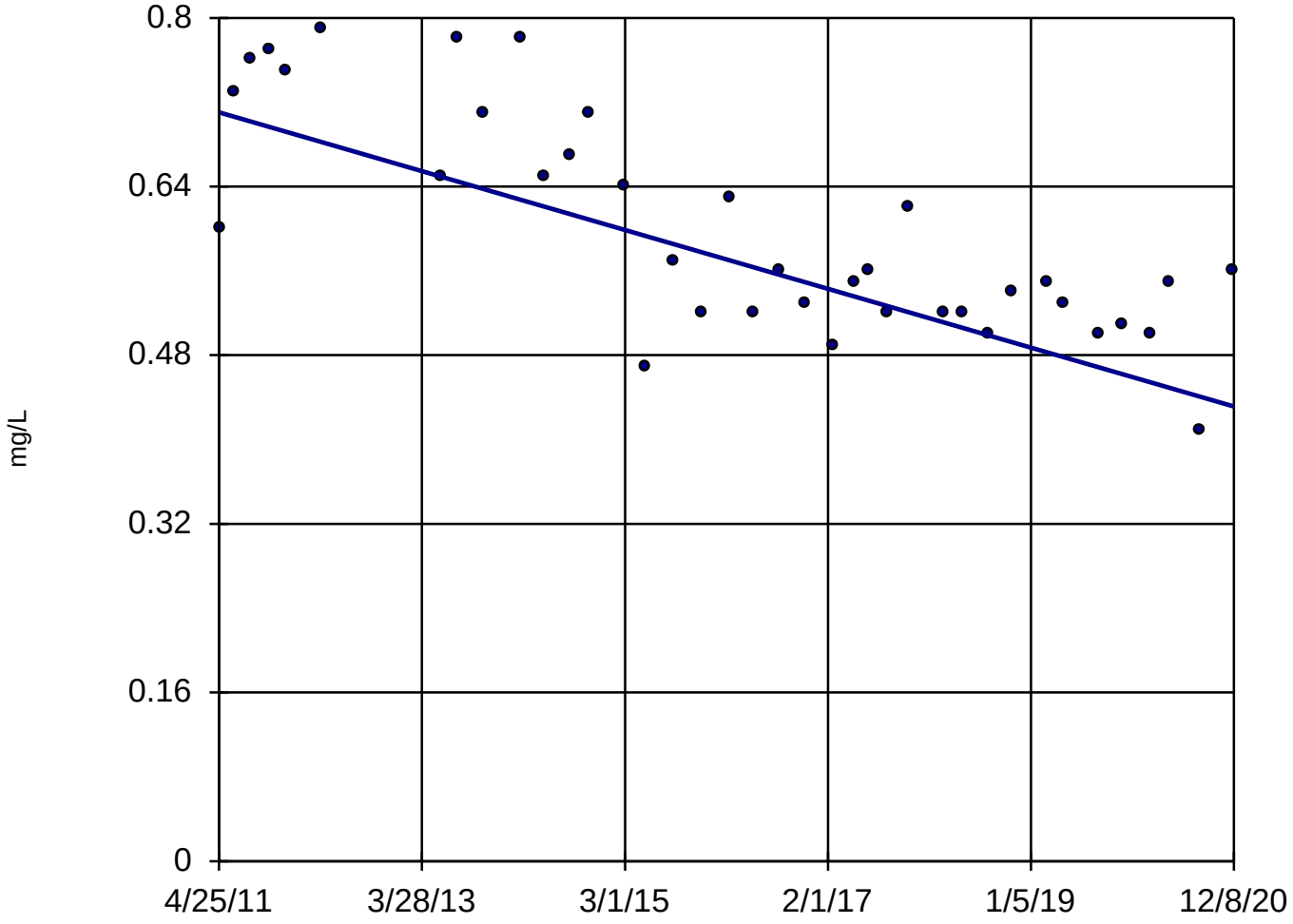
Constituent: Fluoride Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA

Sen's Slope Estimator

MW-15



n = 38

Slope = -0.02897 units per year.

Mann-Kendall statistic = -382
critical = -206

Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

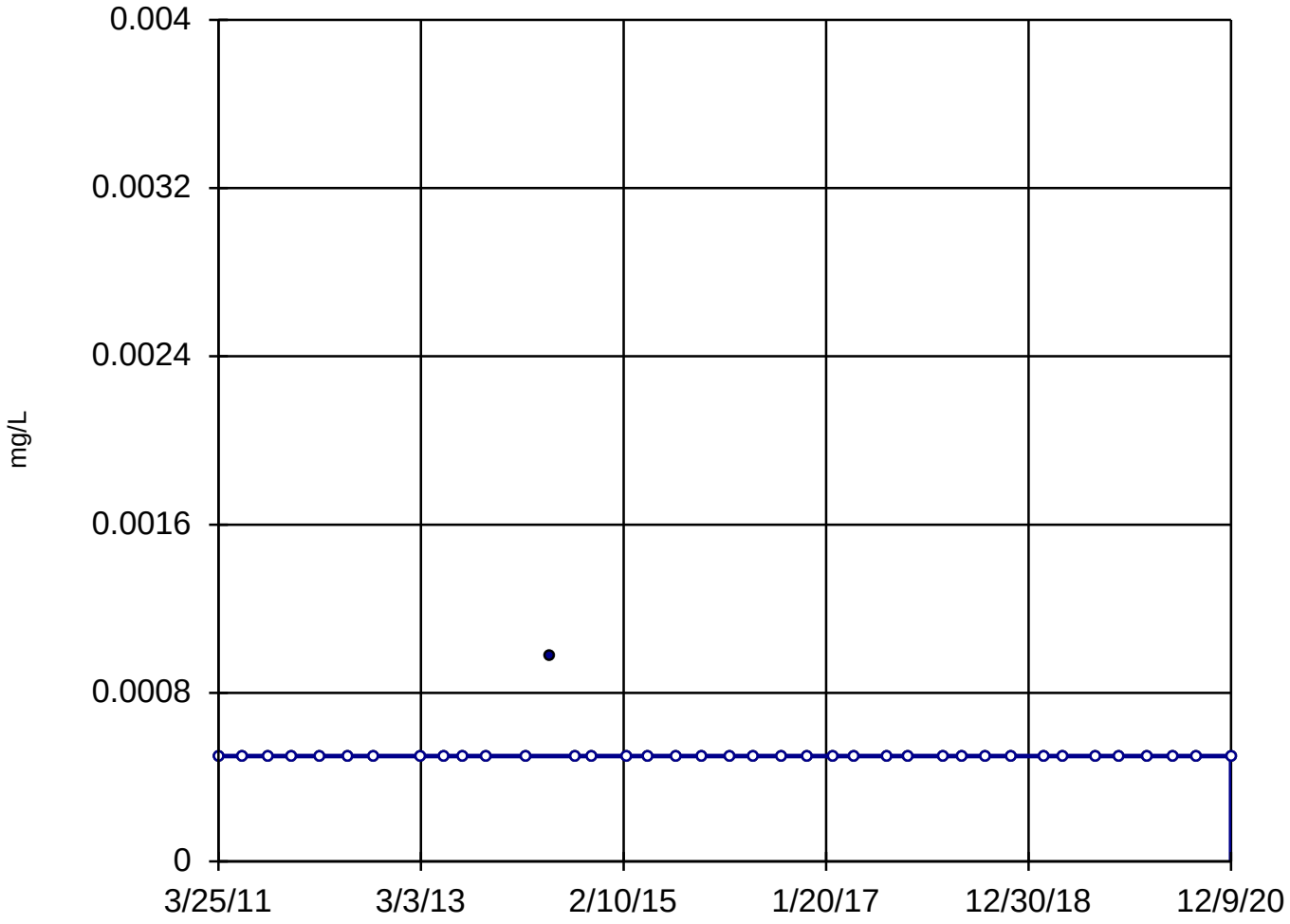
Constituent: Fluoride Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = -14
critical = -214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

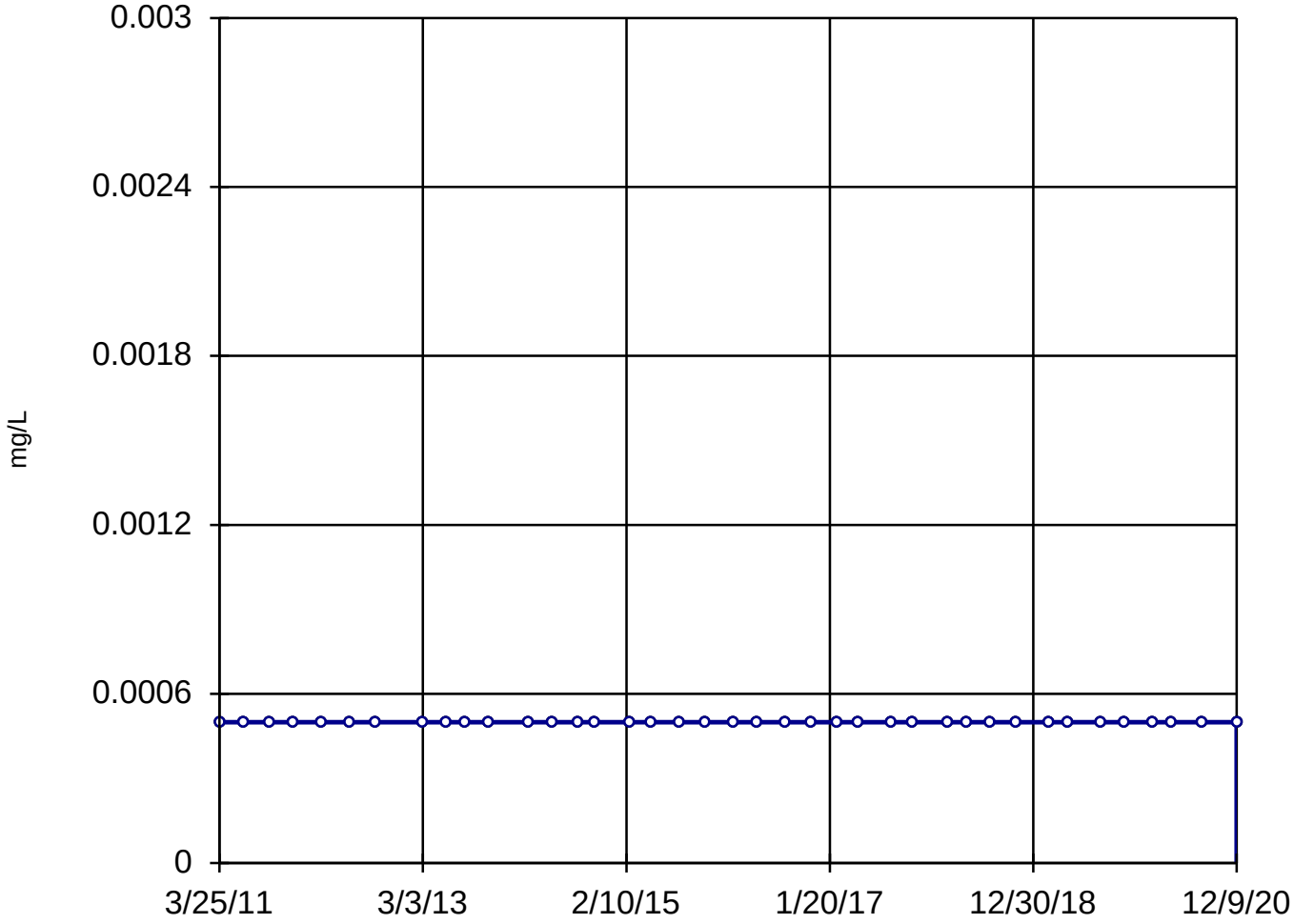
Constituent: Lead, Dissolved Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

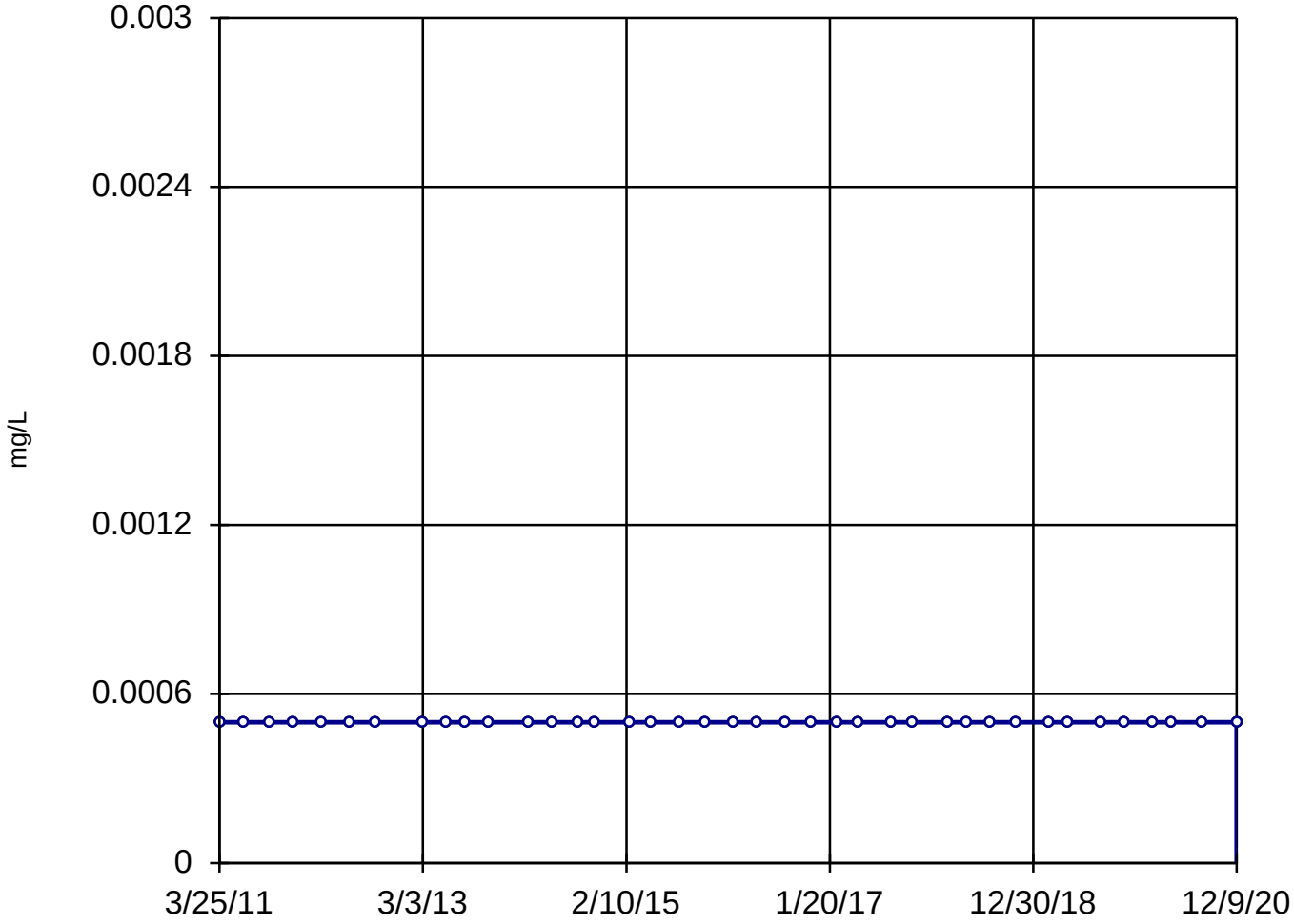
Constituent: Lead, Dissolved Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-05



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

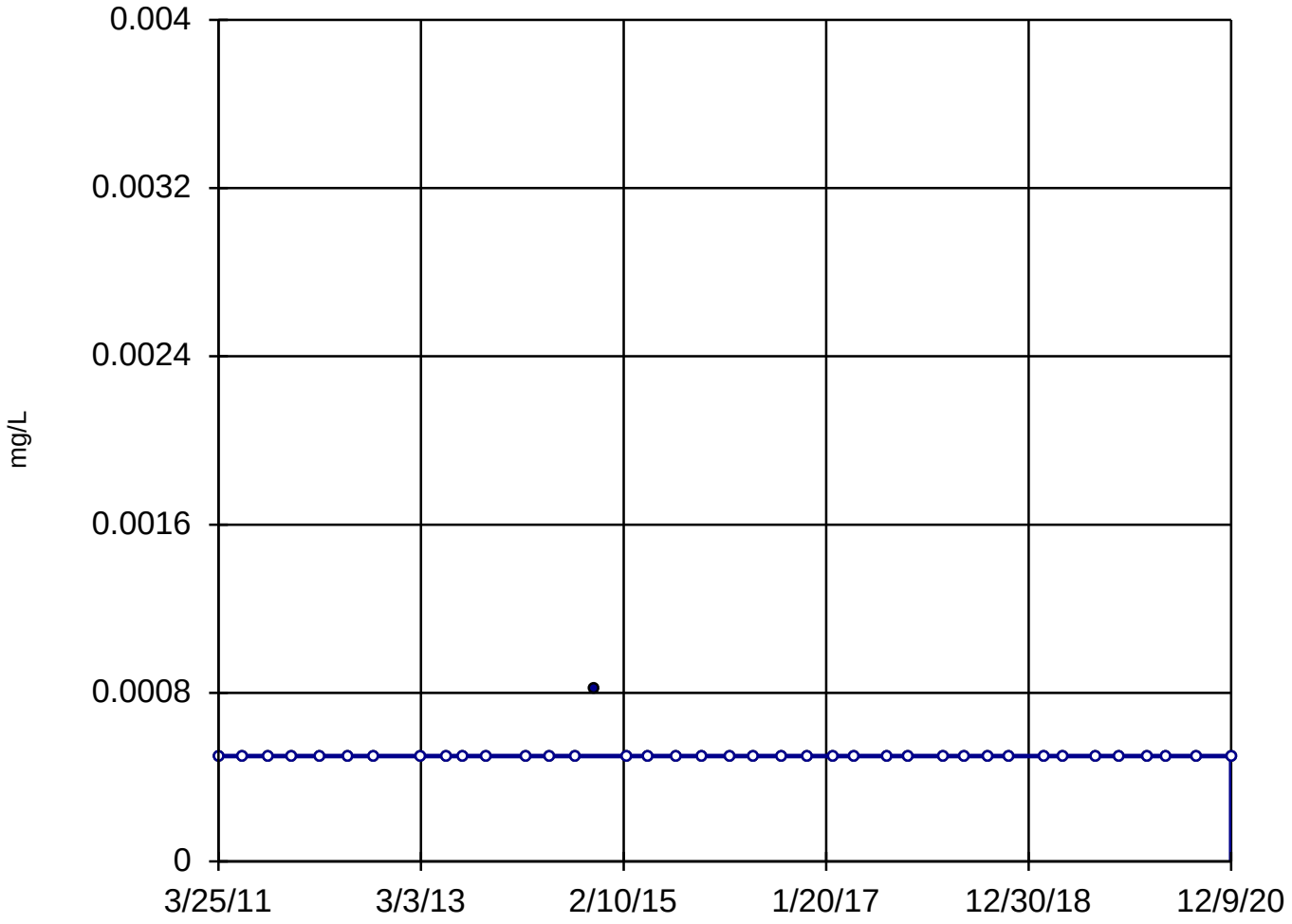
Constituent: Lead, Dissolved Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-06



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = -10
critical = -214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

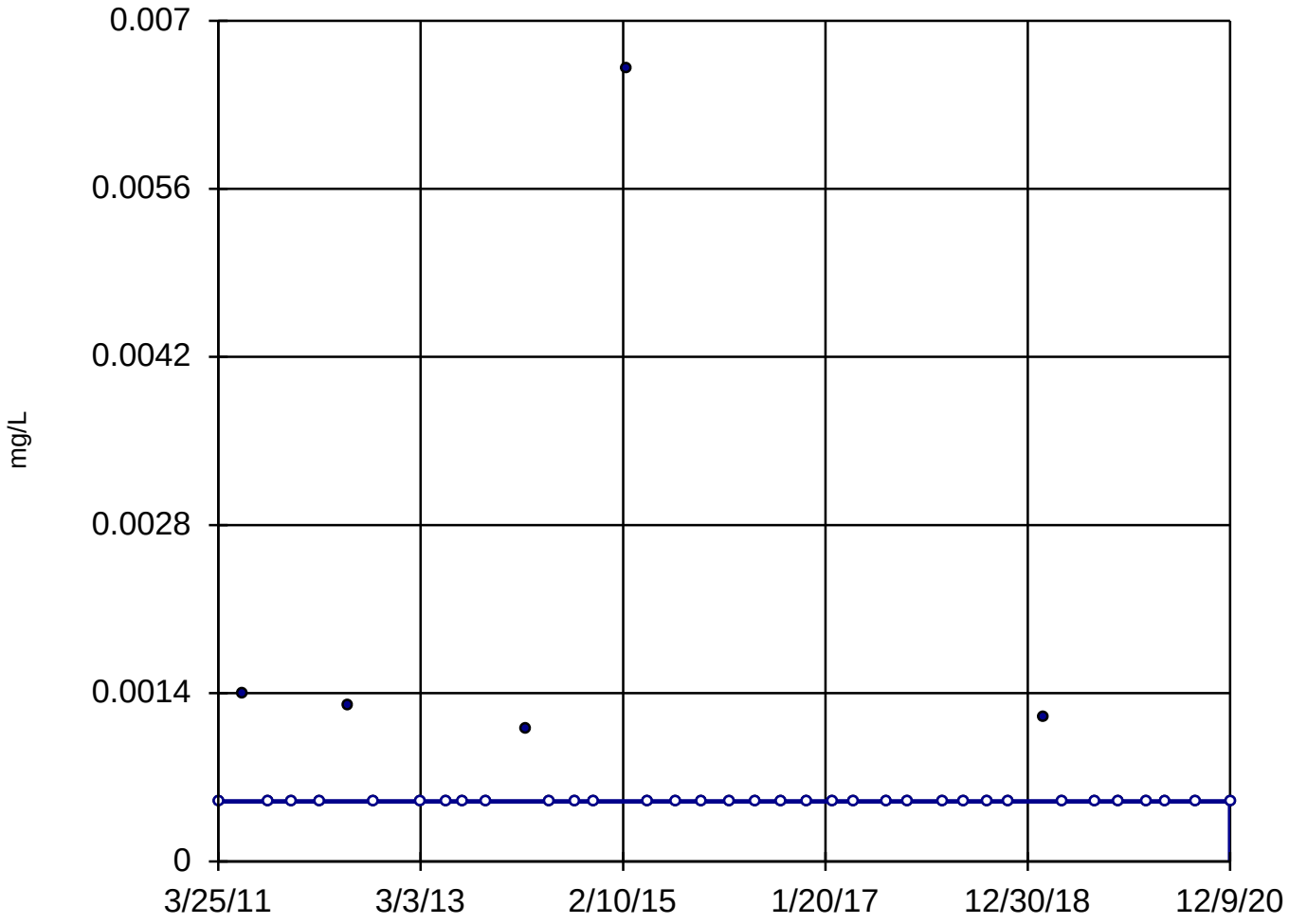
Constituent: Lead, Dissolved Analysis Run 4/2/2021 11:45 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-07



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = -66
critical = -214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

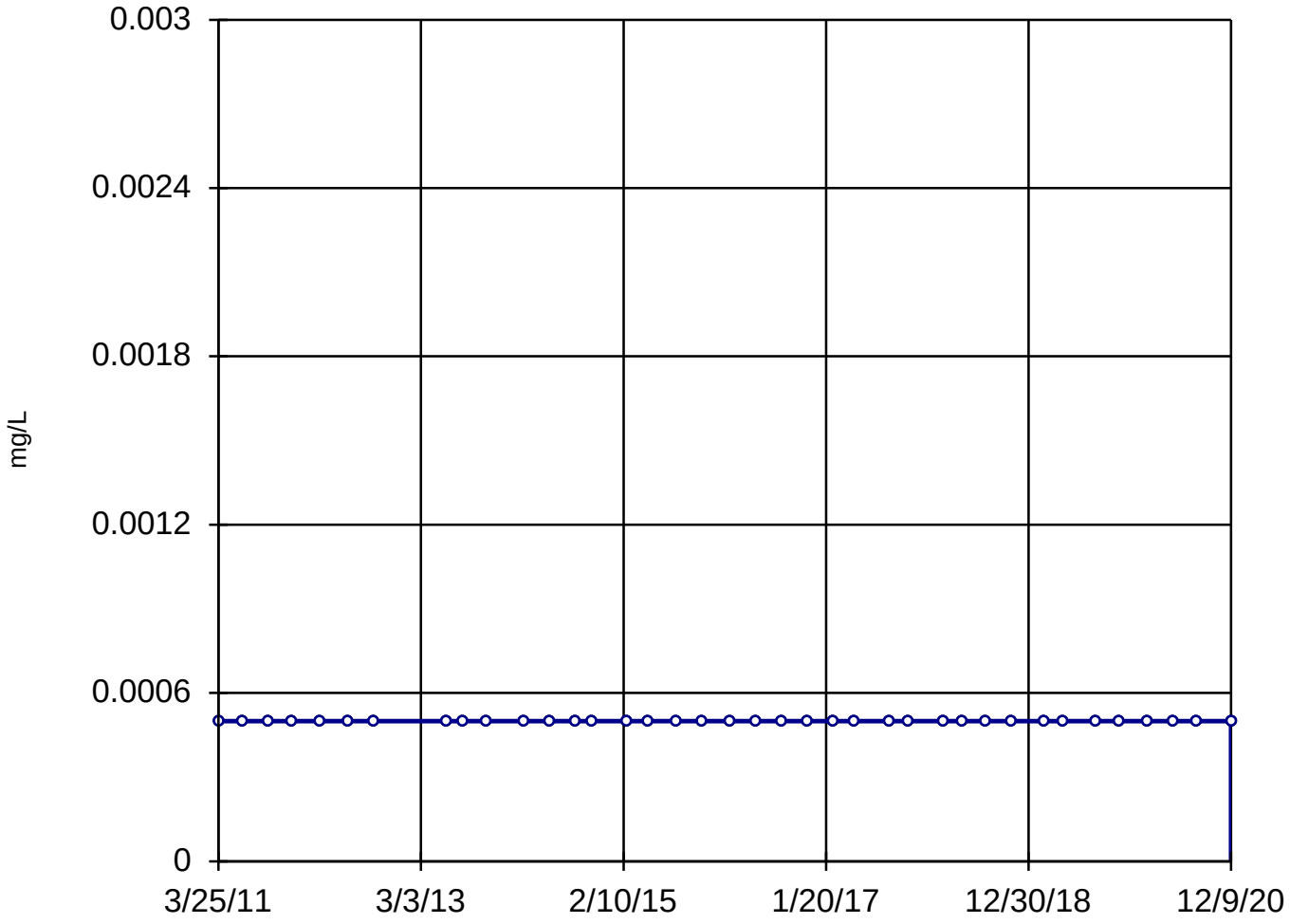
Constituent: Lead, Dissolved Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 38

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 206

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

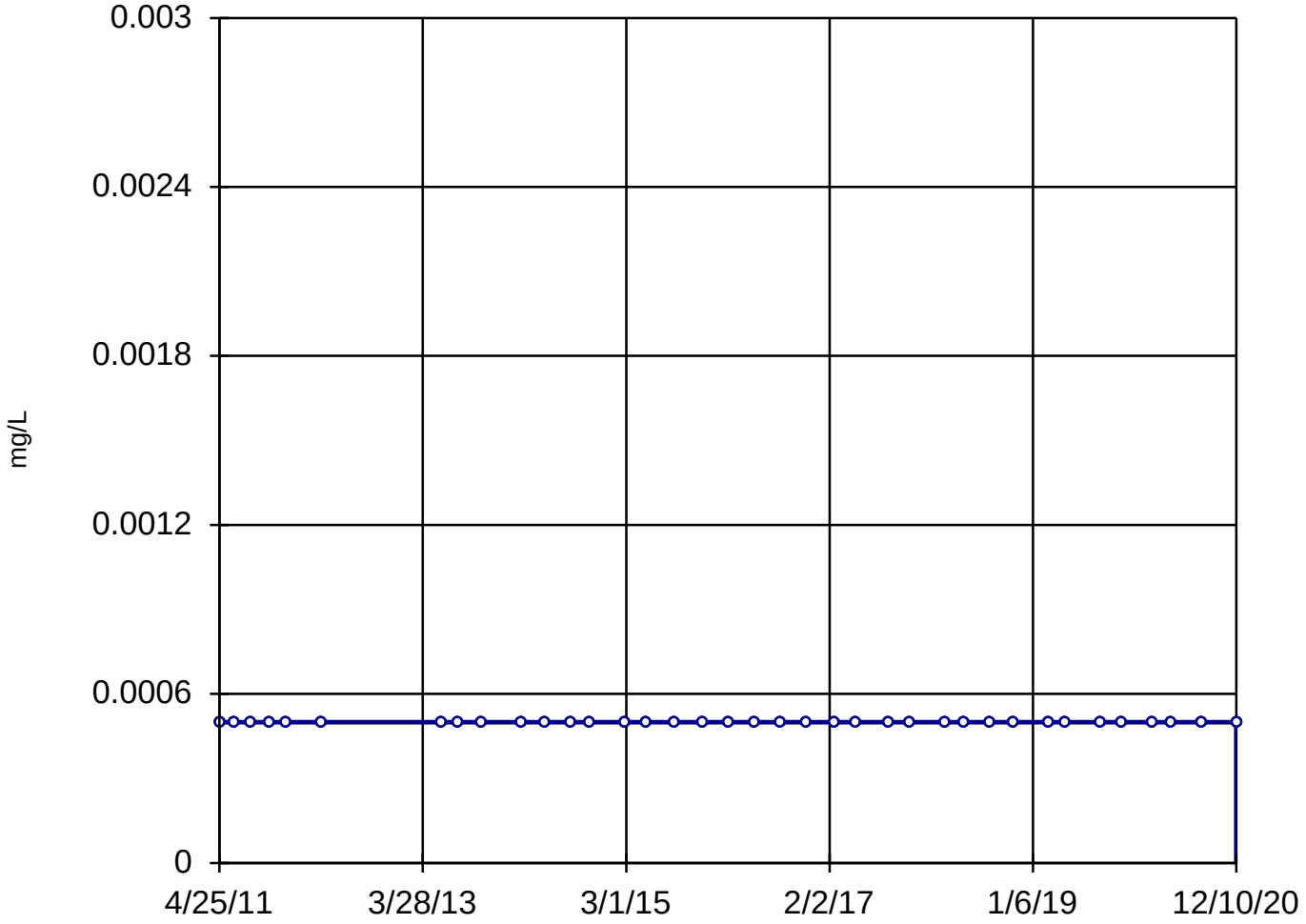
Constituent: Lead, Dissolved Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-13



n = 37

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 199

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

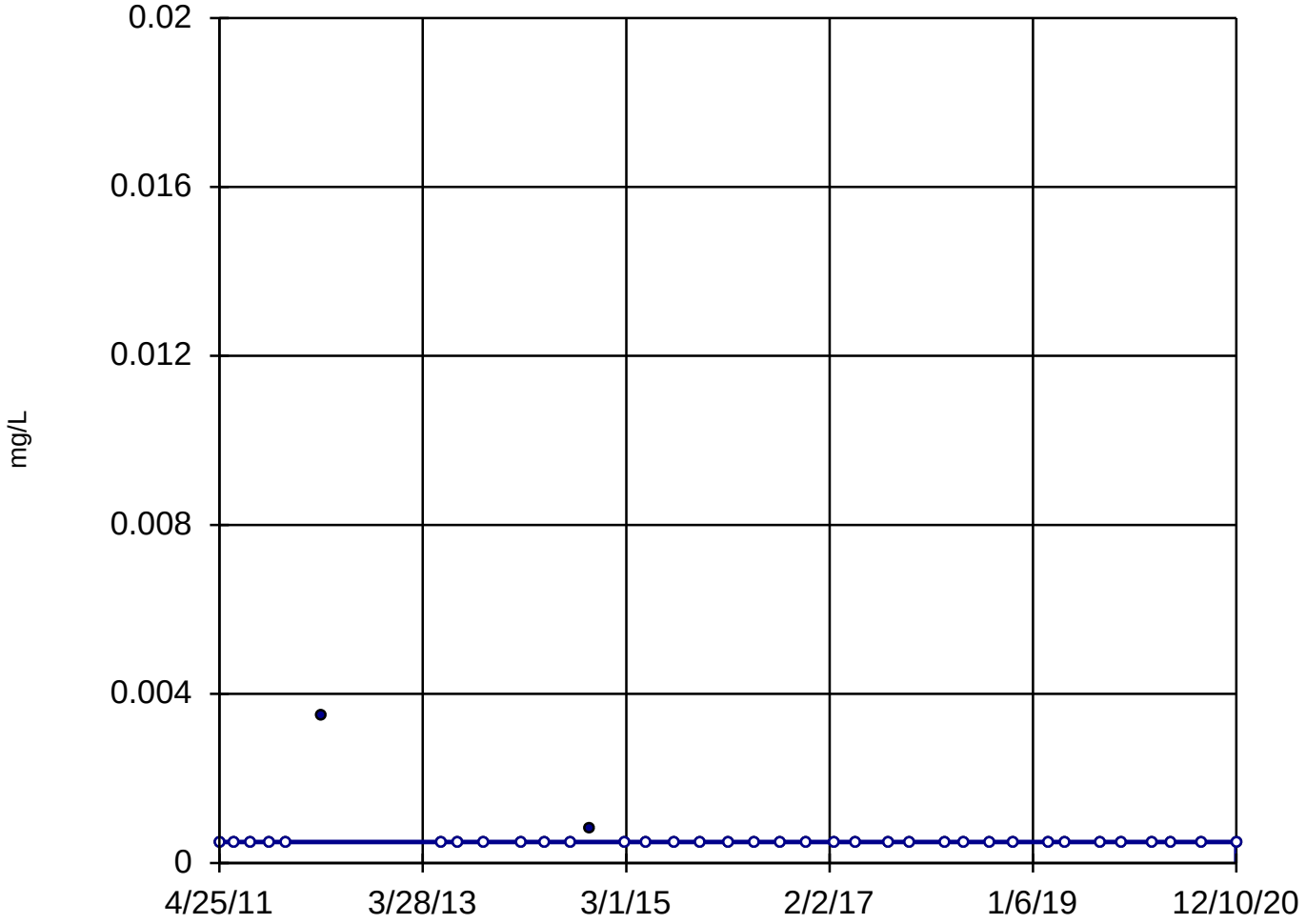
Constituent: Lead, Dissolved Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-14



n = 37

Slope = 0
units per year.

Mann-Kendall
statistic = -39
critical = -199

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

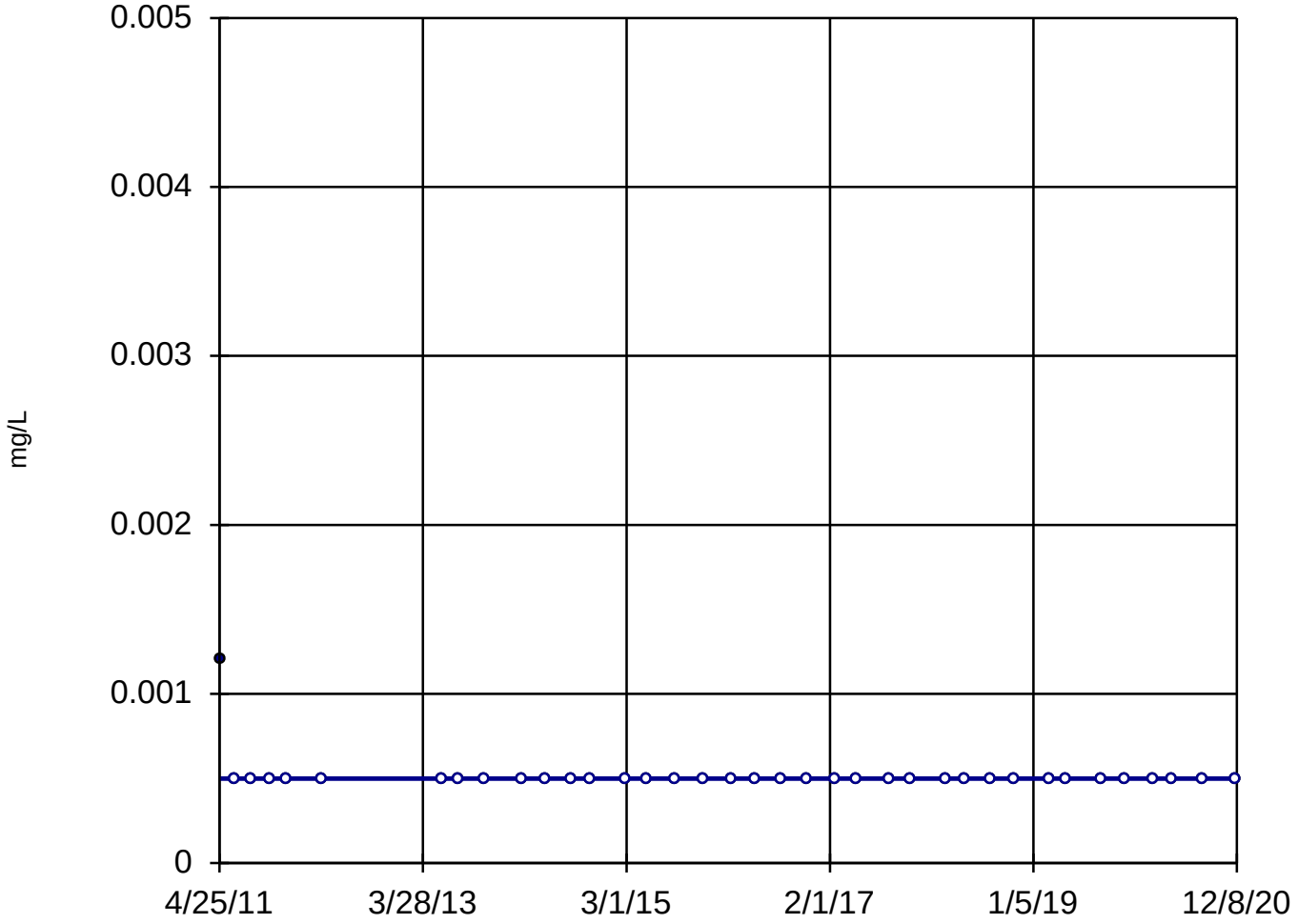
Constituent: Lead, Dissolved Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-15



n = 37

Slope = 0
units per year.

Mann-Kendall
statistic = -36
critical = -199

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

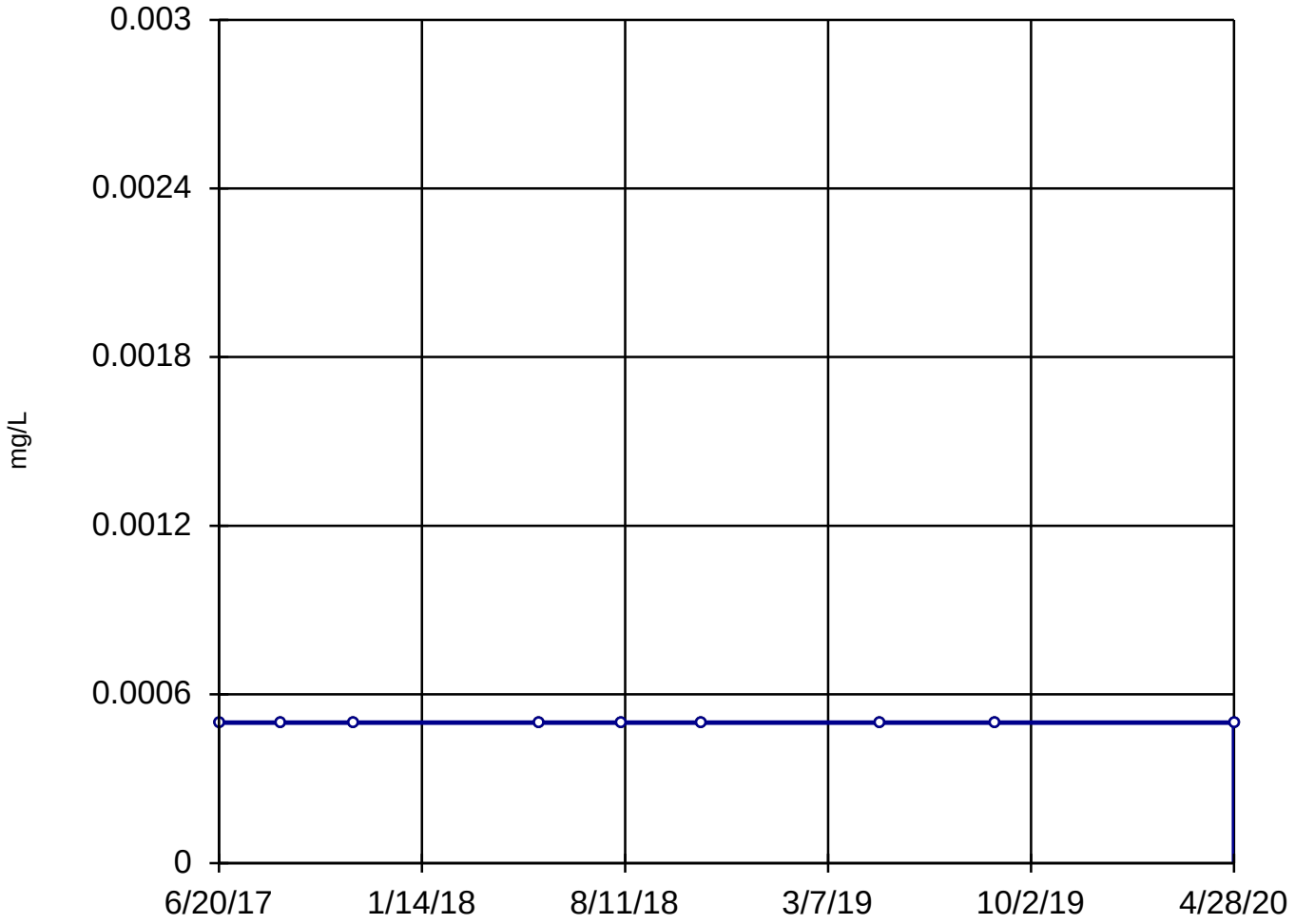
Constituent: Lead, Dissolved Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 25

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

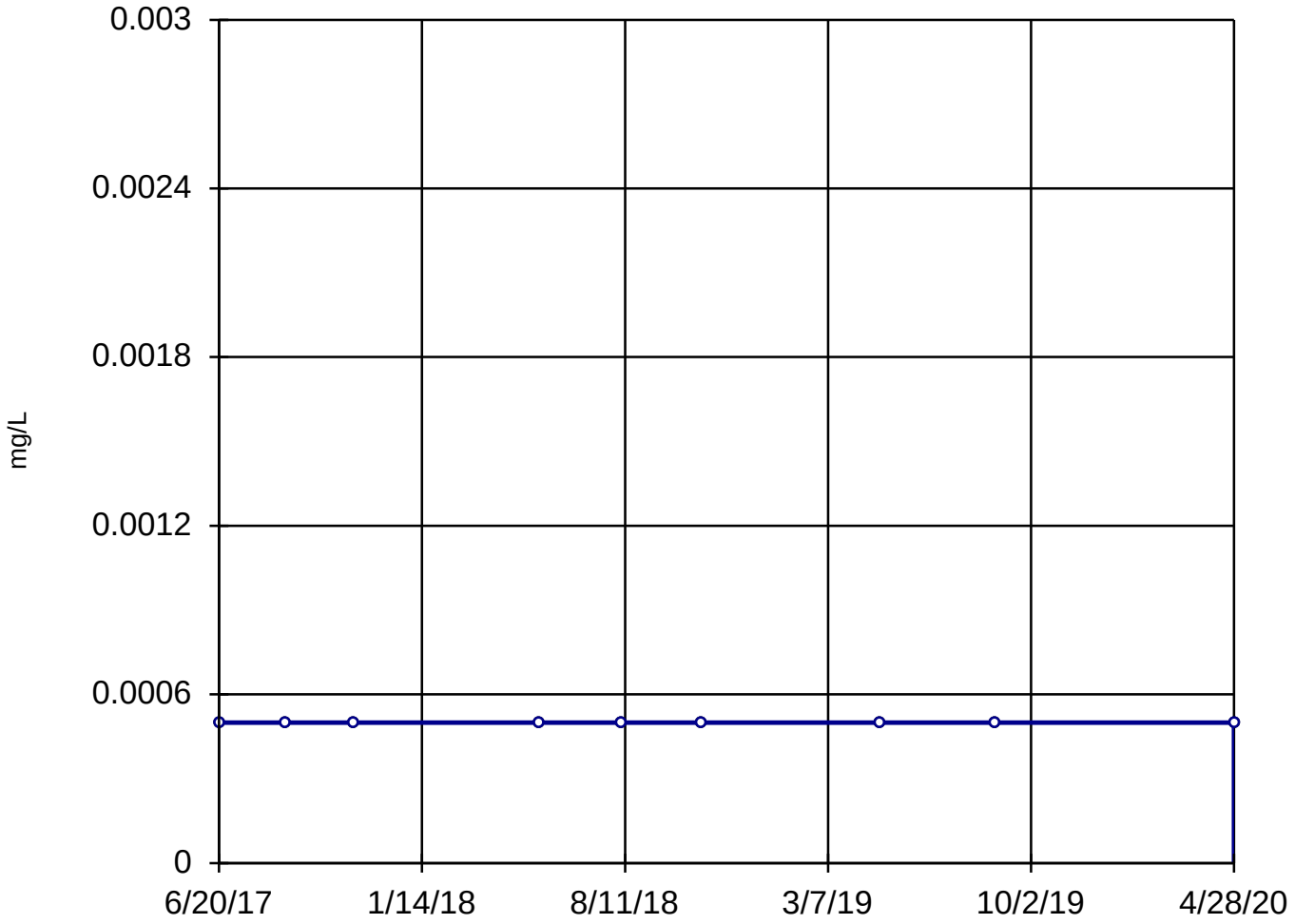
Constituent: Lead, Total Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 25

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

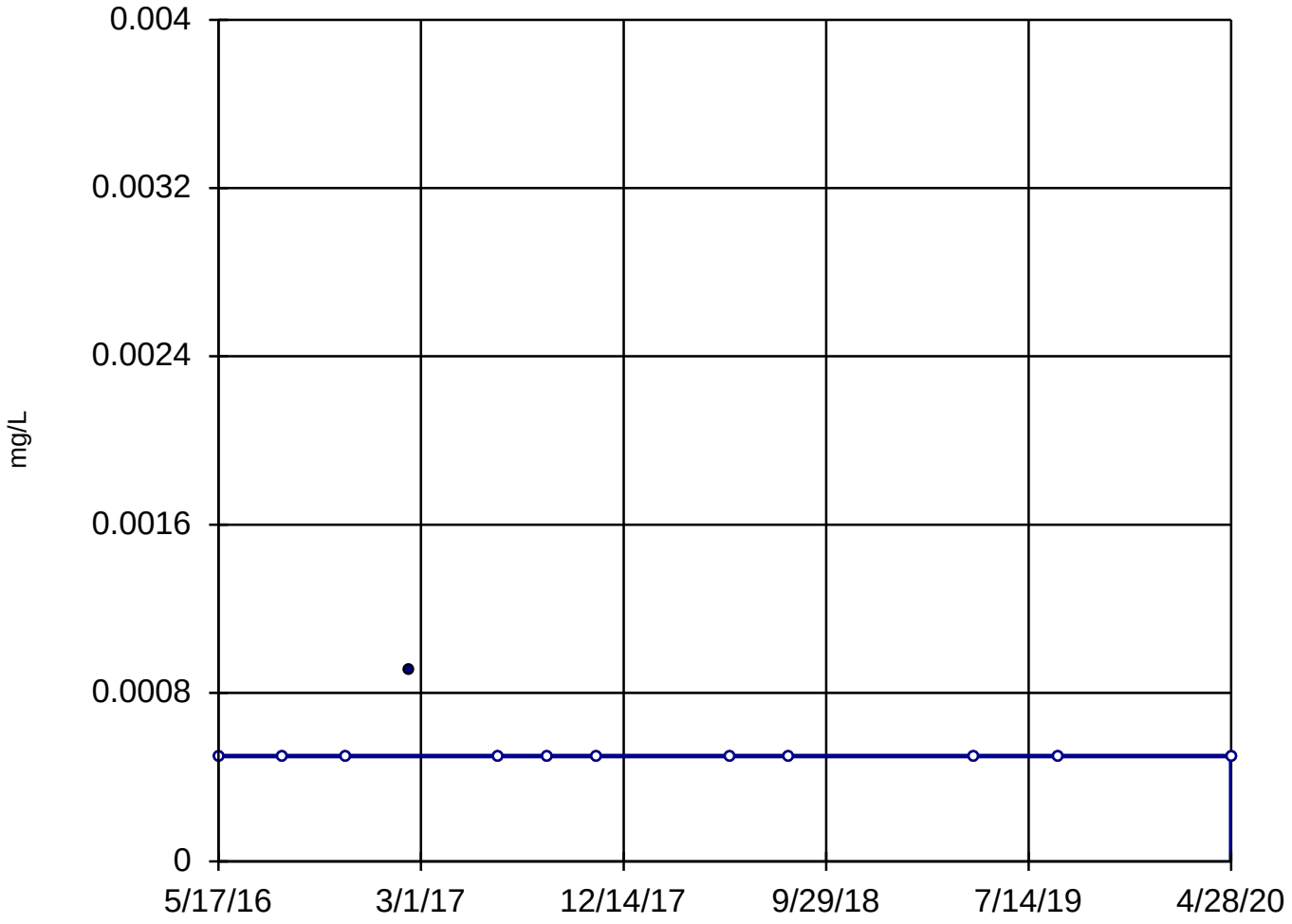
Constituent: Lead, Total Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-05



n = 12

Slope = 0
units per year.

Mann-Kendall
statistic = -5
critical = -38

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

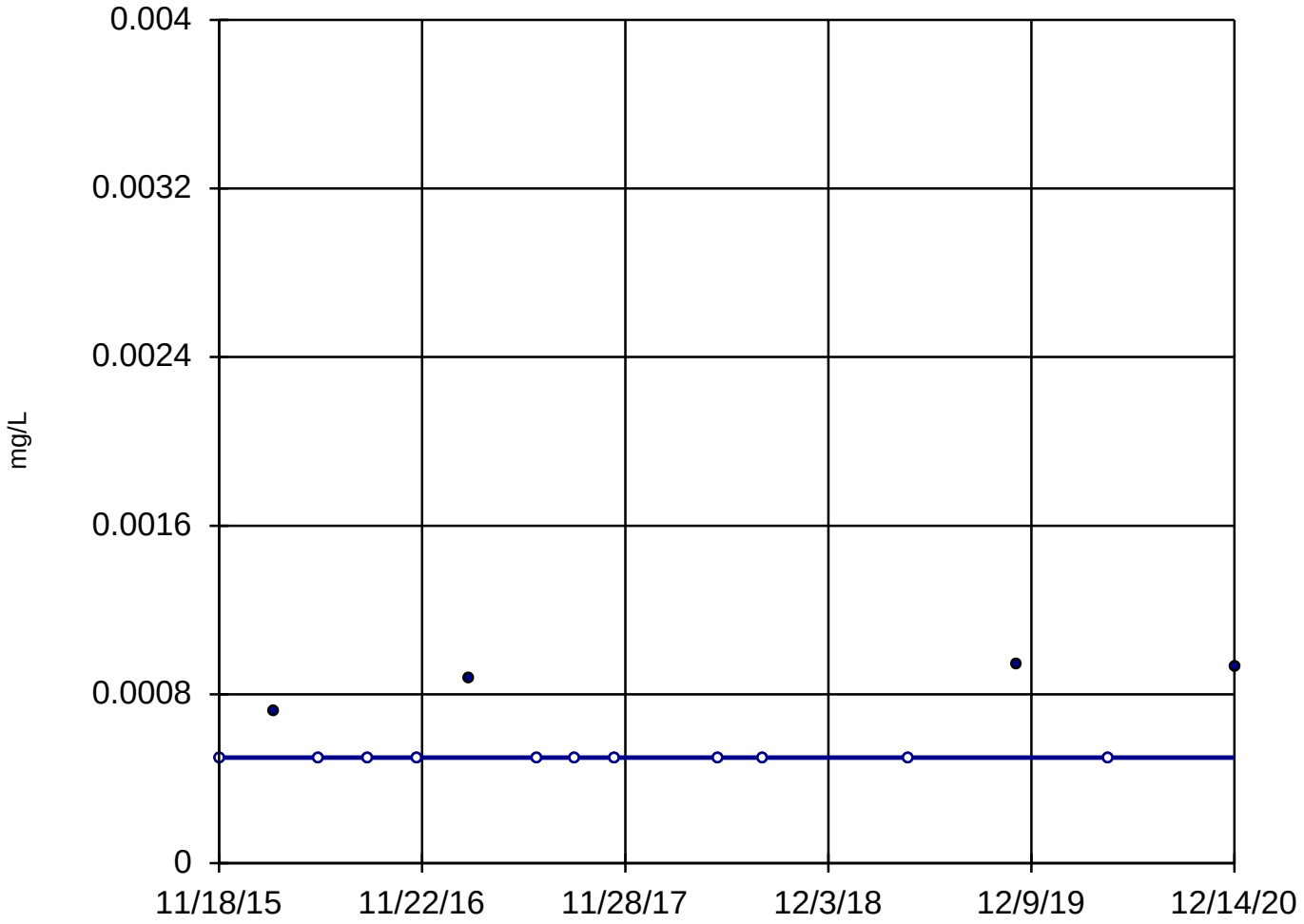
Constituent: Lead, Total Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 15

Slope = 0
units per year.

Mann-Kendall
statistic = 12
critical = 53

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

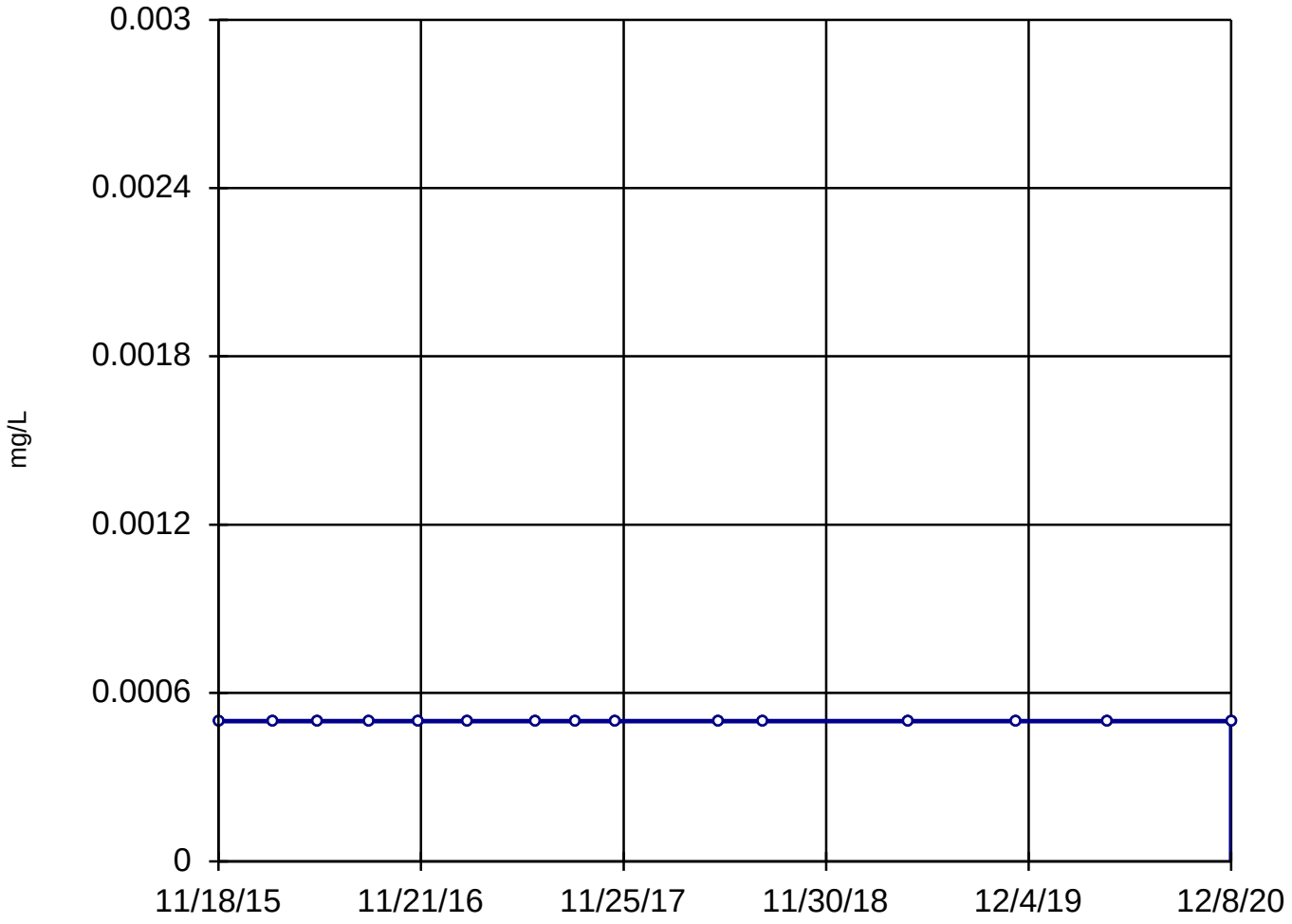
Constituent: Lead, Total Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-15



n = 15

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 53

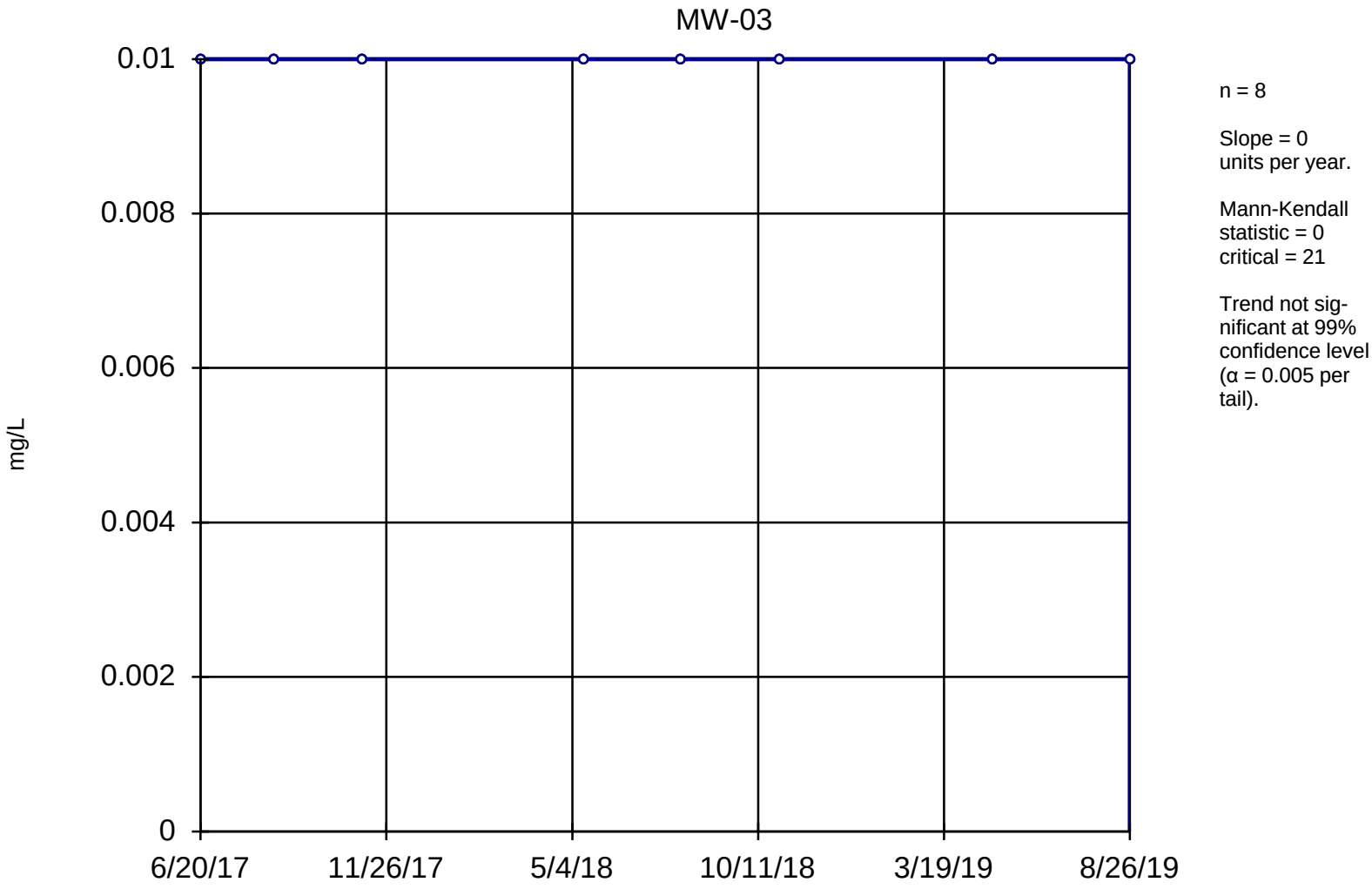
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Lead, Total Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

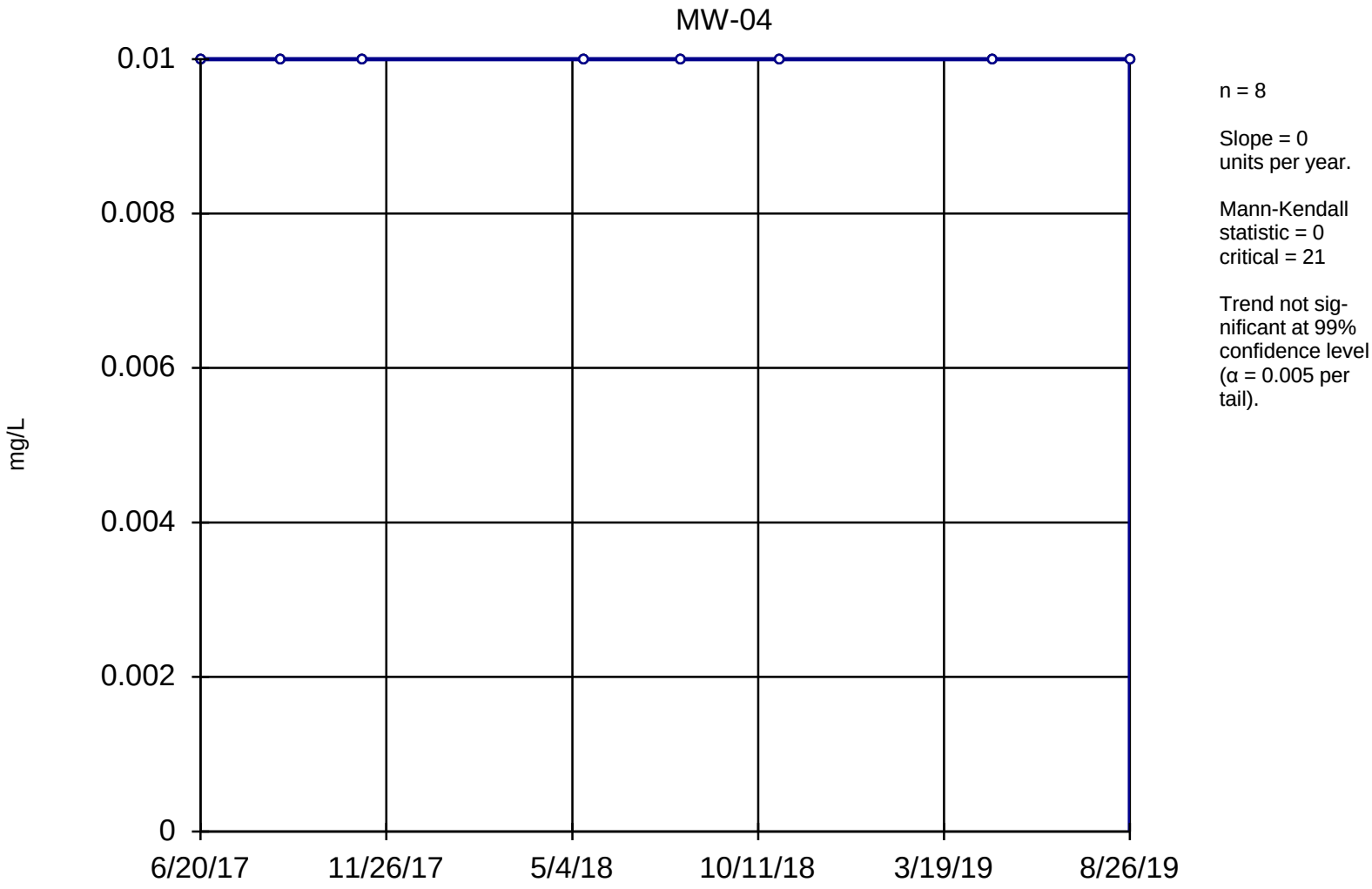


Constituent: Lithium, Total Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

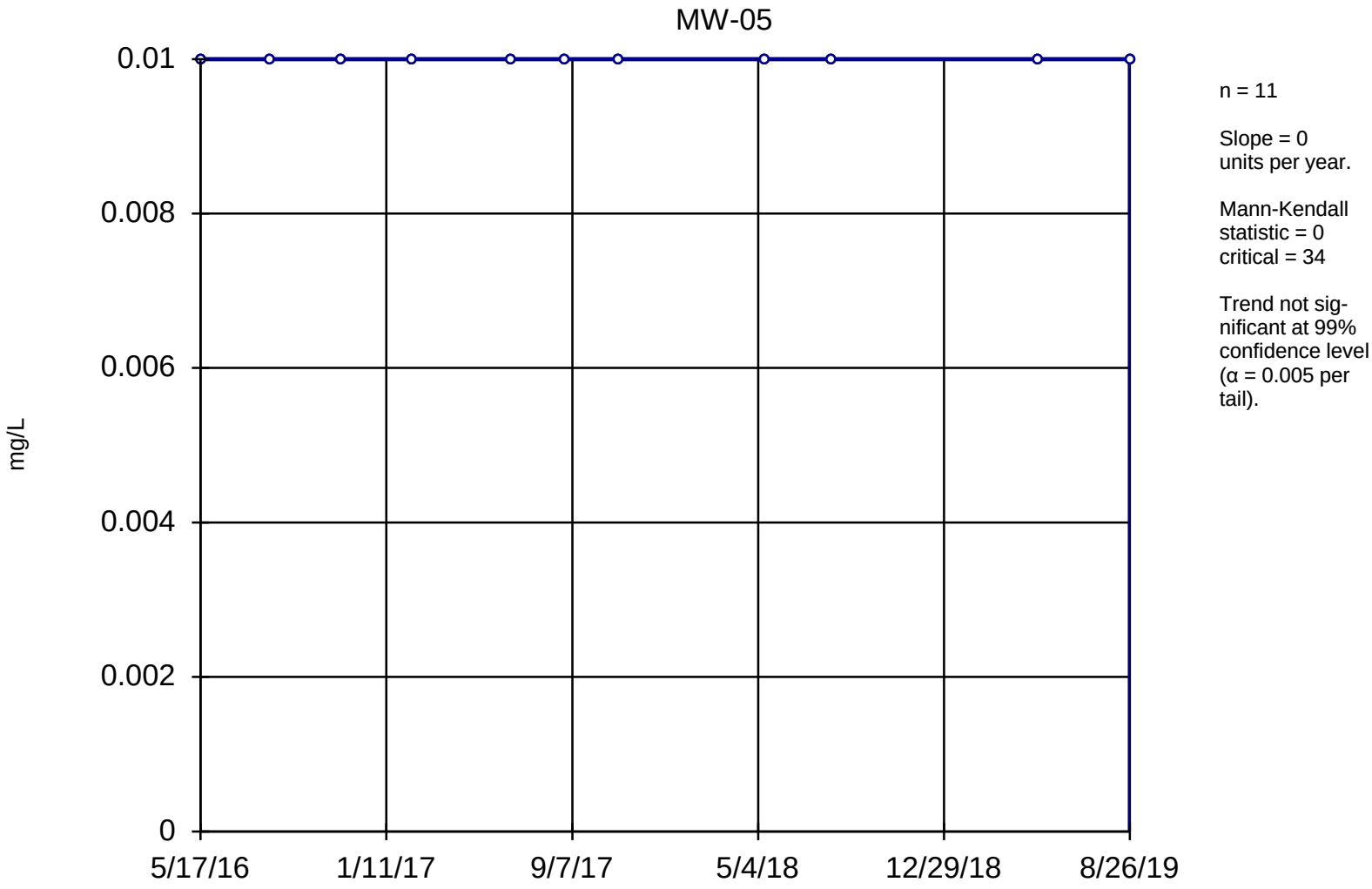


Constituent: Lithium, Total Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator



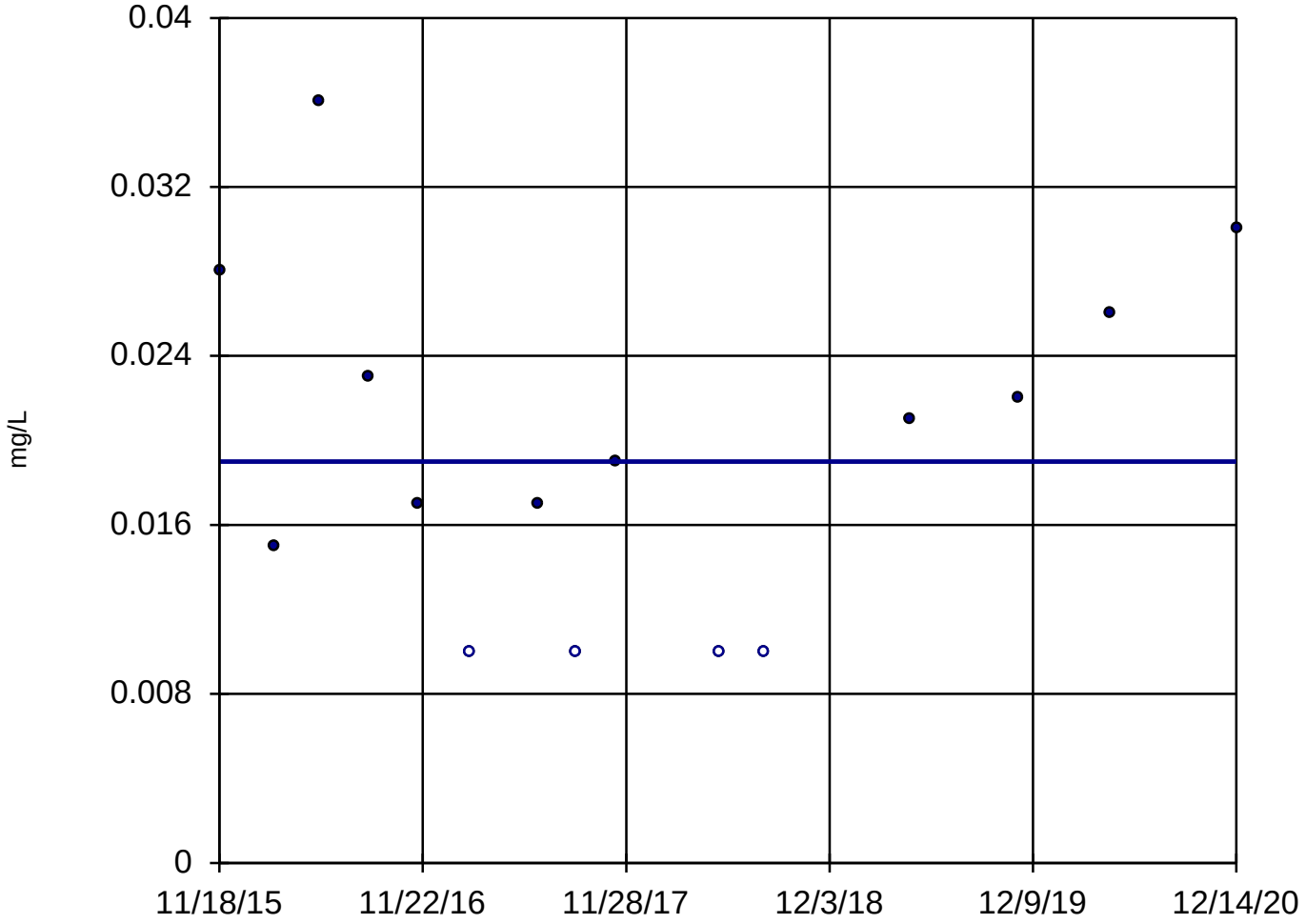
Constituent: Lithium, Total Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 15

Slope = 0
units per year.

Mann-Kendall
statistic = 6
critical = 53

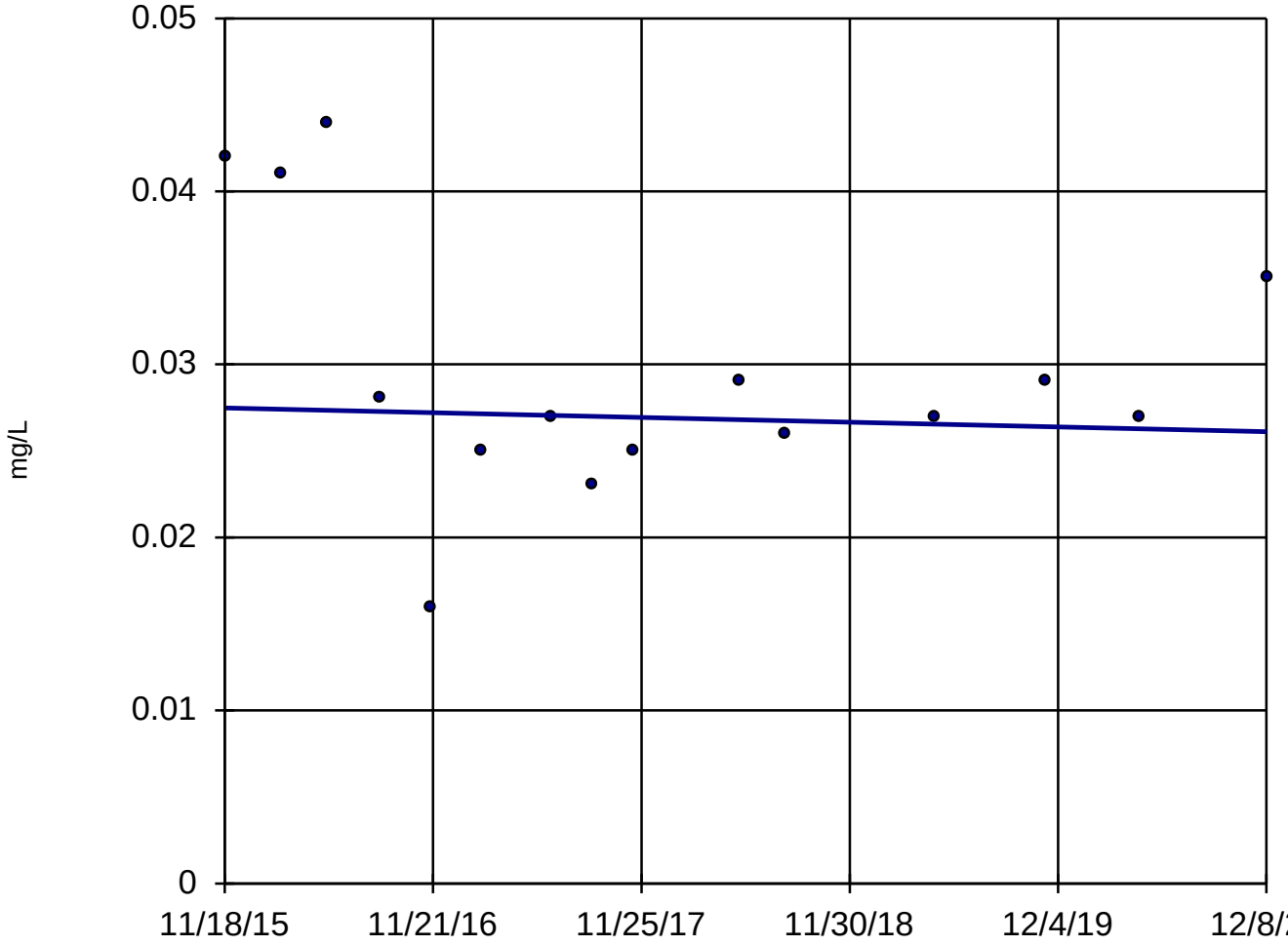
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Lithium, Total Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-15



n = 15

Slope = -0.0002704 units per year.

Mann-Kendall statistic = -6
critical = -53

Trend not significant at 99% confidence level (α = 0.005 per tail).

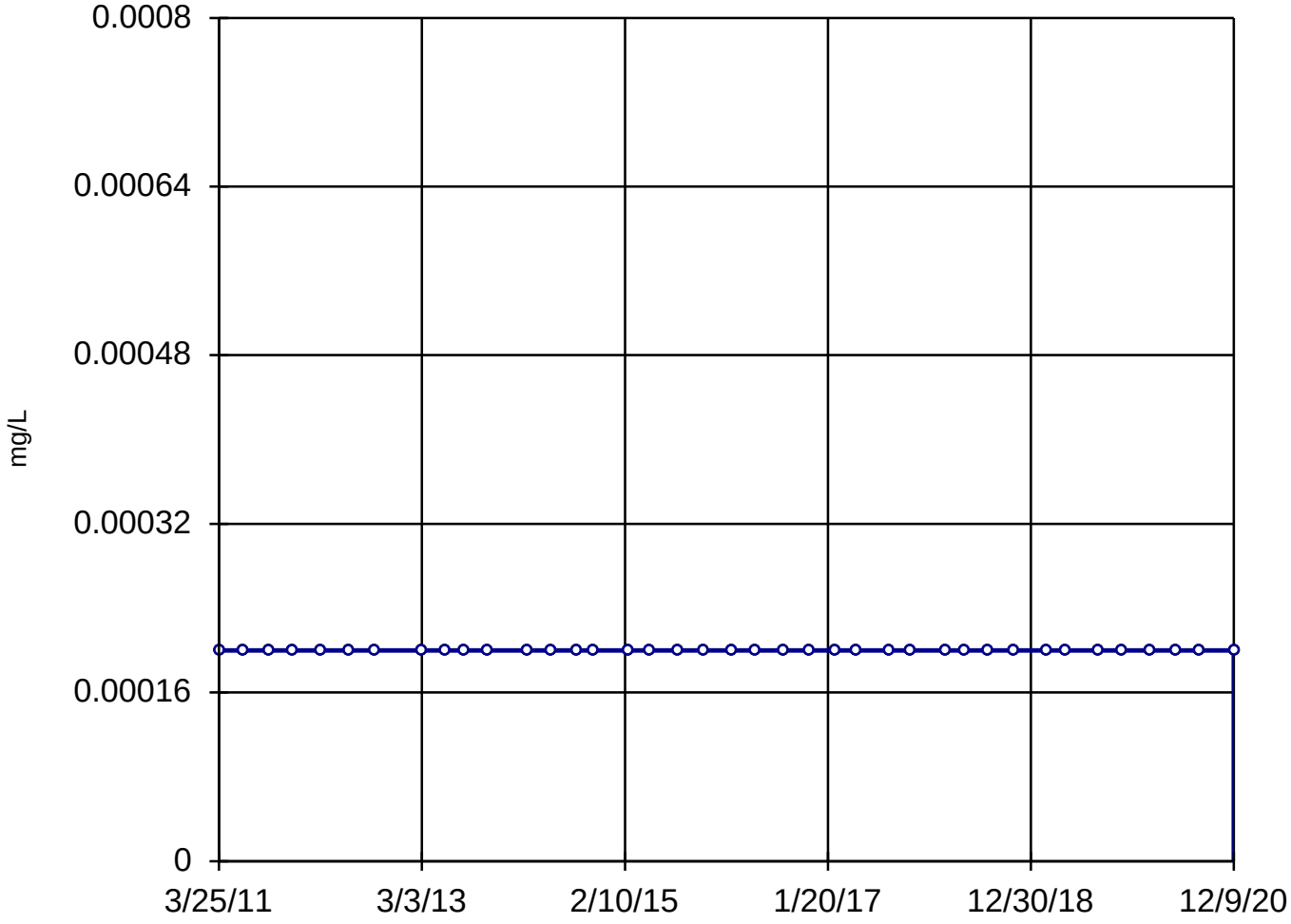
Constituent: Lithium, Total Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Mercury, Dissolved Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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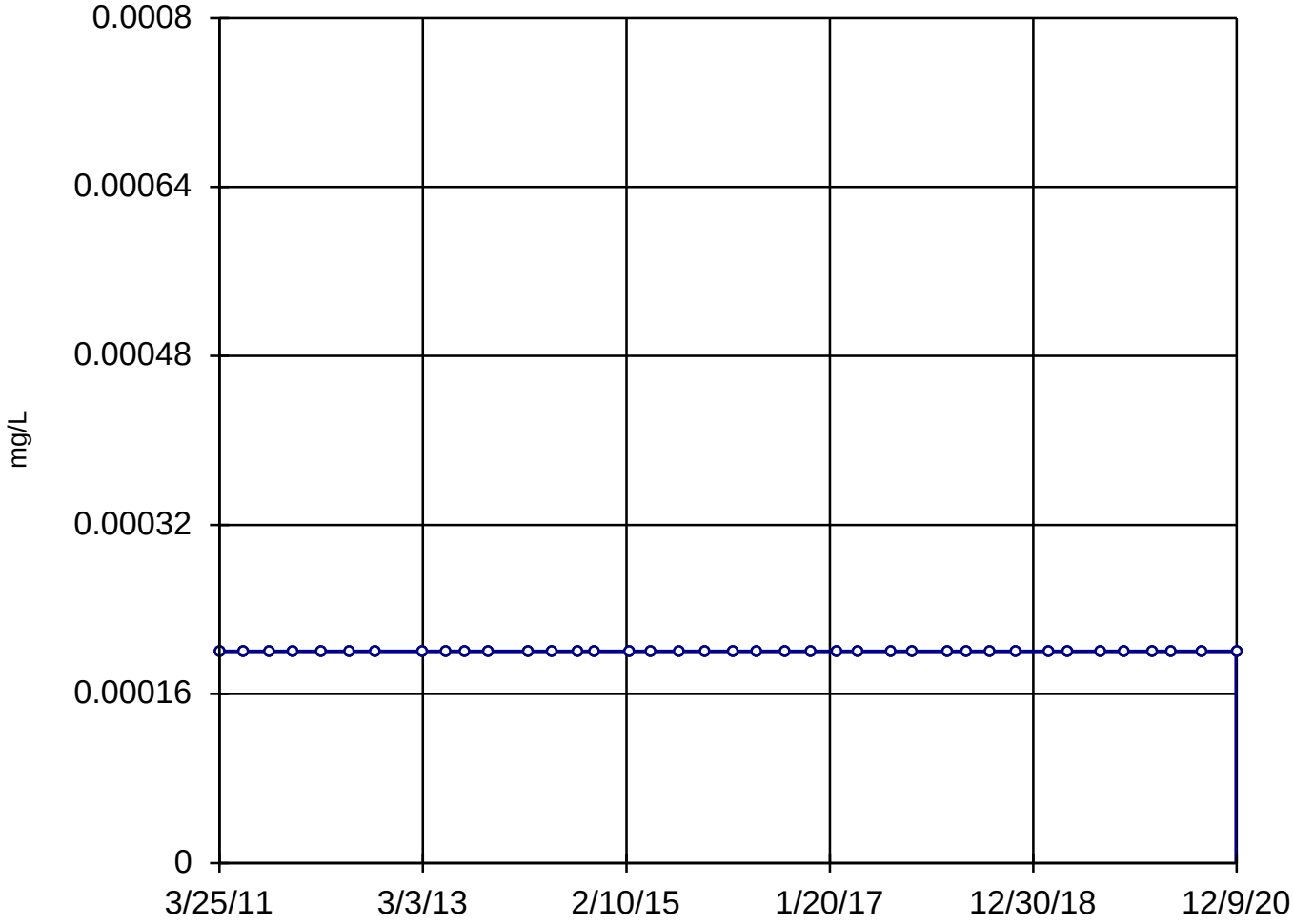
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

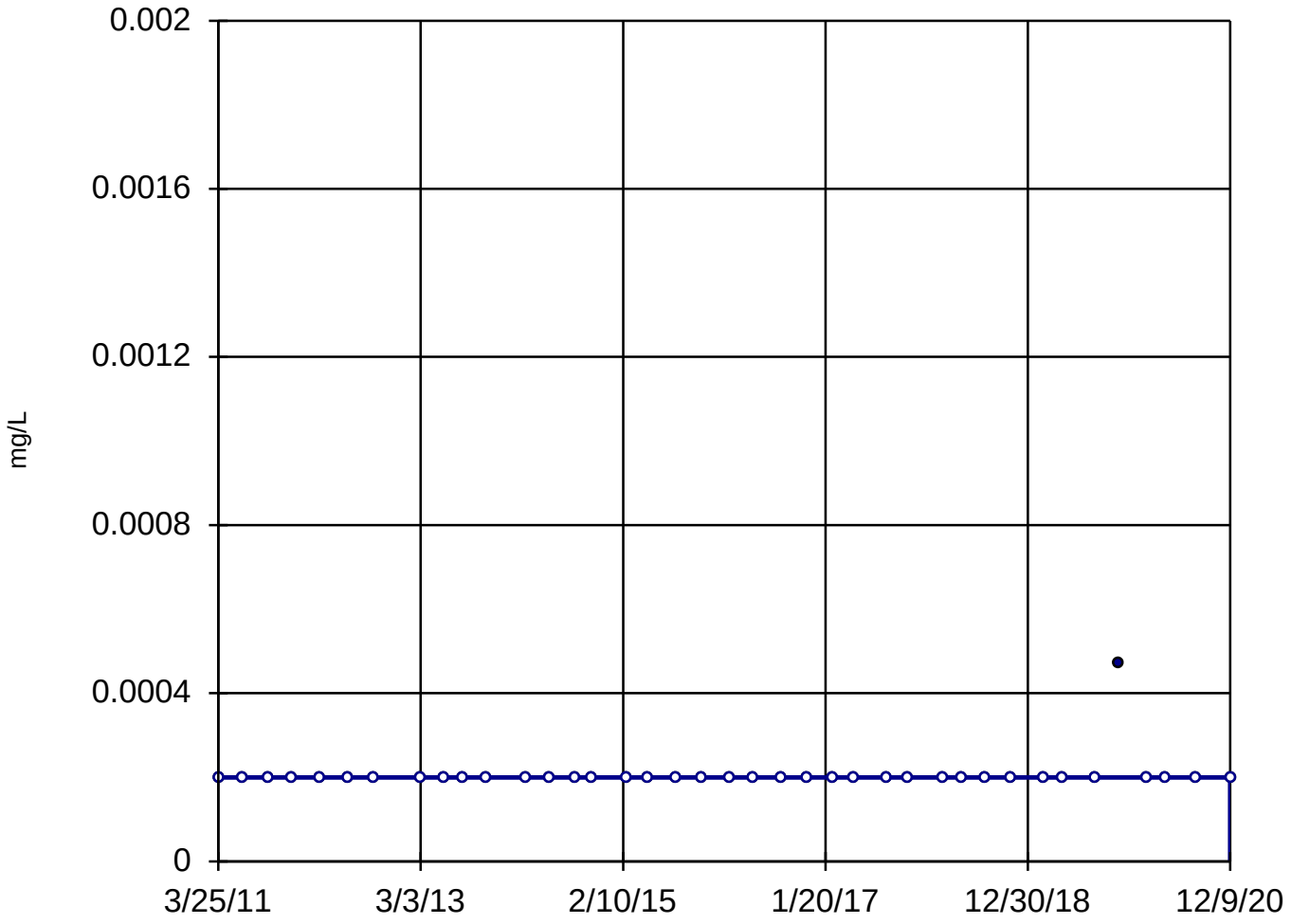
Constituent: Mercury, Dissolved Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-05



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 30
critical = 214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

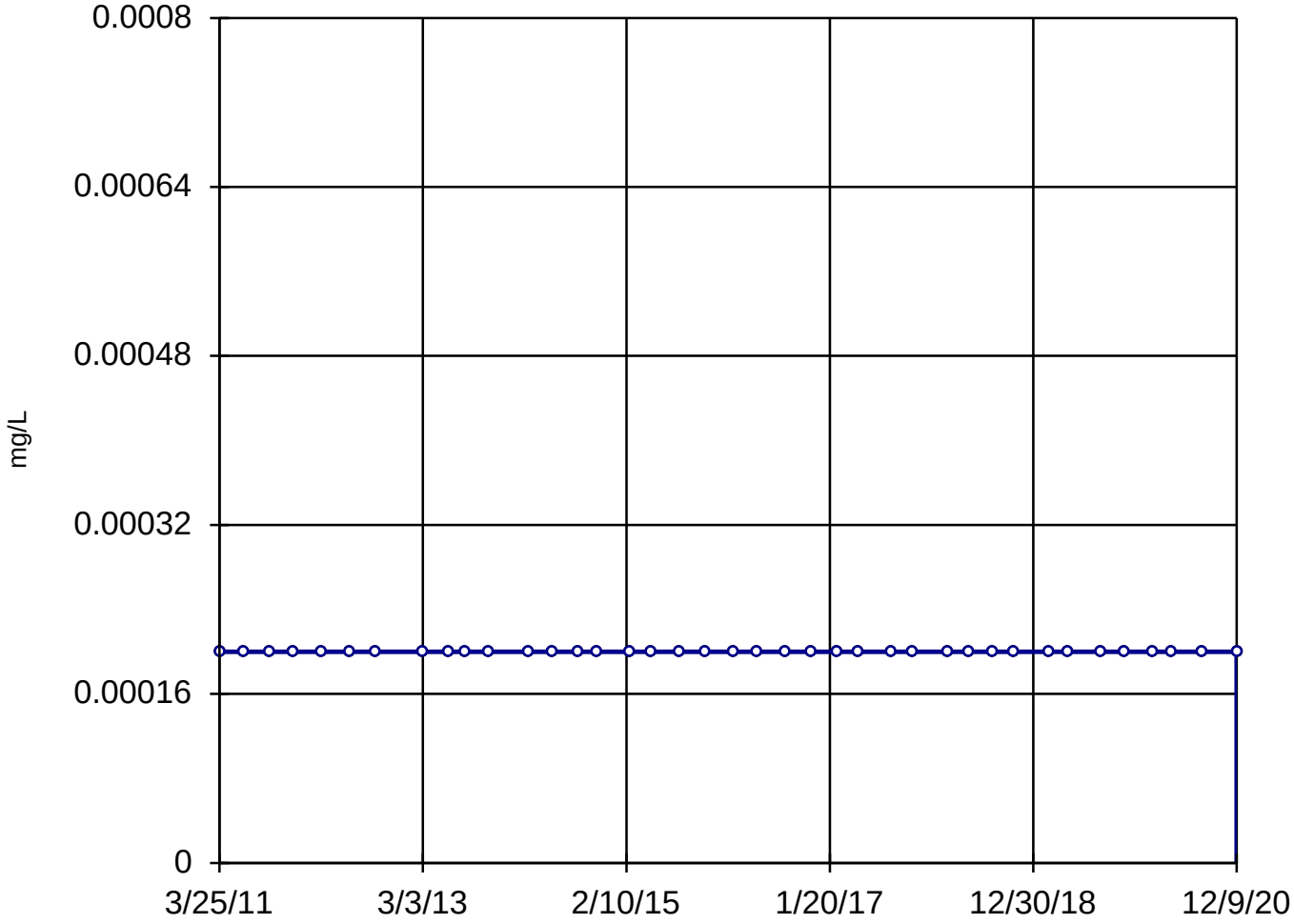
Constituent: Mercury, Dissolved Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-06



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

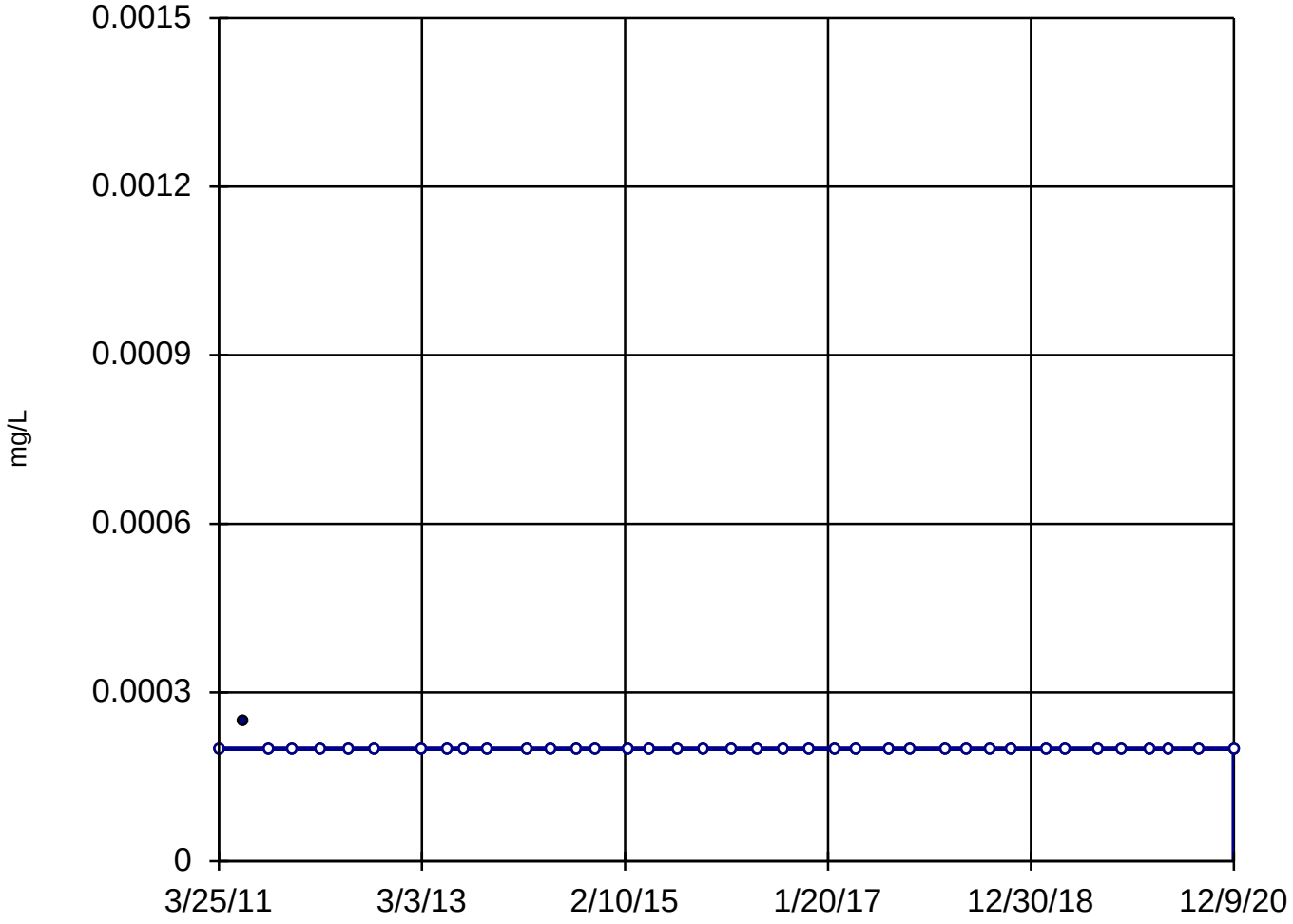
Constituent: Mercury, Dissolved Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-07



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = -36
critical = -214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

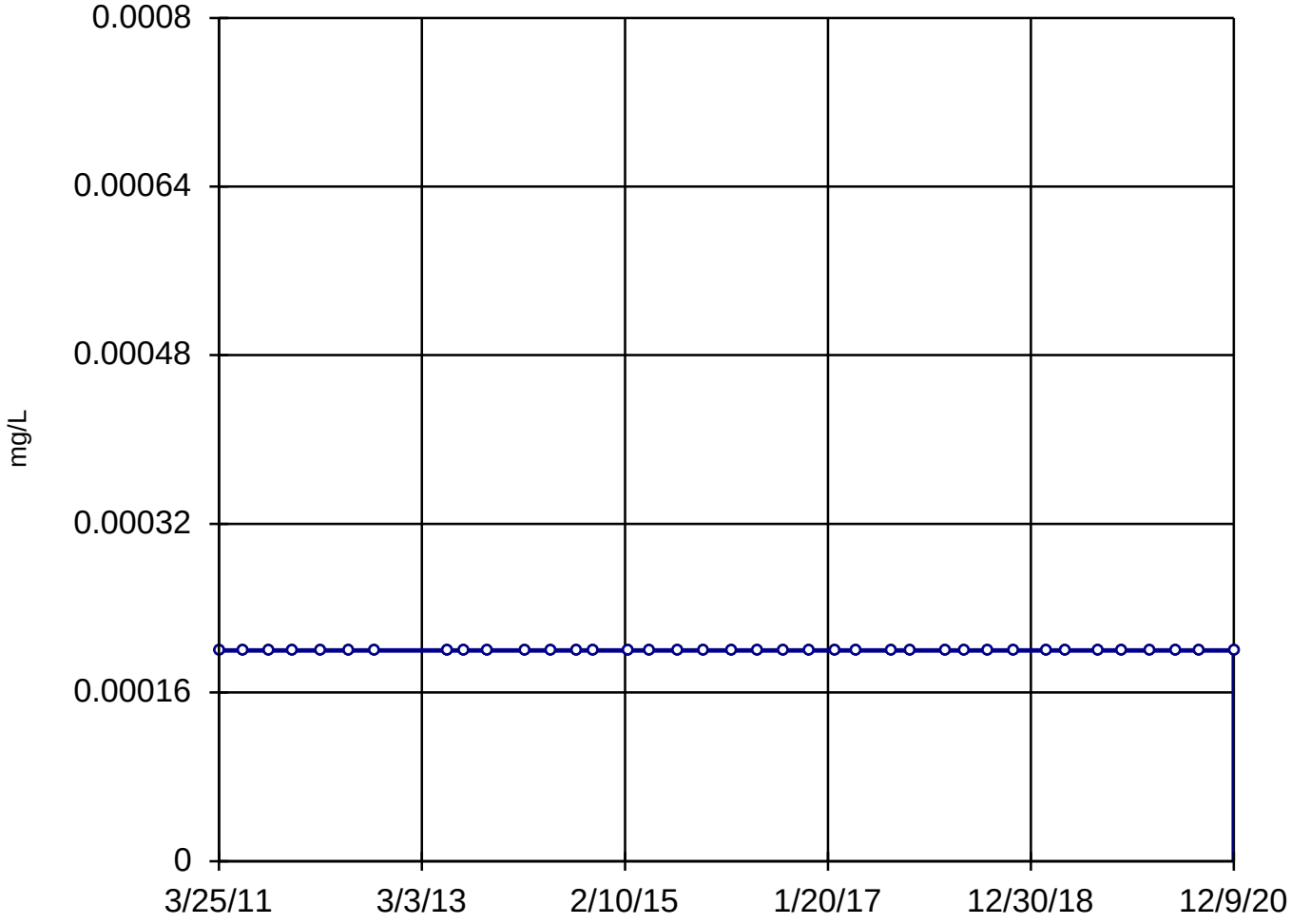
Constituent: Mercury, Dissolved Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 38

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 206

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

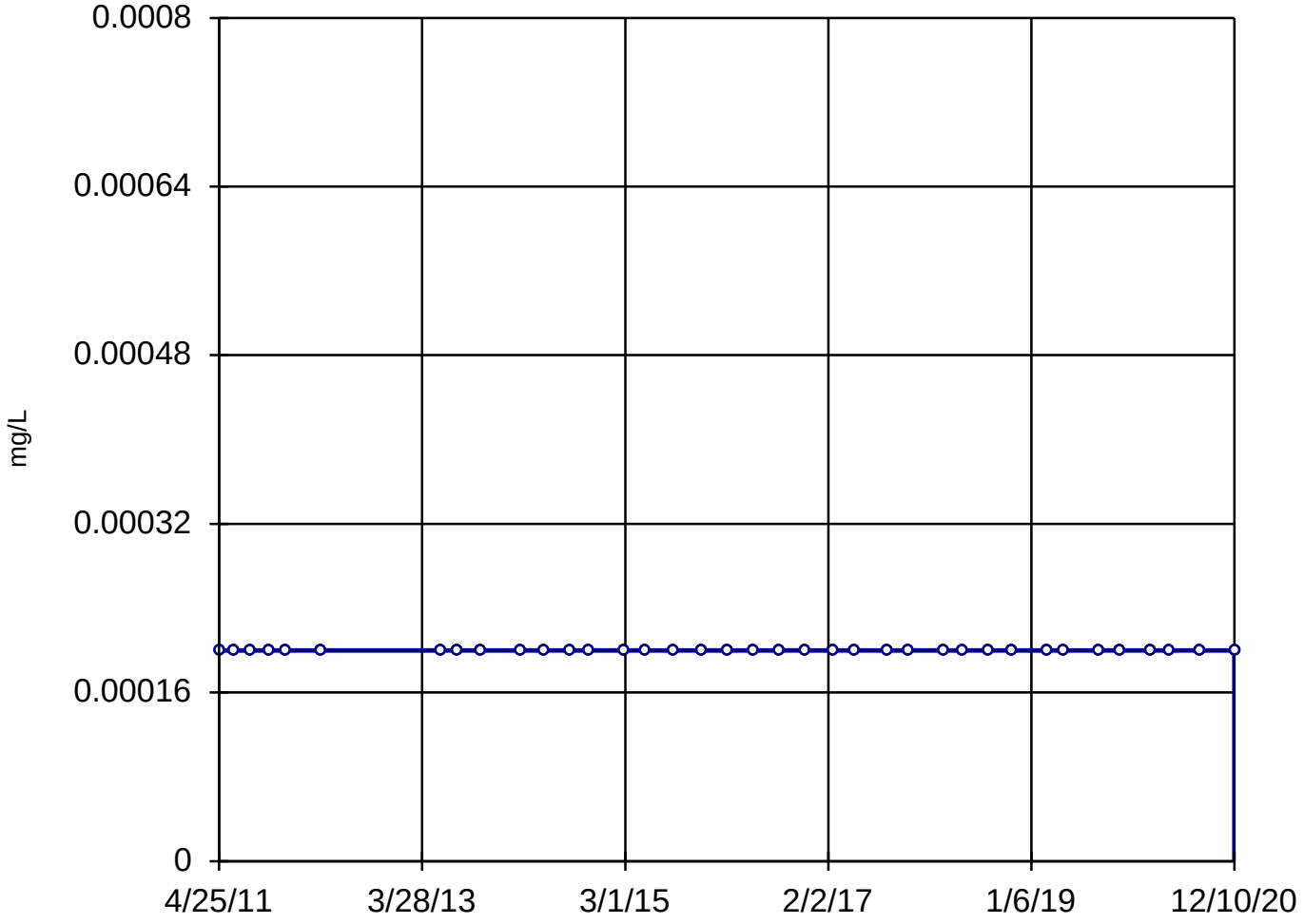
Constituent: Mercury, Dissolved Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-13



n = 37

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 199

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

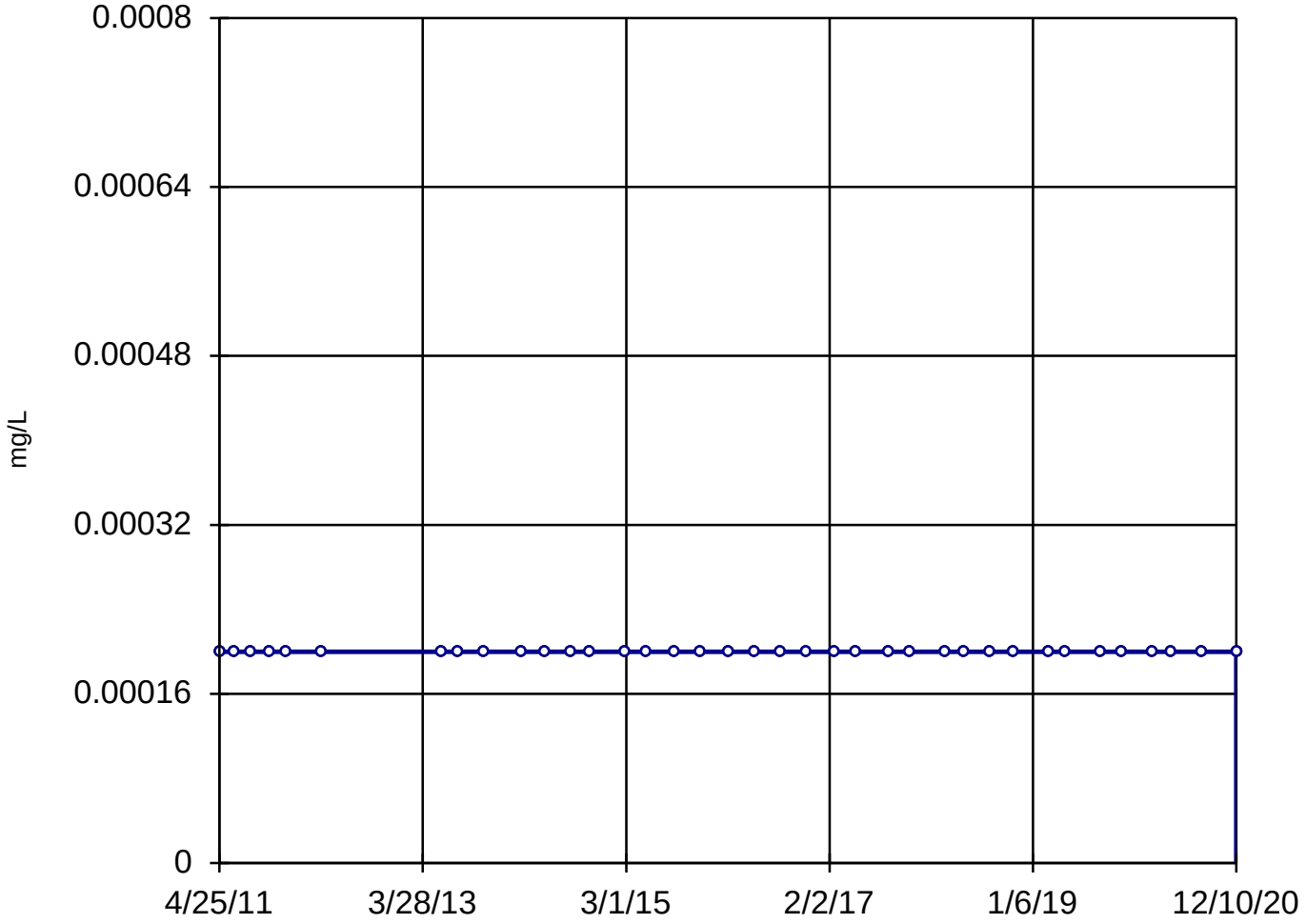
Constituent: Mercury, Dissolved Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-14



n = 37

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 199

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

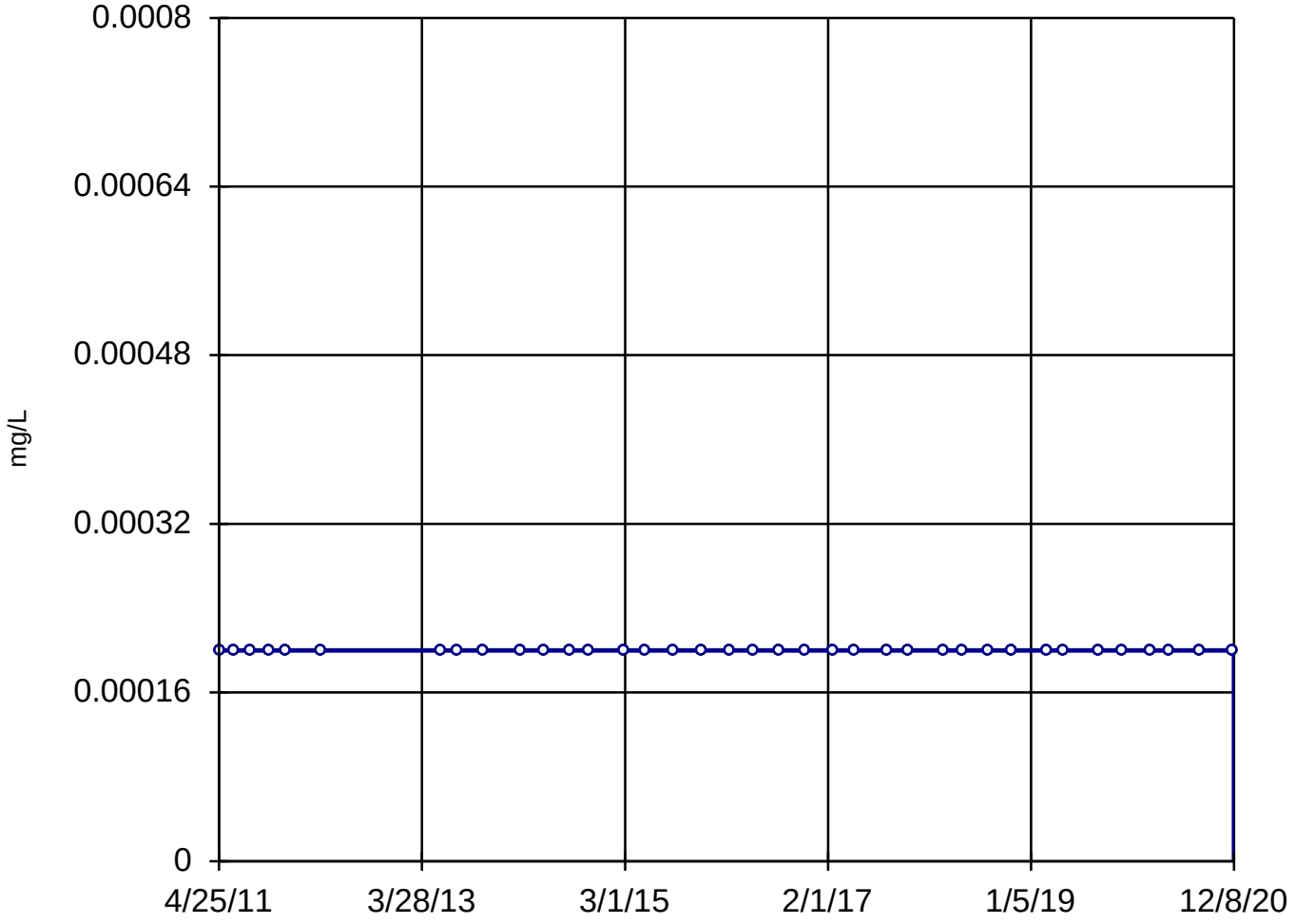
Constituent: Mercury, Dissolved Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-15



n = 37

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 199

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

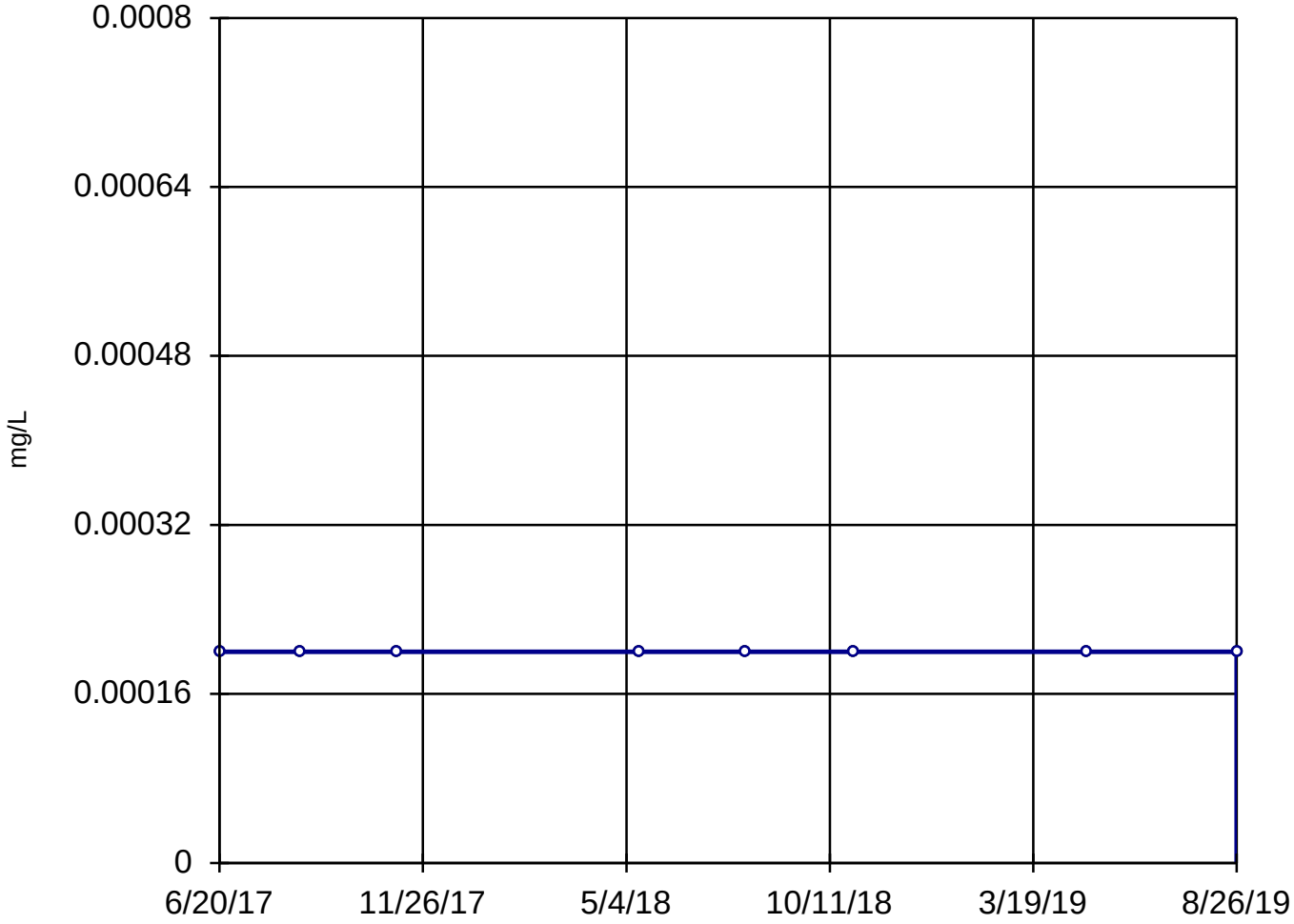
Constituent: Mercury, Dissolved Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 8

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 21

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

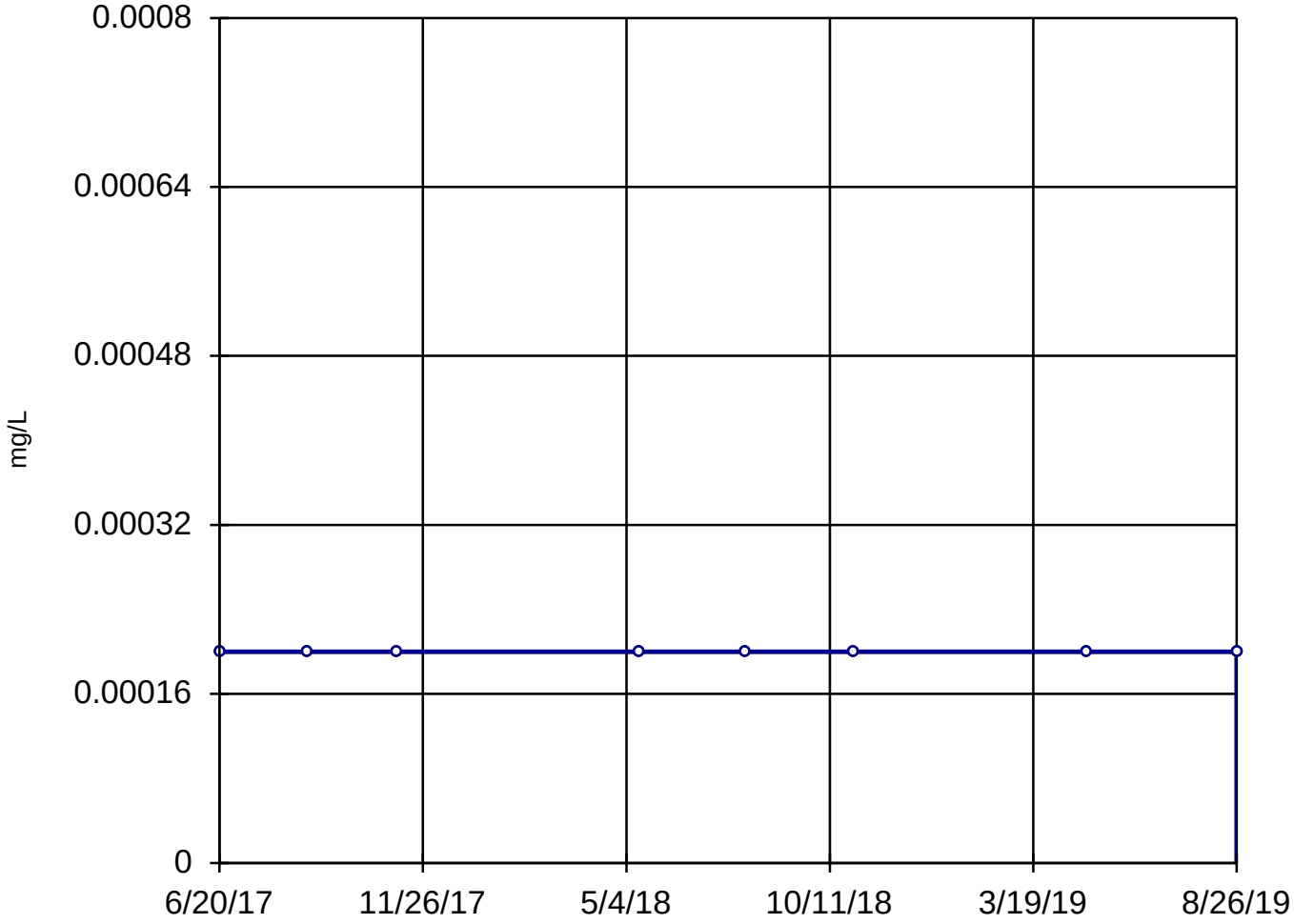
Constituent: Mercury, Total Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 8

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 21

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

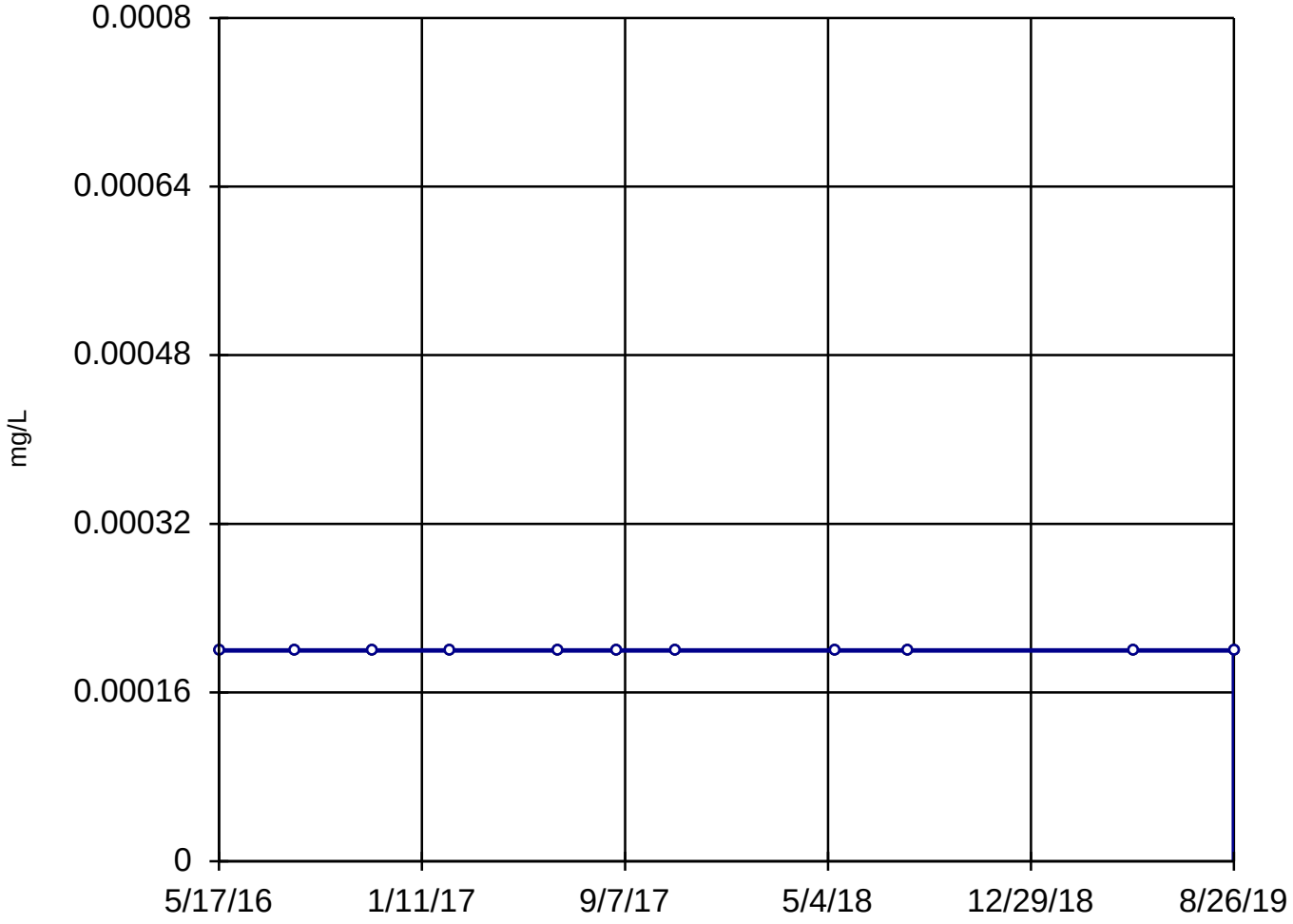
Constituent: Mercury, Total Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-05



n = 11

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 34

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

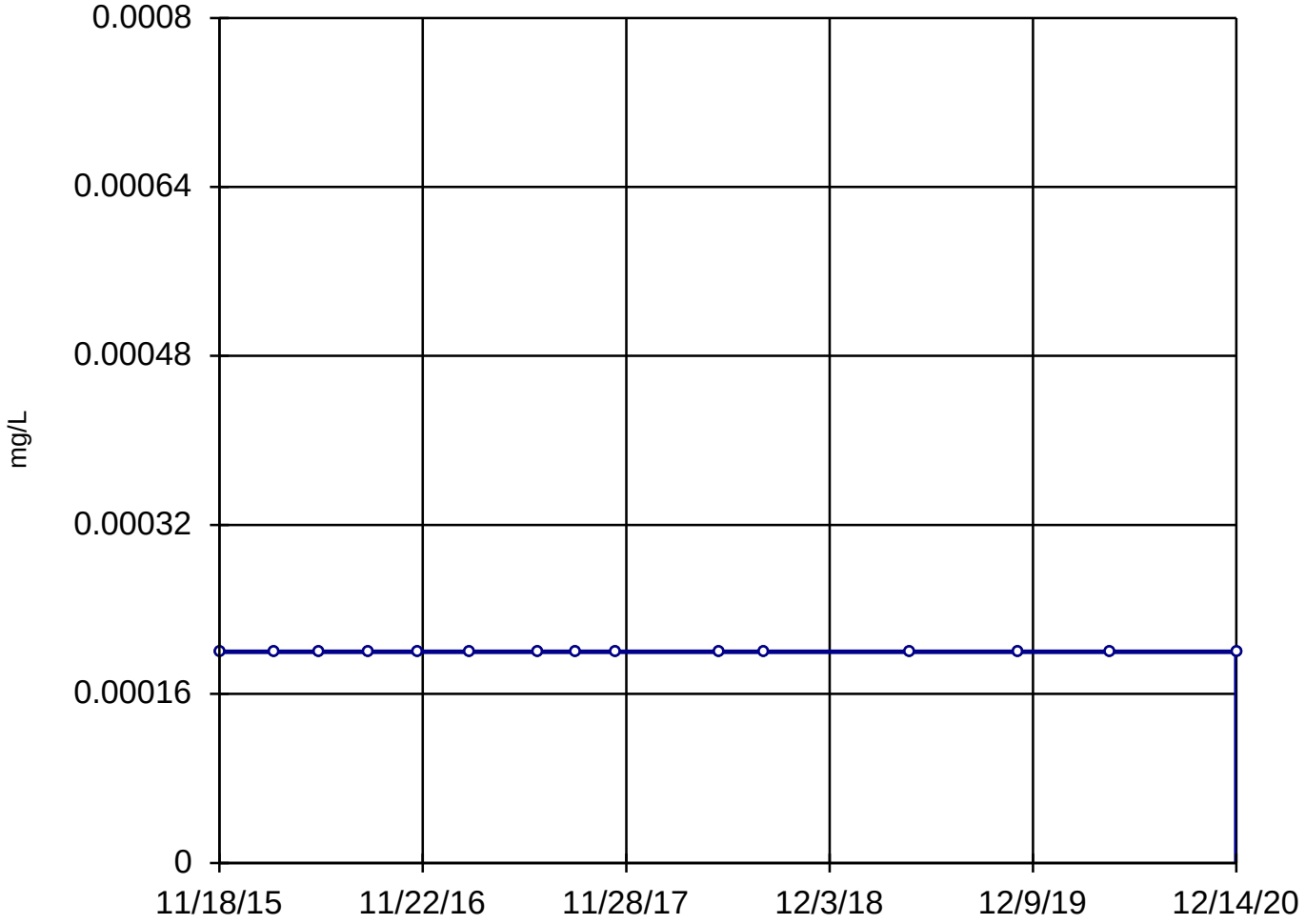
Constituent: Mercury, Total Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 15

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 53

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

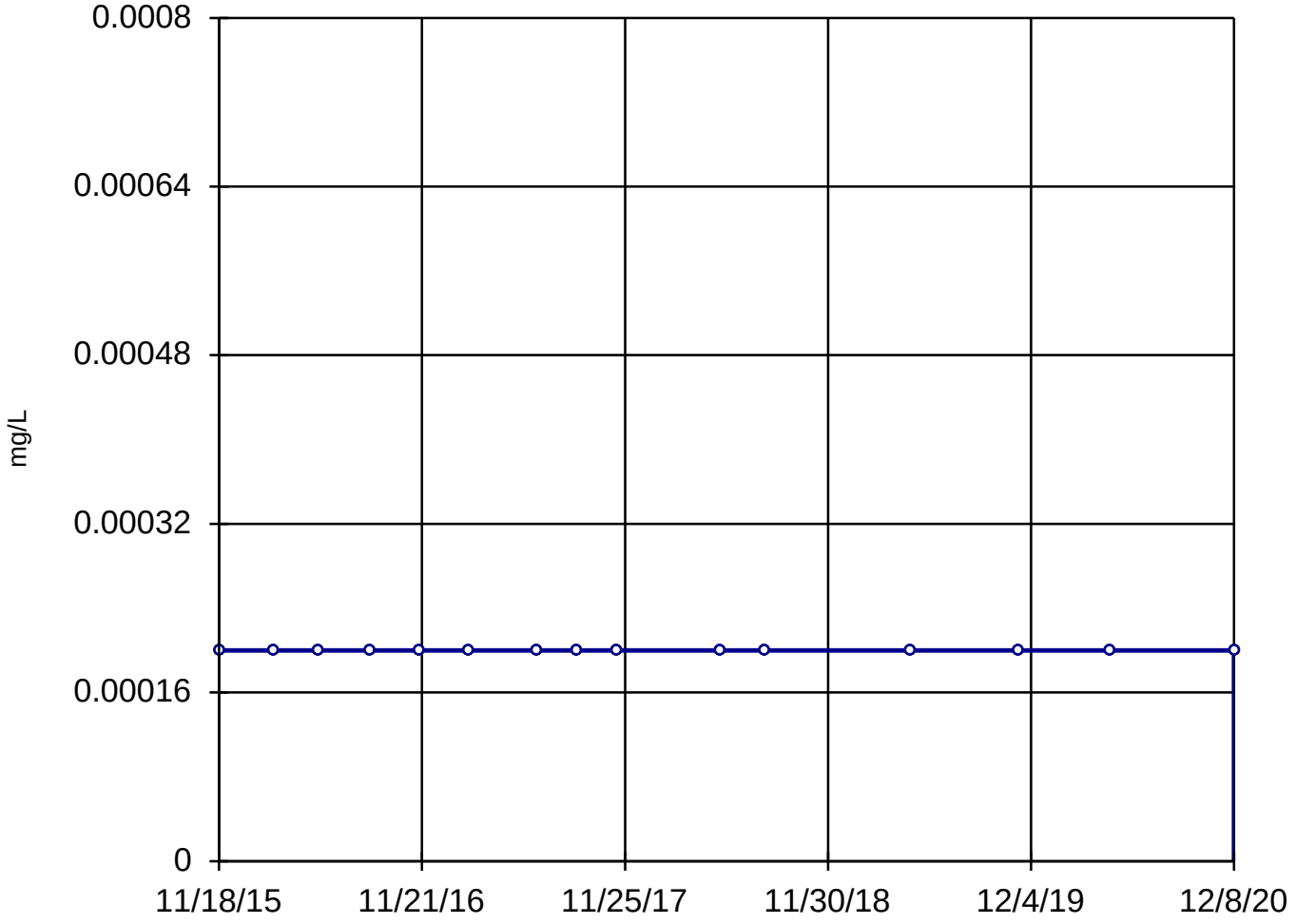
Constituent: Mercury, Total Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-15



n = 15

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 53

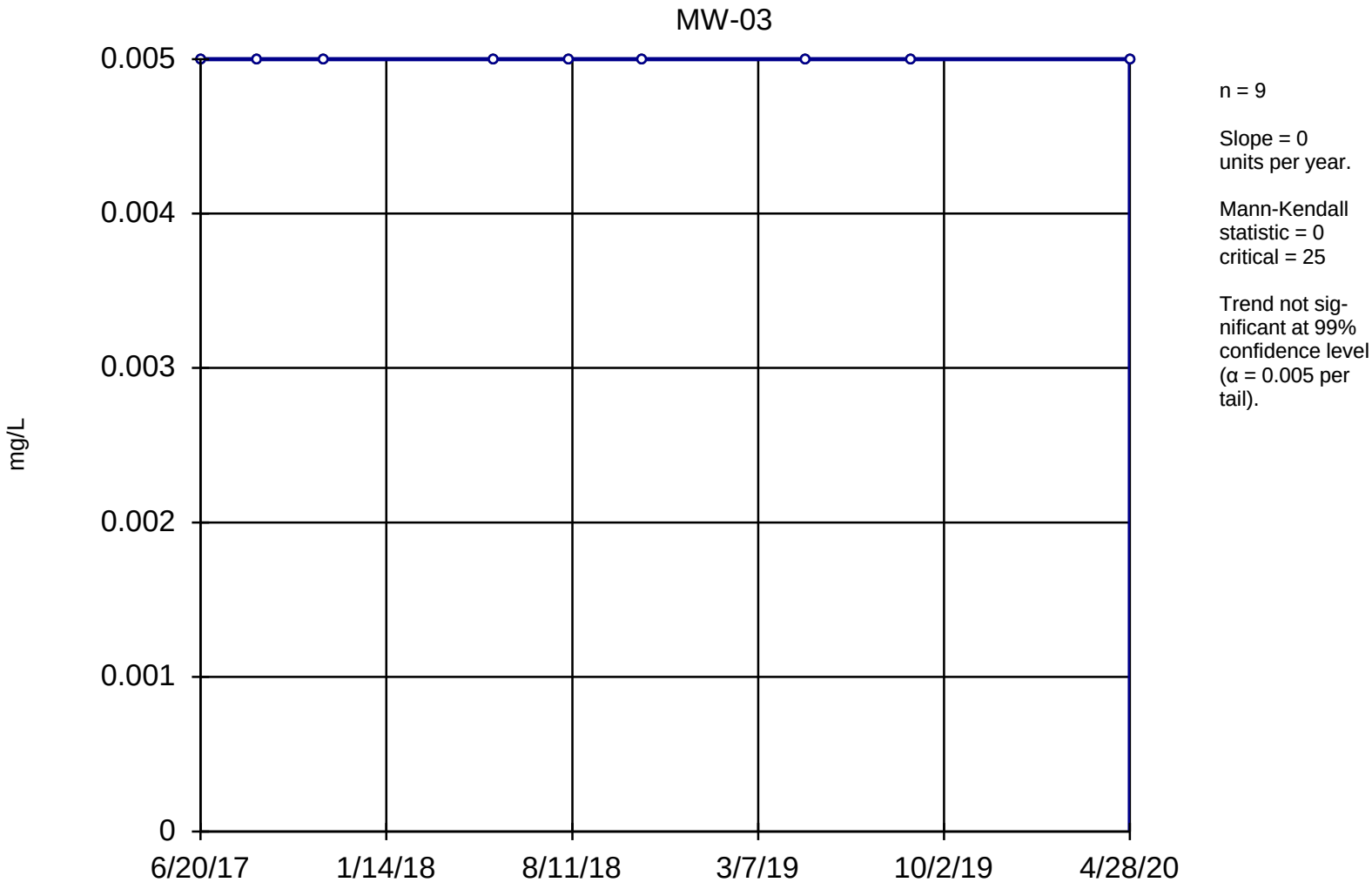
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Mercury, Total Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator



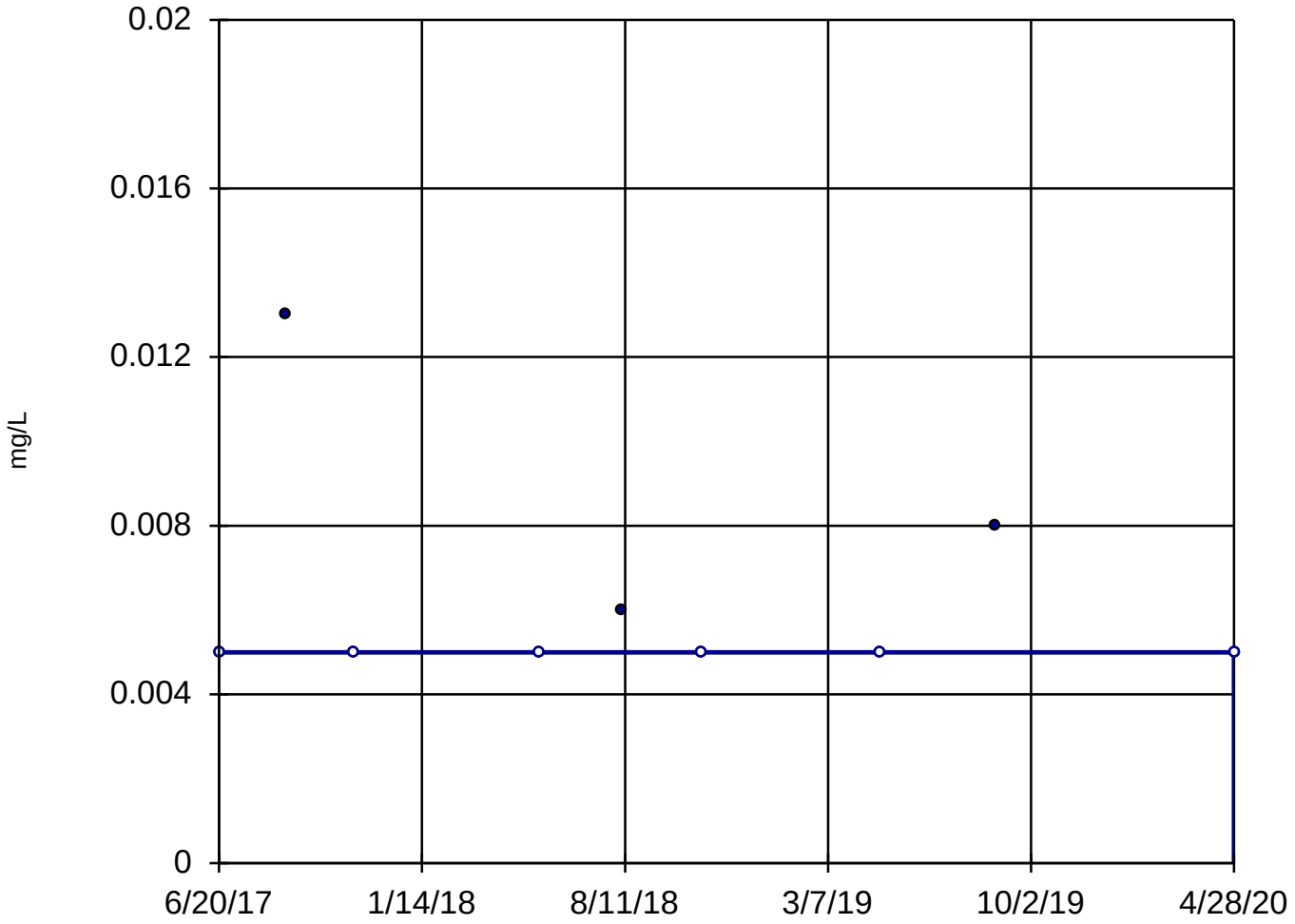
Constituent: Molybdenum, Total Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = -1
critical = -25

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

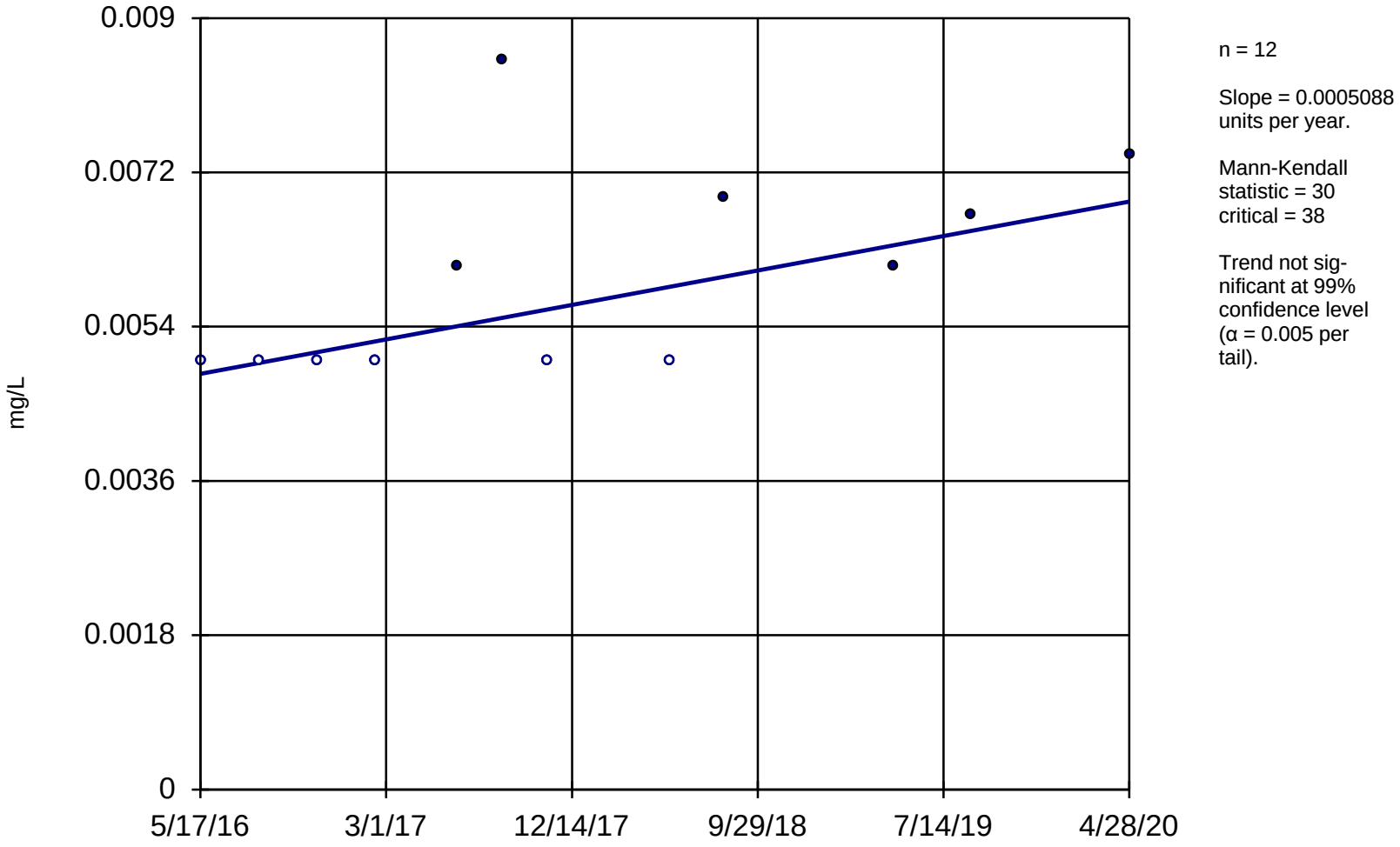
Constituent: Molybdenum, Total Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-05



n = 12

Slope = 0.0005088 units per year.

Mann-Kendall statistic = 30
critical = 38

Trend not significant at 99% confidence level (α = 0.005 per tail).

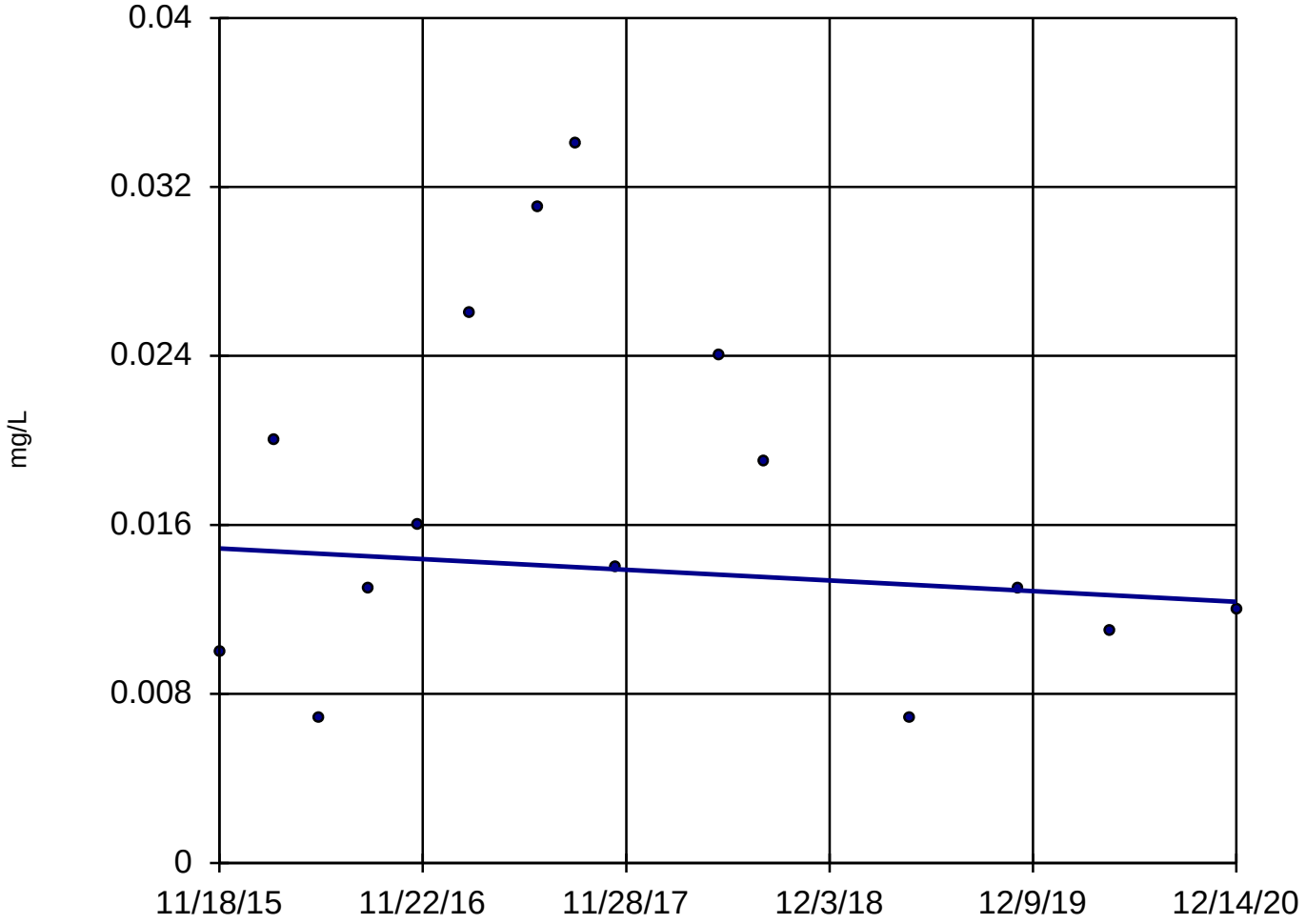
Constituent: Molybdenum, Total Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA

Sen's Slope Estimator

MW-08



n = 15

Slope = -0.0004966 units per year.

Mann-Kendall statistic = -7
critical = -53

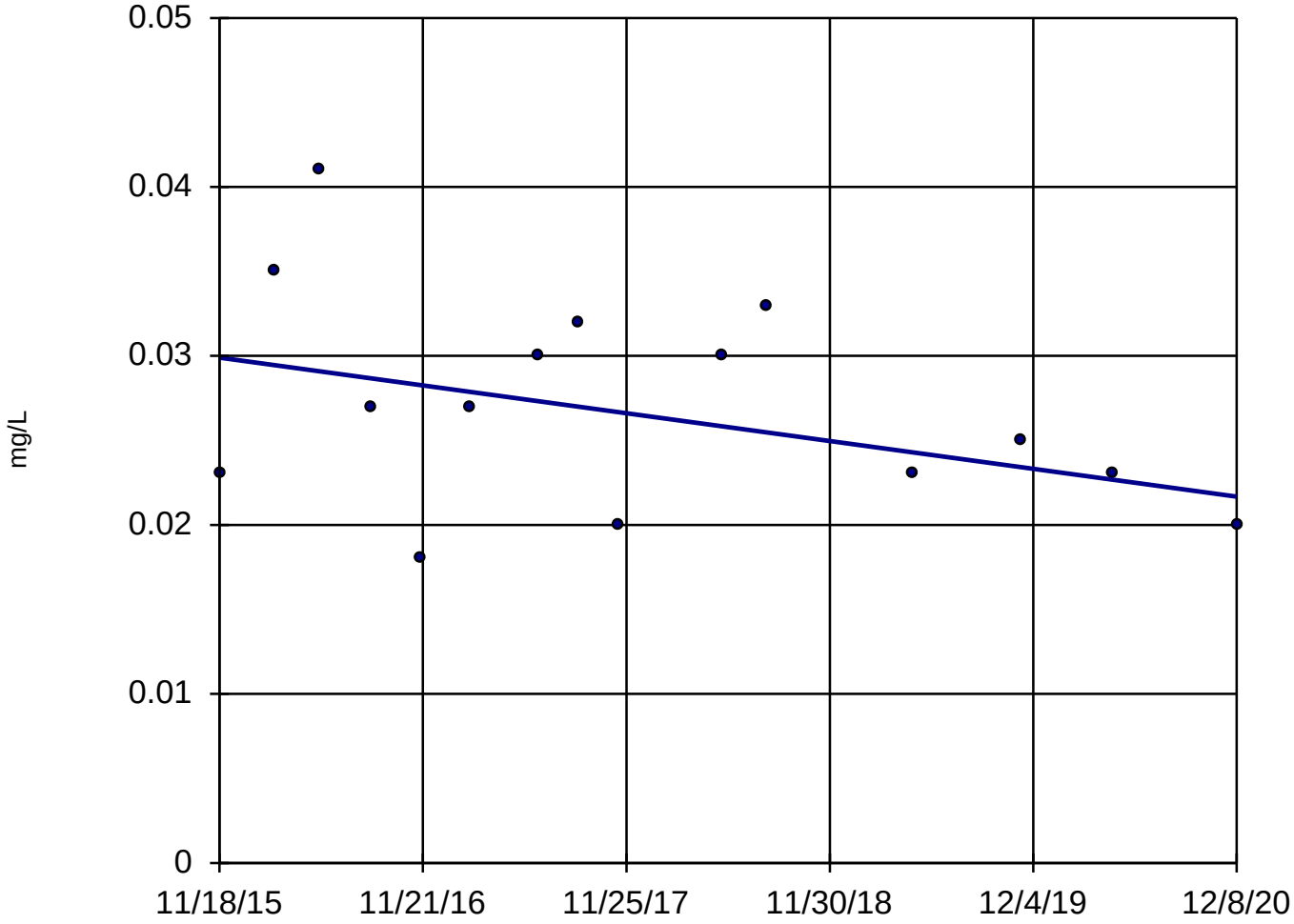
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Molybdenum, Total Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-15



n = 15

Slope = -0.001624 units per year.

Mann-Kendall statistic = -23
critical = -53

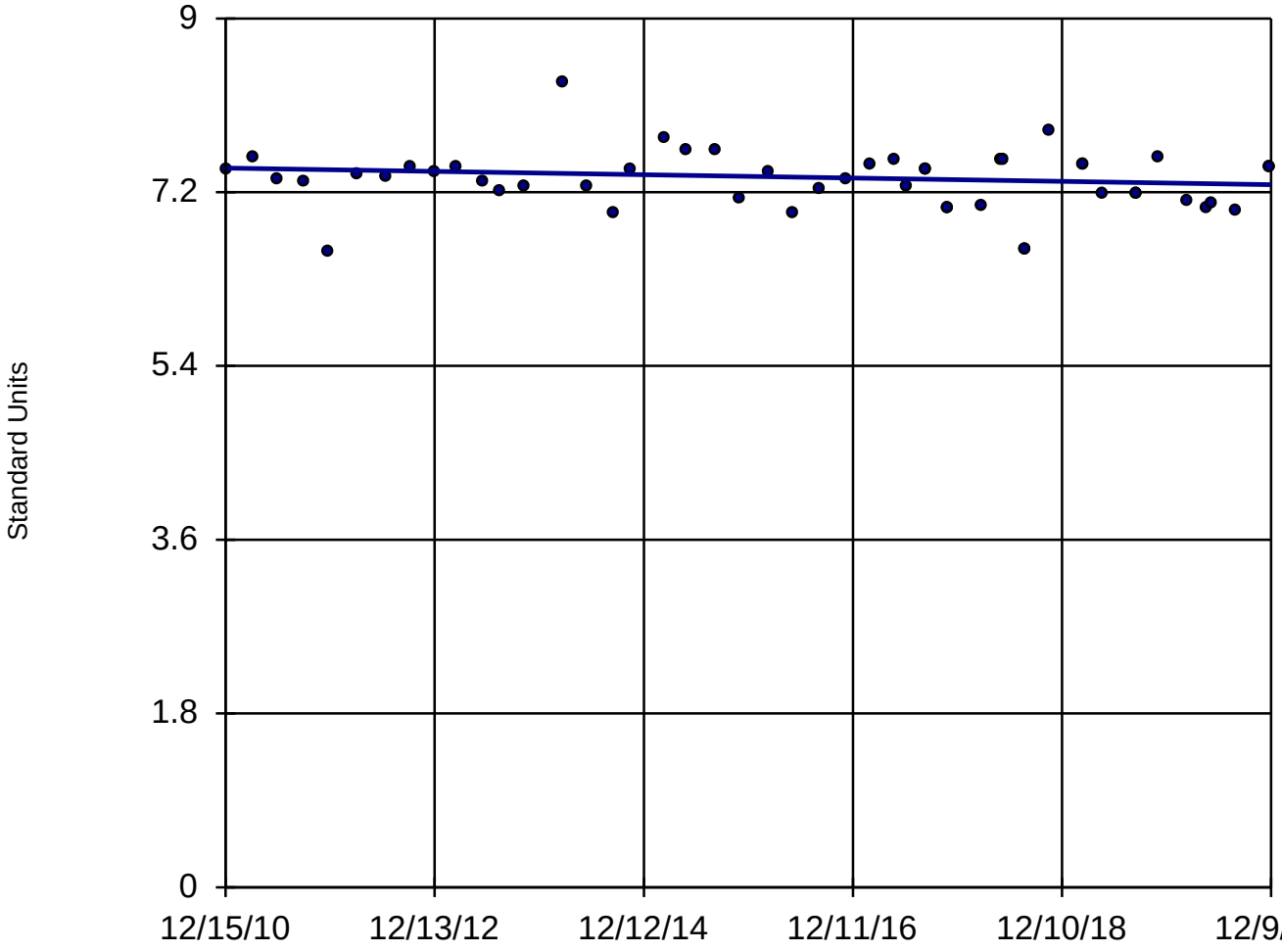
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Molybdenum, Total Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-03



n = 50

Slope = -0.01712 units per year.

Mann-Kendall normal approx. = -1.063
critical = -2.58

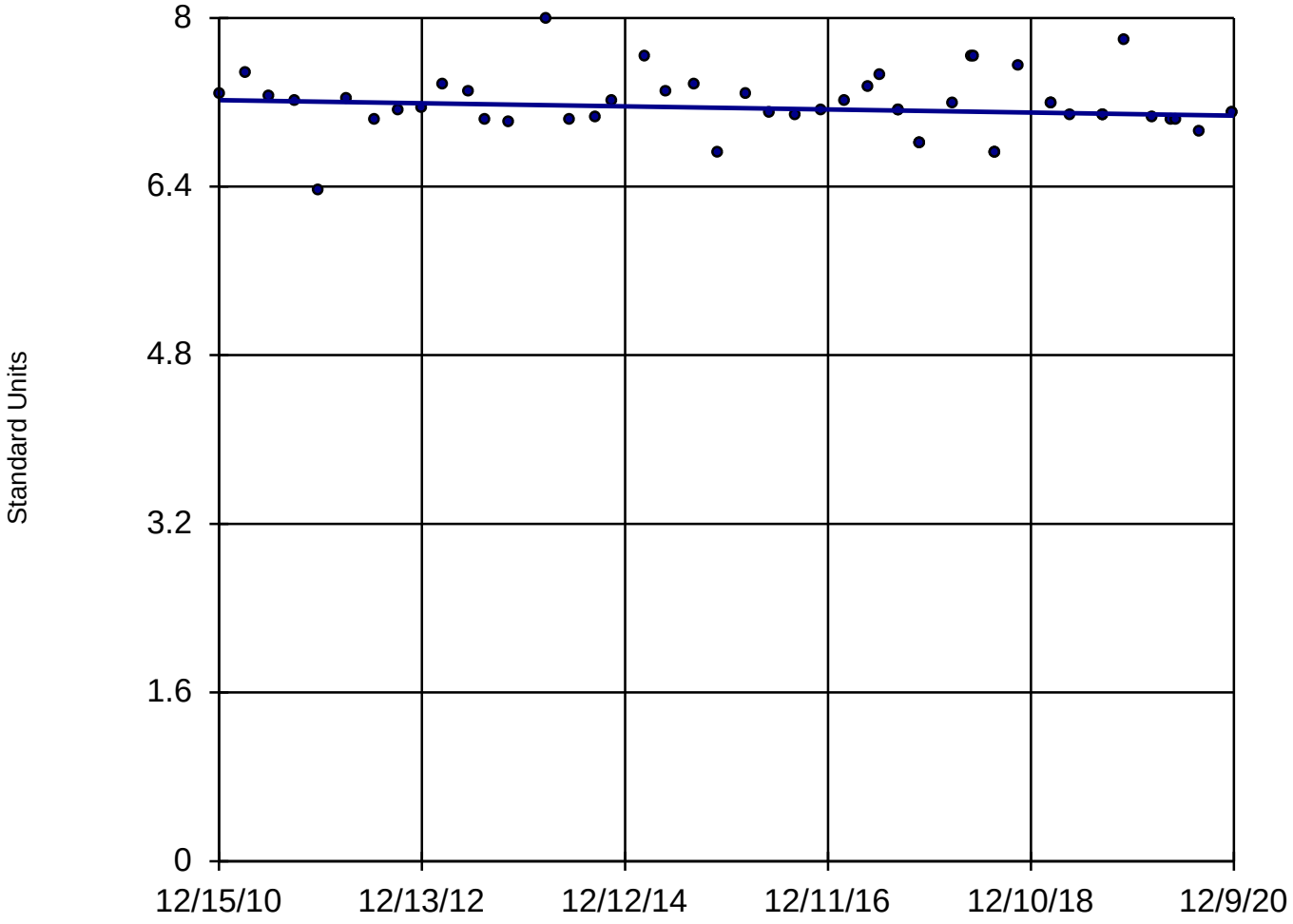
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: pH, Field Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-04



n = 50

Slope = -0.01479 units per year.

Mann-Kendall normal approx. = -1.398
critical = -2.58

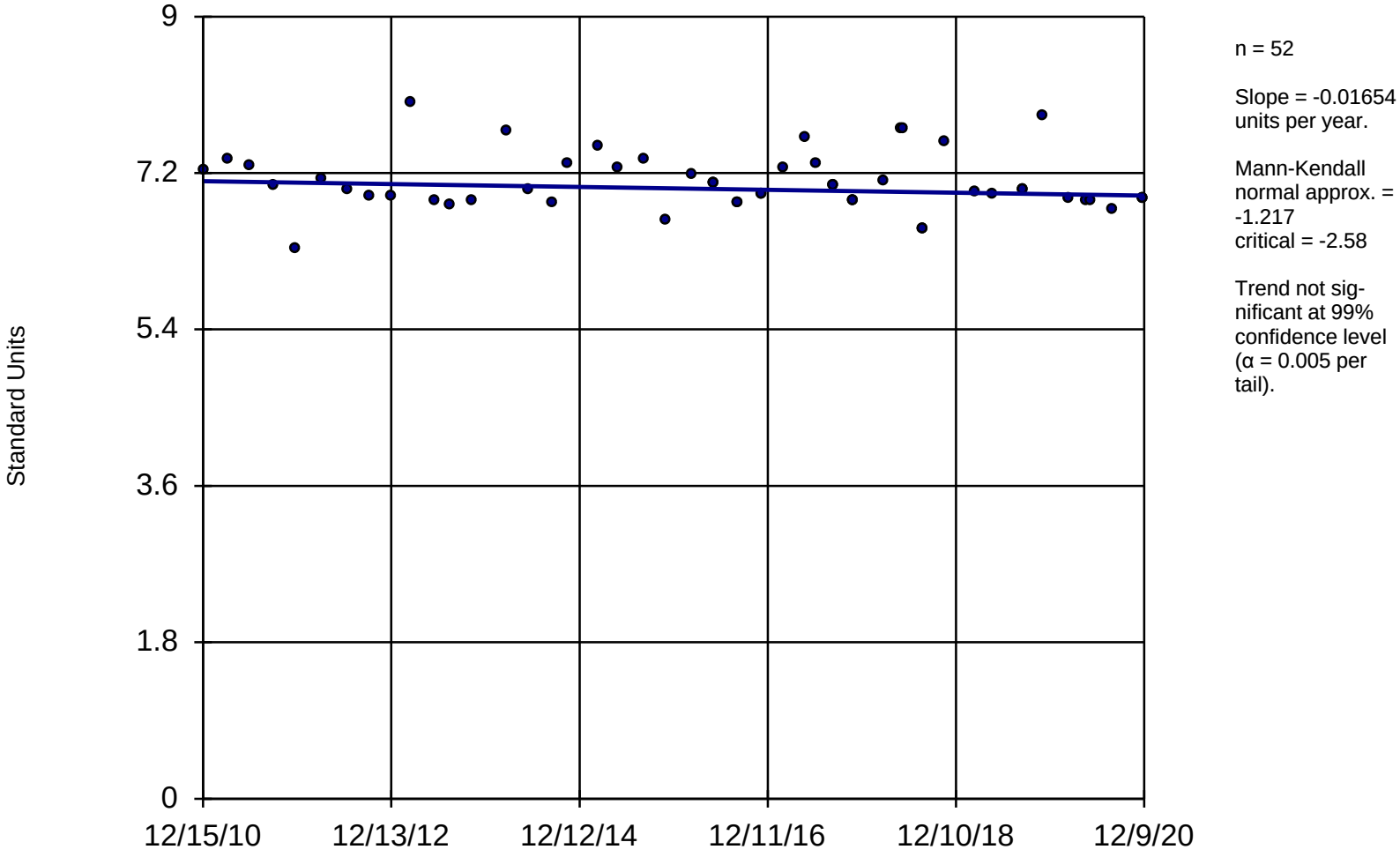
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: pH, Field Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-05



n = 52

Slope = -0.01654 units per year.

Mann-Kendall normal approx. = -1.217
critical = -2.58

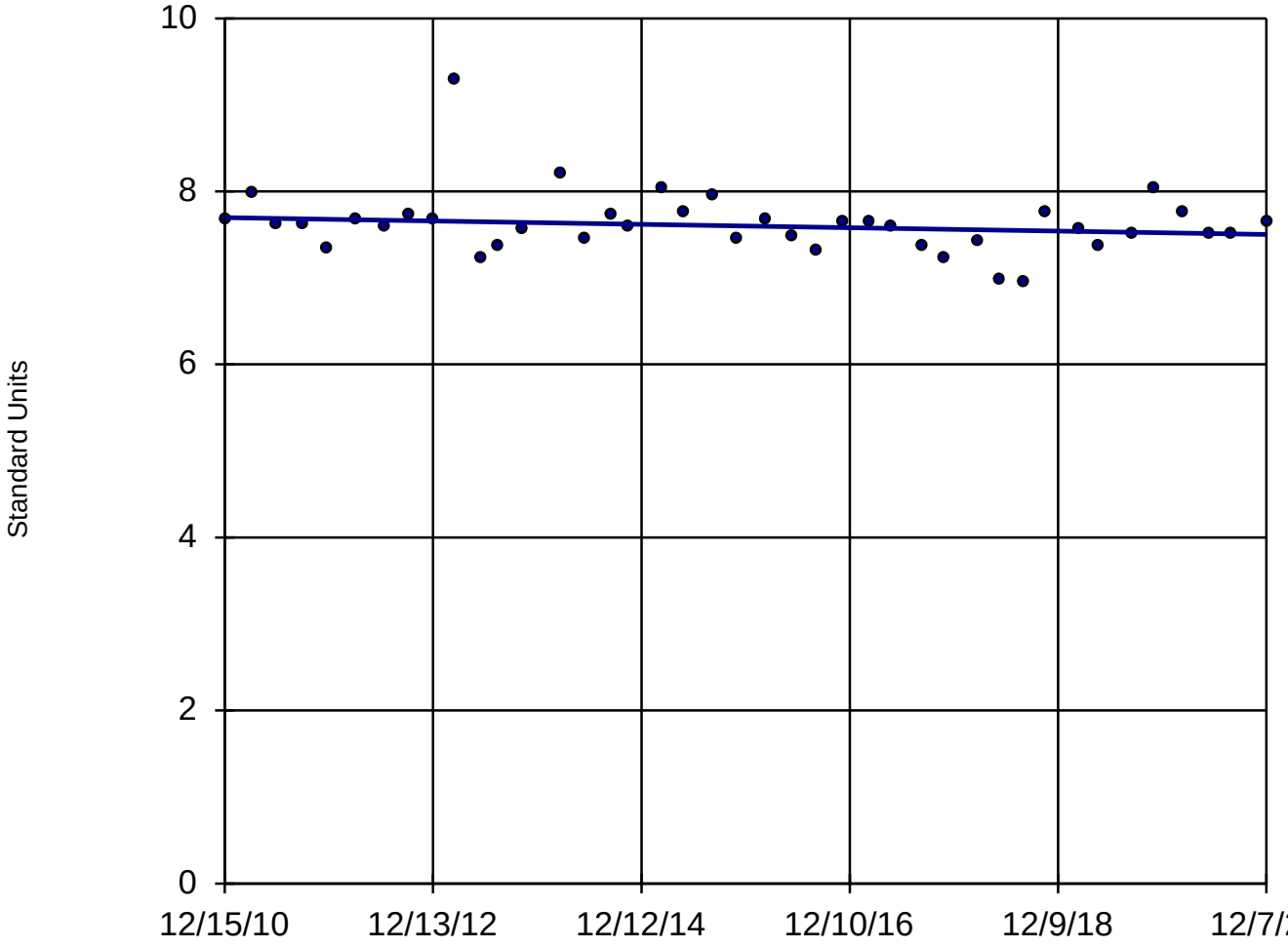
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: pH, Field Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-06



n = 41

Slope = -0.01961 units per year.

Mann-Kendall normal approx. = -1.472
critical = -2.58

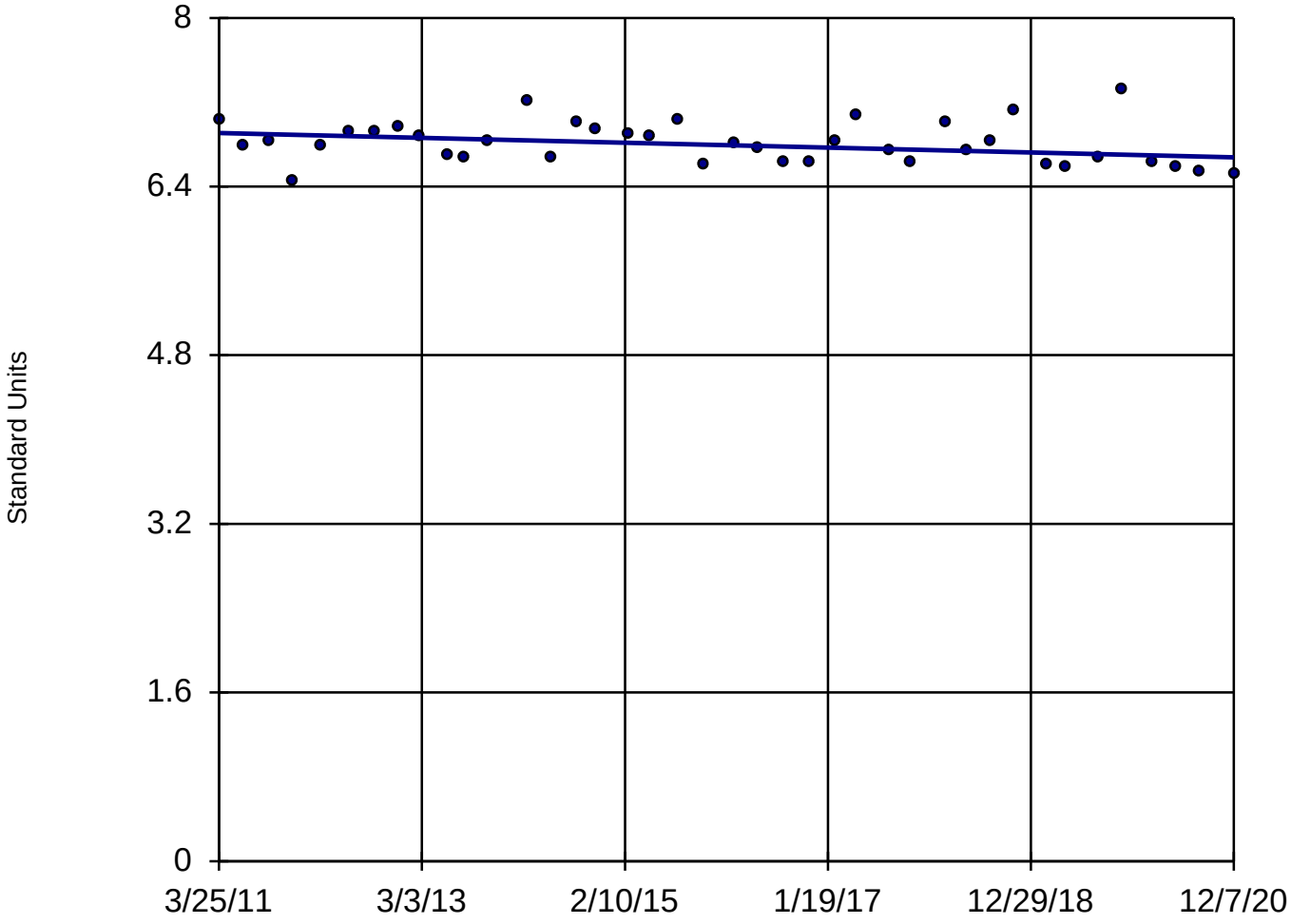
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: pH, Field Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-07



n = 40

Slope = -0.02391 units per year.

Mann-Kendall statistic = -184
critical = -223

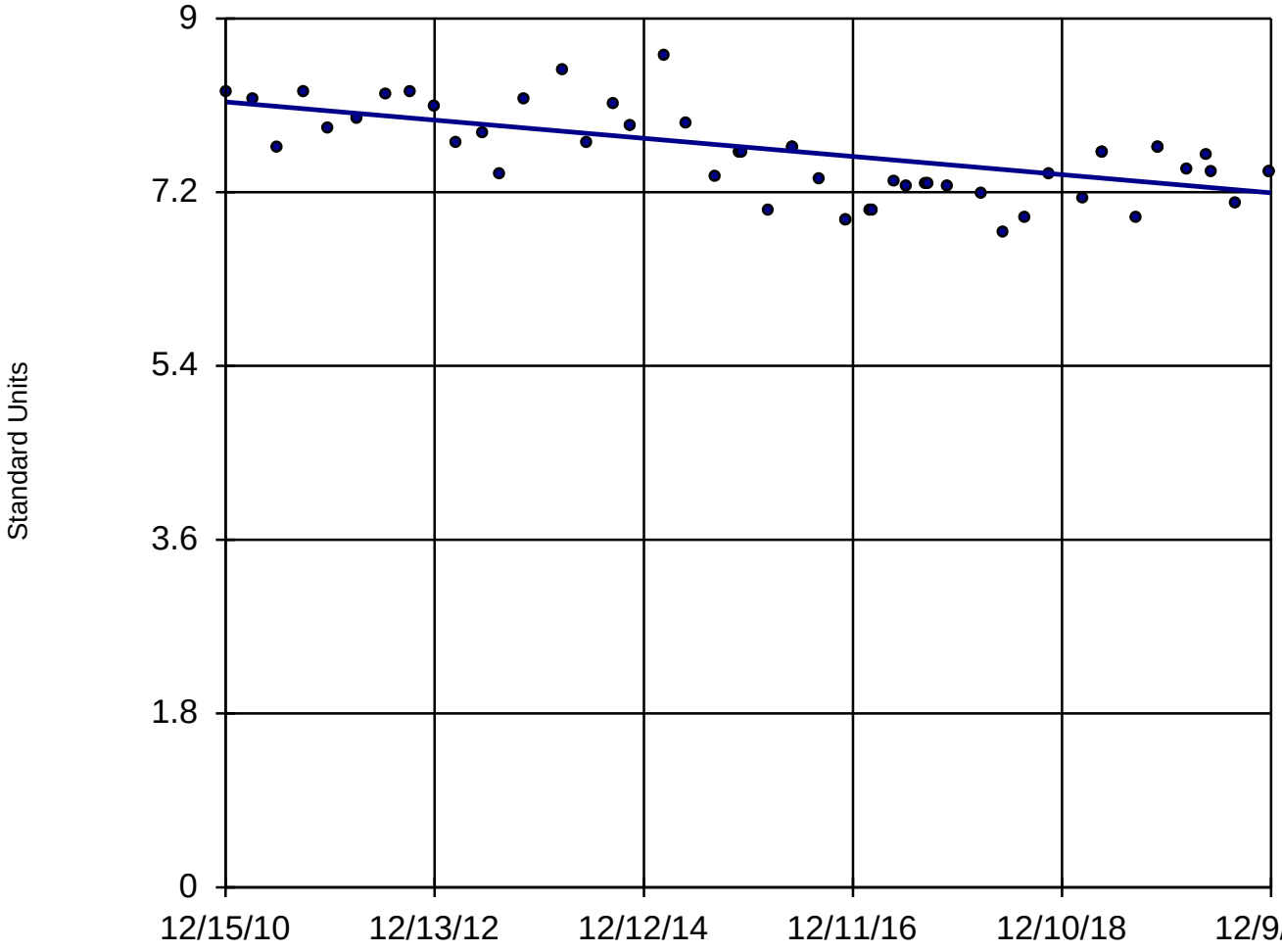
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: pH, Field Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-08



n = 51

Slope = -0.0944 units per year.

Mann-Kendall normal approx. = -4.543
critical = -2.58

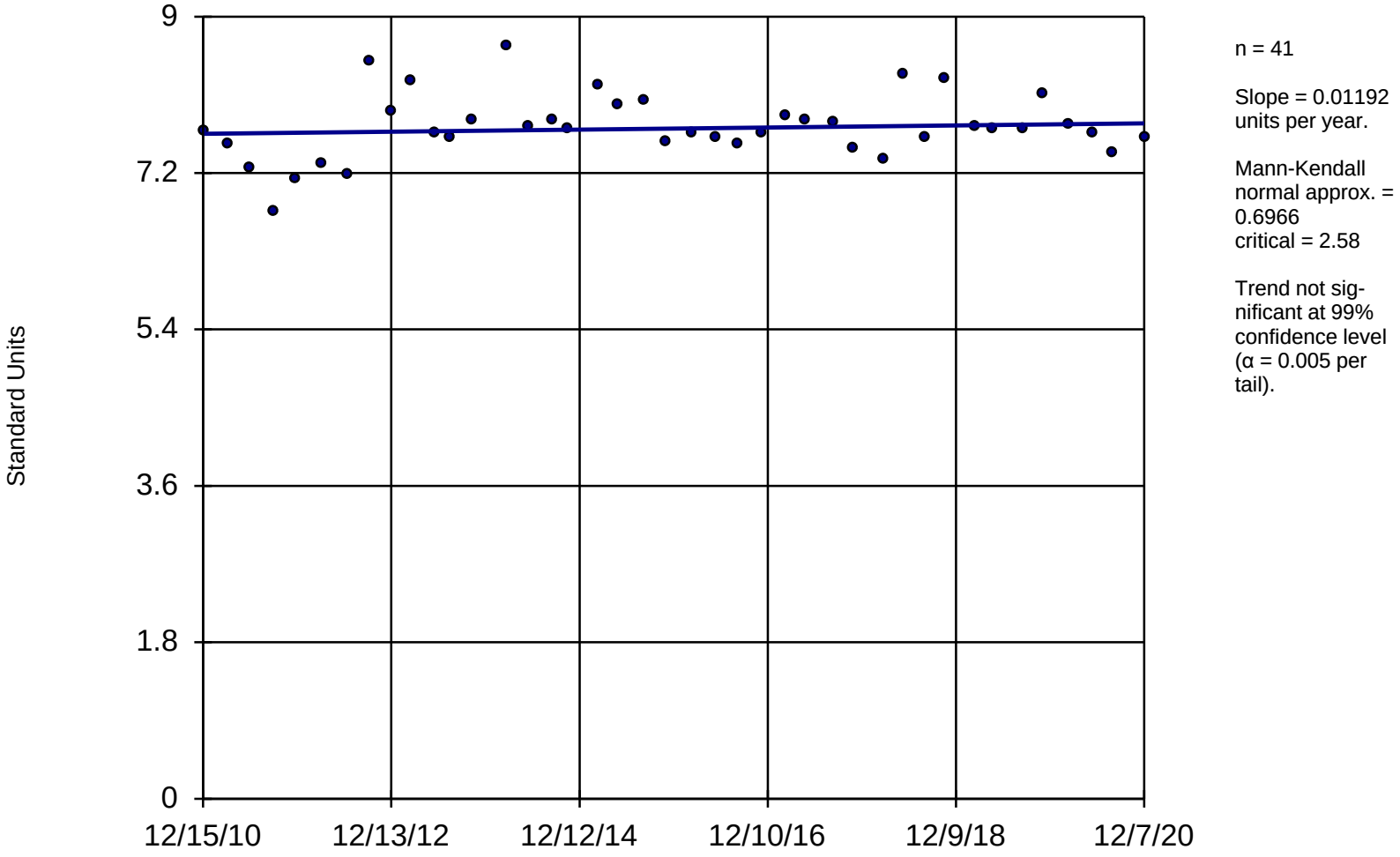
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: pH, Field Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-13



n = 41

Slope = 0.01192 units per year.

Mann-Kendall normal approx. = 0.6966
critical = 2.58

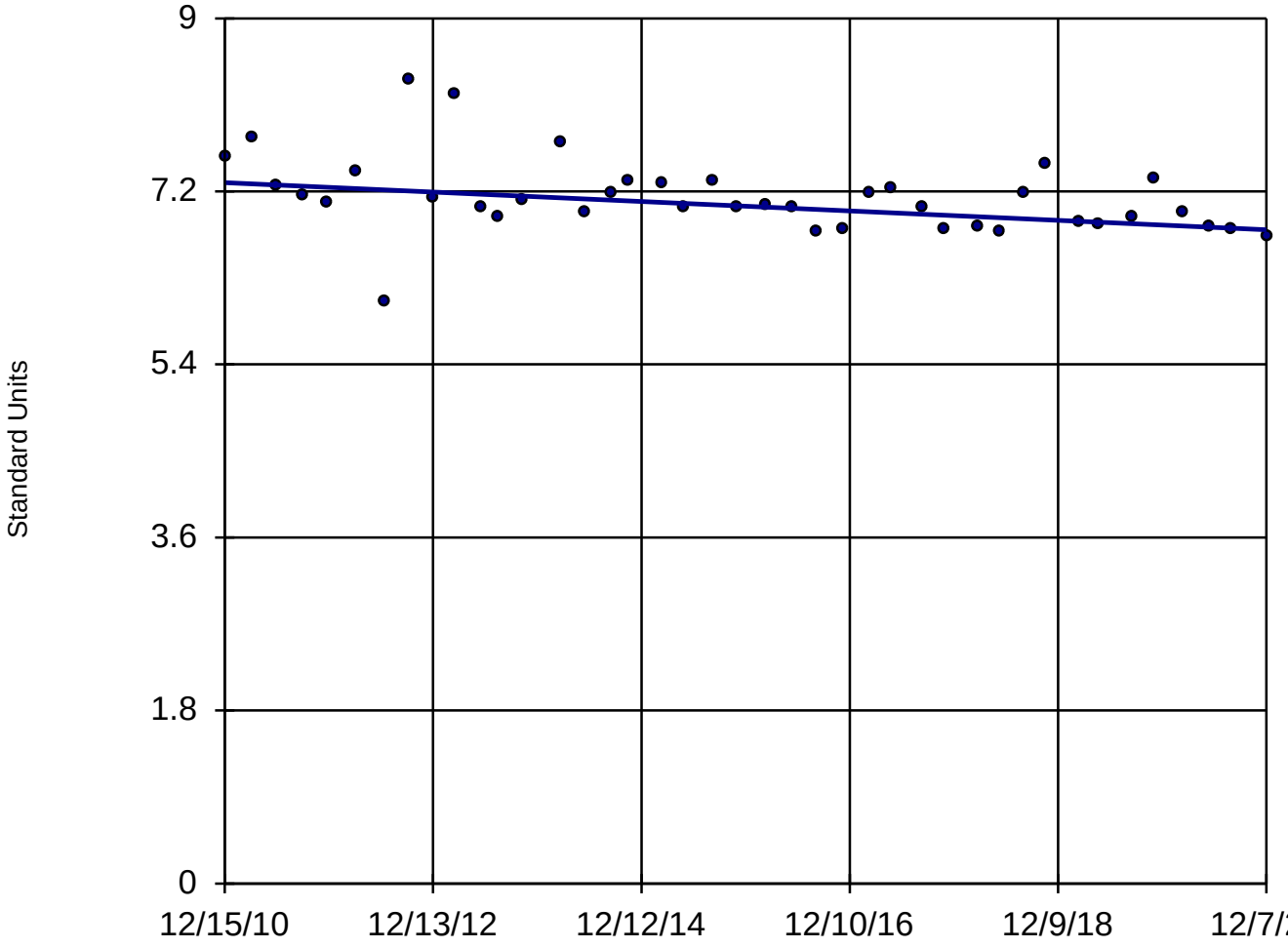
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: pH, Field Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-14



n = 41

Slope = -0.04916 units per year.

Mann-Kendall normal approx. = -3.382
critical = -2.58

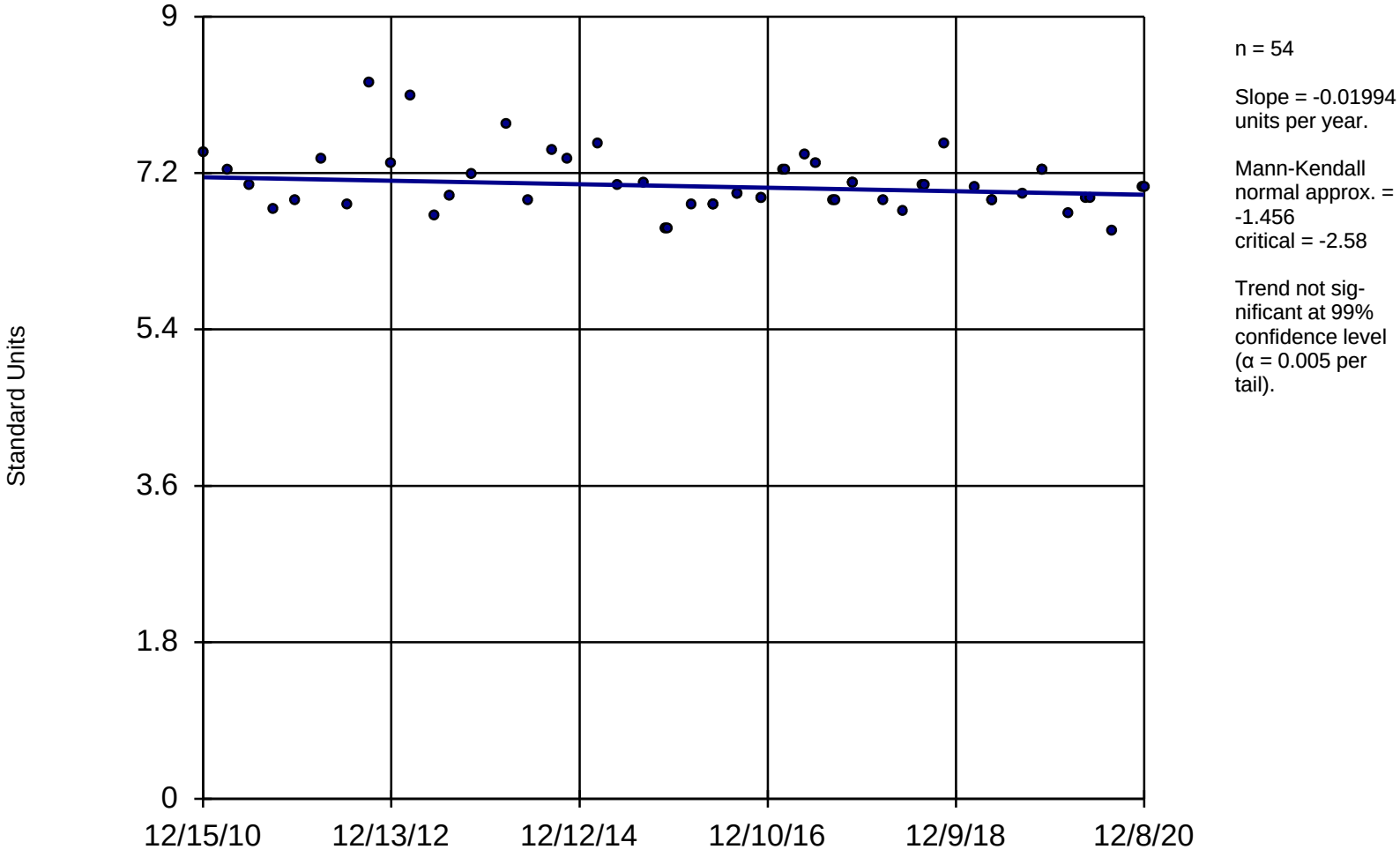
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: pH, Field Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-15



n = 54

Slope = -0.01994 units per year.

Mann-Kendall normal approx. = -1.456
critical = -2.58

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: pH, Field Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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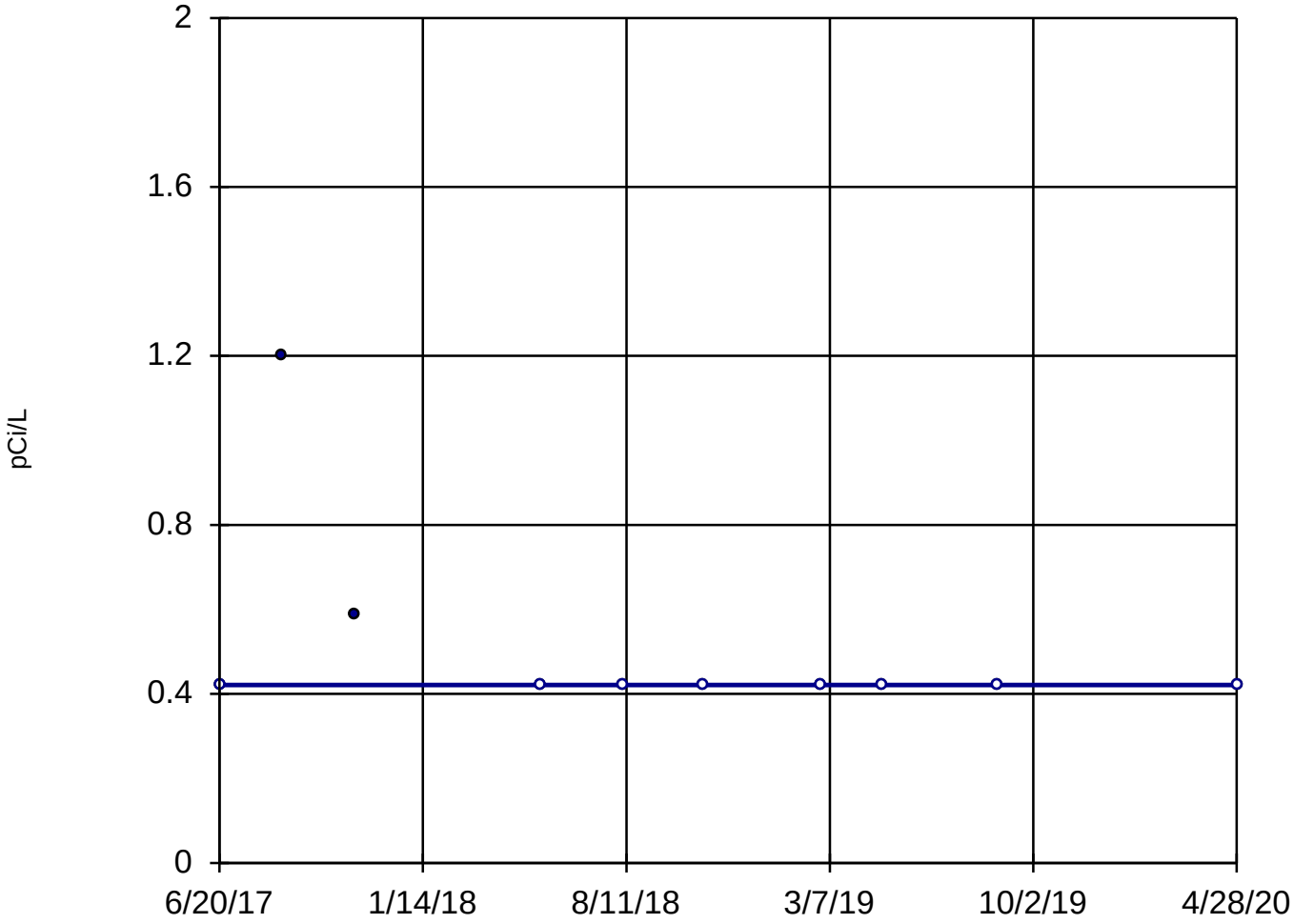
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = -13
critical = -30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Radium 226 + Radium 228, Combined Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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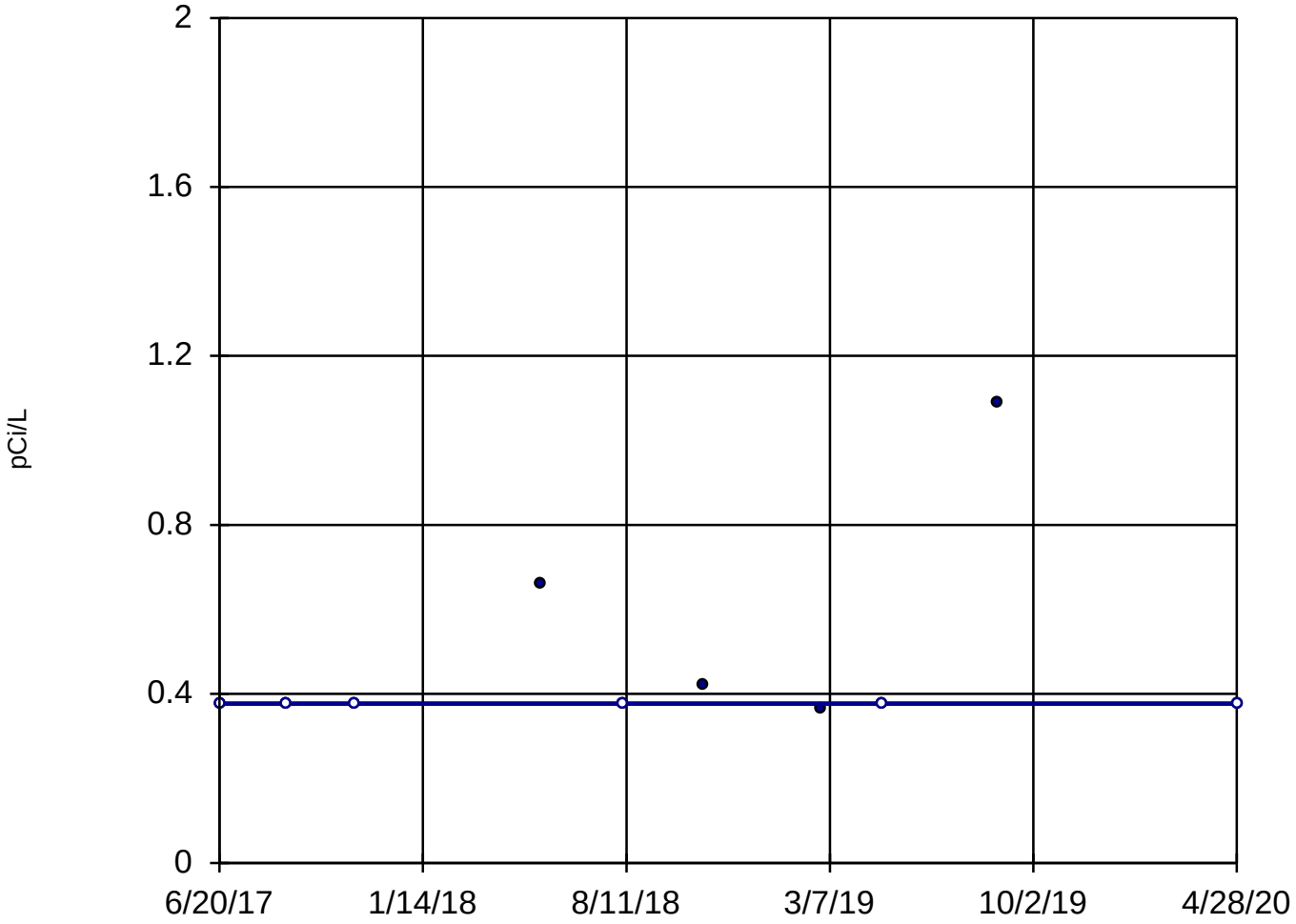
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 4
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

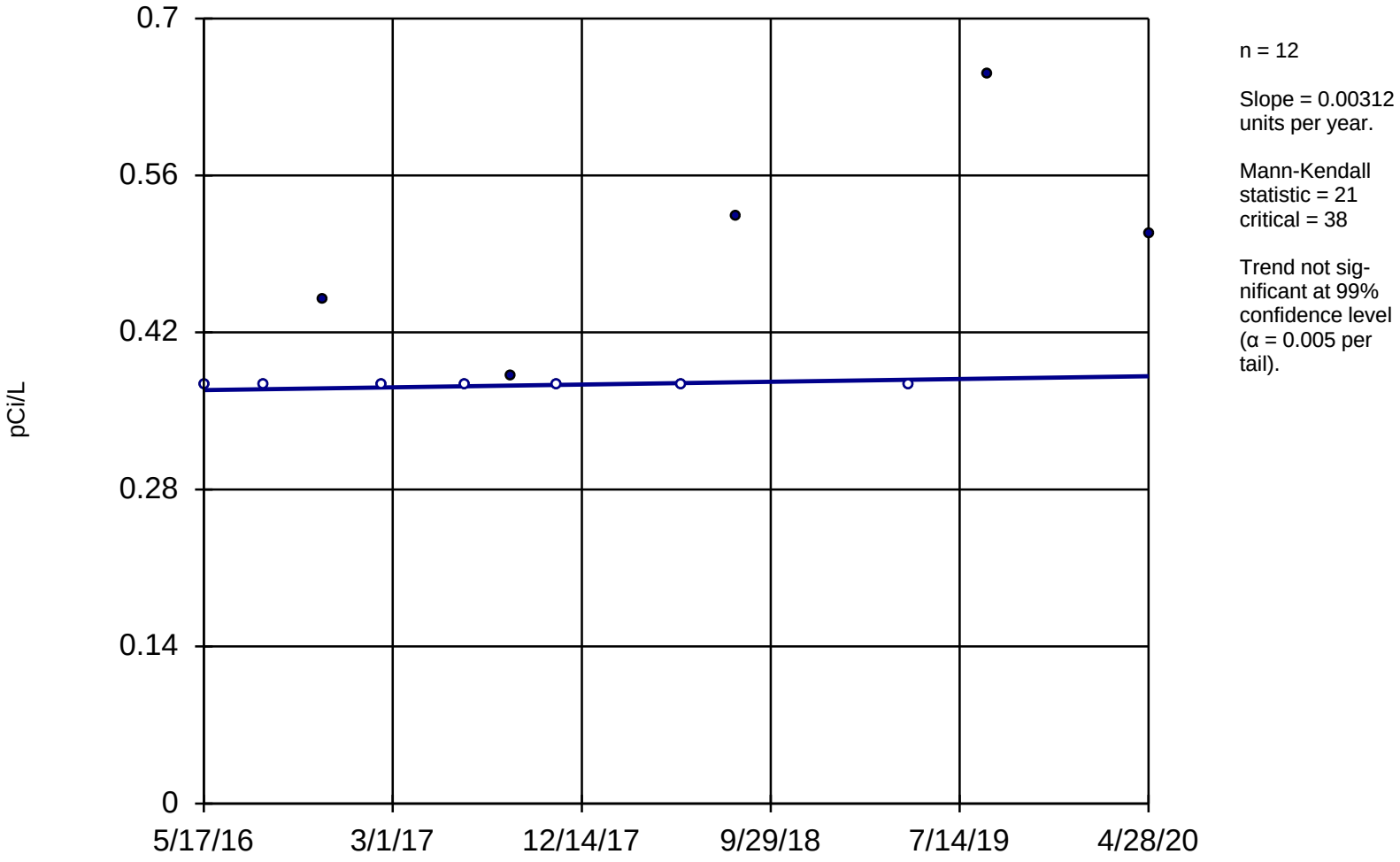
Constituent: Radium 226 + Radium 228, Combined Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-05



n = 12

Slope = 0.00312 units per year.

Mann-Kendall statistic = 21
critical = 38

Trend not significant at 99% confidence level (α = 0.005 per tail).

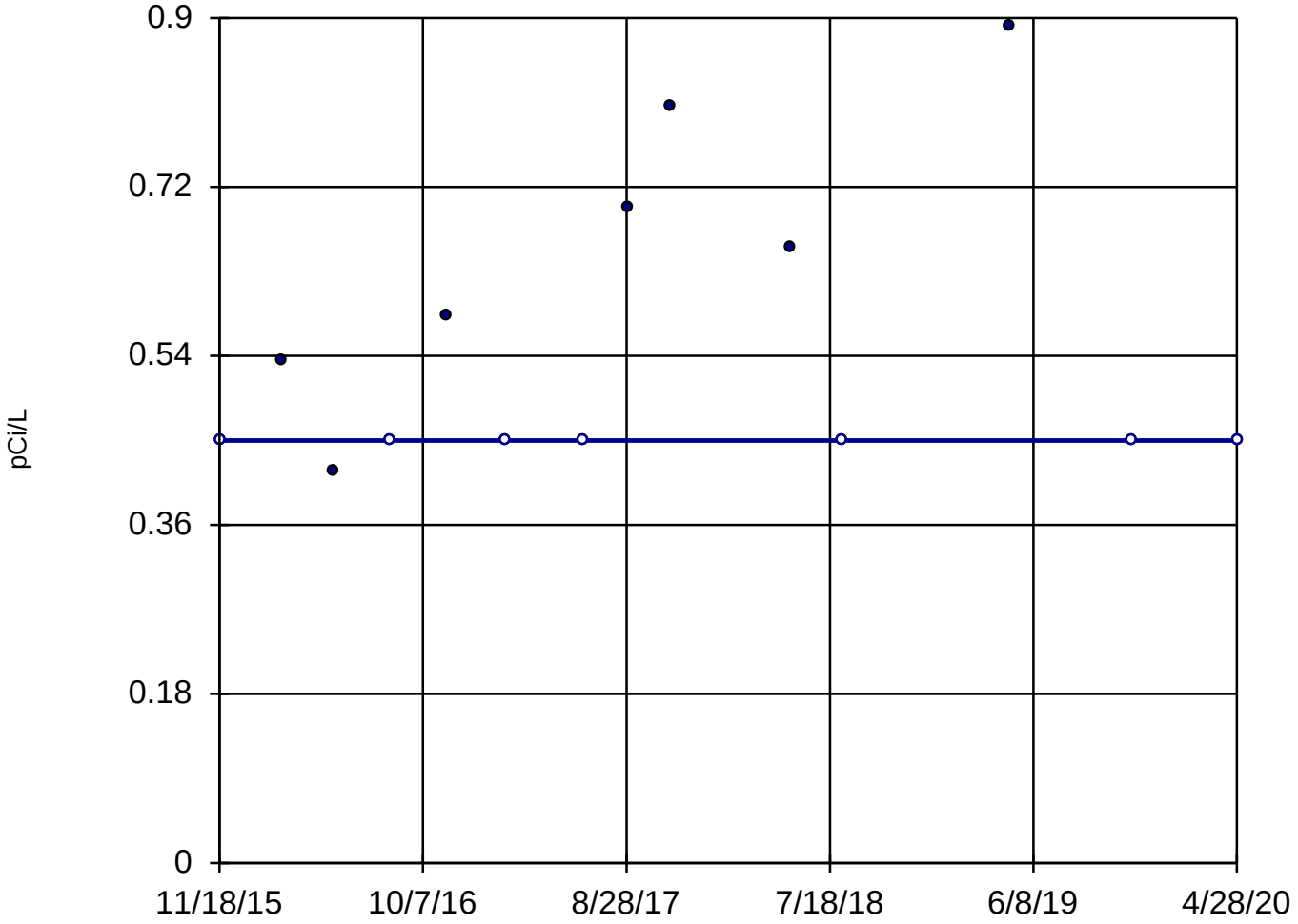
Constituent: Radium 226 + Radium 228, Combined Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 14

Slope = 0
units per year.

Mann-Kendall
statistic = 18
critical = 48

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Radium 226 + Radium 228, Combined Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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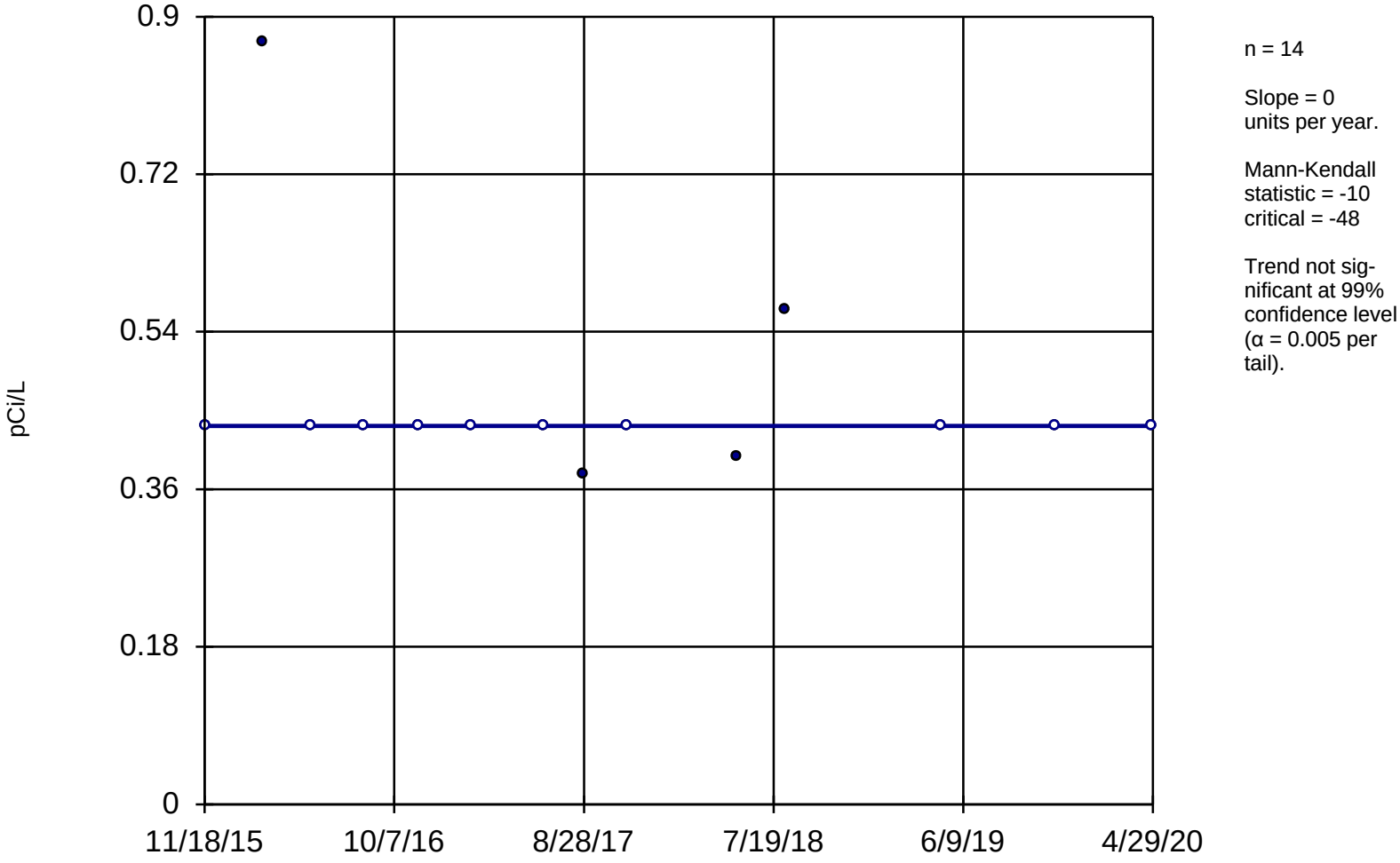
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-15



n = 14

Slope = 0
units per year.

Mann-Kendall
statistic = -10
critical = -48

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

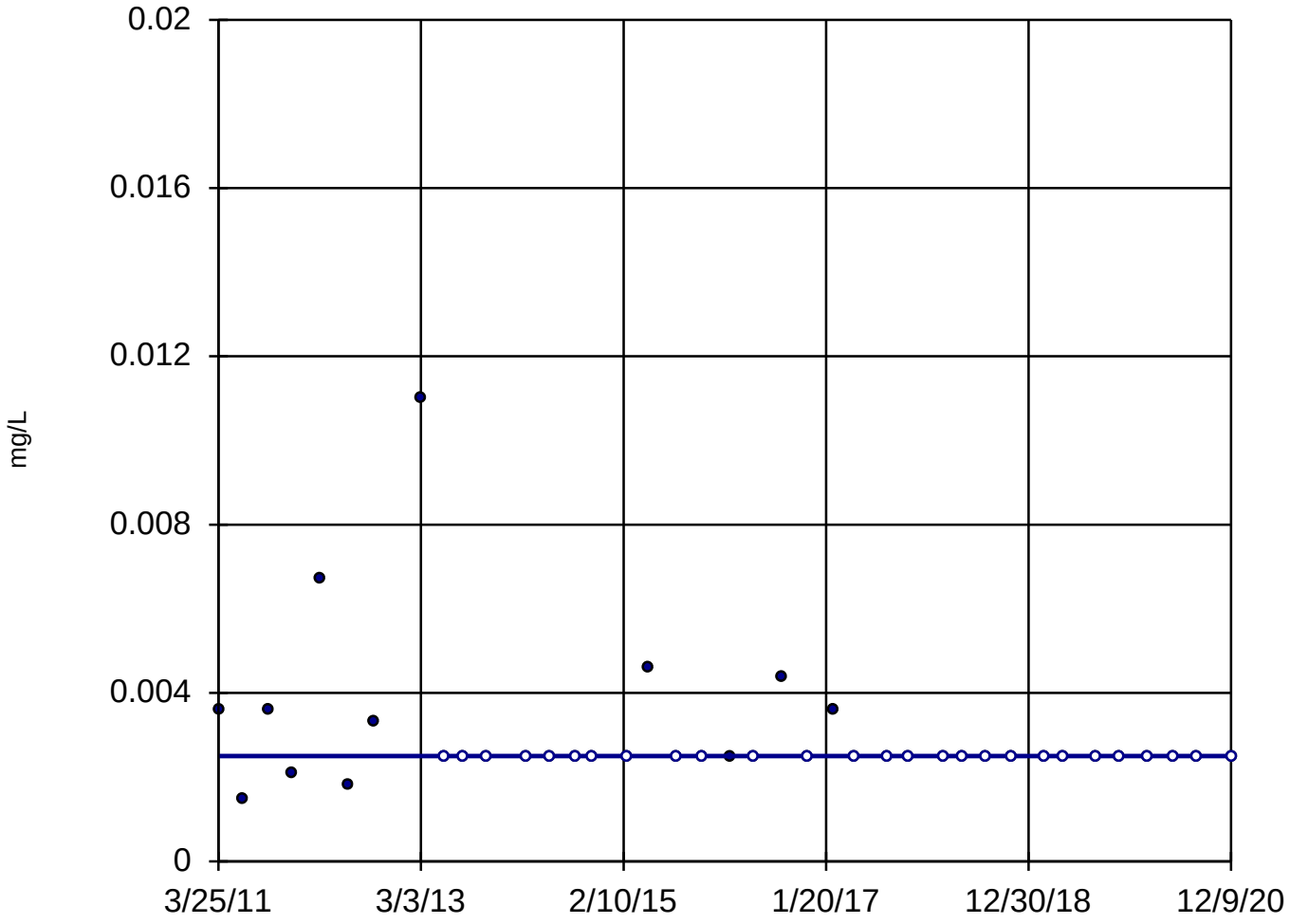
Constituent: Radium 226 + Radium 228, Combined Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = -60
critical = -214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Selenium, Dissolved Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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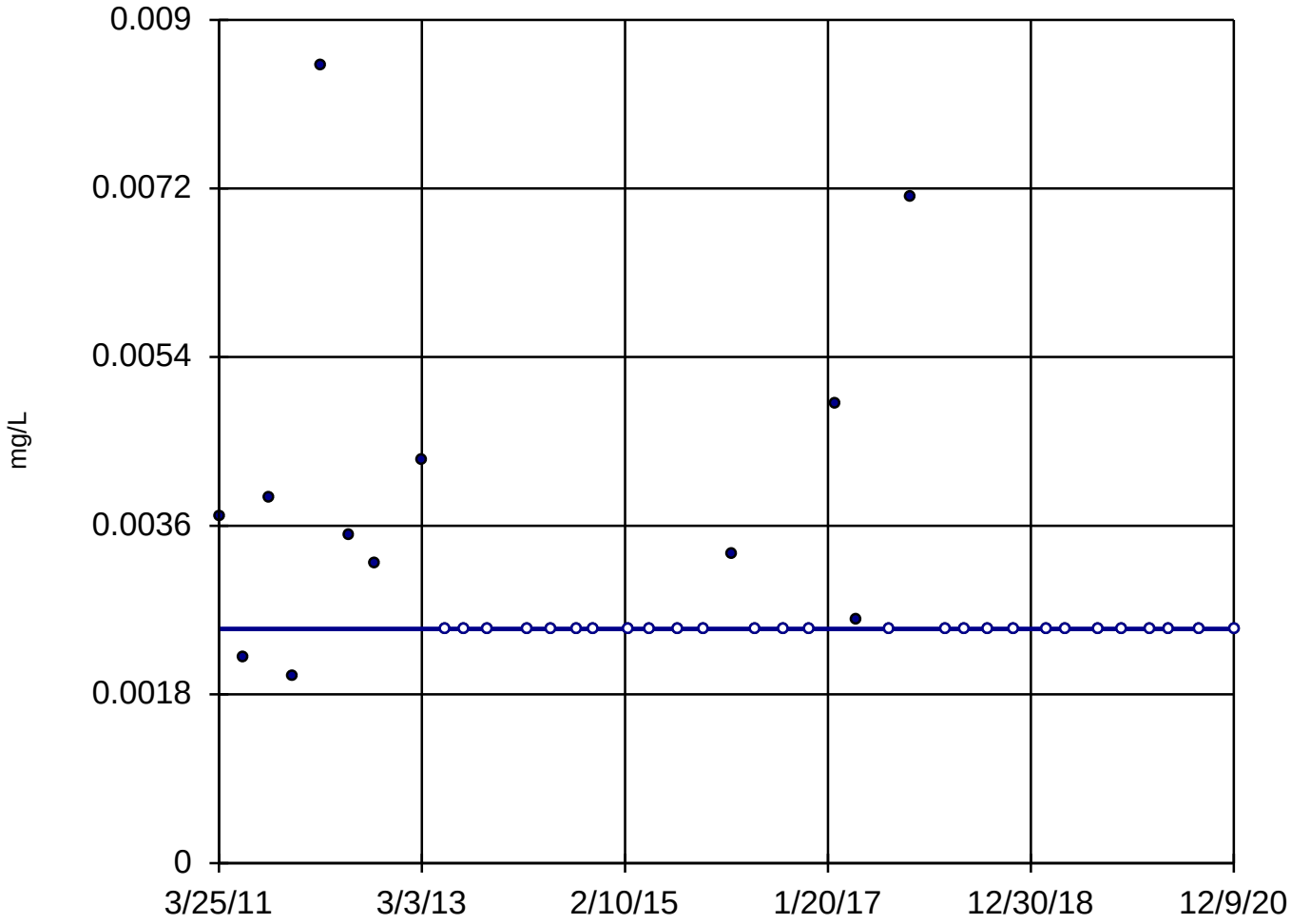
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = -96
critical = -214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

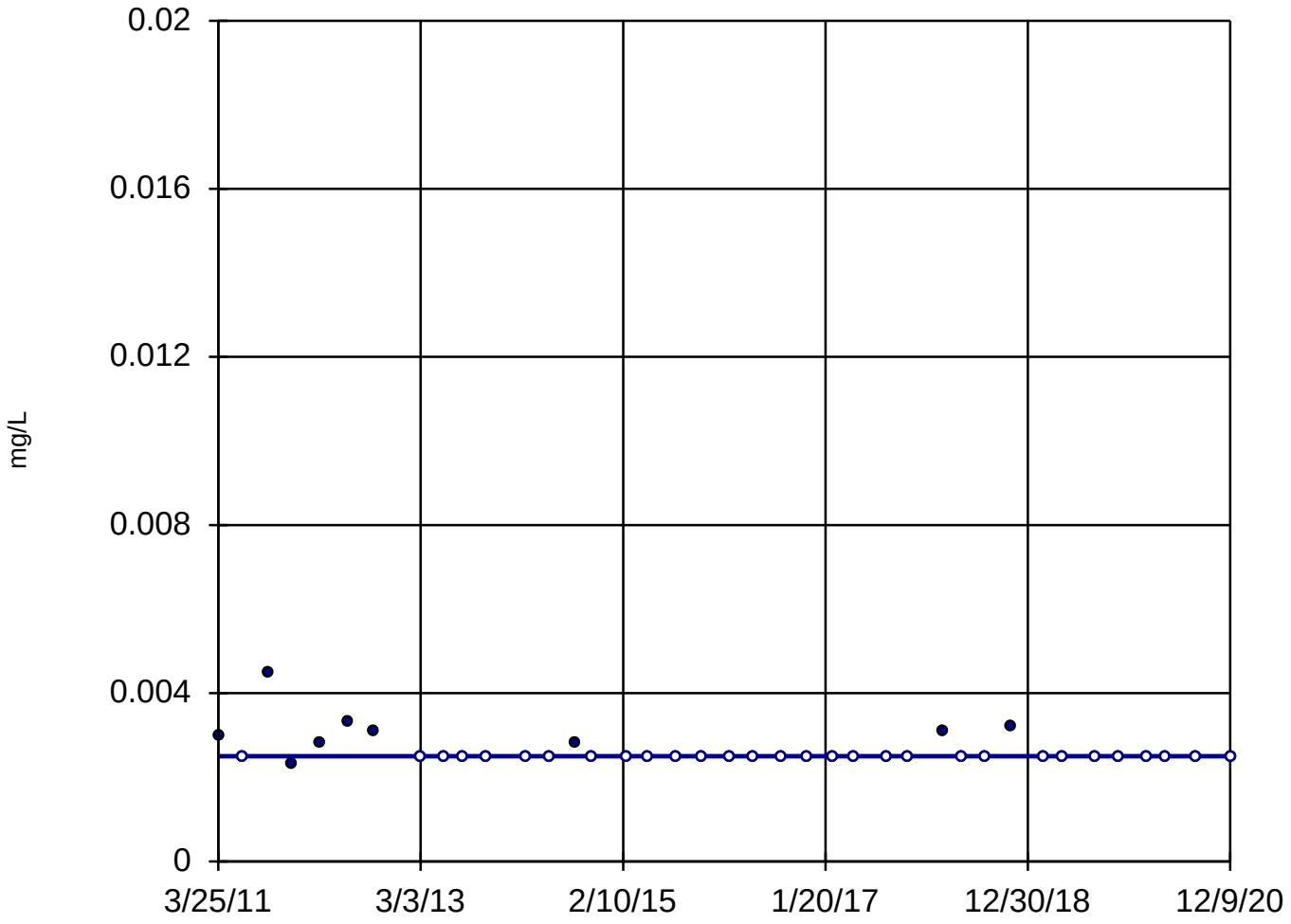
Constituent: Selenium, Dissolved Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-05



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = -102
critical = -214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

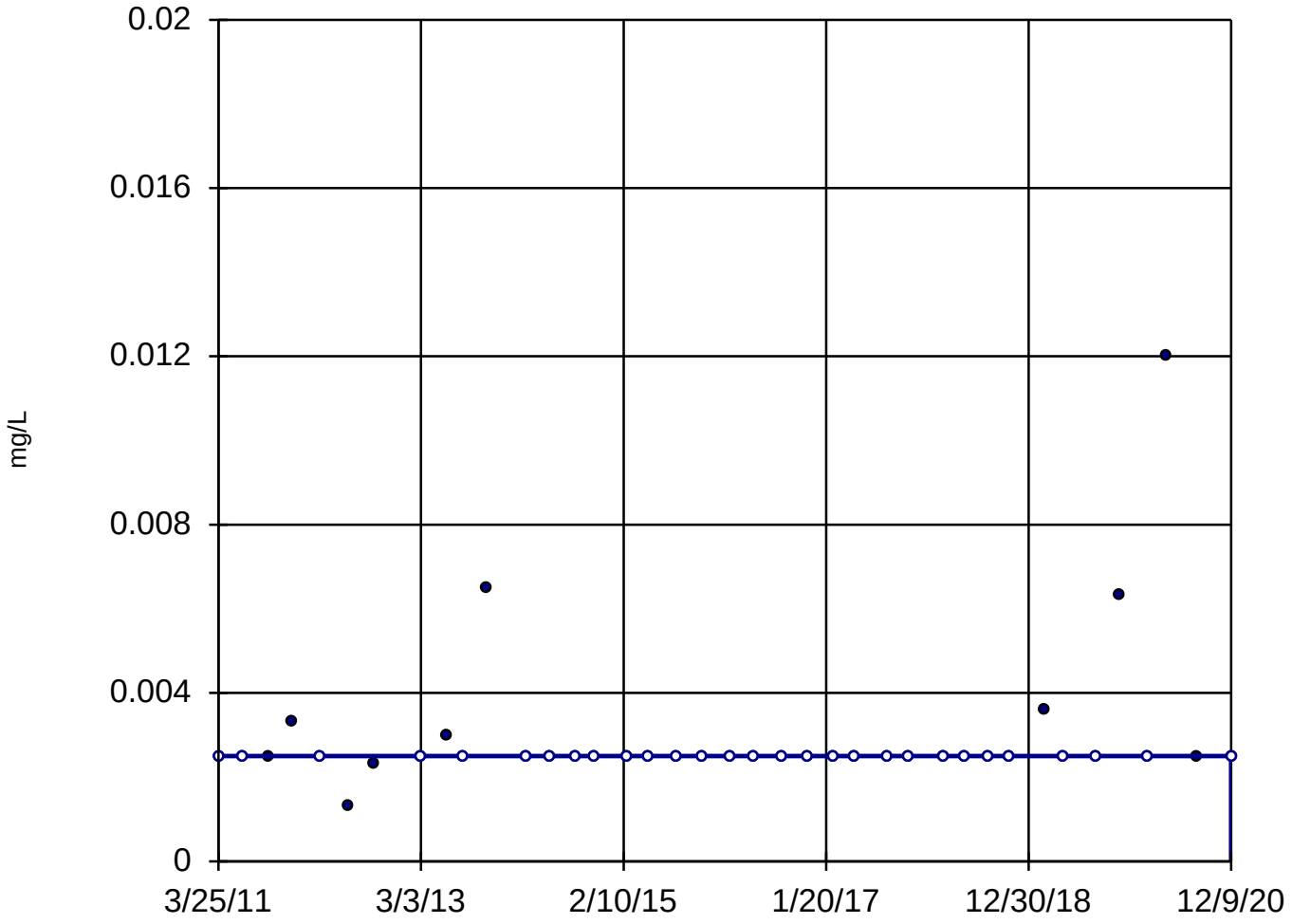
Constituent: Selenium, Dissolved Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-06



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 72
critical = 214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

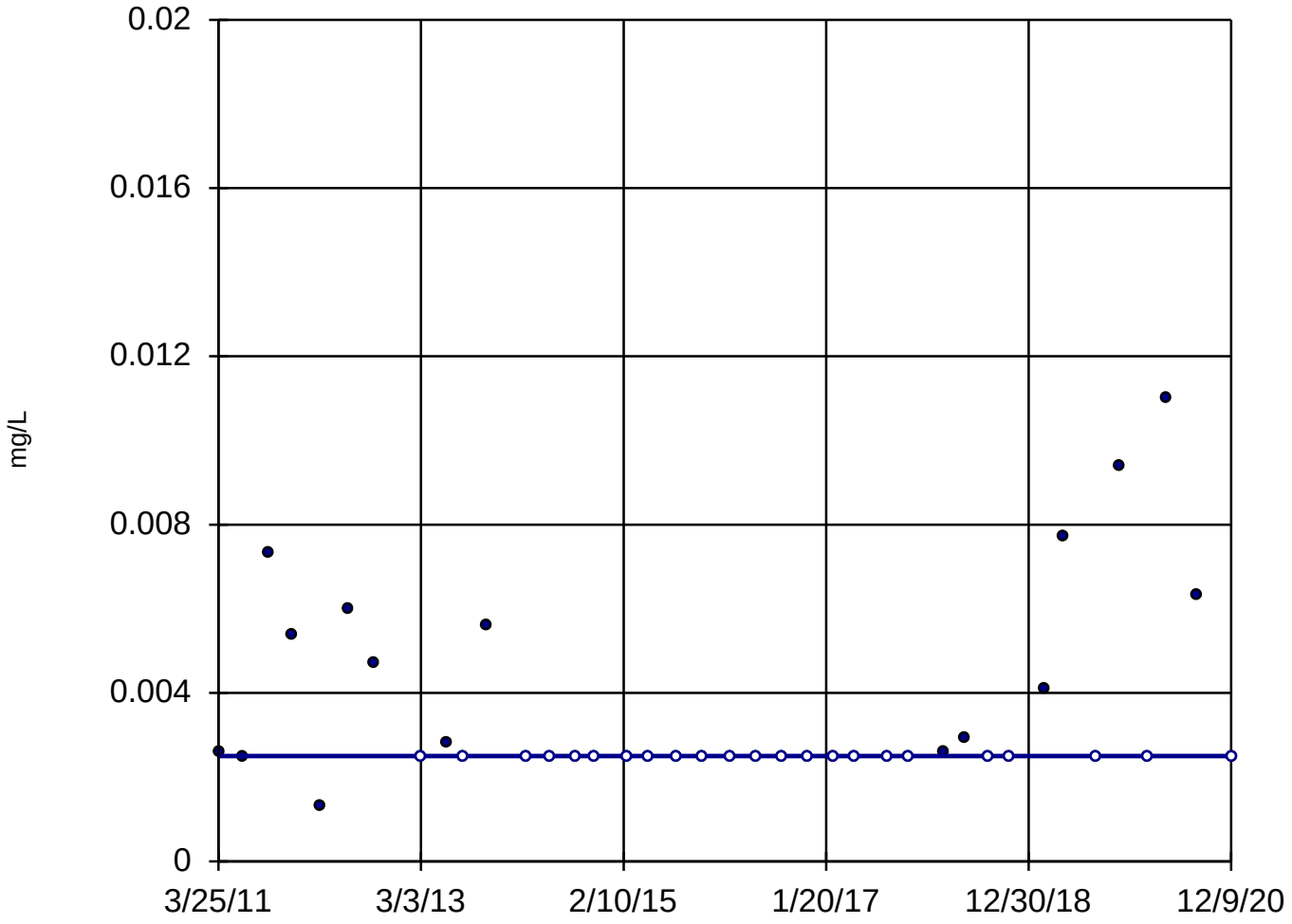
Constituent: Selenium, Dissolved Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-07



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 36
critical = 214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

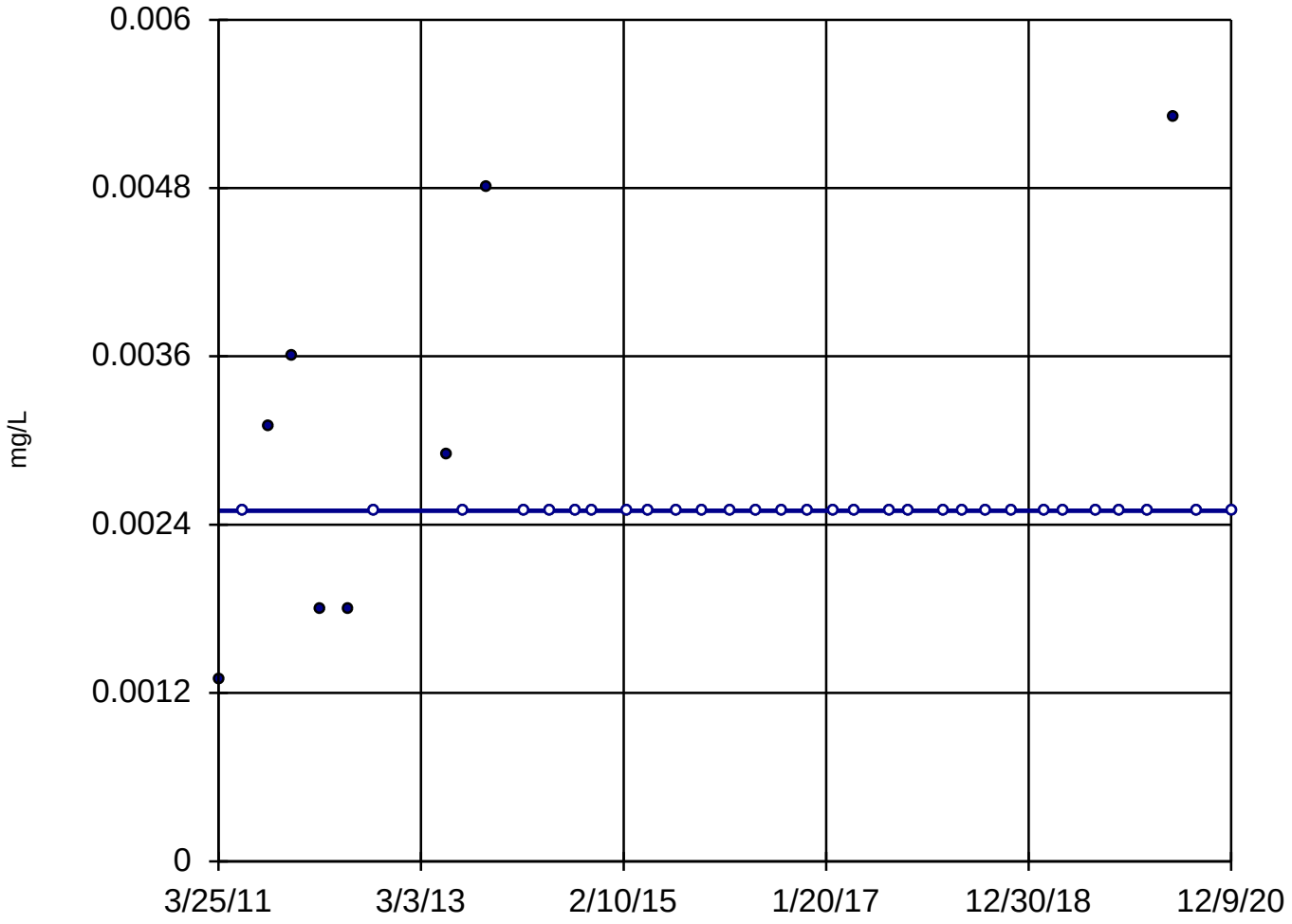
Constituent: Selenium, Dissolved Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 38

Slope = 0
units per year.

Mann-Kendall
statistic = 21
critical = 206

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

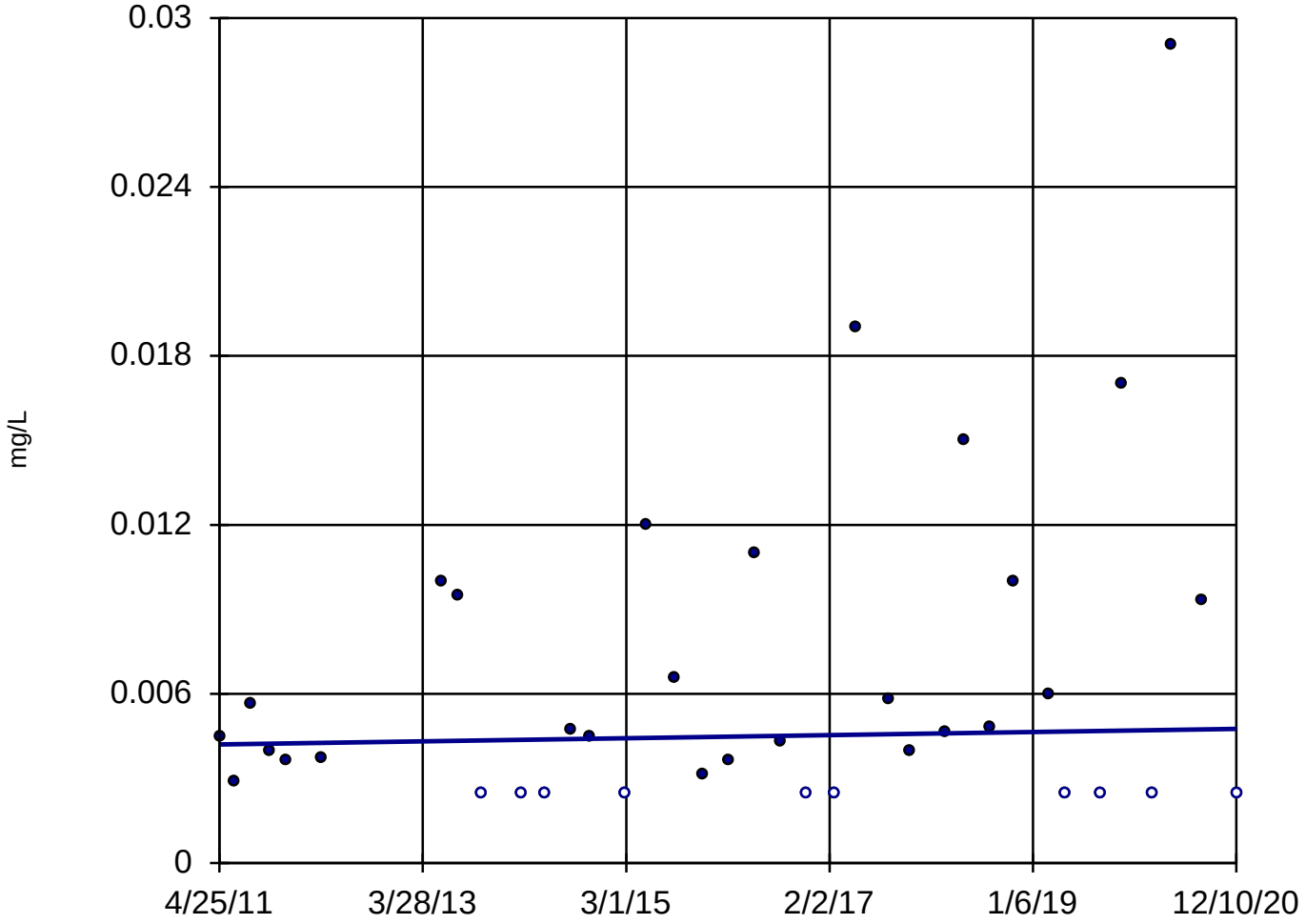
Constituent: Selenium, Dissolved Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-13



n = 37

Slope = 0.00005677 units per year.

Mann-Kendall statistic = 65
critical = 199

Trend not significant at 99% confidence level (α = 0.005 per tail).

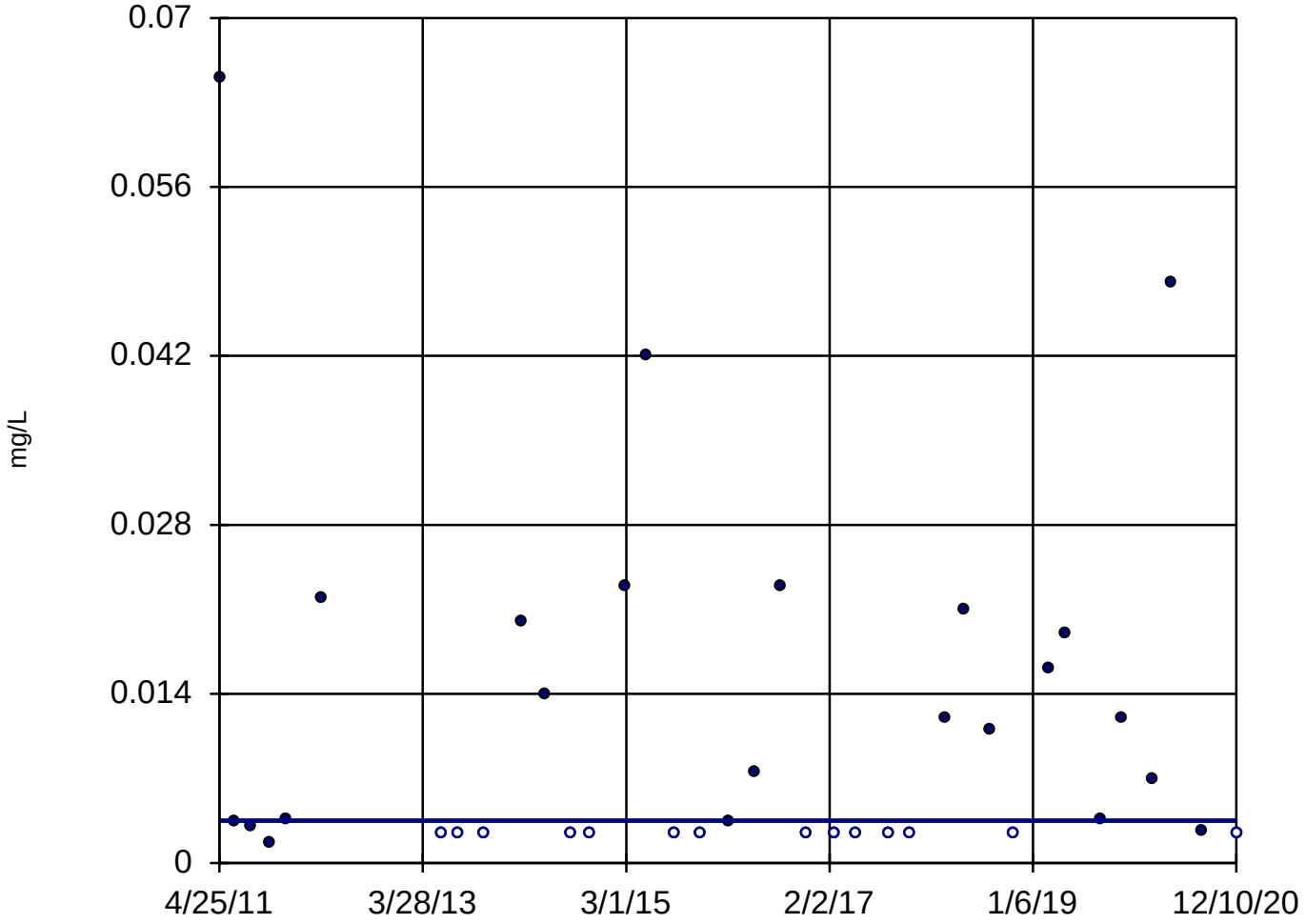
Constituent: Selenium, Dissolved Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-14



n = 37

Slope = 0
units per year.

Mann-Kendall
statistic = 34
critical = 199

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

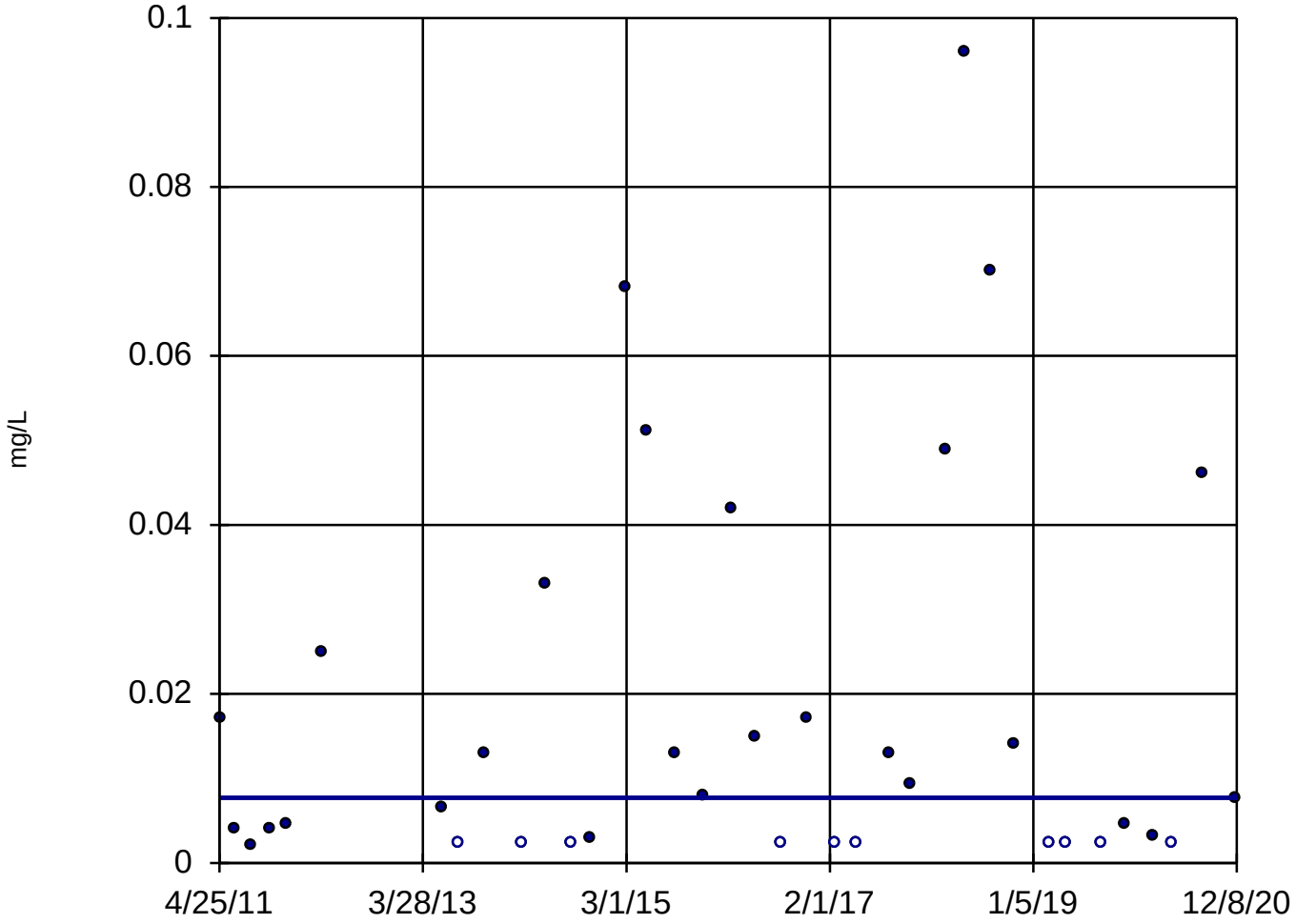
Constituent: Selenium, Dissolved Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-15



n = 37

Slope = 0
units per year.

Mann-Kendall
statistic = 20
critical = 199

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

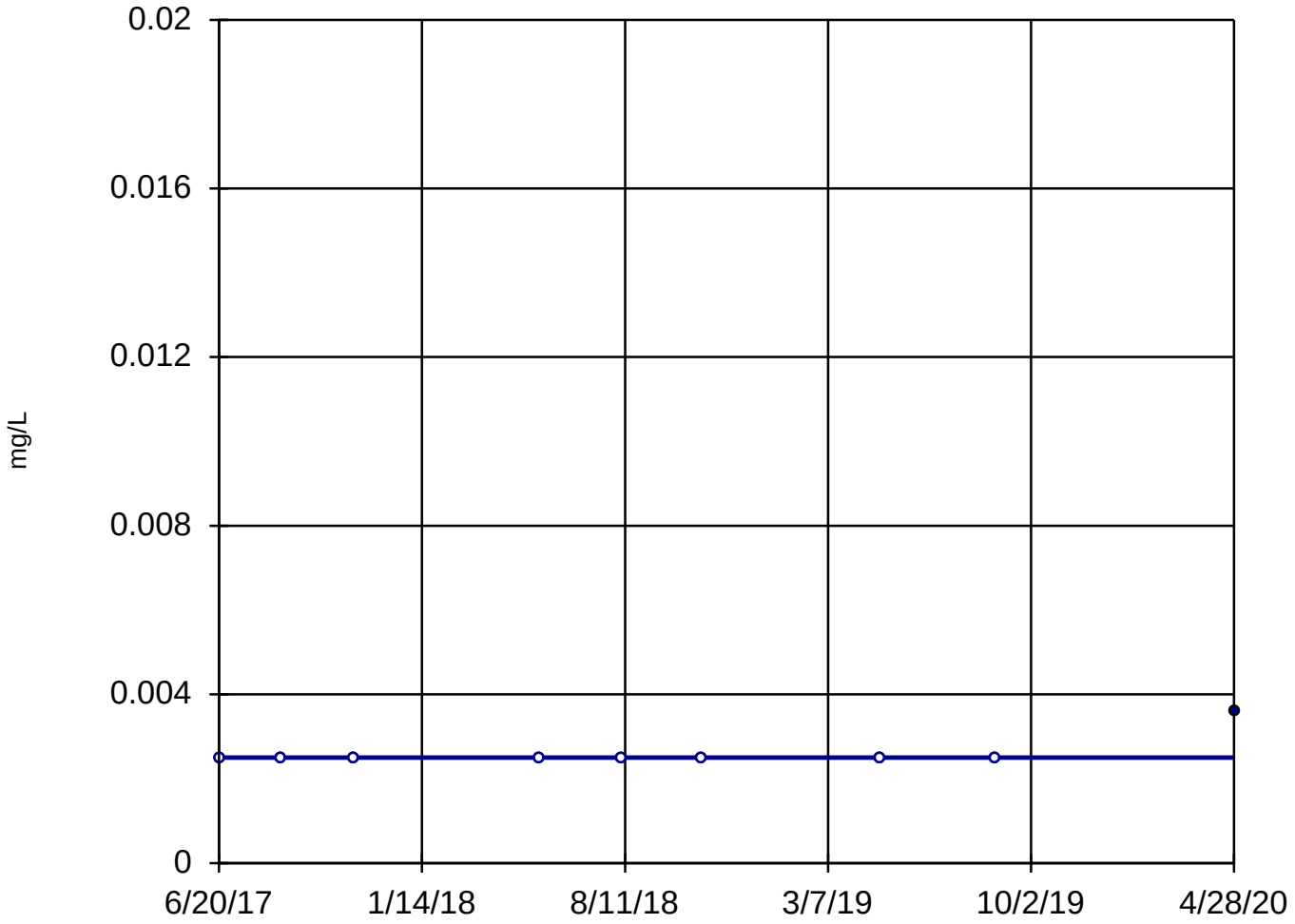
Constituent: Selenium, Dissolved Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 8
critical = 25

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

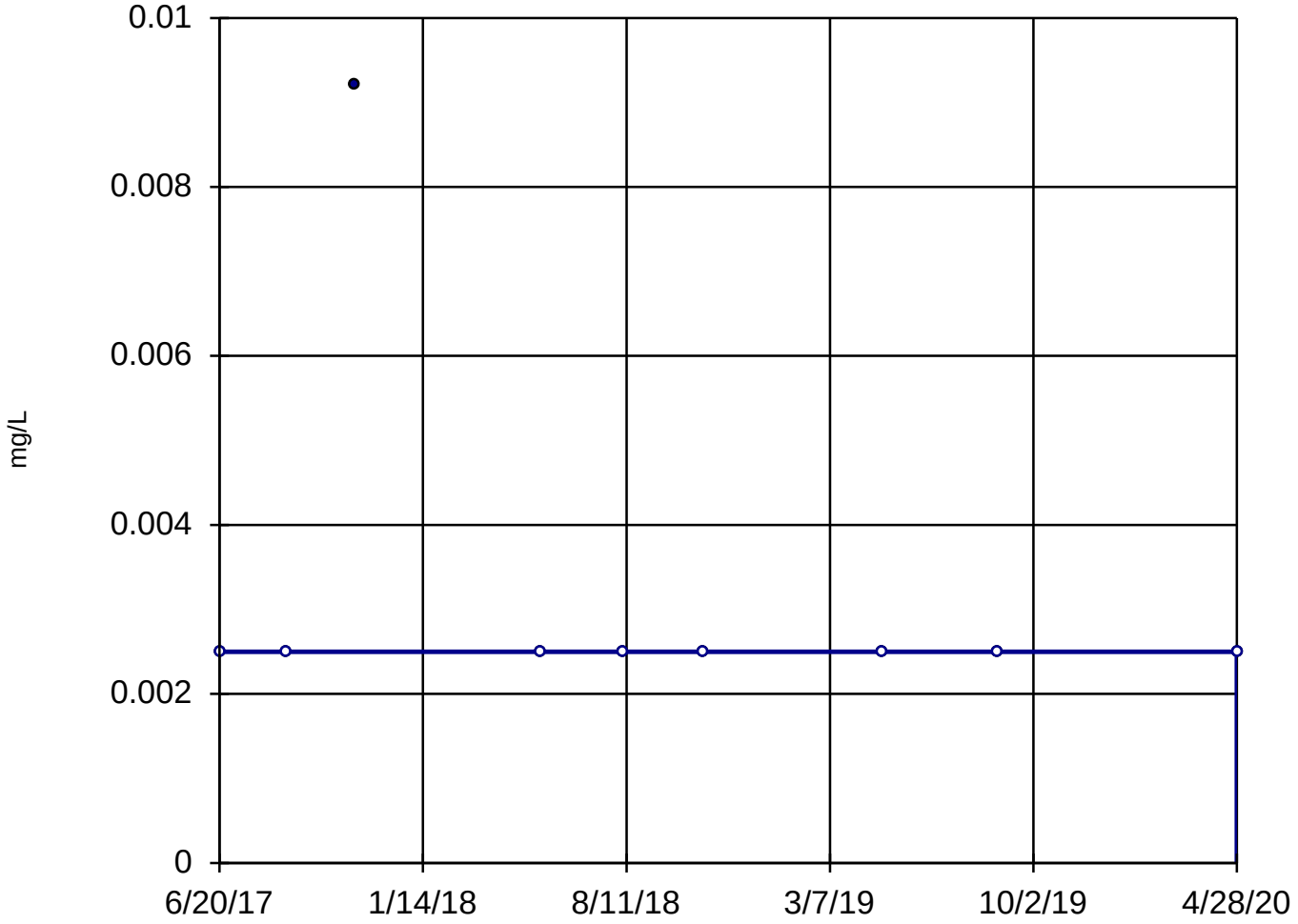
Constituent: Selenium, Total Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = -4
critical = -25

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

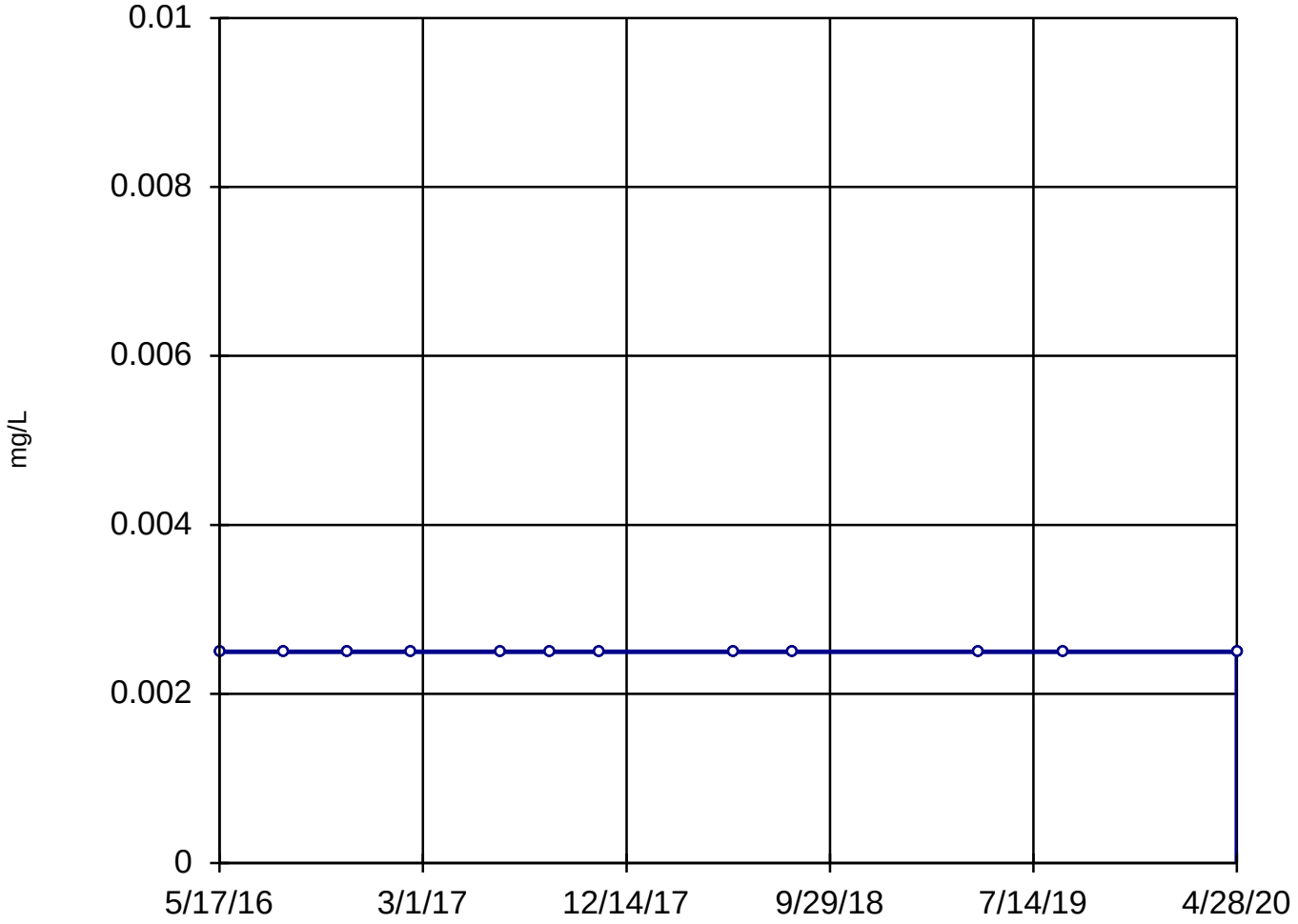
Constituent: Selenium, Total Analysis Run 4/2/2021 11:46 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-05



n = 12

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 38

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

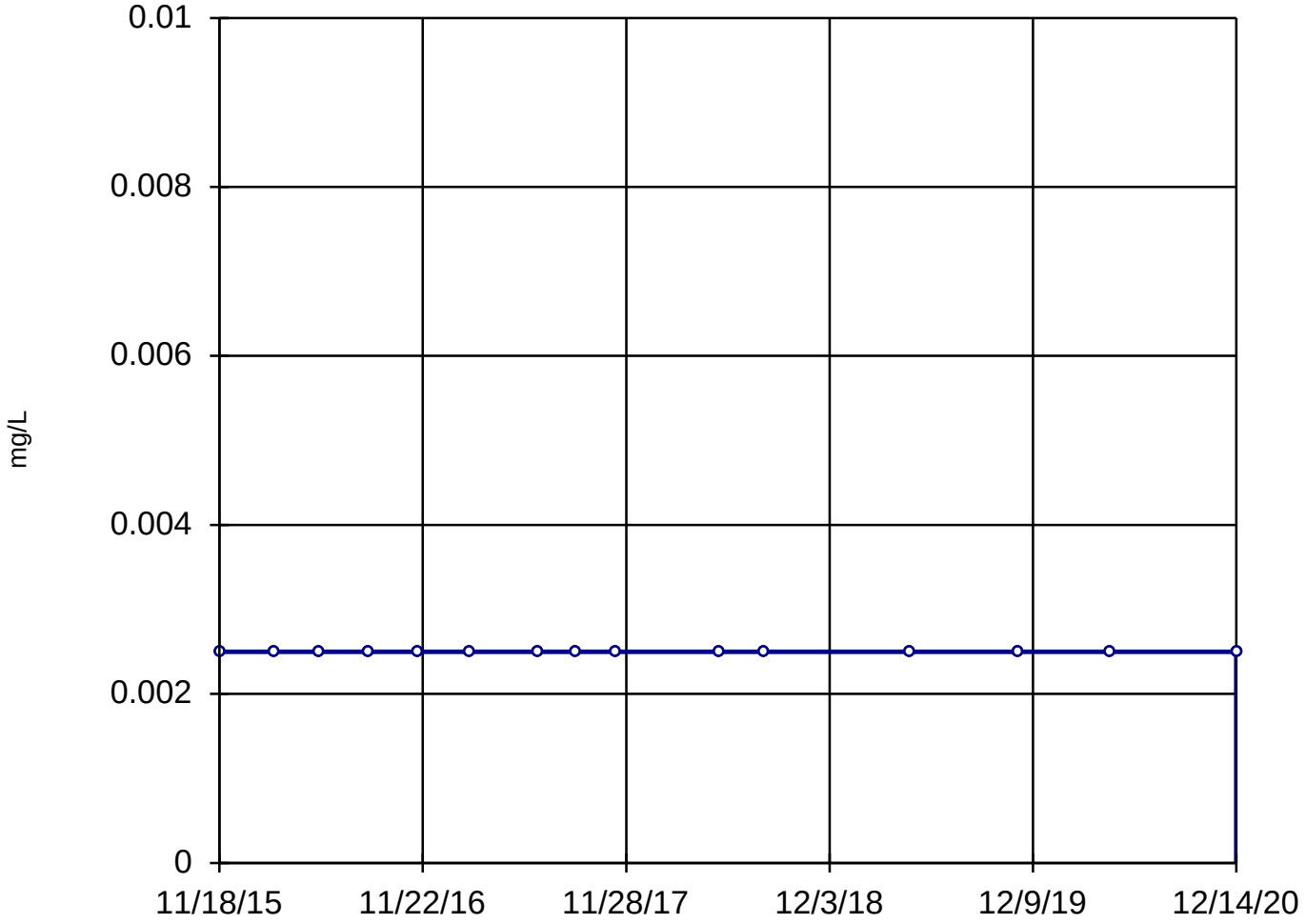
Constituent: Selenium, Total Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 15

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 53

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

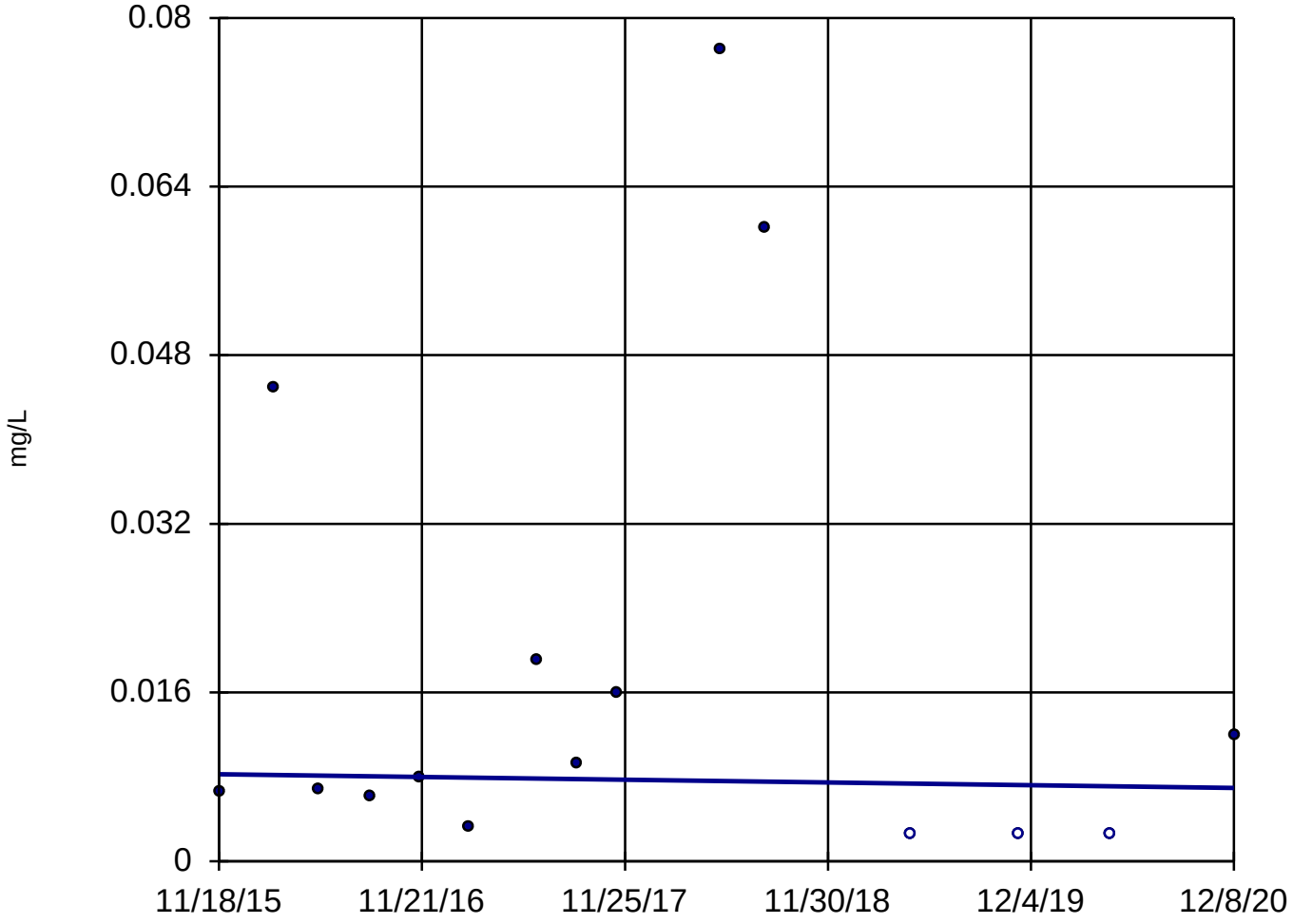
Constituent: Selenium, Total Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-15



n = 15

Slope = -0.0002555 units per year.

Mann-Kendall statistic = -6
critical = -53

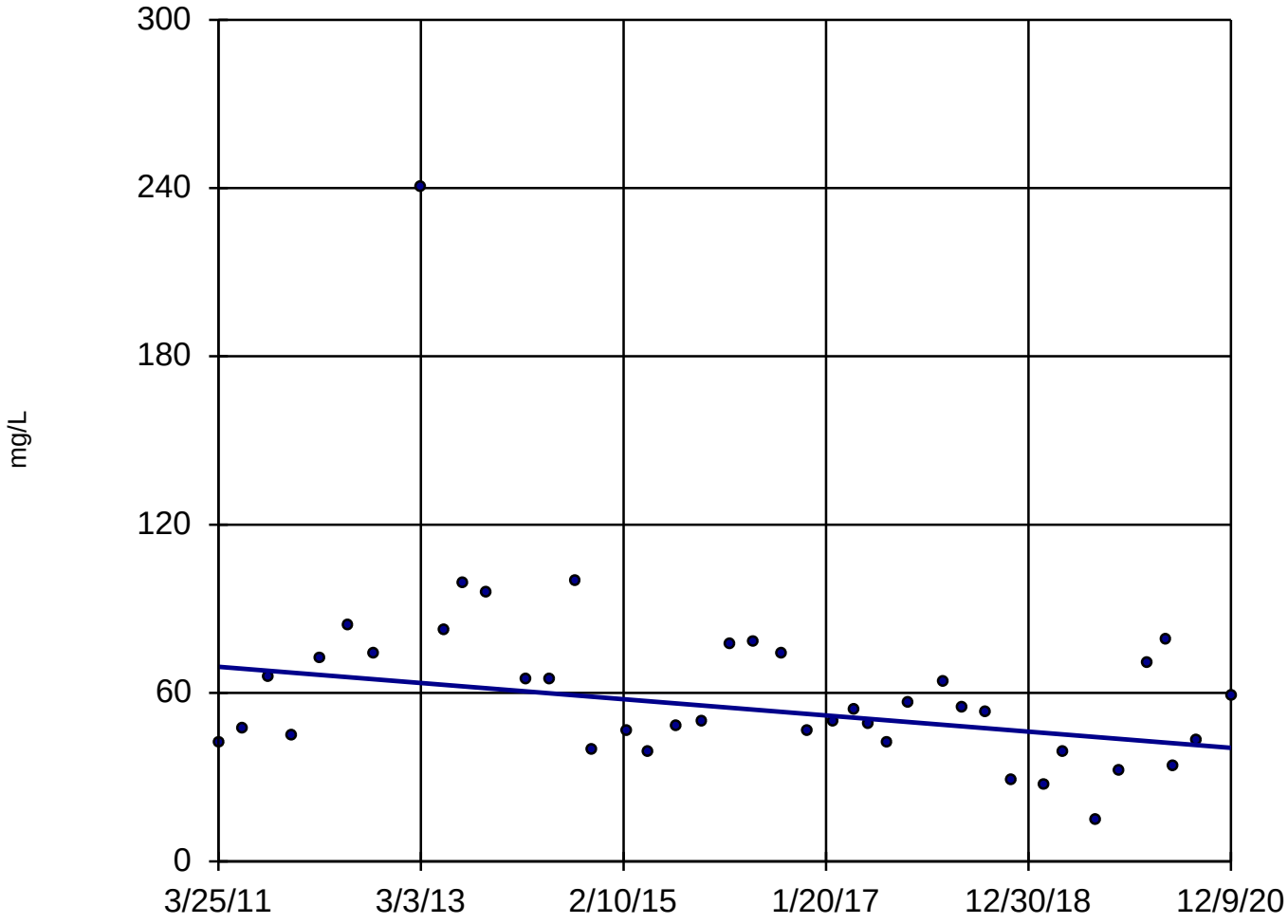
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Selenium, Total Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-03



n = 41

Slope = -2.97 units per year.

Mann-Kendall normal approx. = -2.348
critical = -2.58

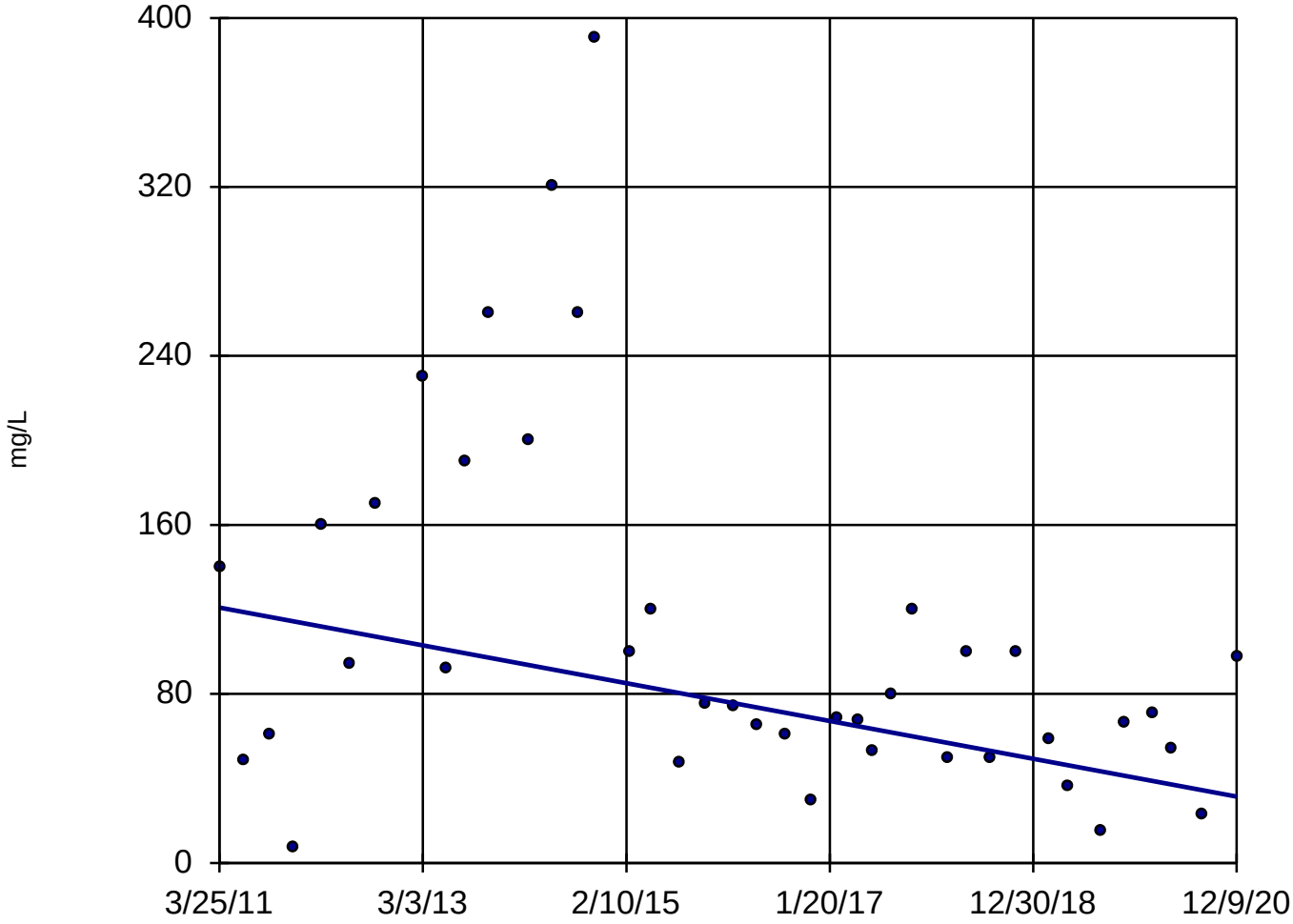
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Sulfate Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-04



n = 40

Slope = -9.213 units per year.

Mann-Kendall statistic = -219
critical = -223

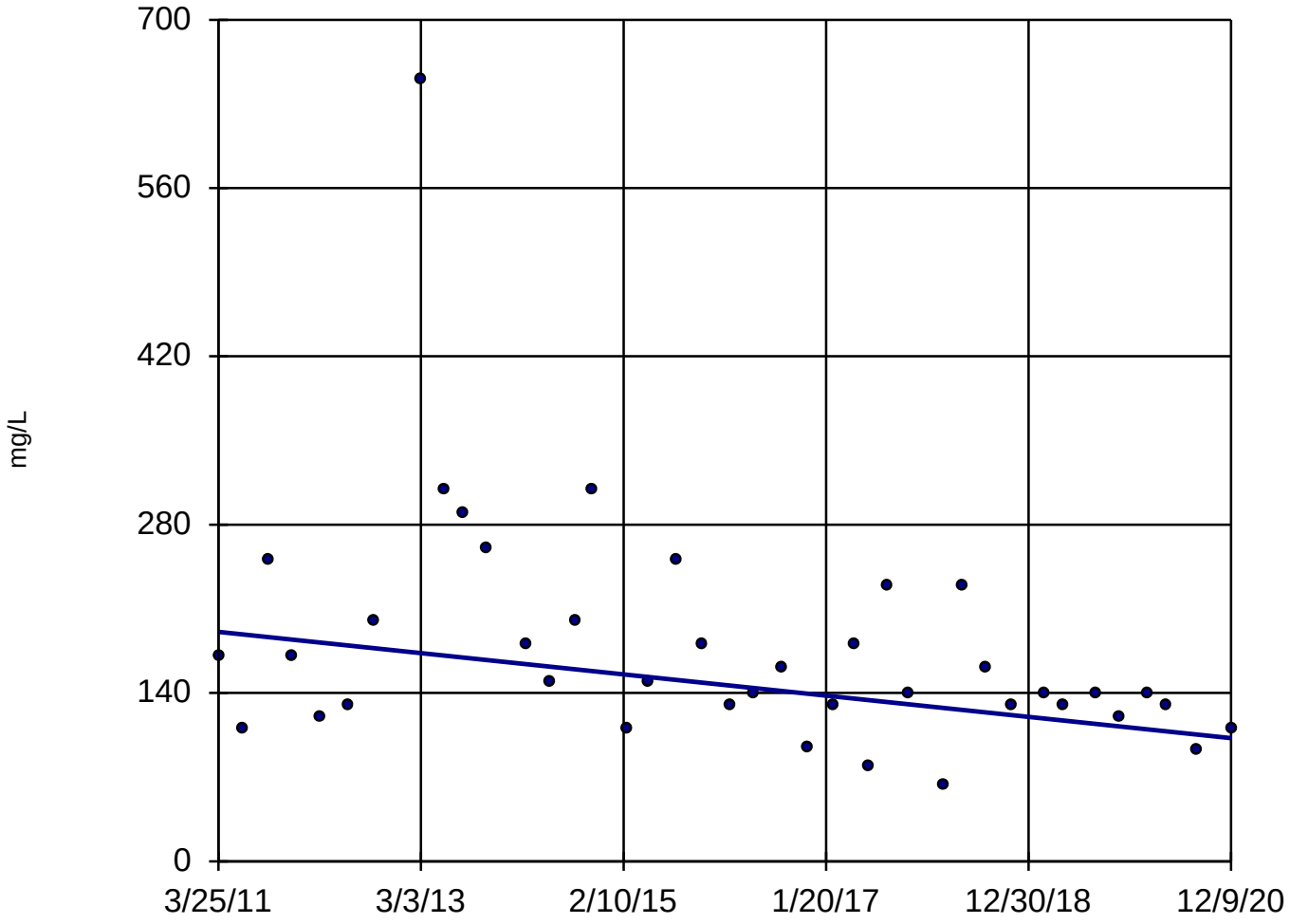
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Sulfate Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-05



n = 40

Slope = -9.096 units per year.

Mann-Kendall statistic = -249
critical = -223

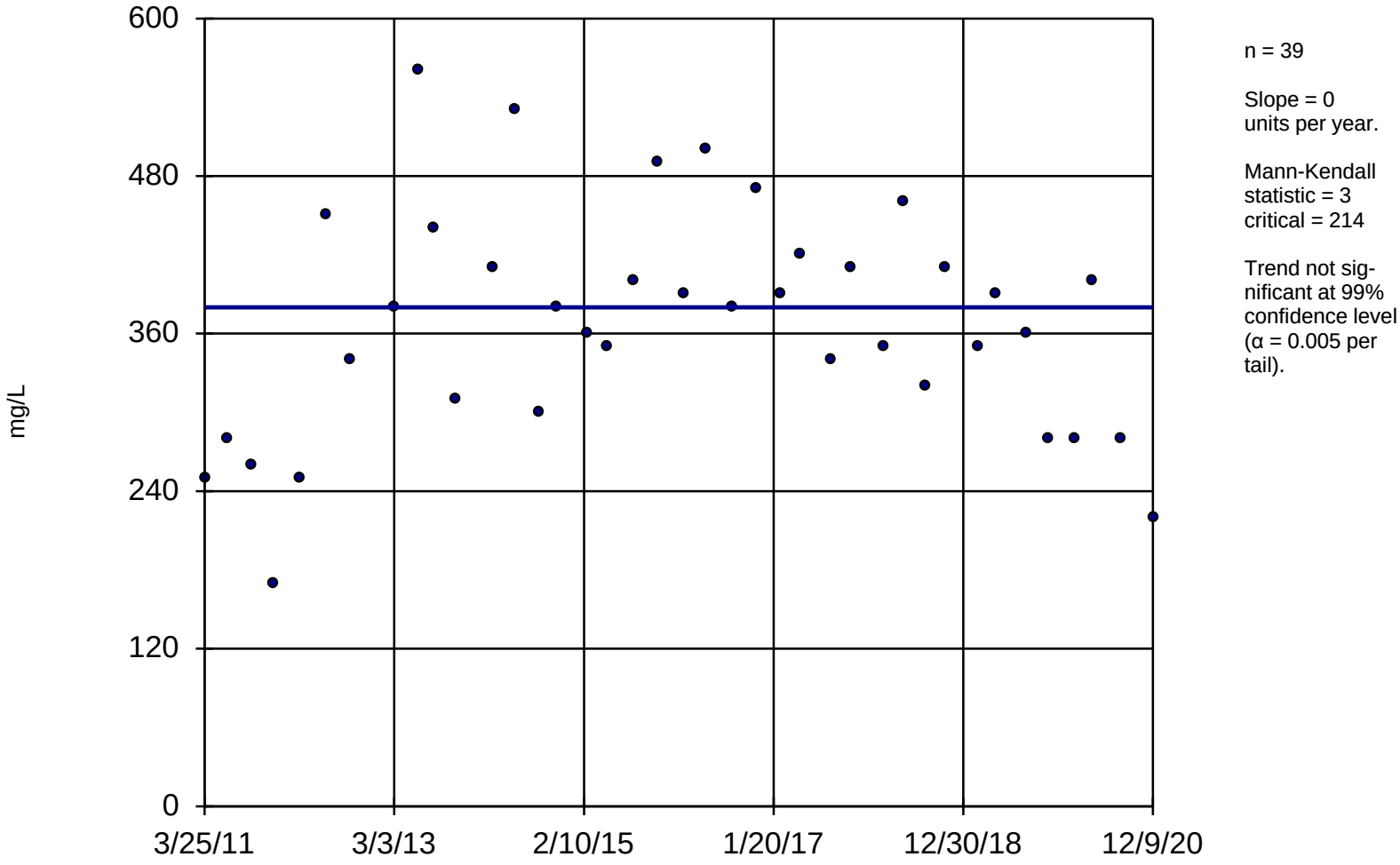
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Sulfate Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-06



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 3
critical = 214

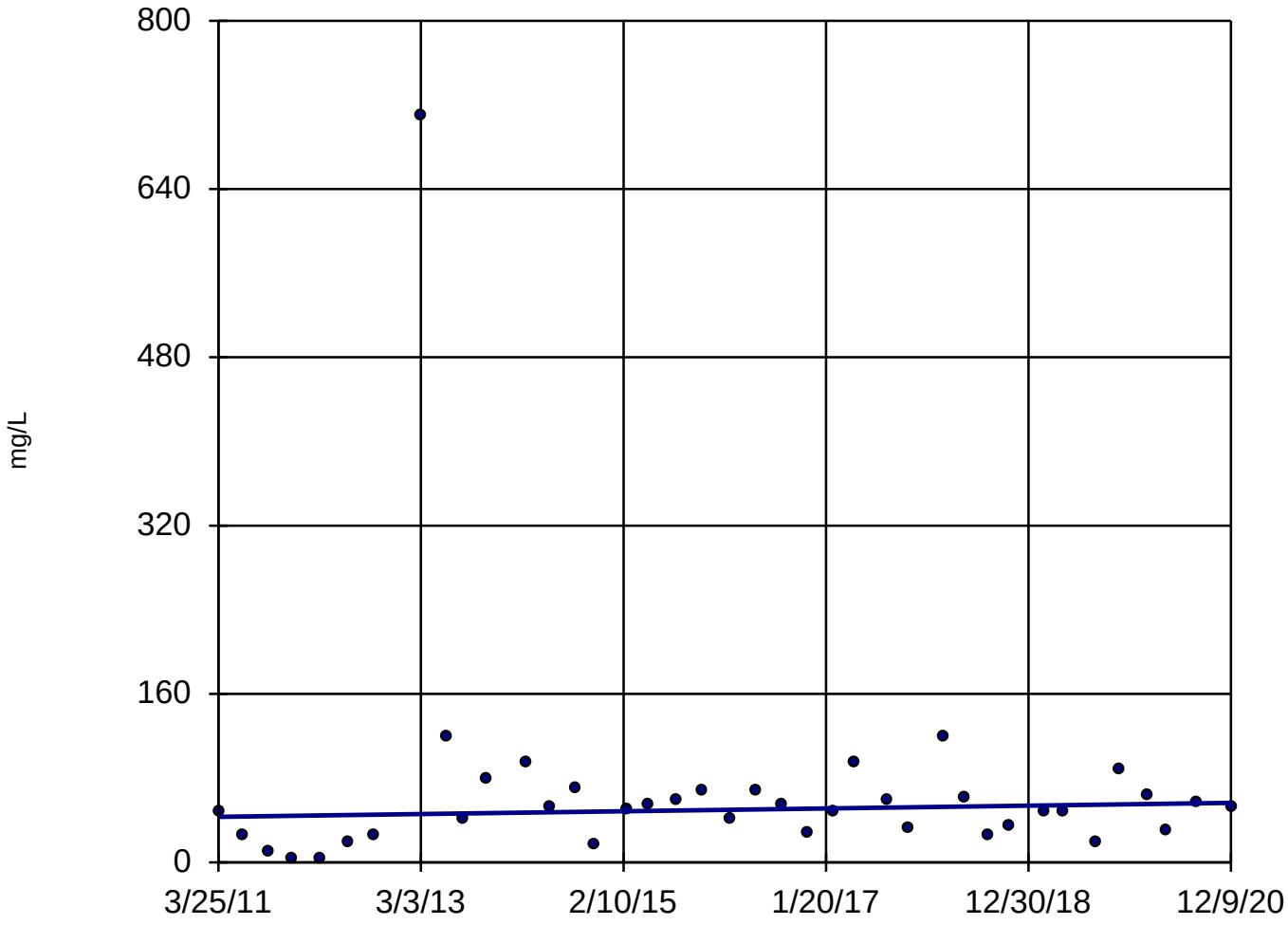
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Sulfate Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-07



n = 39

Slope = 1.361 units per year.

Mann-Kendall statistic = 73
critical = 214

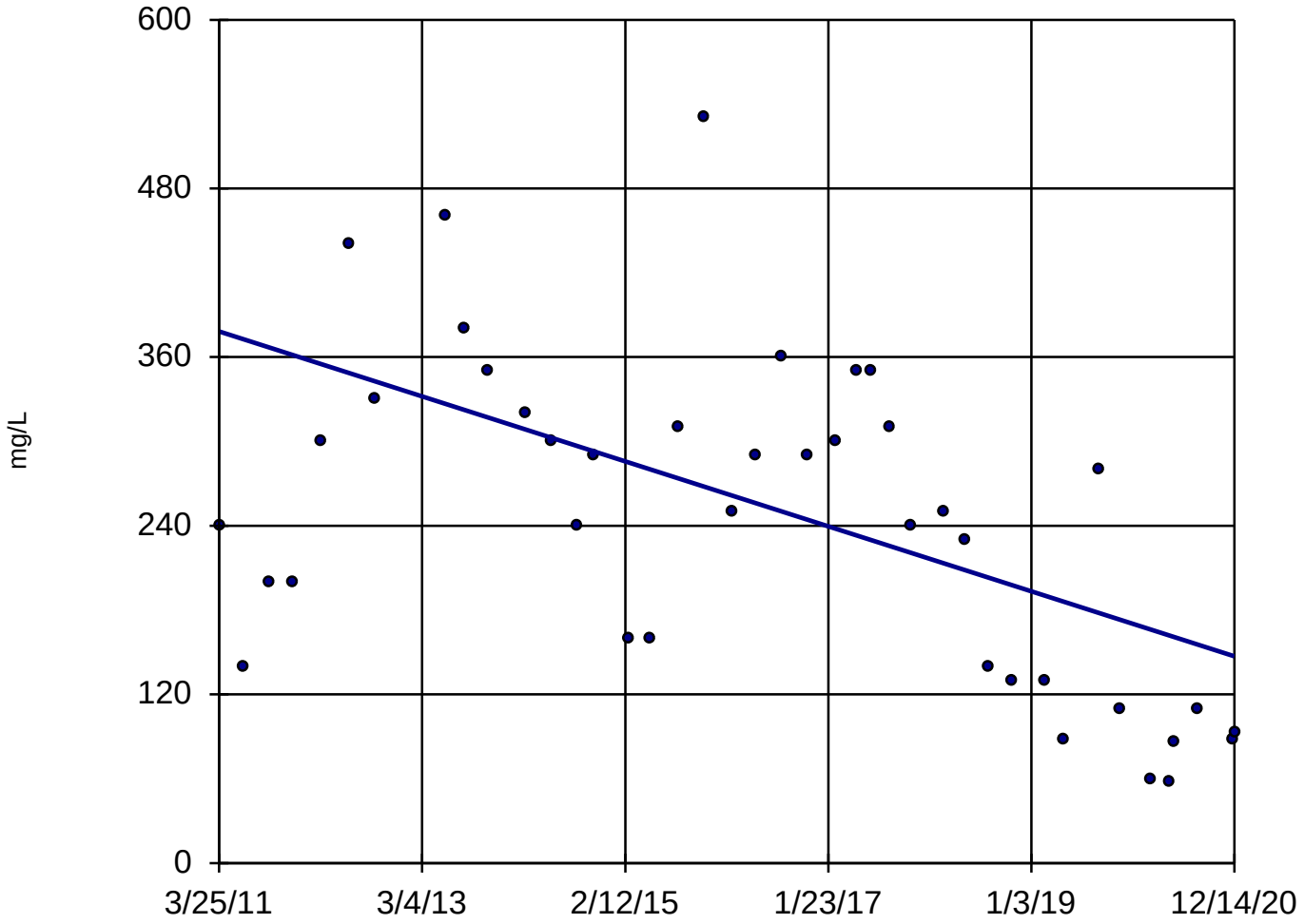
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Sulfate Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-08



n = 41

Slope = -23.74 units per year.

Mann-Kendall normal approx. = -3.881
critical = -2.58

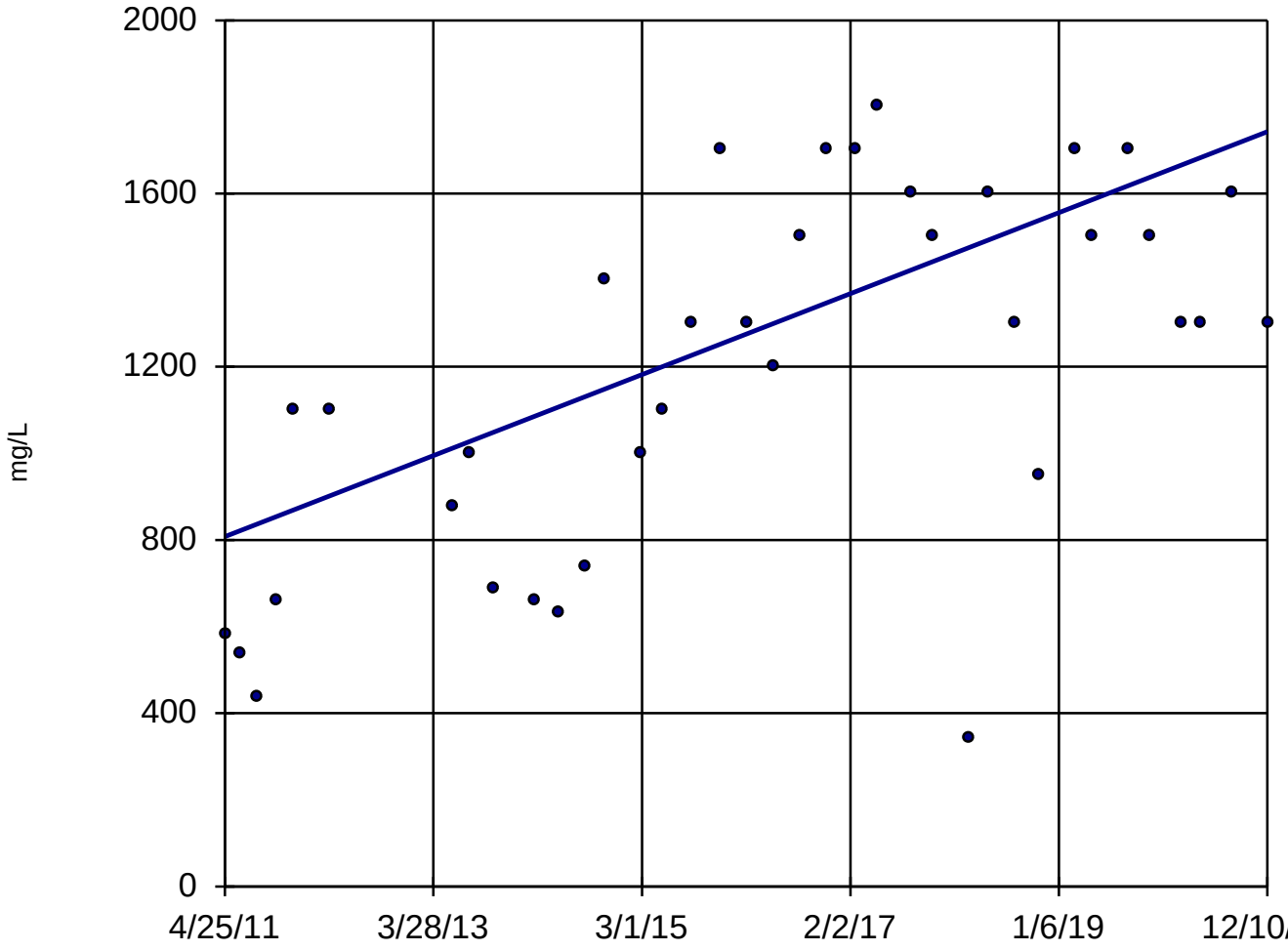
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Sulfate Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-13



n = 37

Slope = 97.09 units per year.

Mann-Kendall statistic = 293
critical = 199

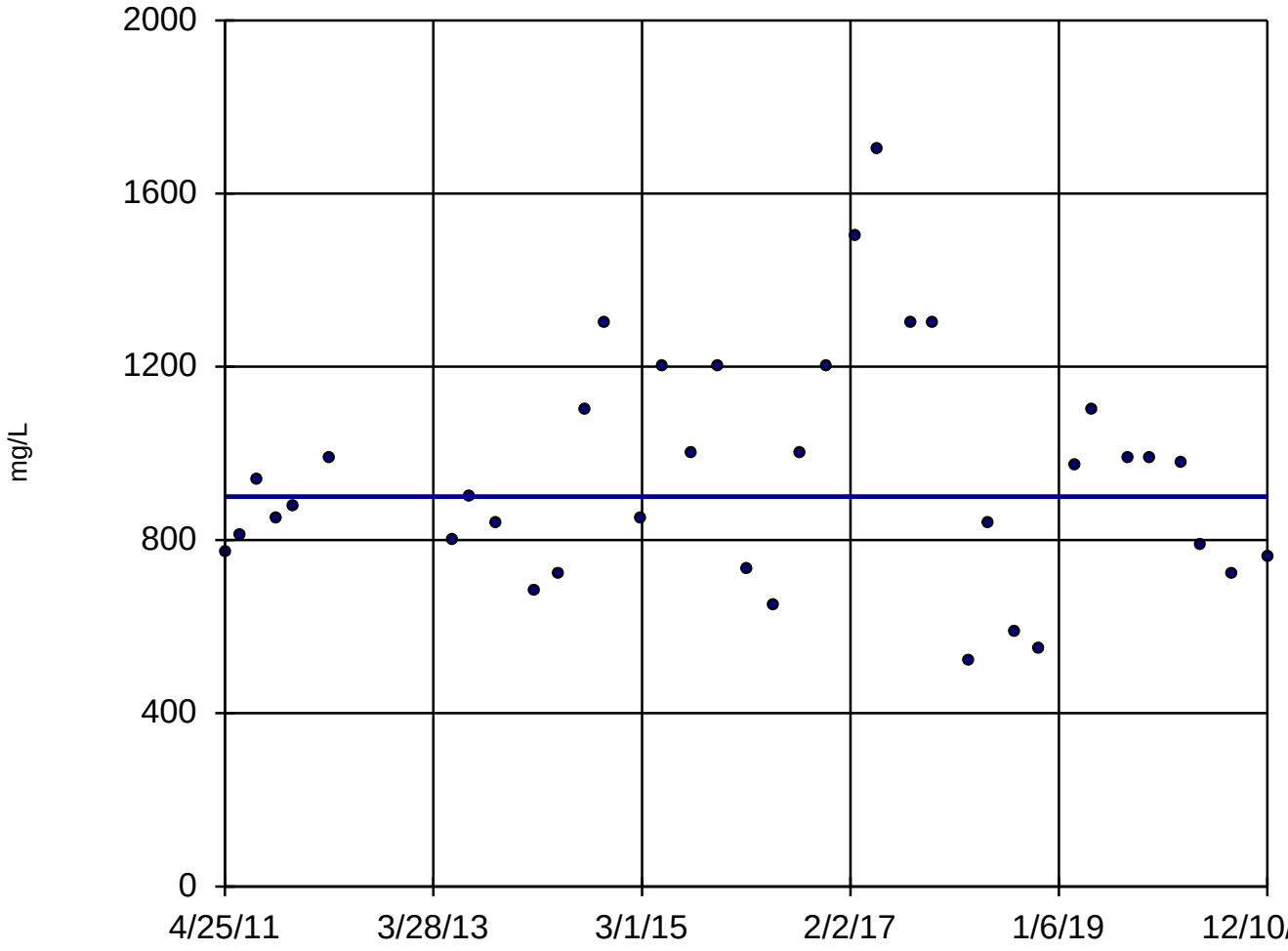
Increasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Sulfate Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-14



n = 37

Slope = 0
units per year.

Mann-Kendall
statistic = 8
critical = 199

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Sulfate Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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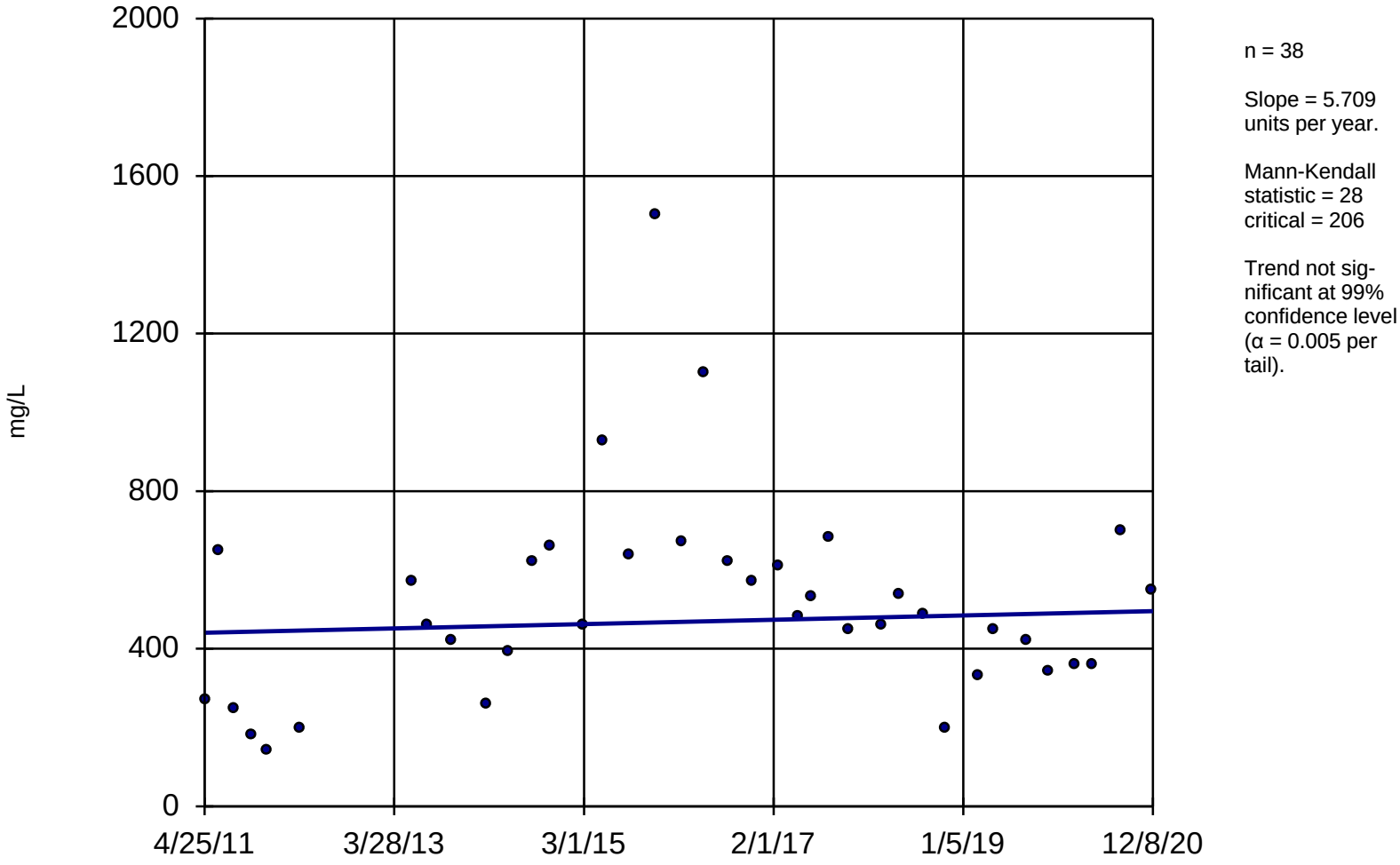
Sen's Slope Estimator

MW-15



n = 38

Slope = 5.709 units per year.

Mann-Kendall statistic = 28
critical = 206

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Sulfate Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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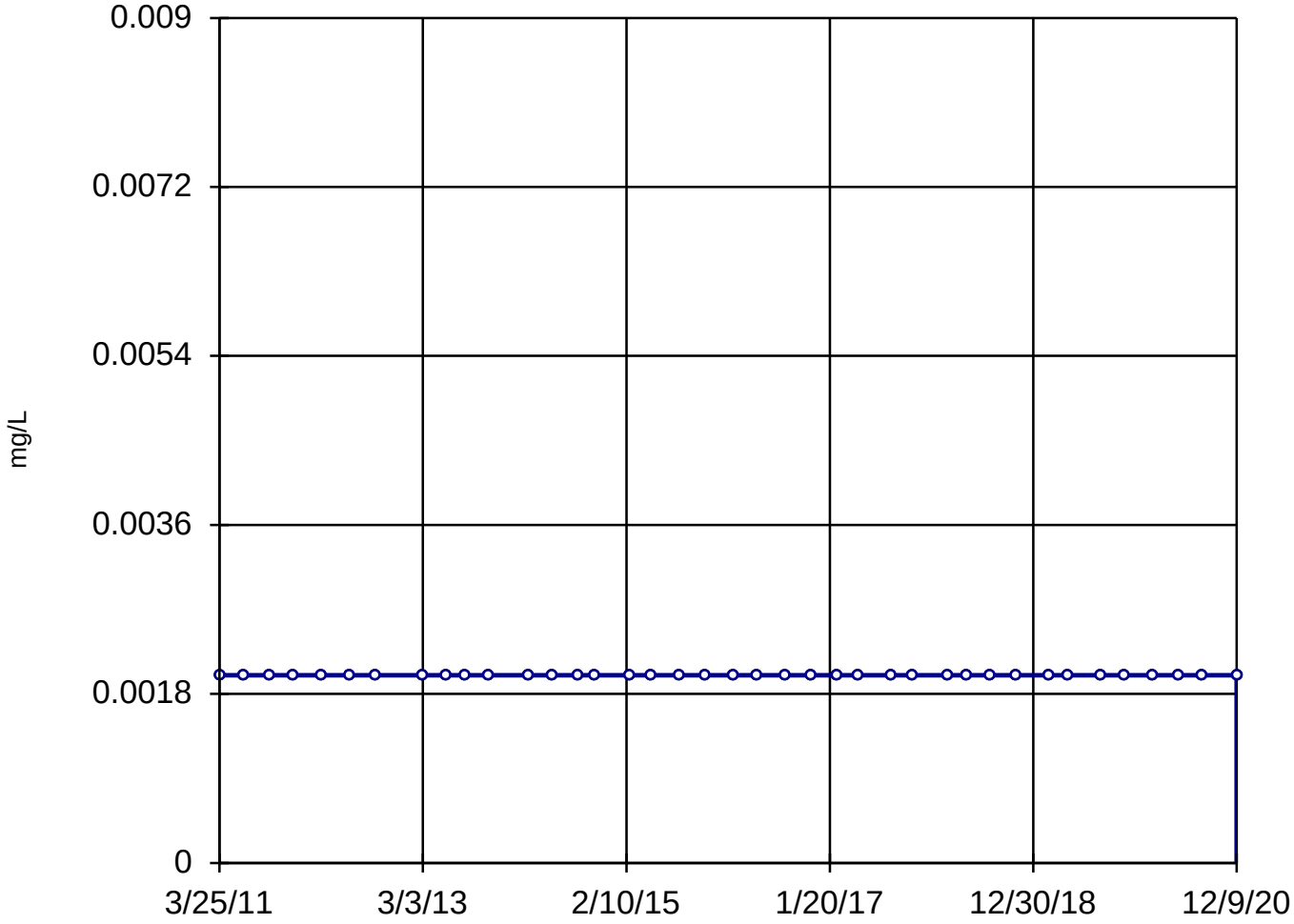
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Thallium, Dissolved Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

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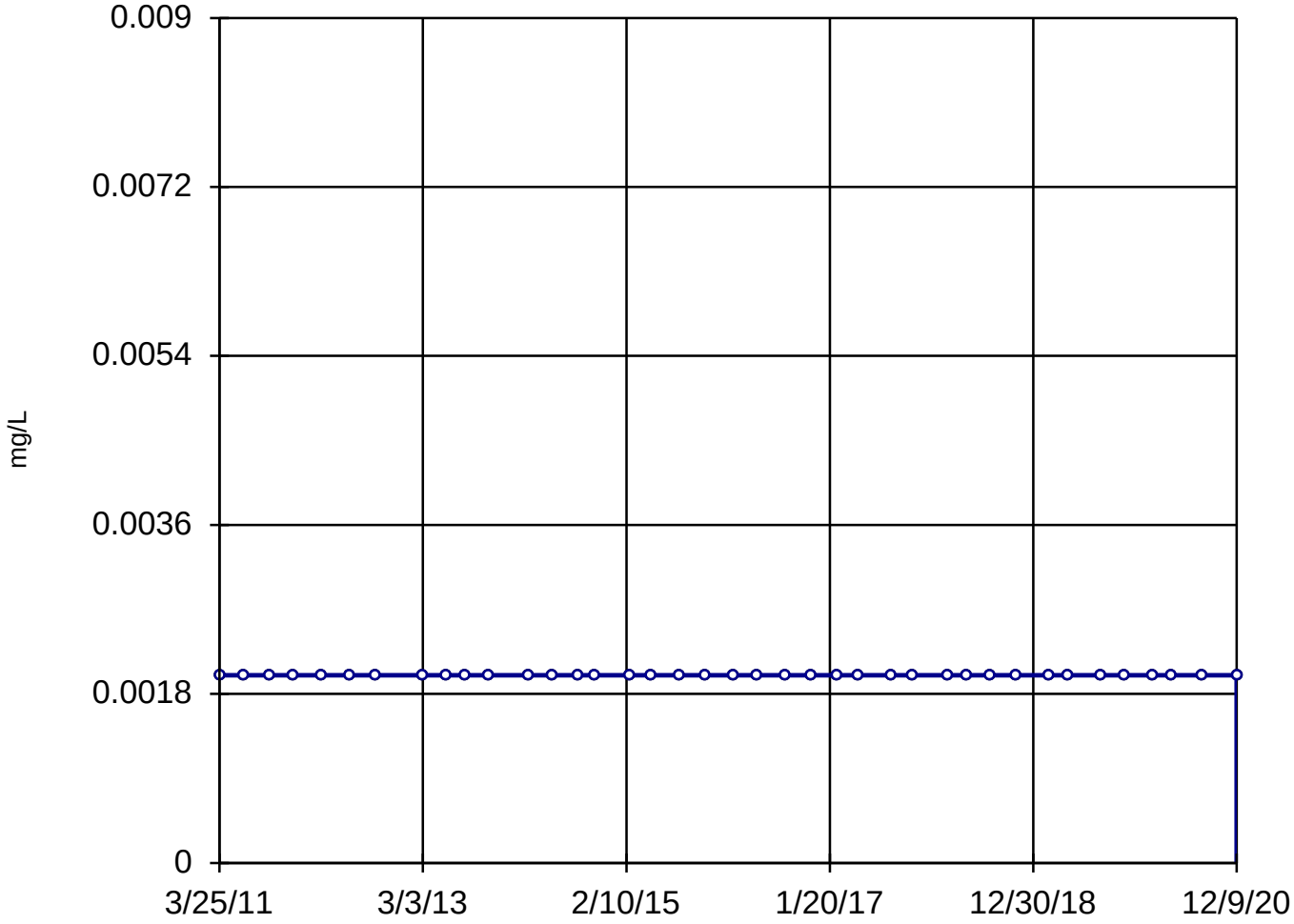
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

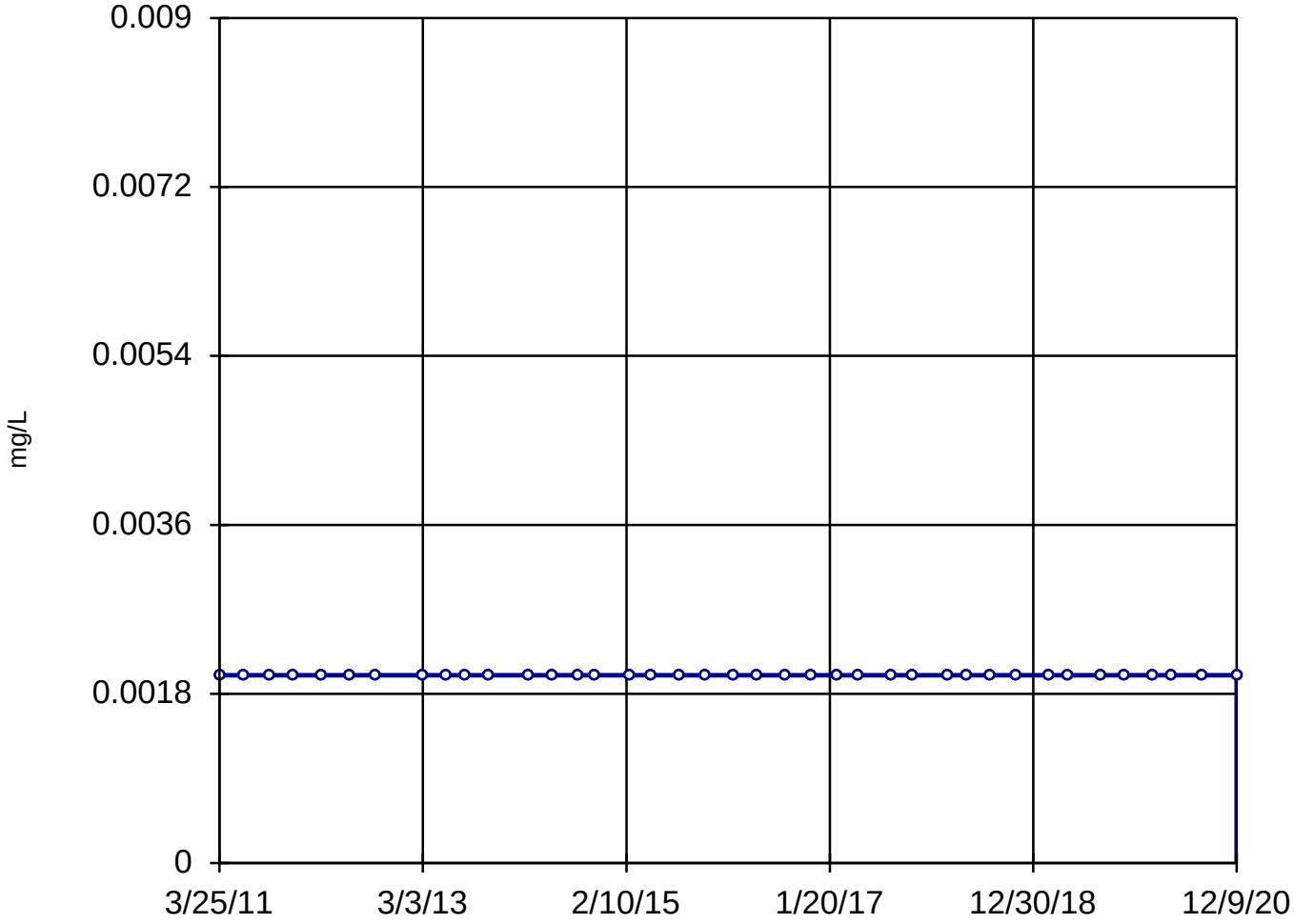
Constituent: Thallium, Dissolved Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-05



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

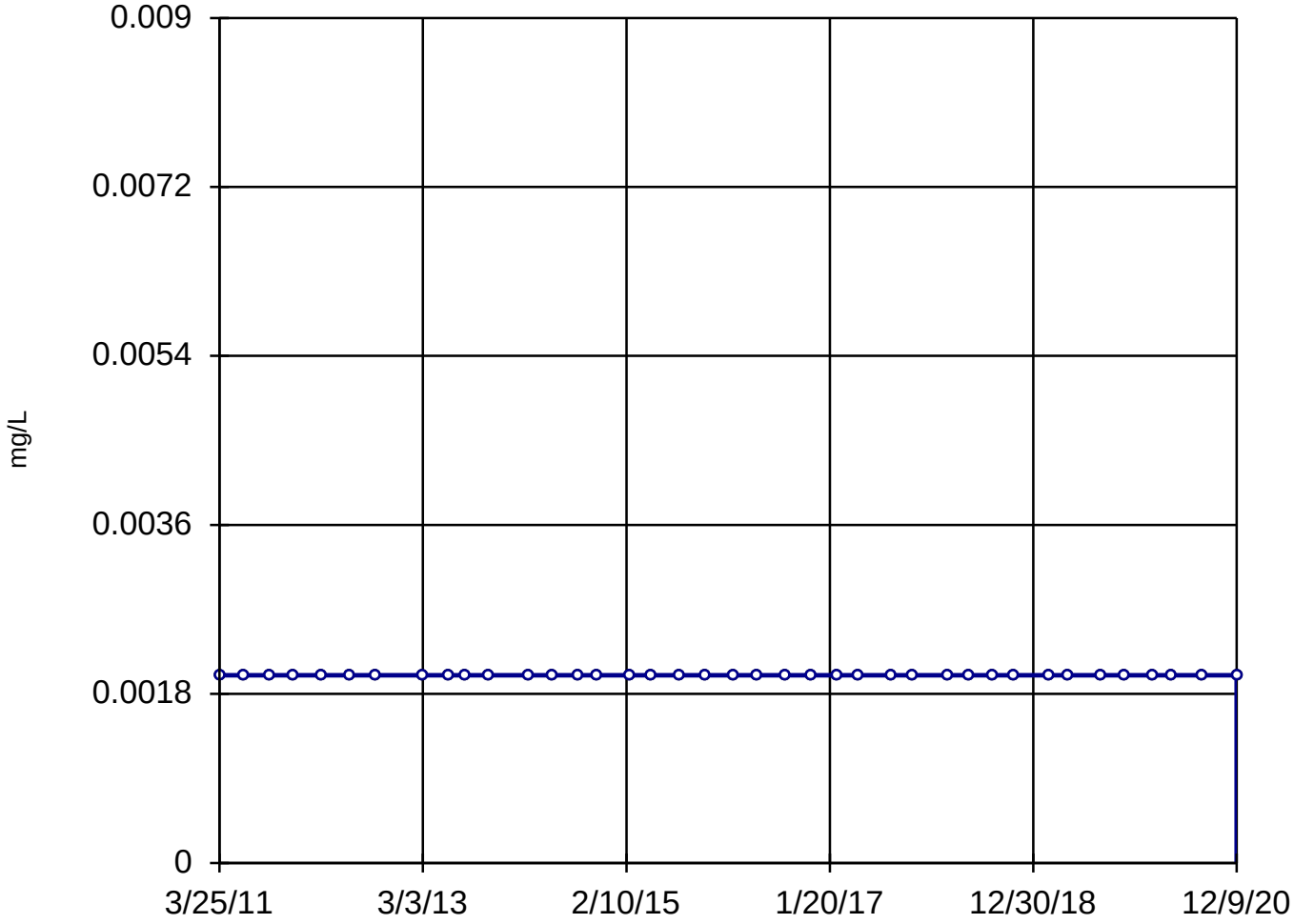
Constituent: Thallium, Dissolved Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-06



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

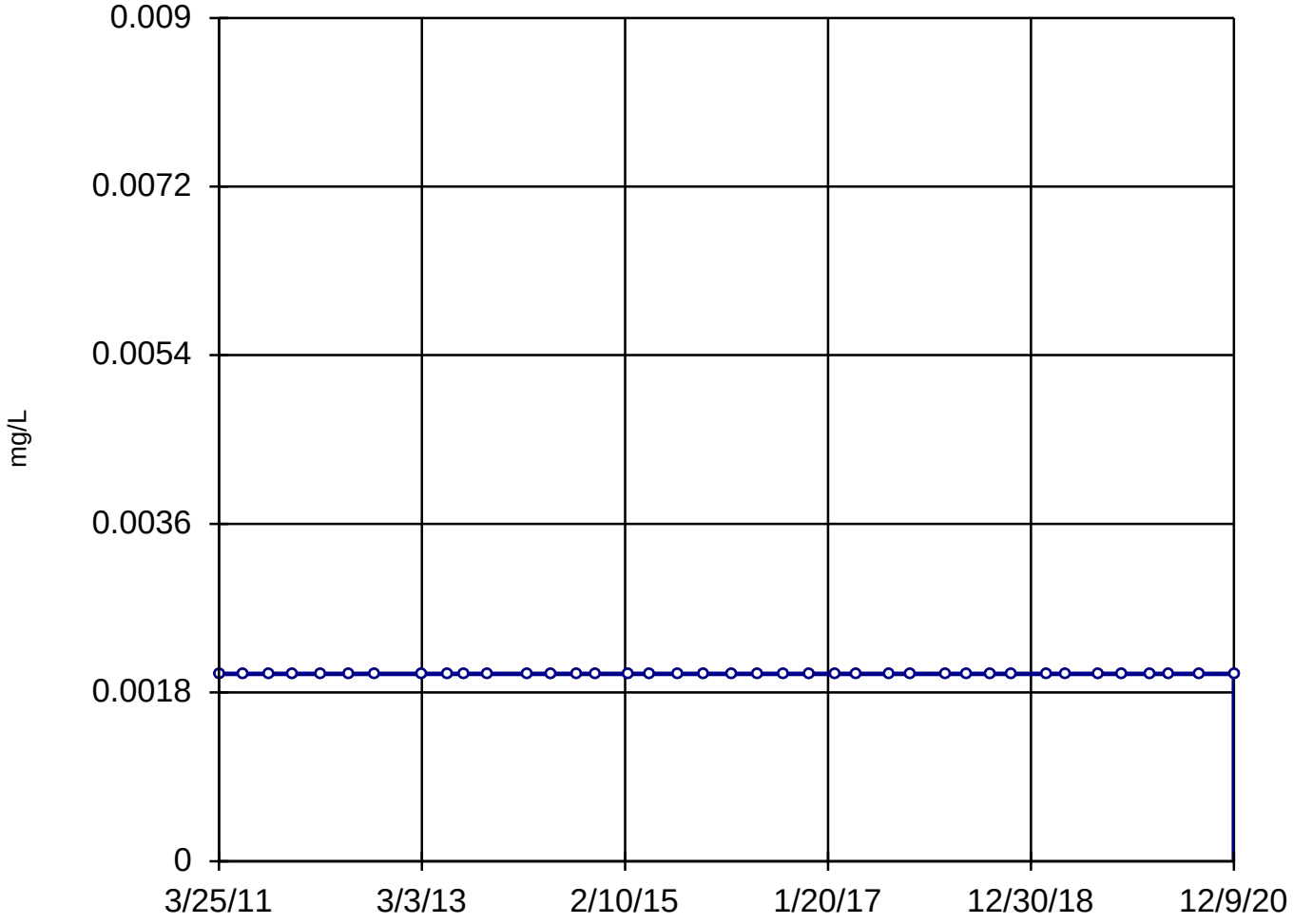
Constituent: Thallium, Dissolved Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-07



n = 39

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 214

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

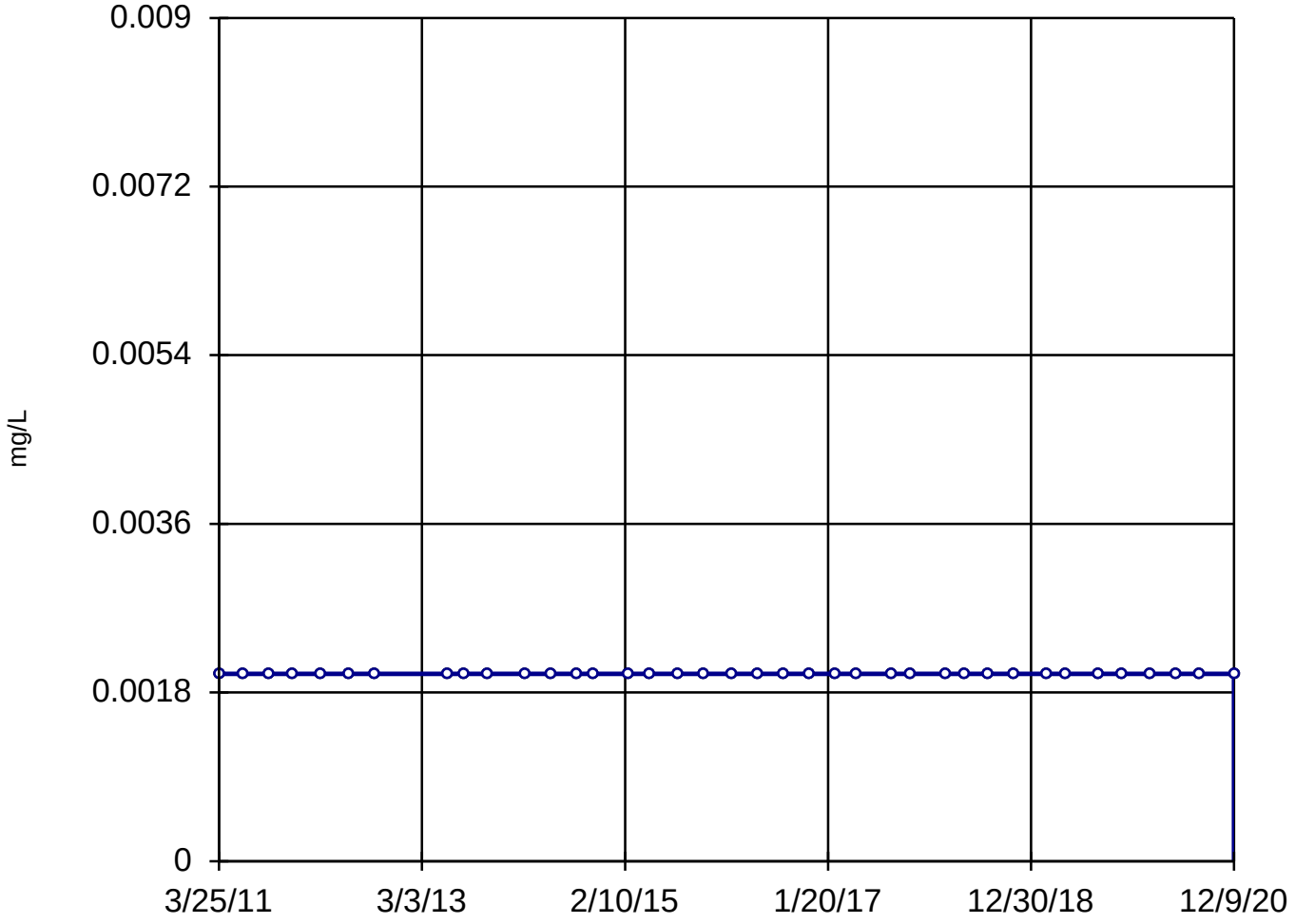
Constituent: Thallium, Dissolved Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 38

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 206

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

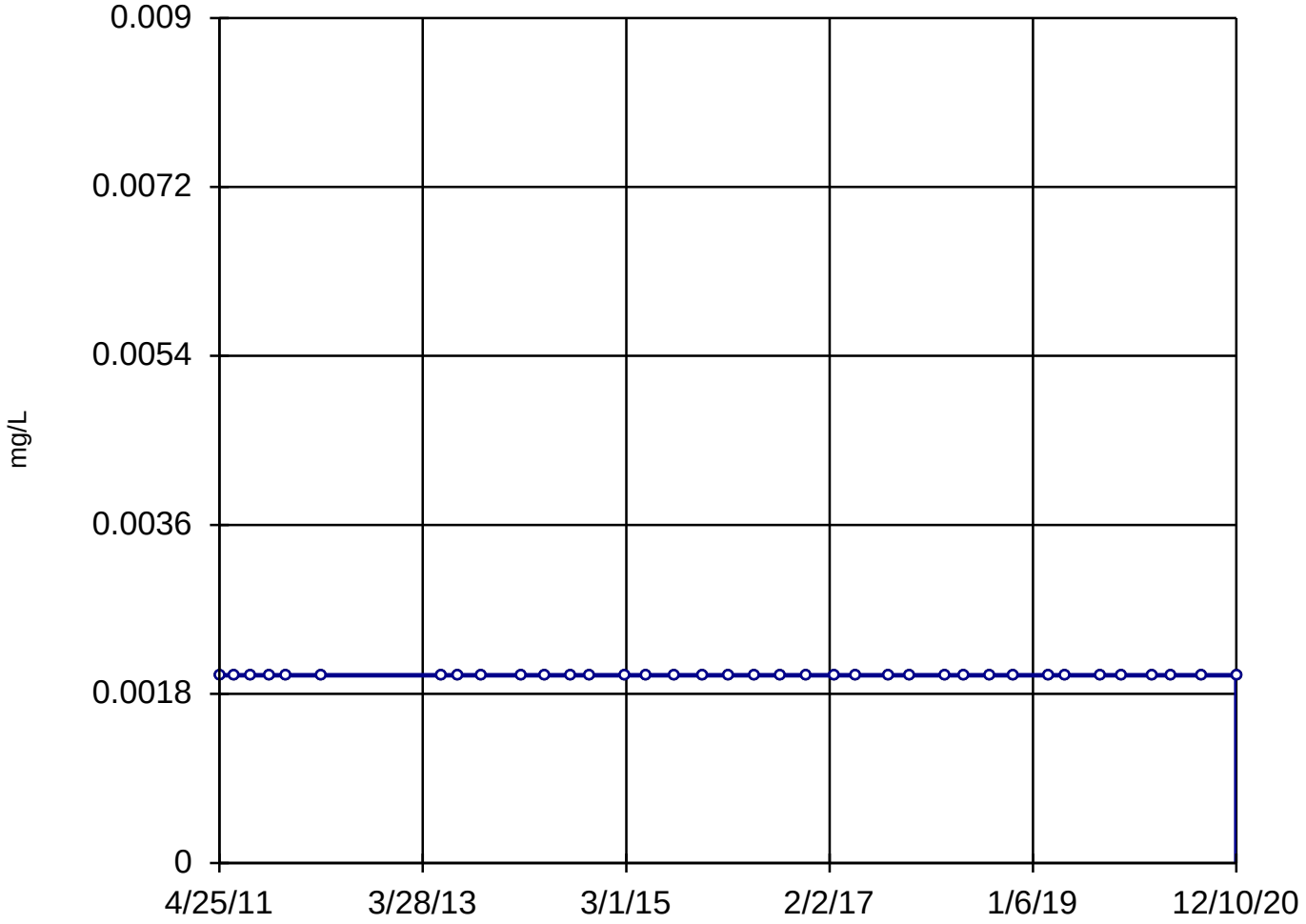
Constituent: Thallium, Dissolved Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-13



n = 37

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 199

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

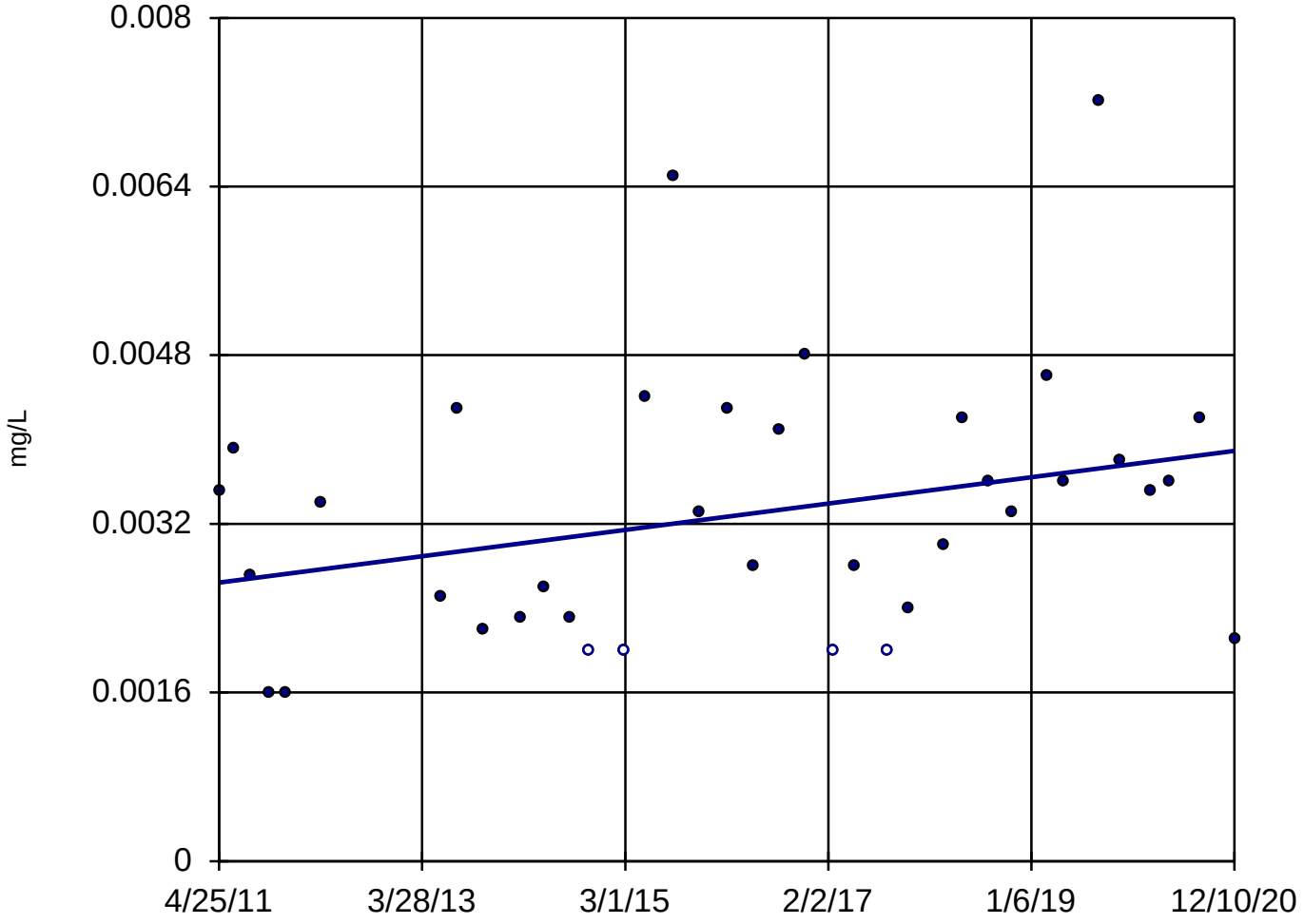
Constituent: Thallium, Dissolved Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-14



n = 37

Slope = 0.0001298 units per year.

Mann-Kendall statistic = 140
critical = 199

Trend not significant at 99% confidence level (α = 0.005 per tail).

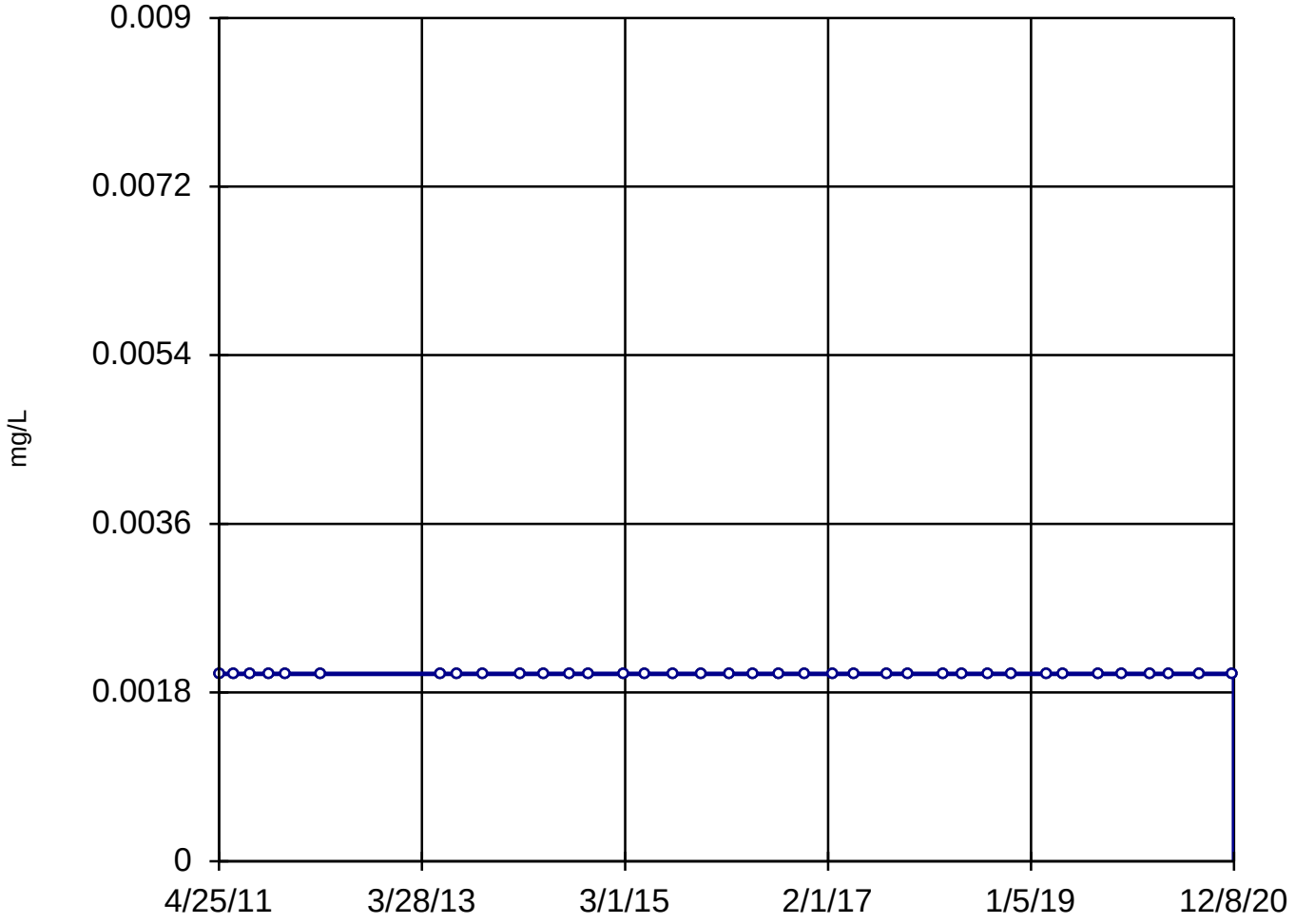
Constituent: Thallium, Dissolved Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-15



n = 37

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 199

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

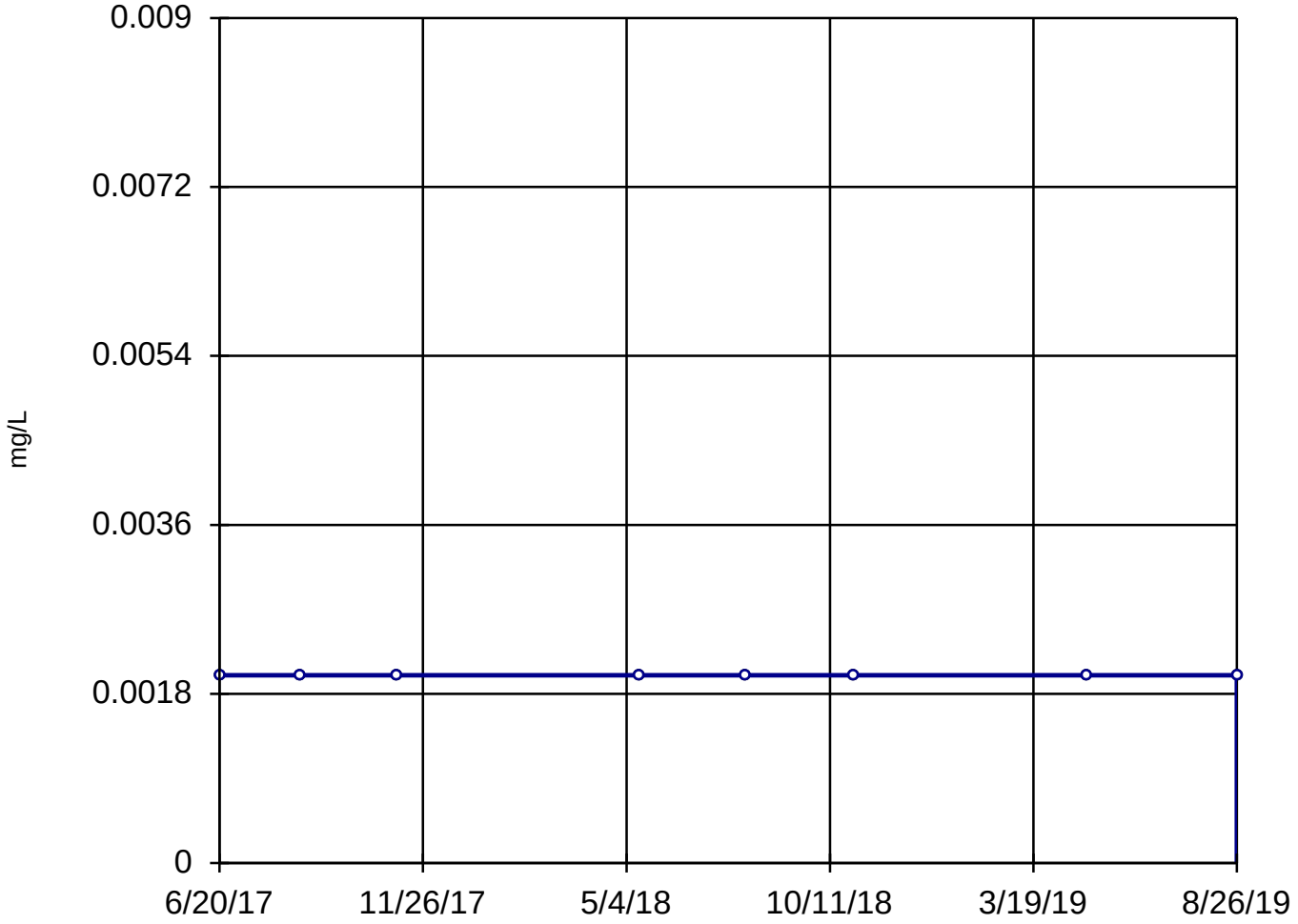
Constituent: Thallium, Dissolved Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 8

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 21

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

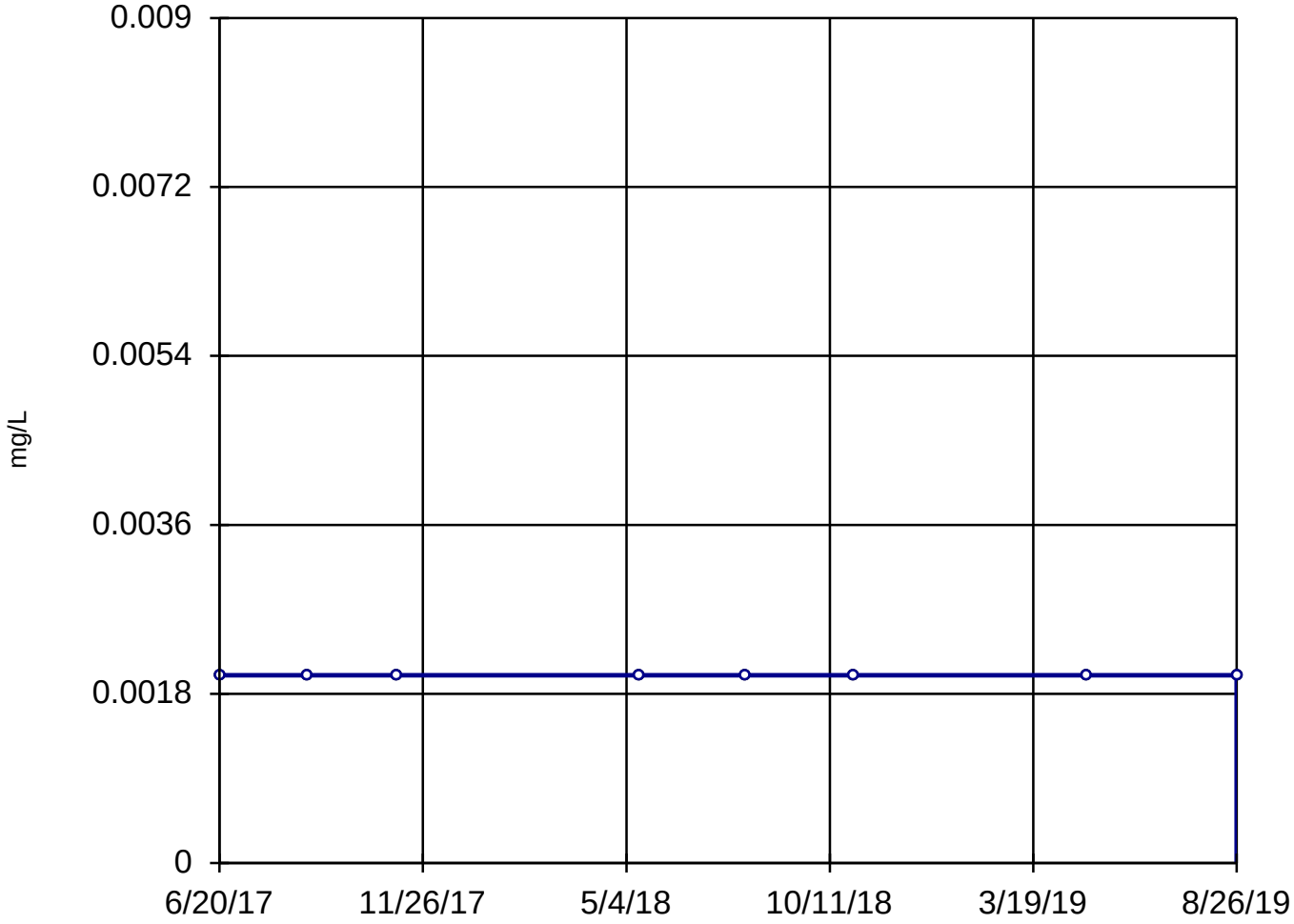
Constituent: Thallium, Total Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 8

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 21

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

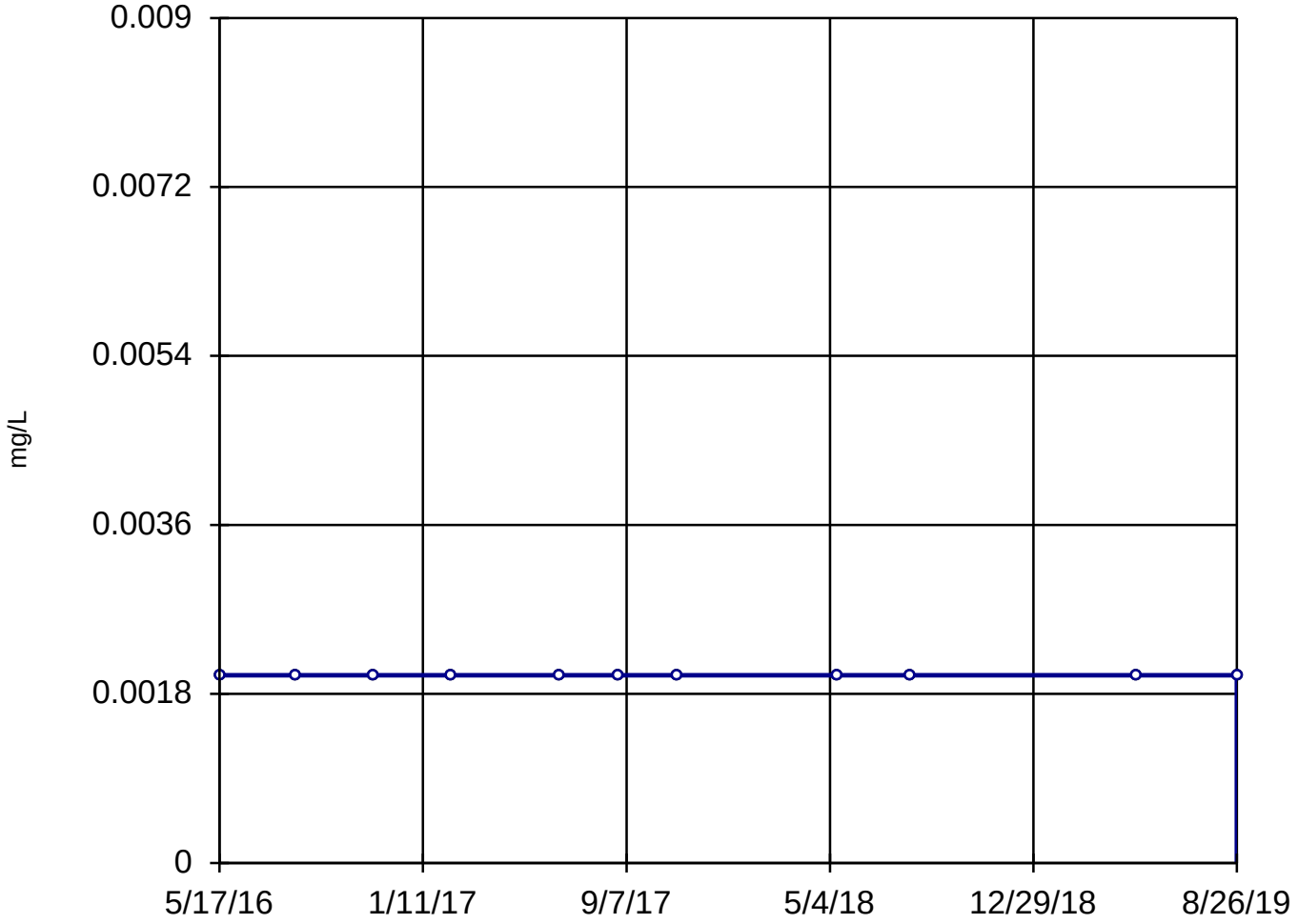
Constituent: Thallium, Total Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-05



n = 11

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 34

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

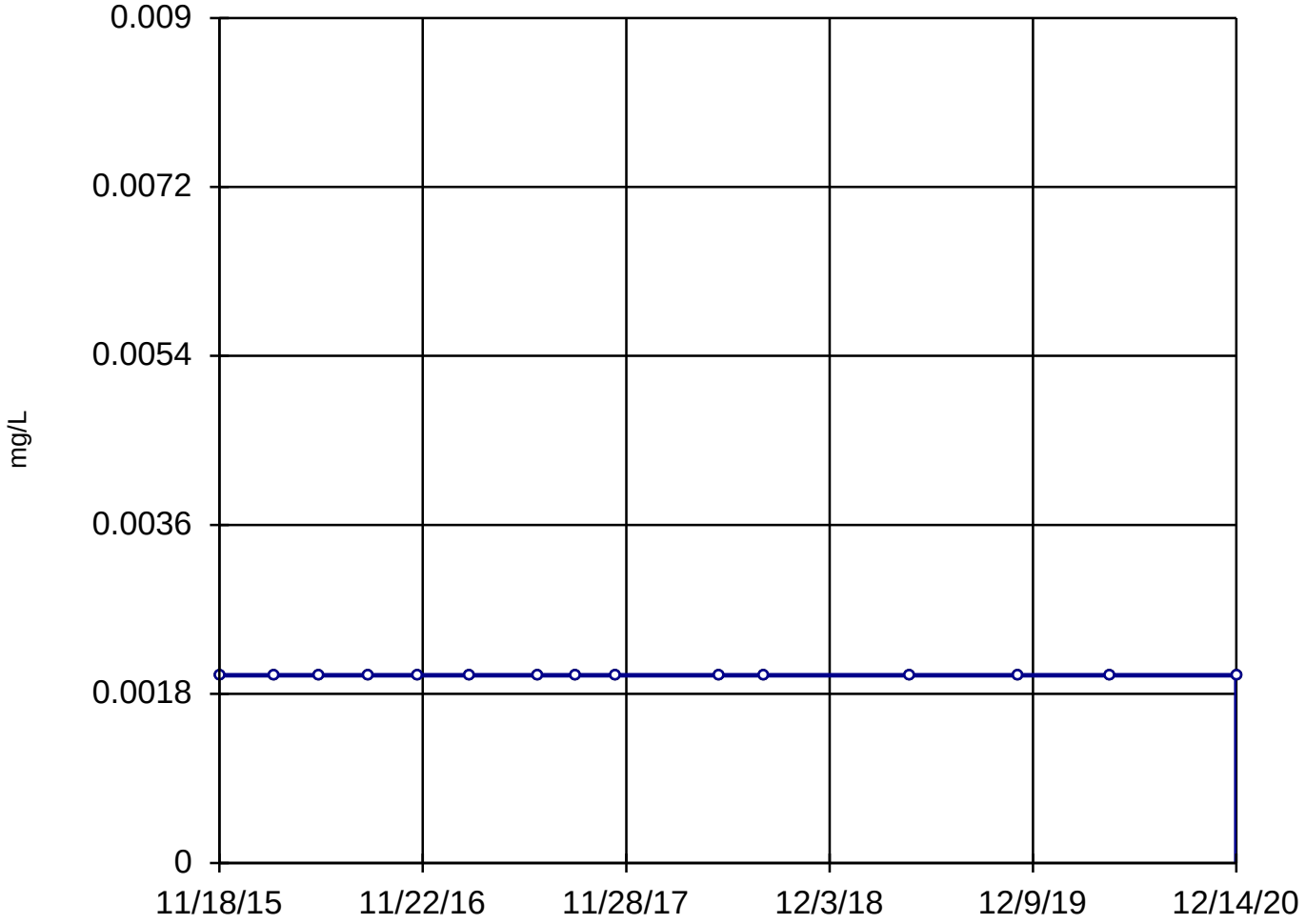
Constituent: Thallium, Total Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 15

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 53

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

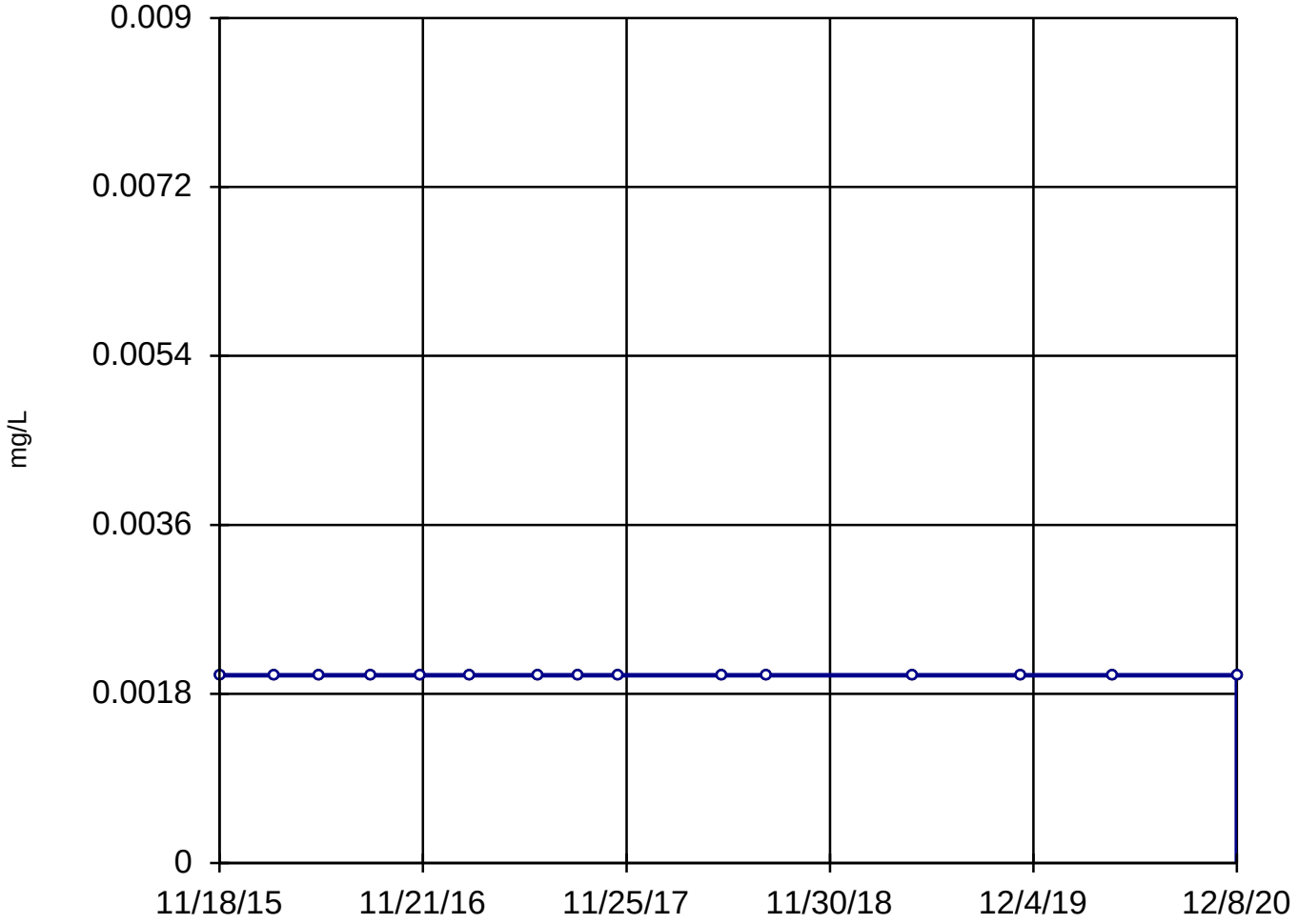
Constituent: Thallium, Total Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-15



n = 15

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 53

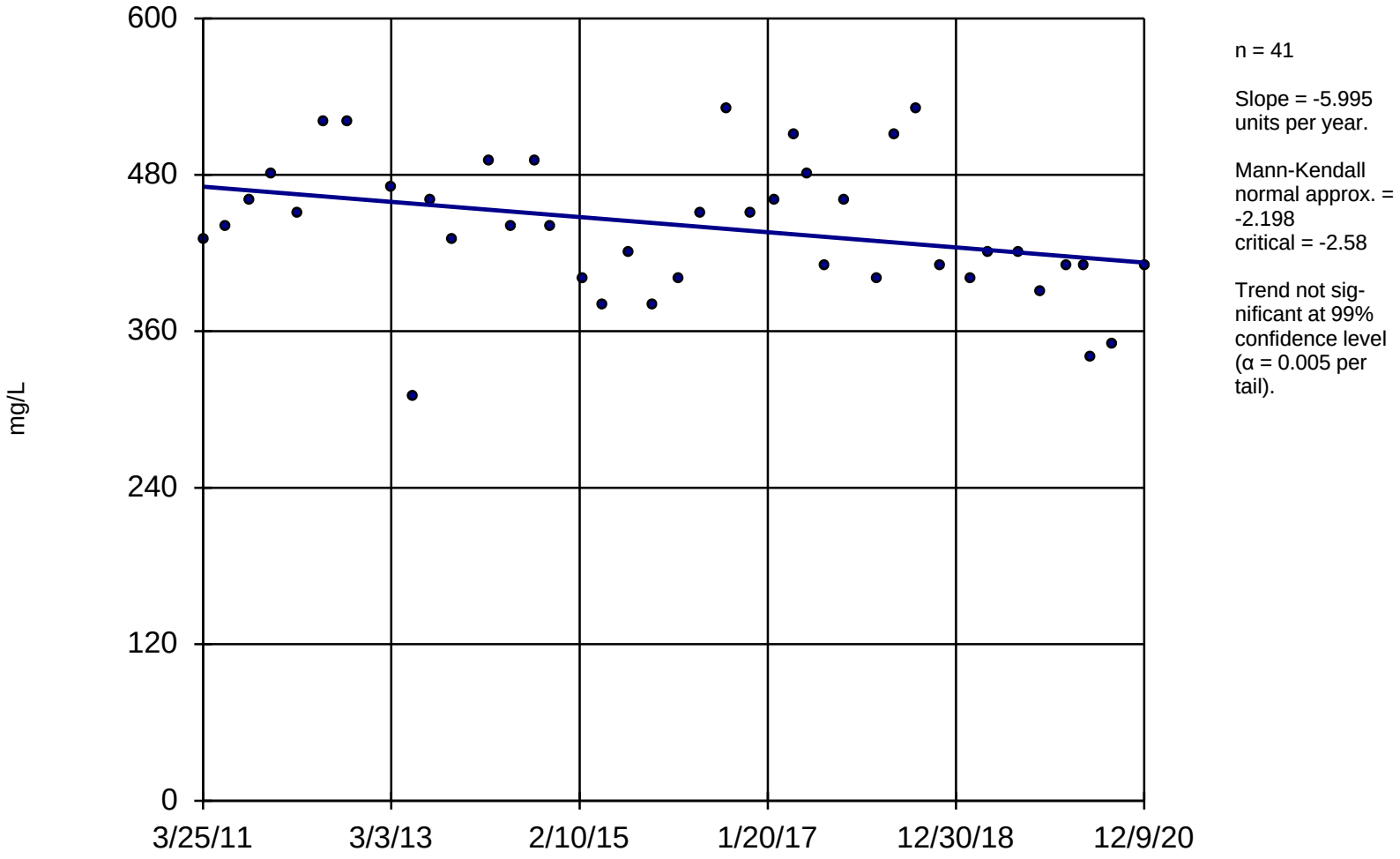
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Thallium, Total Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-03



n = 41

Slope = -5.995 units per year.

Mann-Kendall normal approx. = -2.198
critical = -2.58

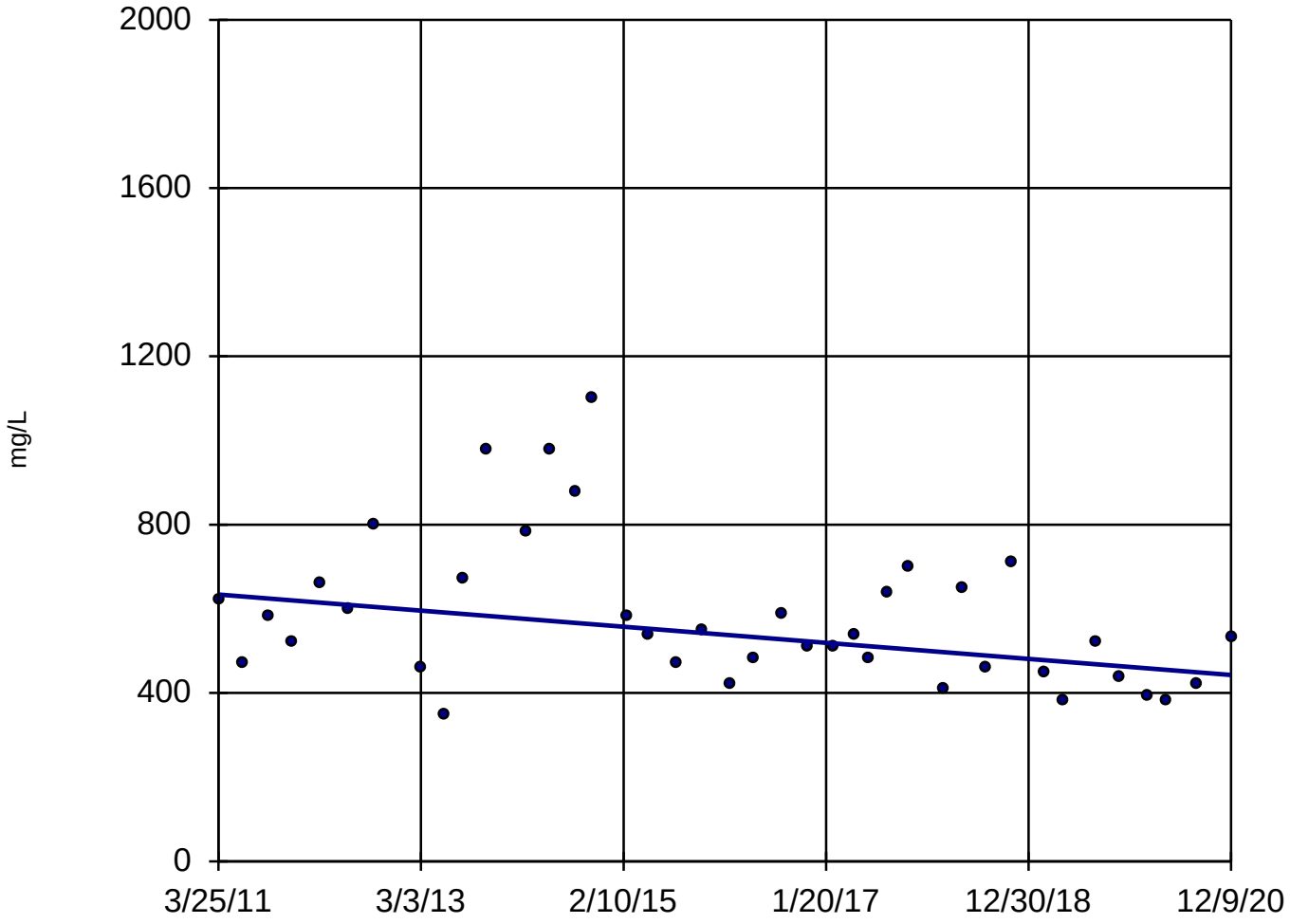
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Total Dissolved Solids Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-04



n = 40

Slope = -19.65 units per year.

Mann-Kendall statistic = -224
critical = -223

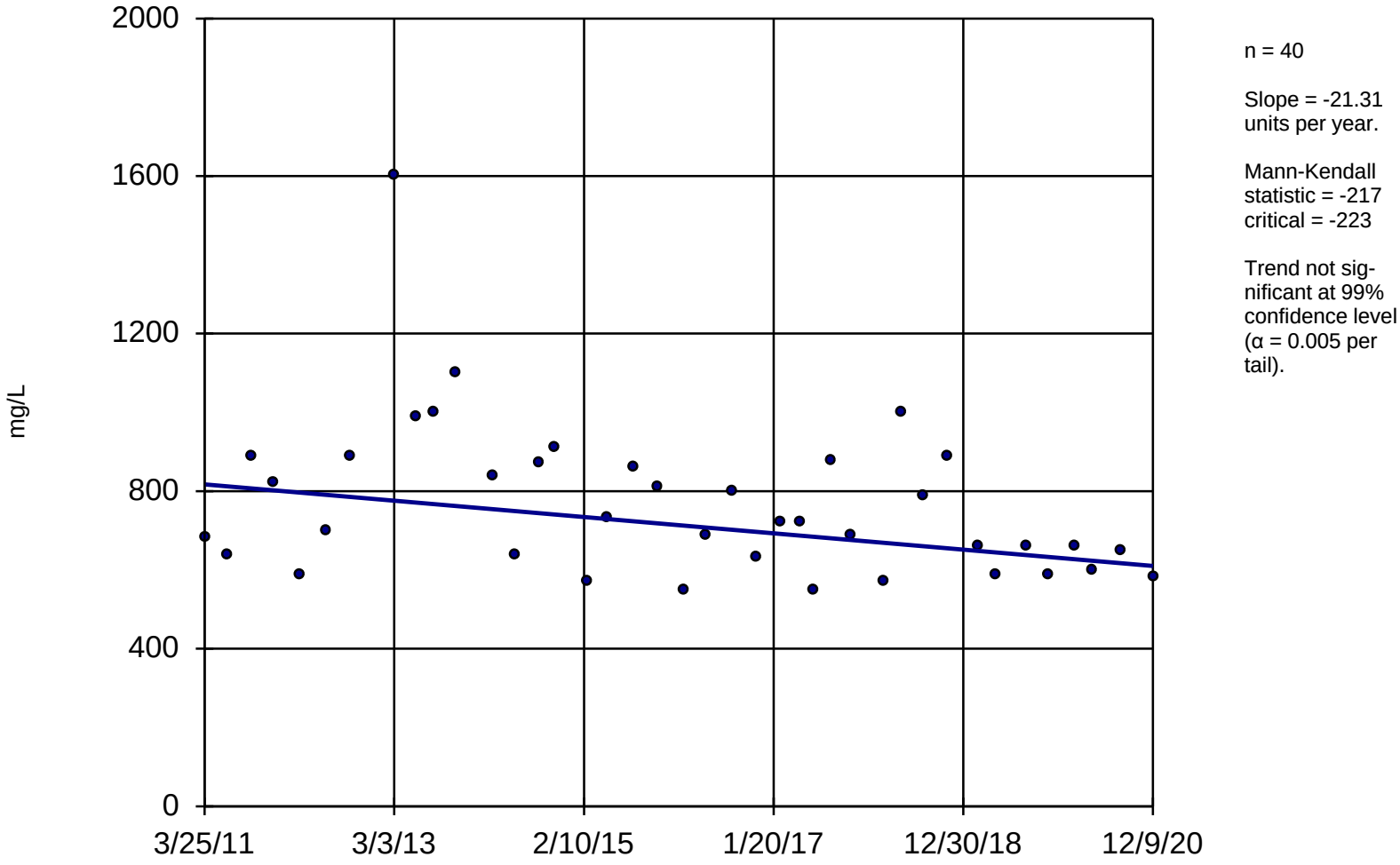
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Total Dissolved Solids Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-05



n = 40

Slope = -21.31 units per year.

Mann-Kendall statistic = -217
critical = -223

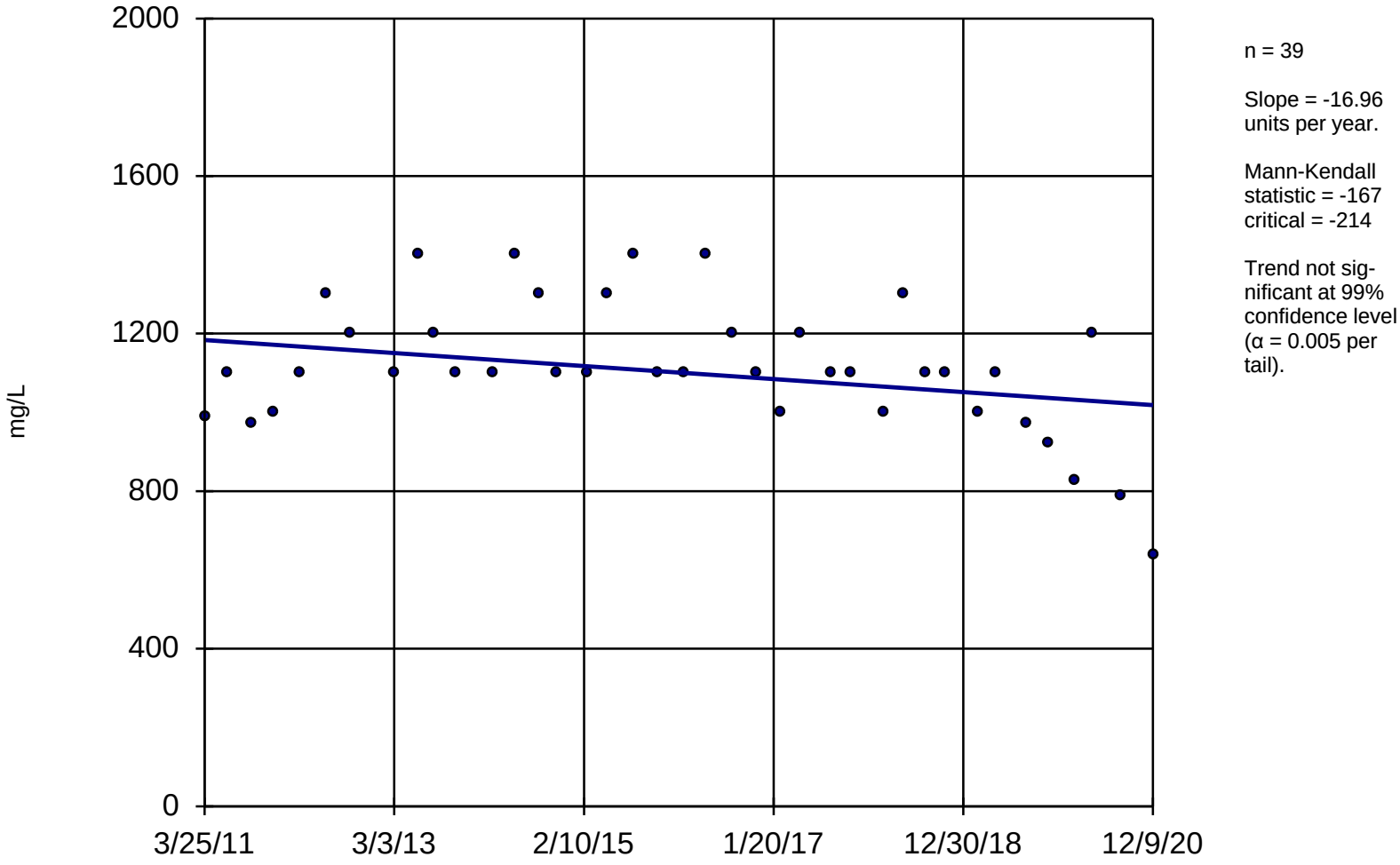
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Total Dissolved Solids Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-06



n = 39

Slope = -16.96 units per year.

Mann-Kendall statistic = -167
critical = -214

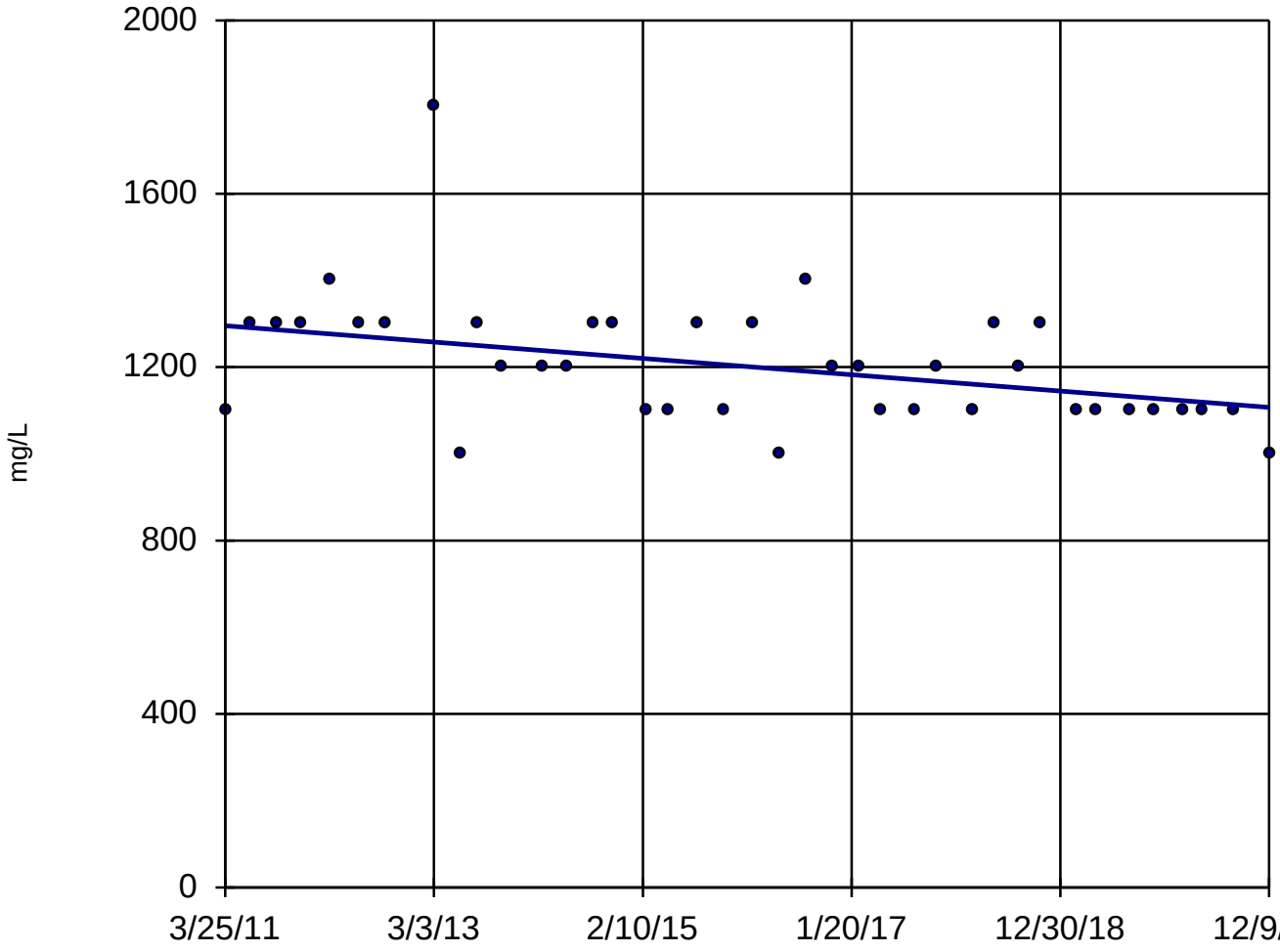
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Total Dissolved Solids Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-07



n = 39

Slope = -19.4 units per year.

Mann-Kendall statistic = -257
critical = -214

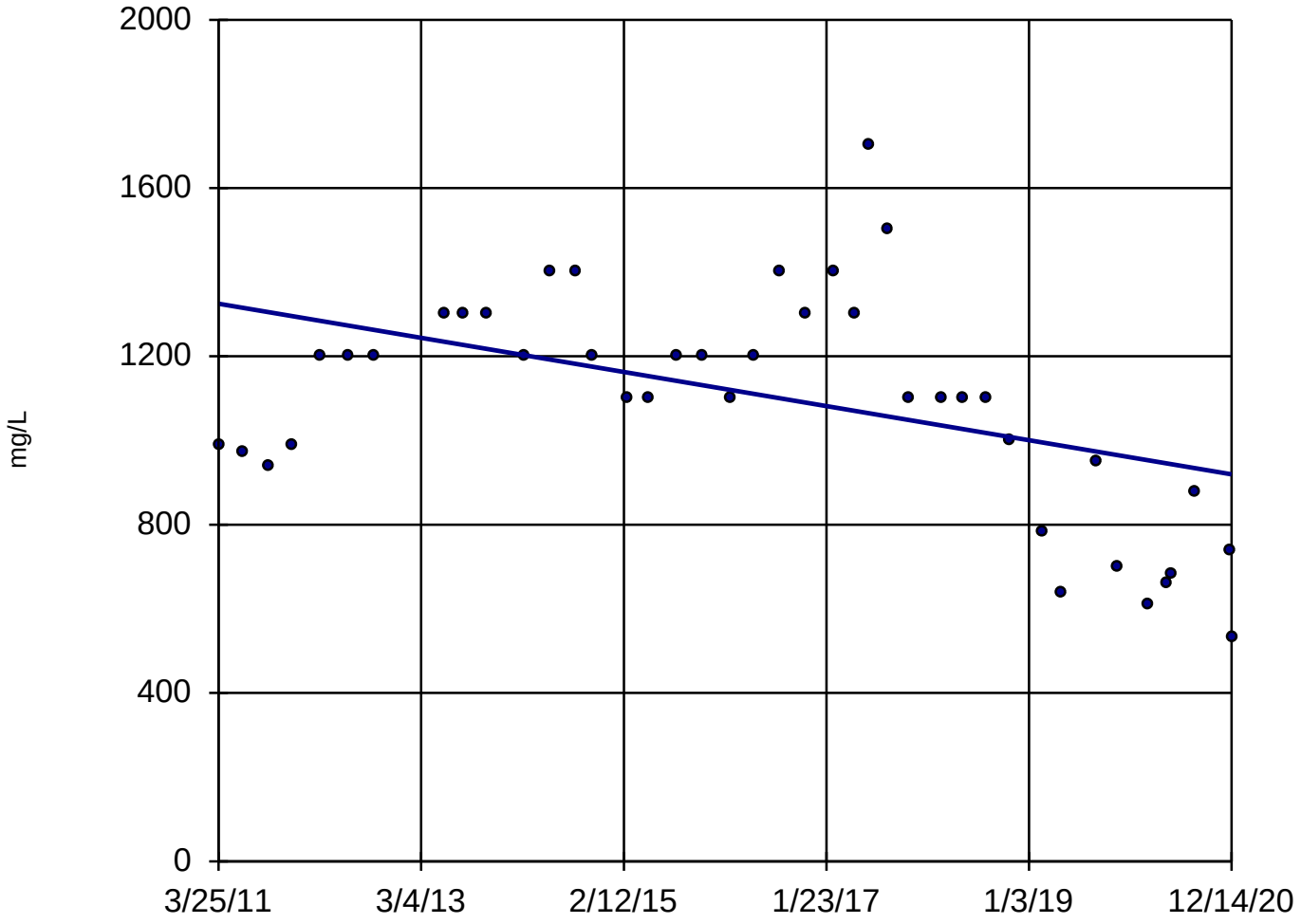
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Total Dissolved Solids Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-08



n = 41

Slope = -41.7 units per year.

Mann-Kendall normal approx. = -2.844
critical = -2.58

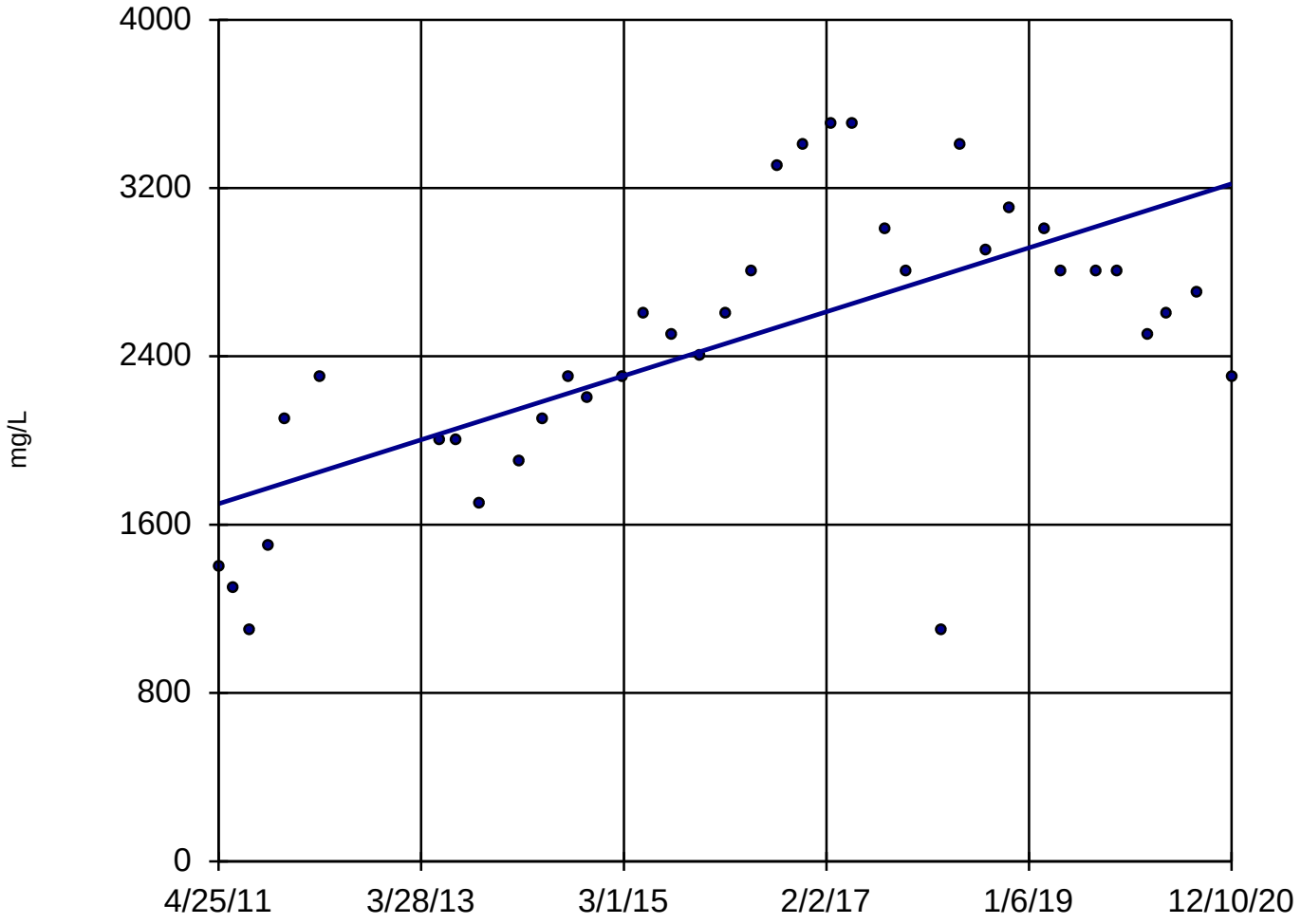
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Total Dissolved Solids Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-13



n = 37

Slope = 157.7 units per year.

Mann-Kendall statistic = 310
critical = 199

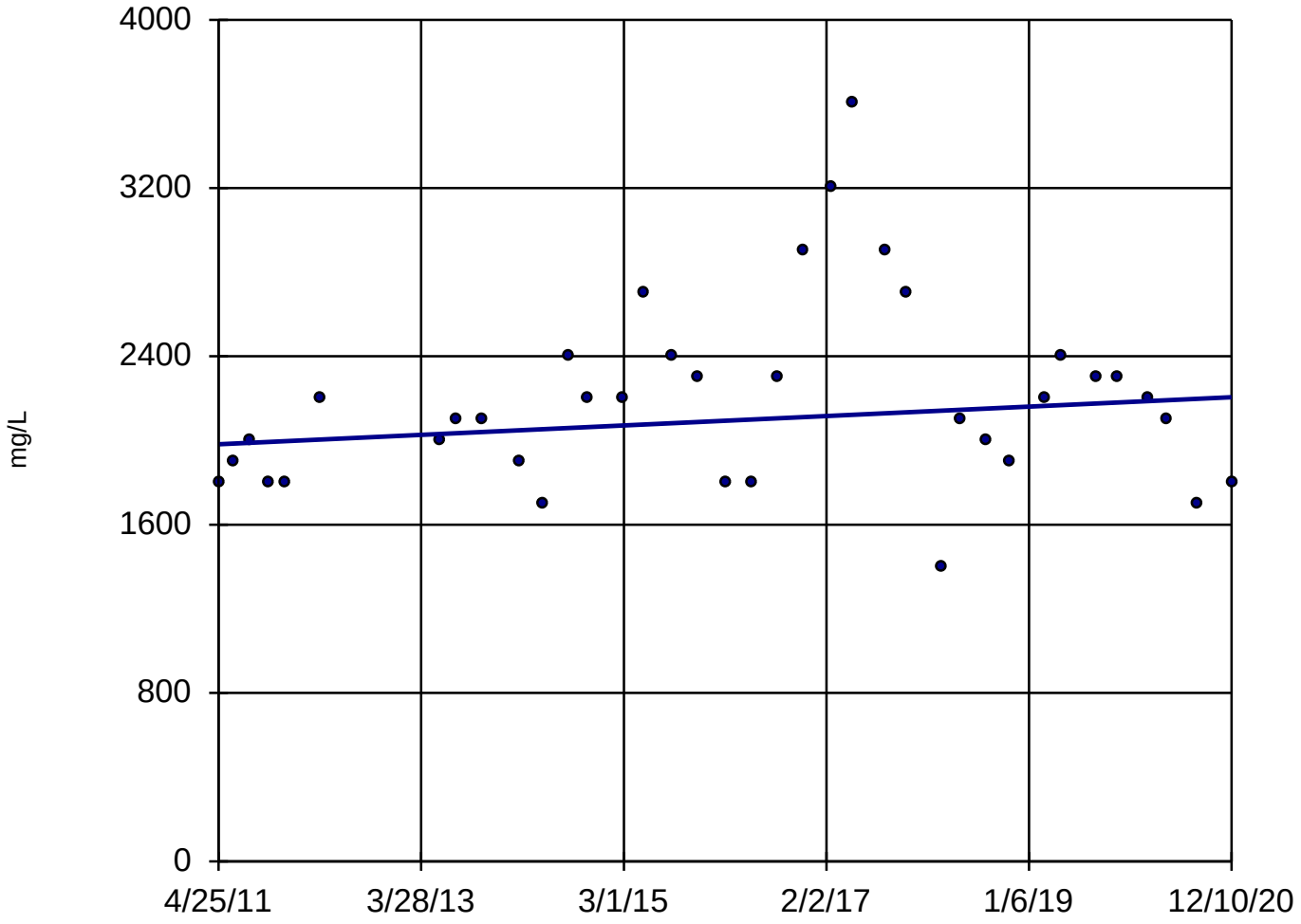
Increasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Total Dissolved Solids Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-14



n = 37

Slope = 23.16 units per year.

Mann-Kendall statistic = 93
critical = 199

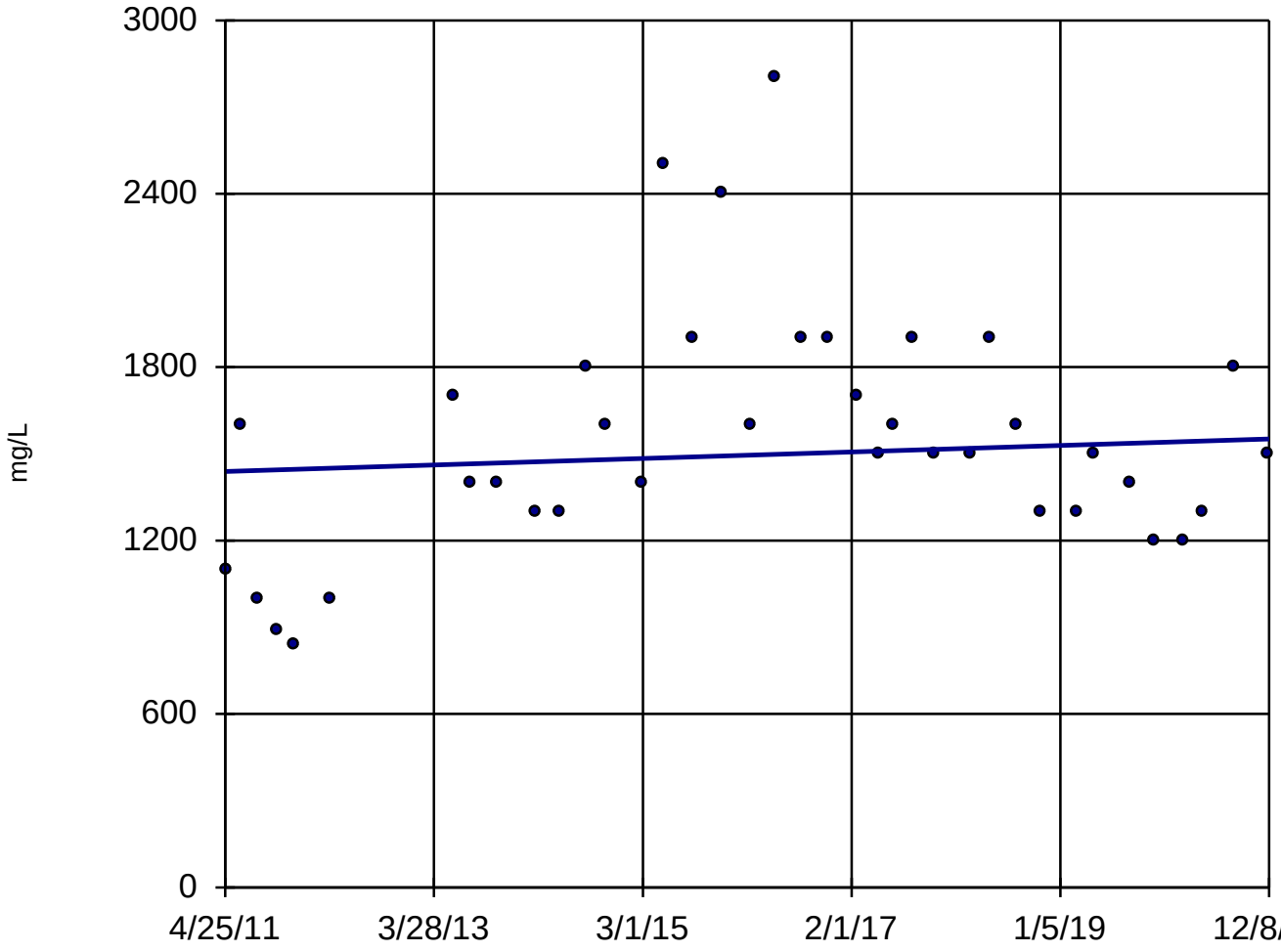
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Total Dissolved Solids Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Sen's Slope Estimator

MW-15



n = 38

Slope = 11.68 units per year.

Mann-Kendall statistic = 53
critical = 206

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Total Dissolved Solids Analysis Run 4/2/2021 11:47 AM

Utility Site P Client: Weaver Consultants Group Data: Powerton Sanitas Database

Trend Test

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database Printed 4/2/2021, 12:08 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Antimony, Dissolved (mg/L)	MW-07	0	0	2.58	No	41	100	n/a	n/a	0.01	NP
Antimony, Dissolved (mg/L)	MW-08	0	0	2.58	No	41	100	n/a	n/a	0.01	NP
Antimony, Dissolved (mg/L)	MW-09	0	0	2.58	No	41	100	n/a	n/a	0.01	NP
Antimony, Dissolved (mg/L)	MW-10	0	0	2.58	No	41	100	n/a	n/a	0.01	NP
Antimony, Total (mg/L)	MW-09	0	0	30	No	10	100	n/a	n/a	0.01	NP
Antimony, Total (mg/L)	MW-10	0	0	30	No	10	100	n/a	n/a	0.01	NP
Antimony, Total (mg/L)	MW-11	0	0	30	No	10	100	n/a	n/a	0.01	NP
Antimony, Total (mg/L)	MW-12	0	0	30	No	10	100	n/a	n/a	0.01	NP
Arsenic, Dissolved (mg/L)	**MW-07**	**-0.00019**	**-4.499**	**-2.58**	**Yes**	**41**	**4.878**	**n/a**	**n/a**	**0.01**	**NP**
Arsenic, Dissolved (mg/L)	**MW-08**	**-0.00...**	**-2.654**	**-2.58**	**Yes**	**41**	**9.756**	**n/a**	**n/a**	**0.01**	**NP**
Arsenic, Dissolved (mg/L)	**MW-09**	**-0.00...**	**-2.654**	**-2.58**	**Yes**	**41**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Arsenic, Dissolved (mg/L)	MW-10	0.000...	1.461	2.58	No	41	2.439	n/a	n/a	0.01	NP
Arsenic, Total (mg/L)	MW-09	-0.00...	-7	-30	No	10	0	n/a	n/a	0.01	NP
Arsenic, Total (mg/L)	MW-10	-0.00...	-6	-30	No	10	0	n/a	n/a	0.01	NP
Arsenic, Total (mg/L)	MW-11	0.00079	16	30	No	10	0	n/a	n/a	0.01	NP
Arsenic, Total (mg/L)	MW-12	0.000...	16	30	No	10	0	n/a	n/a	0.01	NP
Barium, Dissolved (mg/L)	MW-07	-0.00...	-1.226	-2.58	No	41	0	n/a	n/a	0.01	NP
Barium, Dissolved (mg/L)	MW-08	-0.00...	-2.136	-2.58	No	41	0	n/a	n/a	0.01	NP
Barium, Dissolved (mg/L)	**MW-09**	**0.001298**	**4.034**	**2.58**	**Yes**	**41**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Barium, Dissolved (mg/L)	MW-10	-0.00...	-2.049	-2.58	No	41	0	n/a	n/a	0.01	NP
Barium, Total (mg/L)	MW-09	0.008982	29	30	No	10	0	n/a	n/a	0.01	NP
Barium, Total (mg/L)	MW-10	0	4	30	No	10	0	n/a	n/a	0.01	NP
Barium, Total (mg/L)	MW-11	0.01931	17	30	No	10	0	n/a	n/a	0.01	NP
Barium, Total (mg/L)	MW-12	0.01043	10	30	No	10	0	n/a	n/a	0.01	NP
Beryllium, Dissolved (mg/L)	MW-07	0	0	2.58	No	41	100	n/a	n/a	0.01	NP
Beryllium, Dissolved (mg/L)	MW-08	0	0	2.58	No	41	100	n/a	n/a	0.01	NP
Beryllium, Dissolved (mg/L)	MW-09	0	0	2.58	No	41	100	n/a	n/a	0.01	NP
Beryllium, Dissolved (mg/L)	MW-10	0	0	2.58	No	41	100	n/a	n/a	0.01	NP
Beryllium, Total (mg/L)	MW-09	0	0	30	No	10	100	n/a	n/a	0.01	NP
Beryllium, Total (mg/L)	MW-10	0	0	30	No	10	100	n/a	n/a	0.01	NP
Beryllium, Total (mg/L)	MW-11	0	0	30	No	10	100	n/a	n/a	0.01	NP
Beryllium, Total (mg/L)	MW-12	0	0	30	No	10	100	n/a	n/a	0.01	NP
Boron, Dissolved (mg/L)	MW-07	-0.1286	-2.013	-2.58	No	41	2.439	n/a	n/a	0.01	NP
Boron, Dissolved (mg/L)	MW-08	0.08139	2.23	2.58	No	41	0	n/a	n/a	0.01	NP
Boron, Dissolved (mg/L)	MW-09	0	-0.43	-2.58	No	41	0	n/a	n/a	0.01	NP
Boron, Dissolved (mg/L)	MW-10	0.0763	2.026	2.58	No	41	0	n/a	n/a	0.01	NP
Boron, Total (mg/L)	MW-09	0	-7	-53	No	15	0	n/a	n/a	0.01	NP
Boron, Total (mg/L)	MW-10	-0.1947	-33	-53	No	15	0	n/a	n/a	0.01	NP
Boron, Total (mg/L)	MW-11	0	-6	-53	No	15	0	n/a	n/a	0.01	NP
Boron, Total (mg/L)	MW-12	-0.02005	-8	-53	No	15	0	n/a	n/a	0.01	NP
Cadmium, Dissolved (mg/L)	MW-07	0	0	2.58	No	41	100	n/a	n/a	0.01	NP
Cadmium, Dissolved (mg/L)	MW-08	0	0	2.58	No	41	100	n/a	n/a	0.01	NP
Cadmium, Dissolved (mg/L)	MW-09	0	0	2.58	No	41	100	n/a	n/a	0.01	NP
Cadmium, Dissolved (mg/L)	MW-10	0	0	2.58	No	41	100	n/a	n/a	0.01	NP
Cadmium, Total (mg/L)	MW-09	0	0	30	No	10	100	n/a	n/a	0.01	NP
Cadmium, Total (mg/L)	MW-10	0	0	30	No	10	100	n/a	n/a	0.01	NP
Cadmium, Total (mg/L)	MW-11	0	0	30	No	10	100	n/a	n/a	0.01	NP
Cadmium, Total (mg/L)	MW-12	0	0	30	No	10	100	n/a	n/a	0.01	NP

Trend Test

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database Printed 4/2/2021, 12:08 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Calcium, Total (mg/L)	MW-11	-3.571	-40	-53	No	15	0	n/a	n/a	0.01	NP
Calcium, Total (mg/L)	MW-12	2.832	14	53	No	15	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-07	-3.132	-2.259	-2.58	No	41	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-08	-5.326	-2.43	-2.58	No	41	0	n/a	n/a	0.01	NP
Chloride (mg/L)	**MW-09**	**10.04**	**2.639**	**2.58**	**Yes**	**44**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Chloride (mg/L)	MW-10	0	1.113	2.58	No	42	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-11	6.703	43	53	No	15	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-12	-3.321	-8	-53	No	15	0	n/a	n/a	0.01	NP
Chromium, Dissolved (mg/L)	MW-07	0	0	2.58	No	41	100	n/a	n/a	0.01	NP
Chromium, Dissolved (mg/L)	MW-08	0	0	2.58	No	41	100	n/a	n/a	0.01	NP
Chromium, Dissolved (mg/L)	MW-09	0	0	2.58	No	41	100	n/a	n/a	0.01	NP
Chromium, Dissolved (mg/L)	MW-10	0	0	2.58	No	41	100	n/a	n/a	0.01	NP
Chromium, Total (mg/L)	MW-09	0	0	30	No	10	100	n/a	n/a	0.01	NP
Chromium, Total (mg/L)	MW-10	0	0	30	No	10	100	n/a	n/a	0.01	NP
Chromium, Total (mg/L)	MW-11	0	0	30	No	10	100	n/a	n/a	0.01	NP
Chromium, Total (mg/L)	MW-12	0	-1	-30	No	10	90	n/a	n/a	0.01	NP
Cobalt, Dissolved (mg/L)	MW-07	0	0.6339	2.58	No	41	97.56	n/a	n/a	0.01	NP
Cobalt, Dissolved (mg/L)	**MW-08**	**0**	**2.939**	**2.58**	**Yes**	**41**	**82.93**	**n/a**	**n/a**	**0.01**	**NP**
Cobalt, Dissolved (mg/L)	MW-09	0	0	2.58	No	41	100	n/a	n/a	0.01	NP
Cobalt, Dissolved (mg/L)	MW-10	0	0	2.58	No	41	100	n/a	n/a	0.01	NP
Cobalt, Total (mg/L)	MW-09	0	0	30	No	10	100	n/a	n/a	0.01	NP
Cobalt, Total (mg/L)	MW-10	0	0	30	No	10	100	n/a	n/a	0.01	NP
Cobalt, Total (mg/L)	MW-11	0	0	30	No	10	100	n/a	n/a	0.01	NP
Cobalt, Total (mg/L)	MW-12	0	0	30	No	10	100	n/a	n/a	0.01	NP
Fluoride (mg/L)	**MW-07**	**-0.02826**	**-3.542**	**-2.58**	**Yes**	**41**	**2.439**	**n/a**	**n/a**	**0.01**	**NP**
Fluoride (mg/L)	MW-08	-0.00...	-0.8104	-2.58	No	41	0	n/a	n/a	0.01	NP
Fluoride (mg/L)	MW-09	0.01394	2.167	2.58	No	44	0	n/a	n/a	0.01	NP
Fluoride (mg/L)	**MW-10**	**0.02406**	**3.998**	**2.58**	**Yes**	**42**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Fluoride (mg/L)	MW-11	-0.01639	-19	-53	No	15	0	n/a	n/a	0.01	NP
Fluoride (mg/L)	MW-12	-0.02033	-32	-53	No	15	0	n/a	n/a	0.01	NP
Lead, Dissolved (mg/L)	MW-07	0	0.7184	2.58	No	41	97.56	n/a	n/a	0.01	NP
Lead, Dissolved (mg/L)	MW-08	0	0	2.58	No	41	100	n/a	n/a	0.01	NP
Lead, Dissolved (mg/L)	MW-09	0	0.7184	2.58	No	41	97.56	n/a	n/a	0.01	NP
Lead, Dissolved (mg/L)	MW-10	0	0	2.58	No	41	97.56	n/a	n/a	0.01	NP
Lead, Total (mg/L)	MW-09	0	-8	-30	No	10	60	n/a	n/a	0.01	NP
Lead, Total (mg/L)	MW-10	0	-3	-30	No	10	80	n/a	n/a	0.01	NP
Lead, Total (mg/L)	MW-11	0	-11	-30	No	10	80	n/a	n/a	0.01	NP
Lead, Total (mg/L)	MW-12	0	-6	-30	No	10	70	n/a	n/a	0.01	NP
Lithium, Total (mg/L)	MW-09	0	9	30	No	10	90	n/a	n/a	0.01	NP
Lithium, Total (mg/L)	MW-10	-0.00...	-9	-30	No	10	0	n/a	n/a	0.01	NP
Lithium, Total (mg/L)	MW-11	0	-7	-30	No	10	90	n/a	n/a	0.01	NP
Lithium, Total (mg/L)	MW-12	-0.00...	-7	-30	No	10	10	n/a	n/a	0.01	NP
Mercury, Dissolved (mg/L)	MW-07	0	0	2.58	No	41	100	n/a	n/a	0.01	NP
Mercury, Dissolved (mg/L)	MW-08	0	1.564	2.58	No	41	97.56	n/a	n/a	0.01	NP
Mercury, Dissolved (mg/L)	MW-09	0	0	2.58	No	41	100	n/a	n/a	0.01	NP
Mercury, Dissolved (mg/L)	MW-10	0	0.1268	2.58	No	41	97.56	n/a	n/a	0.01	NP
Mercury, Total (mg/L)	MW-09	0	0	30	No	10	100	n/a	n/a	0.01	NP
Mercury, Total (mg/L)	MW-10	0	7	30	No	10	90	n/a	n/a	0.01	NP

Trend Test

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database Printed 4/2/2021, 12:08 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Molybdenum, Total (mg/L)	MW-09	-0.03011	-10	-30	No	10	0	n/a	n/a	0.01	NP
Molybdenum, Total (mg/L)	MW-10	0.004063	9	30	No	10	0	n/a	n/a	0.01	NP
Molybdenum, Total (mg/L)	MW-11	-0.00...	-7	-30	No	10	0	n/a	n/a	0.01	NP
Molybdenum, Total (mg/L)	MW-12	0.000...	2	30	No	10	0	n/a	n/a	0.01	NP
pH, Field (Standard Units)	**MW-07**	**-0.0954**	**-3.18**	**-2.58**	**Yes**	**41**	**0**	**n/a**	**n/a**	**0.01**	**NP**
pH, Field (Standard Units)	**MW-08**	**-0.06169**	**-4.36**	**-2.58**	**Yes**	**41**	**0**	**n/a**	**n/a**	**0.01**	**NP**
pH, Field (Standard Units)	**MW-09**	**-0.2753**	**-6.593**	**-2.58**	**Yes**	**41**	**0**	**n/a**	**n/a**	**0.01**	**NP**
pH, Field (Standard Units)	**MW-10**	**-0.03769**	**-2.765**	**-2.58**	**Yes**	**41**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Radium 226 + Radium 228, Combin...	MW-09	0	5	30	No	10	40	n/a	n/a	0.01	NP
Radium 226 + Radium 228, Combin...	MW-10	-0.01989	-1	-30	No	10	10	n/a	n/a	0.01	NP
Radium 226 + Radium 228, Combin...	MW-11	0.01931	1	30	No	10	0	n/a	n/a	0.01	NP
Radium 226 + Radium 228, Combin...	MW-12	0	5	30	No	10	50	n/a	n/a	0.01	NP
Selenium, Dissolved (mg/L)	**MW-07**	**0.000...**	**3.258**	**2.58**	**Yes**	**41**	**48.78**	**n/a**	**n/a**	**0.01**	**NP**
Selenium, Dissolved (mg/L)	MW-08	0	1.563	2.58	No	41	58.54	n/a	n/a	0.01	NP
Selenium, Dissolved (mg/L)	**MW-09**	**-0.00...**	**-4.197**	**-2.58**	**Yes**	**41**	**56.1**	**n/a**	**n/a**	**0.01**	**NP**
Selenium, Dissolved (mg/L)	MW-10	0	0	2.58	No	41	85.37	n/a	n/a	0.01	NP
Selenium, Total (mg/L)	MW-09	0	9	30	No	10	90	n/a	n/a	0.01	NP
Selenium, Total (mg/L)	MW-10	0	0	30	No	10	100	n/a	n/a	0.01	NP
Selenium, Total (mg/L)	MW-11	0	0	30	No	10	100	n/a	n/a	0.01	NP
Selenium, Total (mg/L)	MW-12	0	9	30	No	10	50	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-07	-4.734	-0.4842	-2.58	No	41	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-08	9.21	0.9221	2.58	No	41	2.439	n/a	n/a	0.01	NP
Sulfate (mg/L)	**MW-09**	**-19.97**	**-5.128**	**-2.58**	**Yes**	**44**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Sulfate (mg/L)	**MW-10**	**-12.33**	**-4.428**	**-2.58**	**Yes**	**42**	**2.381**	**n/a**	**n/a**	**0.01**	**NP**
Sulfate (mg/L)	**MW-11**	**-19.01**	**-68**	**-53**	**Yes**	**15**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Sulfate (mg/L)	MW-12	-23.7	-50	-53	No	15	0	n/a	n/a	0.01	NP
Thallium, Dissolved (mg/L)	MW-07	0	0	2.58	No	41	100	n/a	n/a	0.01	NP
Thallium, Dissolved (mg/L)	MW-08	0	0	2.58	No	41	100	n/a	n/a	0.01	NP
Thallium, Dissolved (mg/L)	MW-09	0	0	2.58	No	41	100	n/a	n/a	0.01	NP
Thallium, Dissolved (mg/L)	MW-10	0	0	2.58	No	41	100	n/a	n/a	0.01	NP
Thallium, Total (mg/L)	MW-09	0	0	30	No	10	100	n/a	n/a	0.01	NP
Thallium, Total (mg/L)	MW-10	0	0	30	No	10	100	n/a	n/a	0.01	NP
Thallium, Total (mg/L)	MW-11	0	0	30	No	10	100	n/a	n/a	0.01	NP
Thallium, Total (mg/L)	MW-12	0	0	30	No	10	100	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-07	0	-0.05693	-2.58	No	41	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-08	14.23	1.157	2.58	No	41	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-09	-2.653	-0.537	-2.58	No	44	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	**MW-10**	**-12.03**	**-3.225**	**-2.58**	**Yes**	**42**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Total Dissolved Solids (mg/L)	MW-11	0	2	53	No	15	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-12	14.48	12	53	No	15	0	n/a	n/a	0.01	NP

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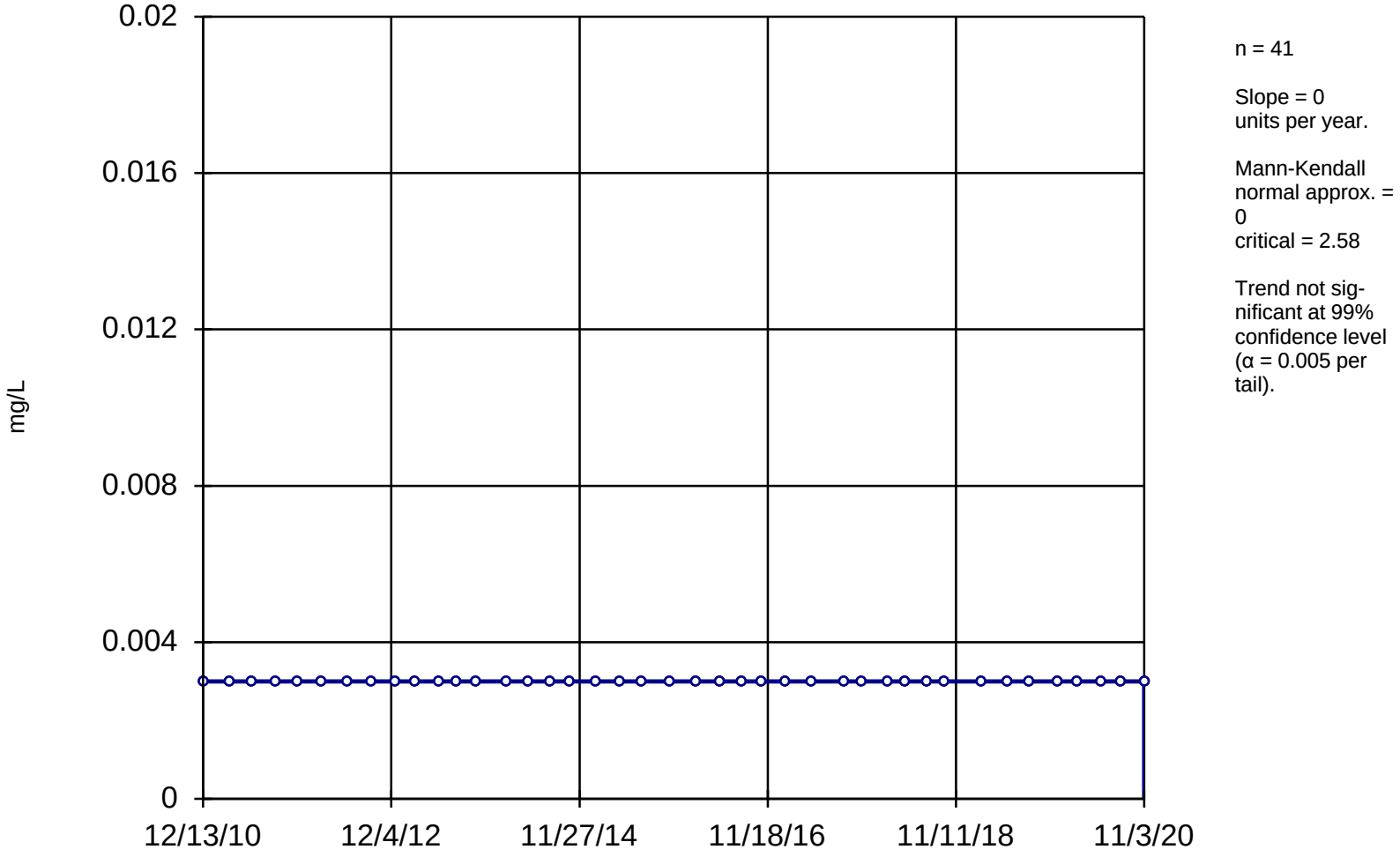
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-07



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Antimony, Dissolved Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

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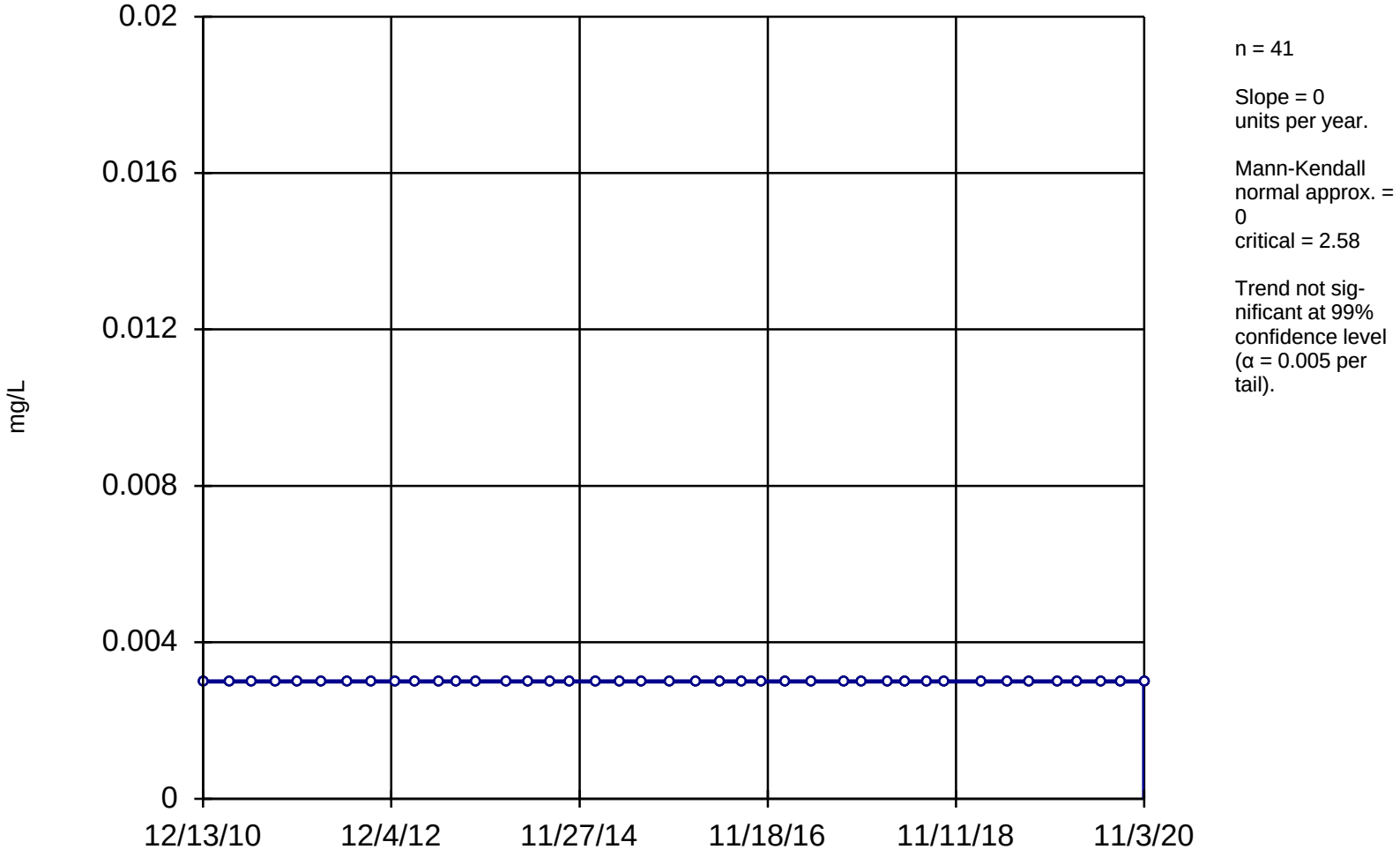
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

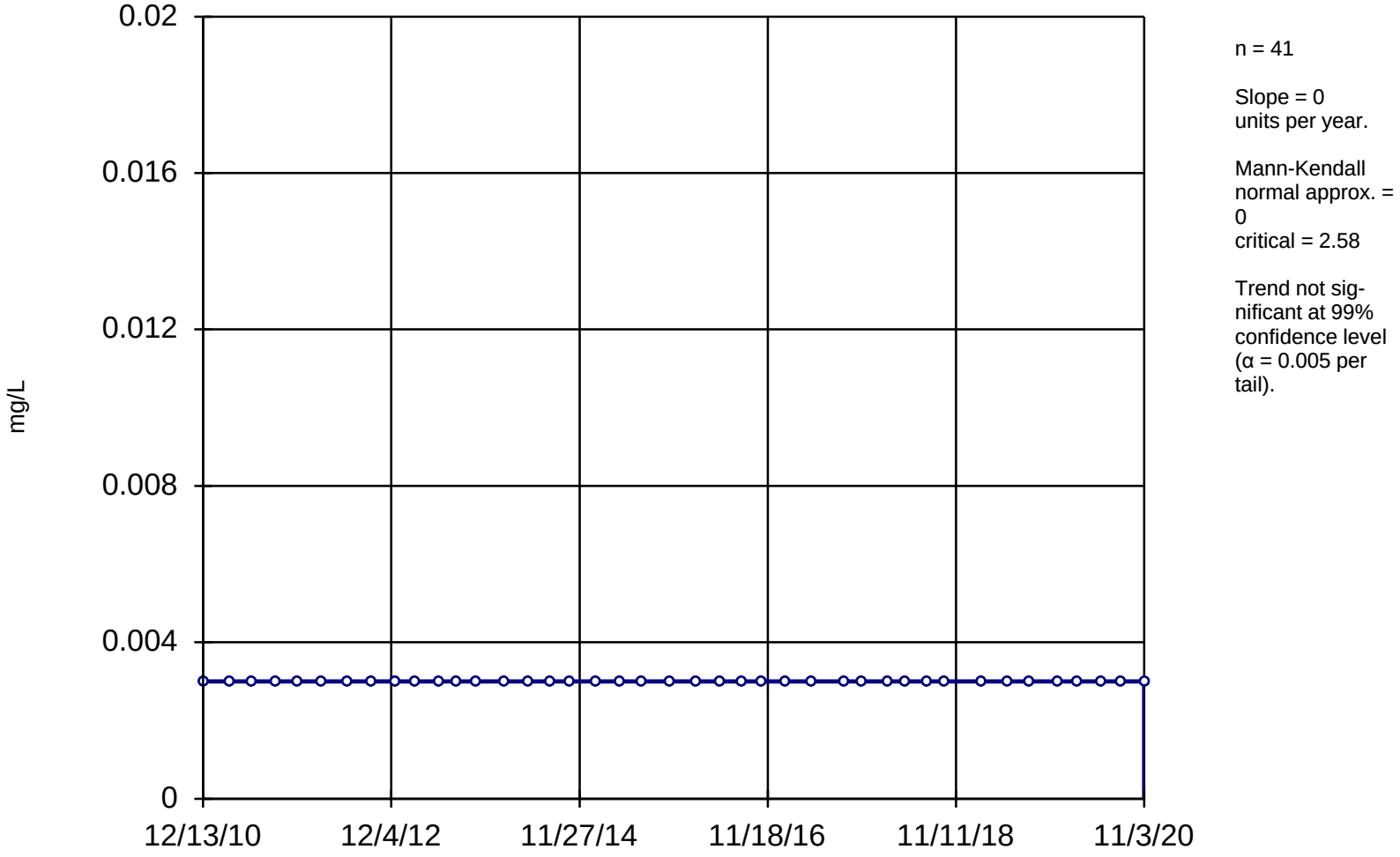
Constituent: Antimony, Dissolved Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-09



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

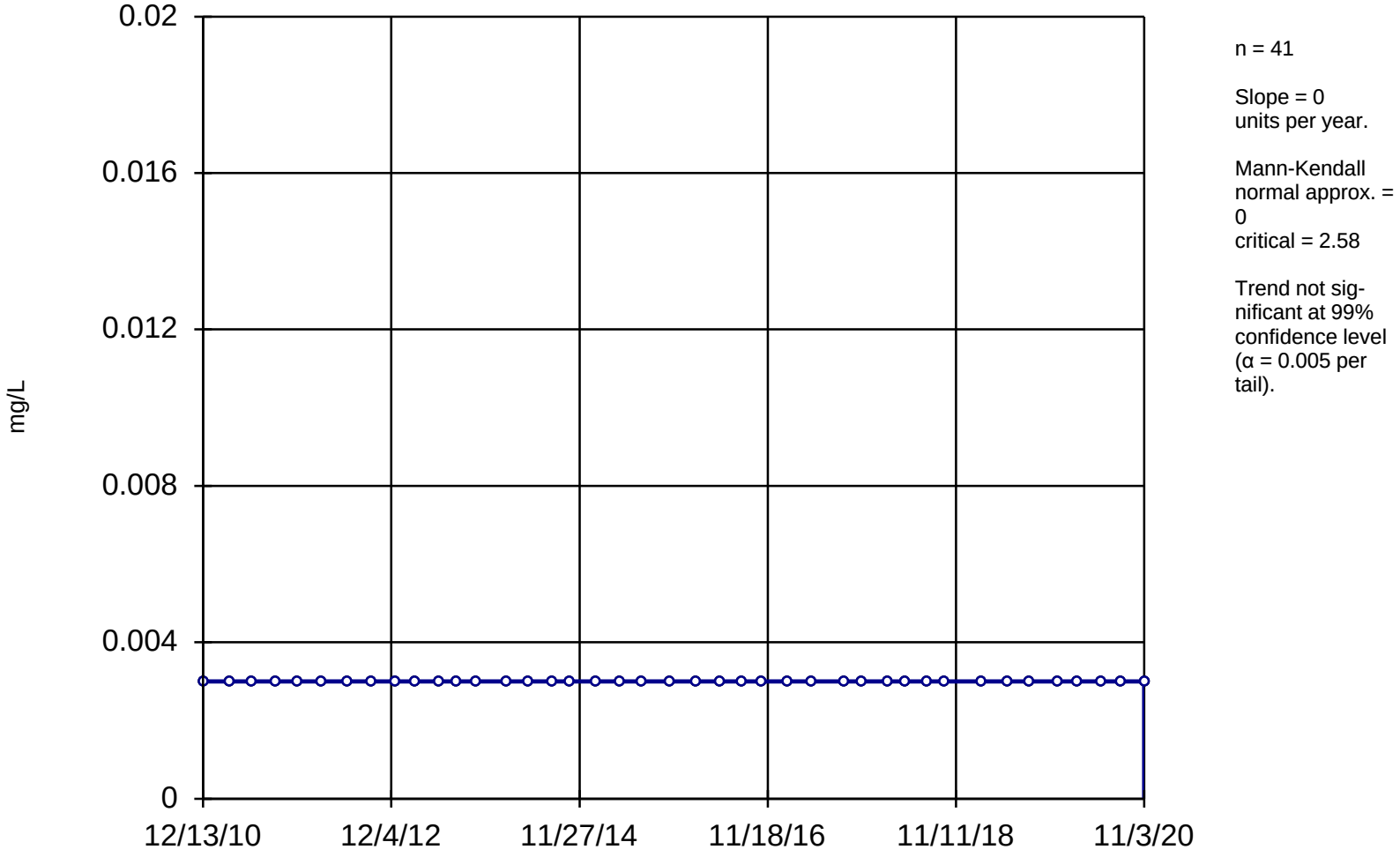
Constituent: Antimony, Dissolved Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

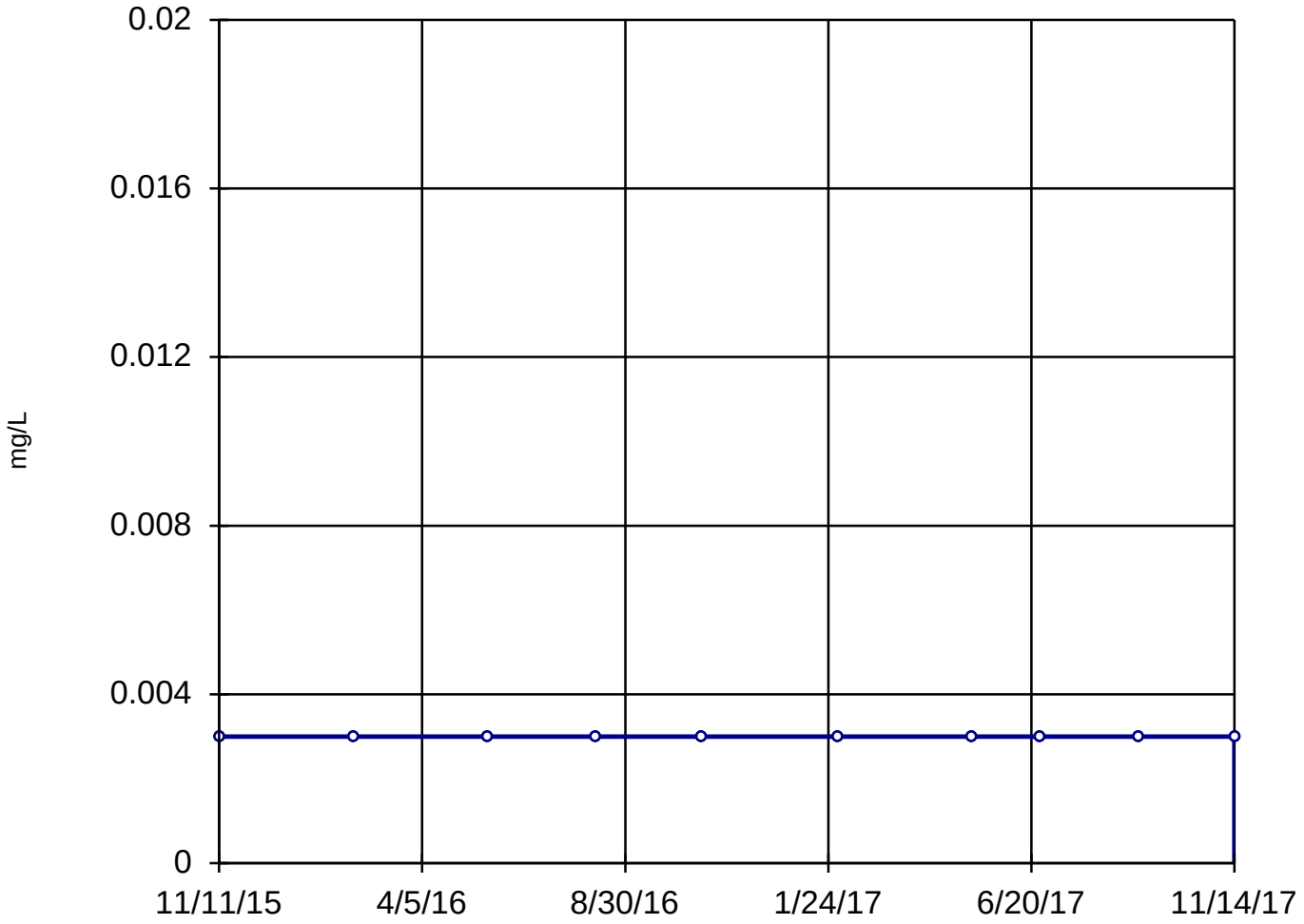
Constituent: Antimony, Dissolved Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-09



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

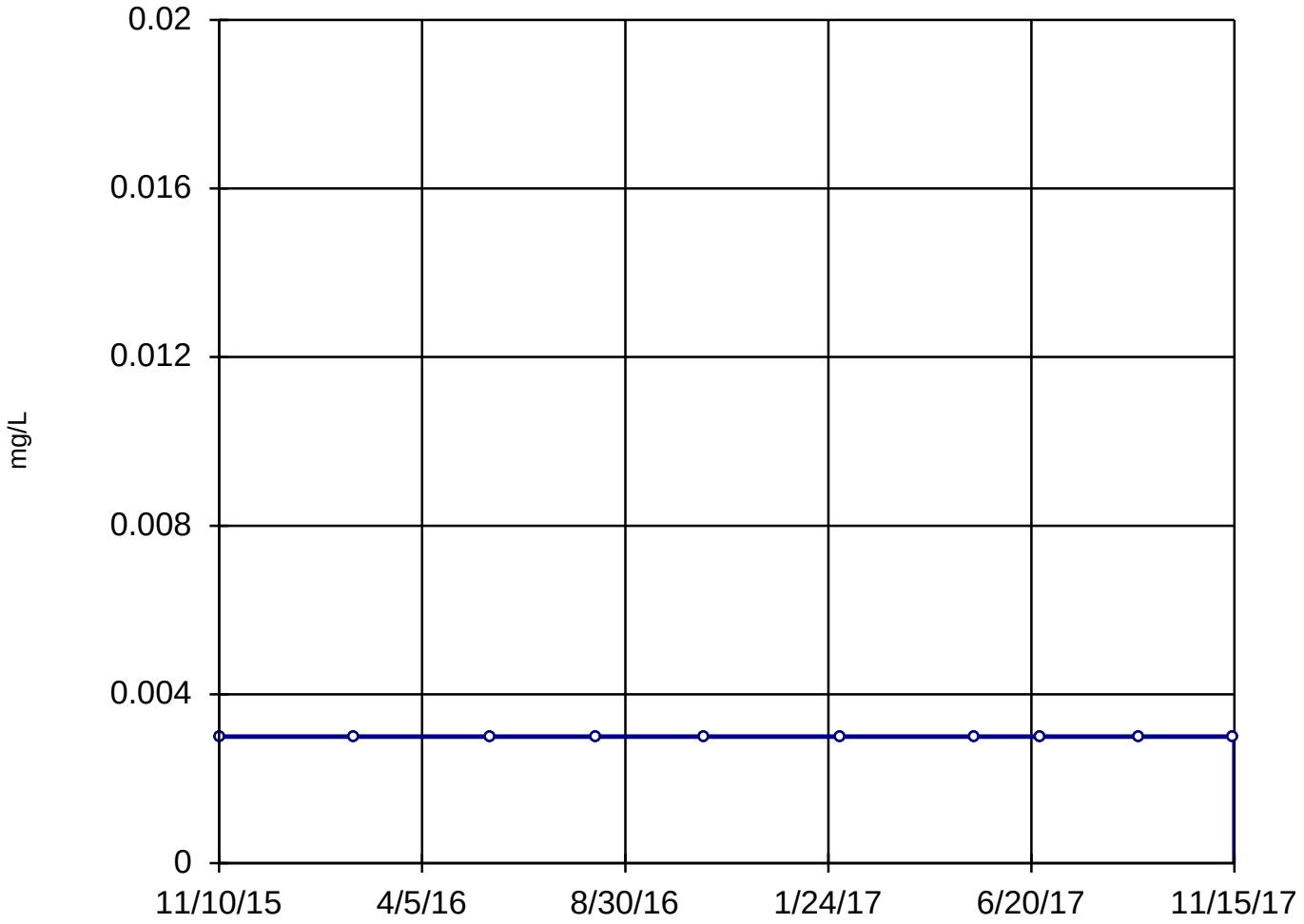
Constituent: Antimony, Total Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

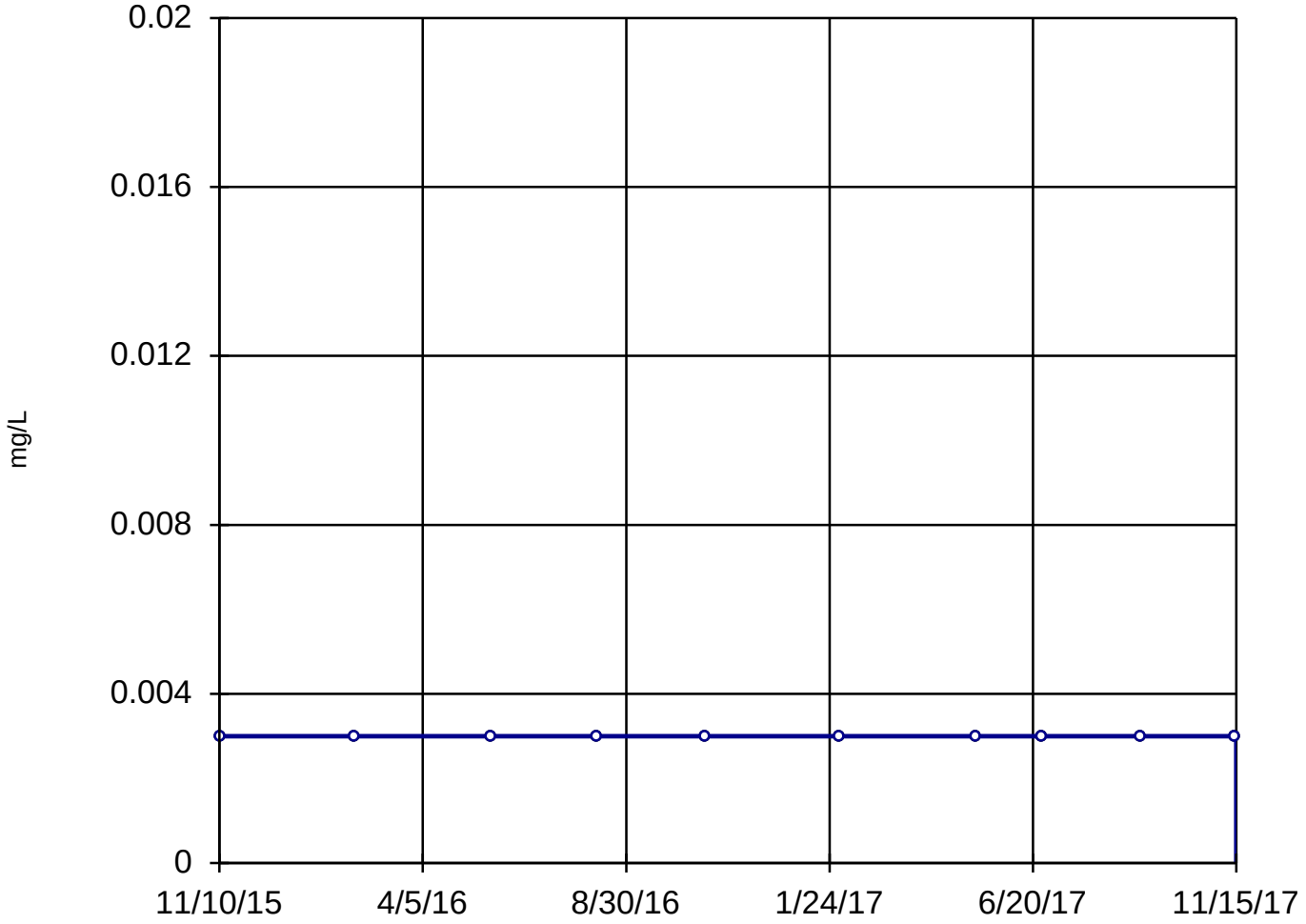
Constituent: Antimony, Total Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-11



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Antimony, Total Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

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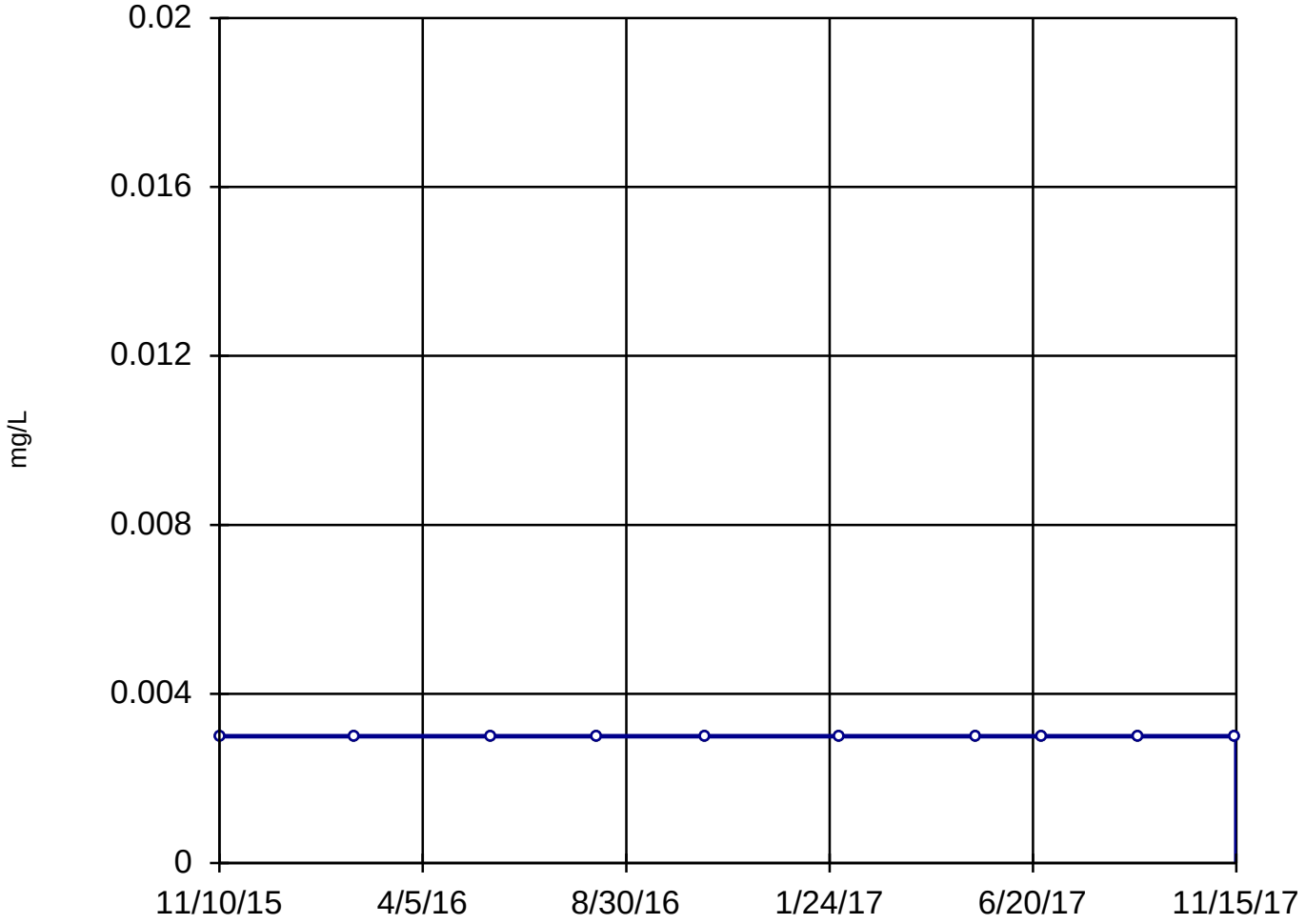
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-12



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

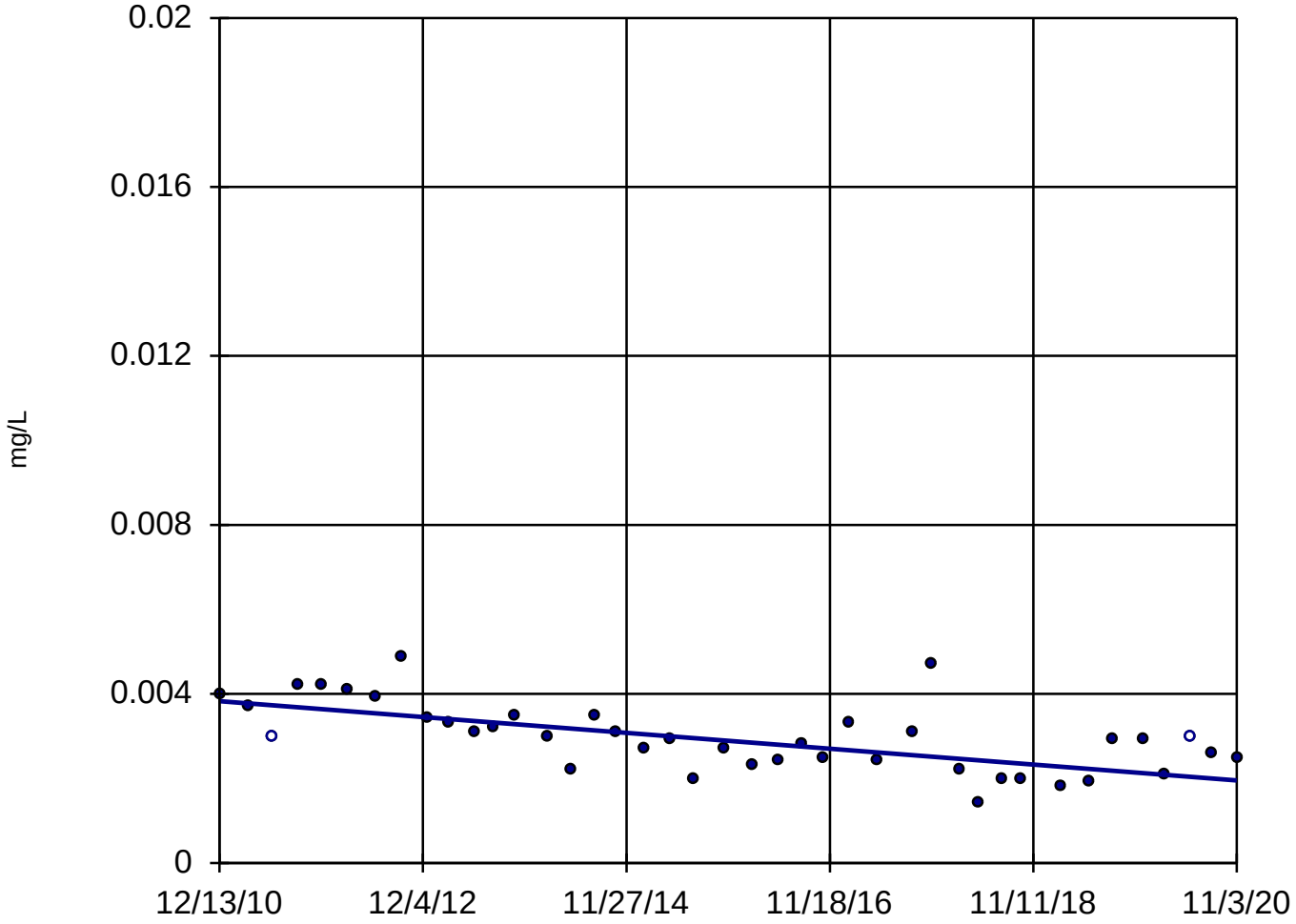
Constituent: Antimony, Total Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-07



n = 41

Slope = -0.00019 units per year.

Mann-Kendall normal approx. = -4.499
critical = -2.58

Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

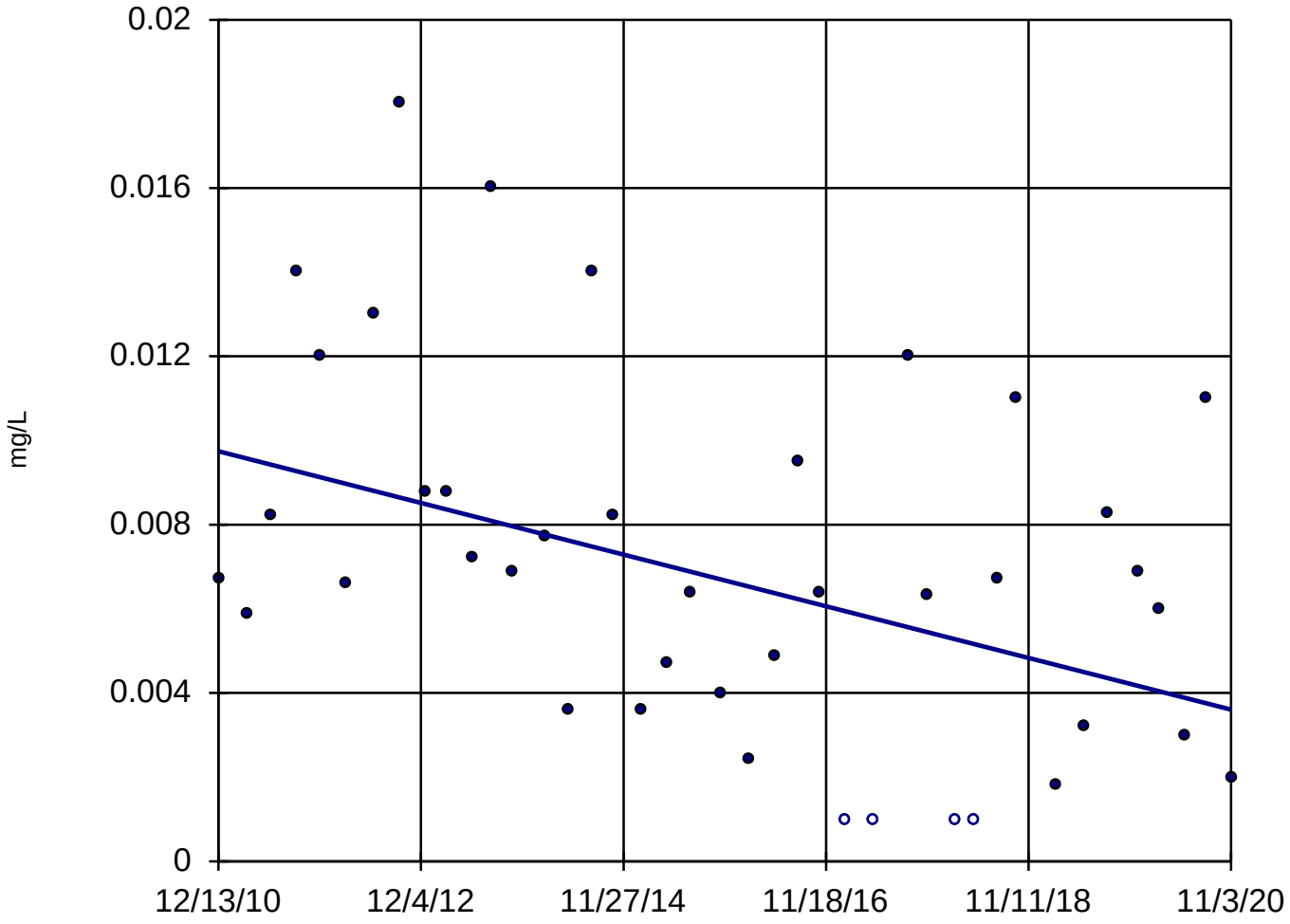
Constituent: Arsenic, Dissolved Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 41

Slope = -0.0006209 units per year.

Mann-Kendall normal approx. = -2.654
critical = -2.58

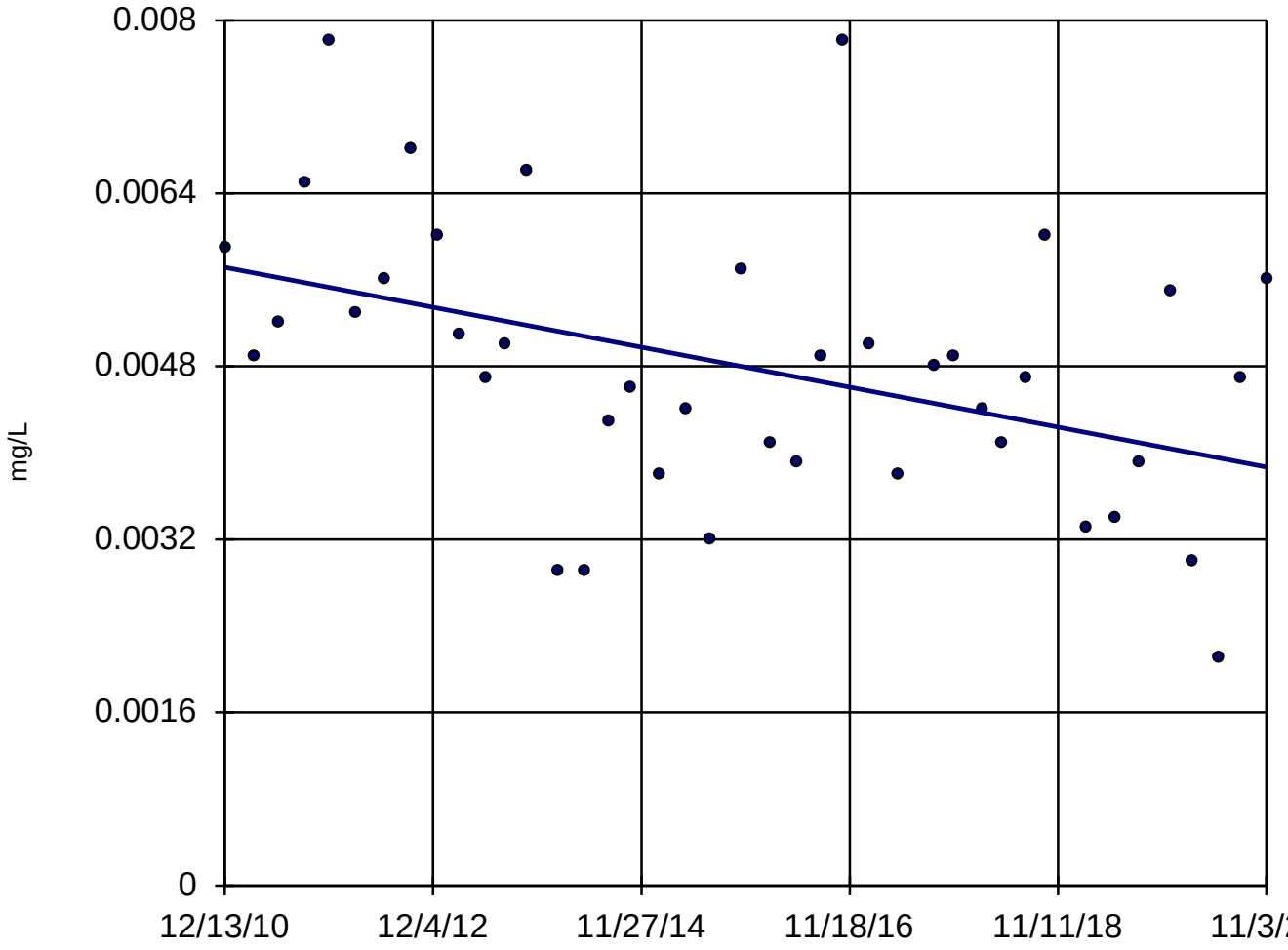
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Arsenic, Dissolved Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-09



n = 41

Slope = -0.0001866 units per year.

Mann-Kendall normal approx. = -2.654
critical = -2.58

Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Arsenic, Dissolved Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

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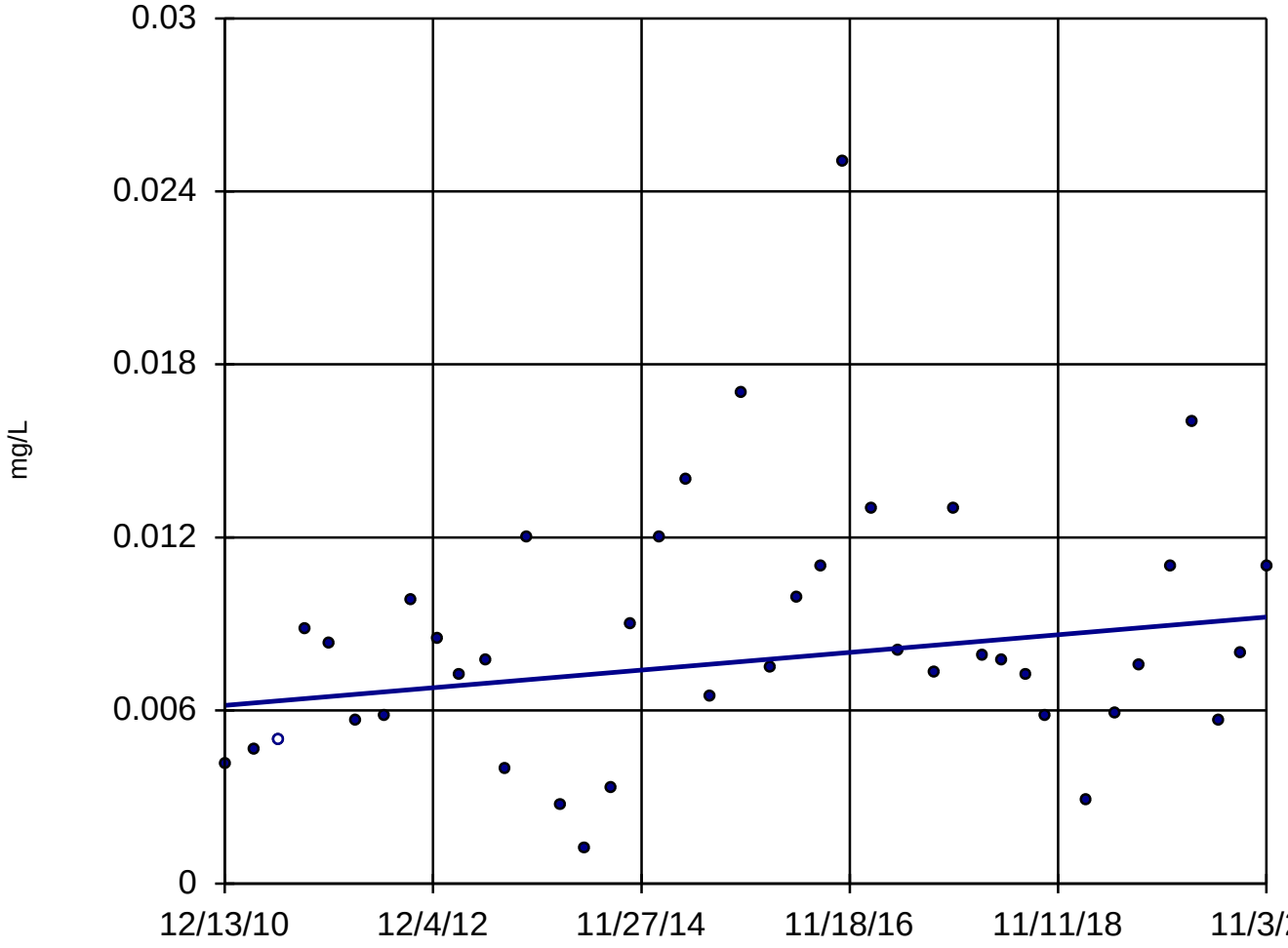
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10



n = 41

Slope = 0.0003097 units per year.

Mann-Kendall normal approx. = 1.461
critical = 2.58

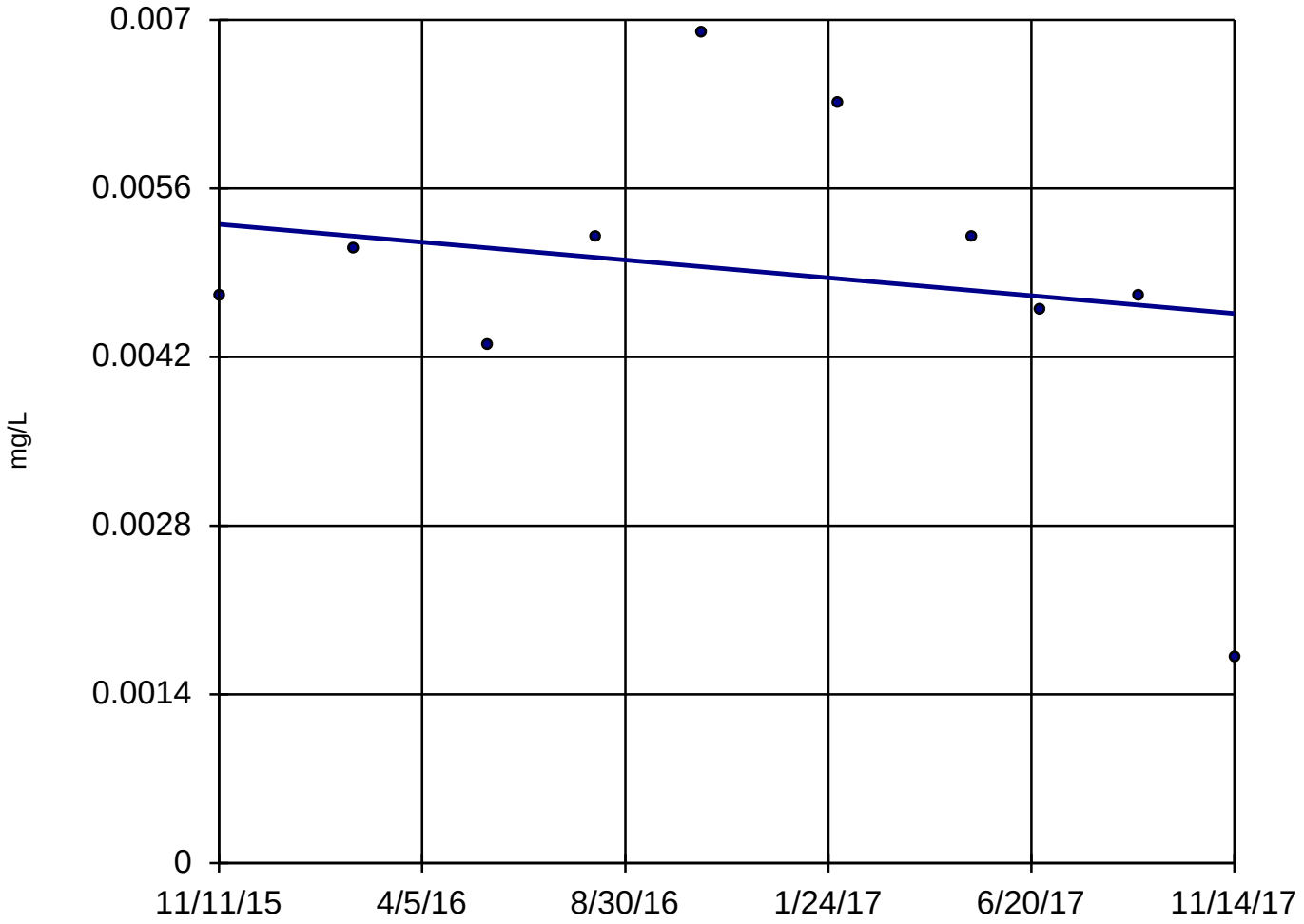
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Arsenic, Dissolved Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-09



n = 10

Slope = -0.0003679 units per year.

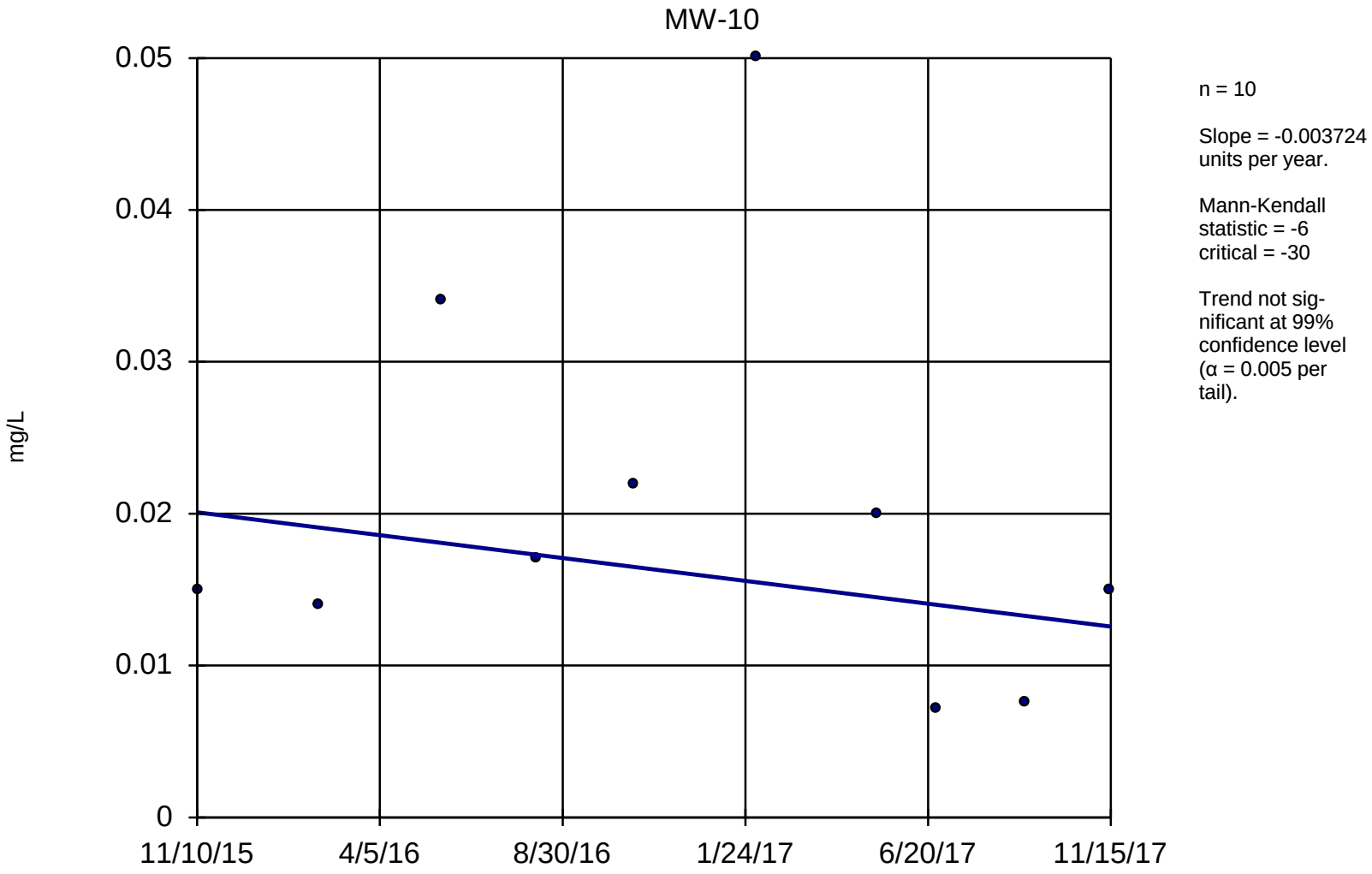
Mann-Kendall statistic = -7
critical = -30

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Arsenic, Total Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

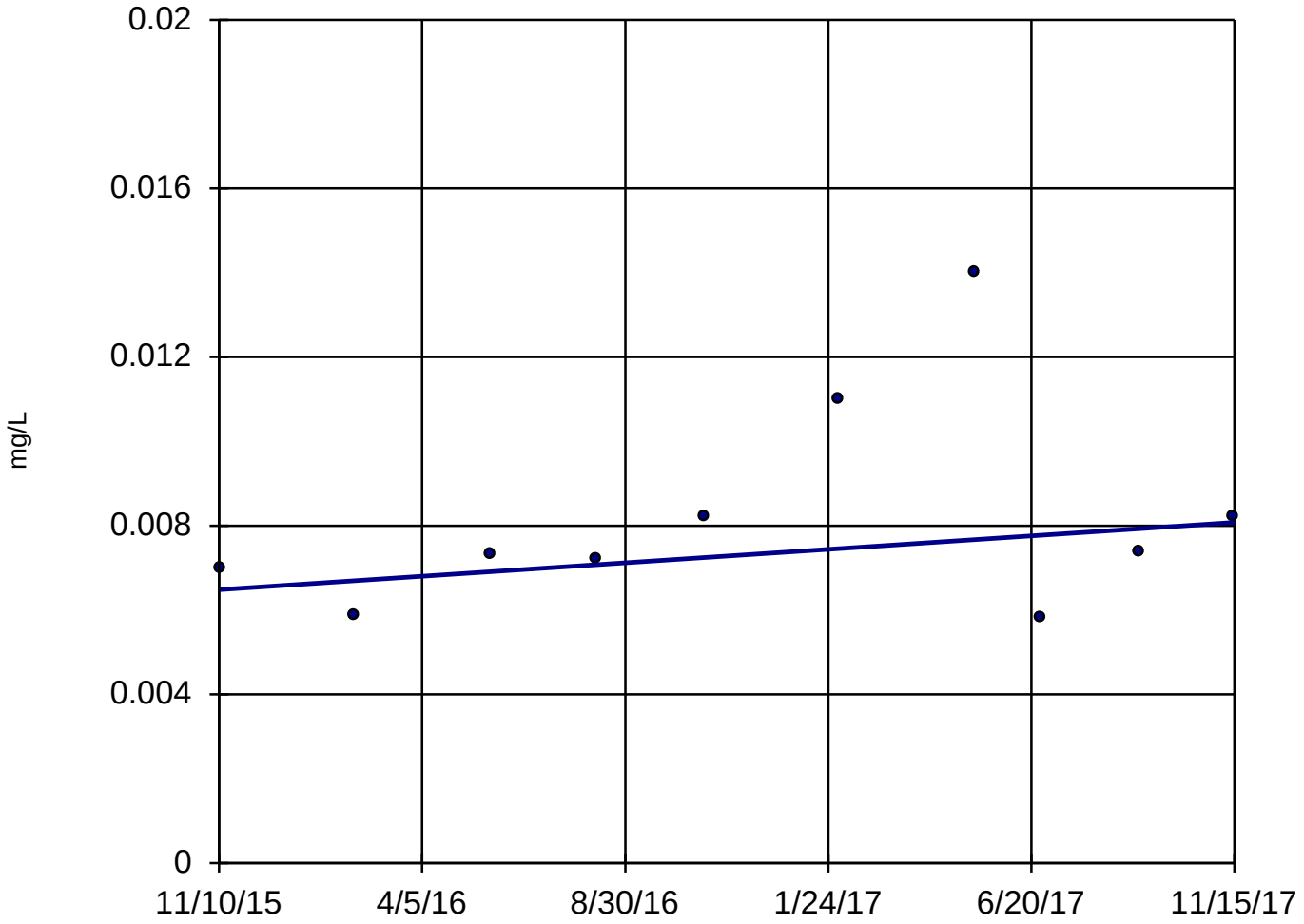


Constituent: Arsenic, Total Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-11



n = 10

Slope = 0.00079 units per year.

Mann-Kendall statistic = 16
critical = 30

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Arsenic, Total Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

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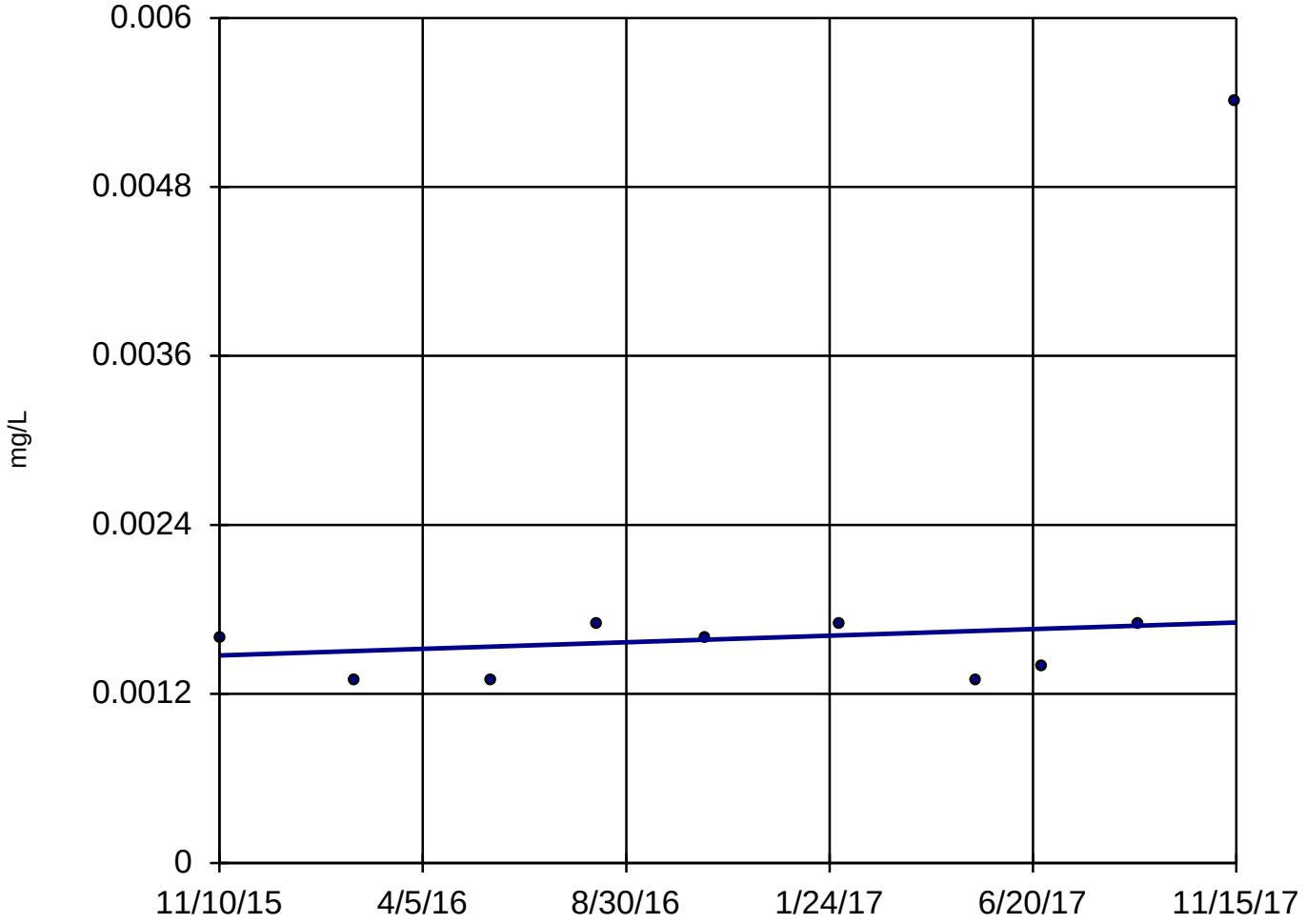
Sen's Slope Estimator

MW-12



n = 10

Slope = 0.0001159 units per year.

Mann-Kendall statistic = 16
critical = 30

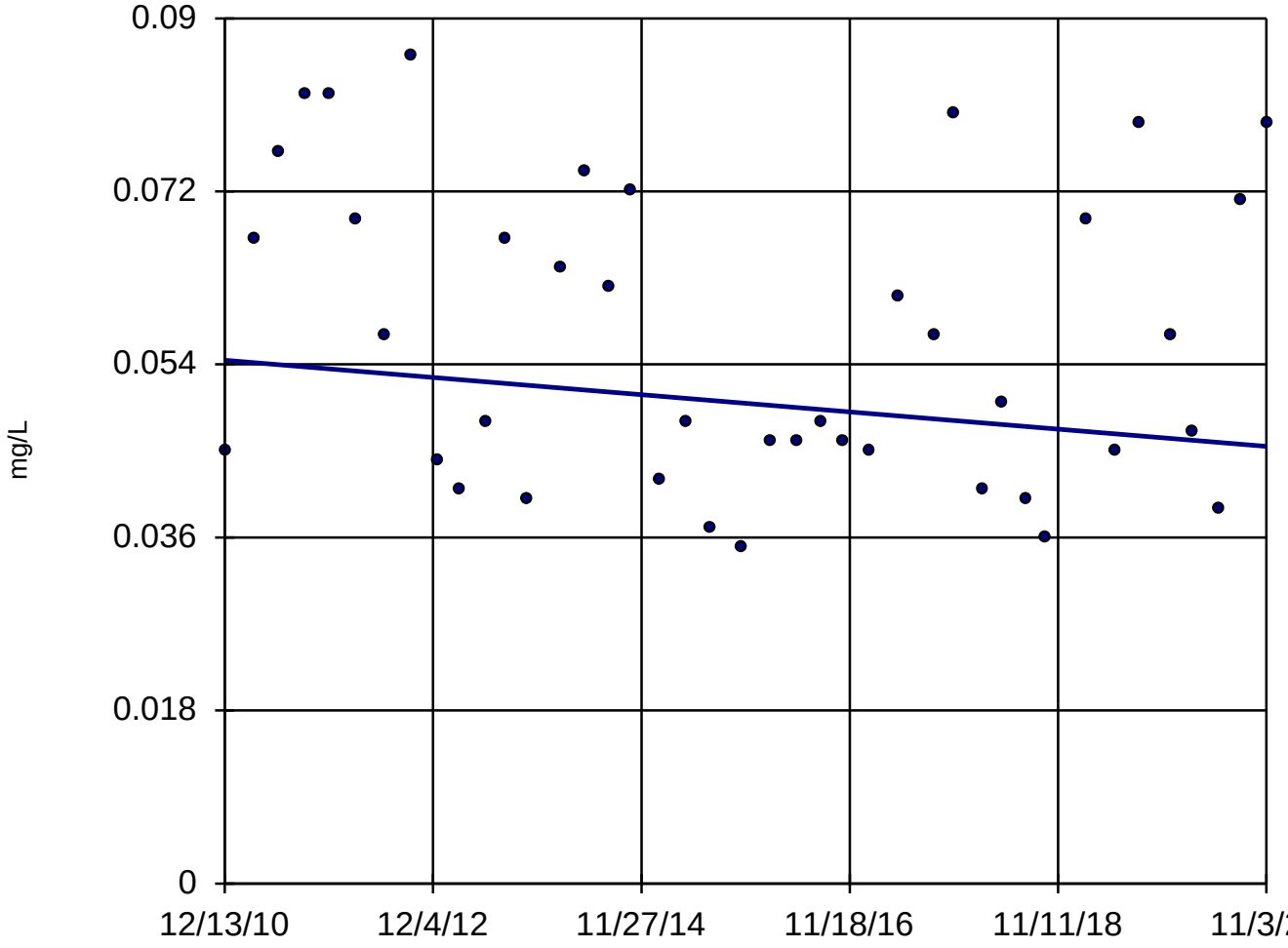
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Arsenic, Total Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-07



n = 41

Slope = -0.0009035 units per year.

Mann-Kendall normal approx. = -1.226
critical = -2.58

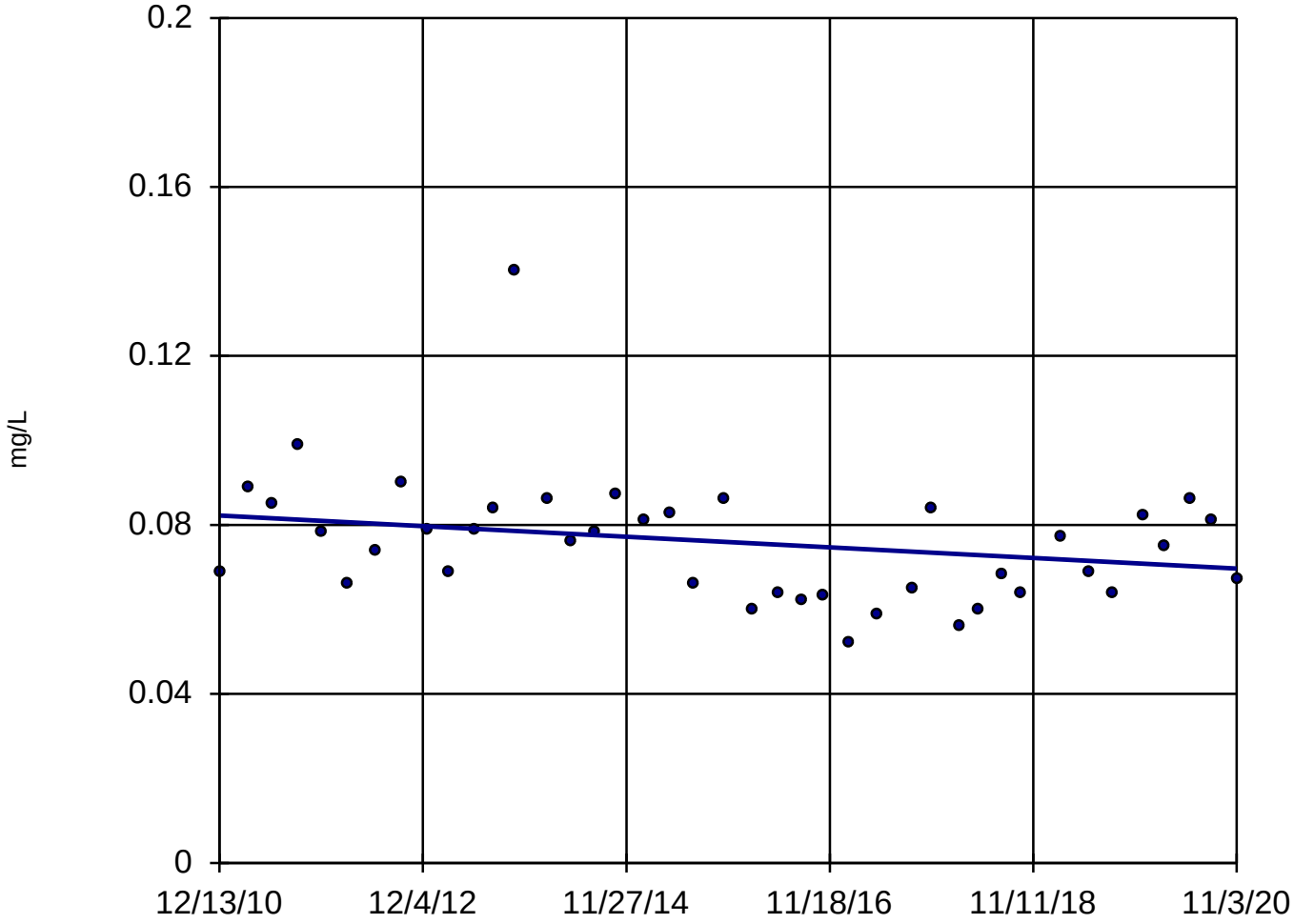
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Dissolved Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-08



n = 41

Slope = -0.001274 units per year.

Mann-Kendall normal approx. = -2.136
critical = -2.58

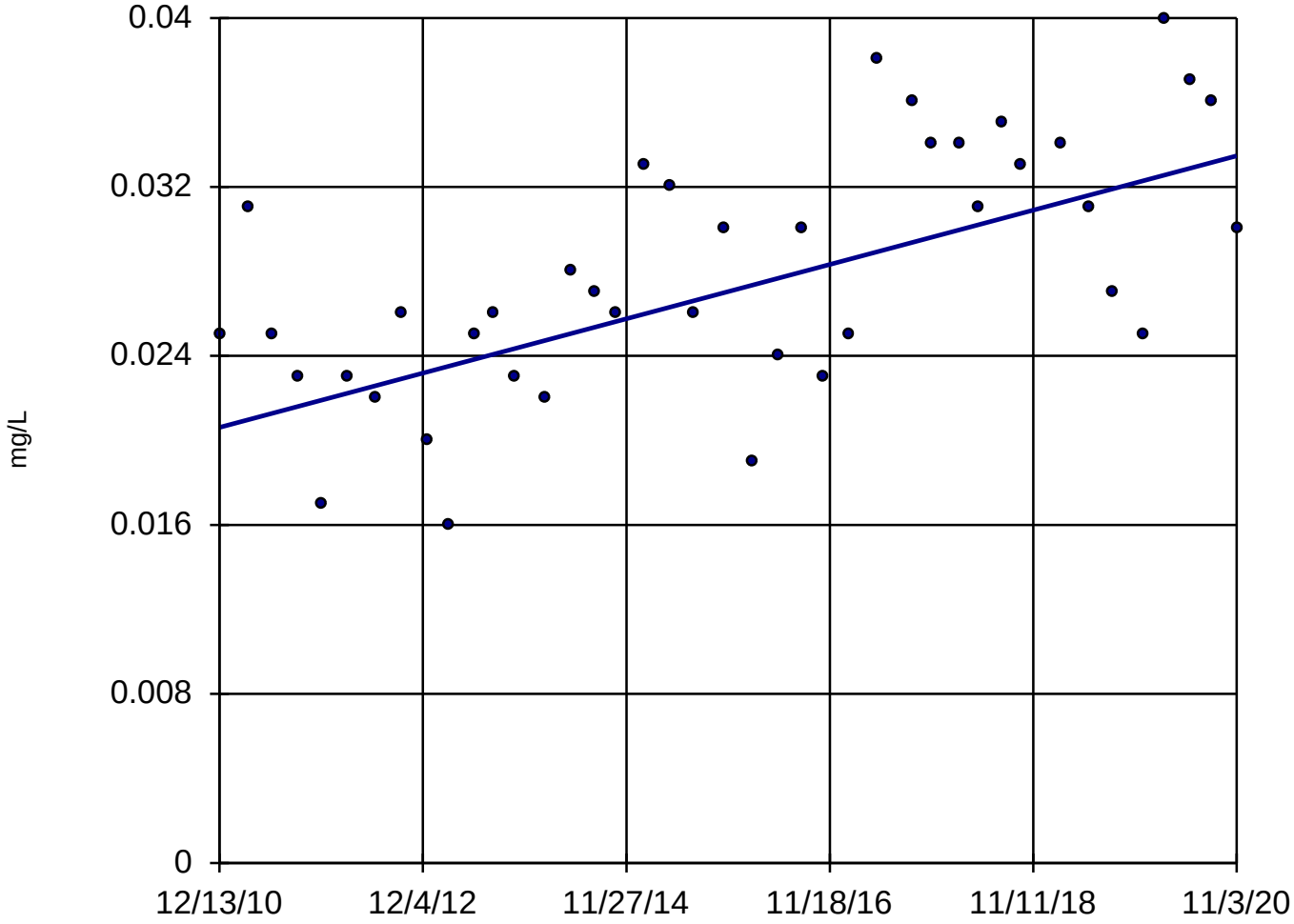
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Dissolved Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-09



n = 41

Slope = 0.001298 units per year.

Mann-Kendall normal approx. = 4.034
critical = 2.58

Increasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Dissolved Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

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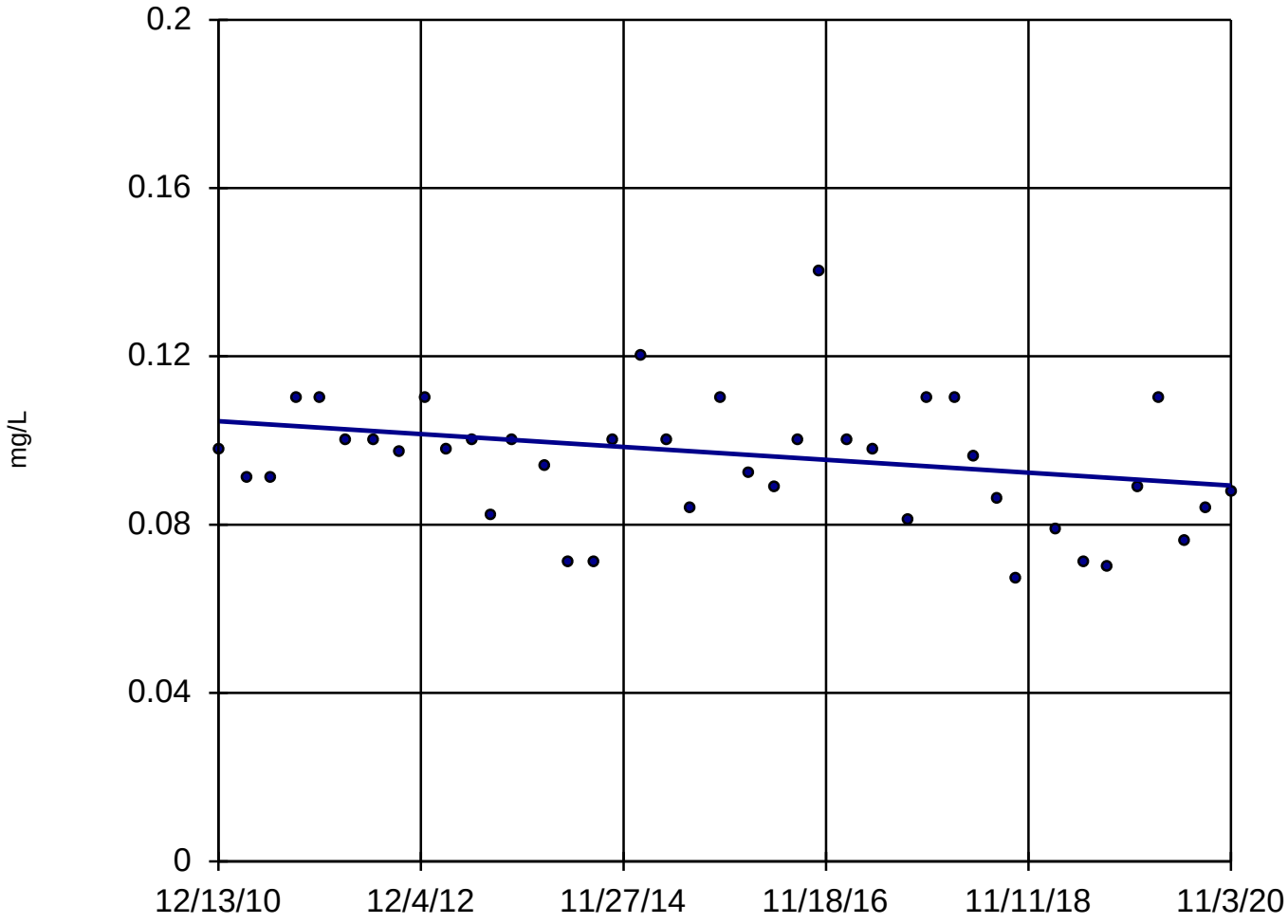
Sen's Slope Estimator

MW-10



n = 41

Slope = -0.001549 units per year.

Mann-Kendall normal approx. = -2.049
critical = -2.58

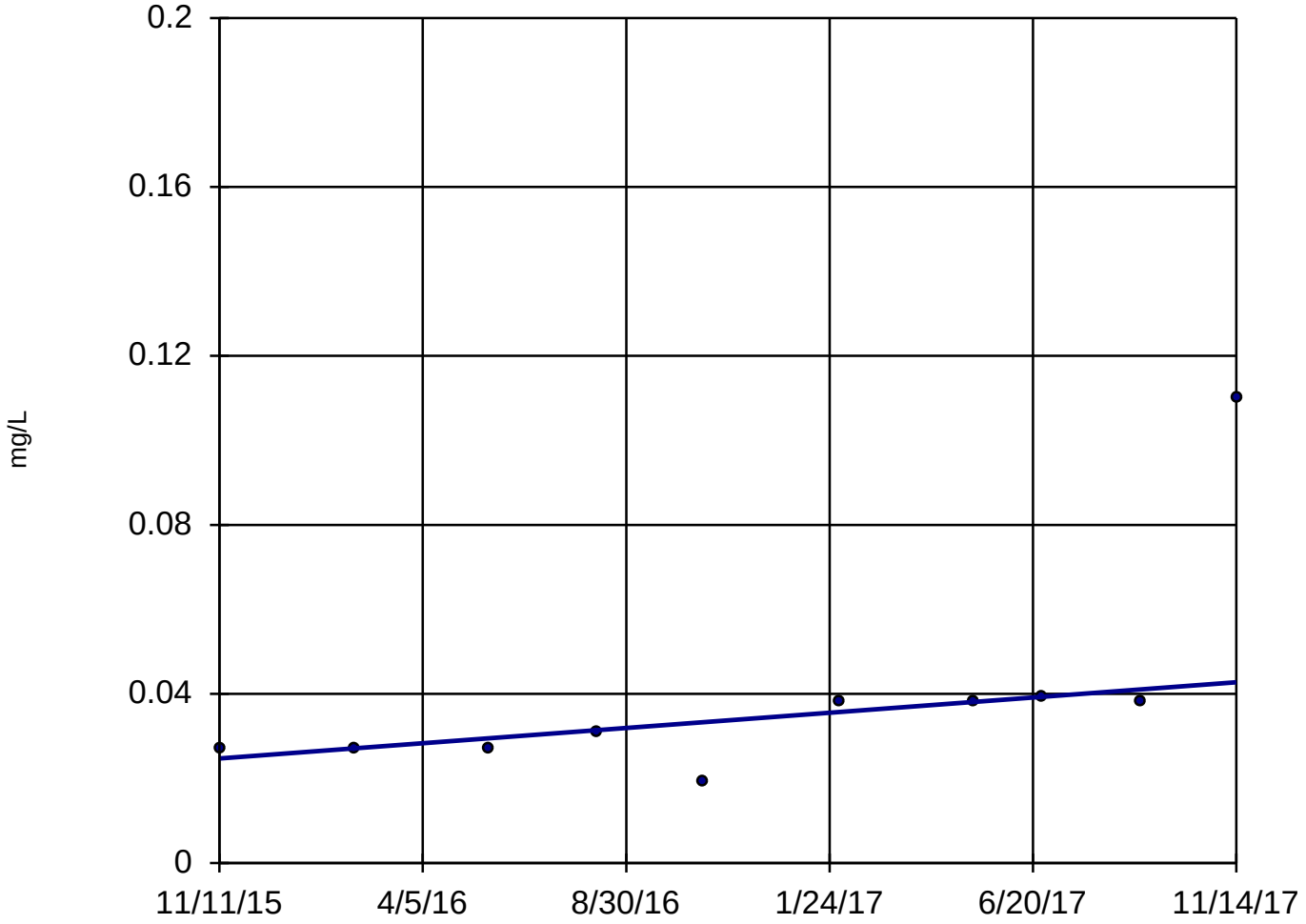
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Dissolved Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-09



n = 10

Slope = 0.008982 units per year.

Mann-Kendall statistic = 29
critical = 30

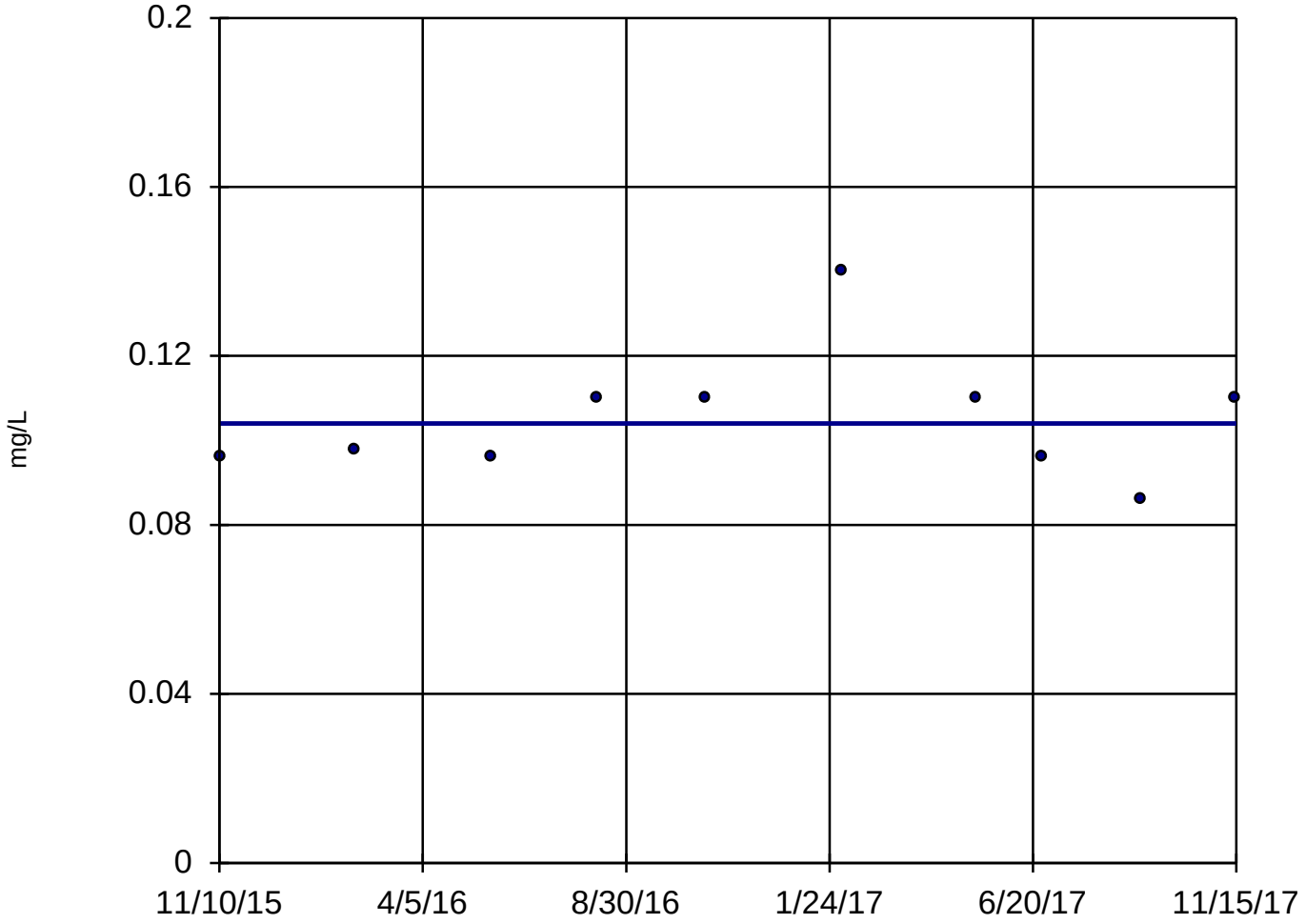
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Total Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-10



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 4
critical = 30

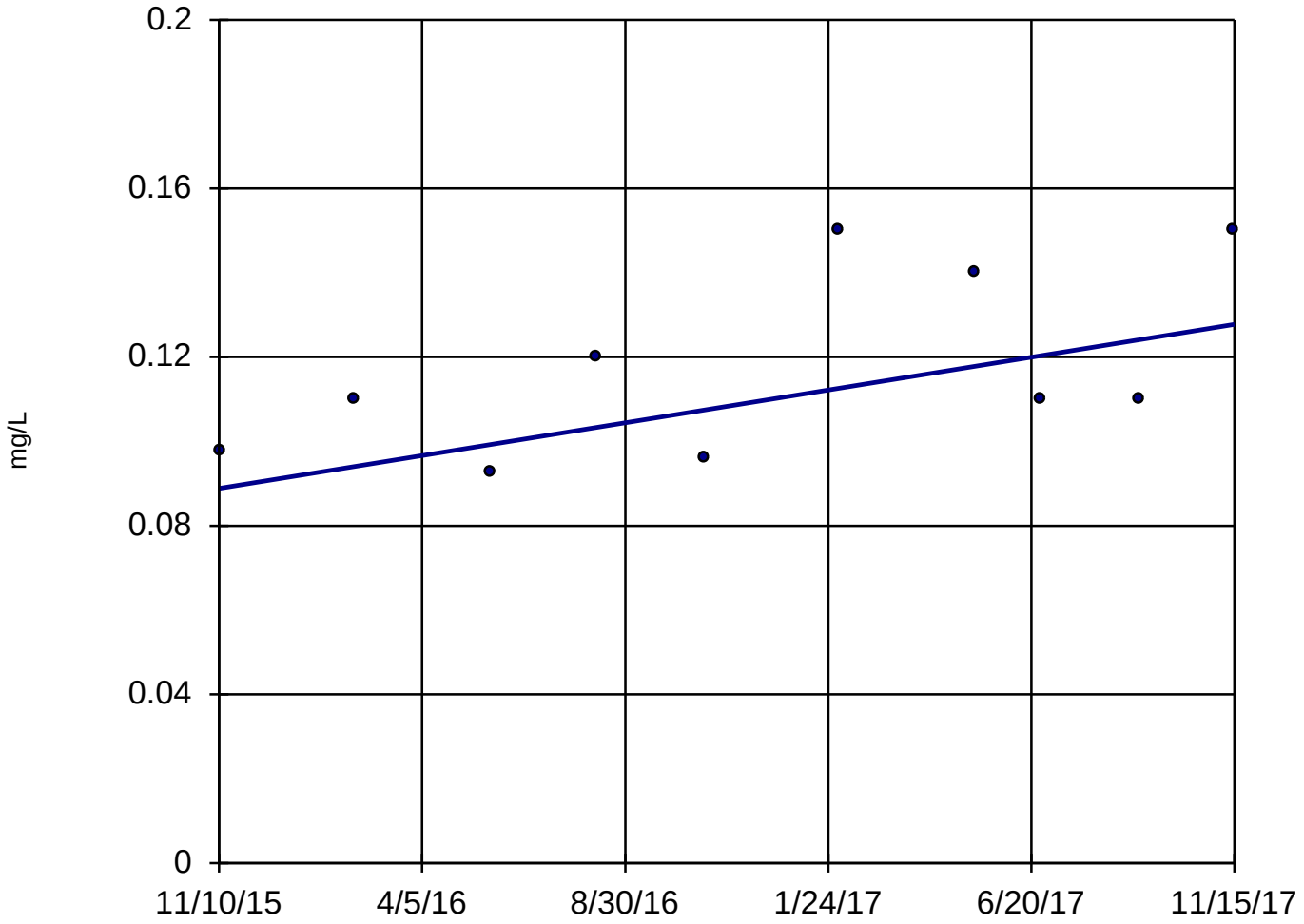
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Barium, Total Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-11



n = 10

Slope = 0.01931 units per year.

Mann-Kendall statistic = 17
critical = 30

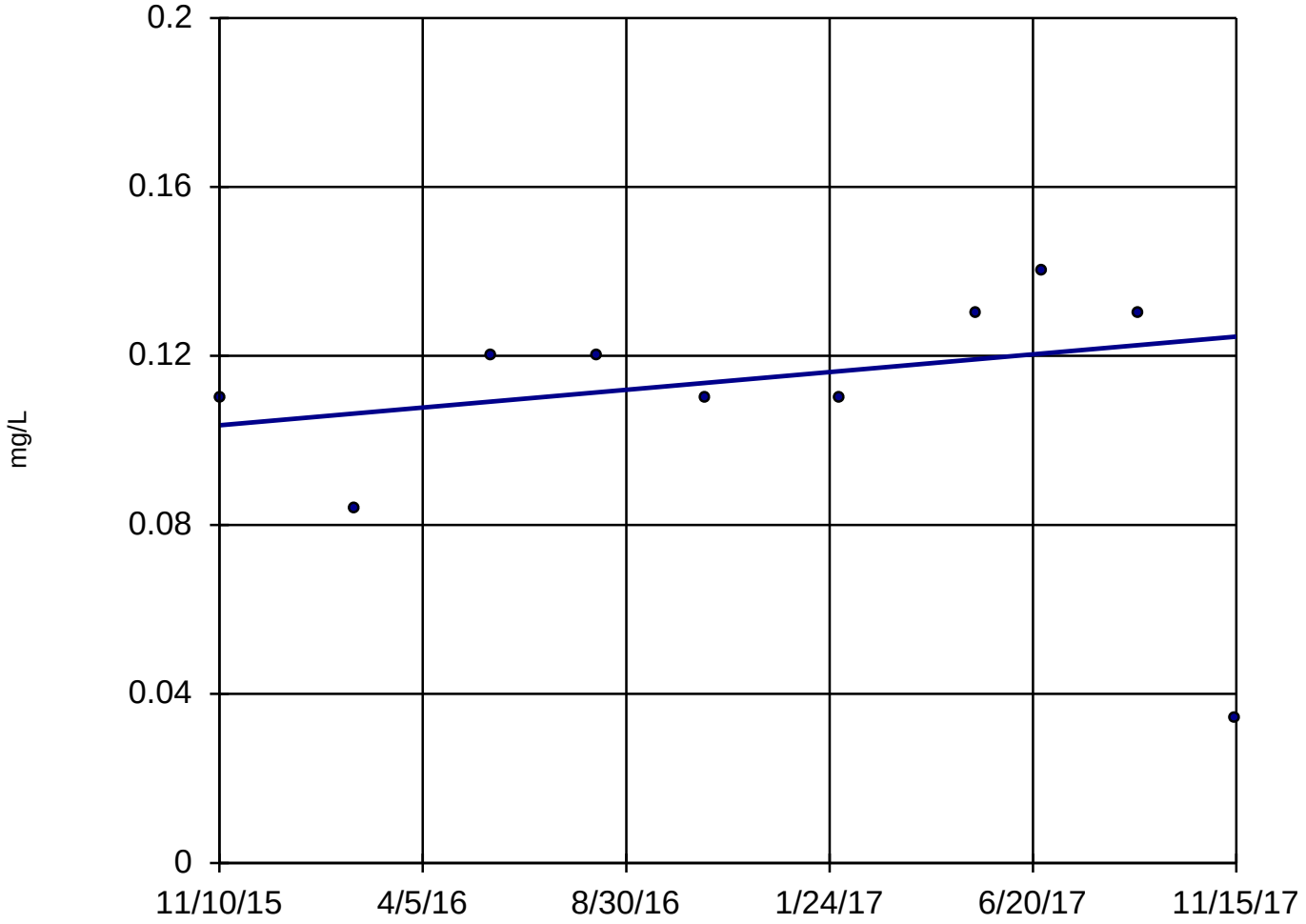
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Total Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-12



n = 10

Slope = 0.01043 units per year.

Mann-Kendall statistic = 10
critical = 30

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Total Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

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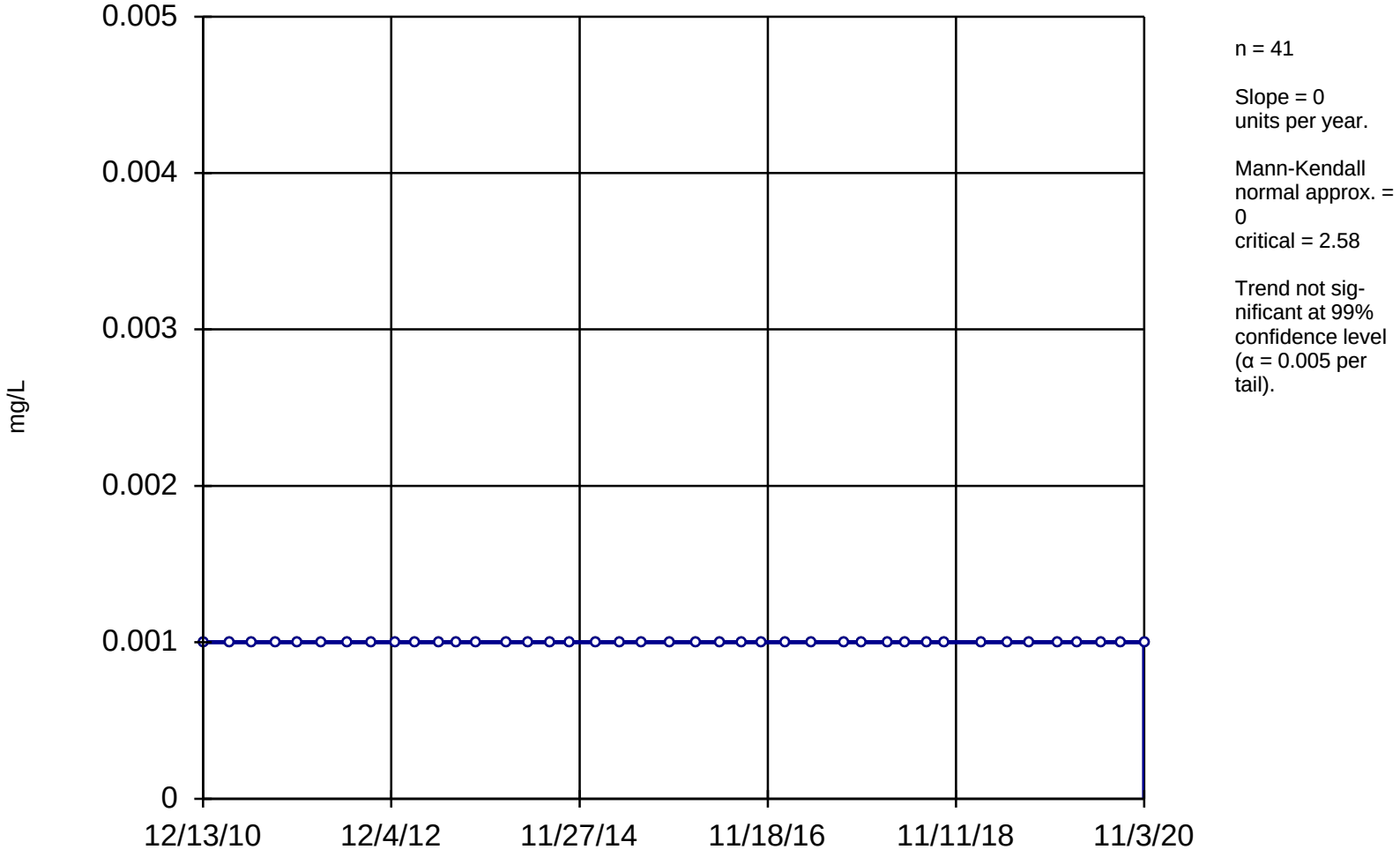
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-07



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

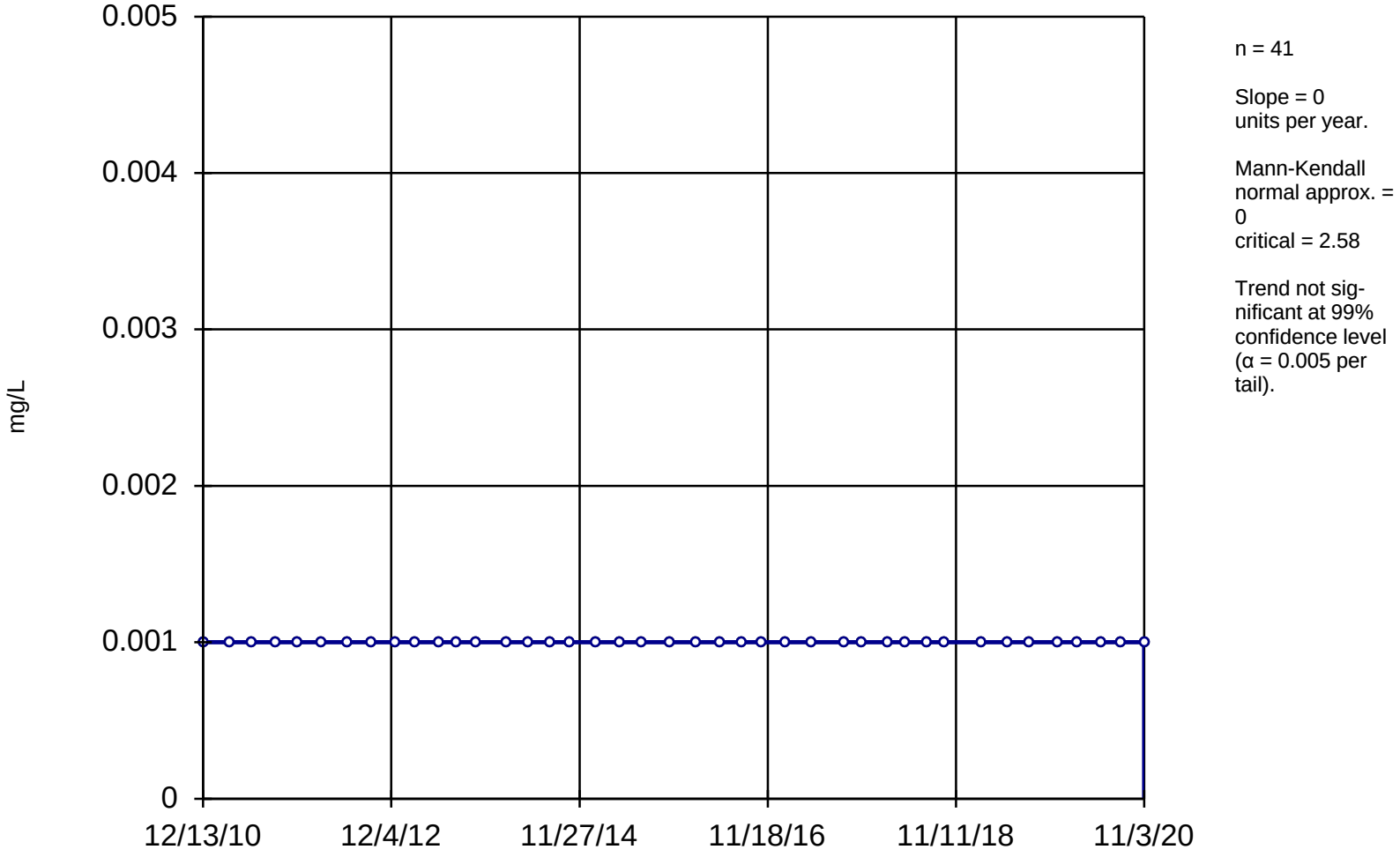
Constituent: Beryllium, Dissolved Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Beryllium, Dissolved Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

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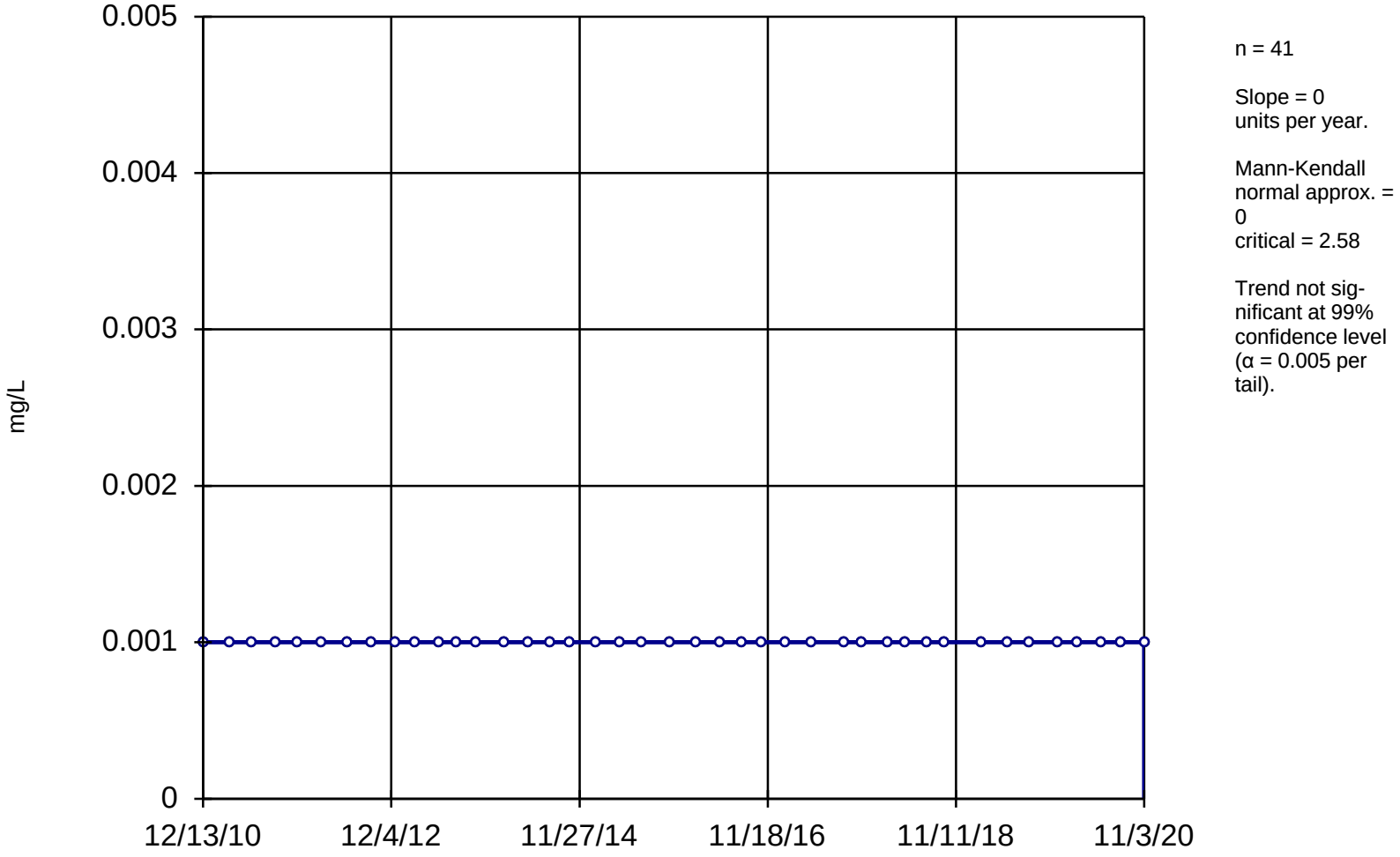
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-09



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Beryllium, Dissolved Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

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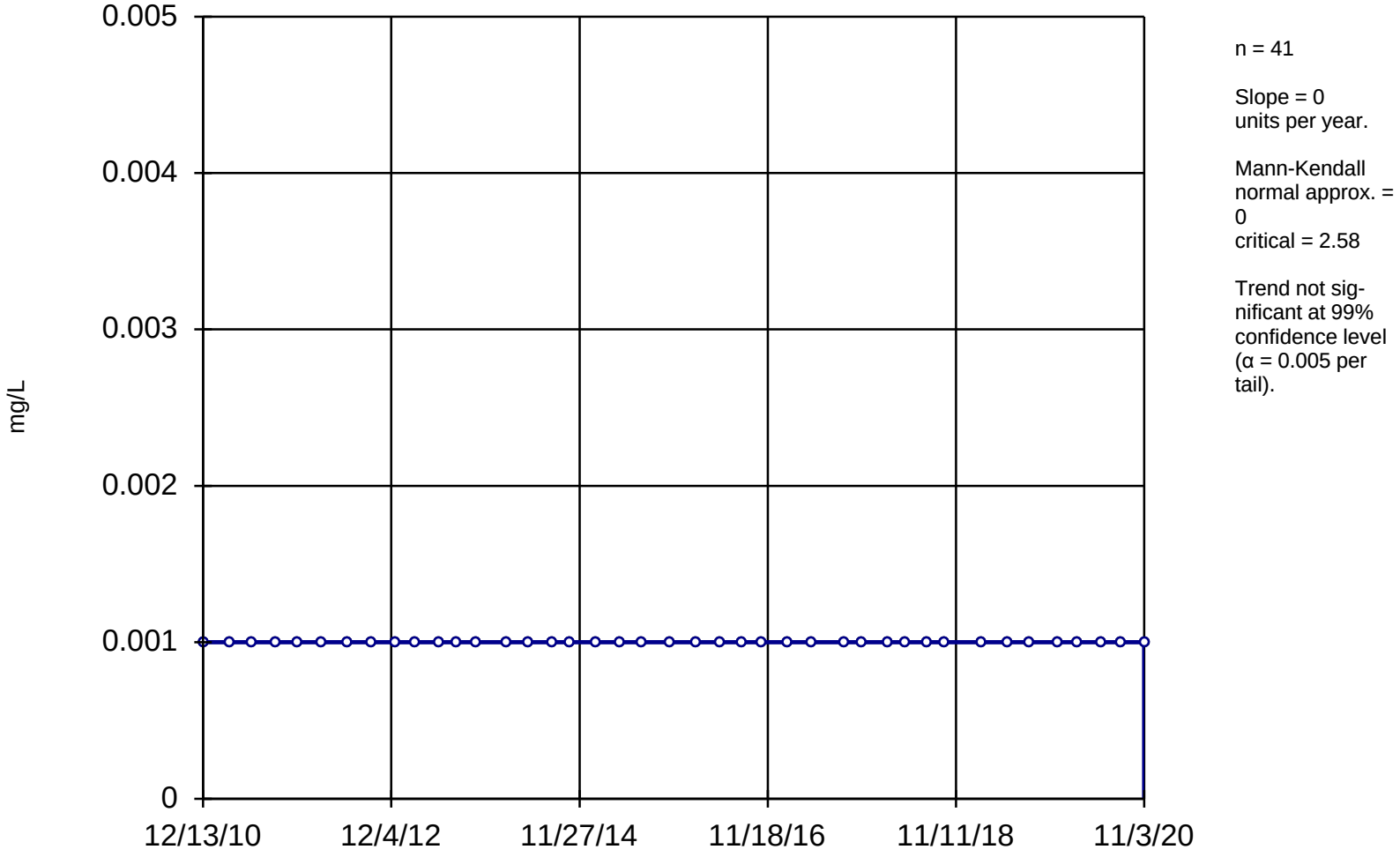
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

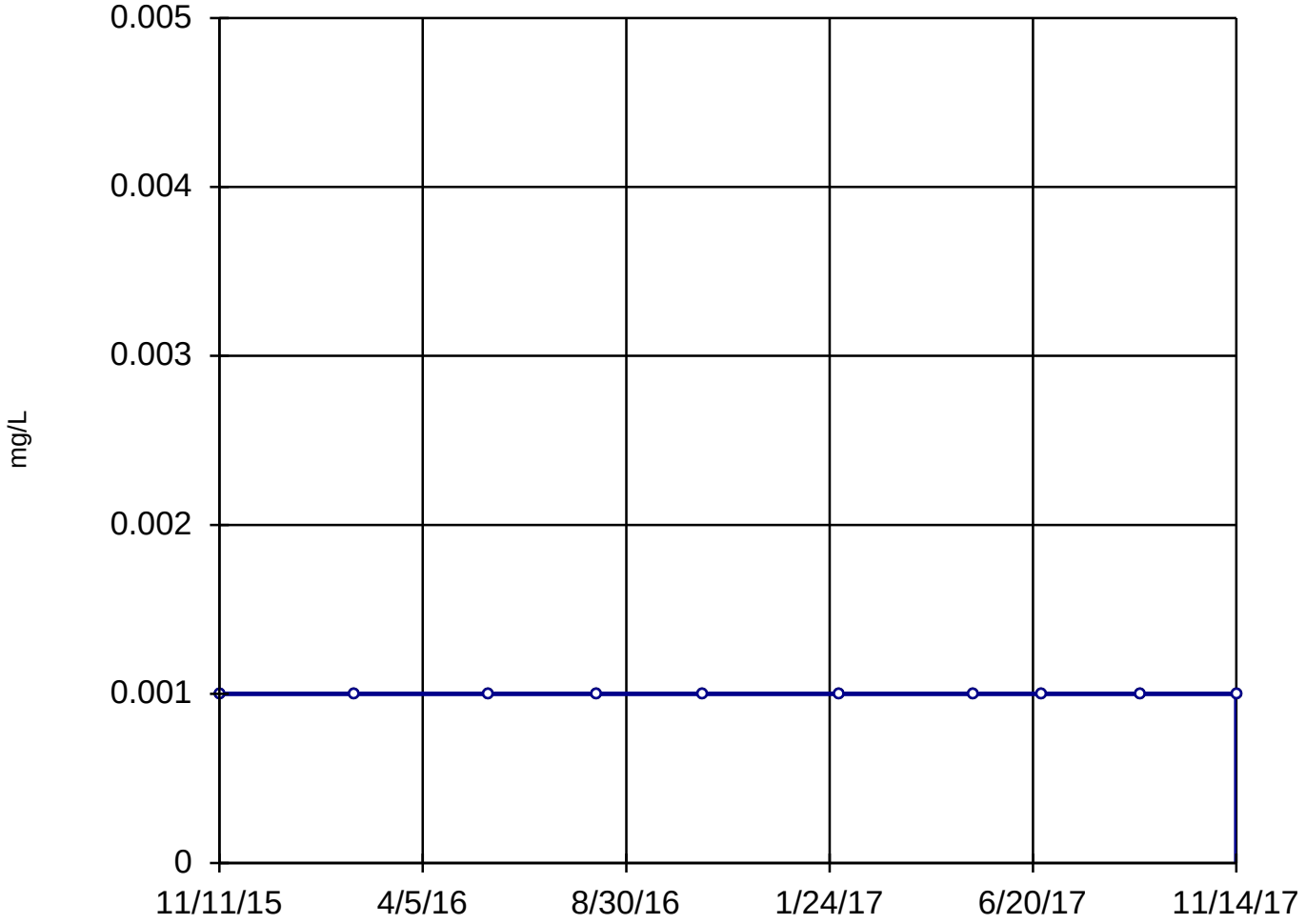
Constituent: Beryllium, Dissolved Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-09



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

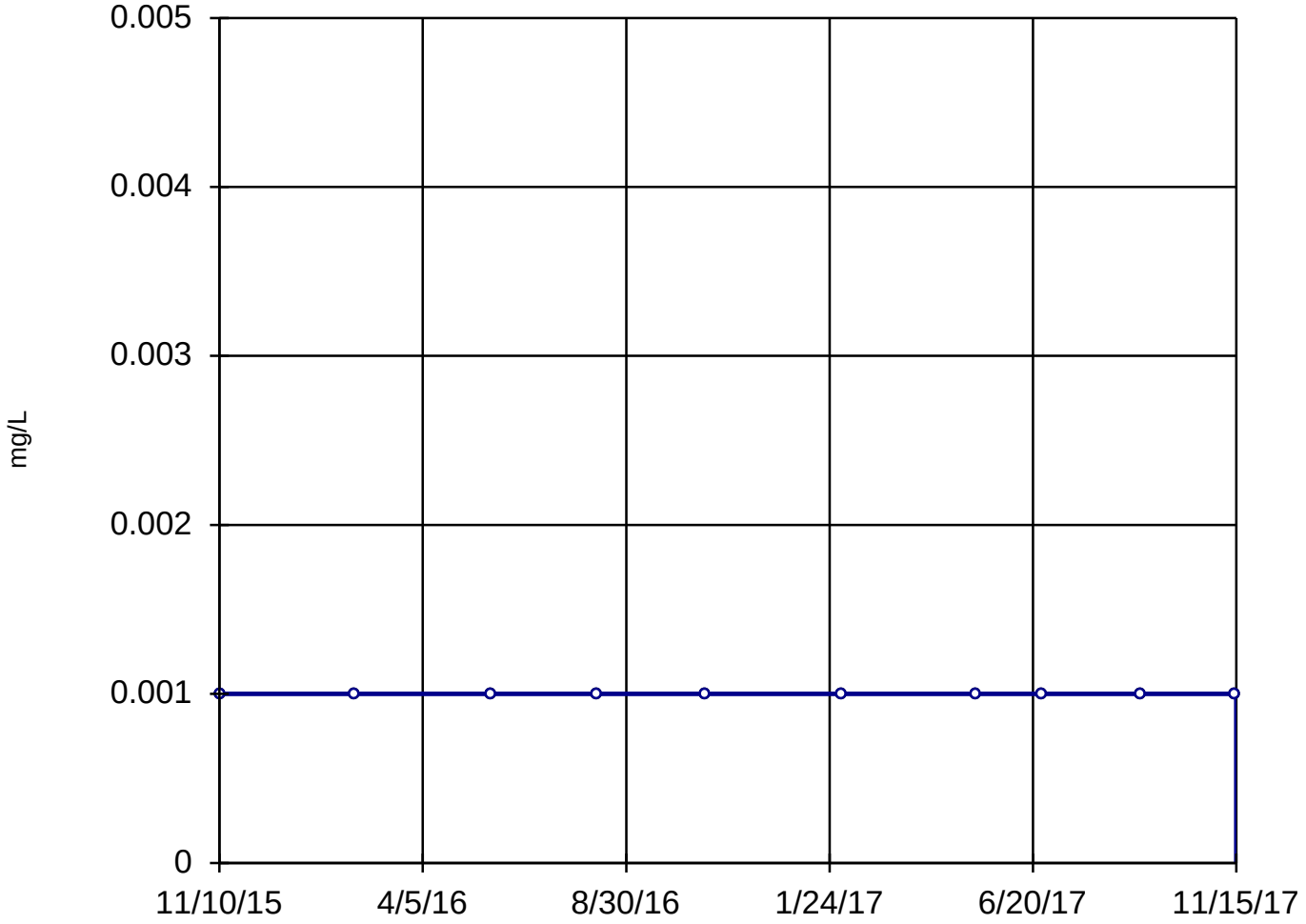
Constituent: Beryllium, Total Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

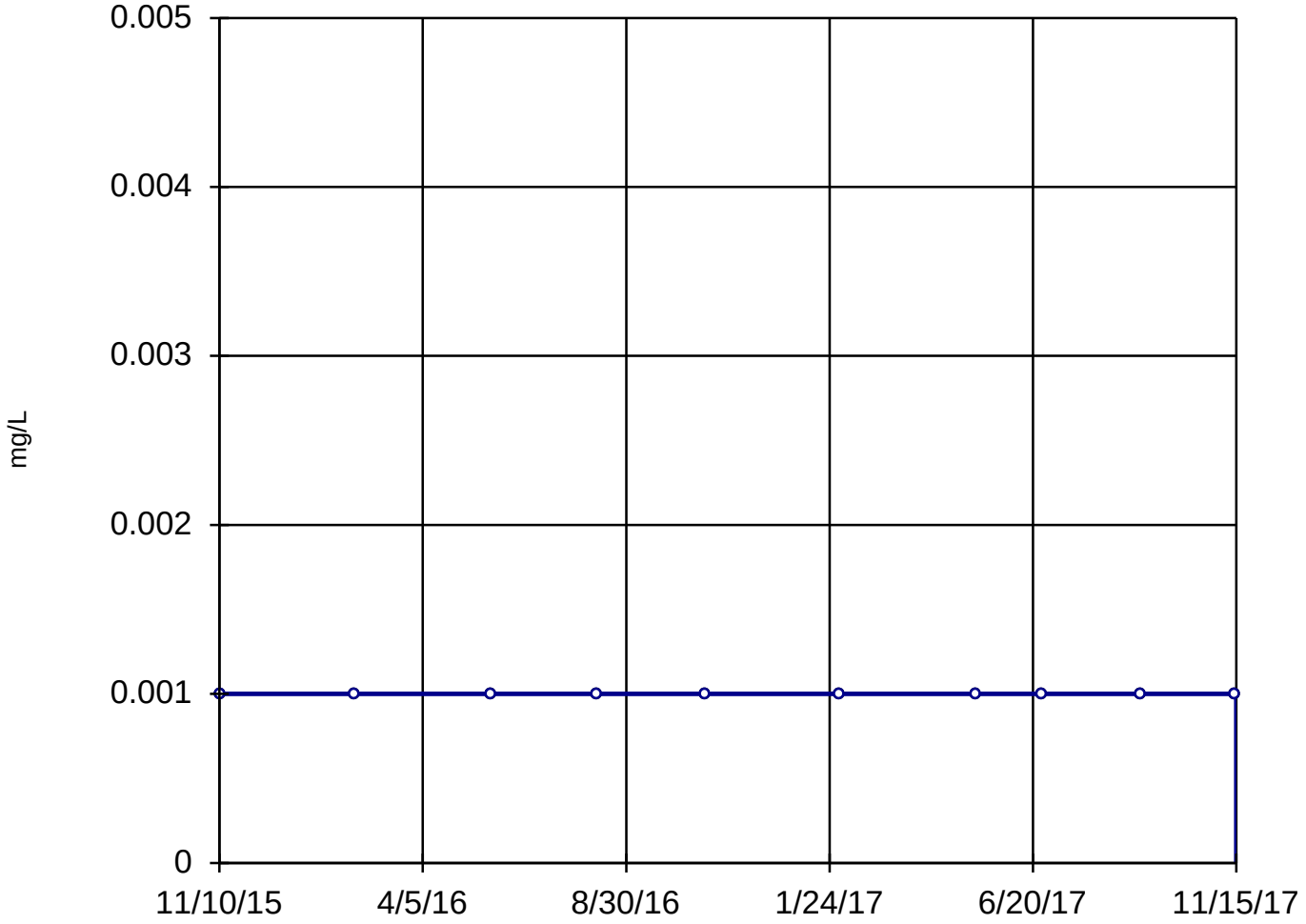
Constituent: Beryllium, Total Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-11



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

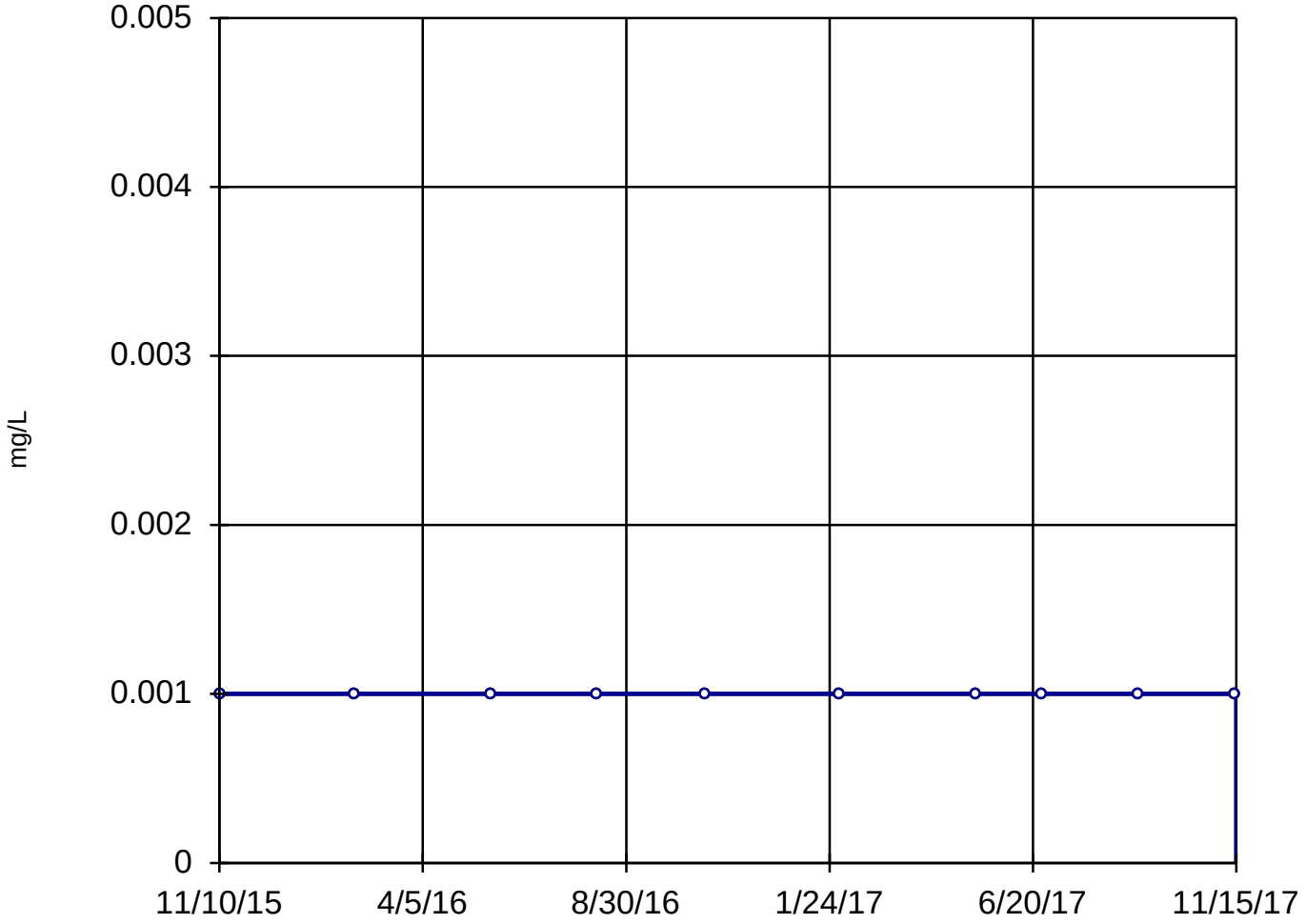
Constituent: Beryllium, Total Analysis Run 4/2/2021 12:05 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-12



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

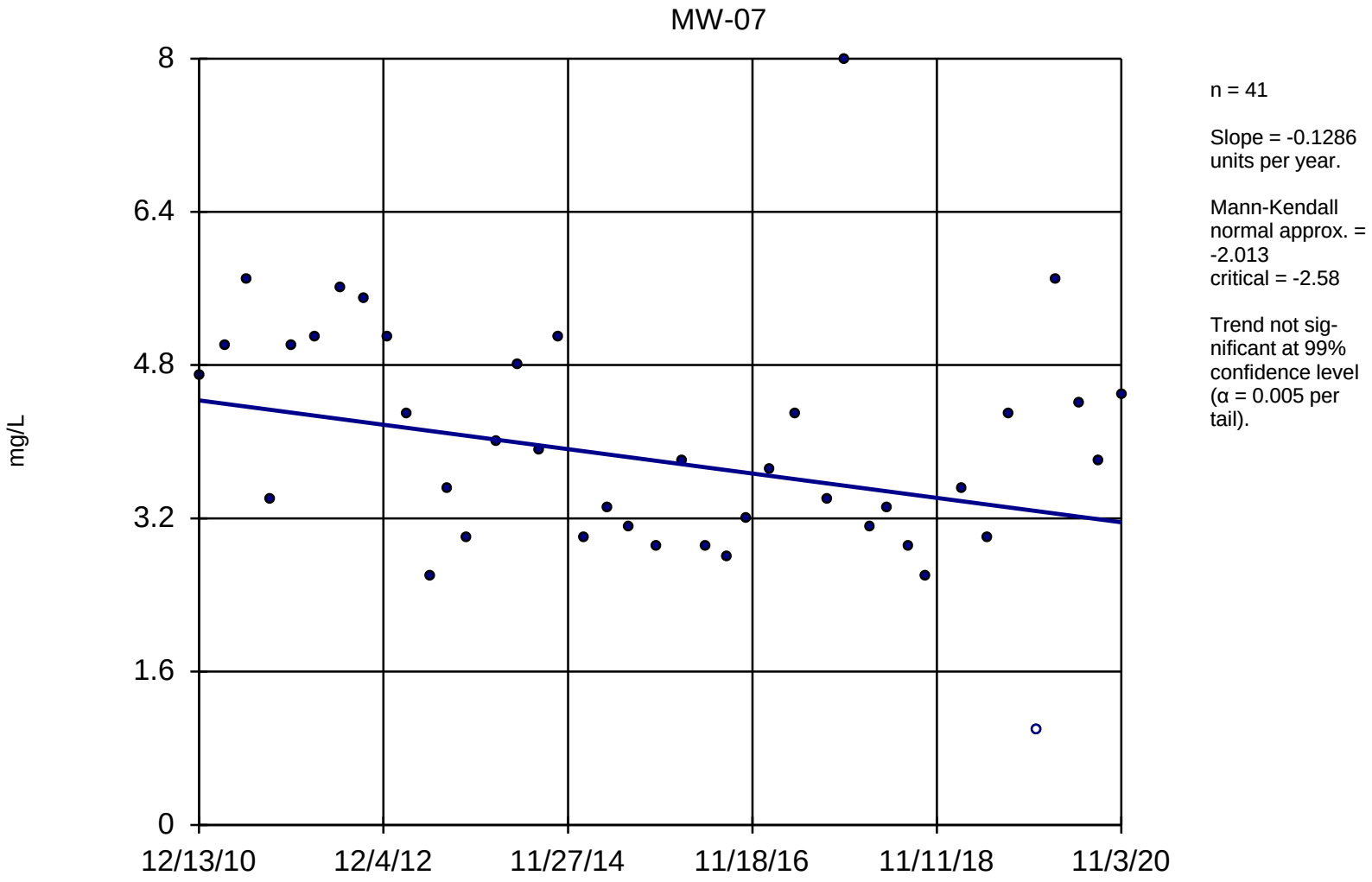
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Beryllium, Total Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator



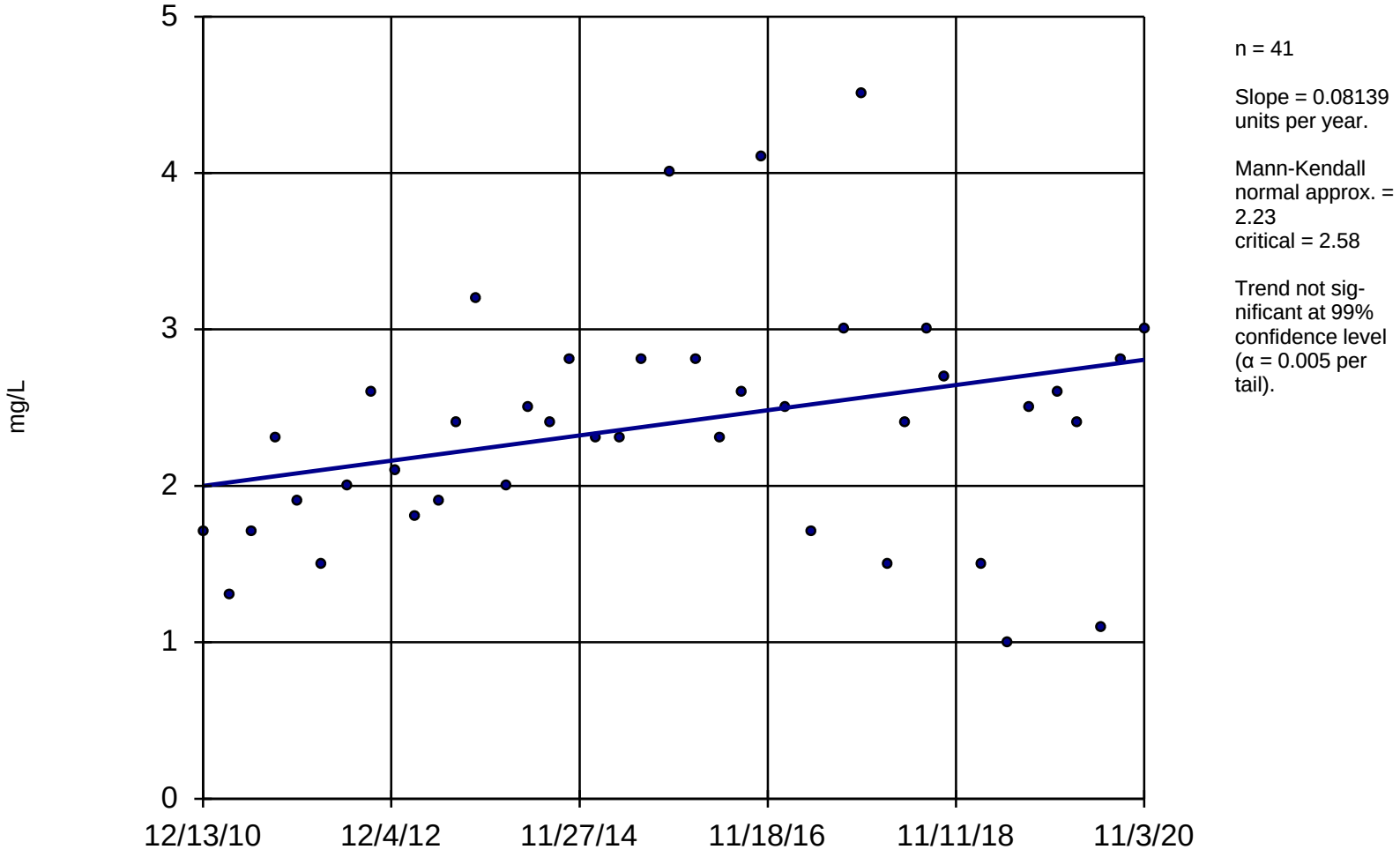
Constituent: Boron, Dissolved Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA

Sen's Slope Estimator

MW-08



n = 41

Slope = 0.08139 units per year.

Mann-Kendall normal approx. = 2.23
critical = 2.58

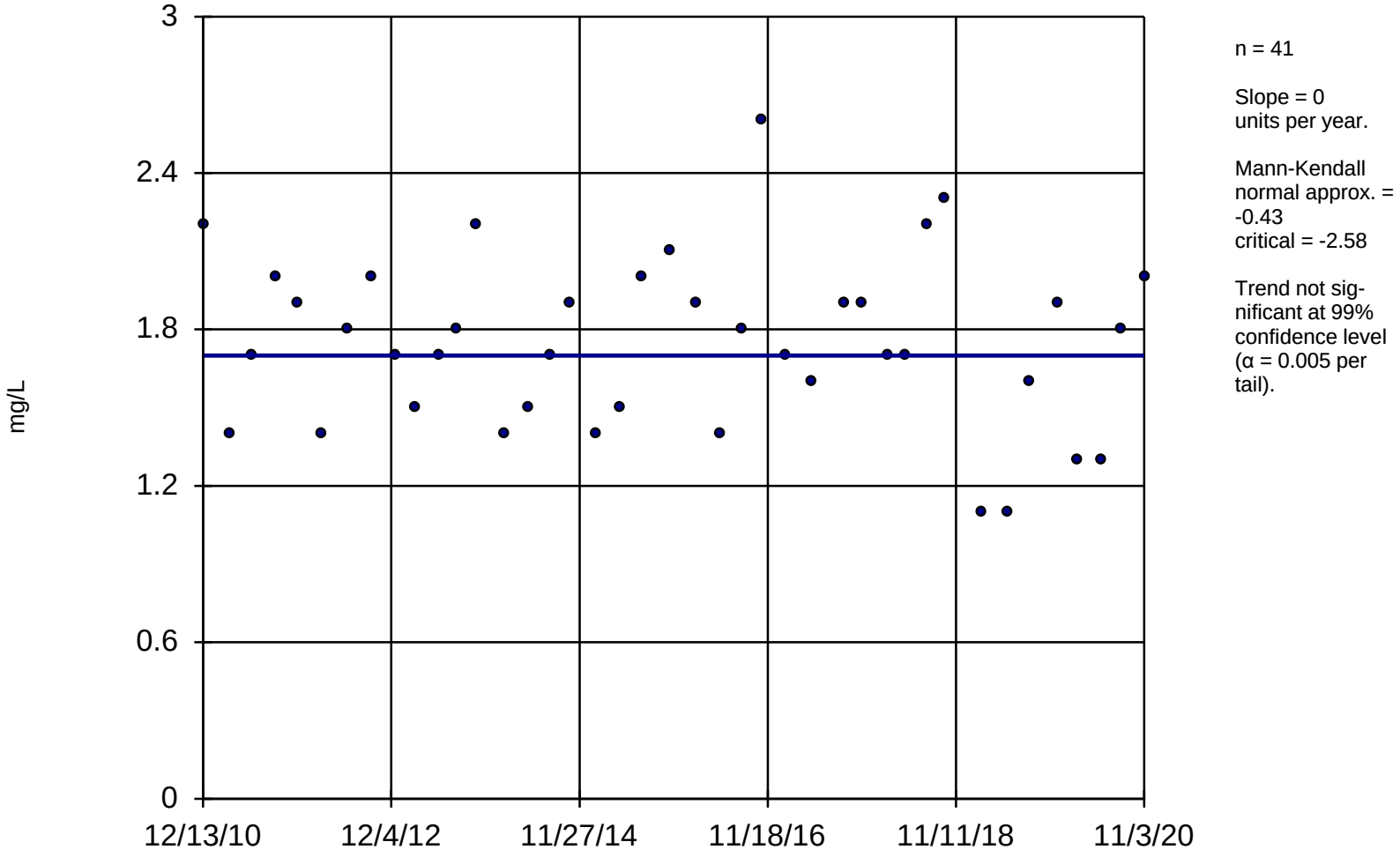
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, Dissolved Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-09



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
-0.43
critical = -2.58

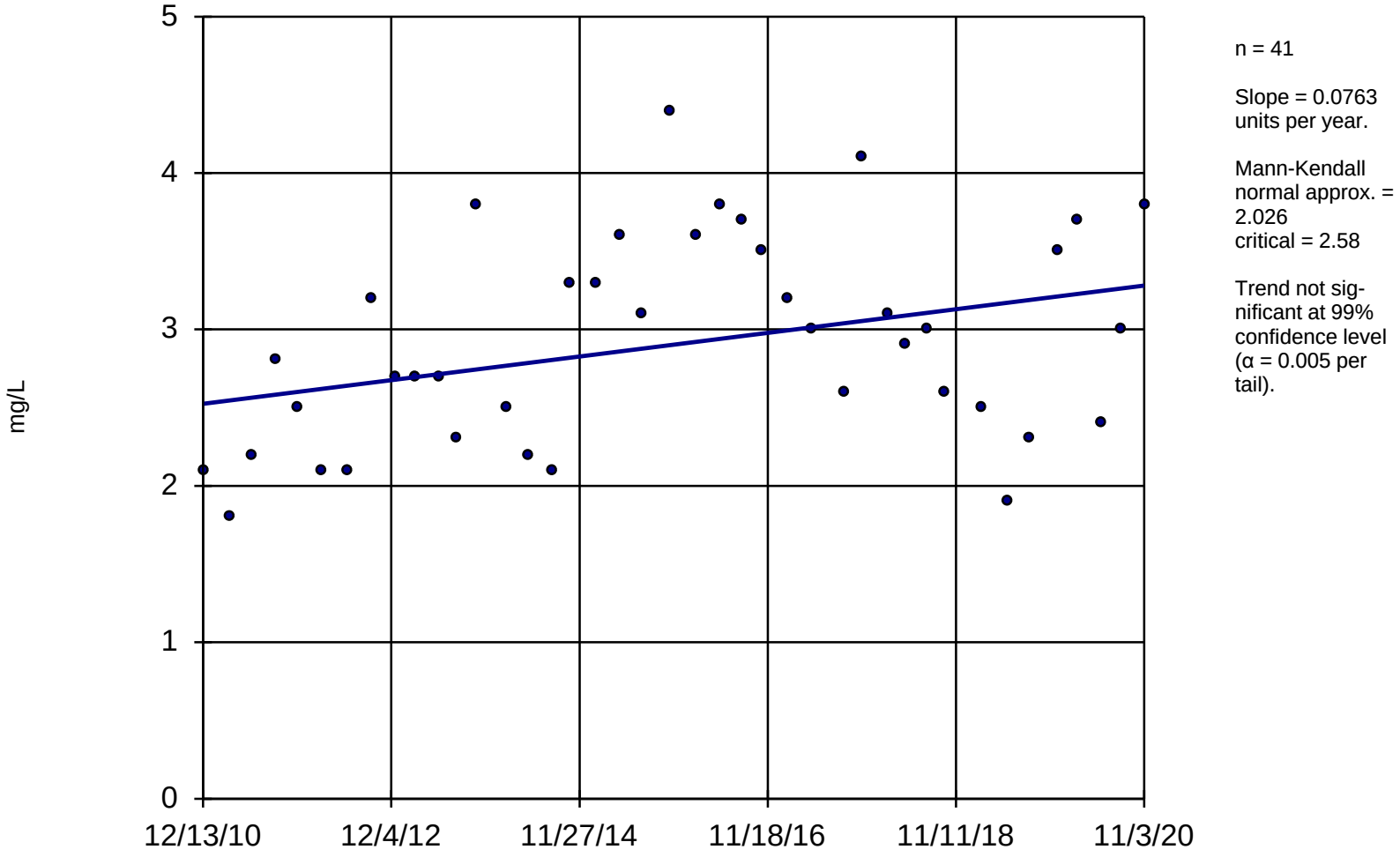
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Boron, Dissolved Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-10



n = 41

Slope = 0.0763 units per year.

Mann-Kendall normal approx. = 2.026
critical = 2.58

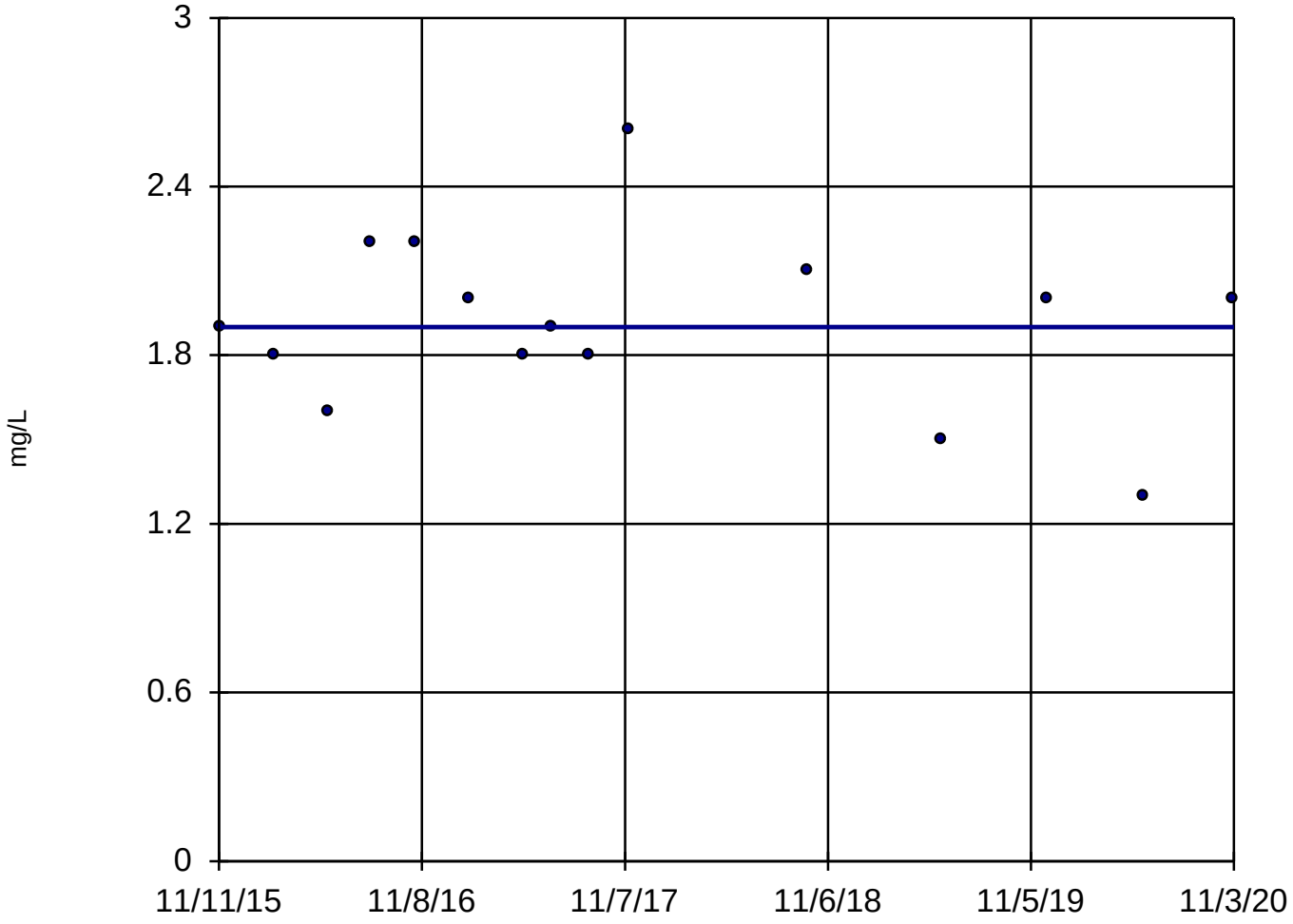
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, Dissolved Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-09



n = 15

Slope = 0
units per year.

Mann-Kendall
statistic = -7
critical = -53

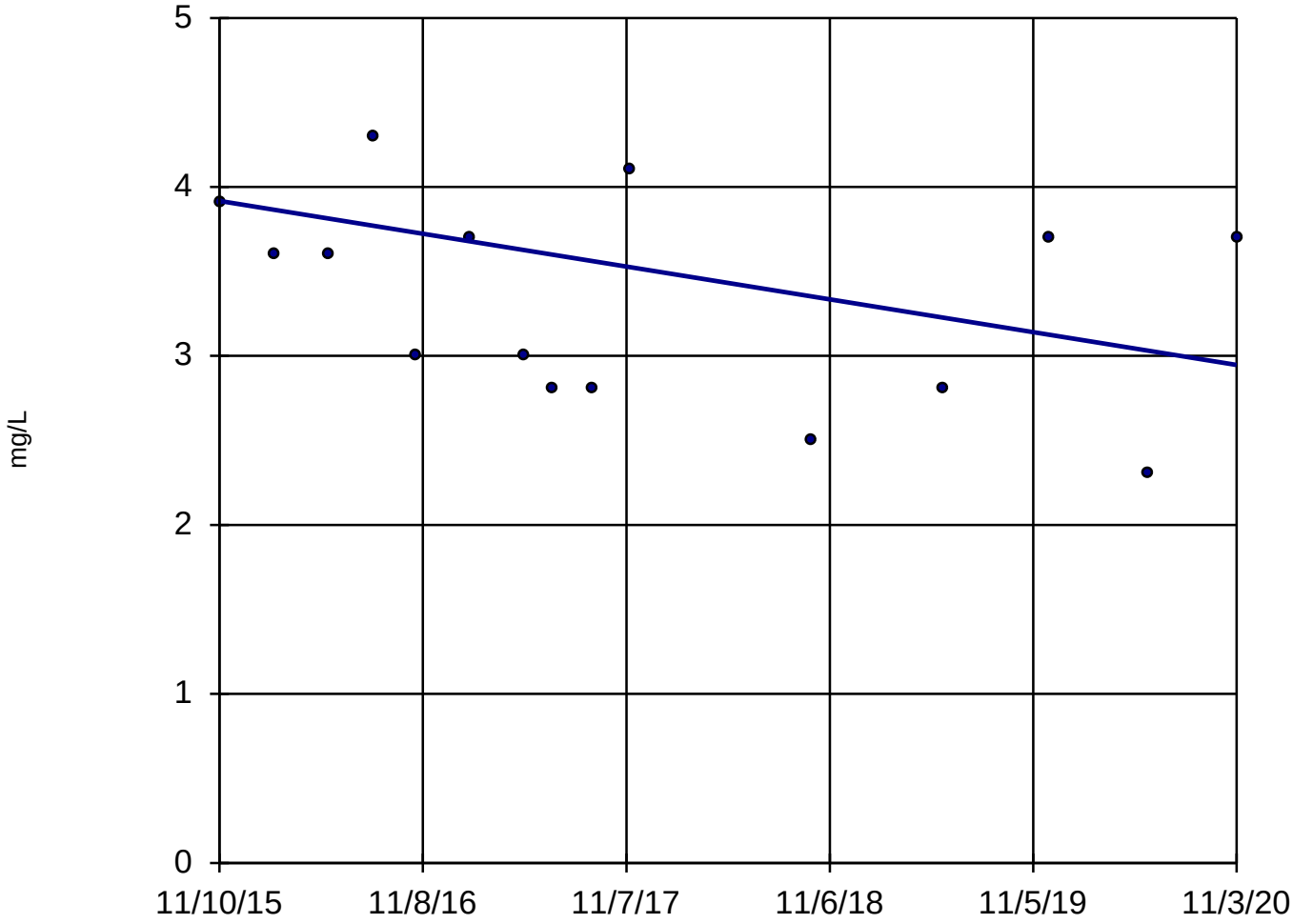
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Boron, Total Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-10



n = 15

Slope = -0.1947 units per year.

Mann-Kendall statistic = -33
critical = -53

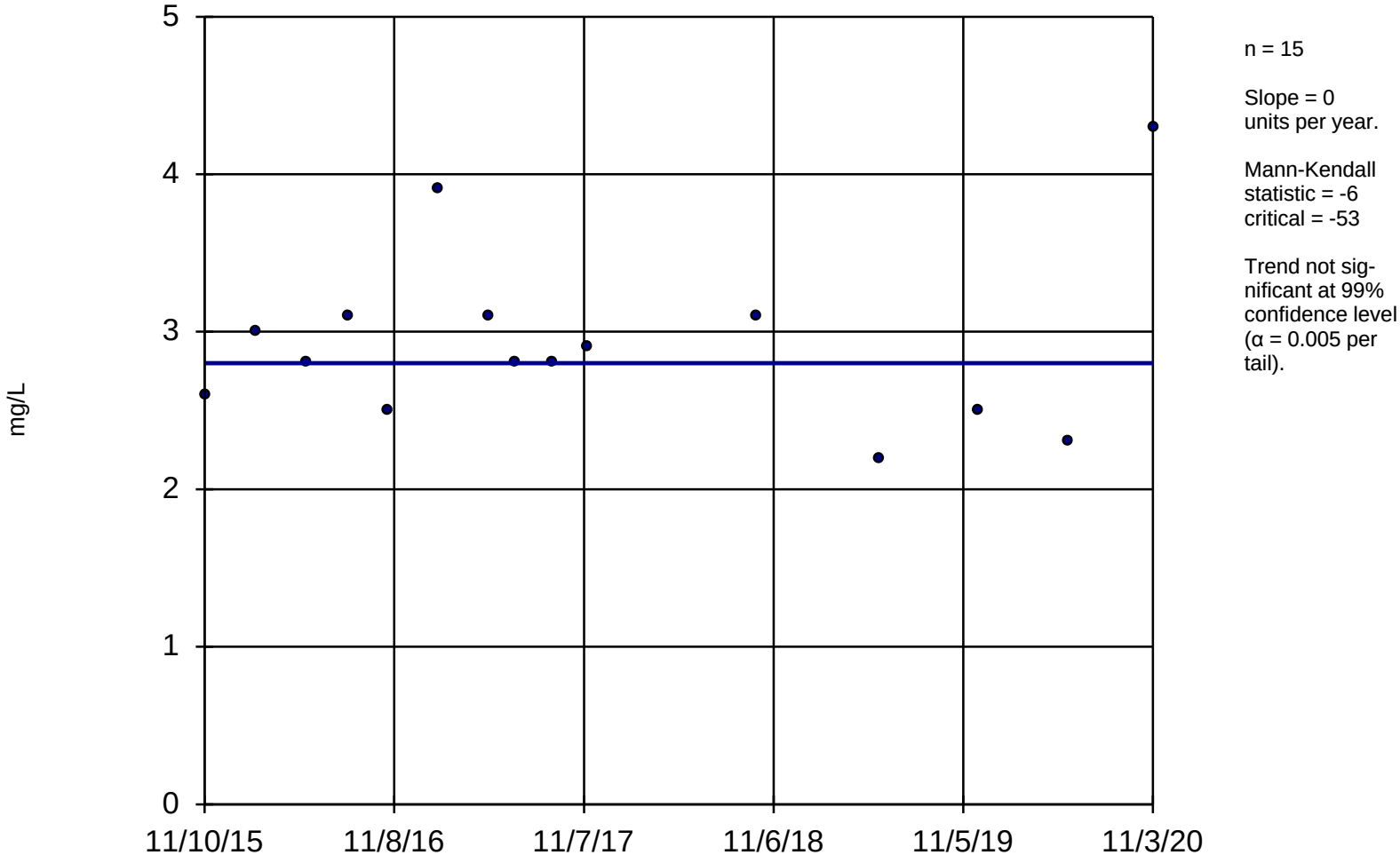
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, Total Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-11

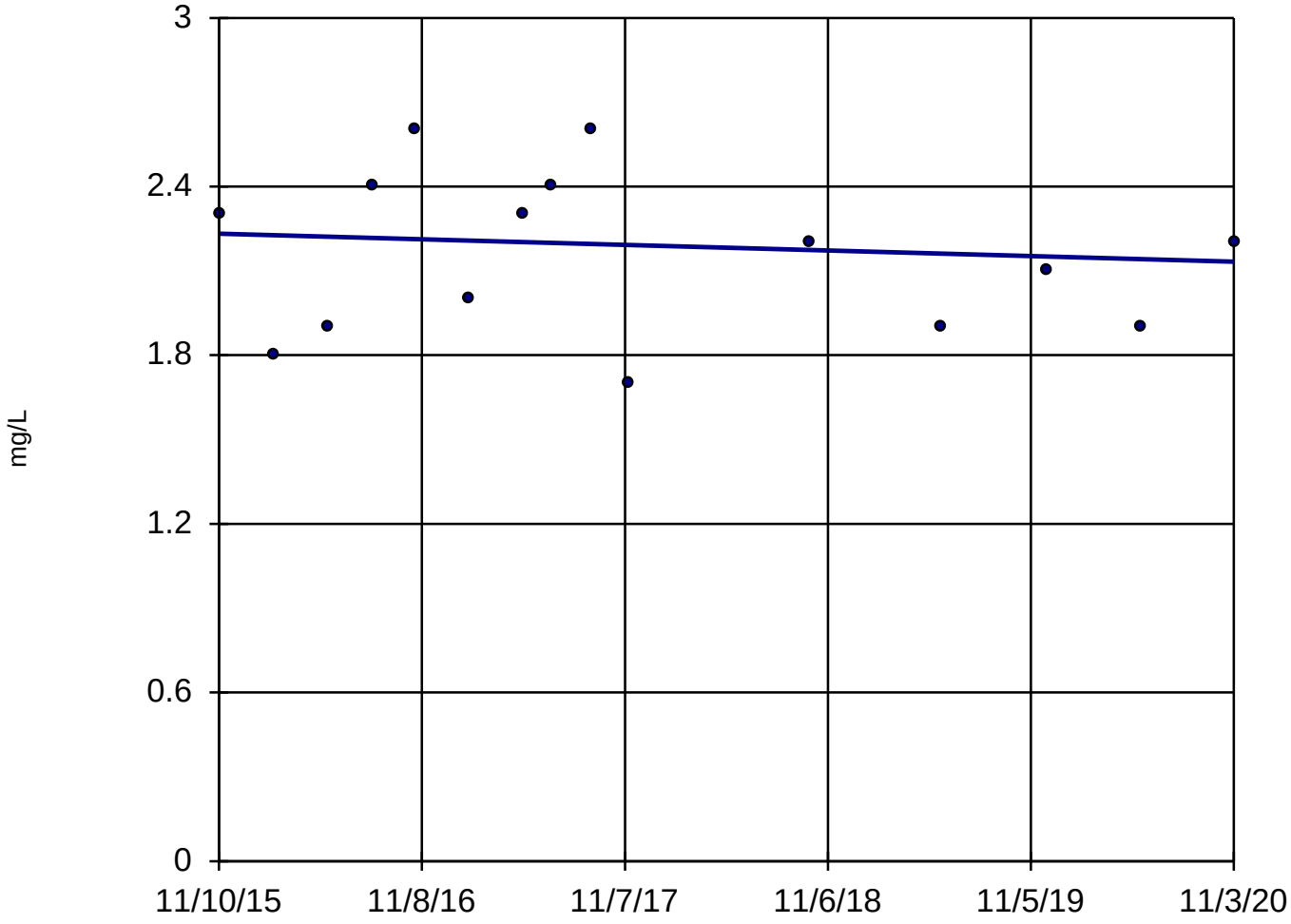


Constituent: Boron, Total Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-12



n = 15

Slope = -0.02005 units per year.

Mann-Kendall statistic = -8
critical = -53

Trend not significant at 99% confidence level (α = 0.005 per tail).

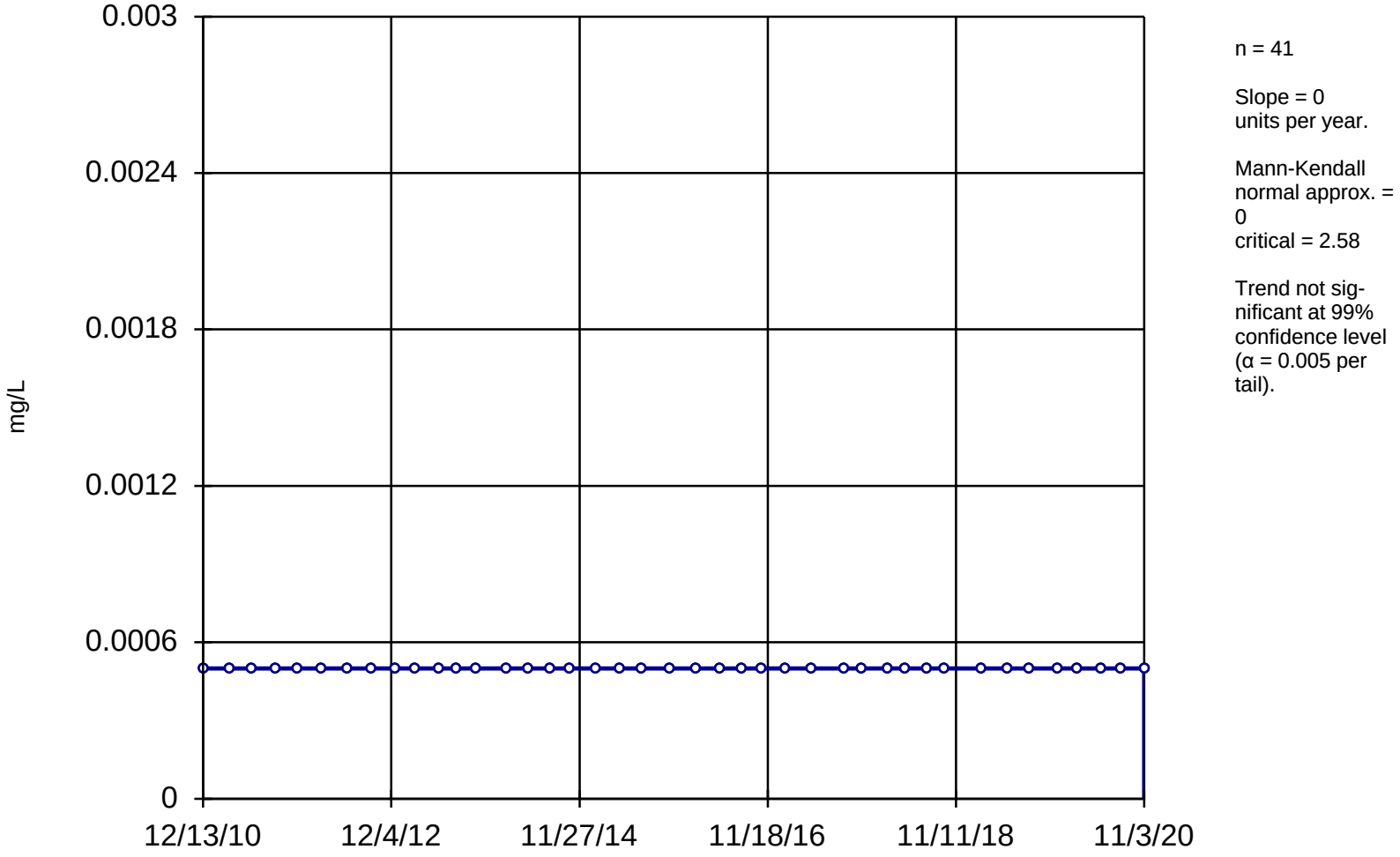
Constituent: Boron, Total Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-07



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

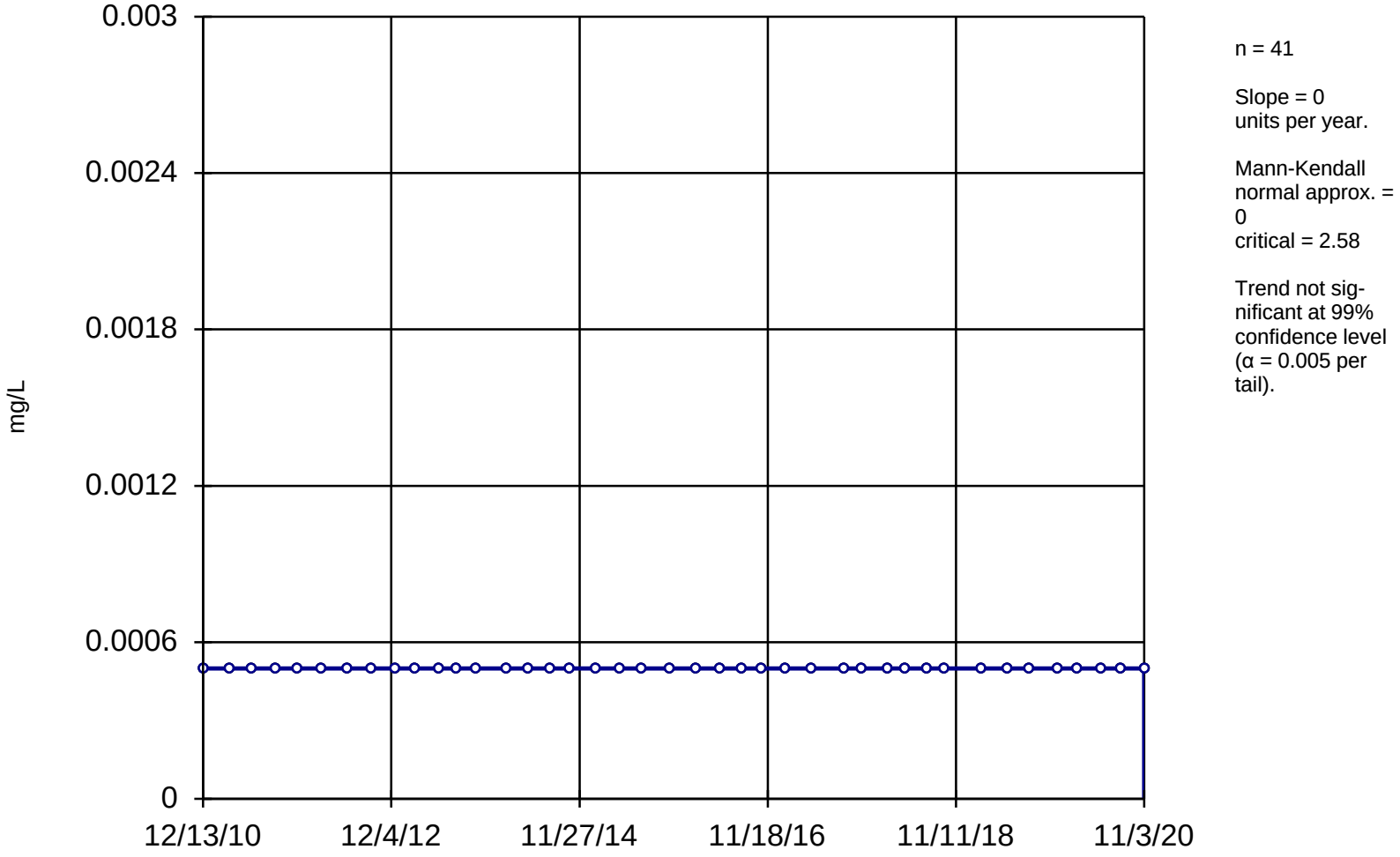
Constituent: Cadmium, Dissolved Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

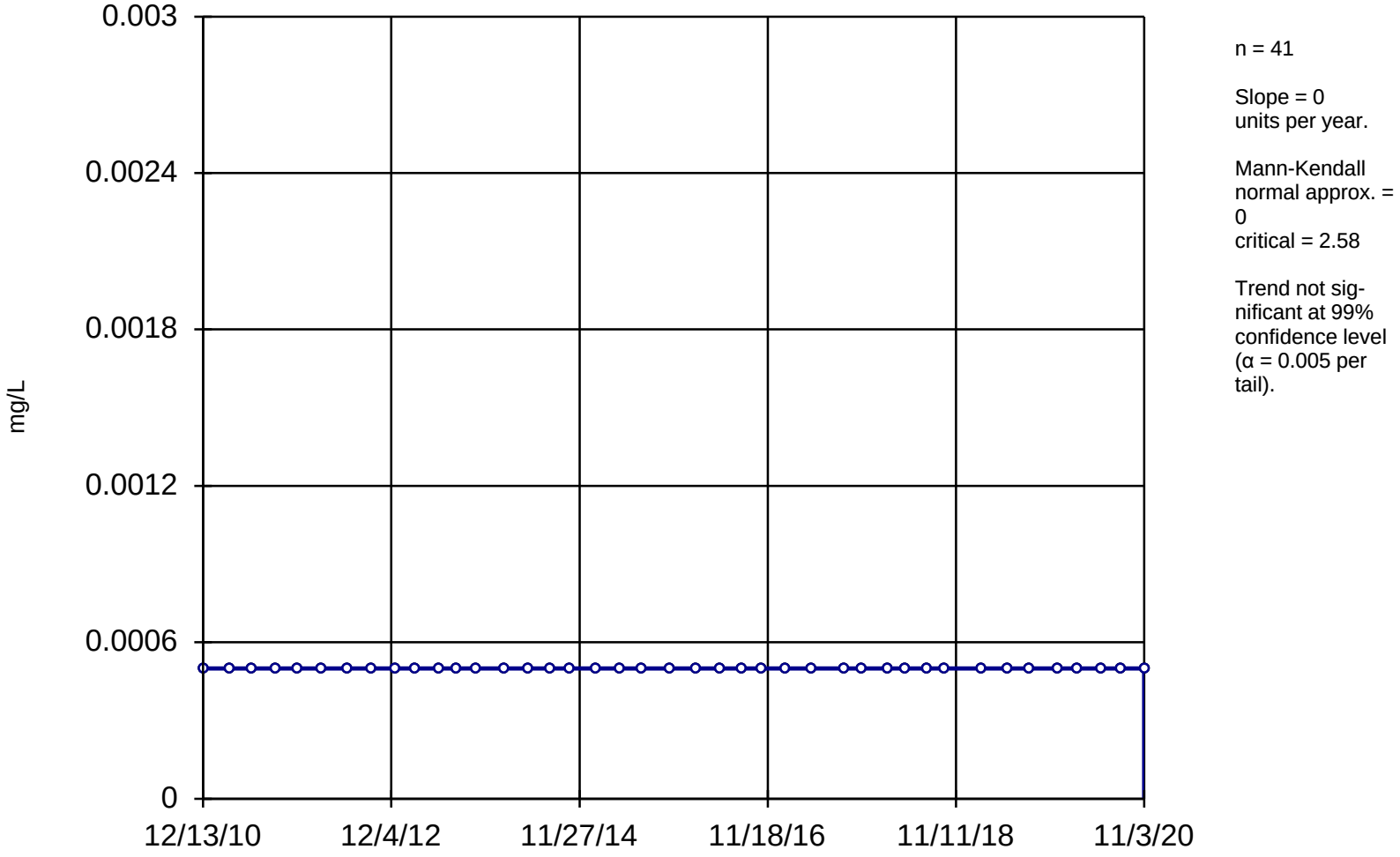
Constituent: Cadmium, Dissolved Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-09



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

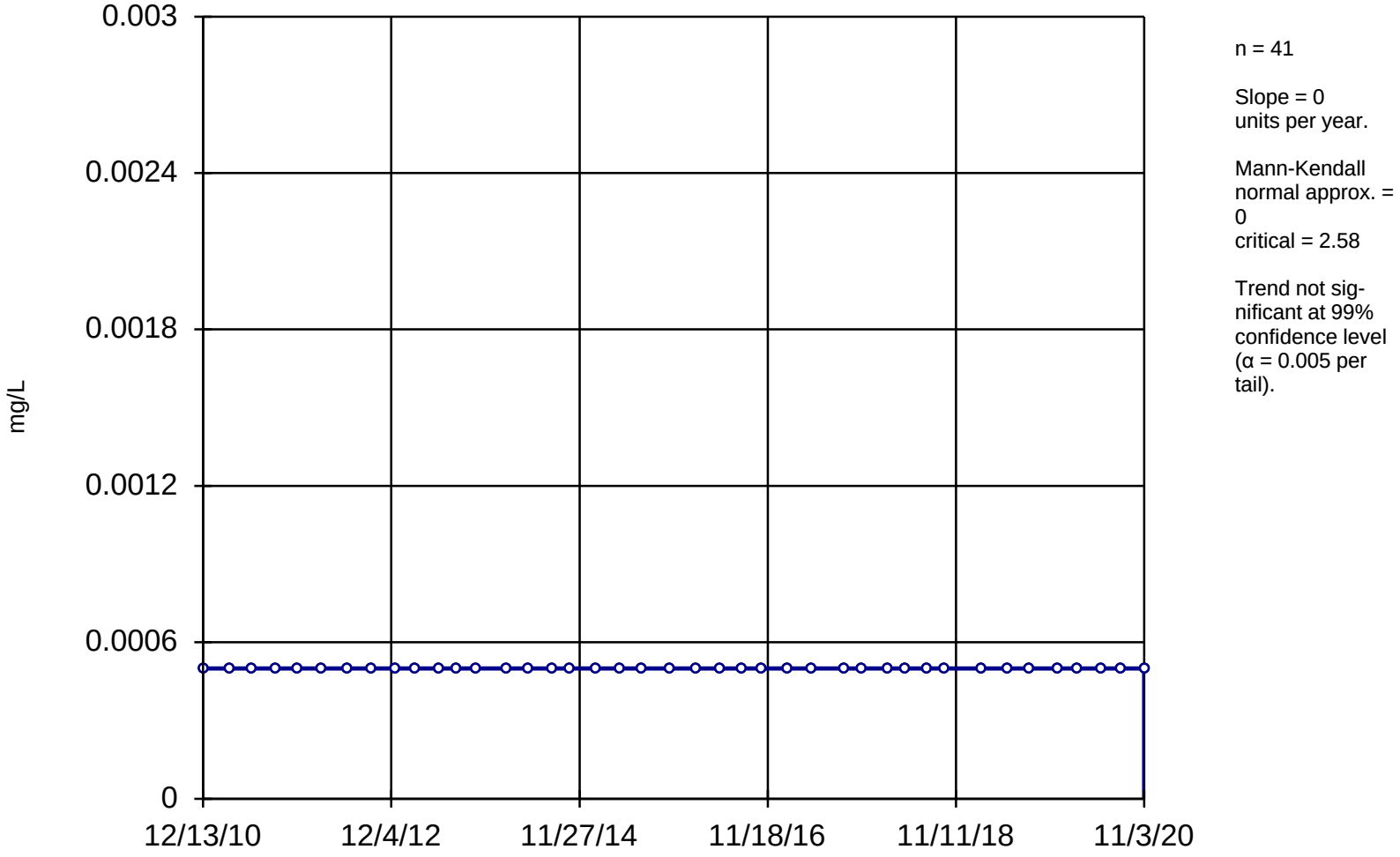
Constituent: Cadmium, Dissolved Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

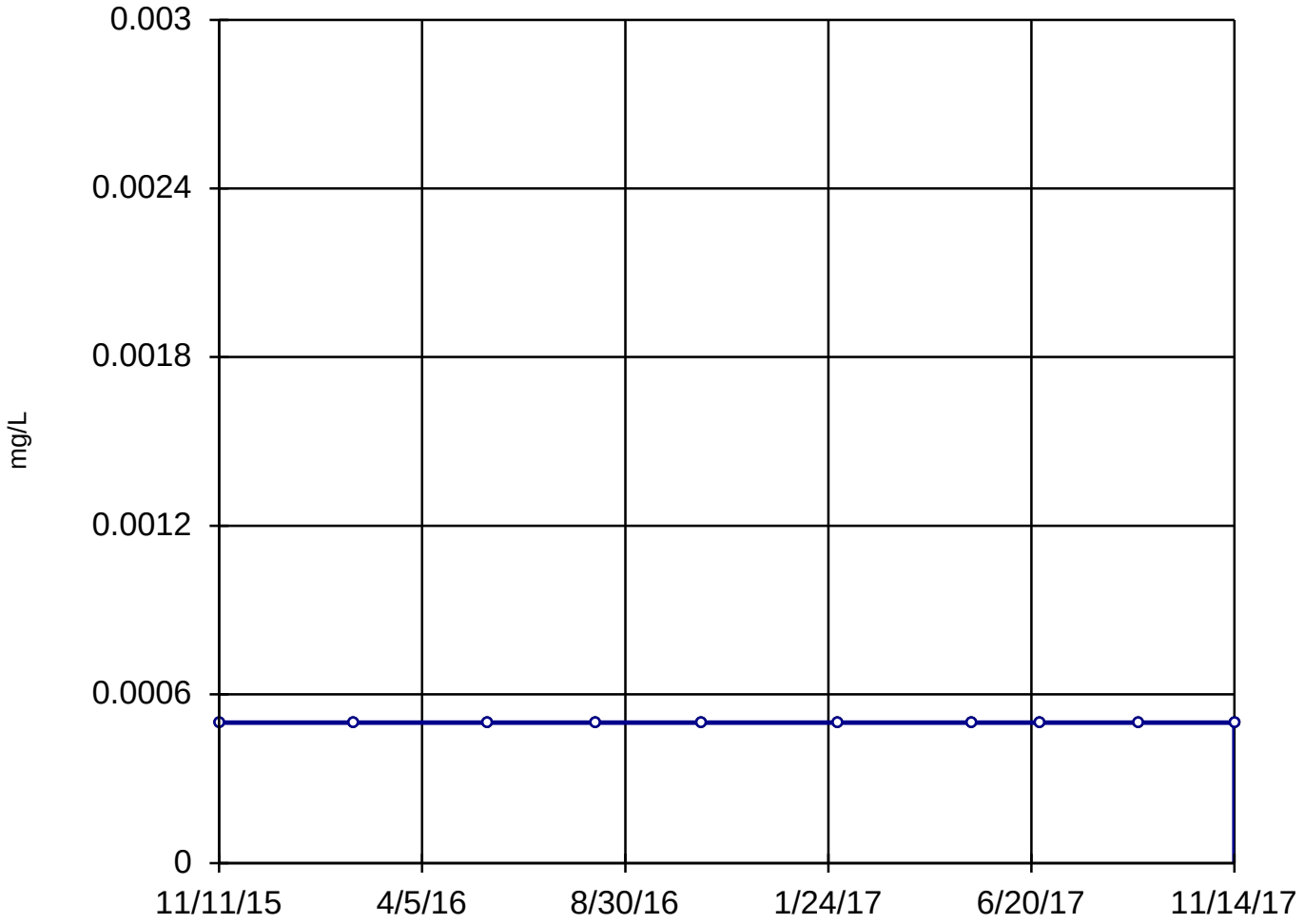
Constituent: Cadmium, Dissolved Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-09



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

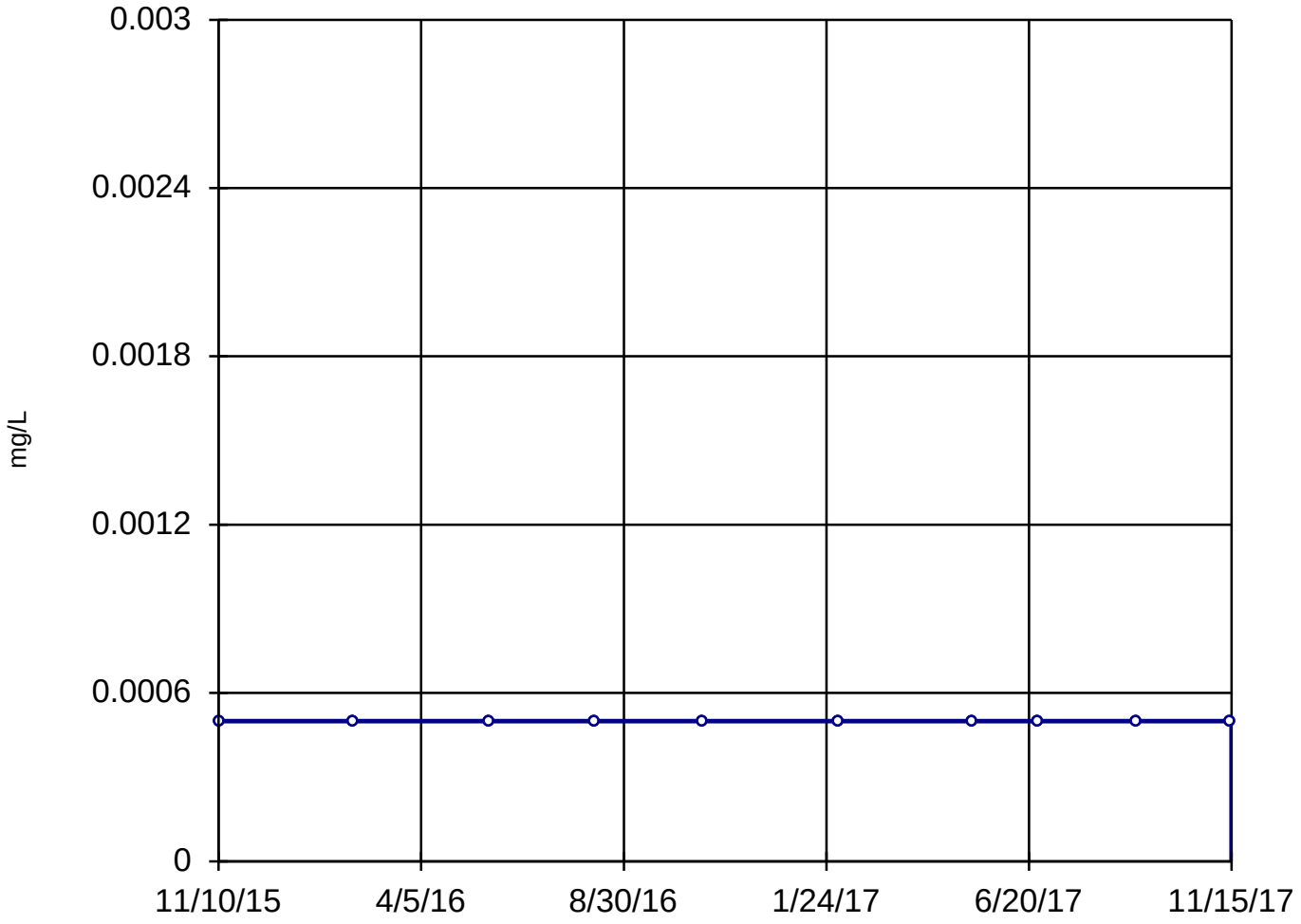
Constituent: Cadmium, Total Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

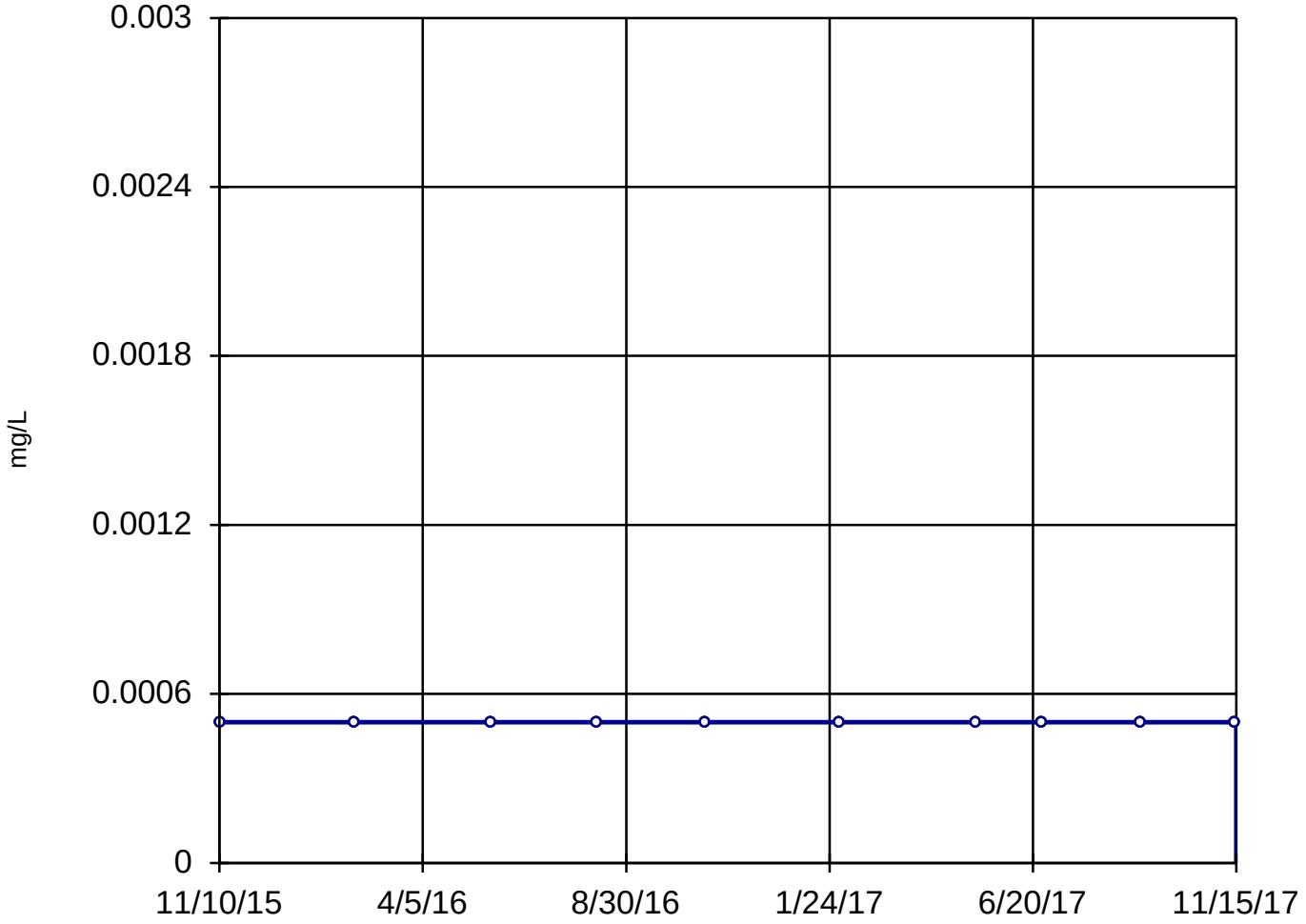
Constituent: Cadmium, Total Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-11



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

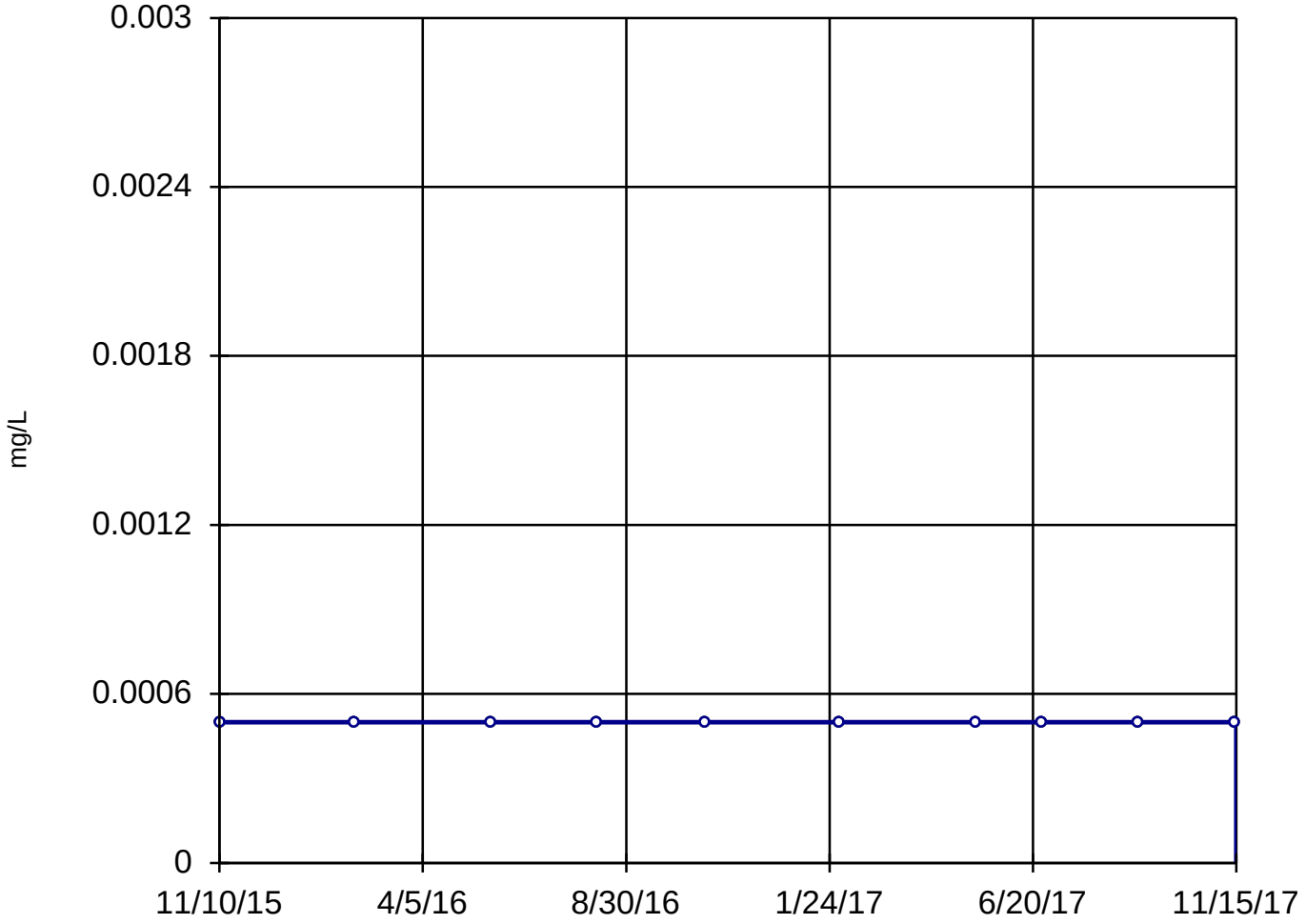
Constituent: Cadmium, Total Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-12



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

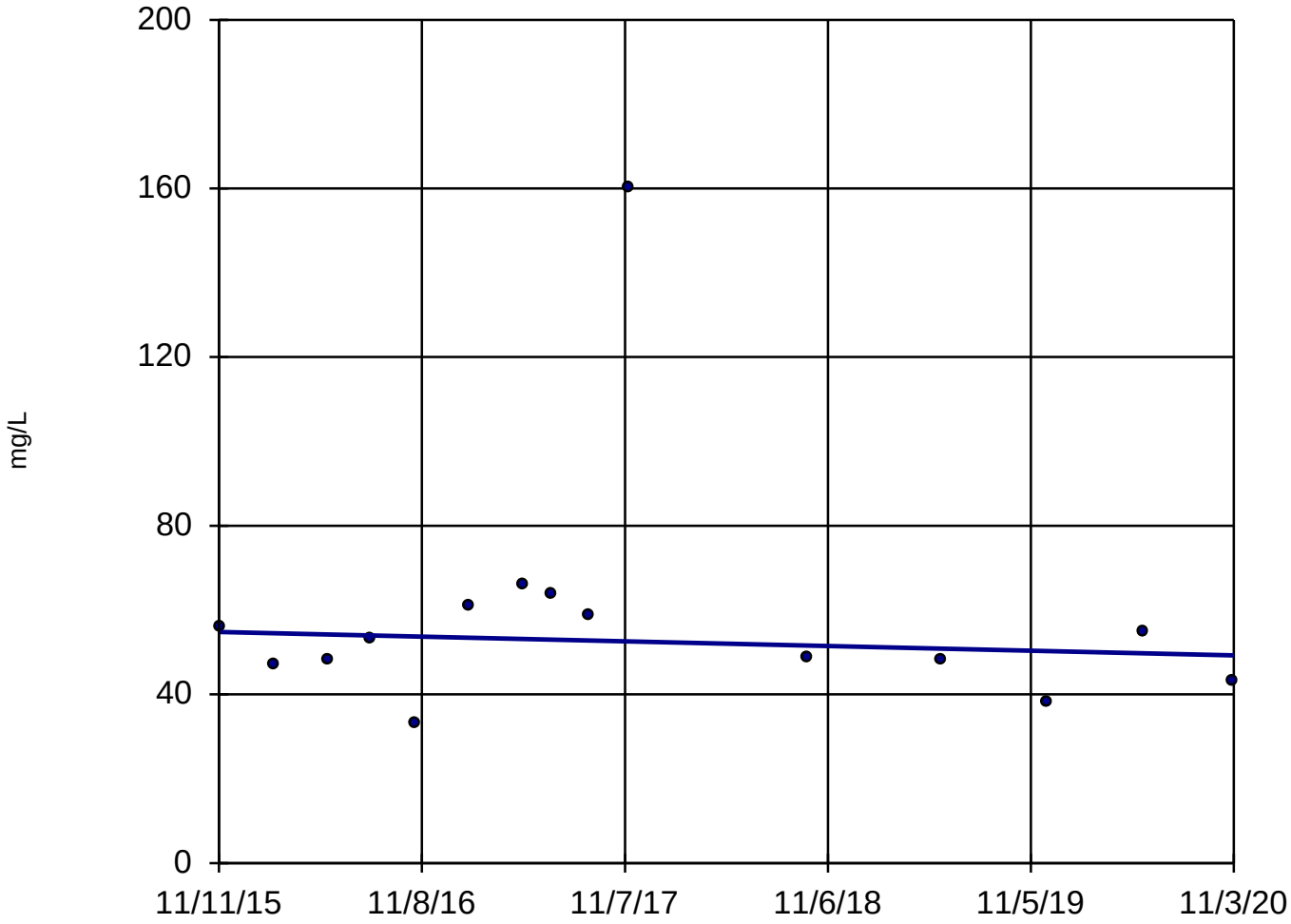
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Cadmium, Total Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-09



n = 15

Slope = -1.124 units per year.

Mann-Kendall statistic = -6
critical = -53

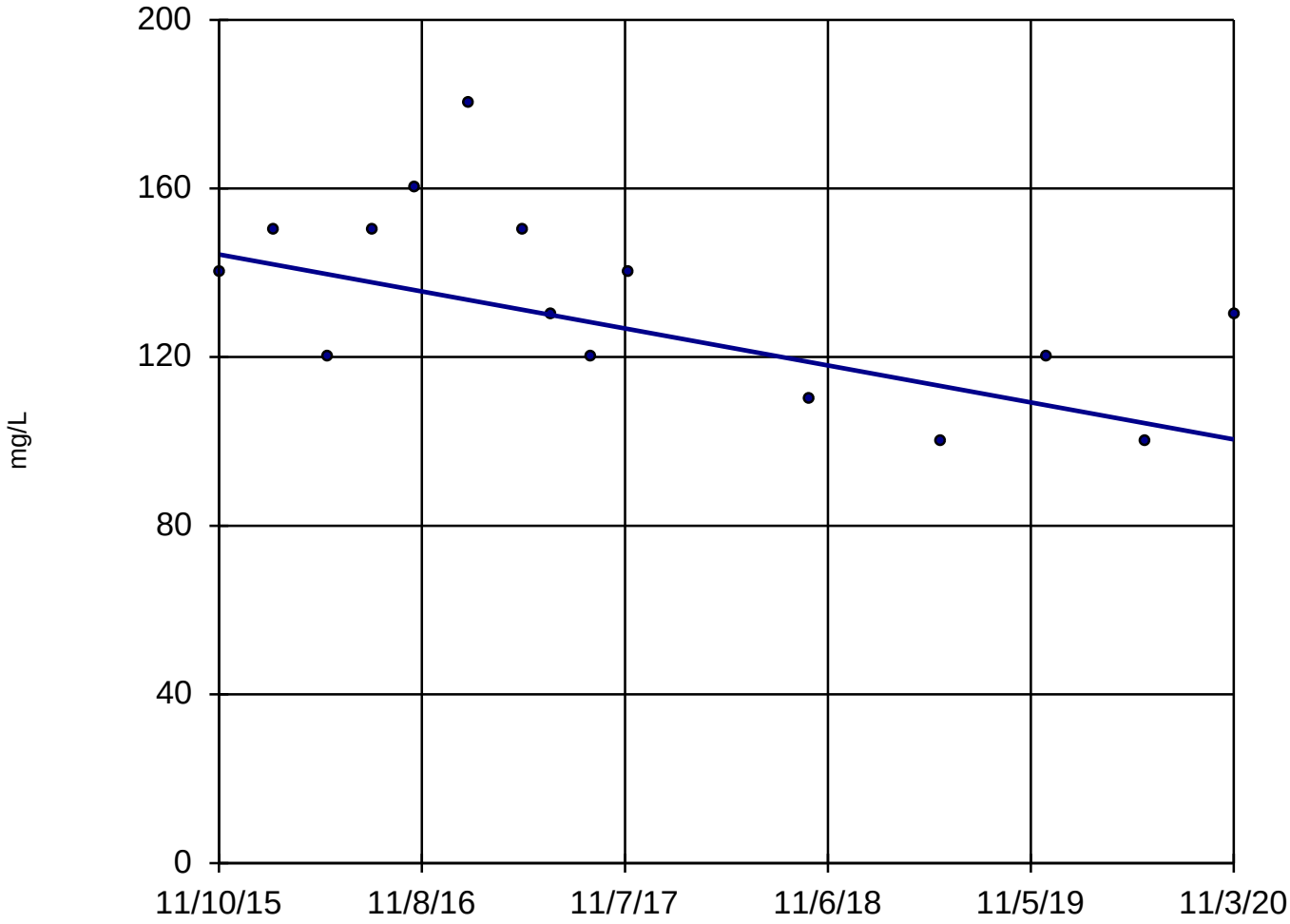
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Calcium, Total Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-10



n = 15

Slope = -8.795 units per year.

Mann-Kendall statistic = -44
critical = -53

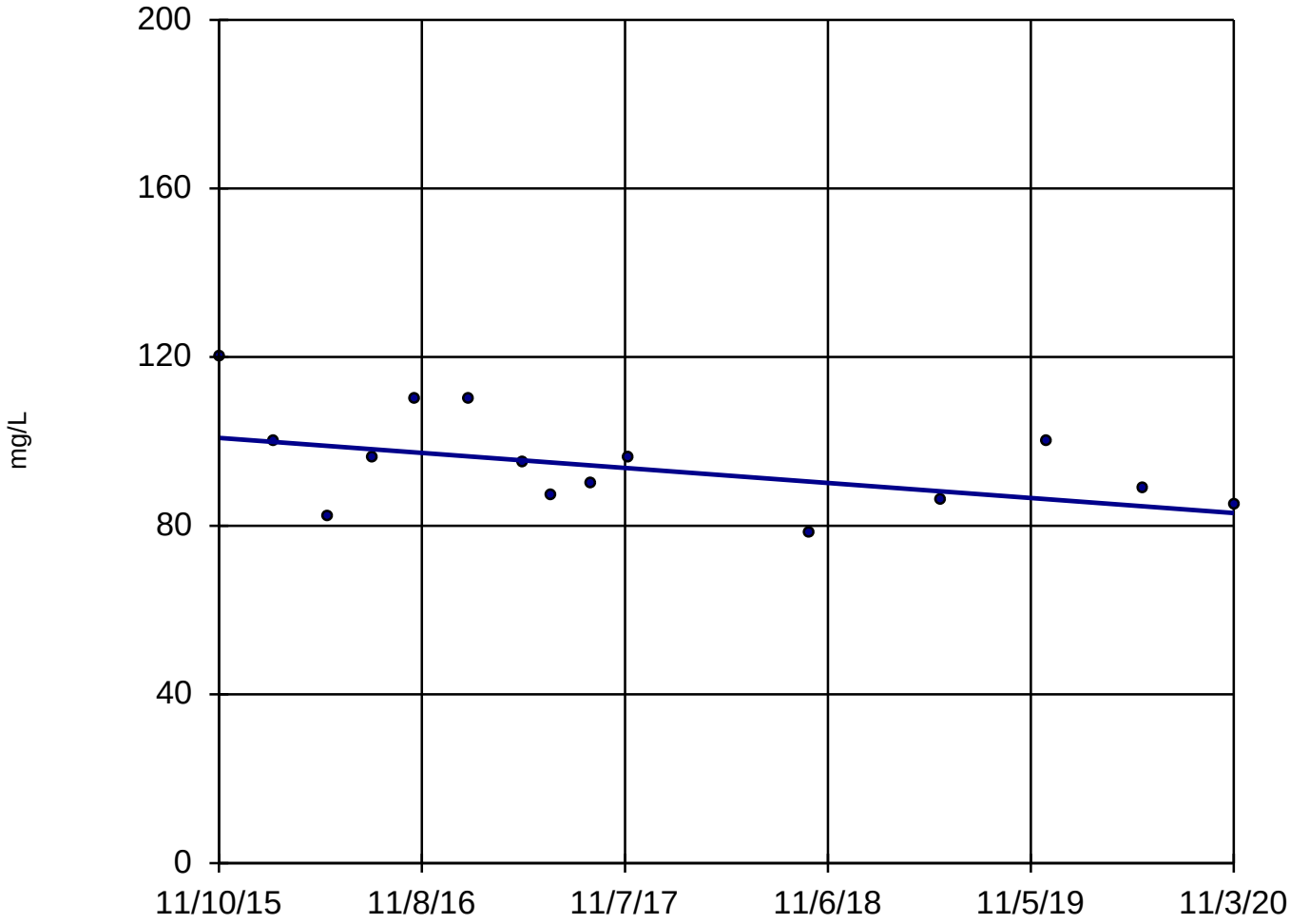
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Calcium, Total Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-11



n = 15

Slope = -3.571 units per year.

Mann-Kendall statistic = -40
critical = -53

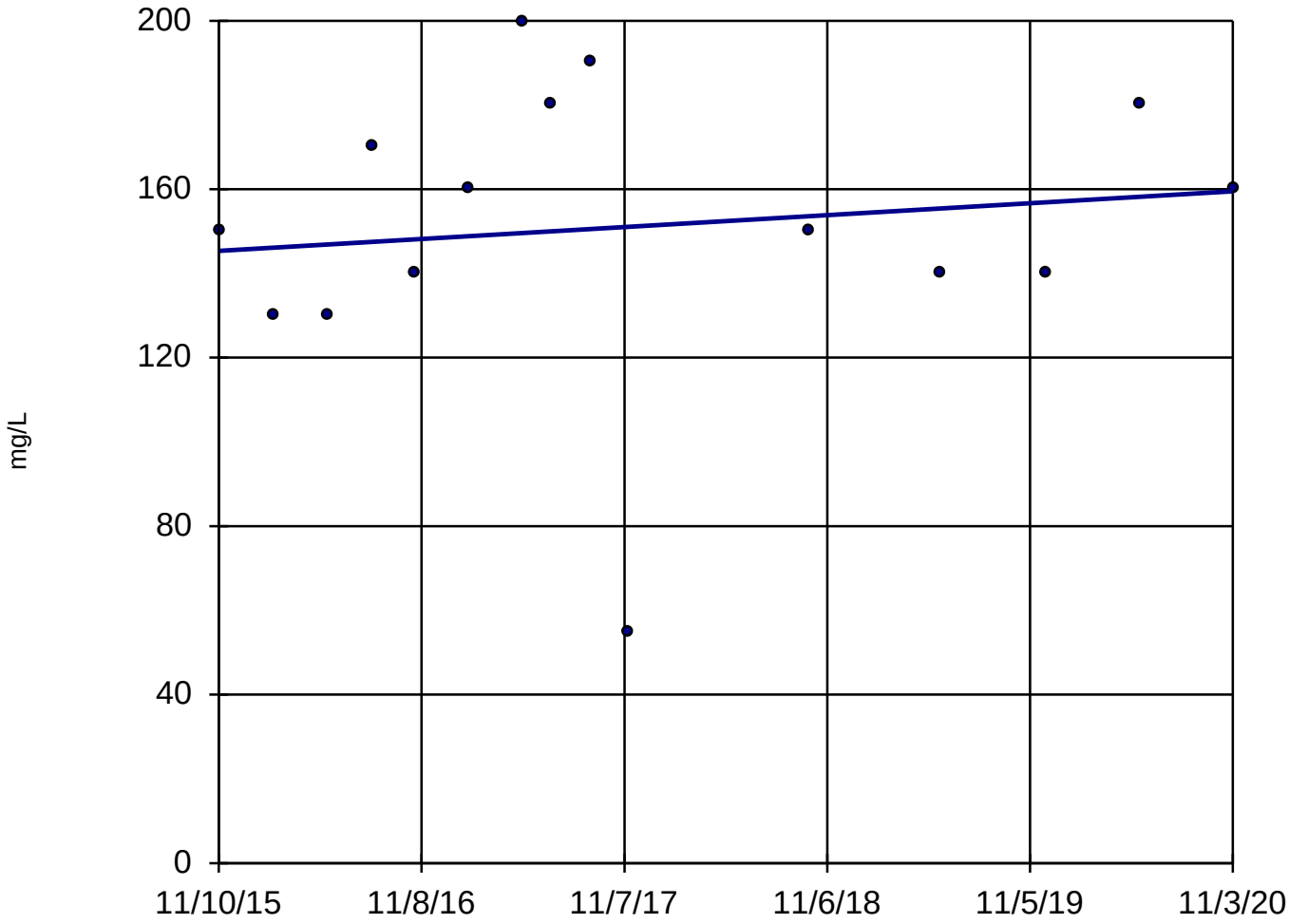
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Calcium, Total Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-12



n = 15

Slope = 2.832 units per year.

Mann-Kendall statistic = 14
critical = 53

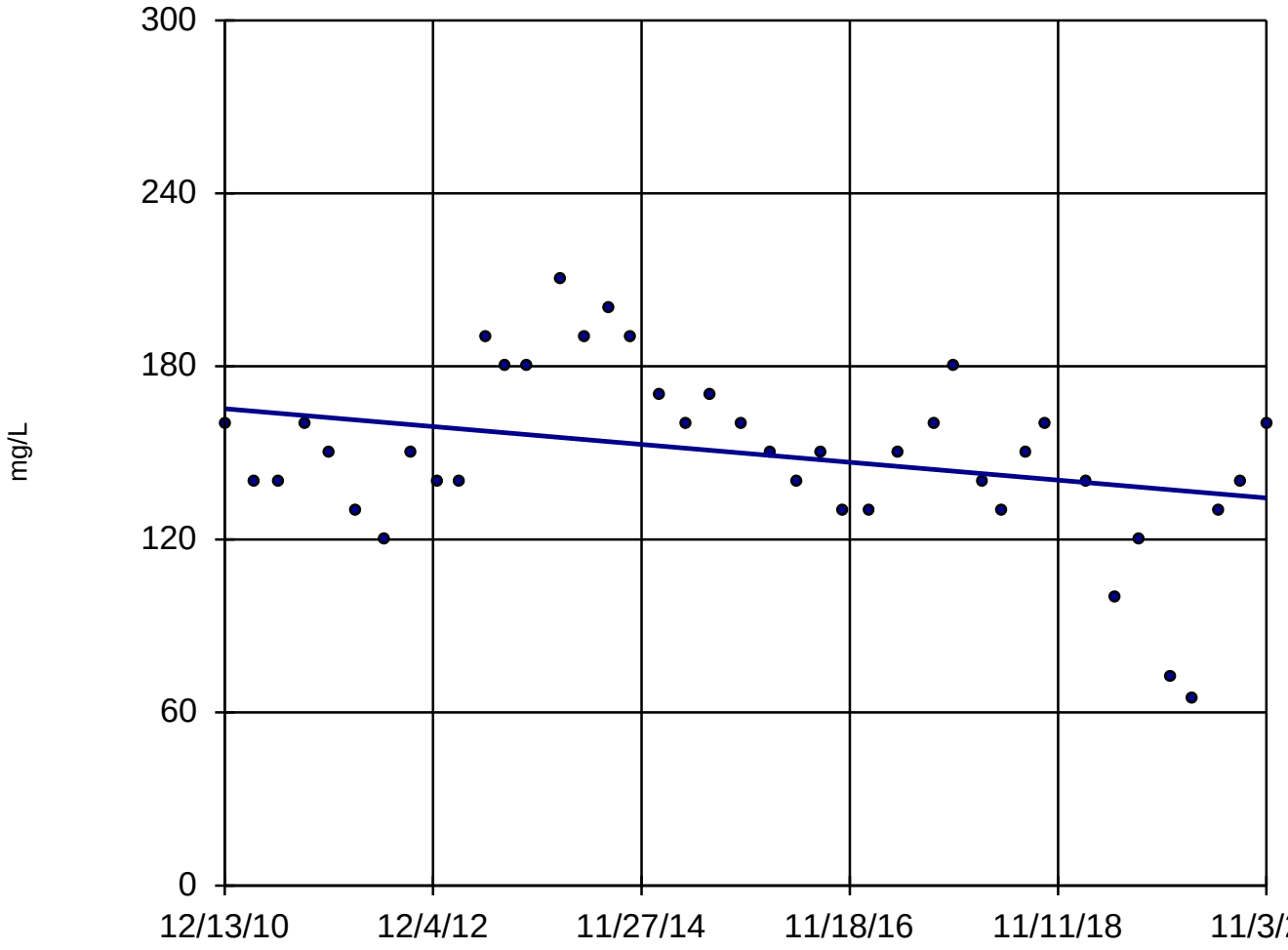
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Calcium, Total Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-07



n = 41

Slope = -3.132 units per year.

Mann-Kendall normal approx. = -2.259
critical = -2.58

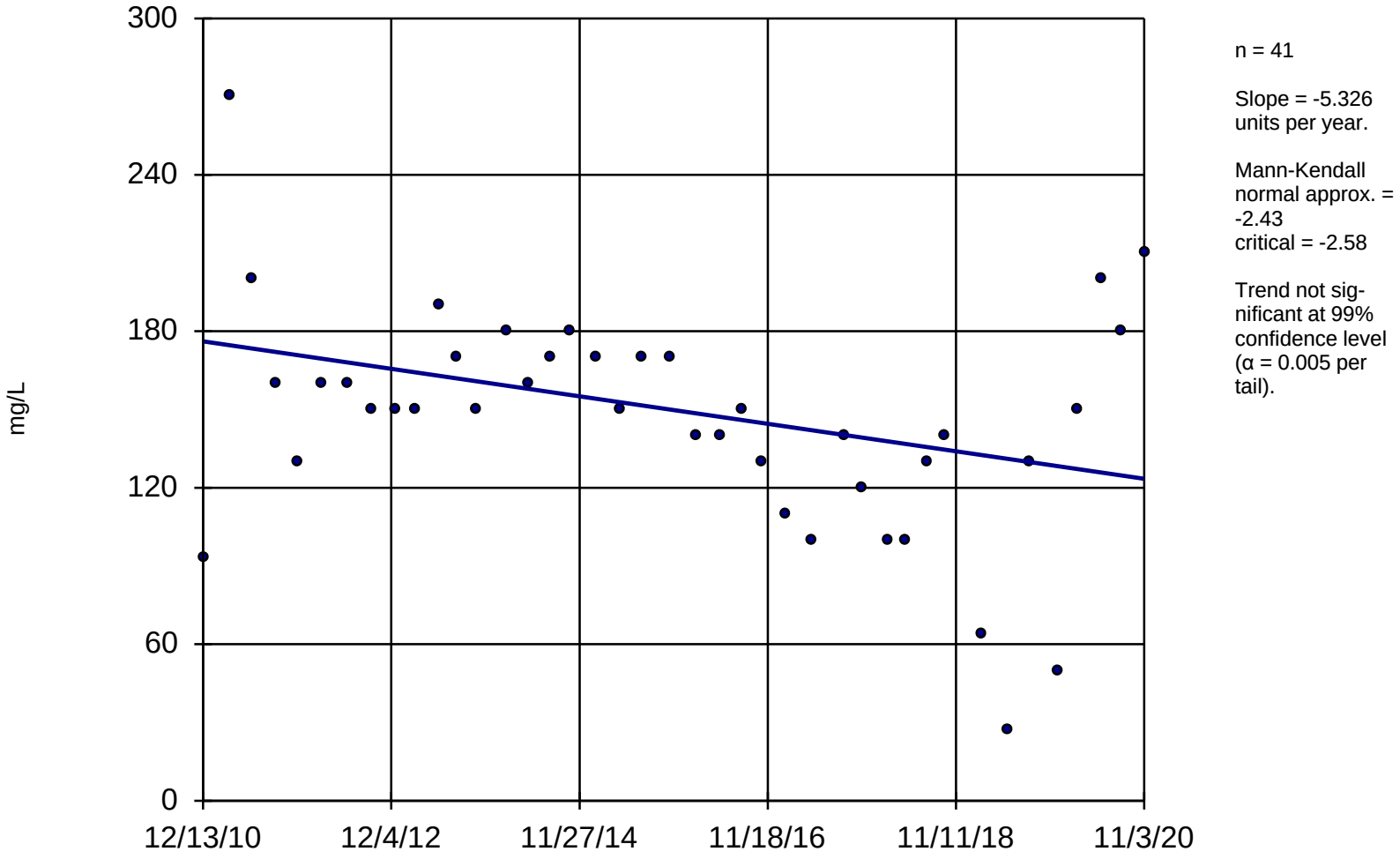
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-08



n = 41

Slope = -5.326 units per year.

Mann-Kendall normal approx. = -2.43
critical = -2.58

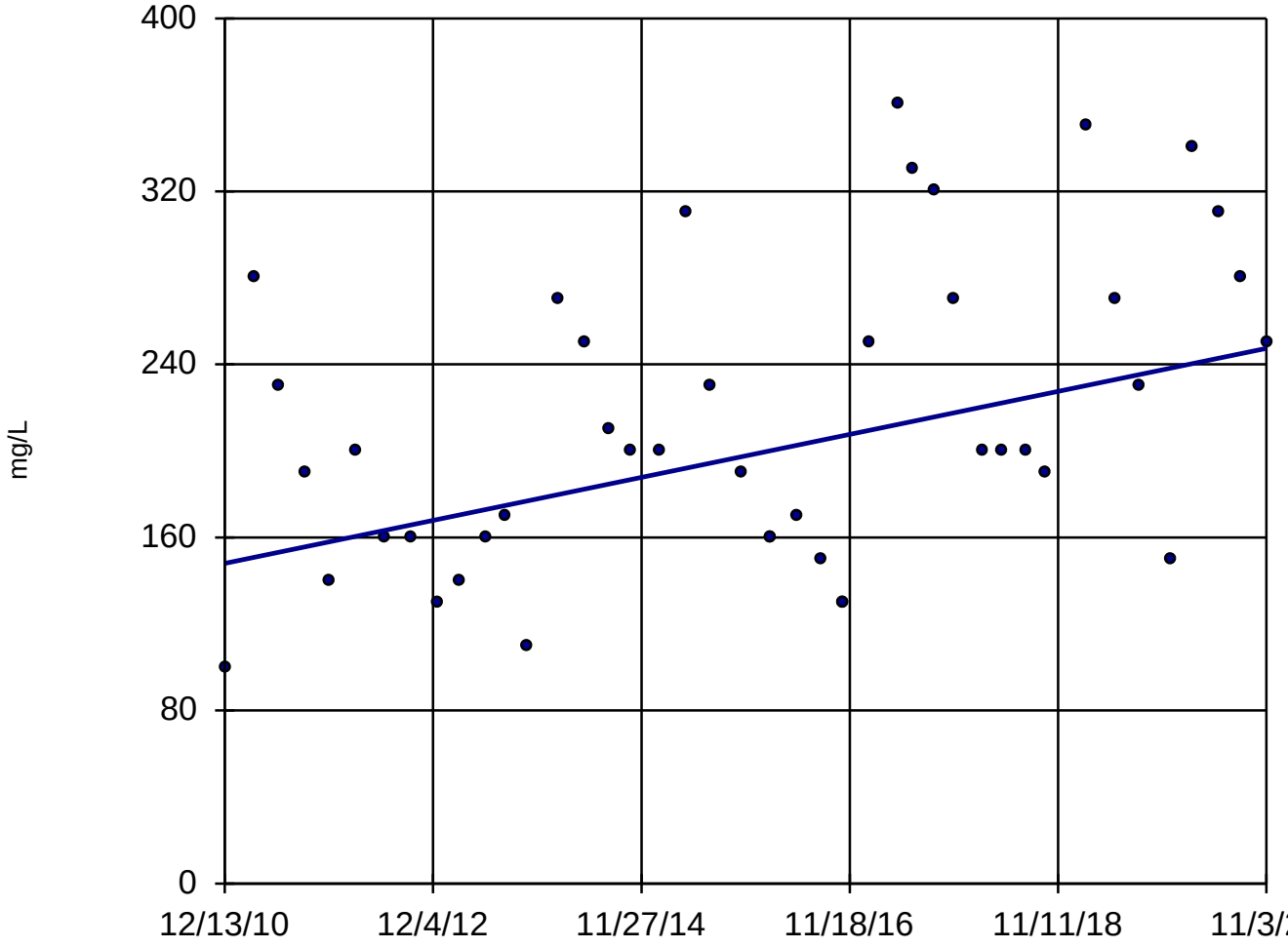
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-09



n = 44

Slope = 10.04 units per year.

Mann-Kendall normal approx. = 2.639
critical = 2.58

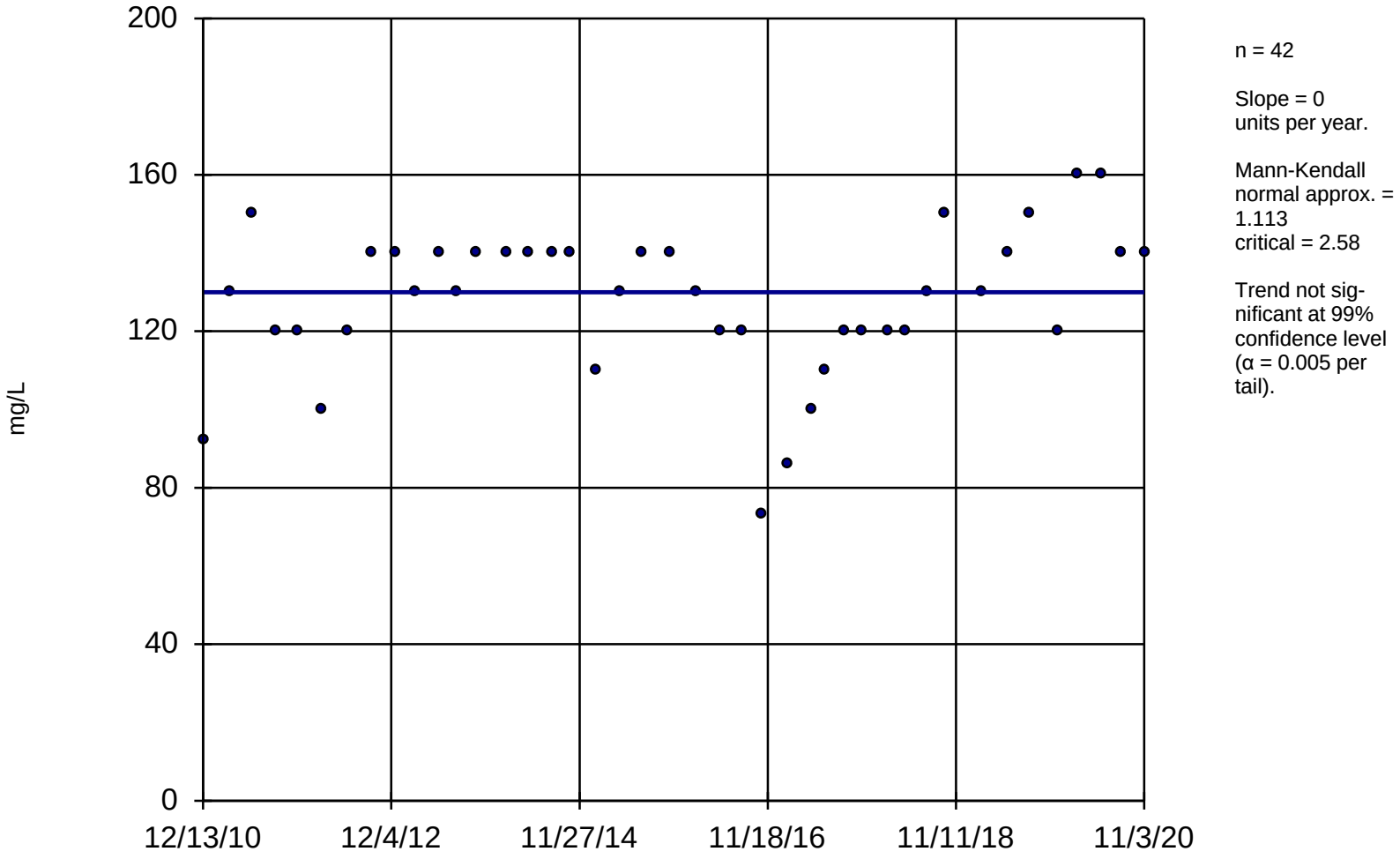
Increasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-10



n = 42

Slope = 0
units per year.

Mann-Kendall
normal approx. =
1.113
critical = 2.58

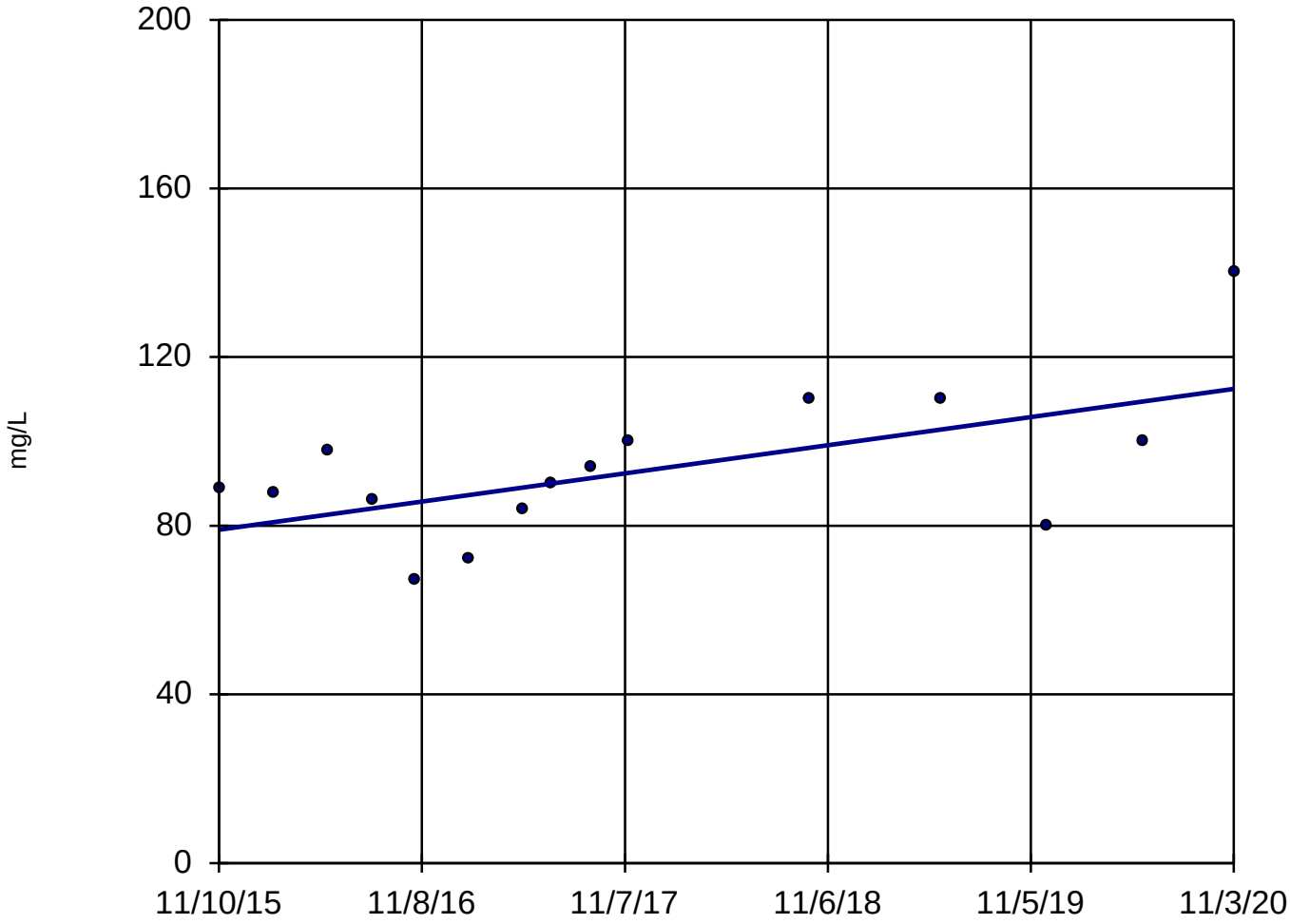
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Chloride Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-11



n = 15

Slope = 6.703 units per year.

Mann-Kendall statistic = 43
critical = 53

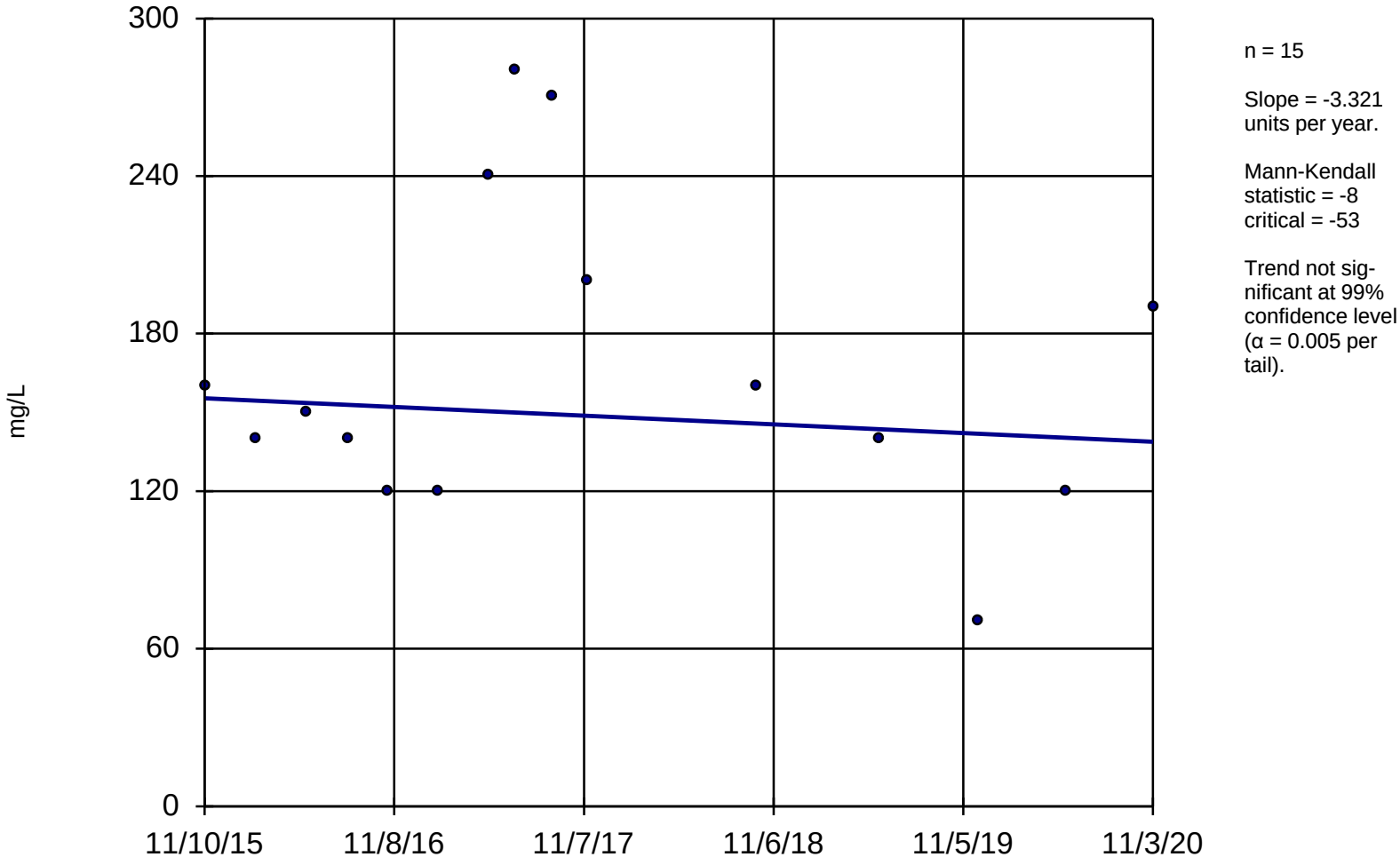
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-12



n = 15

Slope = -3.321 units per year.

Mann-Kendall statistic = -8
critical = -53

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

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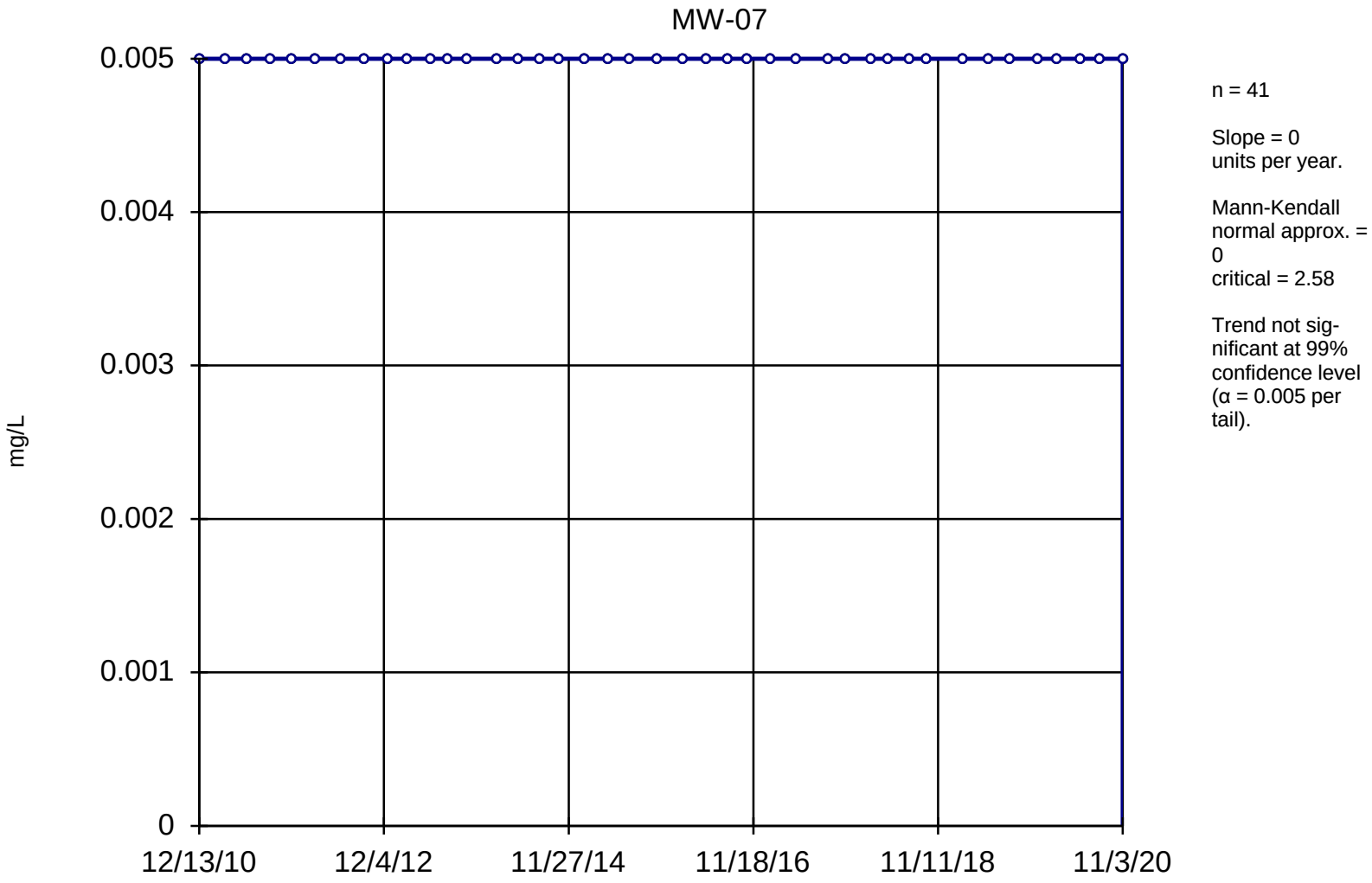
Hollow symbols indicate censored values.

Sen's Slope Estimator

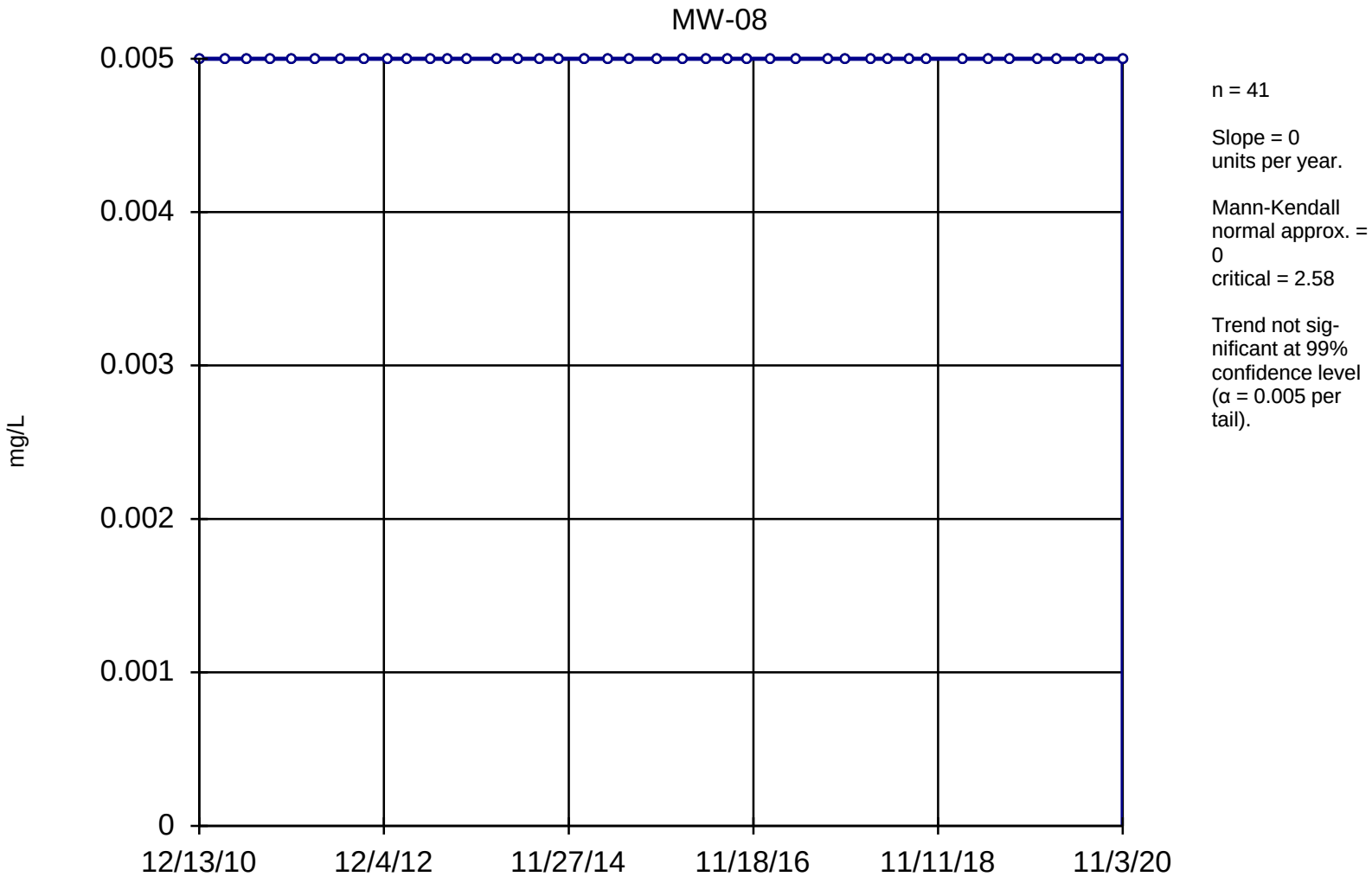


Constituent: Chromium, Dissolved Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

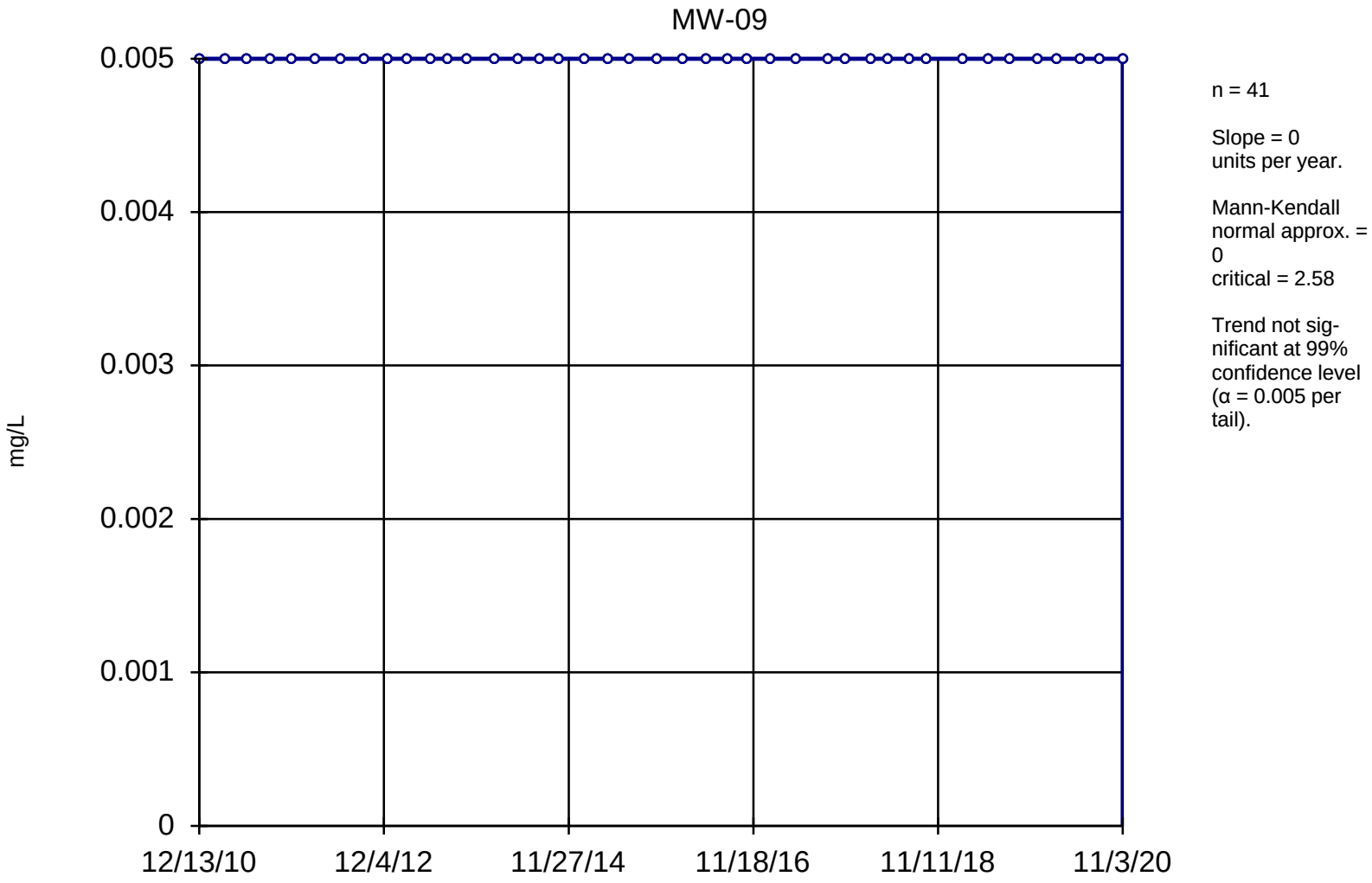


Constituent: Chromium, Dissolved Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

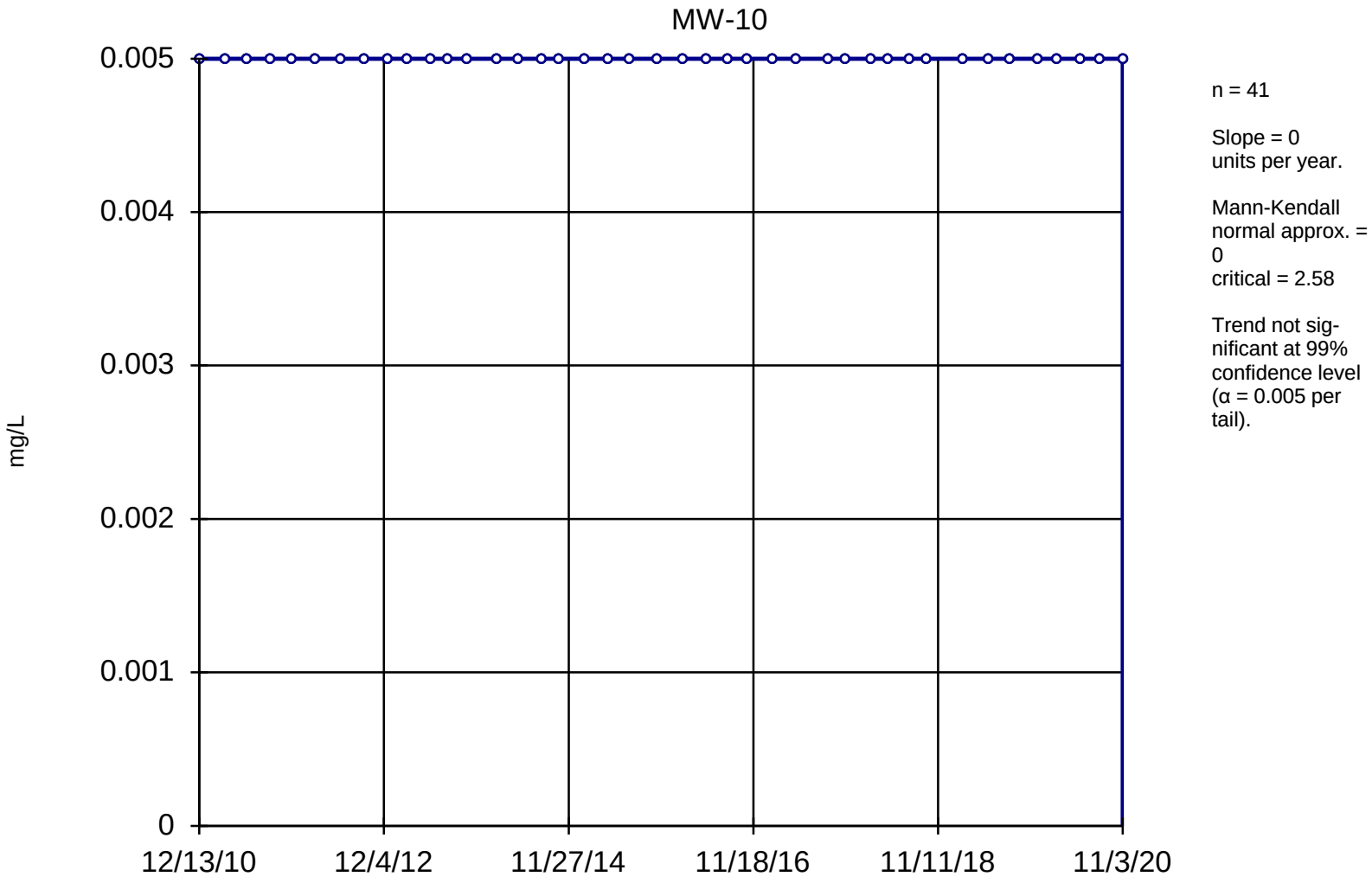


Constituent: Chromium, Dissolved Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

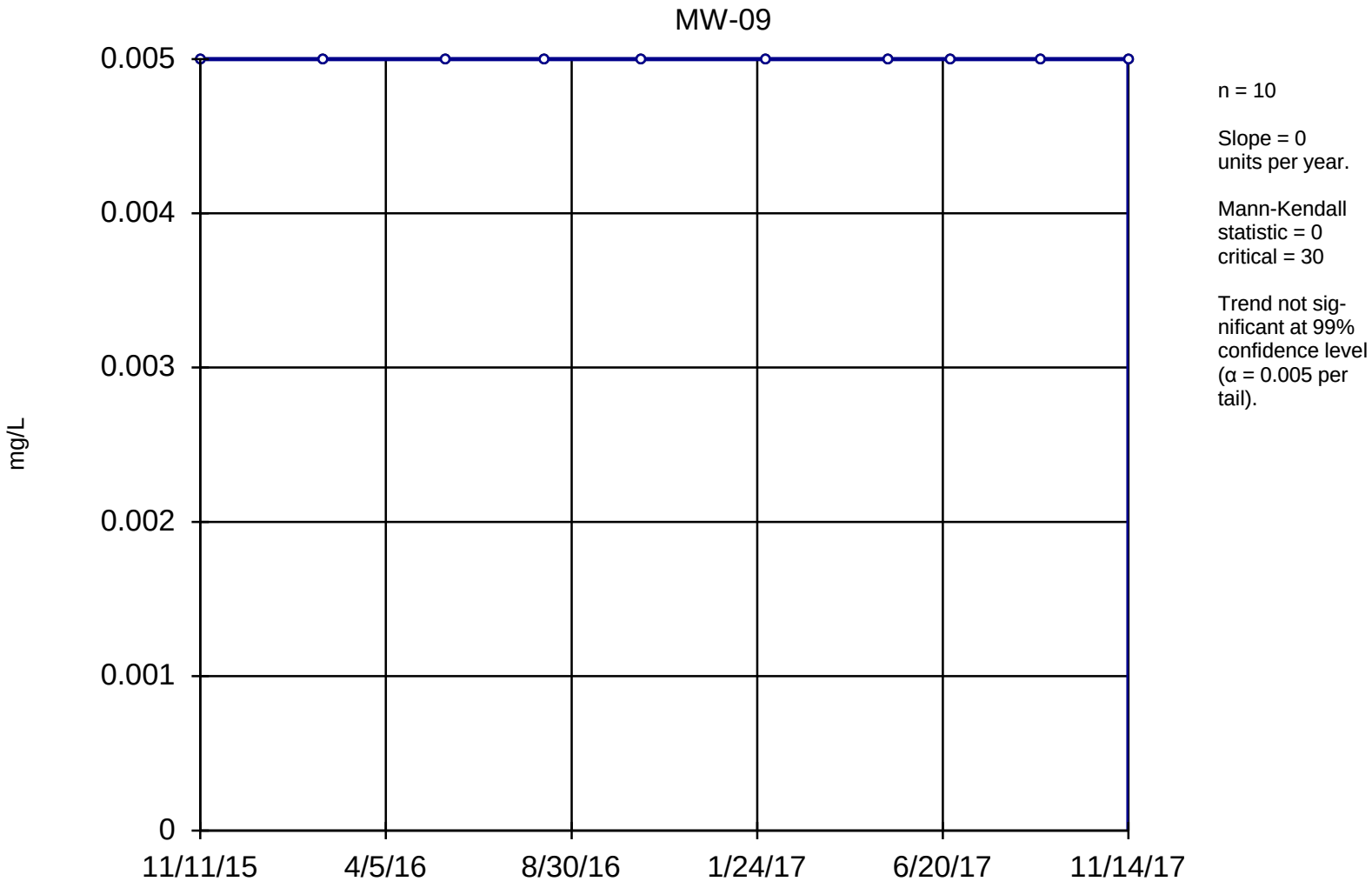


Constituent: Chromium, Dissolved Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

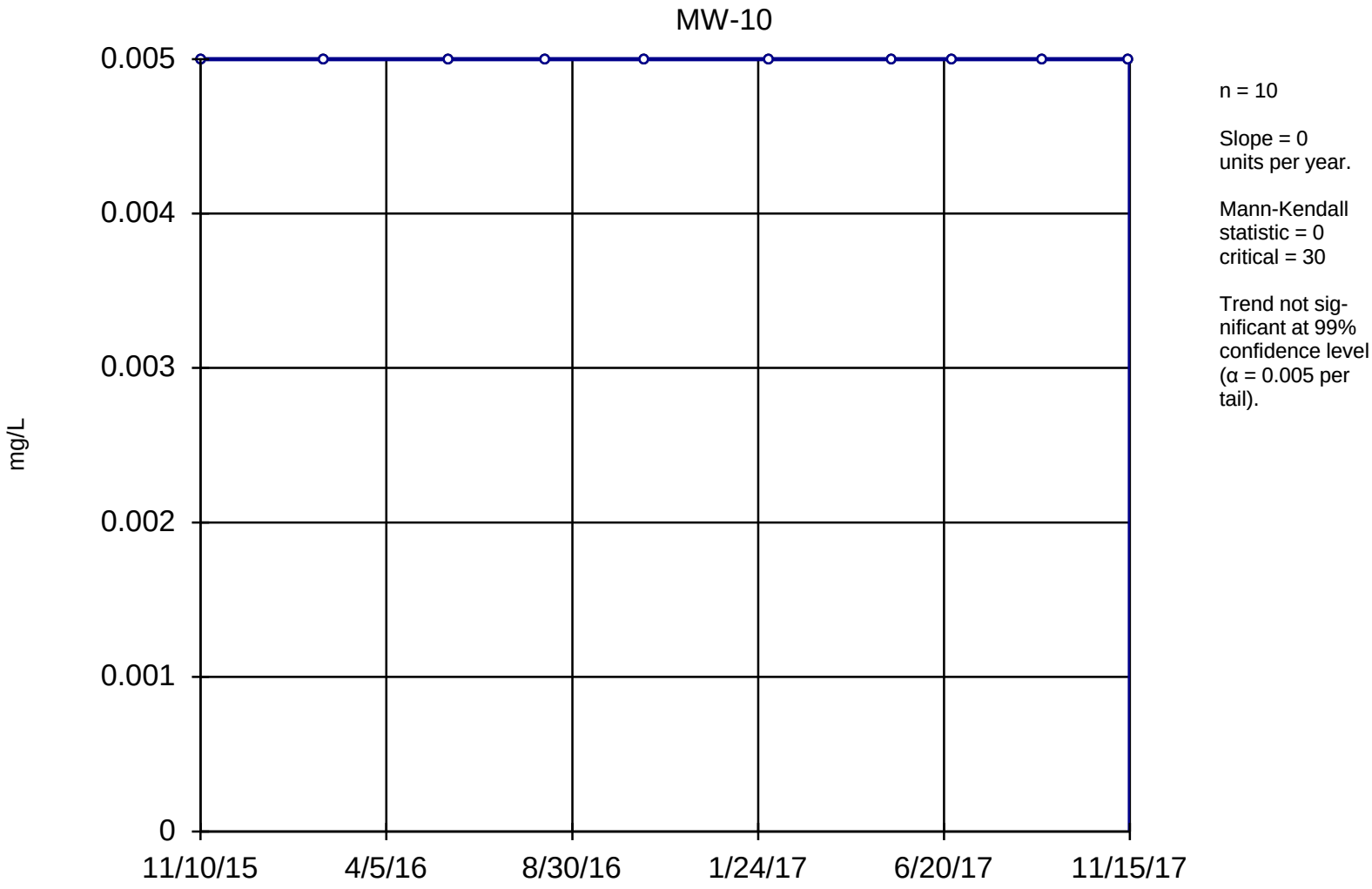


Constituent: Chromium, Total Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

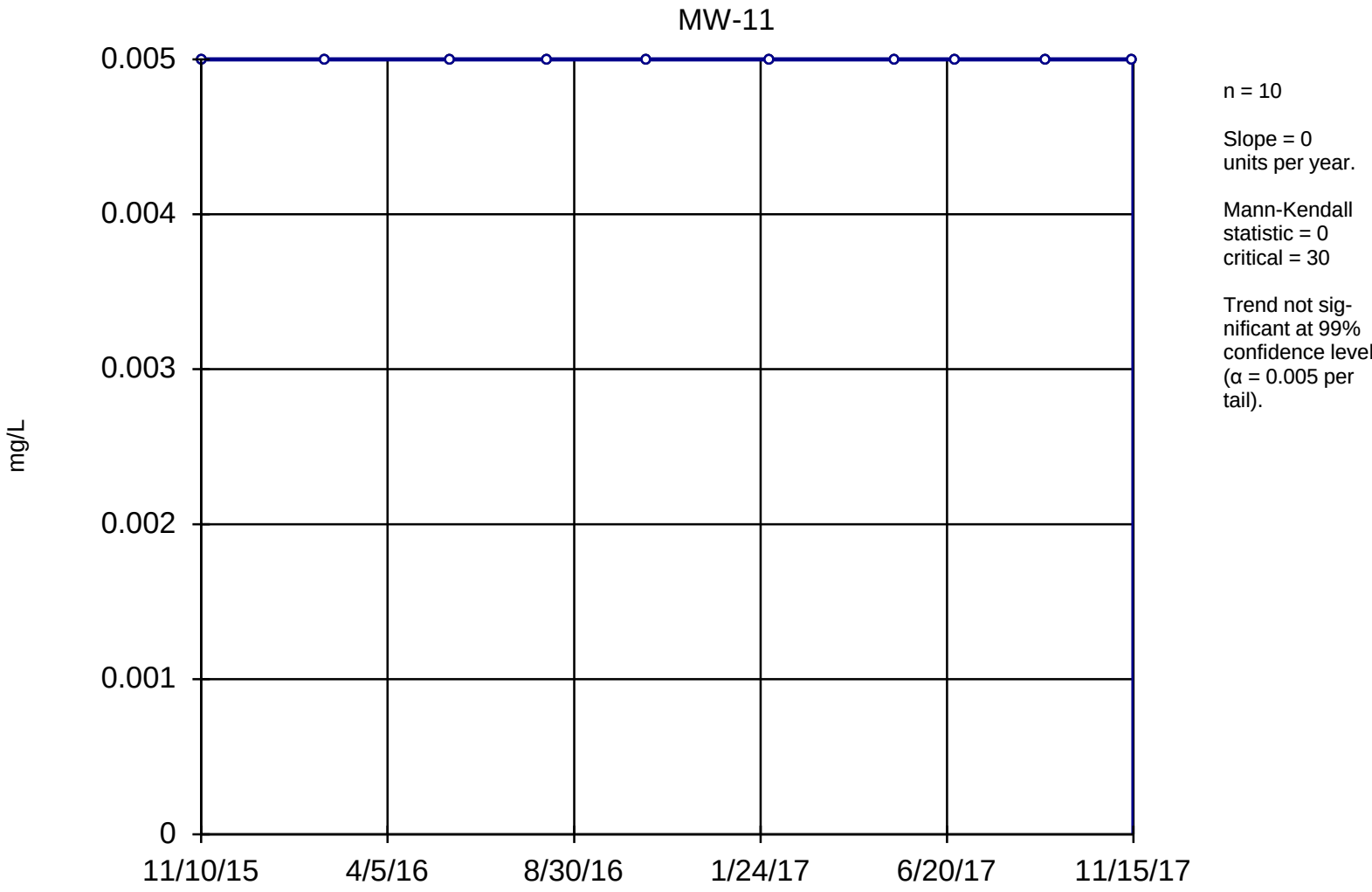


Constituent: Chromium, Total Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator



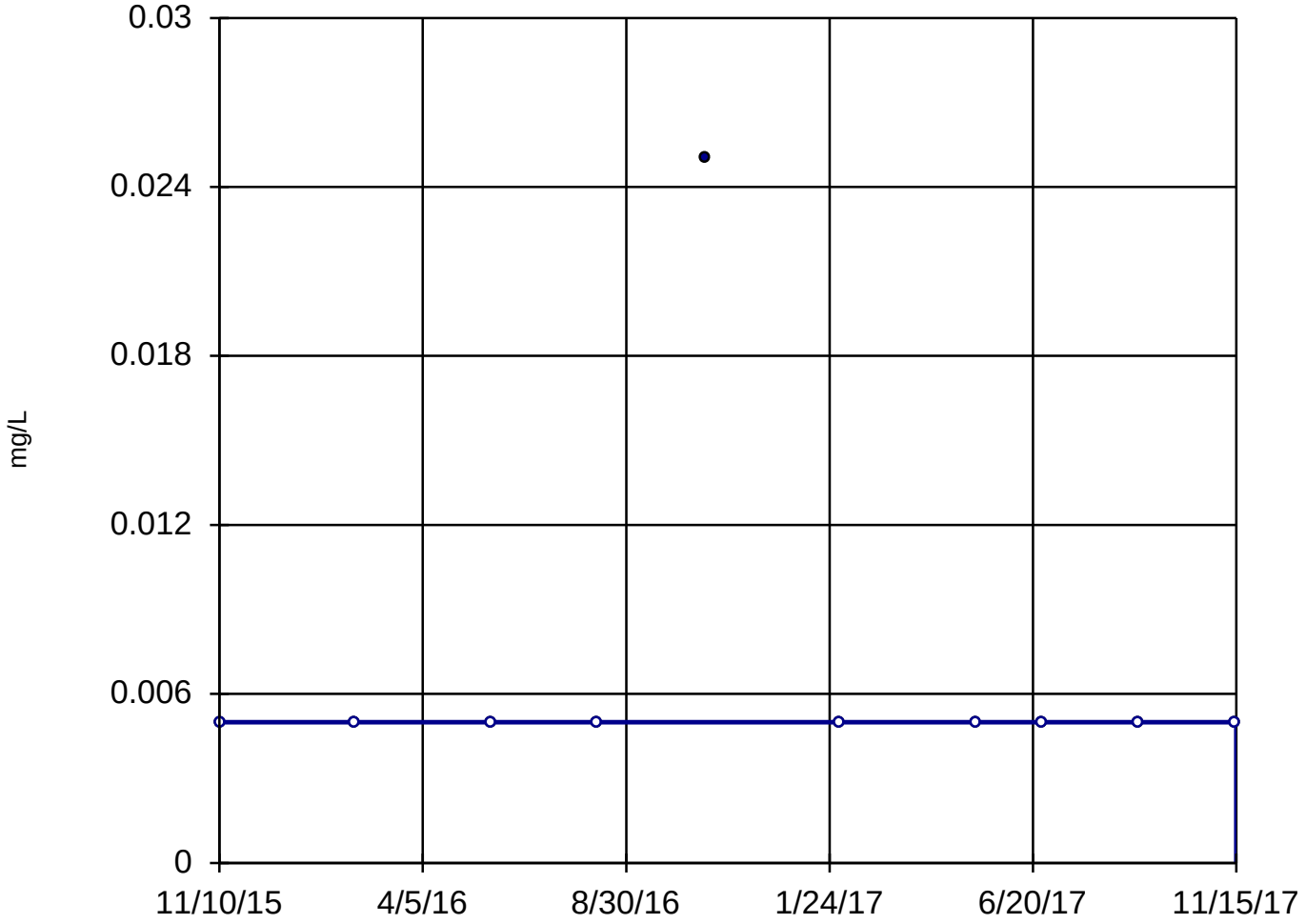
Constituent: Chromium, Total Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-12



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = -1
critical = -30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

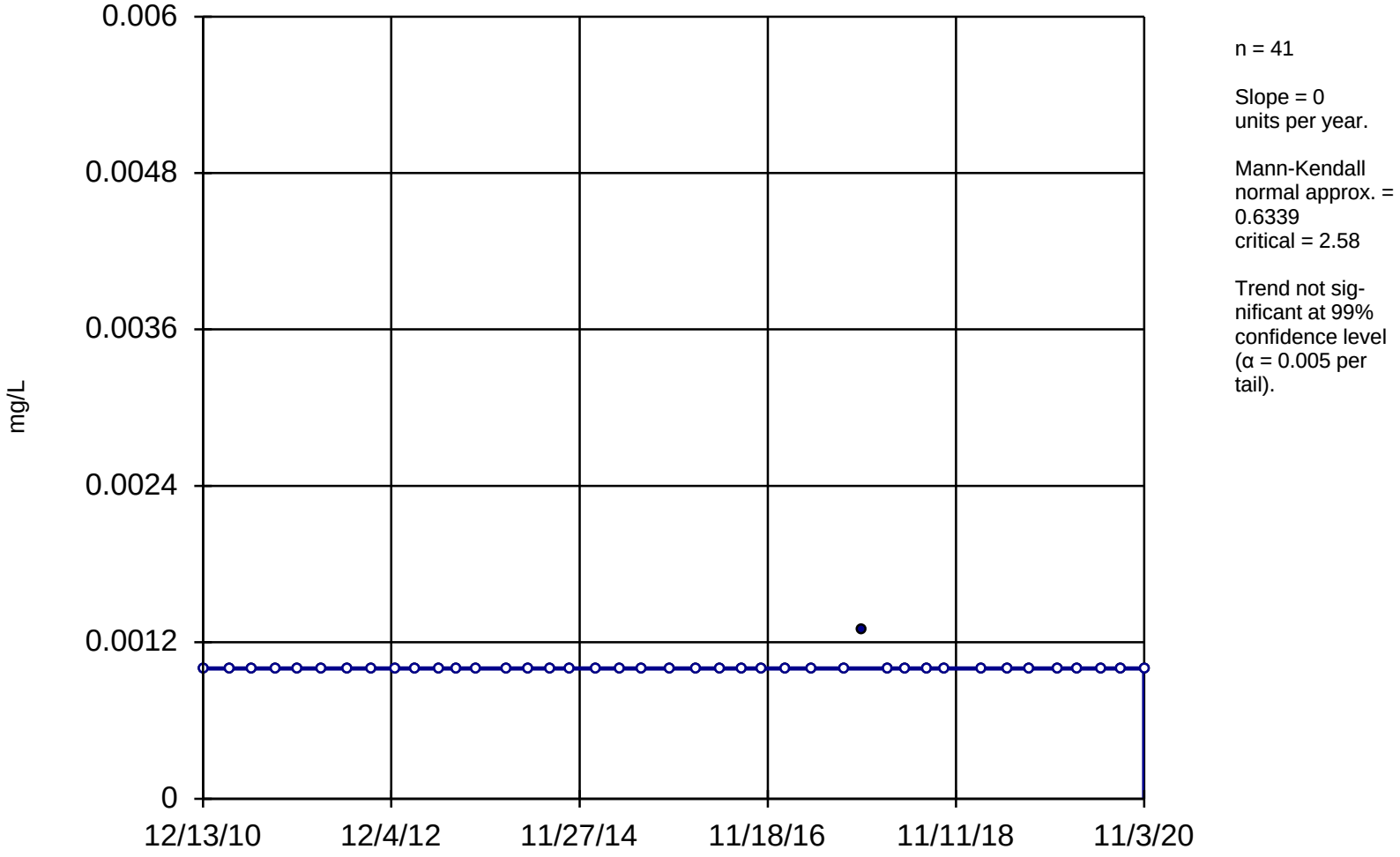
Constituent: Chromium, Total Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-07



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0.6339
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

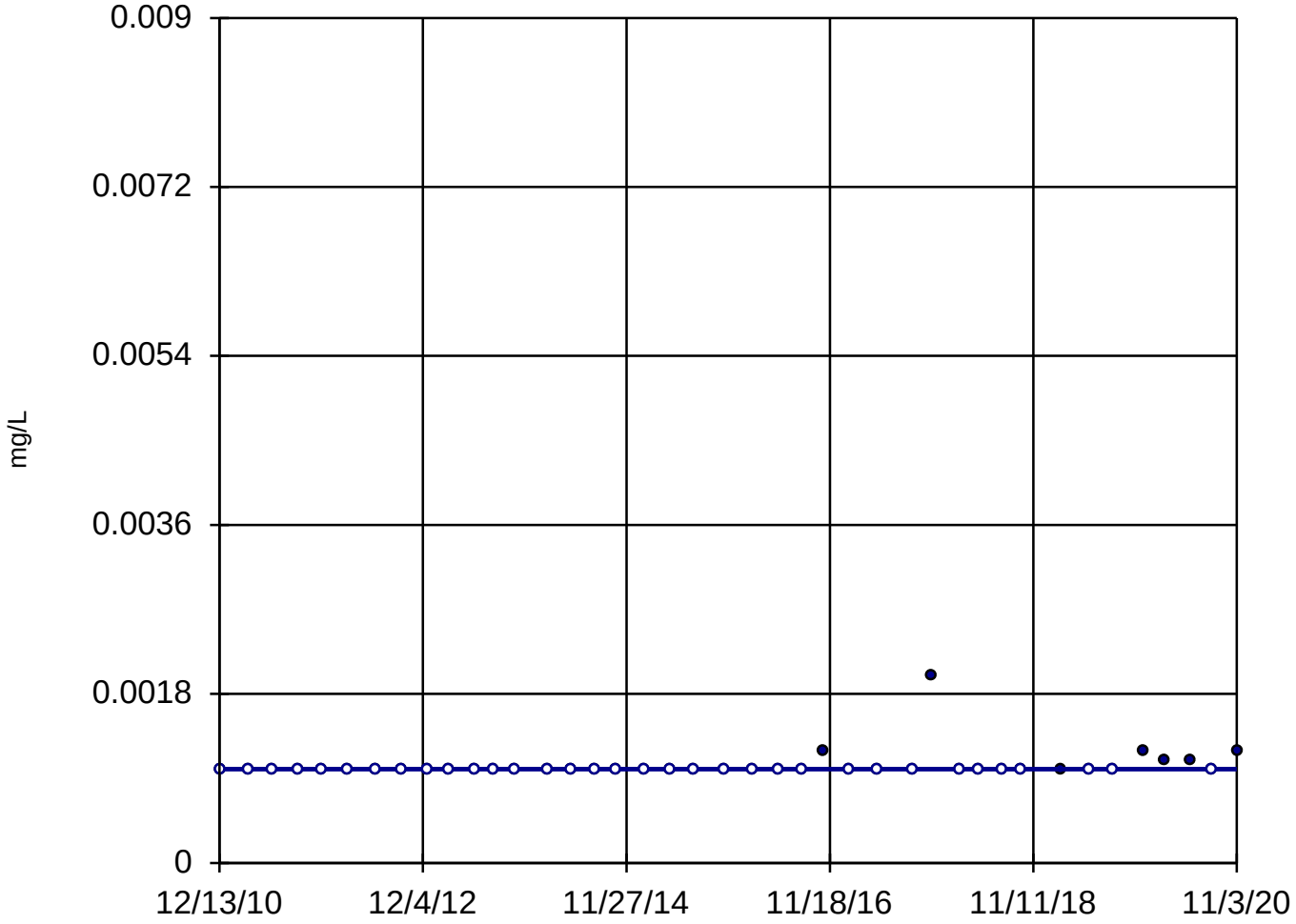
Constituent: Cobalt, Dissolved Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
2.939
critical = 2.58

Increasing trend
significant at 99%
confidence level
(α = 0.005 per
tail).

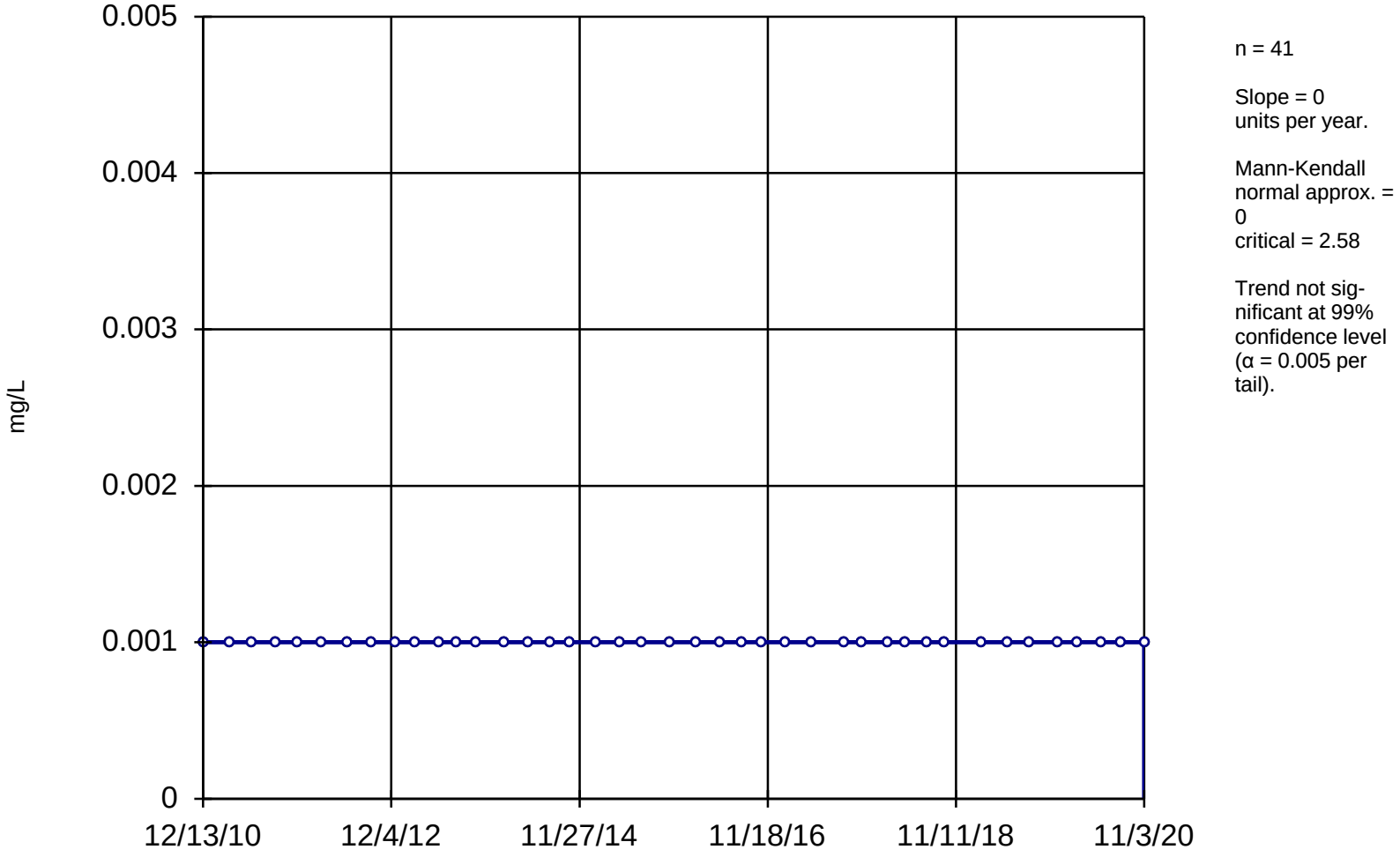
Constituent: Cobalt, Dissolved Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-09



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

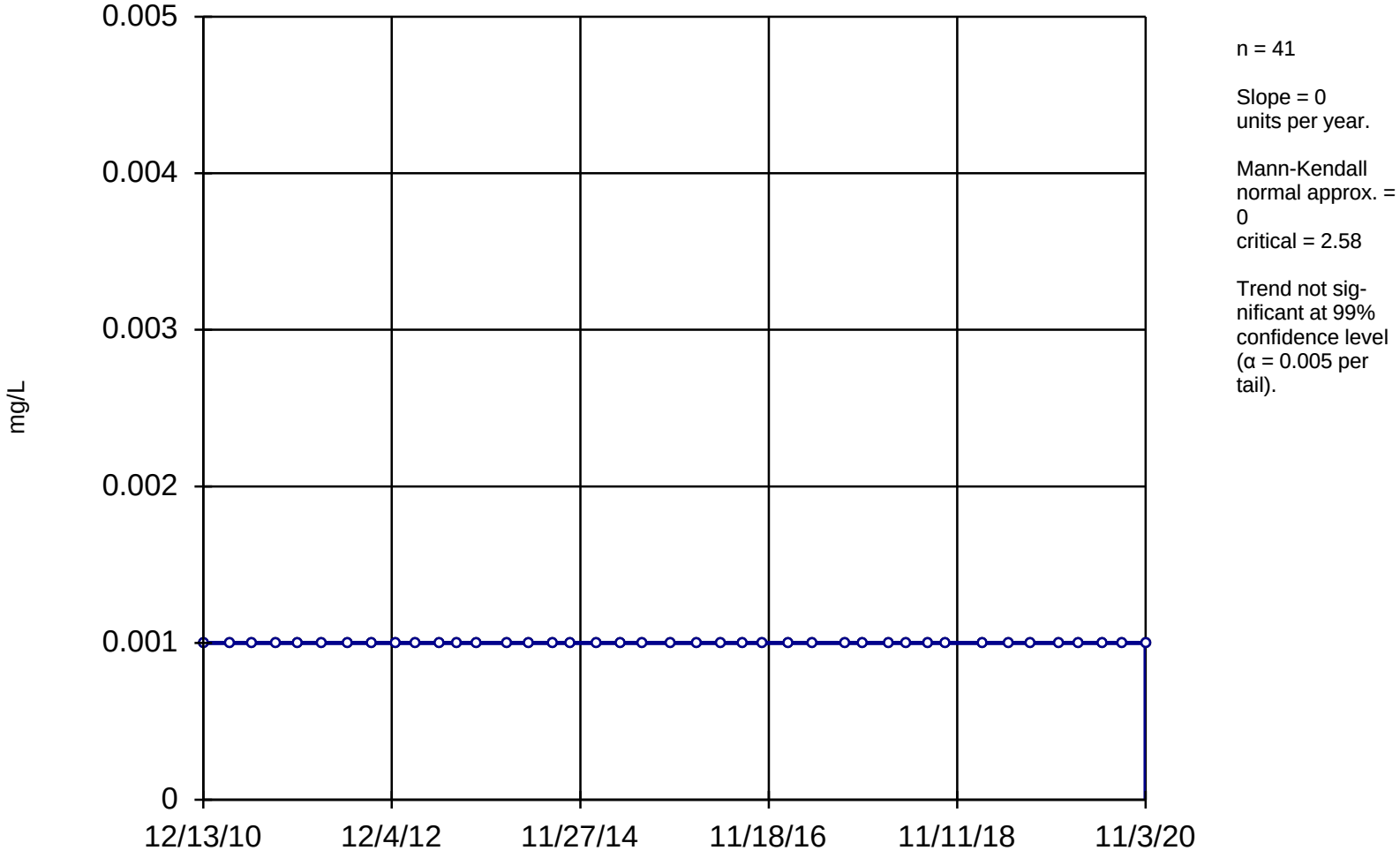
Constituent: Cobalt, Dissolved Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

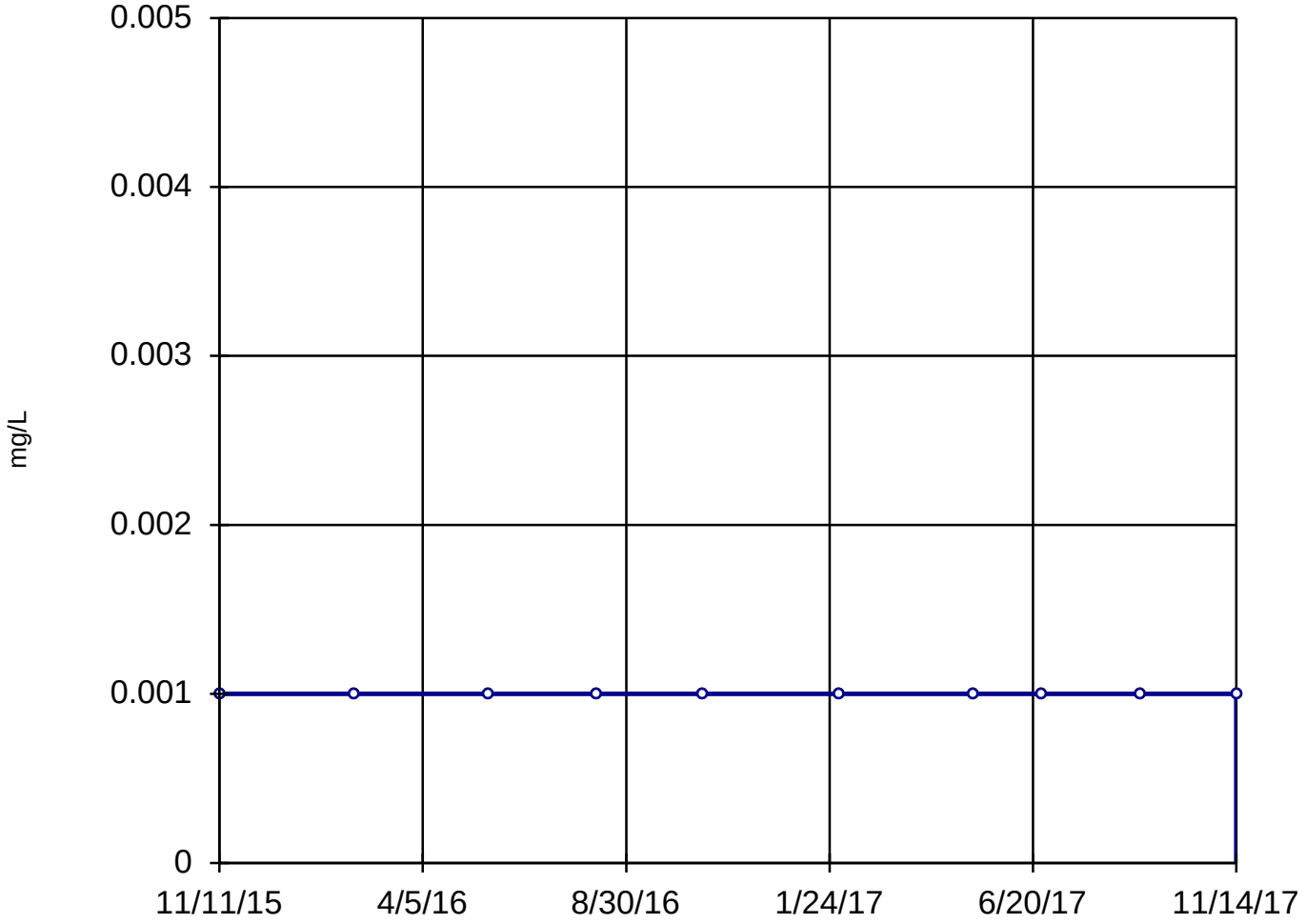
Constituent: Cobalt, Dissolved Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-09



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

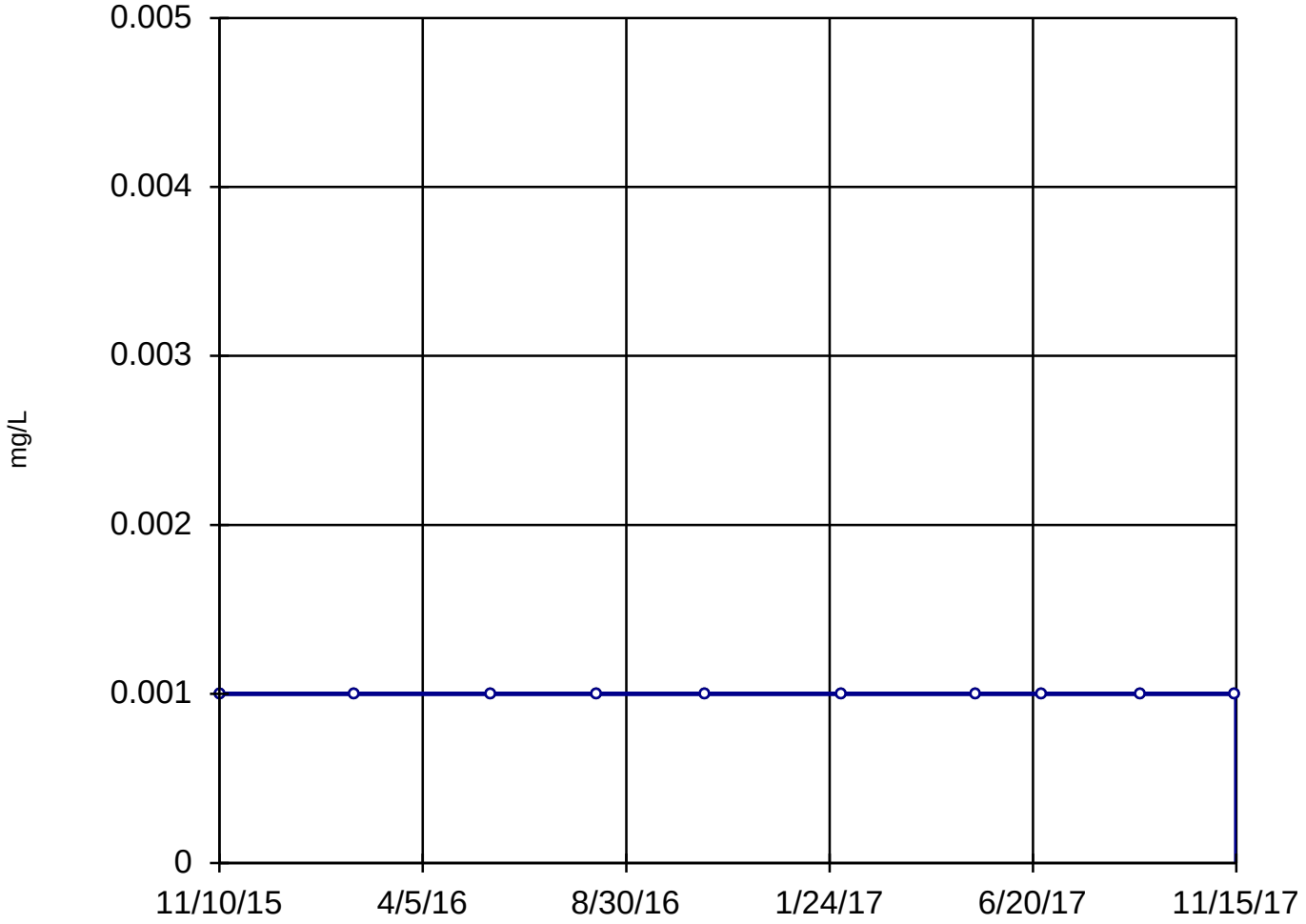
Constituent: Cobalt, Total Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

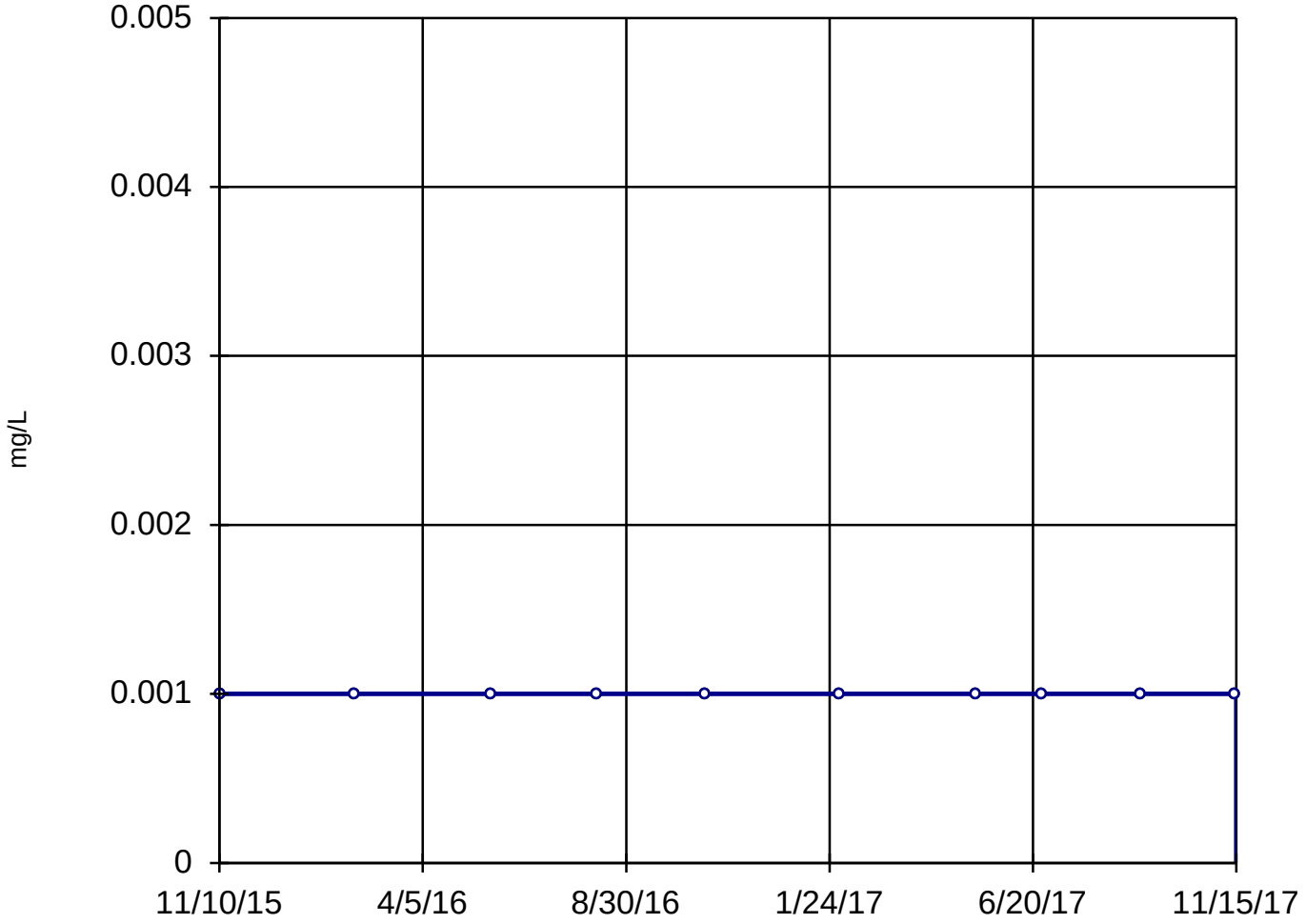
Constituent: Cobalt, Total Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-11



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

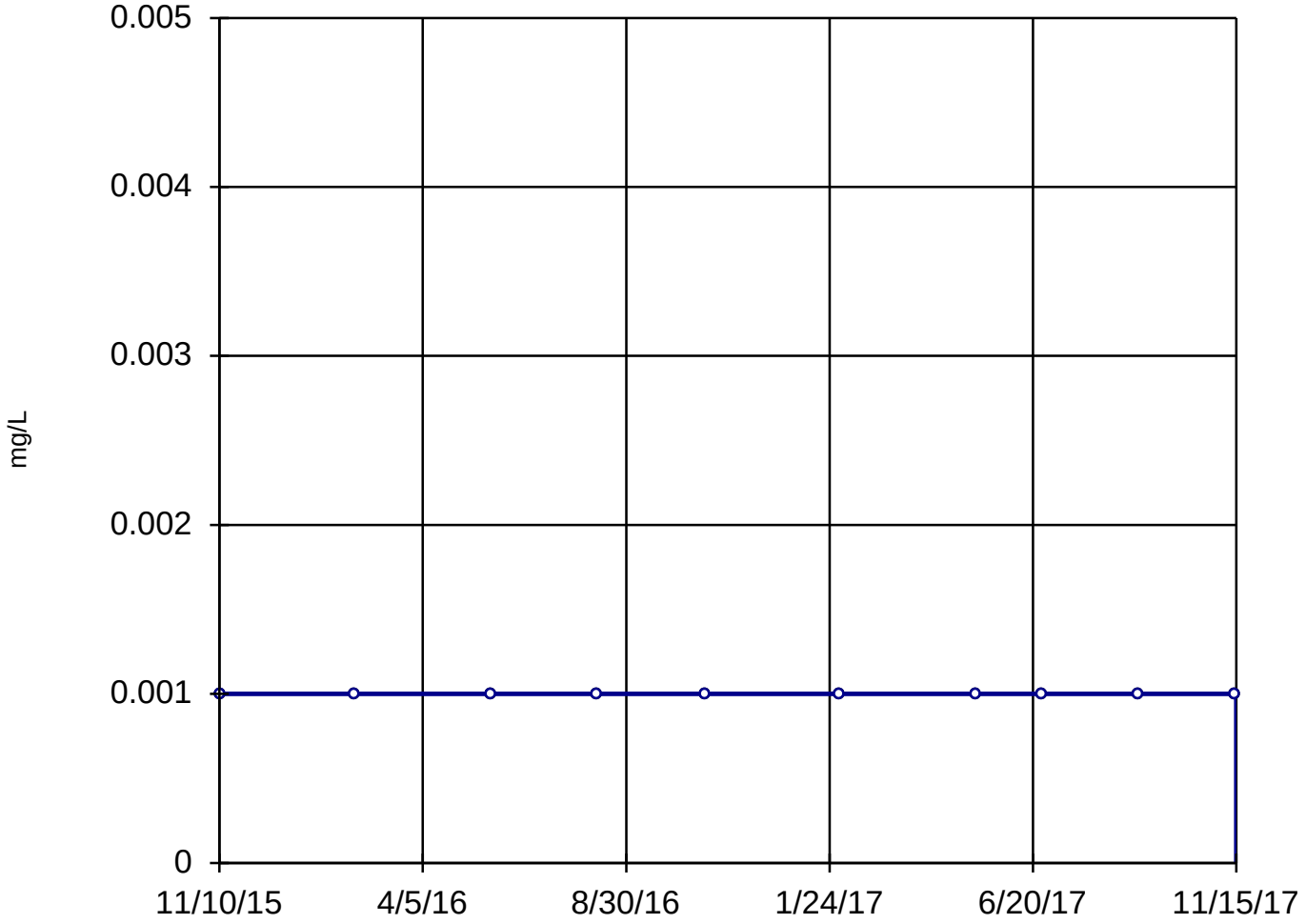
Constituent: Cobalt, Total Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-12



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

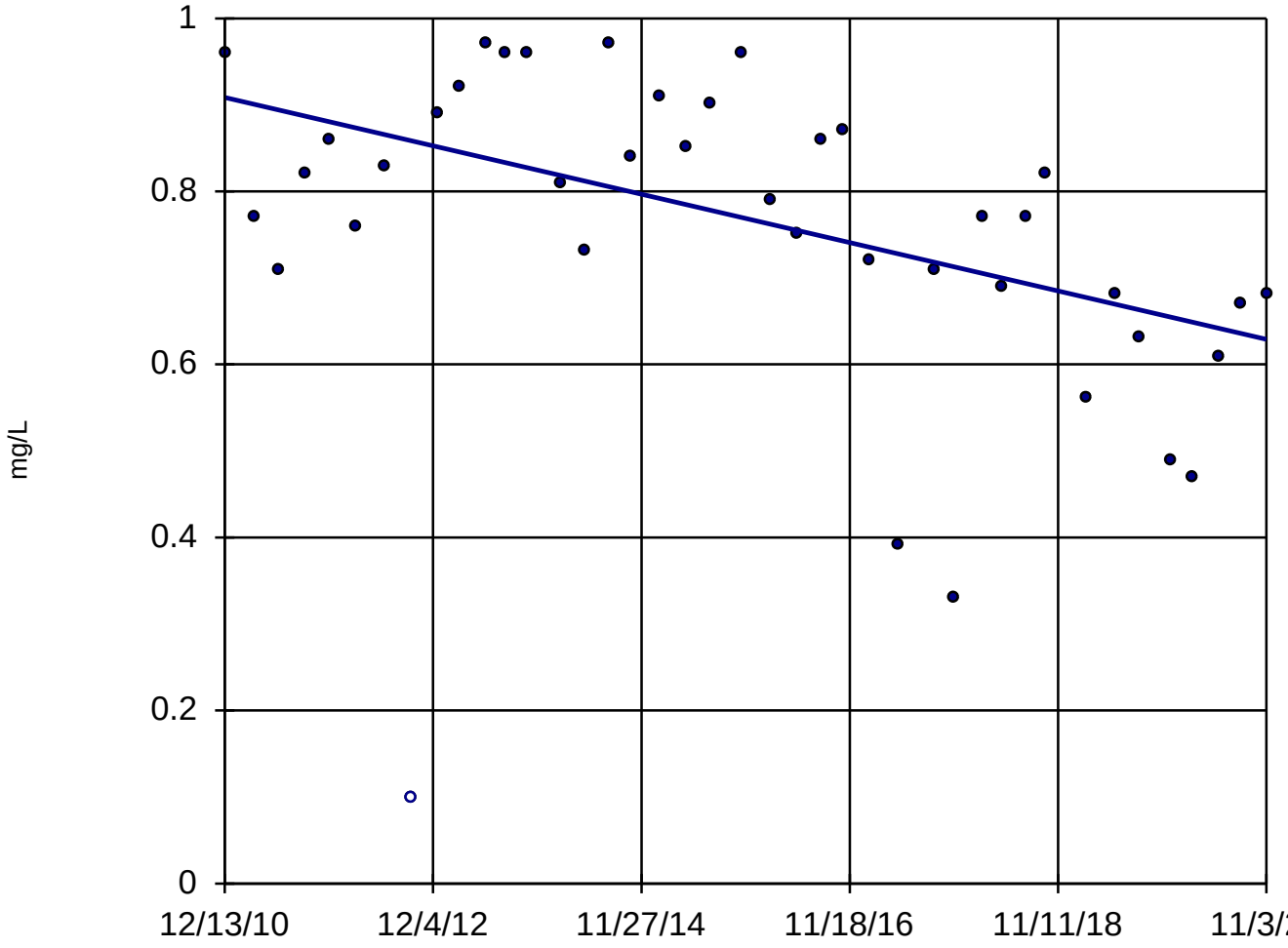
Constituent: Cobalt, Total Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-07



n = 41

Slope = -0.02826 units per year.

Mann-Kendall normal approx. = -3.542
critical = -2.58

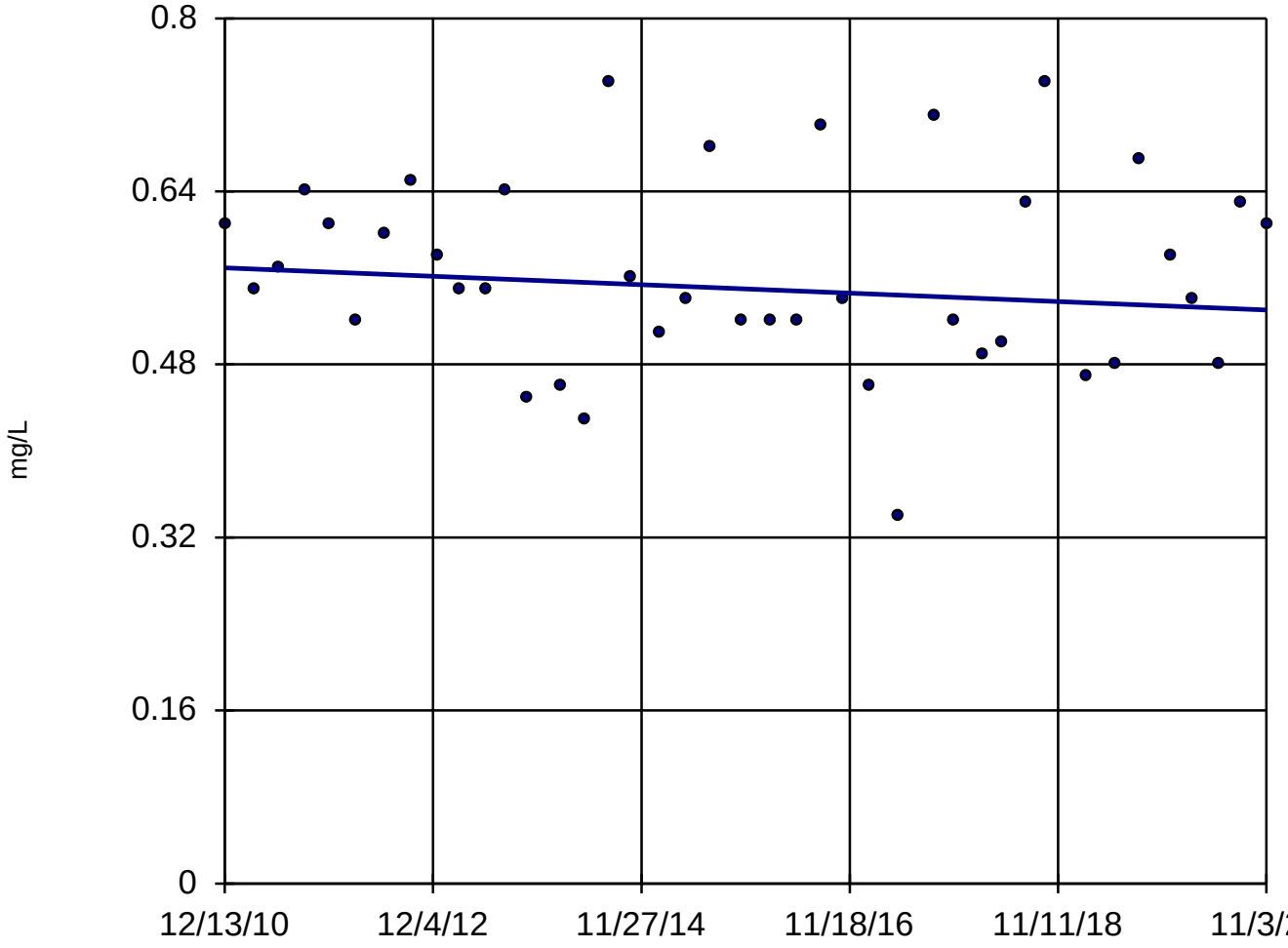
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Fluoride Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-08



n = 41

Slope = -0.003952 units per year.

Mann-Kendall normal approx. = -0.8104
critical = -2.58

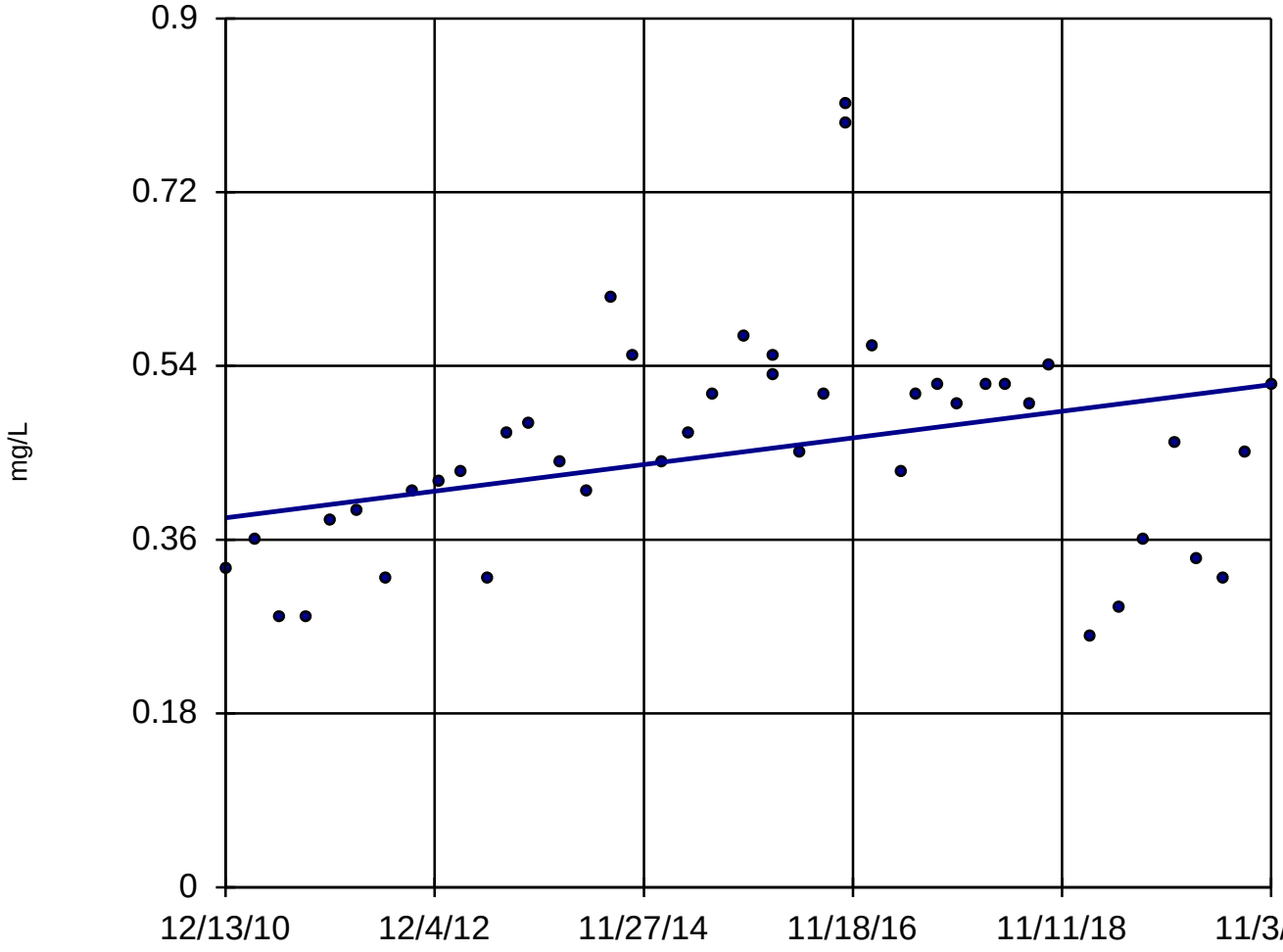
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Fluoride Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-09



n = 44

Slope = 0.01394 units per year.

Mann-Kendall normal approx. = 2.167
critical = 2.58

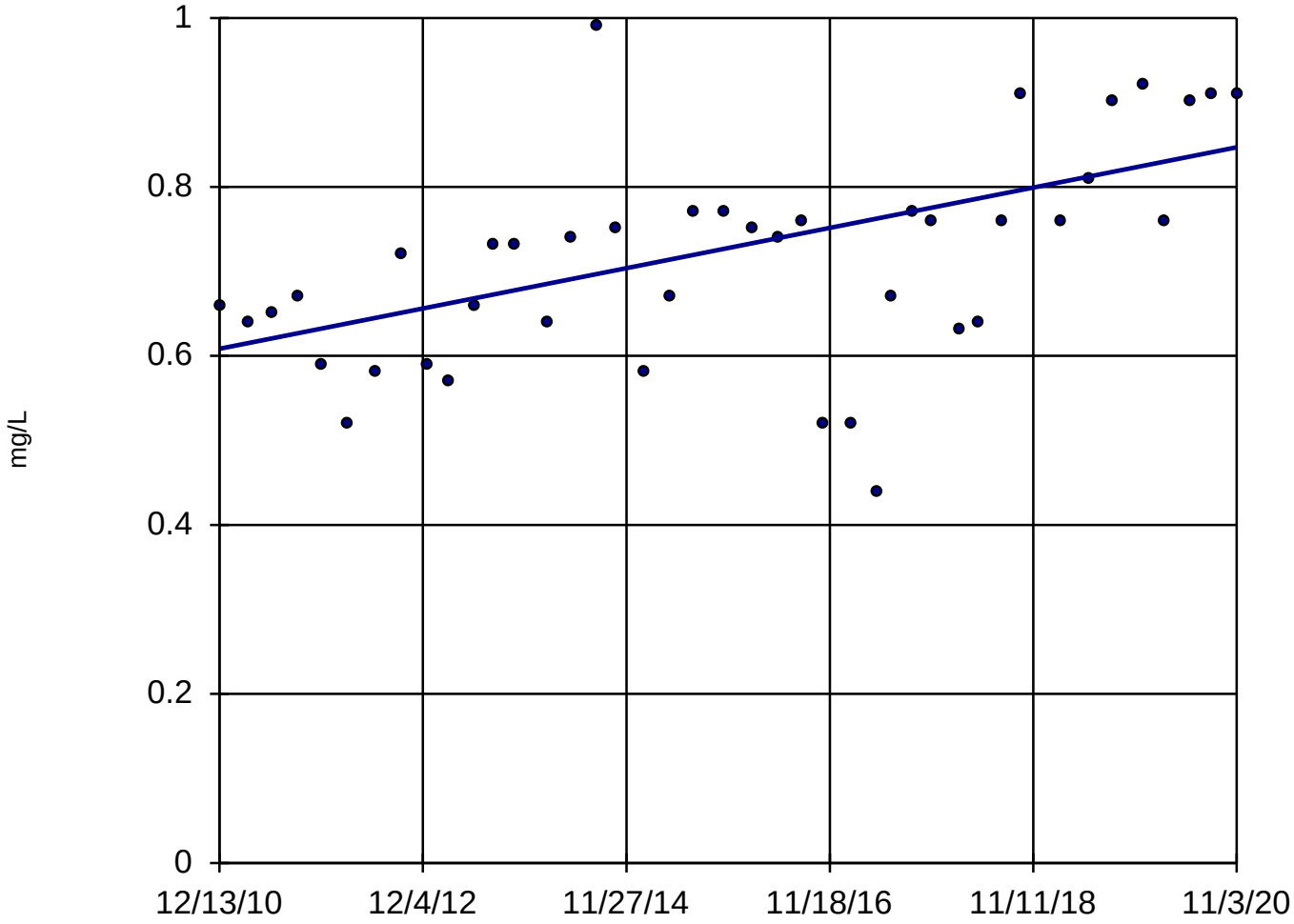
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Fluoride Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-10



n = 42

Slope = 0.02406 units per year.

Mann-Kendall normal approx. = 3.998
critical = 2.58

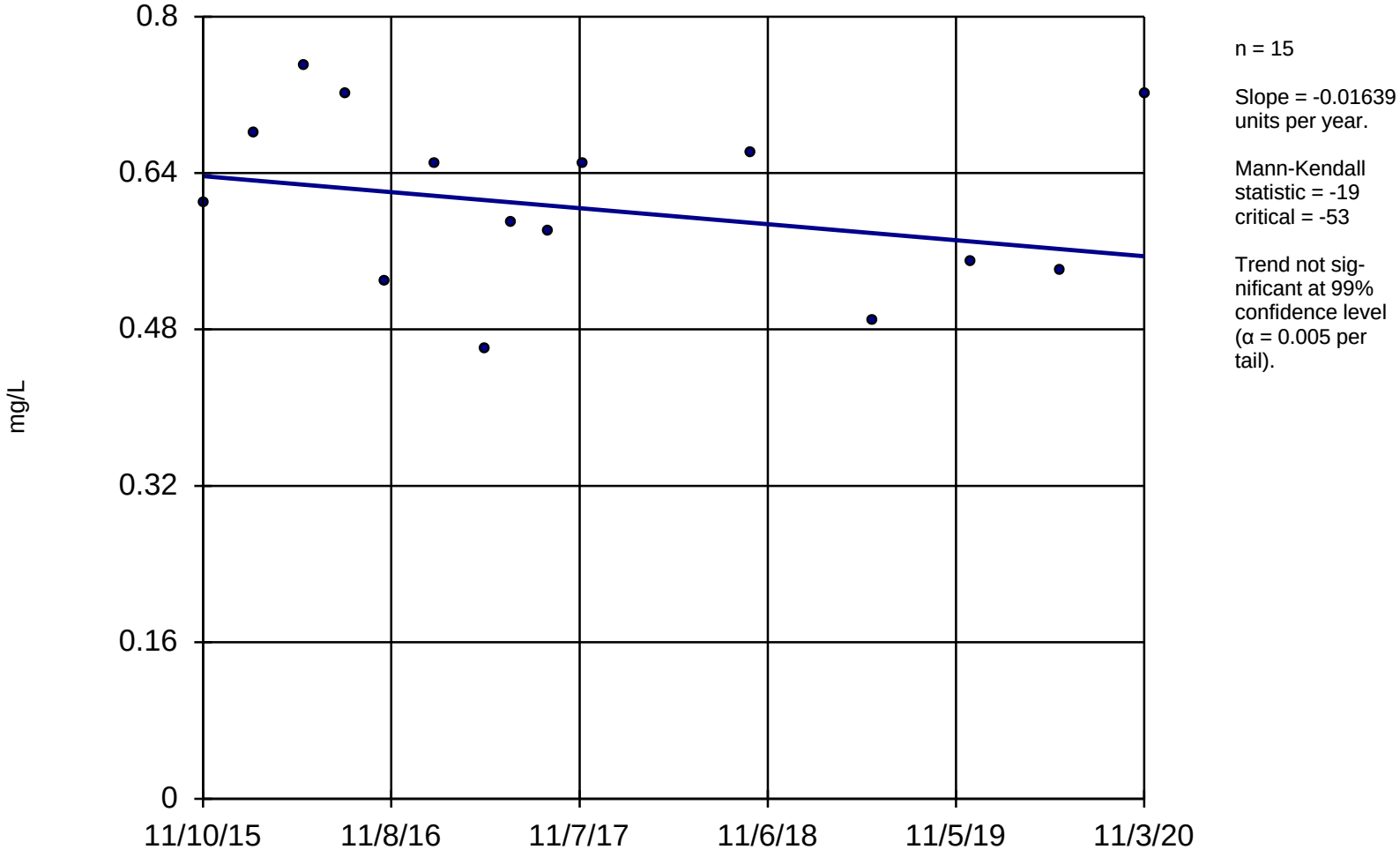
Increasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Fluoride Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-11



n = 15

Slope = -0.01639 units per year.

Mann-Kendall statistic = -19
critical = -53

Trend not significant at 99% confidence level (α = 0.005 per tail).

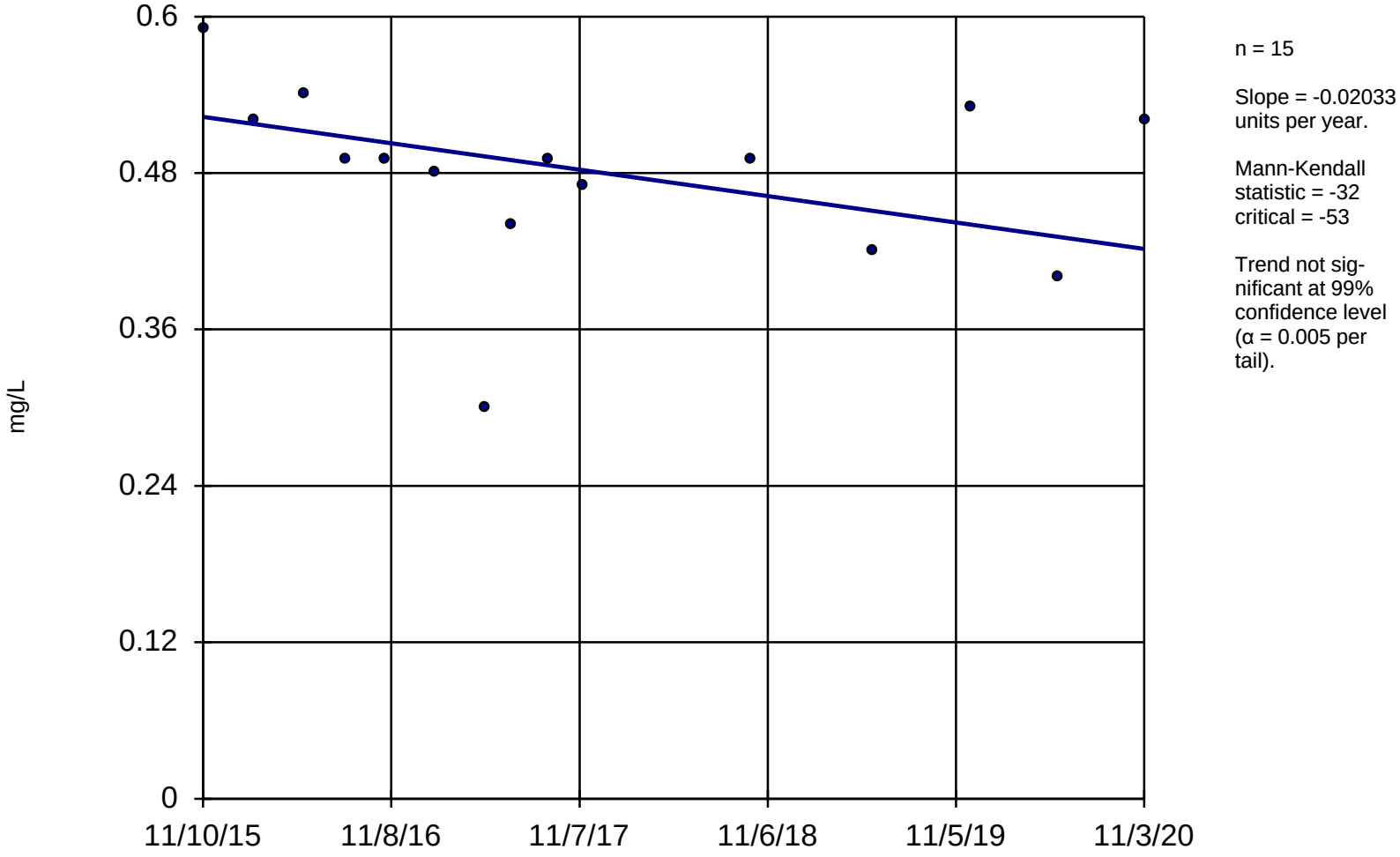
Constituent: Fluoride Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA

Sen's Slope Estimator

MW-12



n = 15

Slope = -0.02033 units per year.

Mann-Kendall statistic = -32
critical = -53

Trend not significant at 99% confidence level (α = 0.005 per tail).

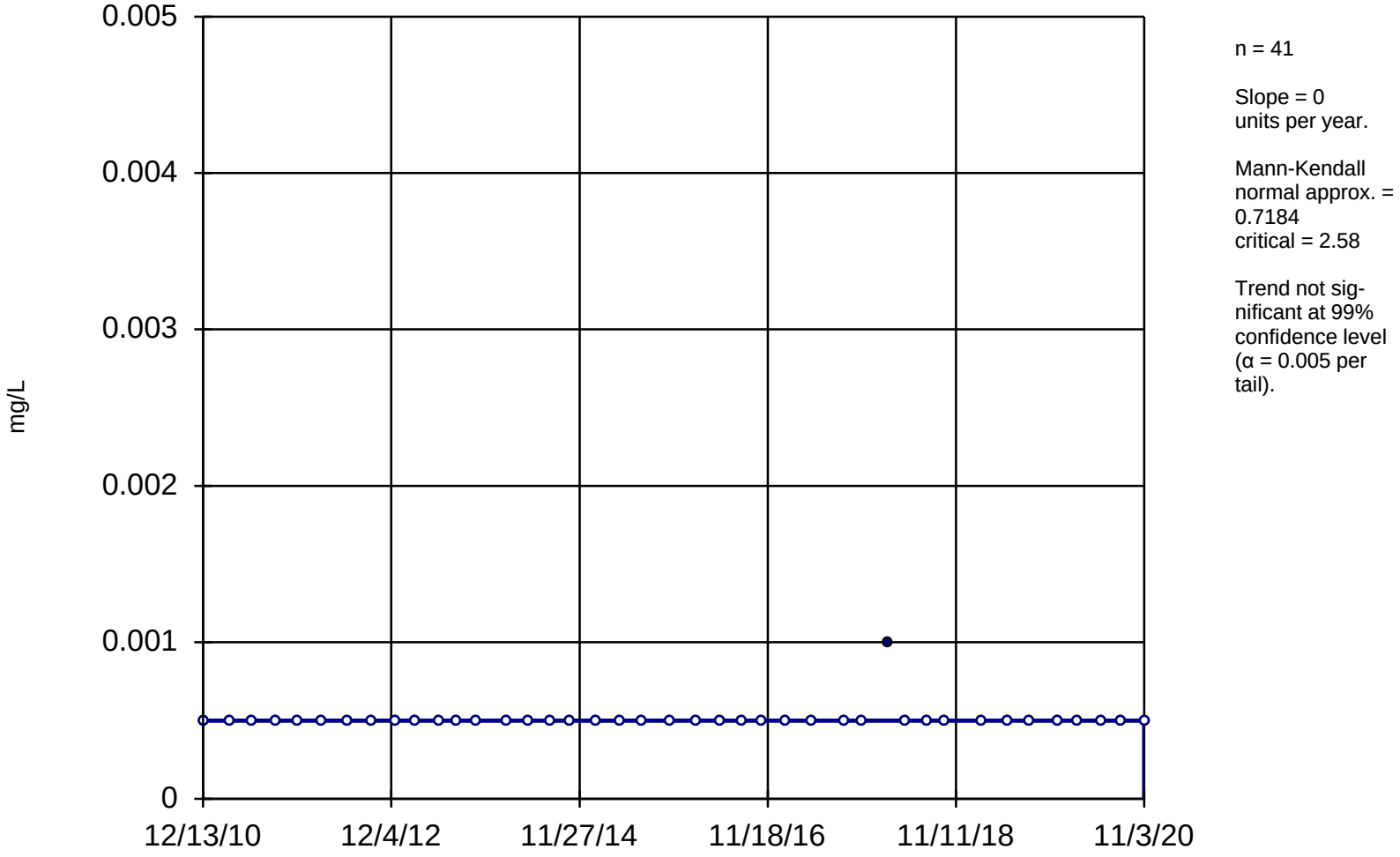
Constituent: Fluoride Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-07



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0.7184
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

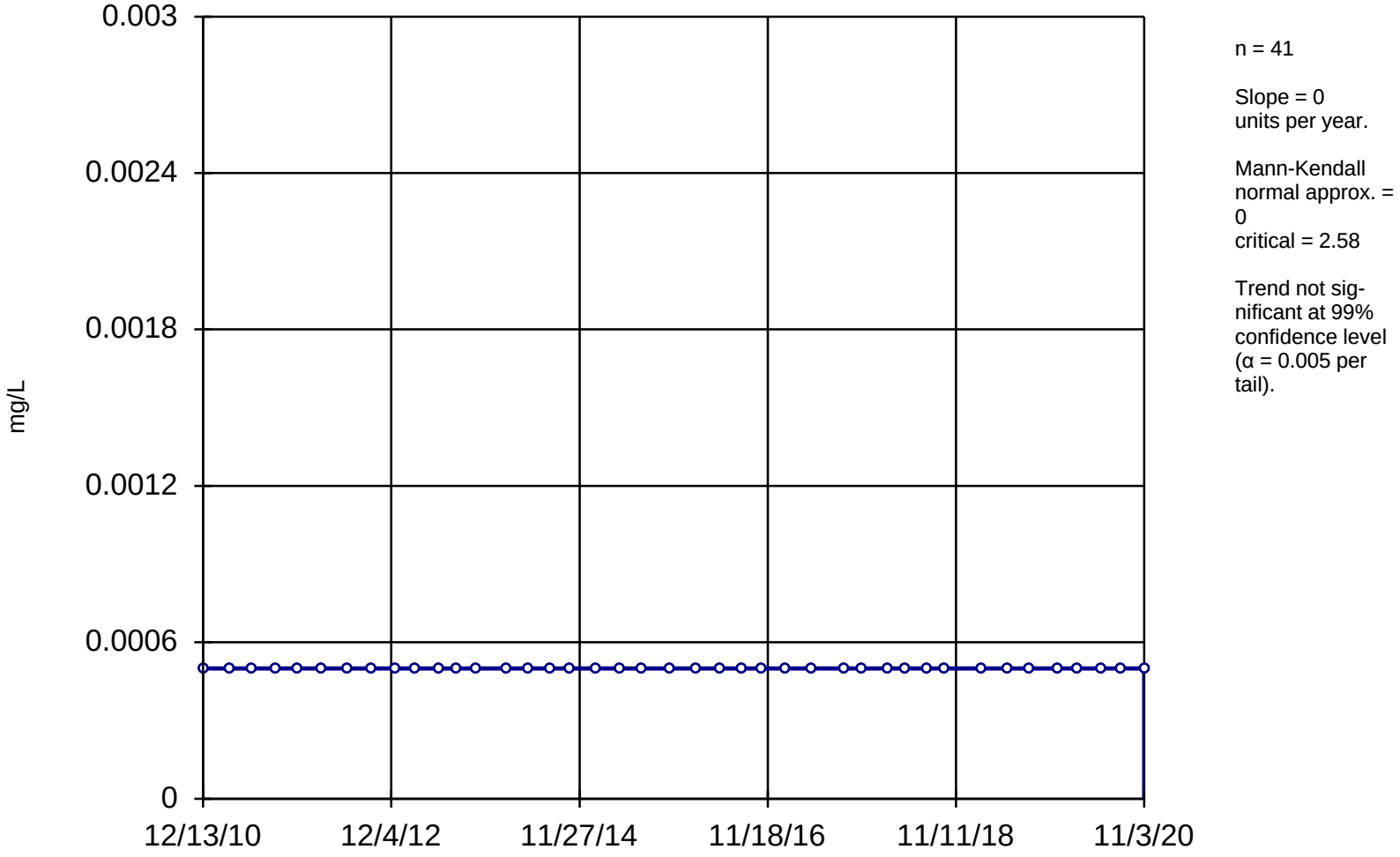
Constituent: Lead, Dissolved Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

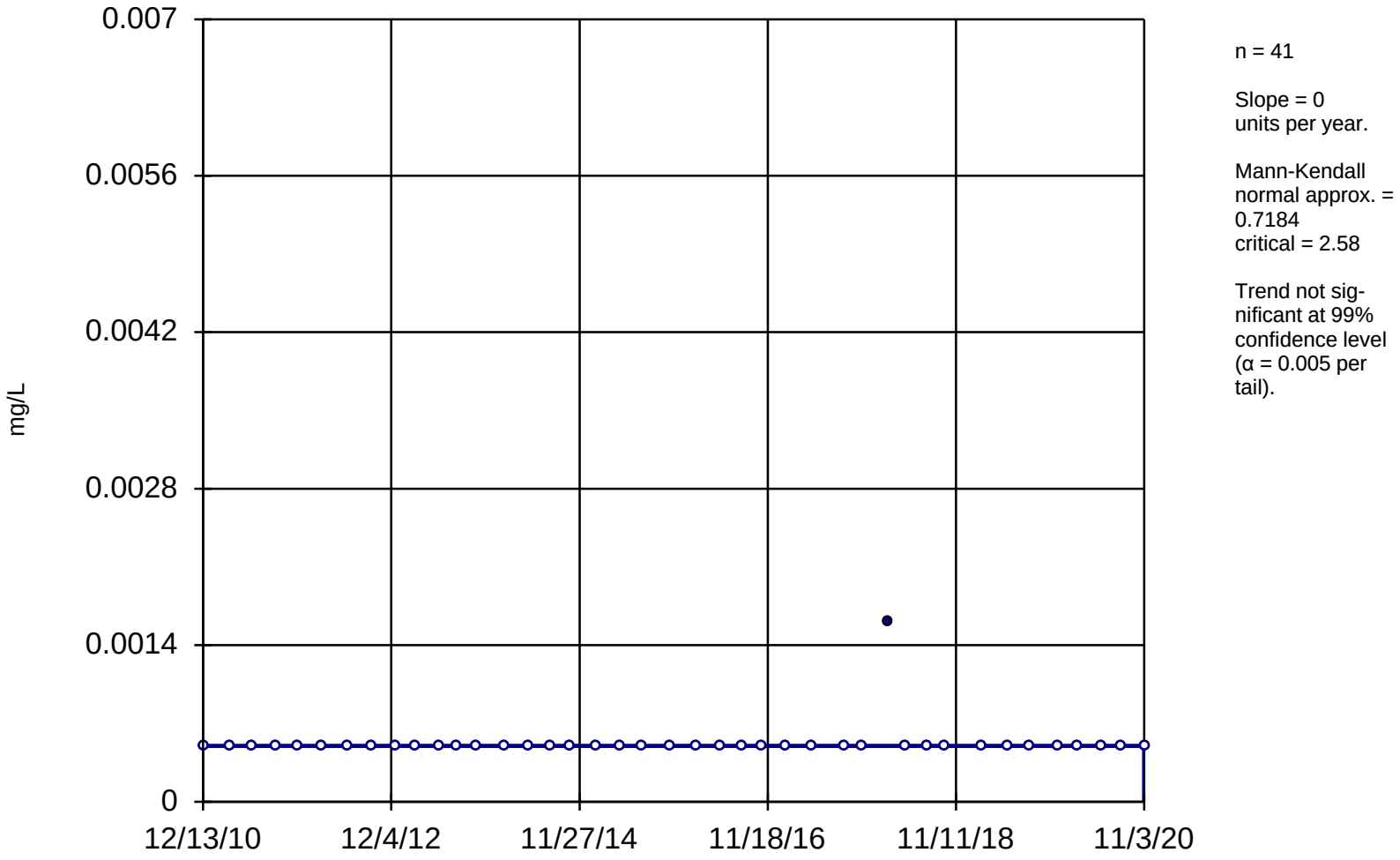
Constituent: Lead, Dissolved Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-09



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0.7184
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

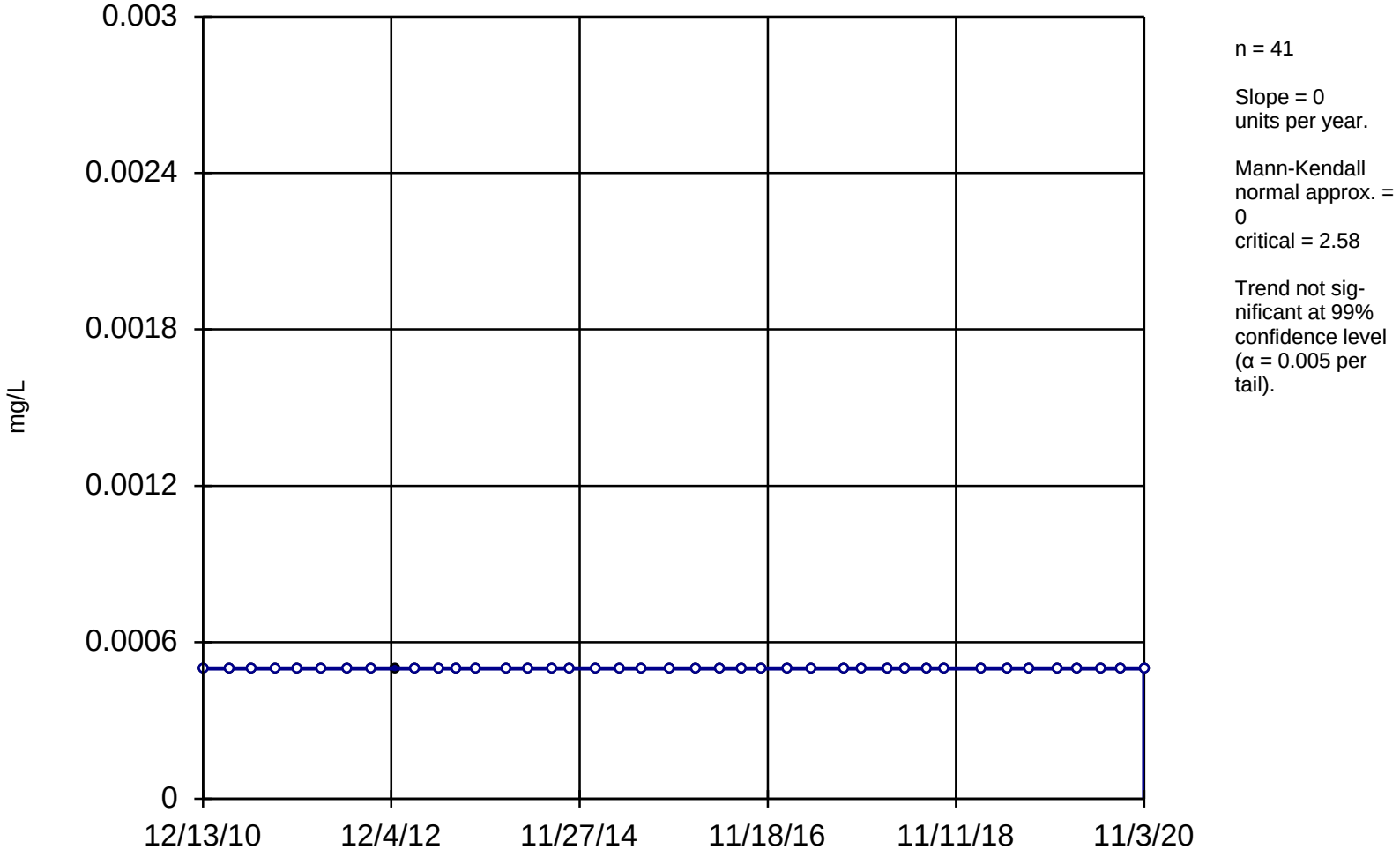
Constituent: Lead, Dissolved Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Lead, Dissolved Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

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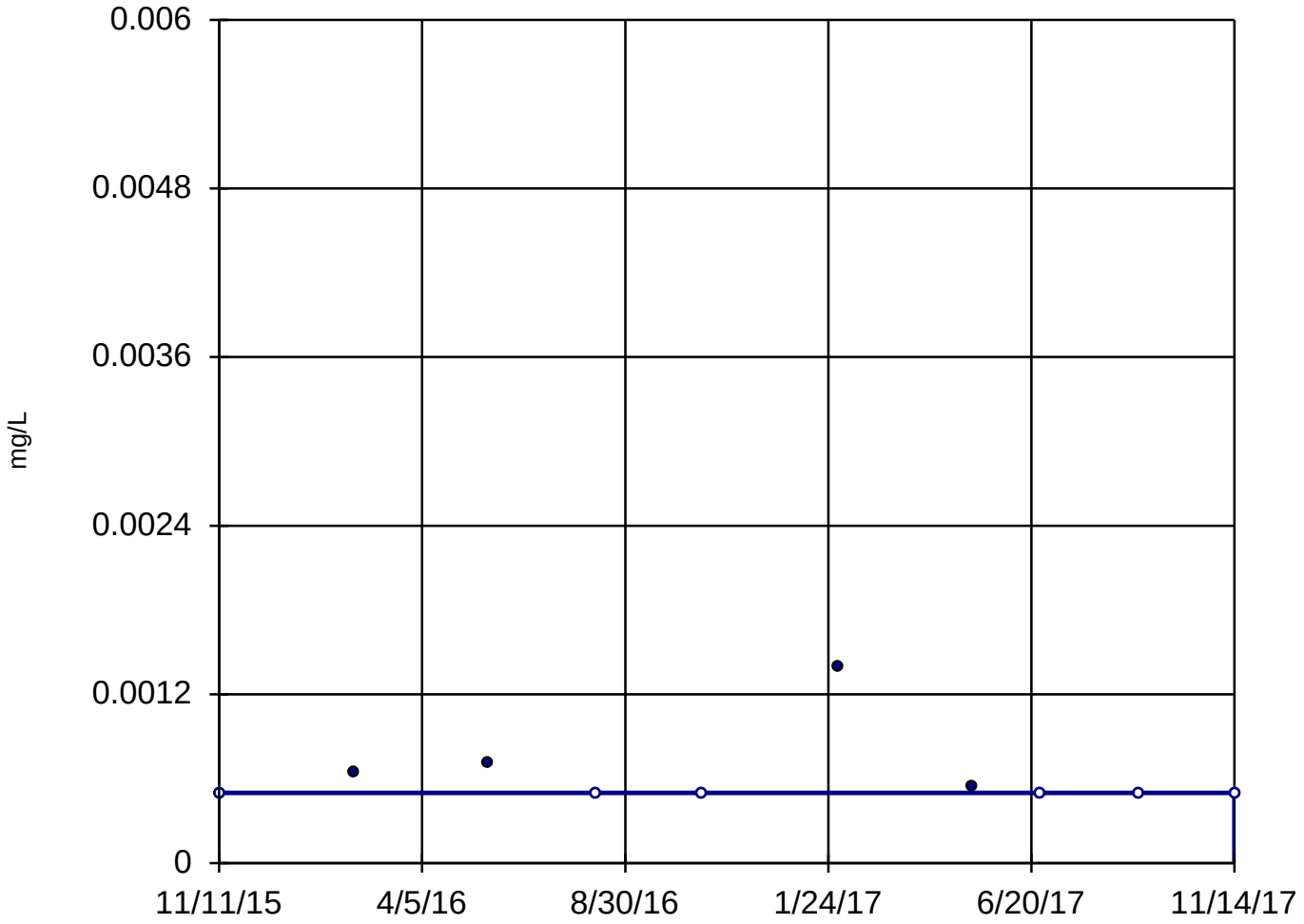
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-09



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = -8
critical = -30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

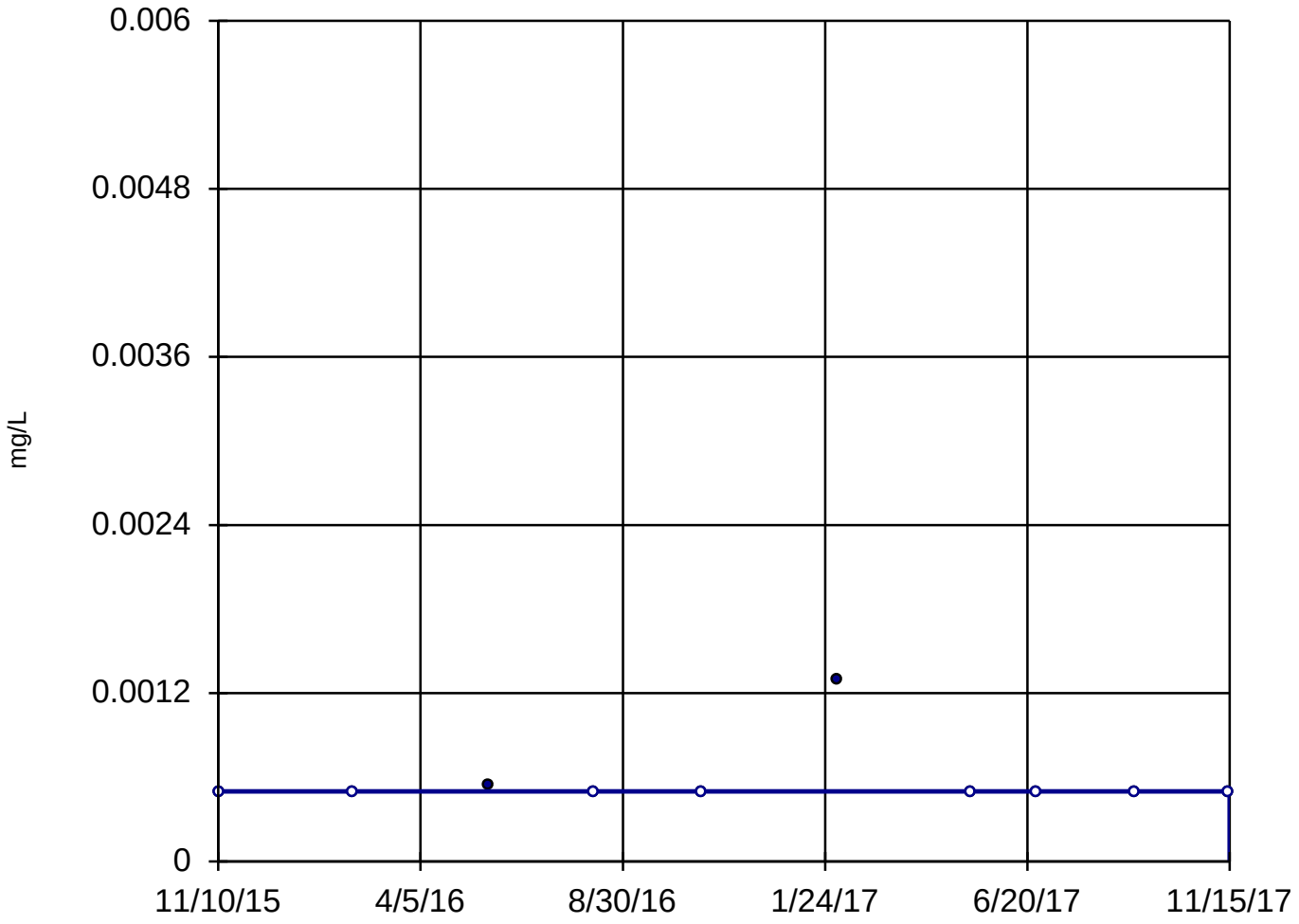
Constituent: Lead, Total Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = -3
critical = -30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

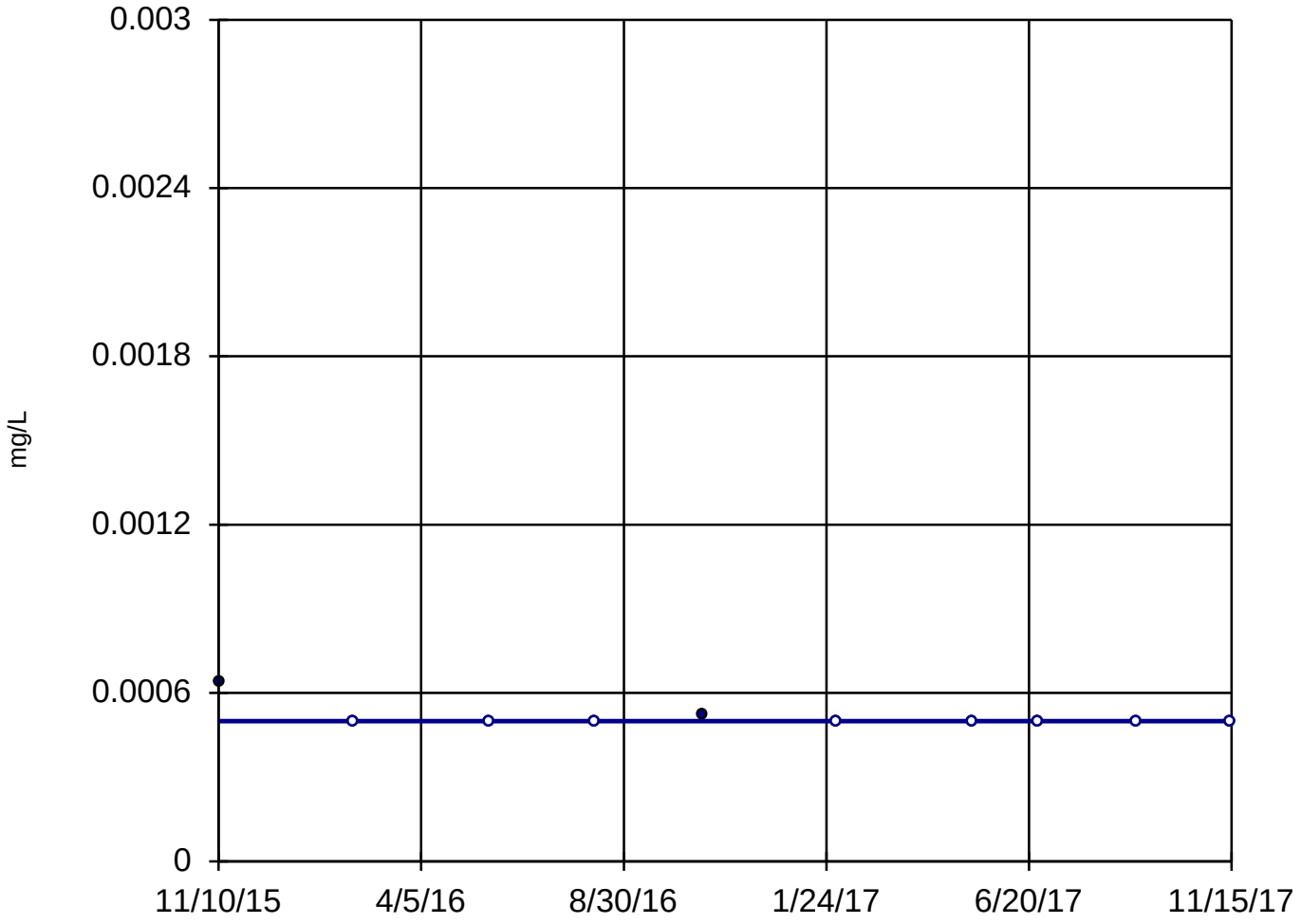
Constituent: Lead, Total Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-11



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = -11
critical = -30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

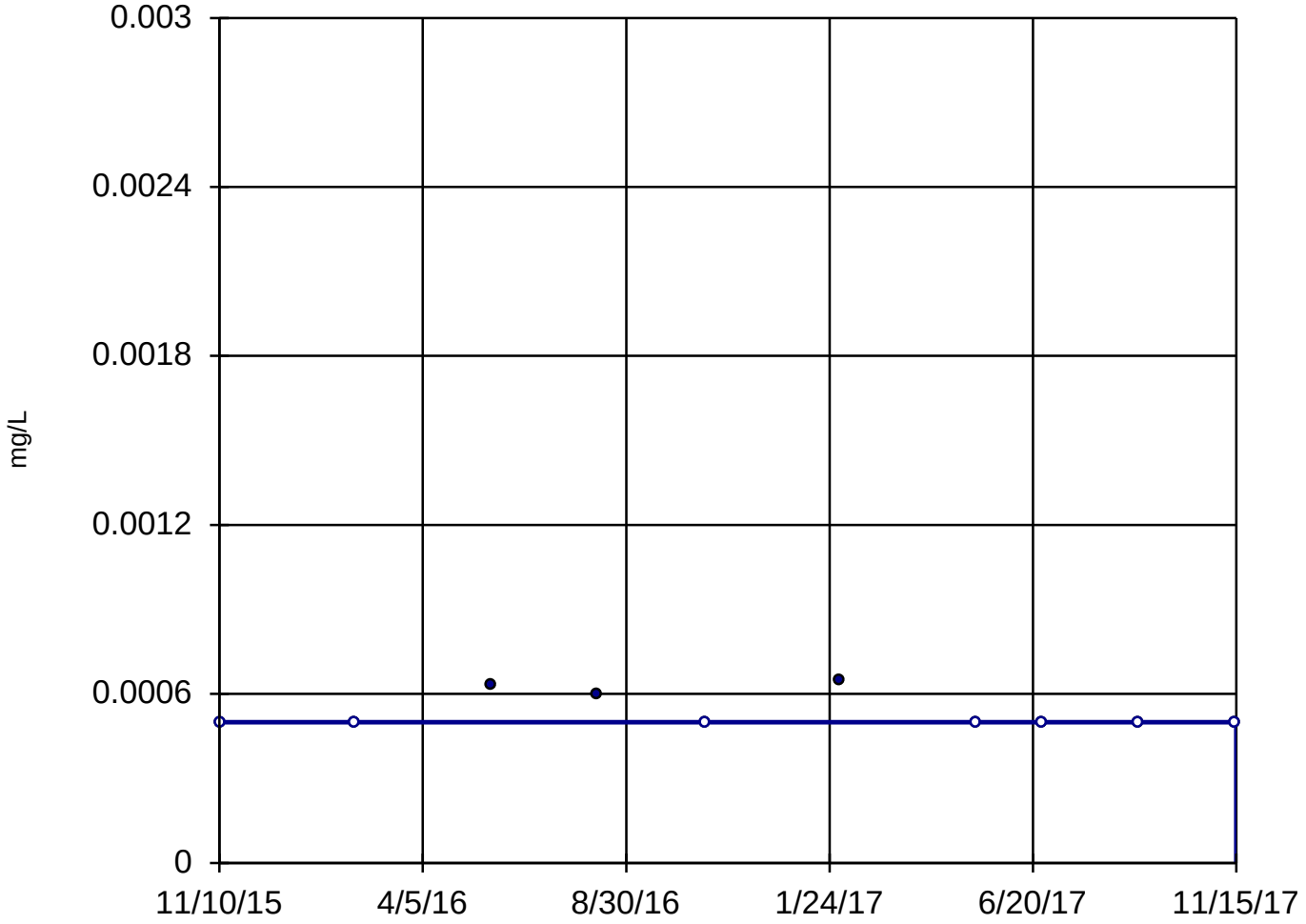
Constituent: Lead, Total Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-12



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = -6
critical = -30

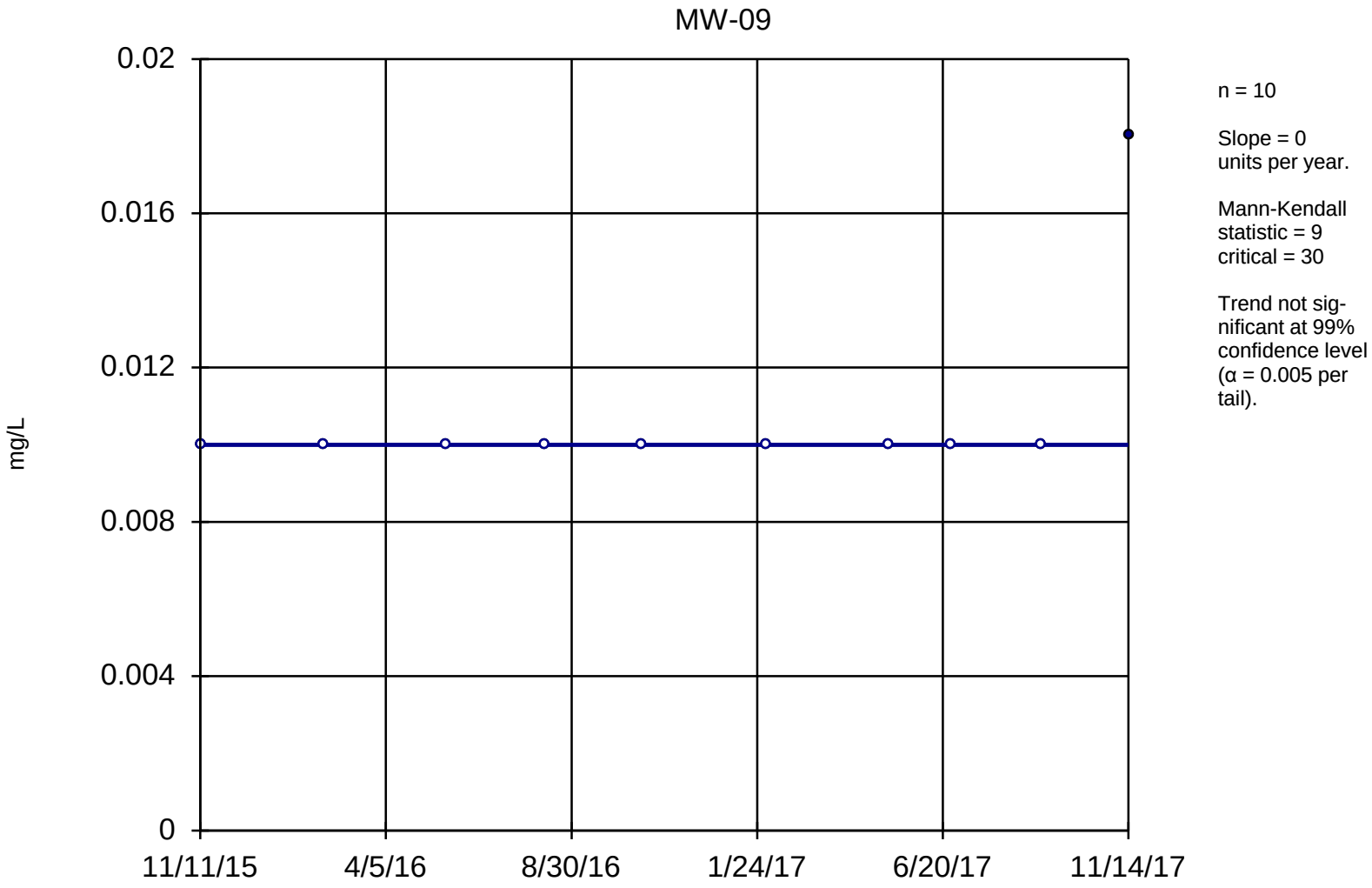
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Lead, Total Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

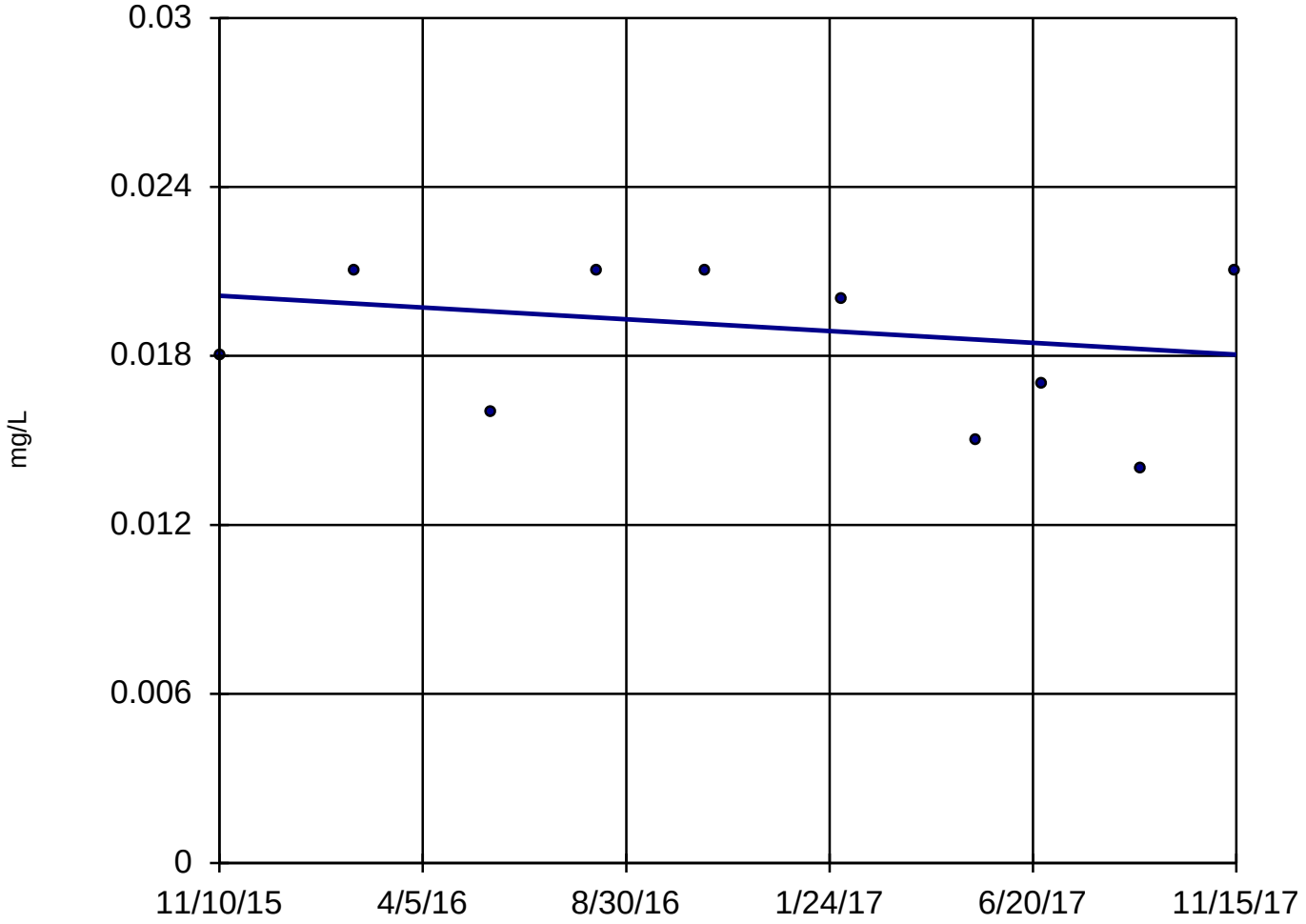


Constituent: Lithium, Total Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-10



n = 10

Slope = -0.001037 units per year.

Mann-Kendall statistic = -9
critical = -30

Trend not significant at 99% confidence level (α = 0.005 per tail).

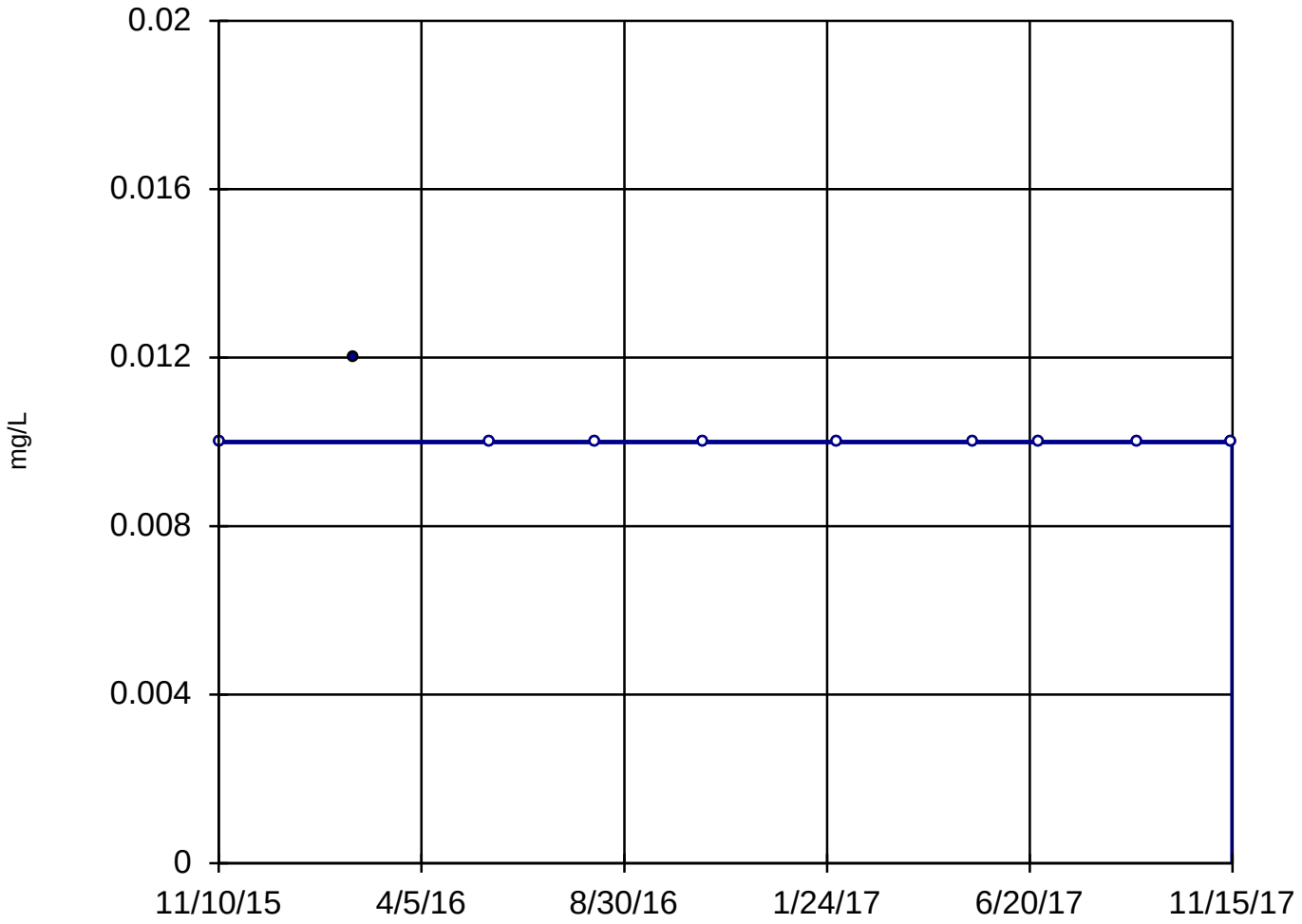
Constituent: Lithium, Total Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-11



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = -7
critical = -30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

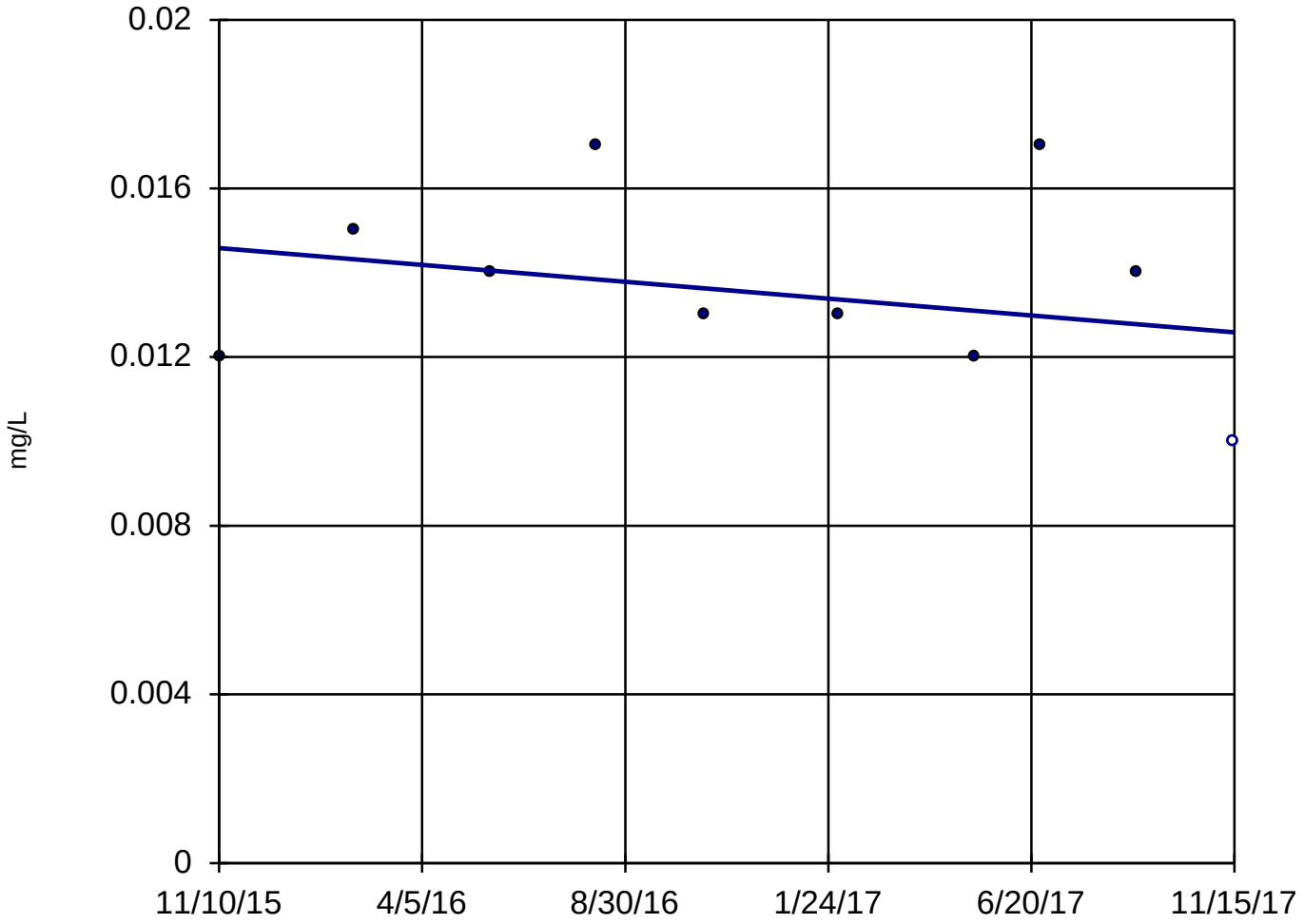
Constituent: Lithium, Total Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-12



n = 10

Slope = -0.0009918 units per year.

Mann-Kendall statistic = -7
critical = -30

Trend not significant at 99% confidence level (α = 0.005 per tail).

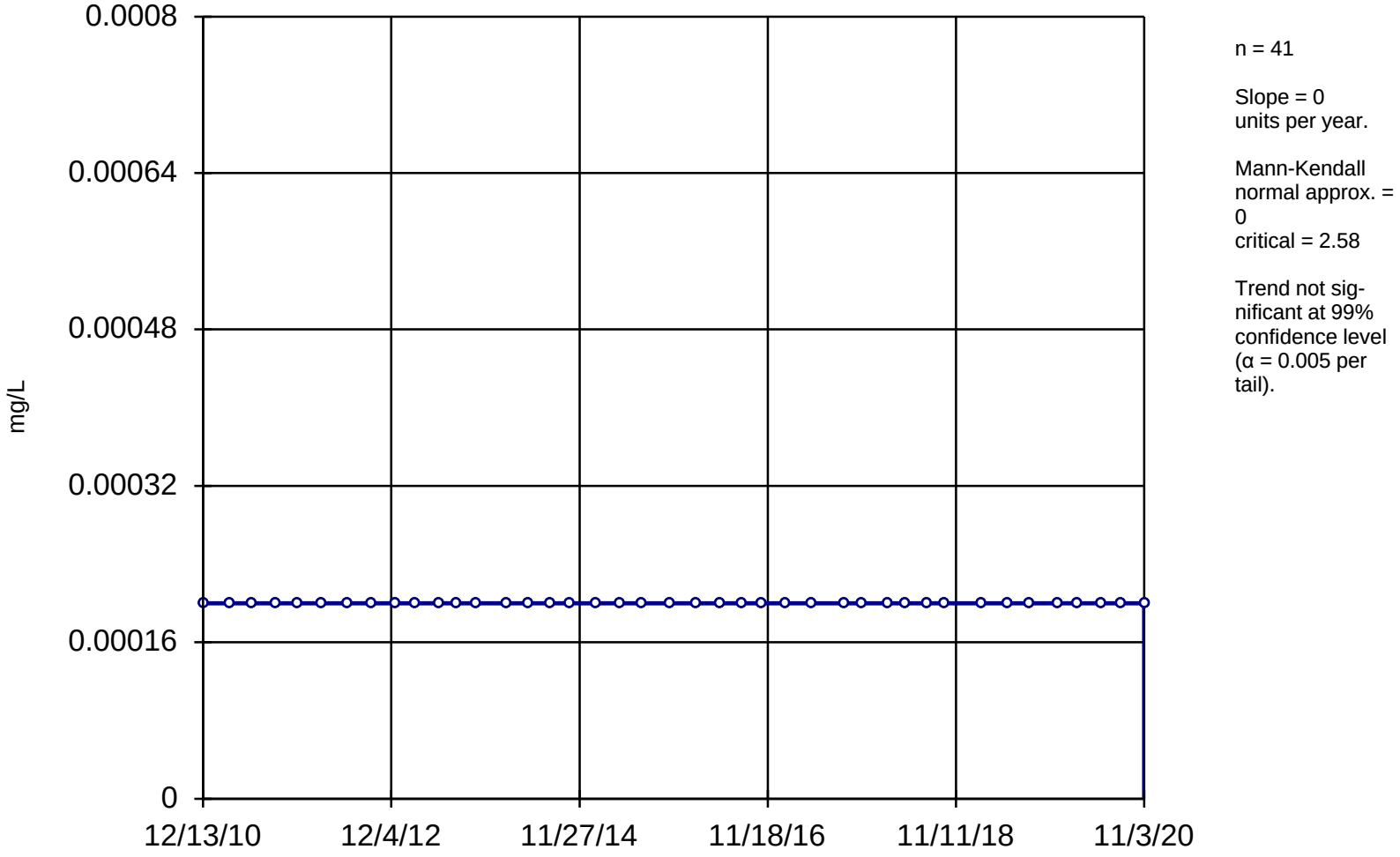
Constituent: Lithium, Total Analysis Run 4/2/2021 12:06 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-07



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

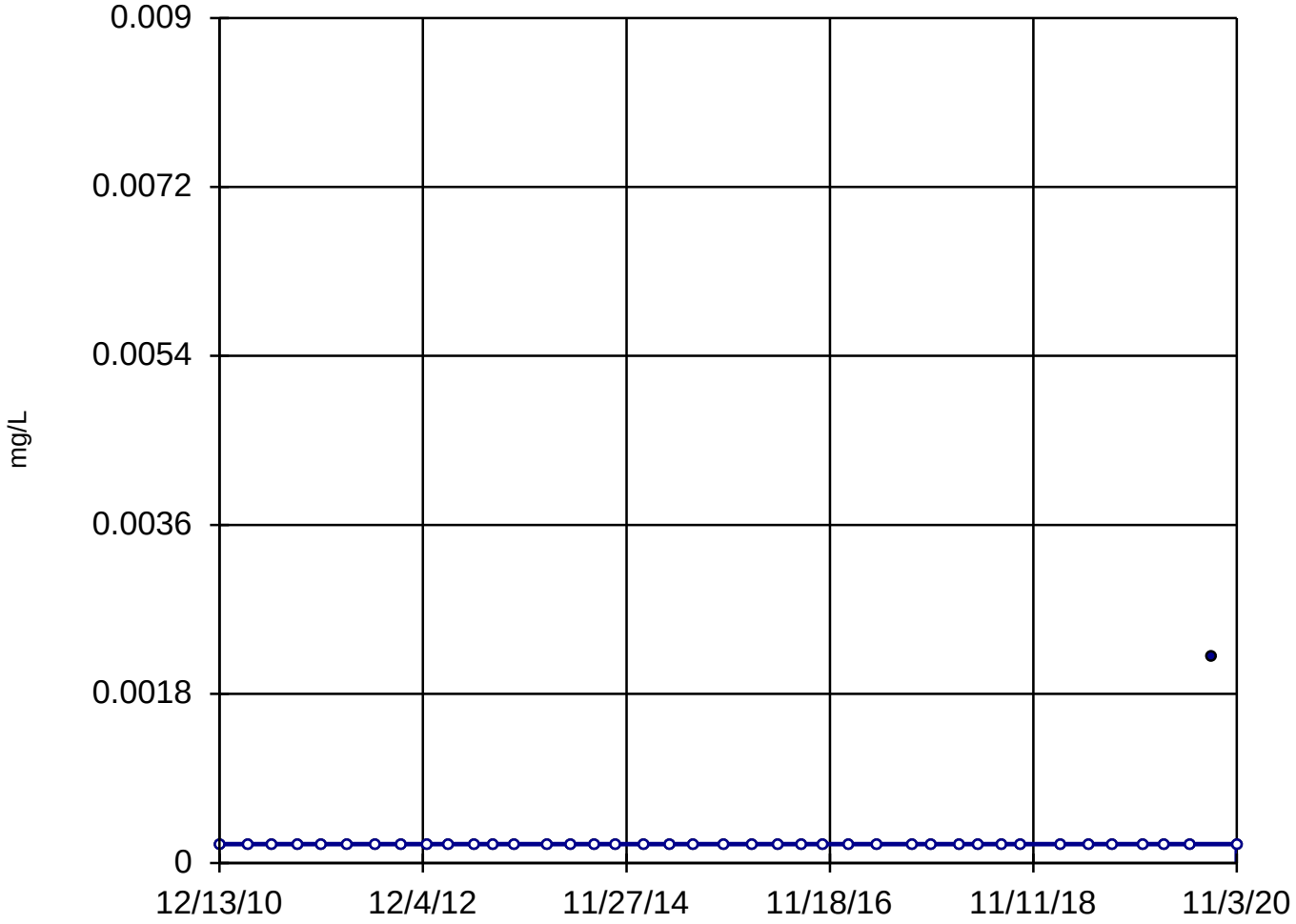
Constituent: Mercury, Dissolved Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
1.564
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

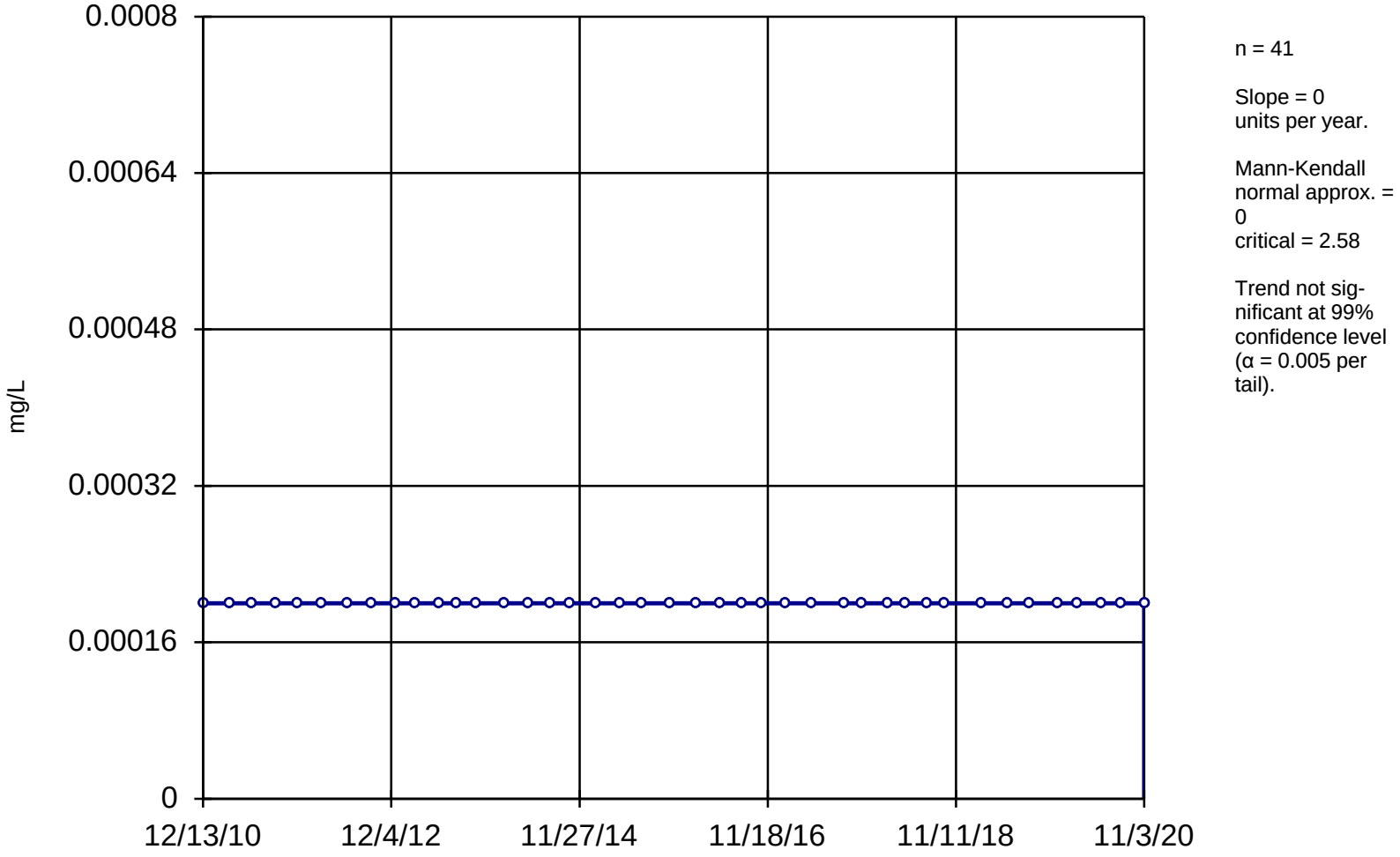
Constituent: Mercury, Dissolved Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-09



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

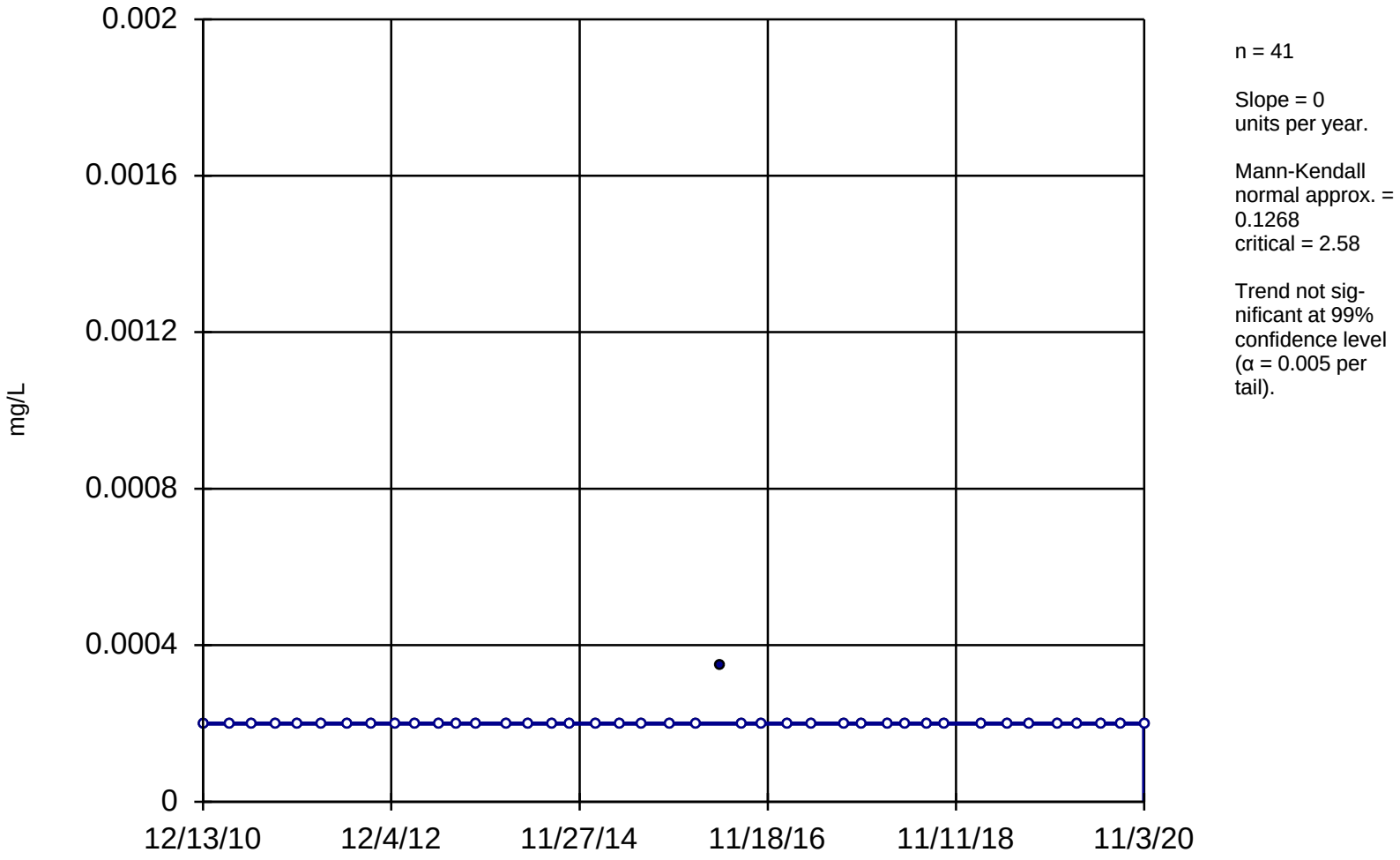
Constituent: Mercury, Dissolved Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0.1268
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

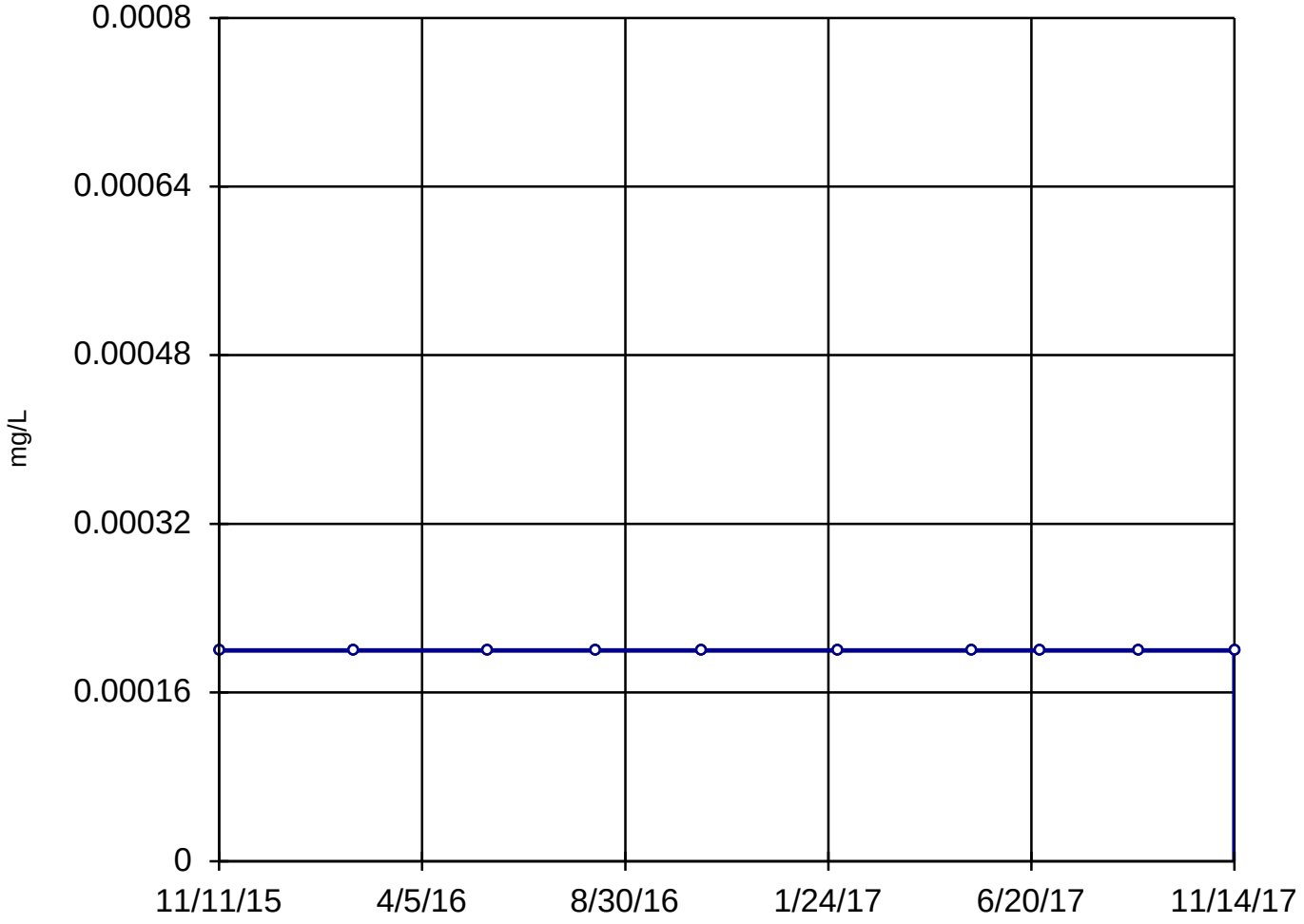
Constituent: Mercury, Dissolved Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-09



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

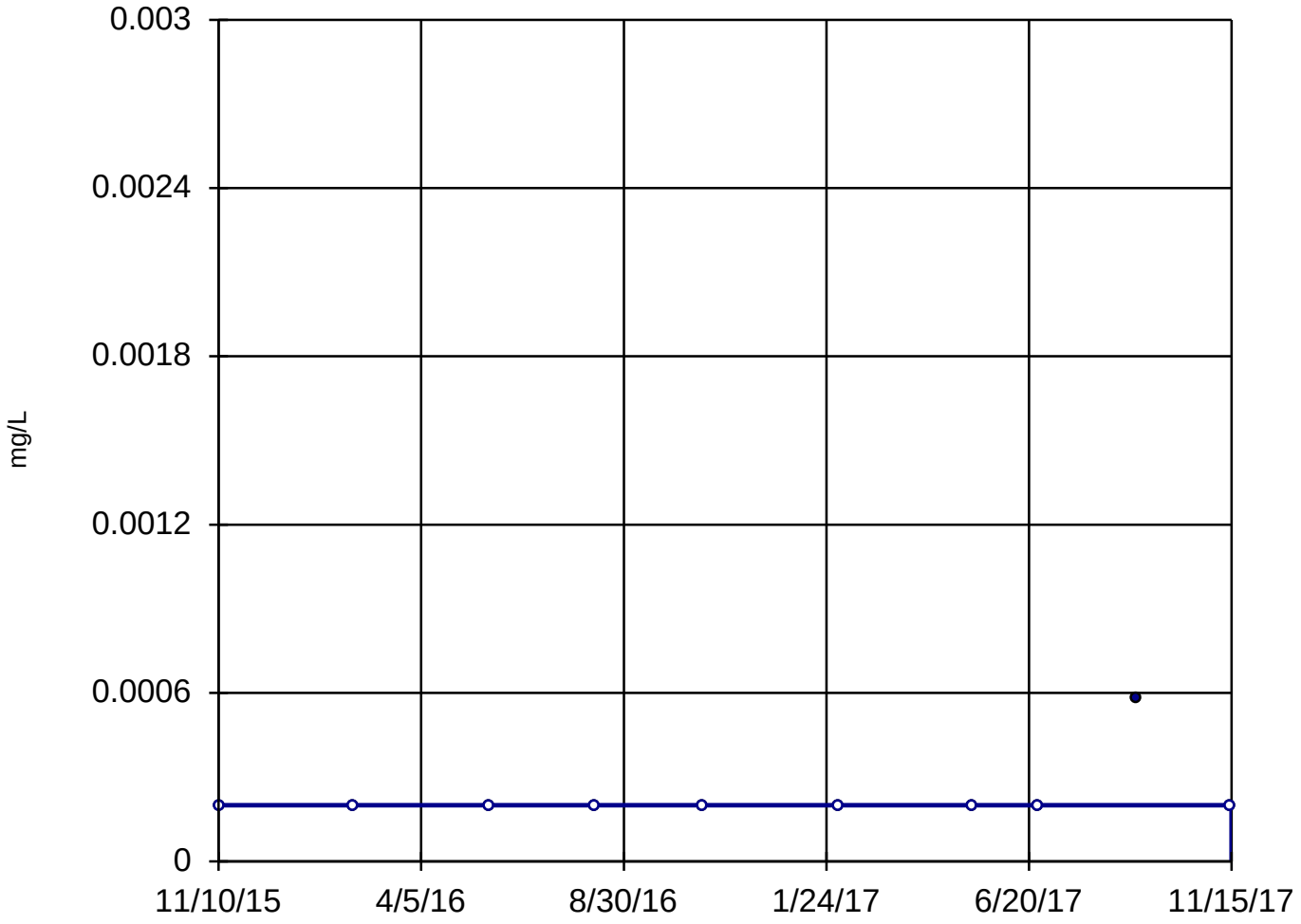
Constituent: Mercury, Total Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 7
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

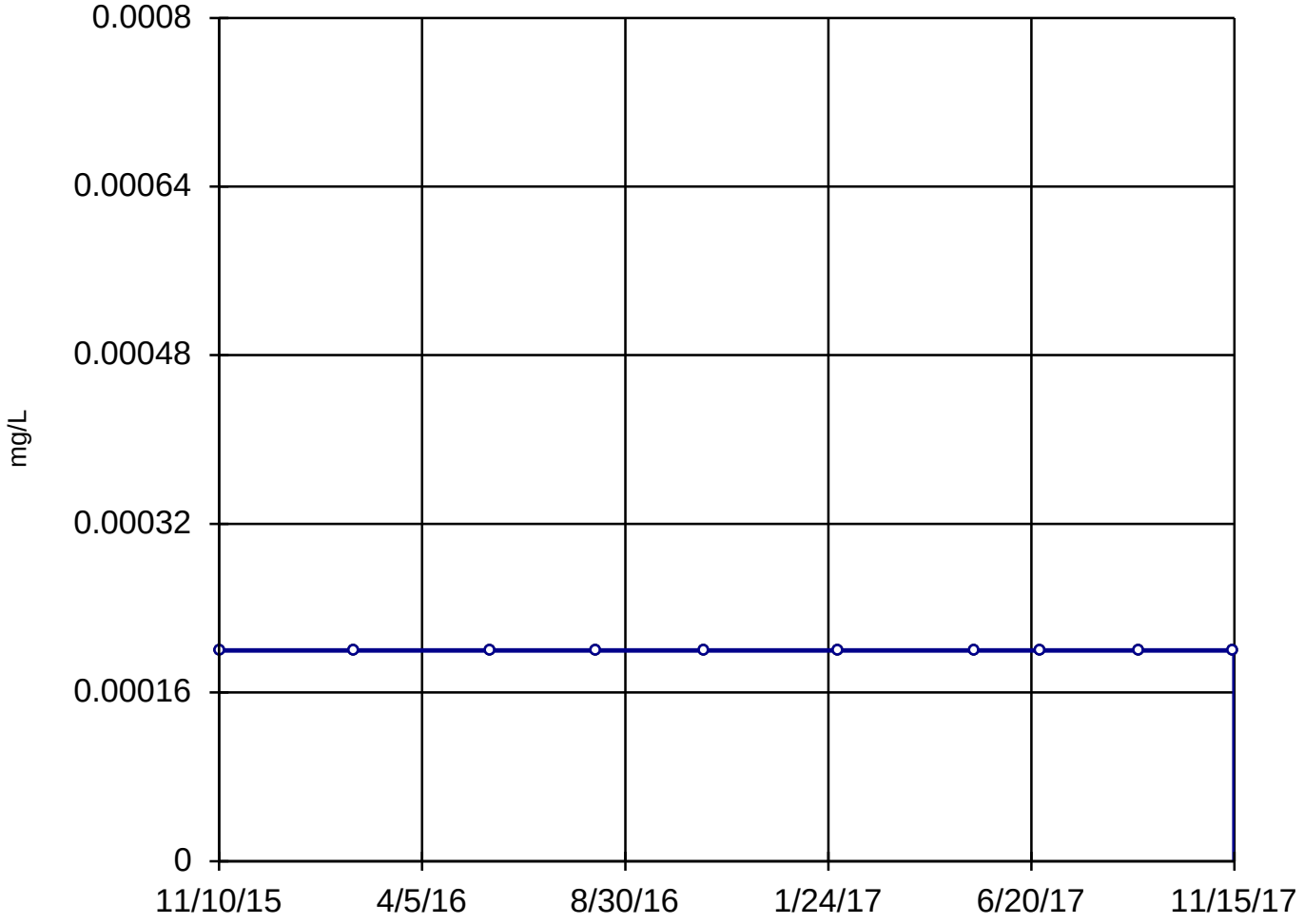
Constituent: Mercury, Total Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-11



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

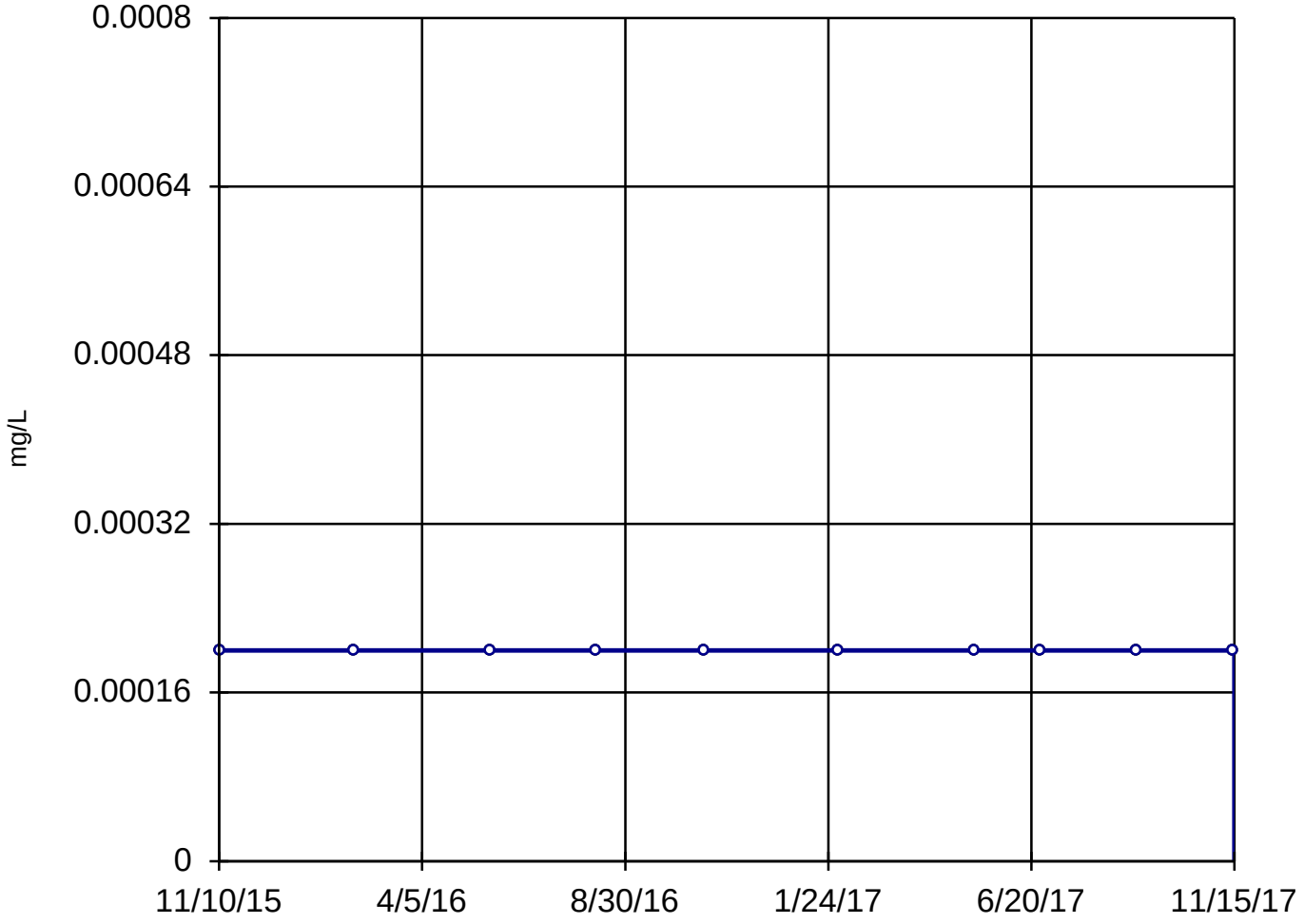
Constituent: Mercury, Total Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-12



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

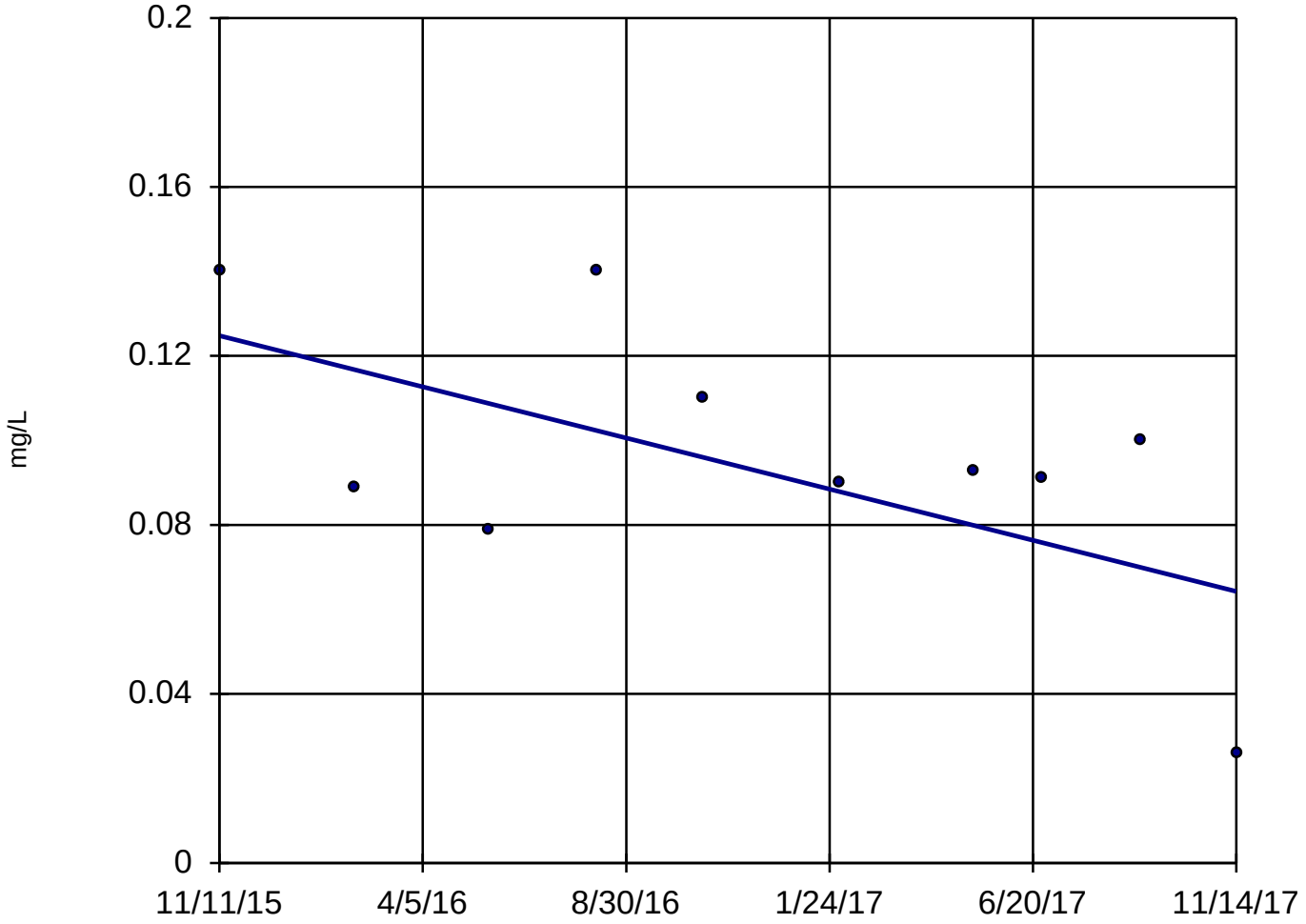
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Mercury, Total Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-09



n = 10

Slope = -0.03011 units per year.

Mann-Kendall statistic = -10
critical = -30

Trend not significant at 99% confidence level (α = 0.005 per tail).

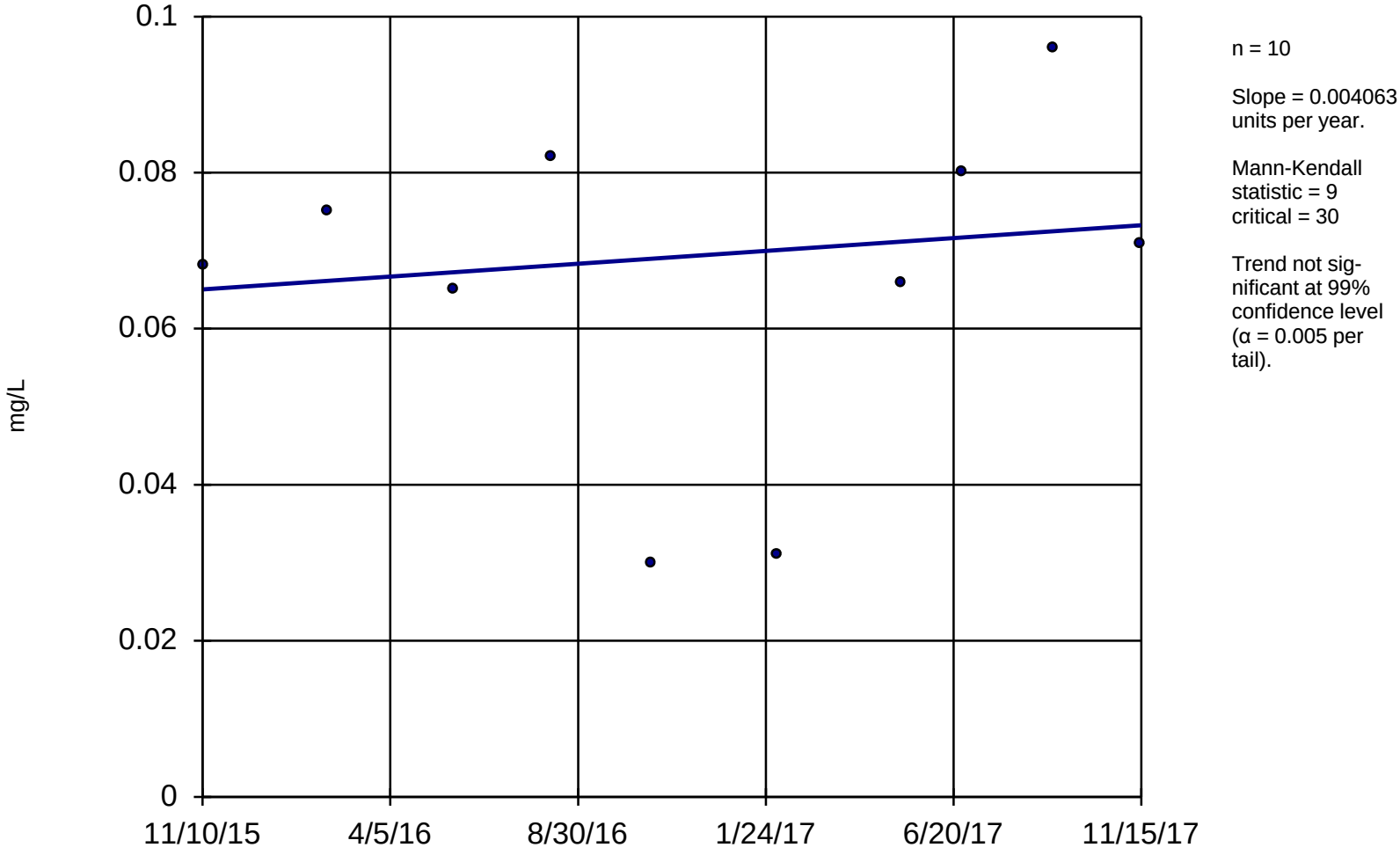
Constituent: Molybdenum, Total Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA

Sen's Slope Estimator

MW-10



n = 10

Slope = 0.004063 units per year.

Mann-Kendall statistic = 9
critical = 30

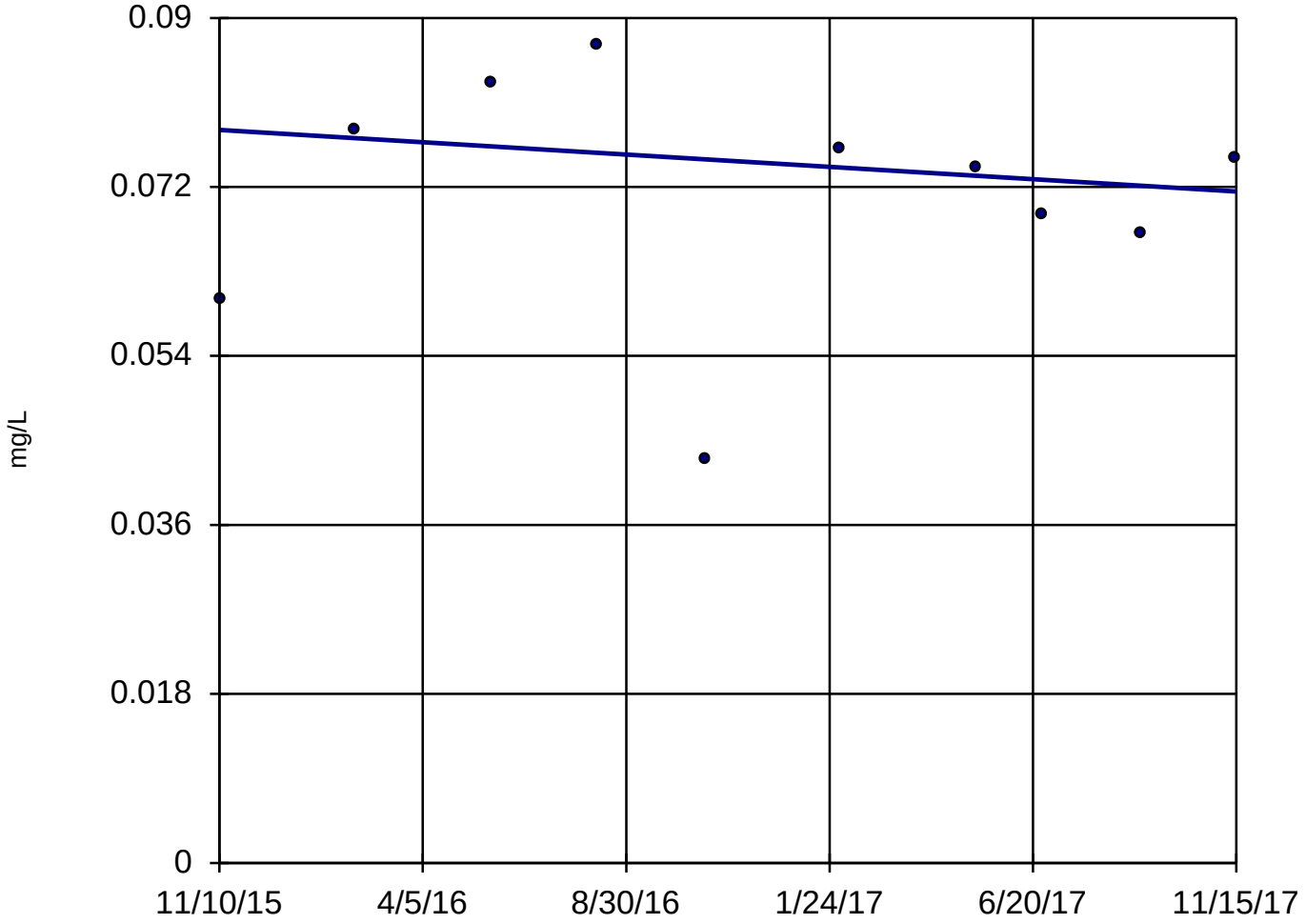
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Molybdenum, Total Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-11



n = 10

Slope = -0.003252 units per year.

Mann-Kendall statistic = -7
critical = -30

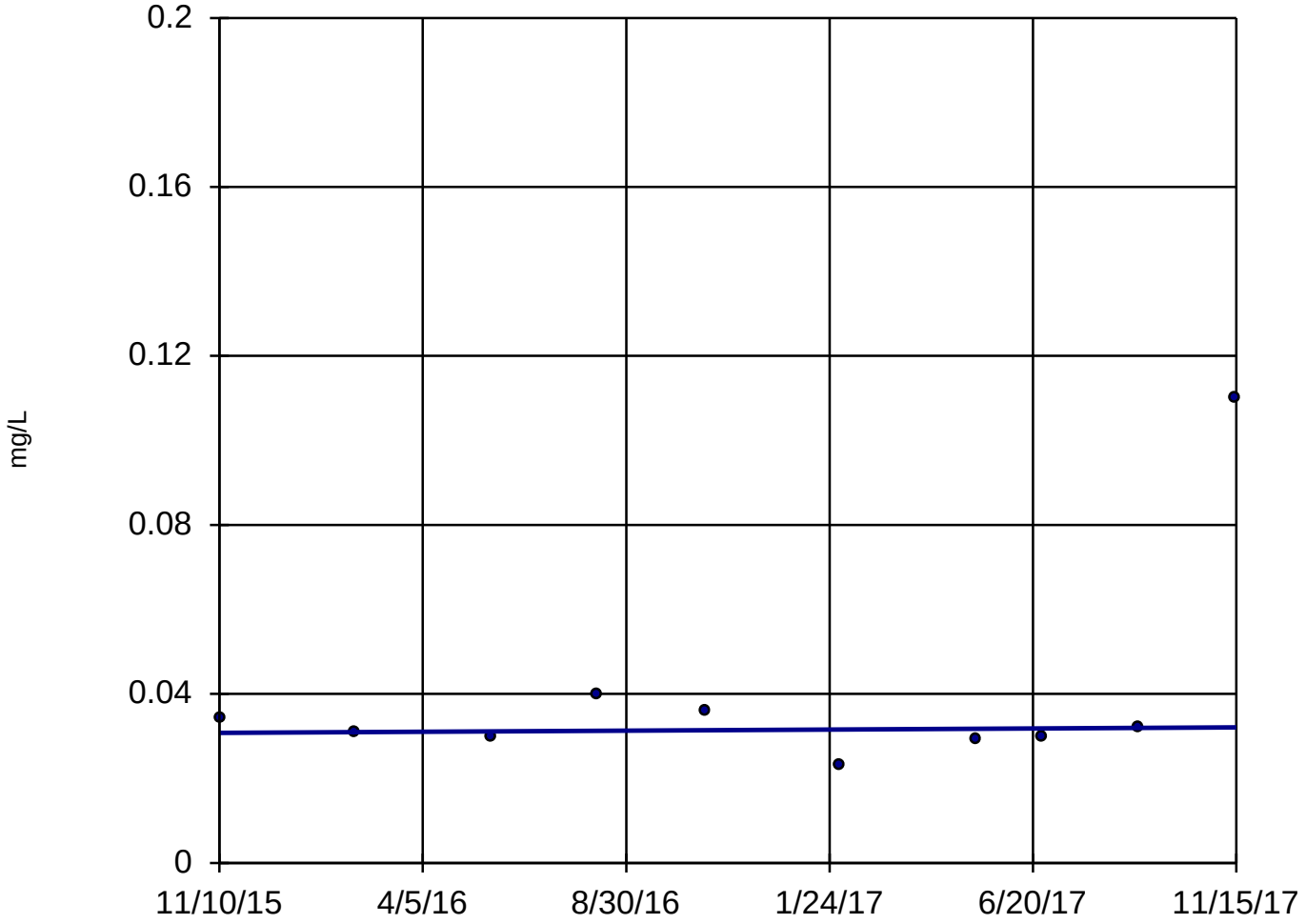
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Molybdenum, Total Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-12



n = 10

Slope = 0.0006426 units per year.

Mann-Kendall statistic = 2
critical = 30

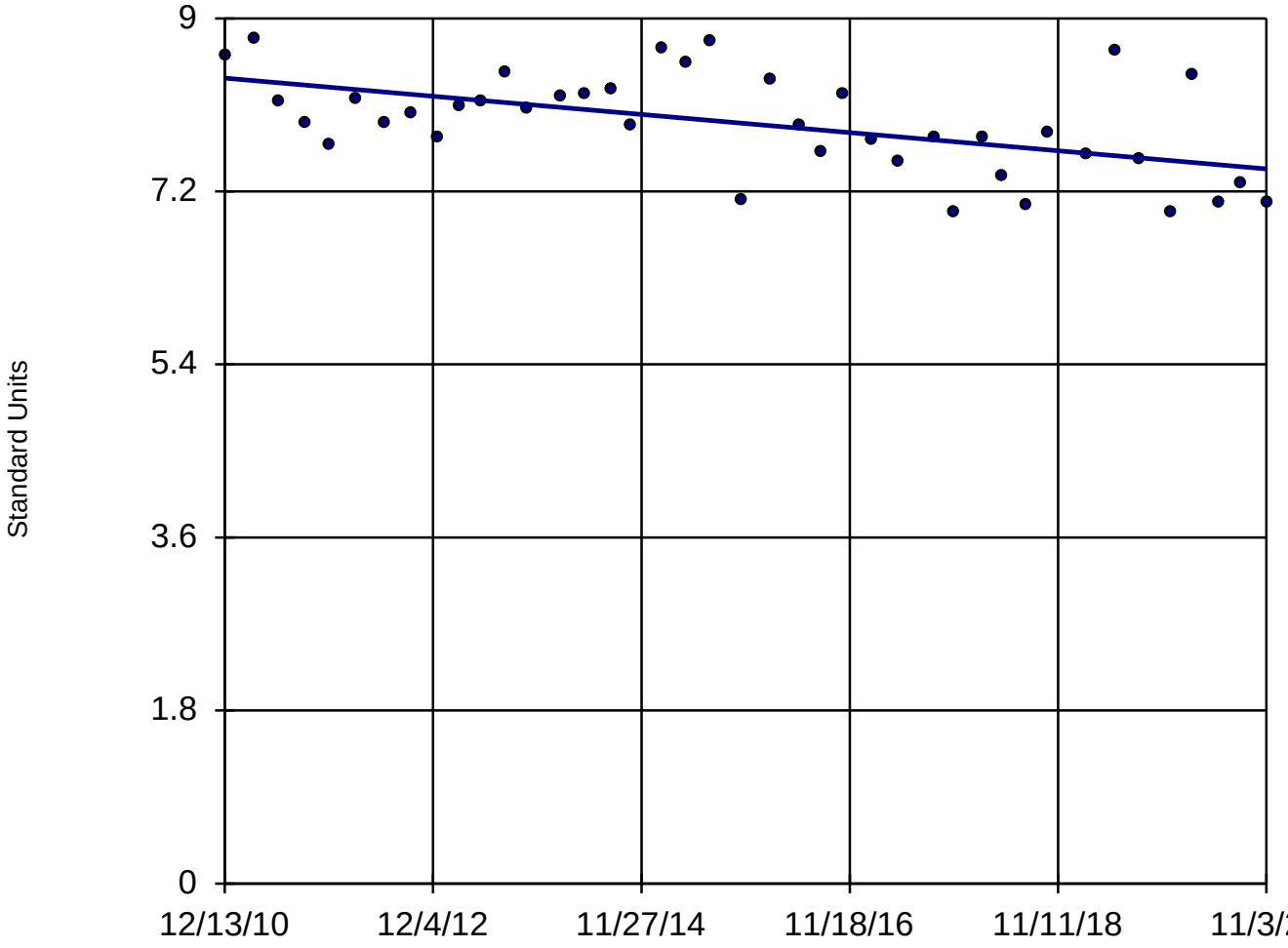
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Molybdenum, Total Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-07



n = 41

Slope = -0.0954 units per year.

Mann-Kendall normal approx. = -3.18
critical = -2.58

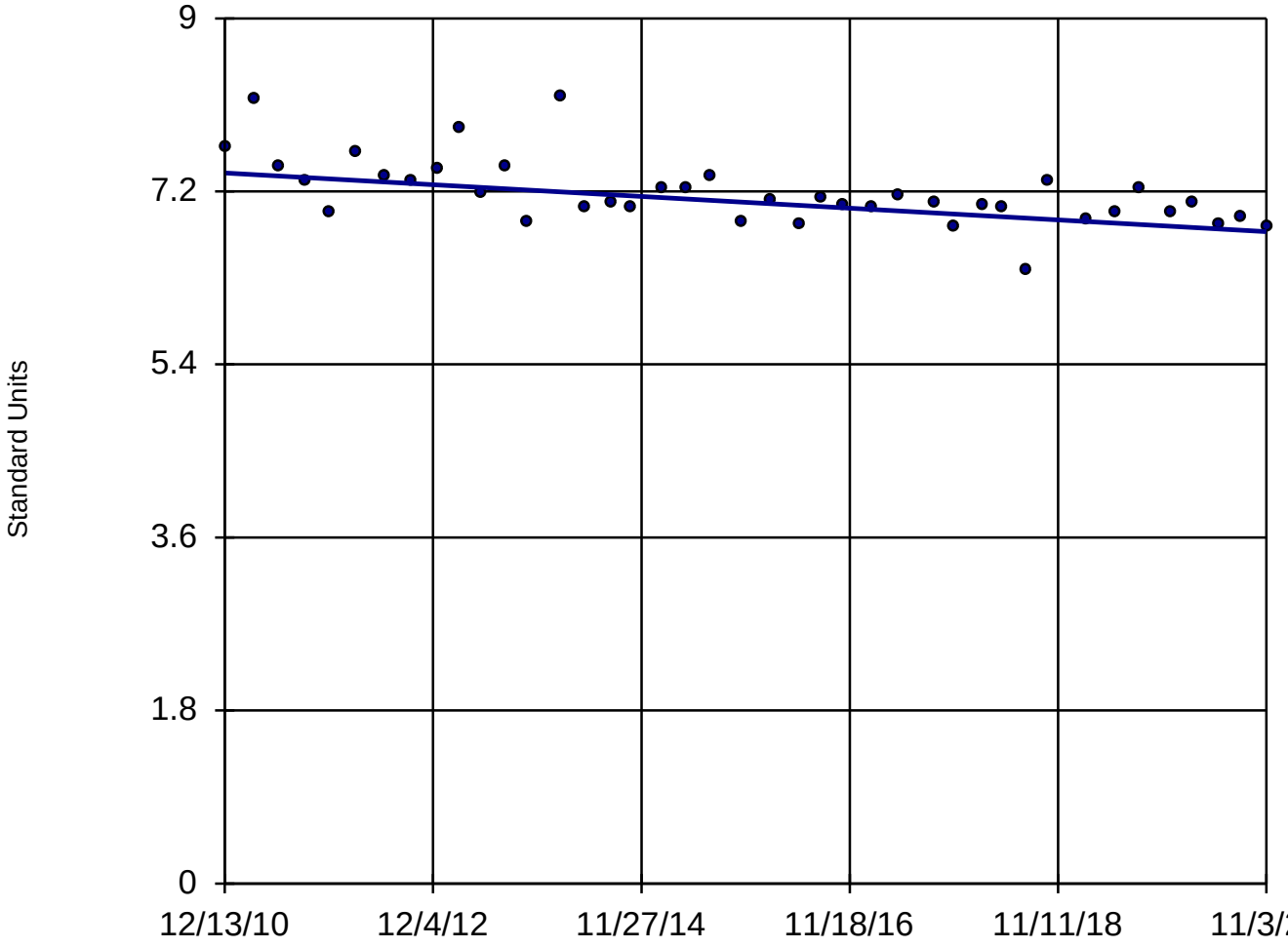
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: pH, Field Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-08



n = 41

Slope = -0.06169 units per year.

Mann-Kendall normal approx. = -4.36
critical = -2.58

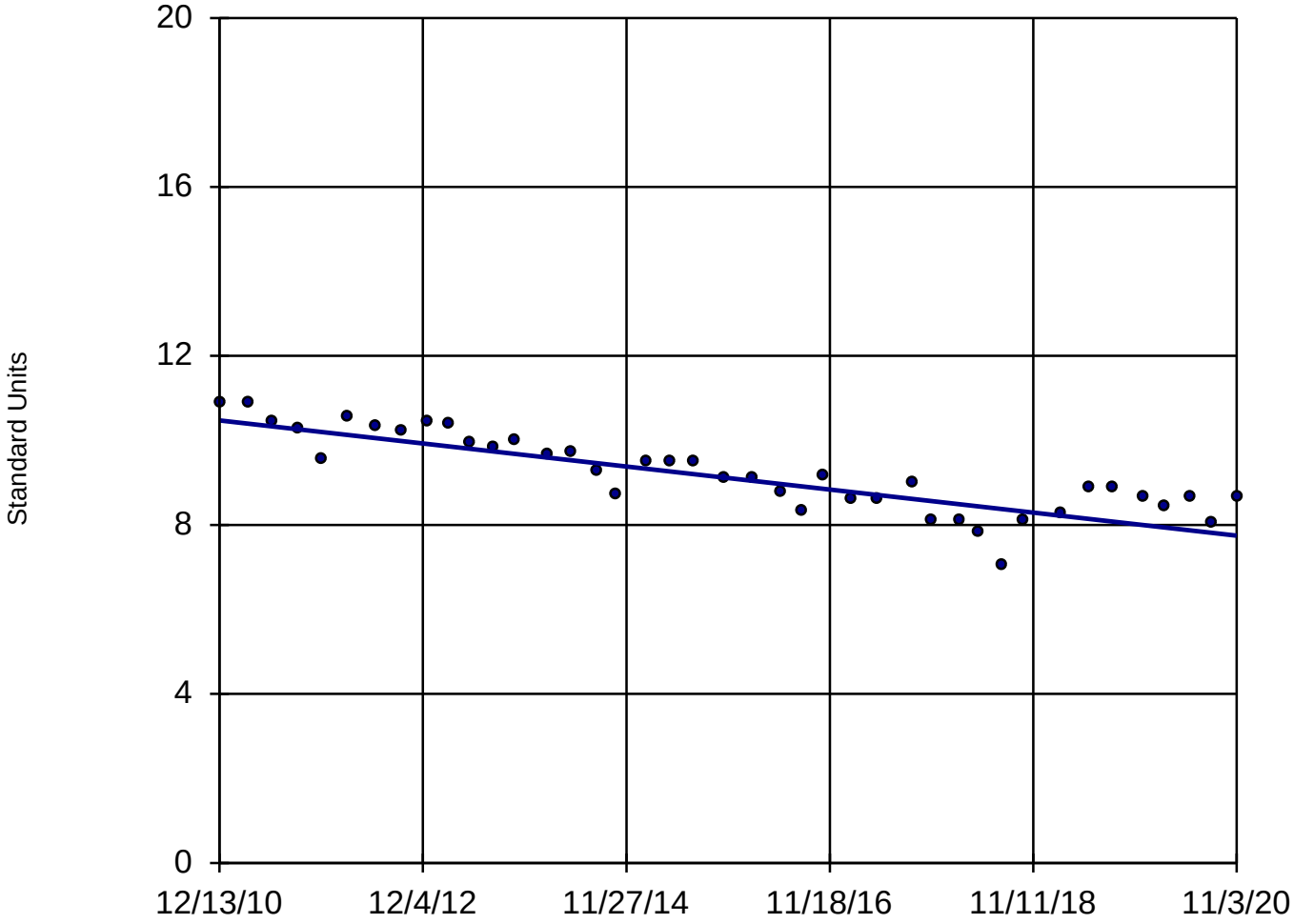
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: pH, Field Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-09



n = 41

Slope = -0.2753 units per year.

Mann-Kendall normal approx. = -6.593
critical = -2.58

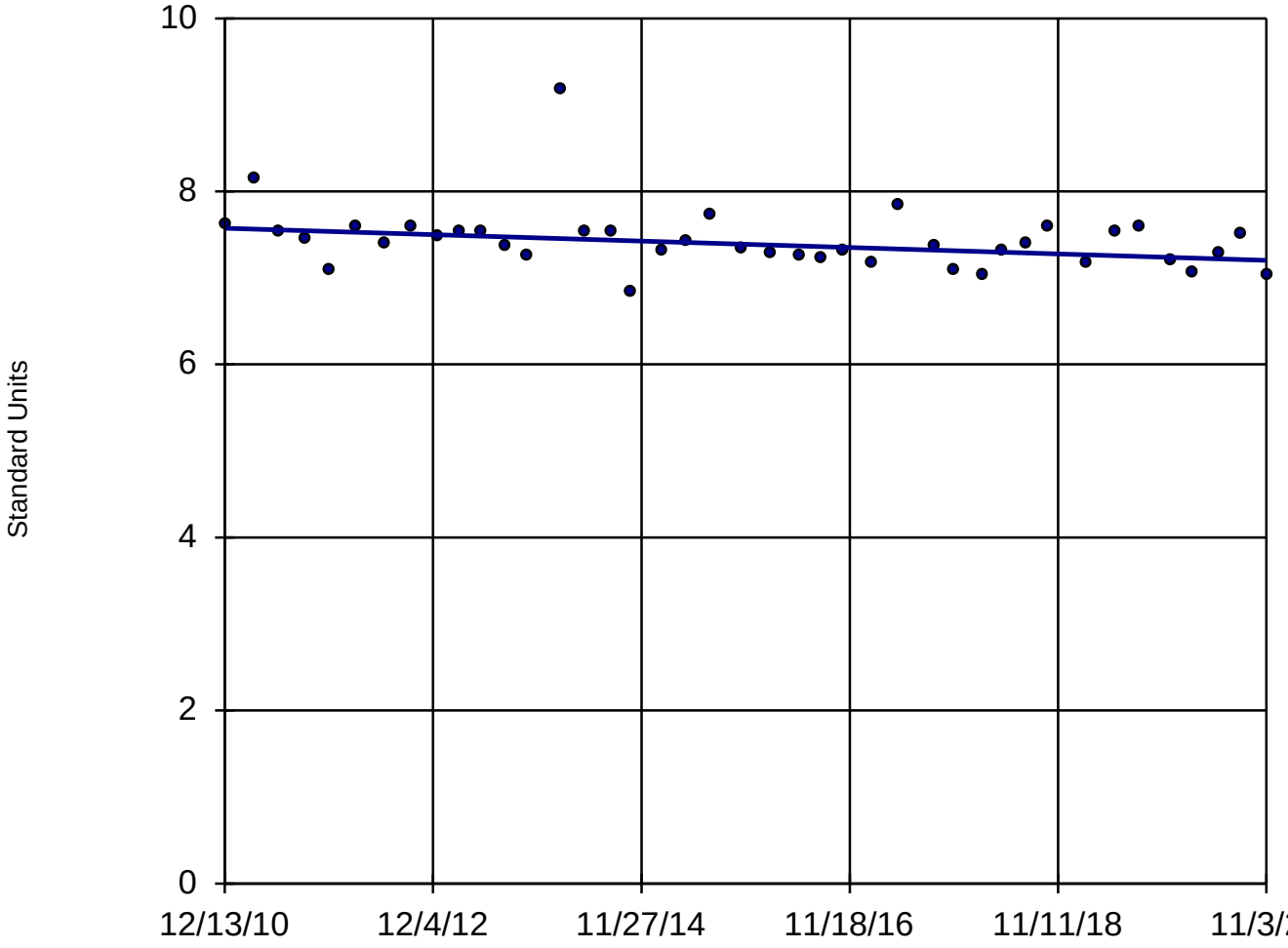
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: pH, Field Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-10



n = 41

Slope = -0.03769 units per year.

Mann-Kendall normal approx. = -2.765
critical = -2.58

Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: pH, Field Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

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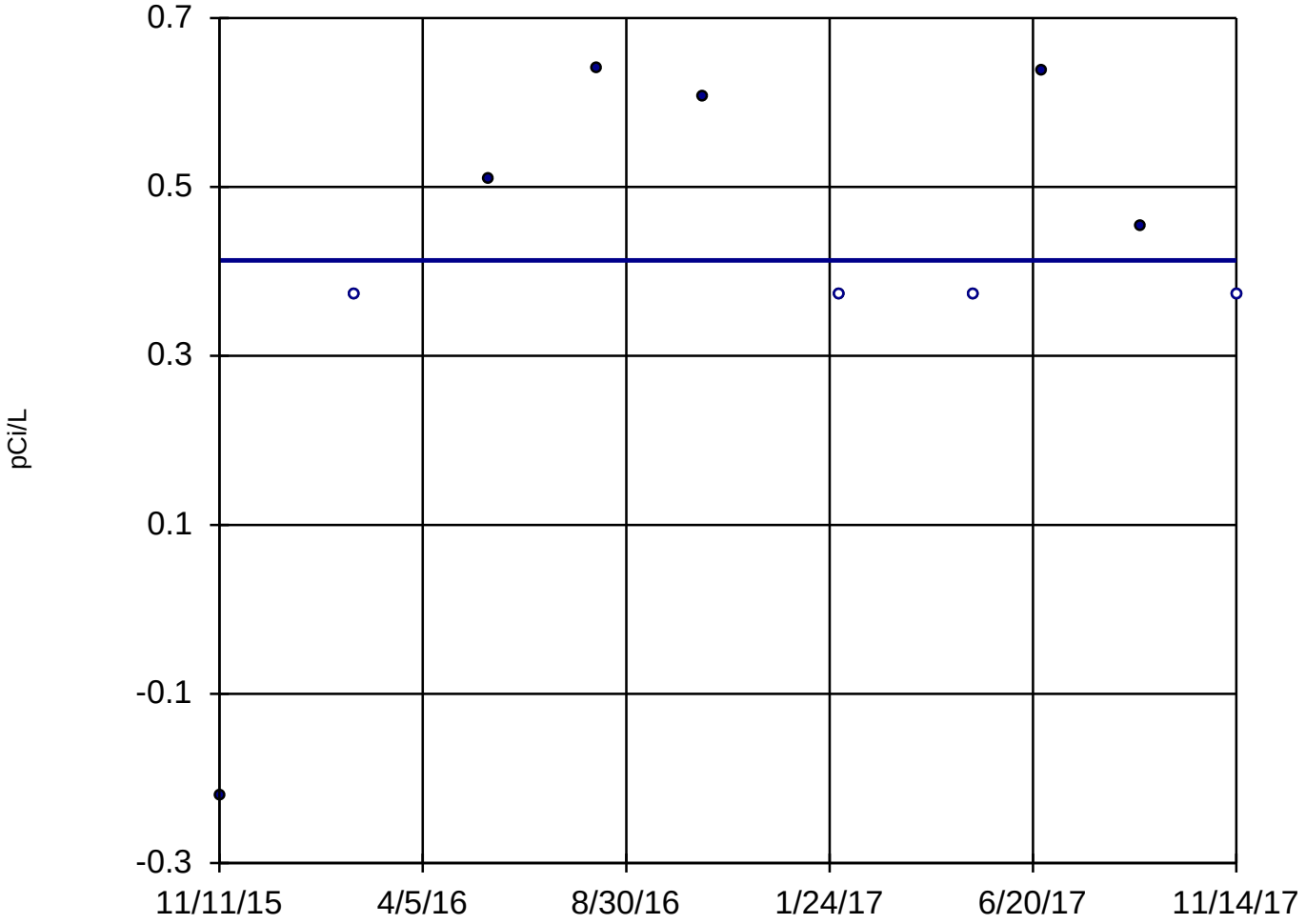
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-09



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 5
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

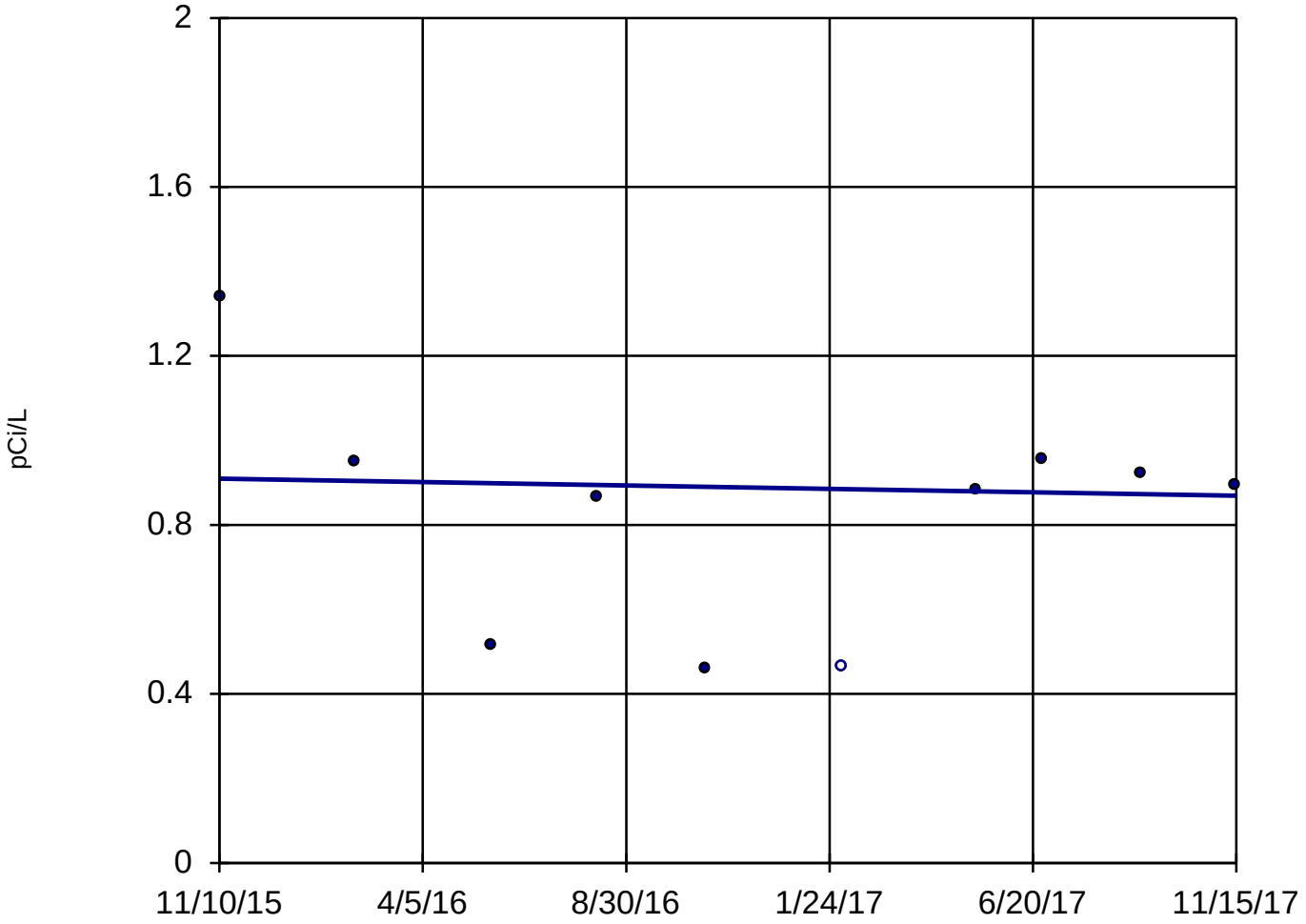
Constituent: Radium 226 + Radium 228, Combined Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10



n = 10

Slope = -0.01989 units per year.

Mann-Kendall statistic = -1
critical = -30

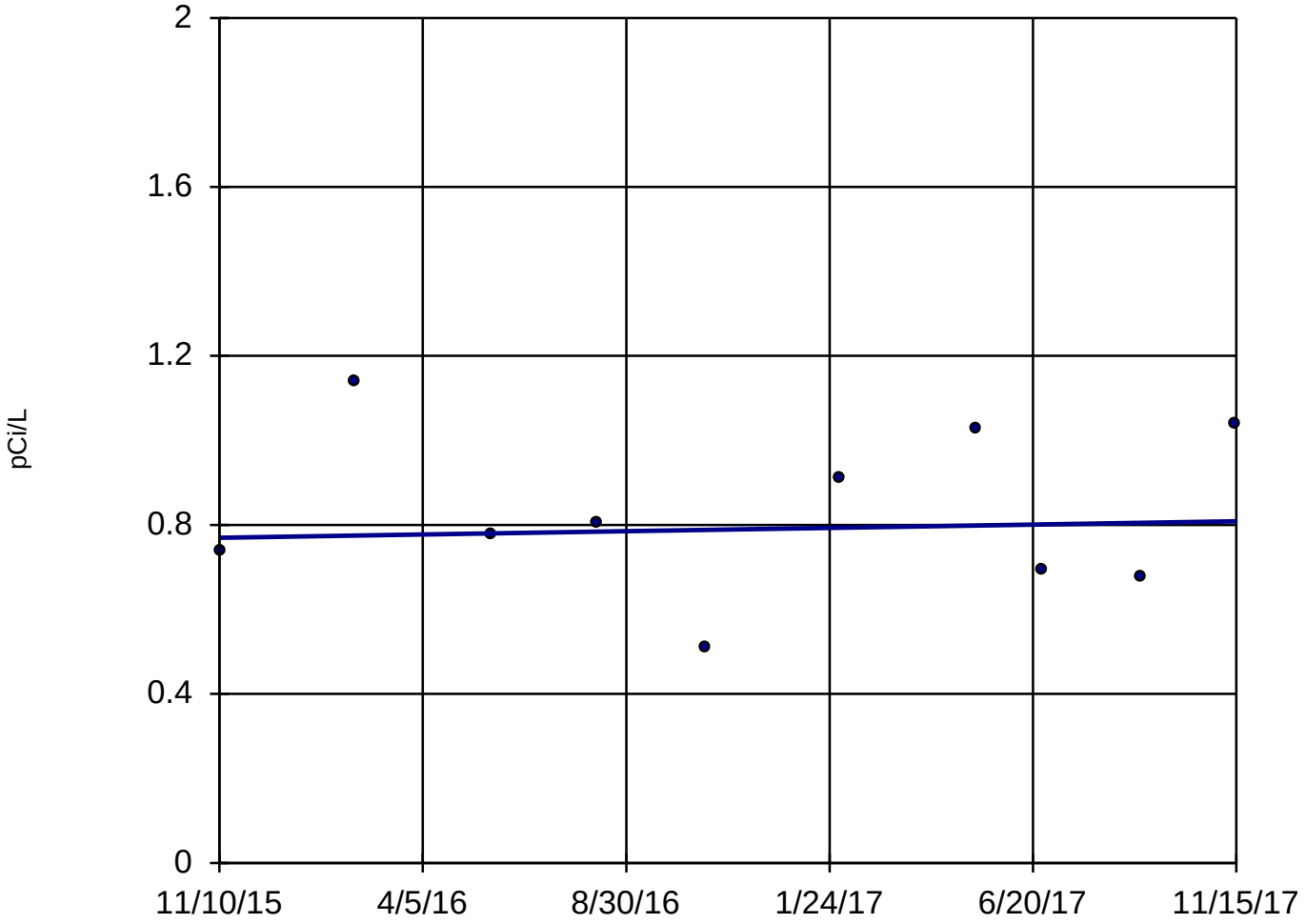
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Radium 226 + Radium 228, Combined Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-11



n = 10

Slope = 0.01931 units per year.

Mann-Kendall statistic = 1
critical = 30

Trend not significant at 99% confidence level (α = 0.005 per tail).

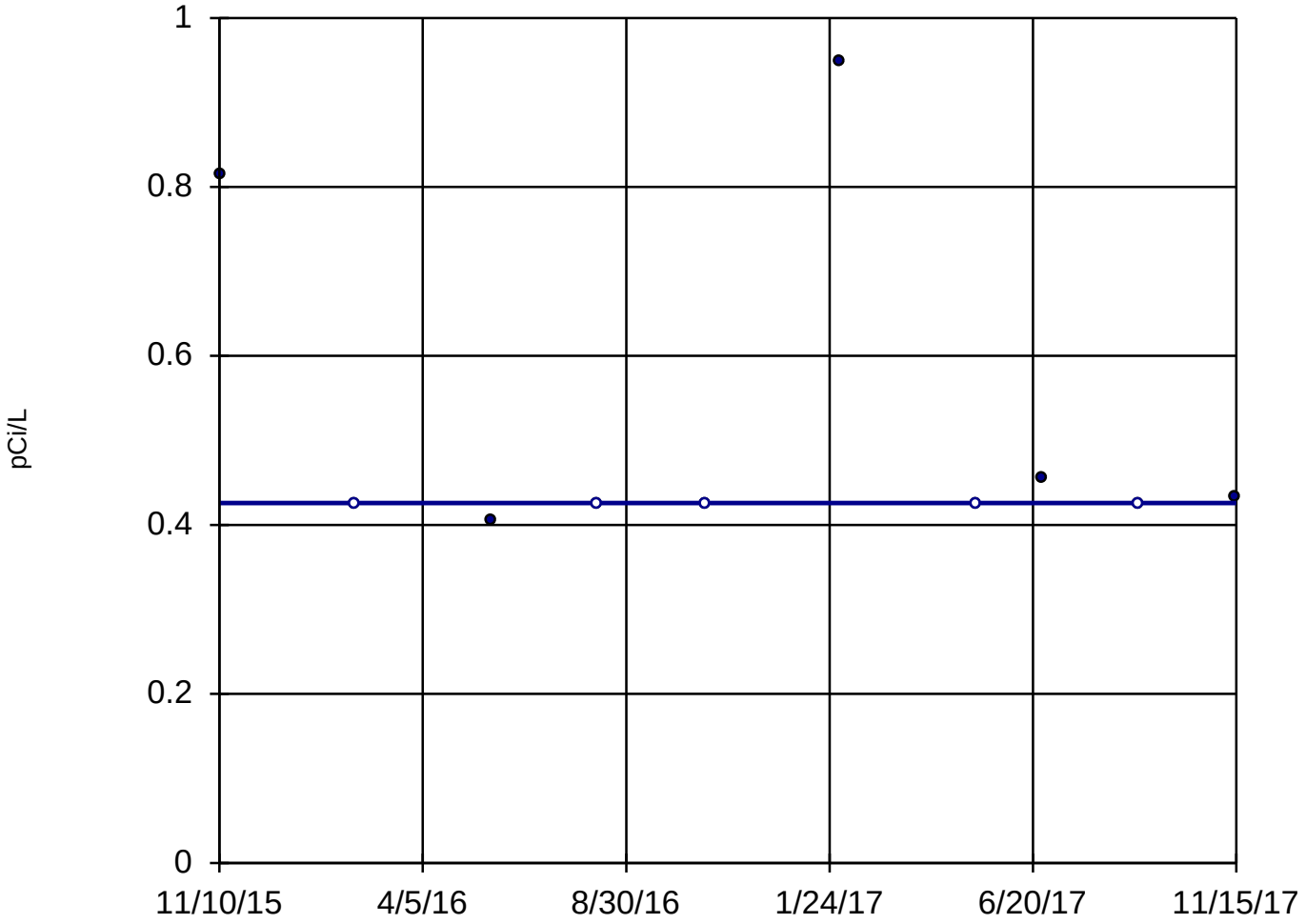
Constituent: Radium 226 + Radium 228, Combined Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-12



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 5
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

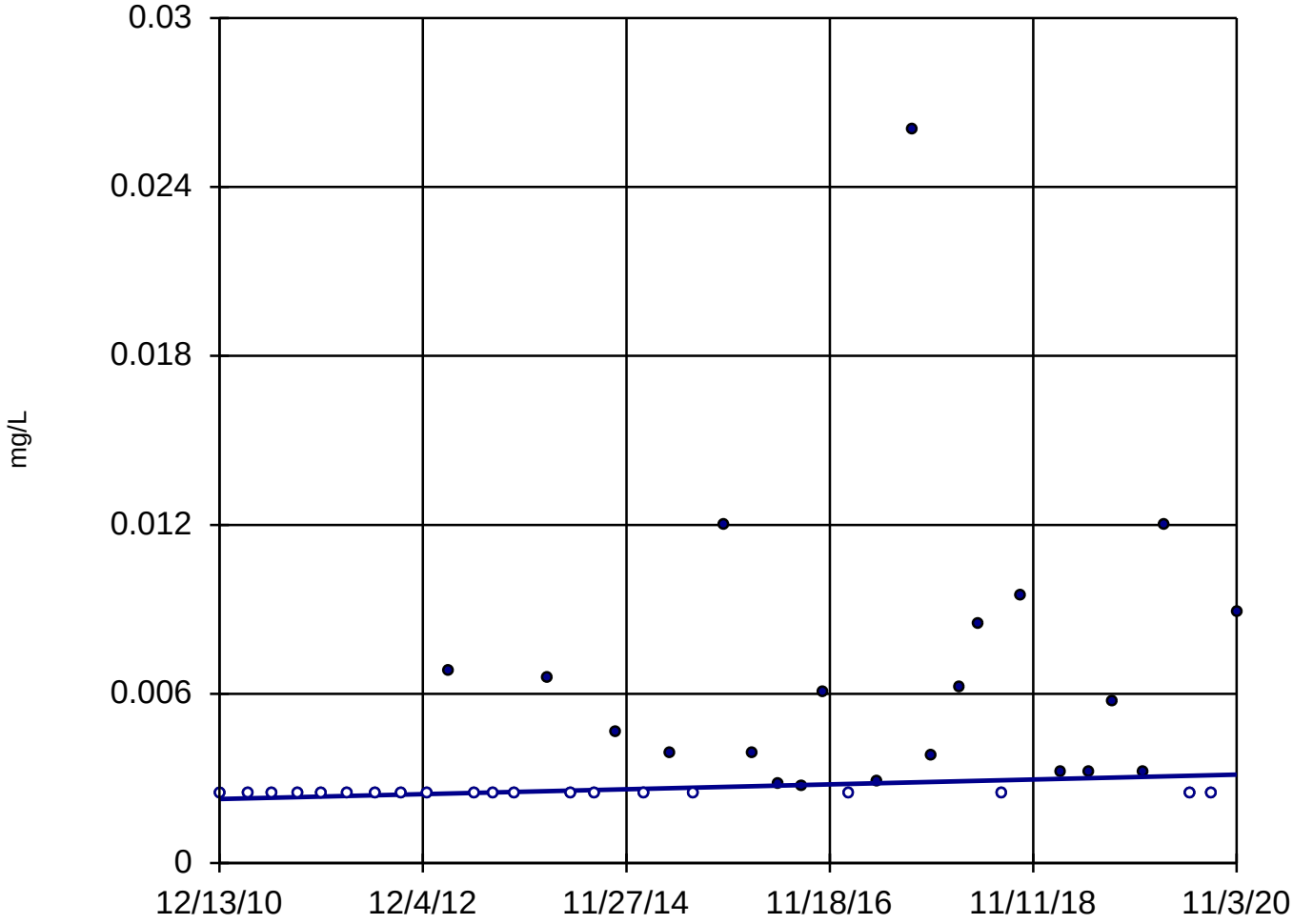
Constituent: Radium 226 + Radium 228, Combined Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-07



n = 41

Slope = 0.00008829 units per year.

Mann-Kendall normal approx. = 3.258
critical = 2.58

Increasing trend significant at 99% confidence level (α = 0.005 per tail).

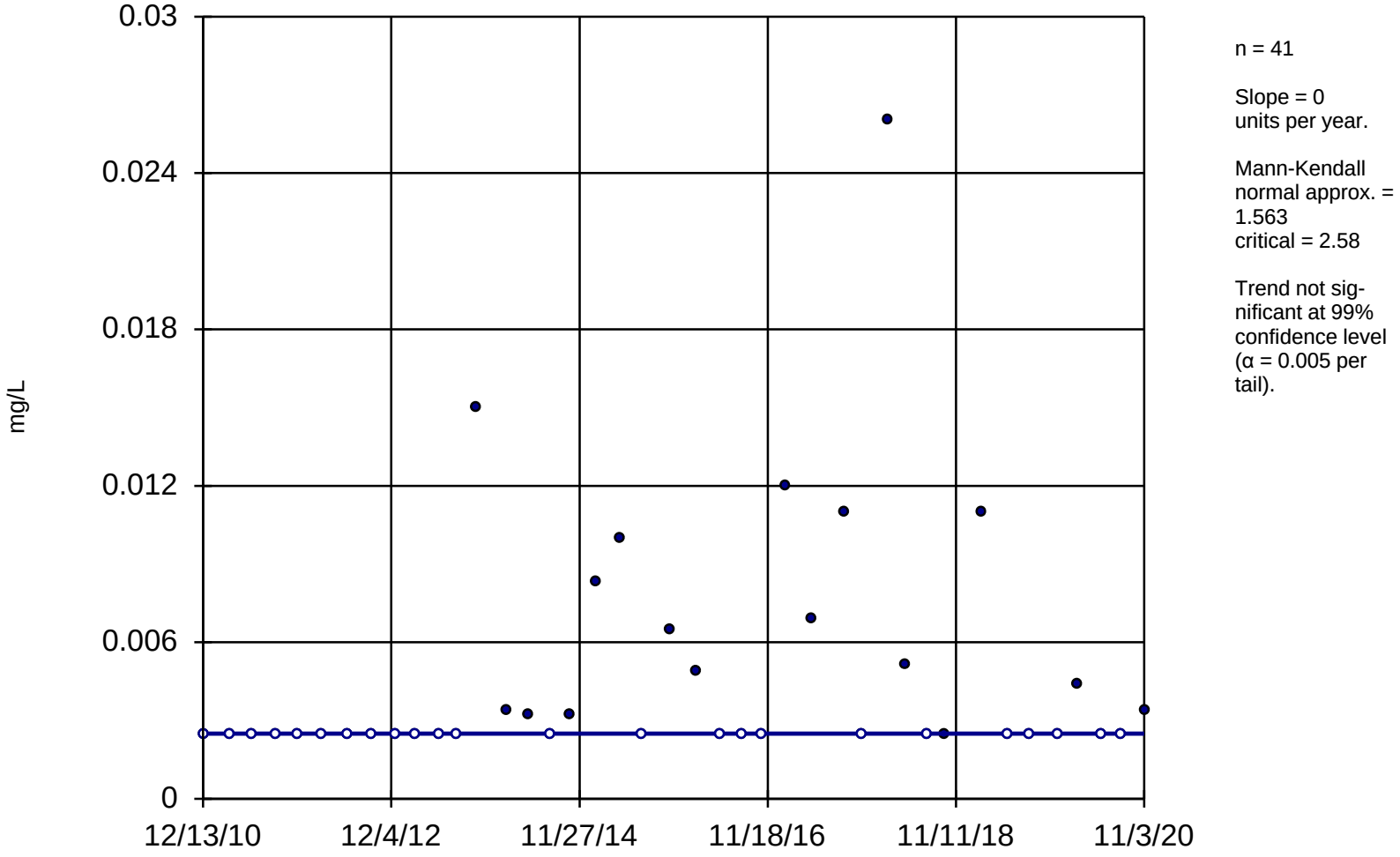
Constituent: Selenium, Dissolved Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
1.563
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

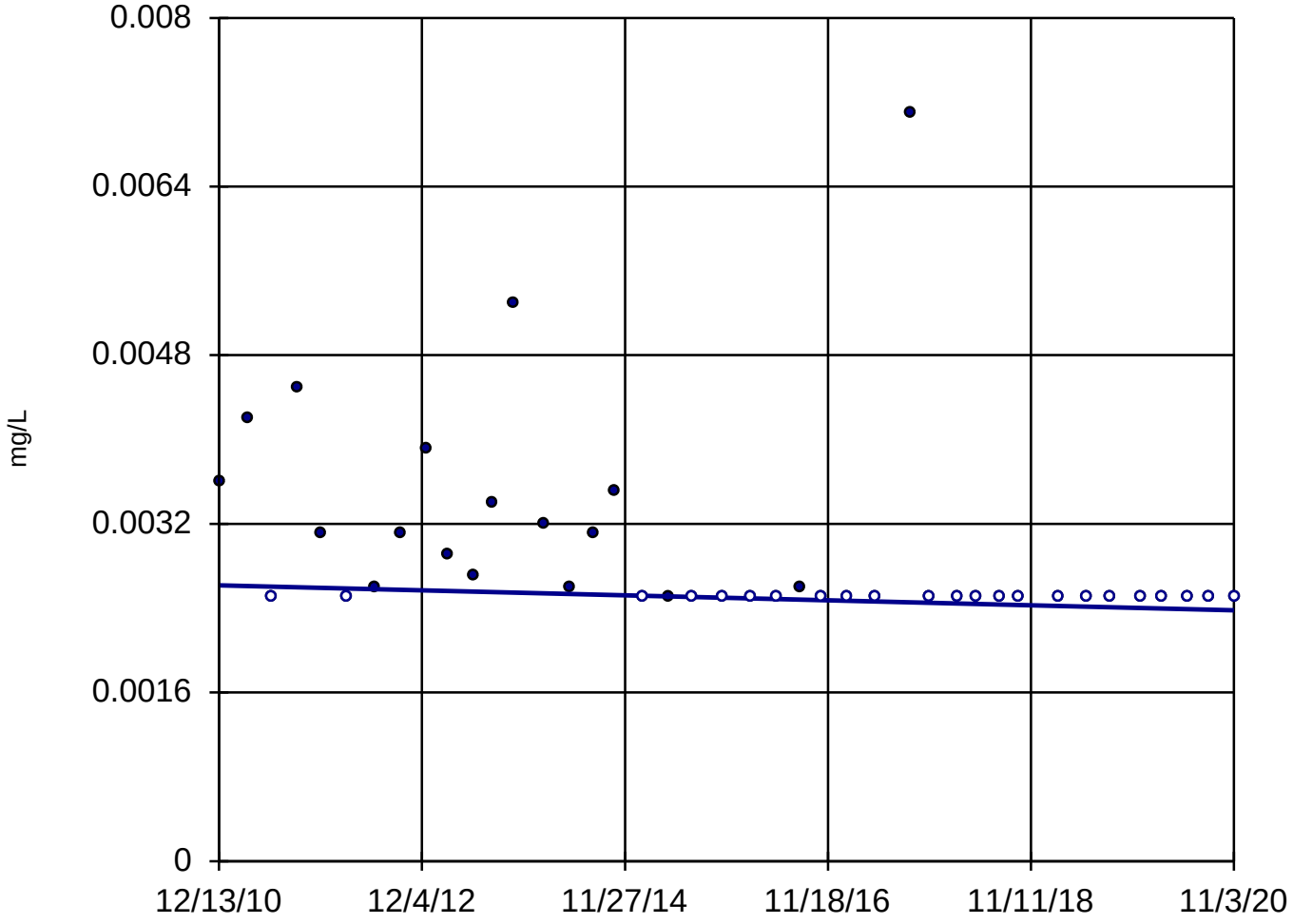
Constituent: Selenium, Dissolved Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-09



n = 41

Slope = -0.00002375 units per year.

Mann-Kendall normal approx. = -4.197
critical = -2.58

Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

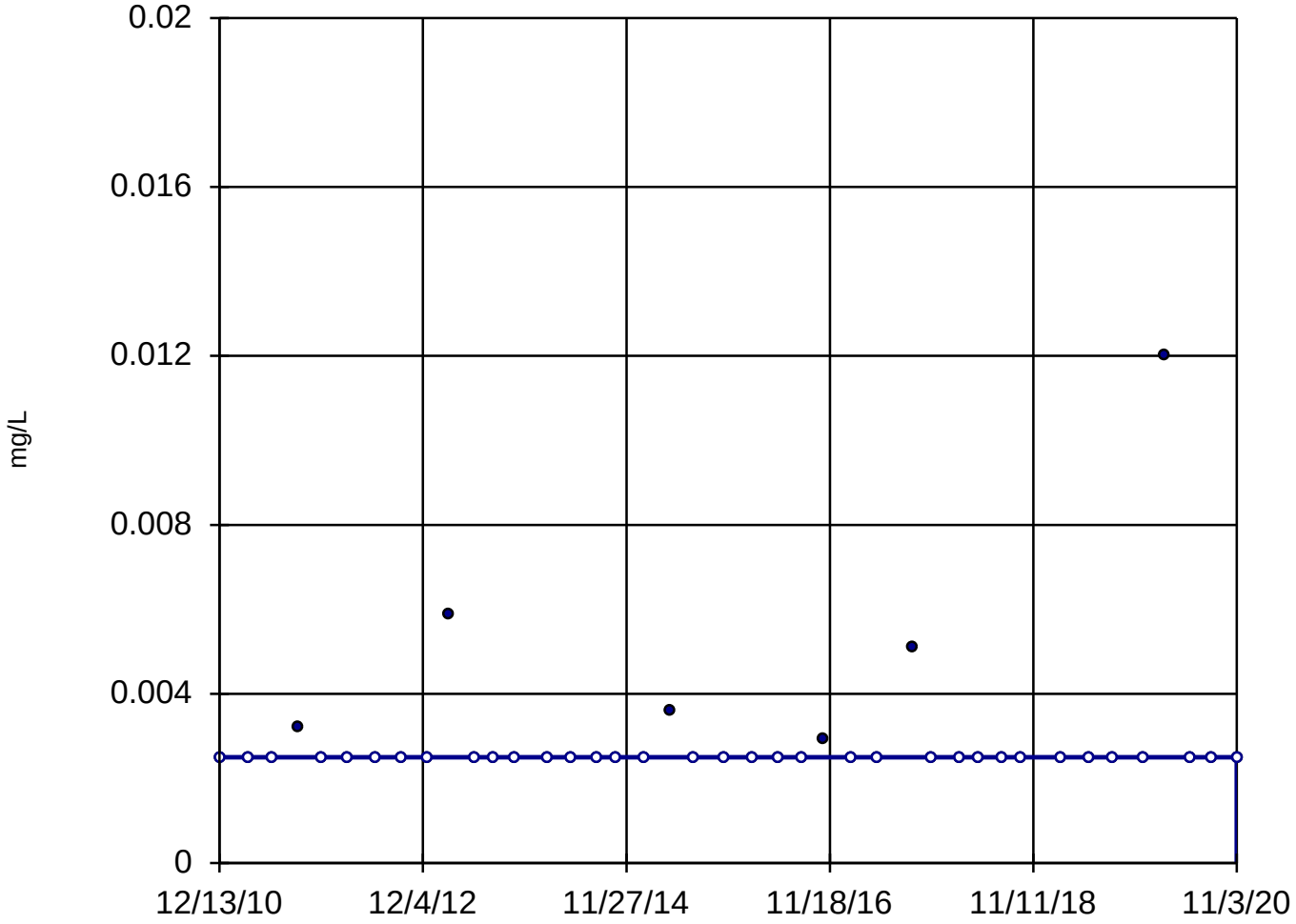
Constituent: Selenium, Dissolved Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

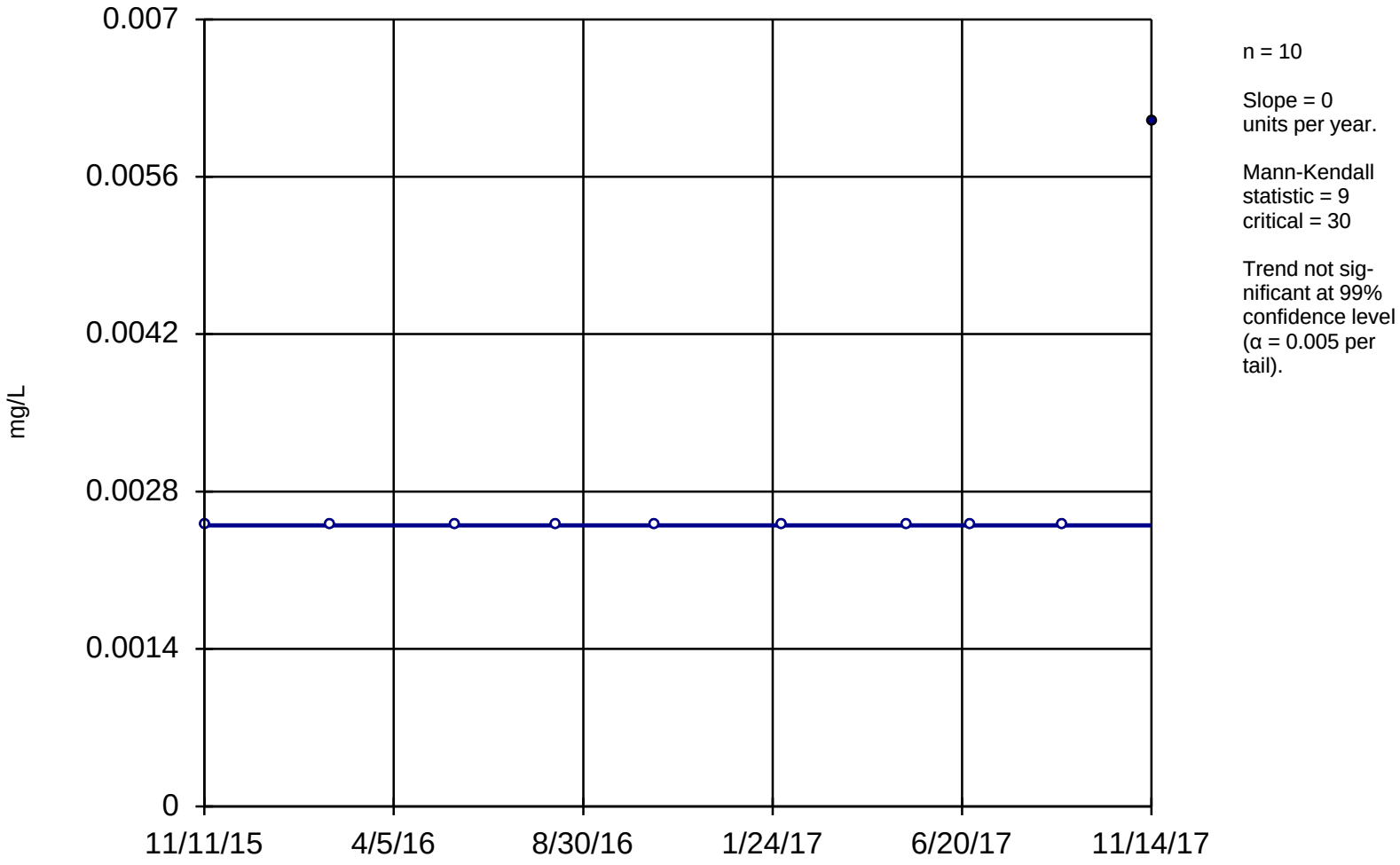
Constituent: Selenium, Dissolved Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-09



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 9
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

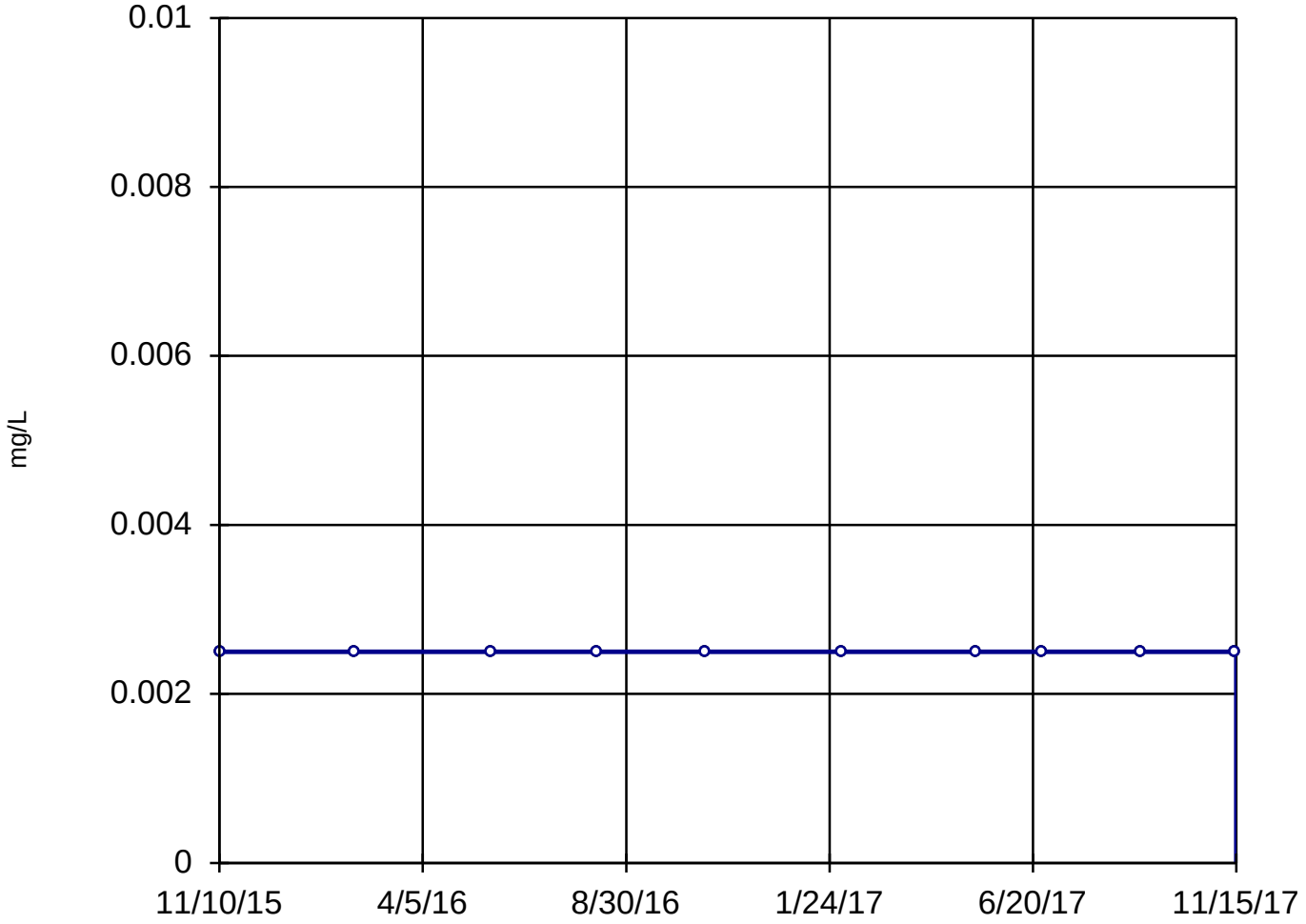
Constituent: Selenium, Total Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

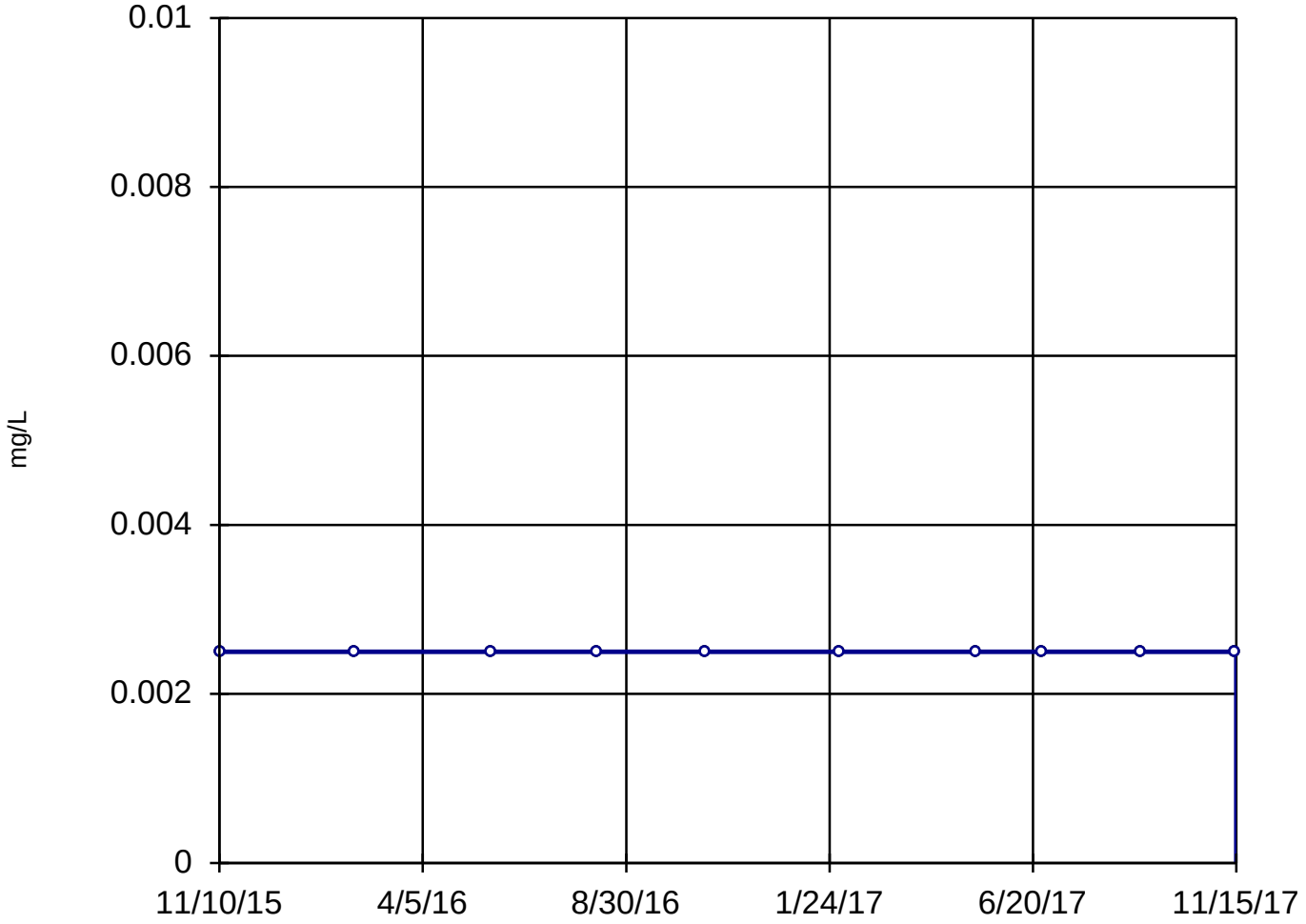
Constituent: Selenium, Total Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-11



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

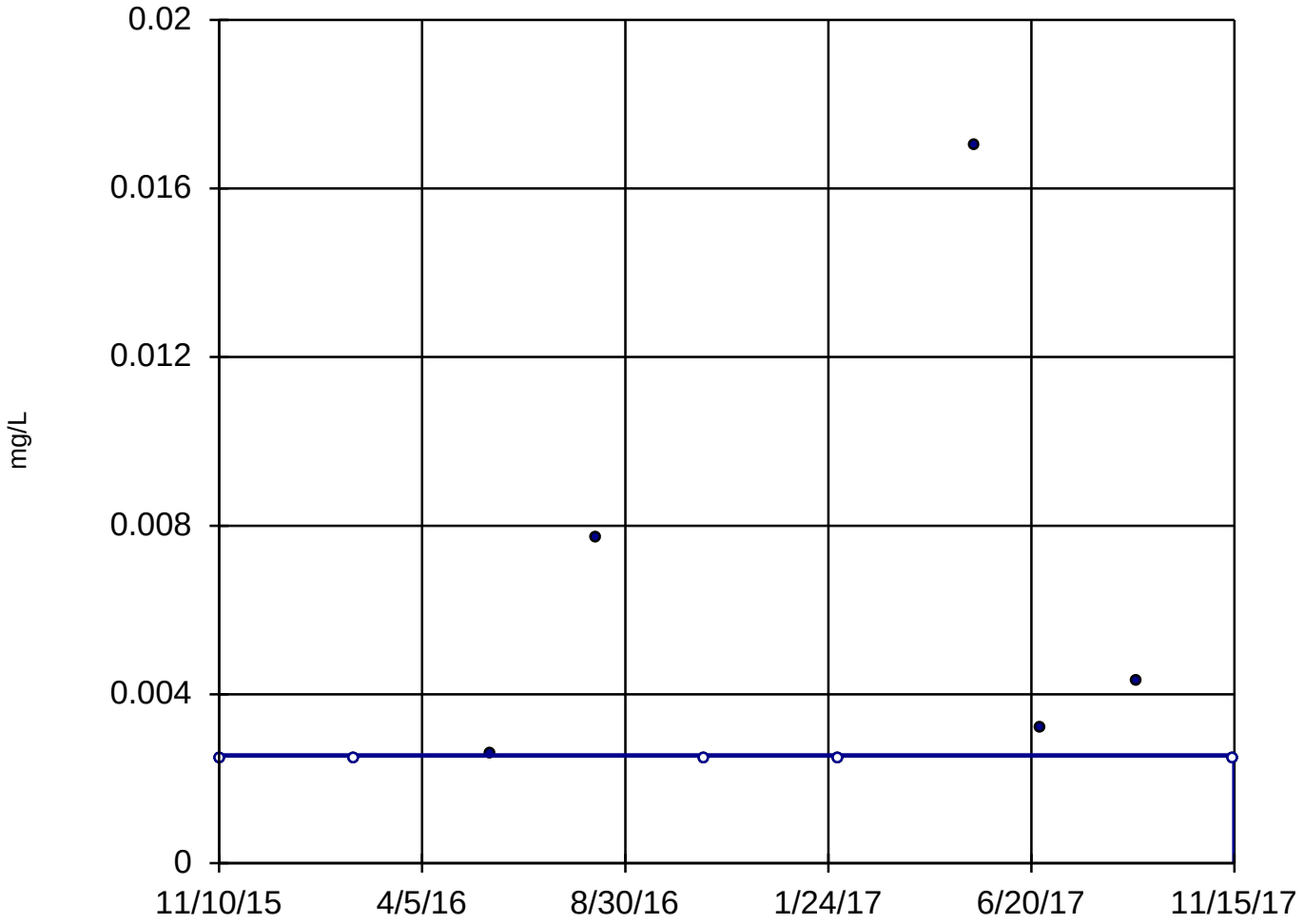
Constituent: Selenium, Total Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-12



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 9
critical = 30

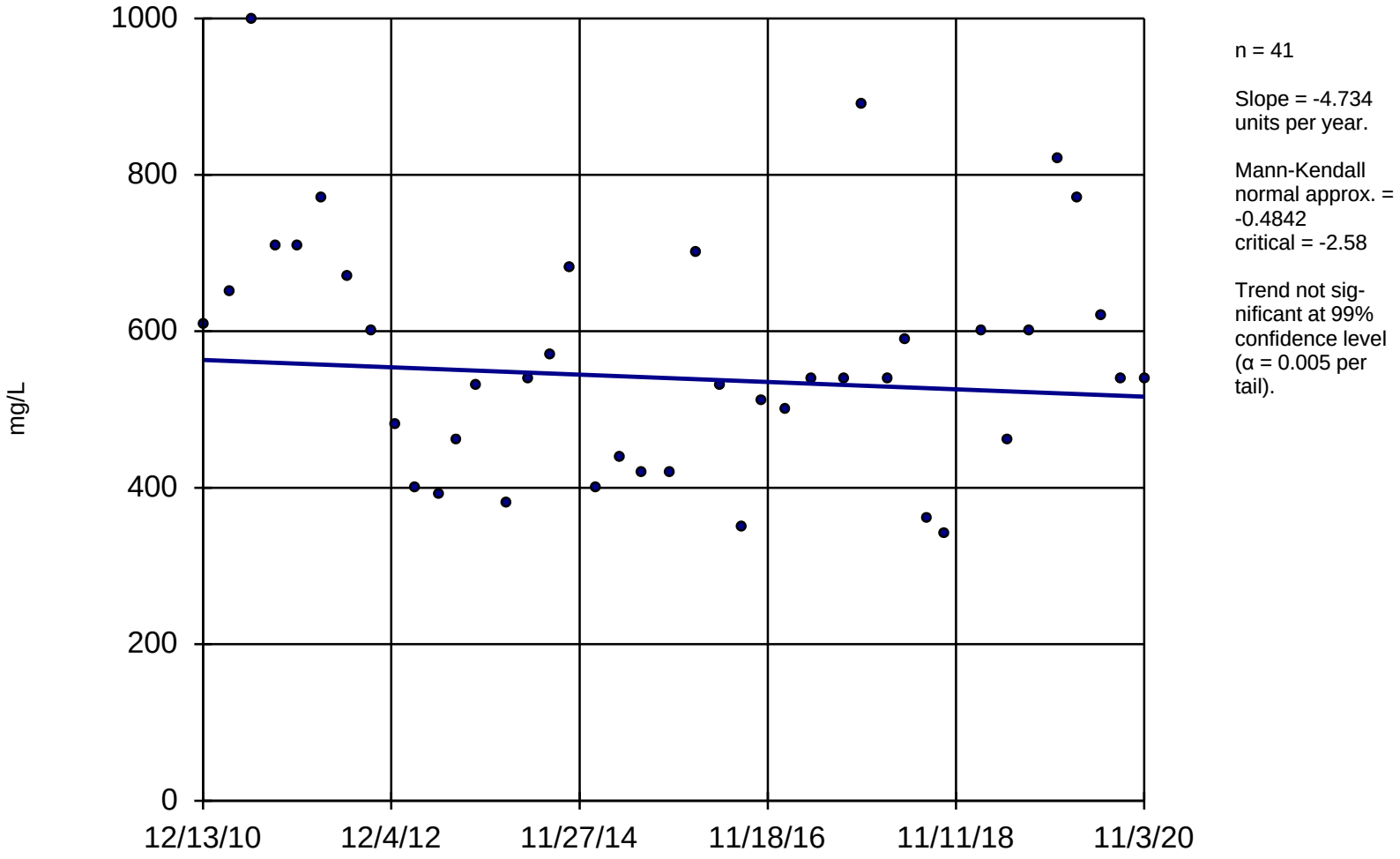
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Selenium, Total Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-07



n = 41

Slope = -4.734 units per year.

Mann-Kendall normal approx. = -0.4842
critical = -2.58

Trend not significant at 99% confidence level (α = 0.005 per tail).

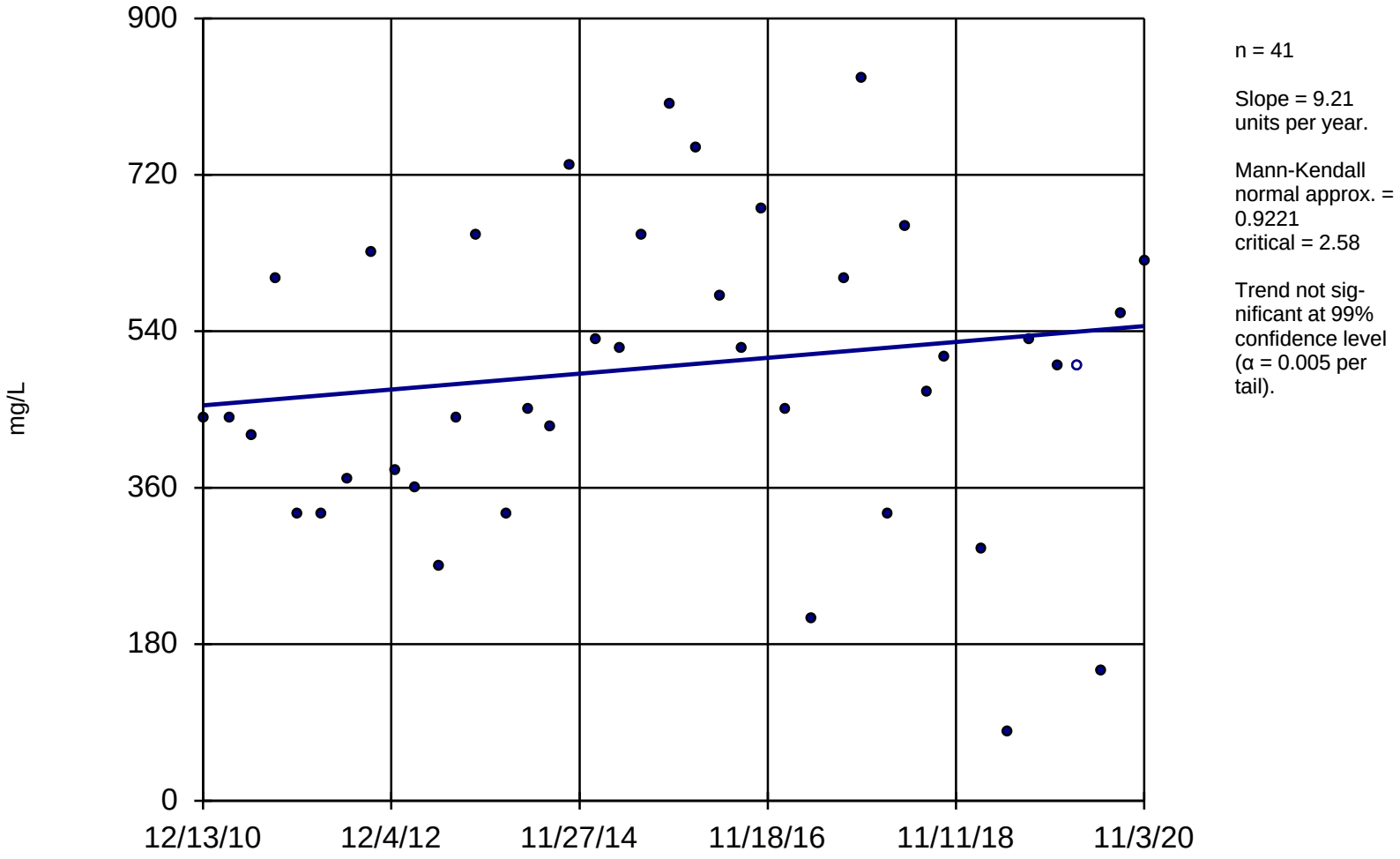
Constituent: Sulfate Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 41

Slope = 9.21 units per year.

Mann-Kendall normal approx. = 0.9221
critical = 2.58

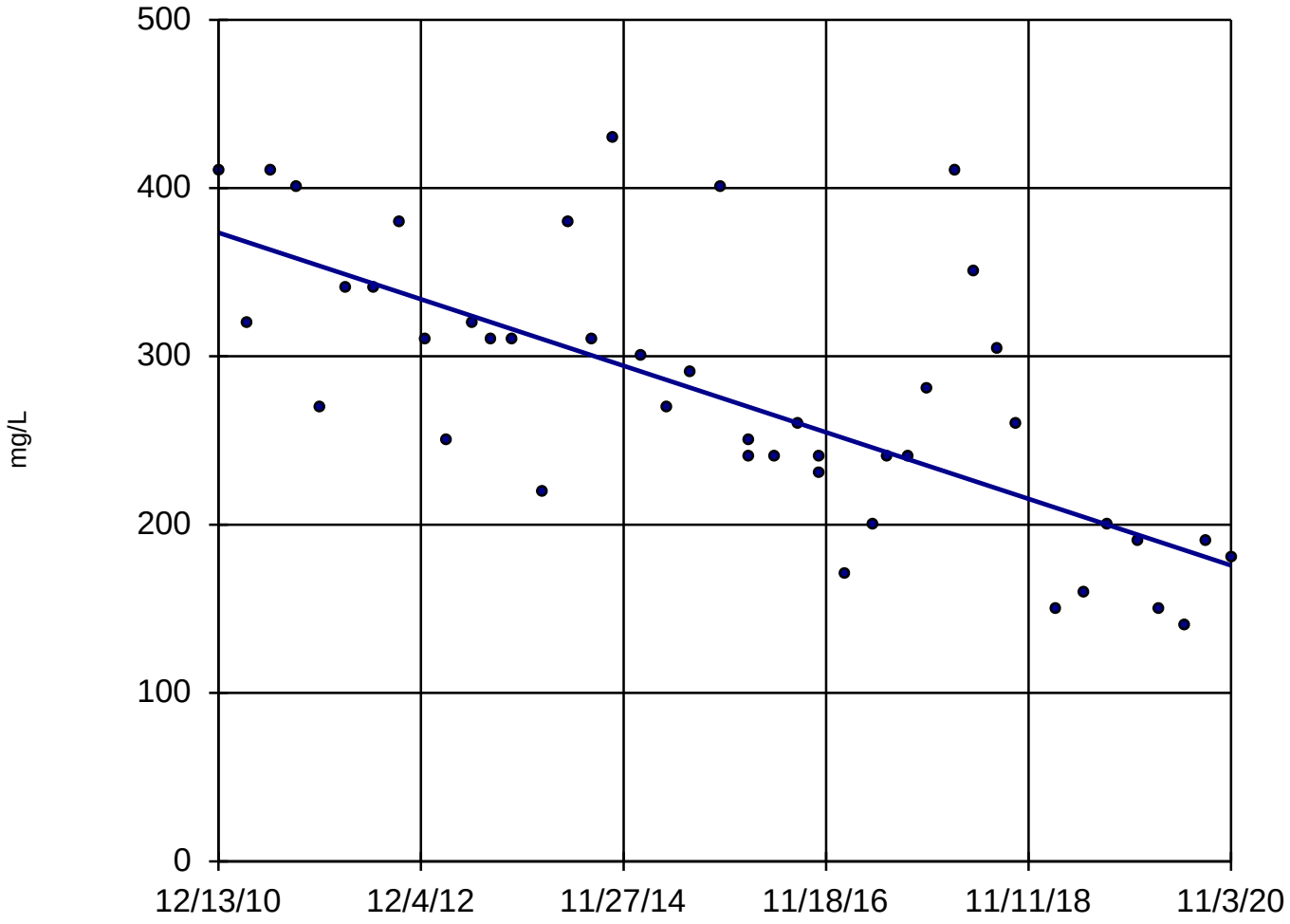
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Sulfate Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-09



n = 44

Slope = -19.97 units per year.

Mann-Kendall normal approx. = -5.128
critical = -2.58

Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

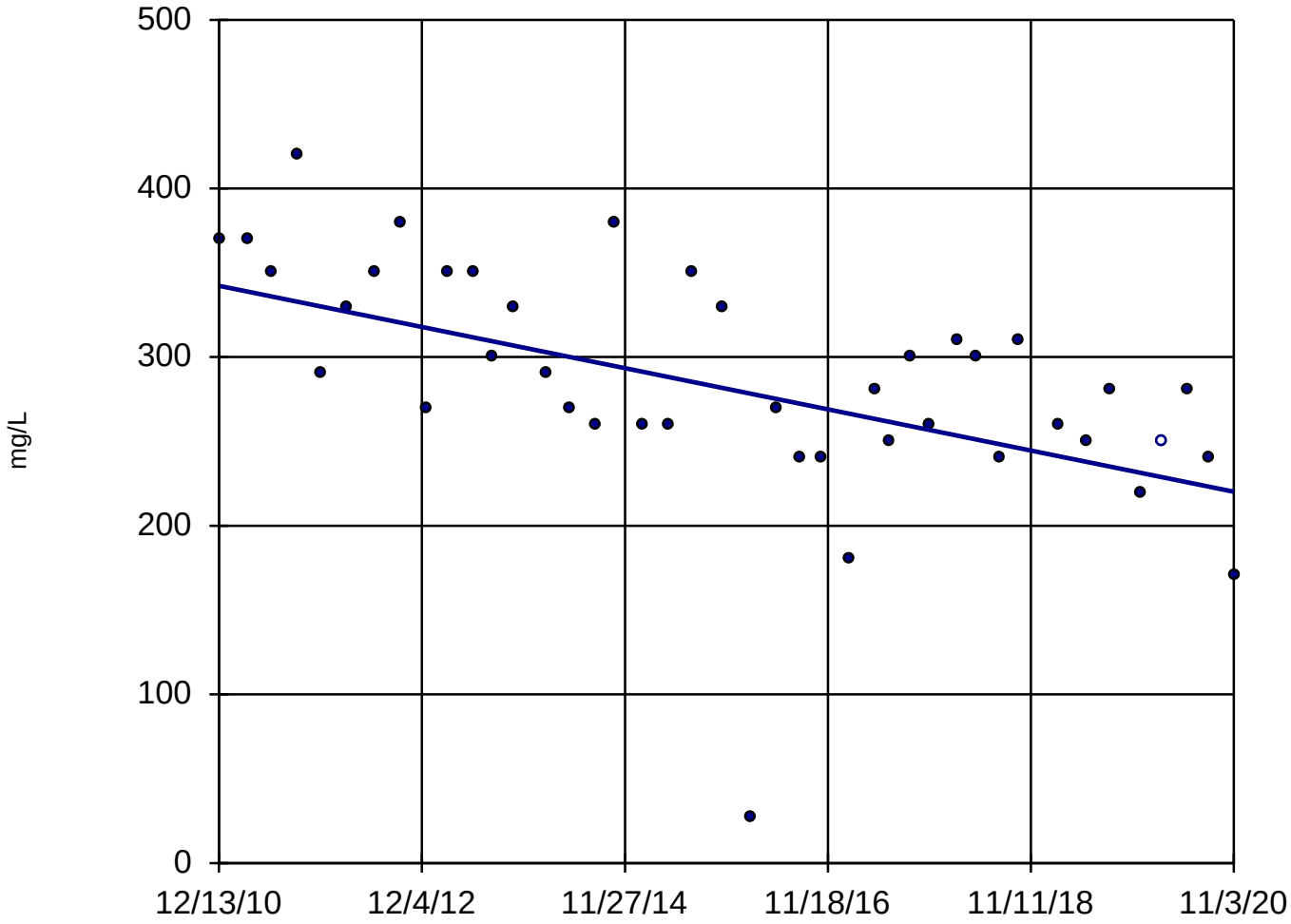
Constituent: Sulfate Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10



n = 42

Slope = -12.33 units per year.

Mann-Kendall normal approx. = -4.428
critical = -2.58

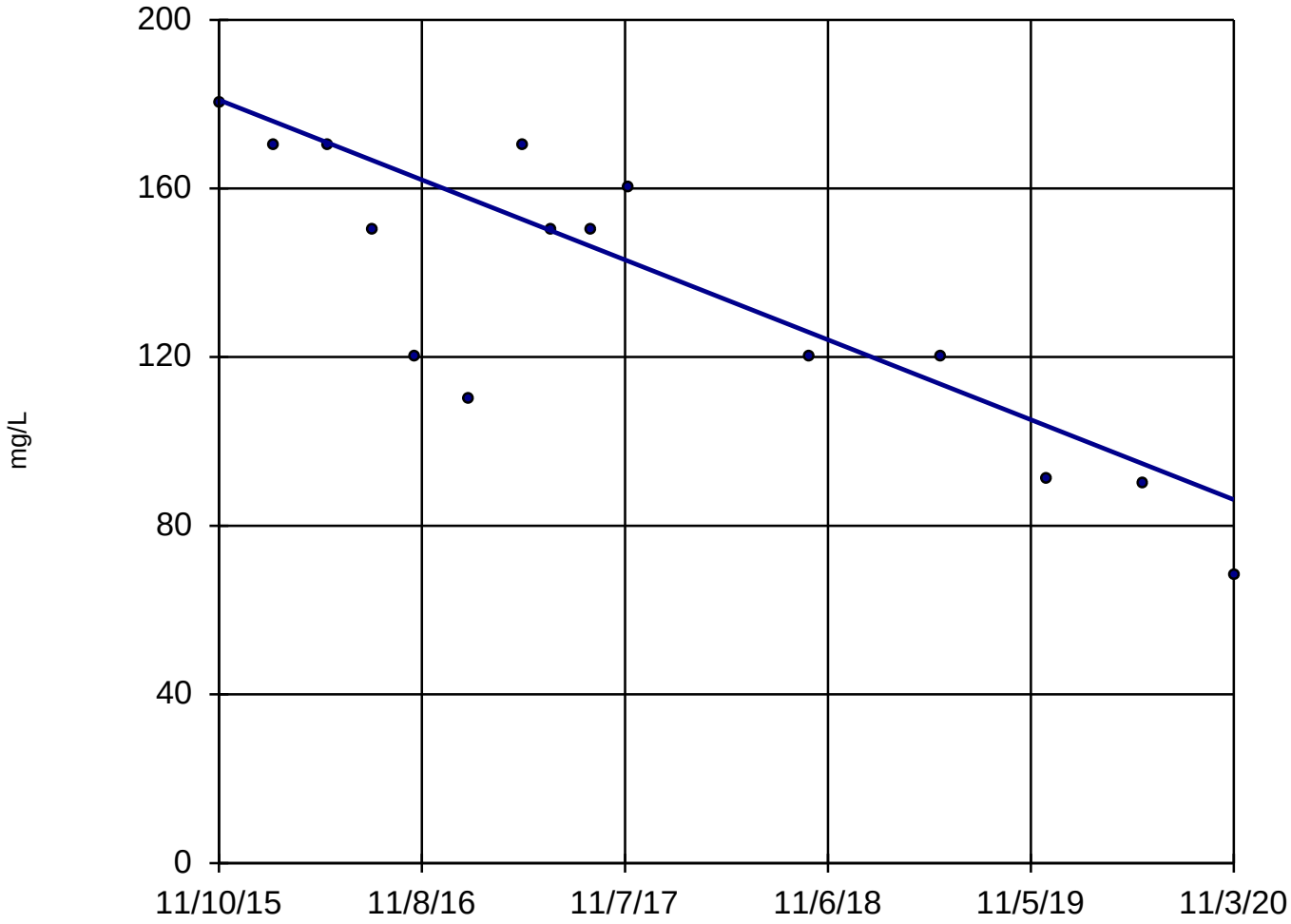
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Sulfate Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-11



n = 15

Slope = -19.01 units per year.

Mann-Kendall statistic = -68
critical = -53

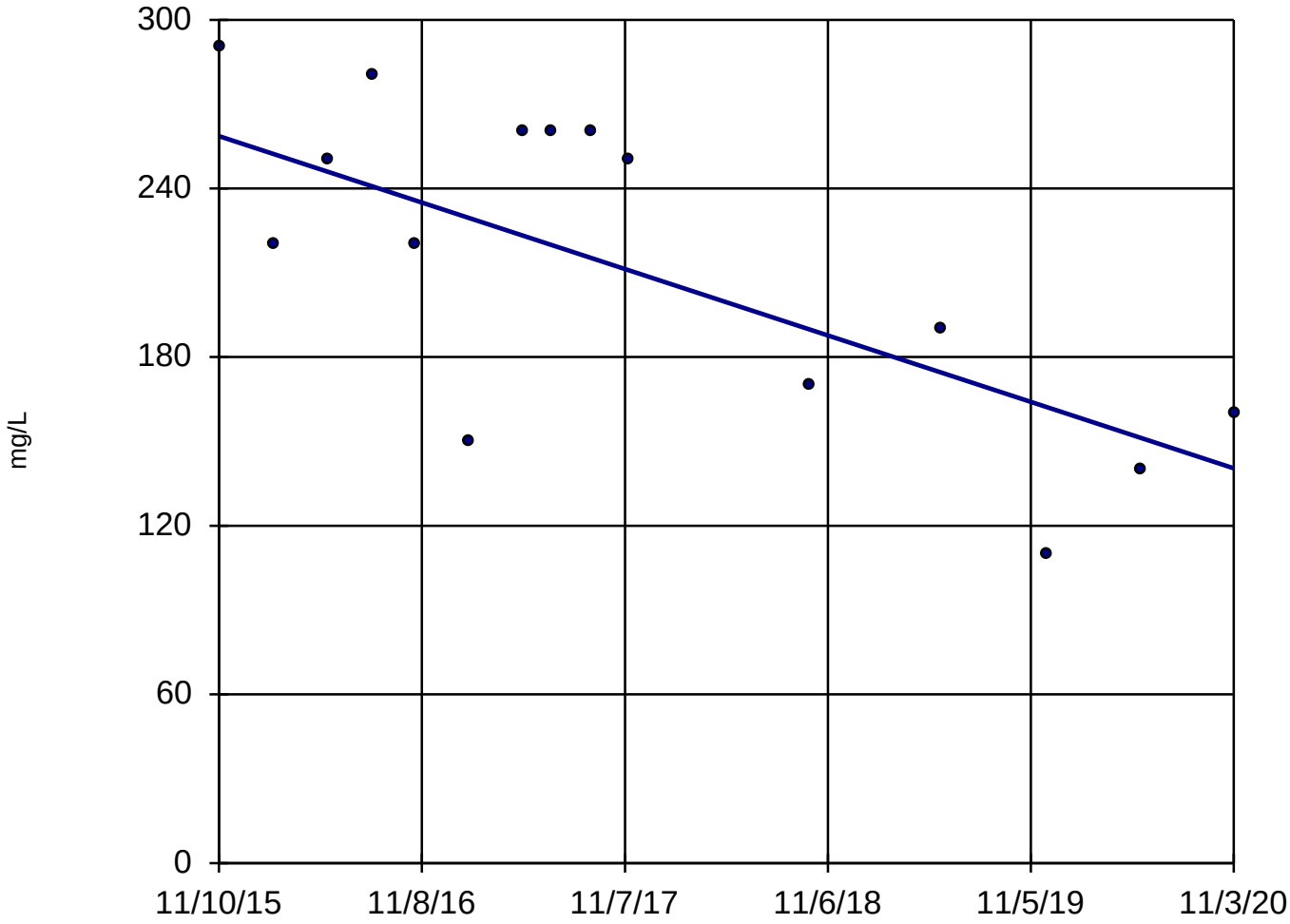
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Sulfate Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-12



n = 15

Slope = -23.7 units per year.

Mann-Kendall statistic = -50
critical = -53

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Sulfate Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

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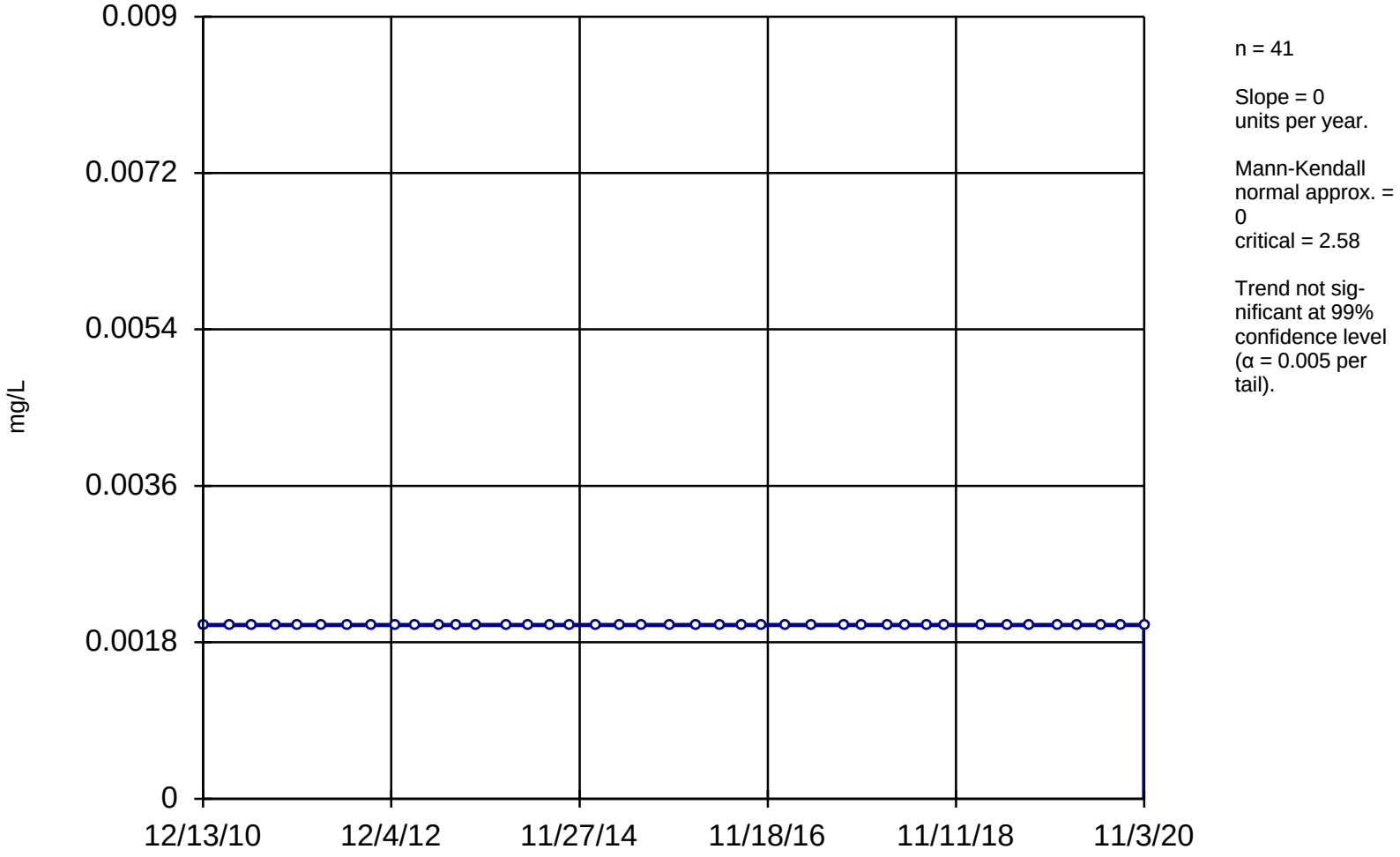
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-07



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Thallium, Dissolved Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

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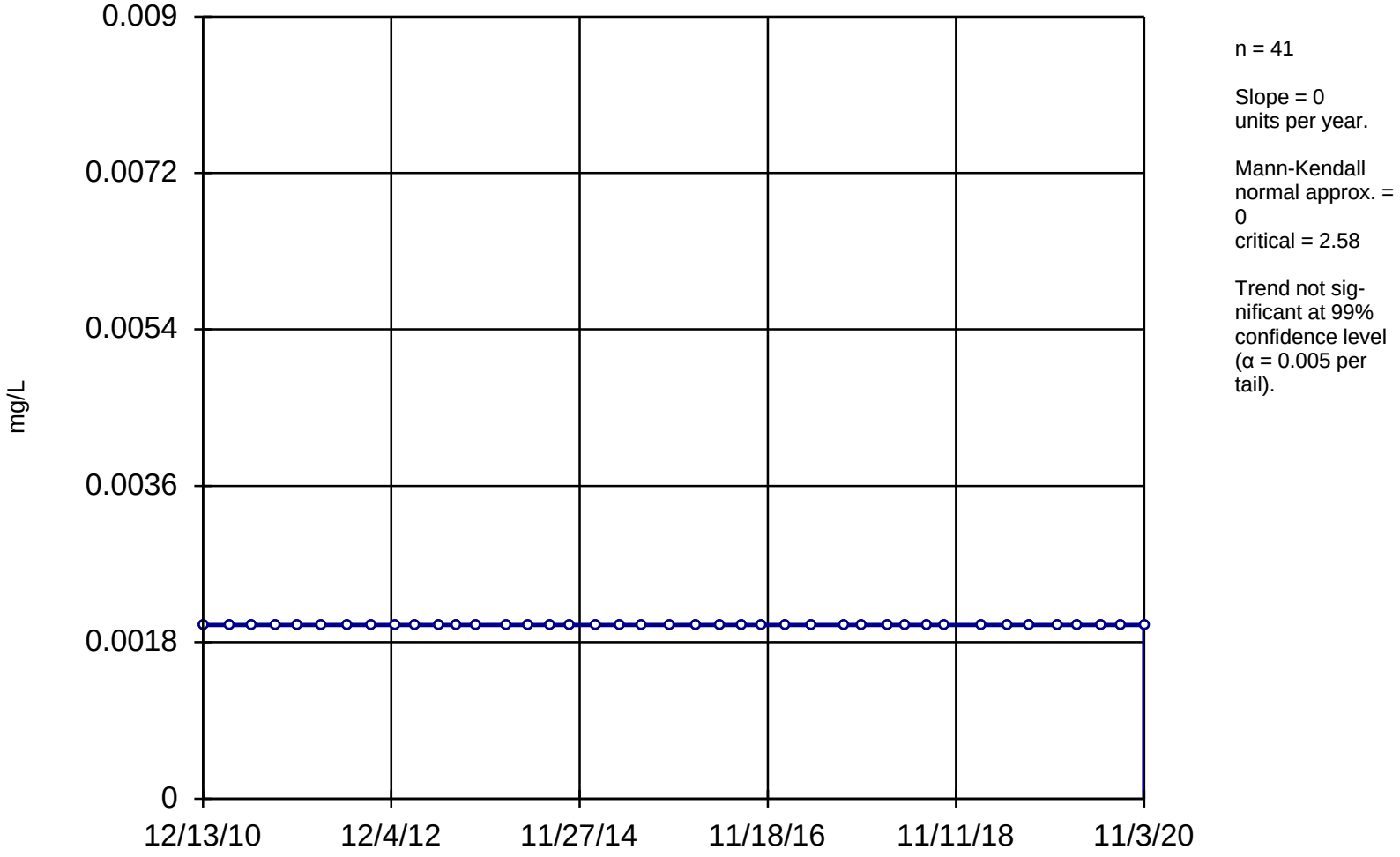
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

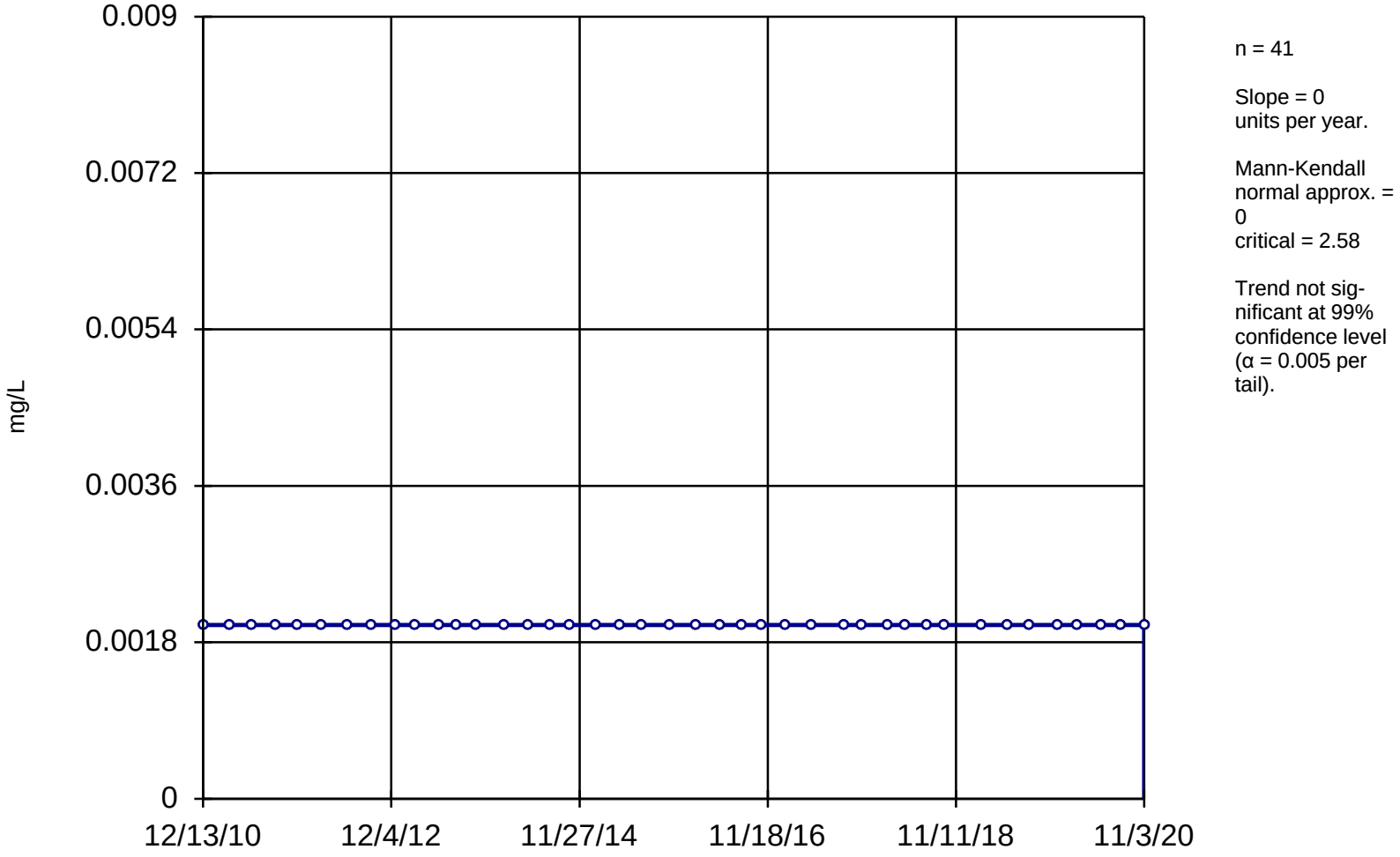
Constituent: Thallium, Dissolved Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-09



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

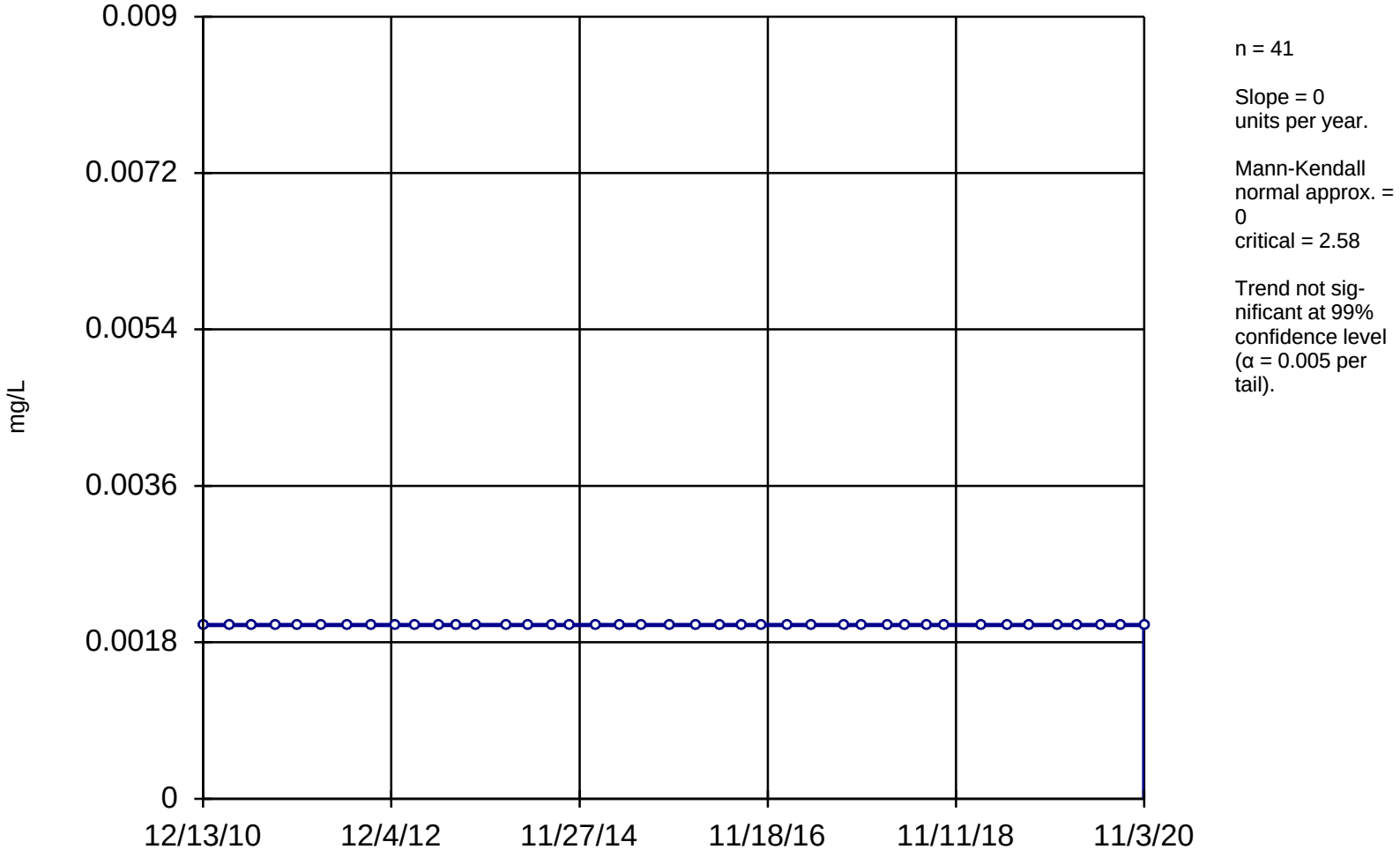
Constituent: Thallium, Dissolved Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0
critical = 2.58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

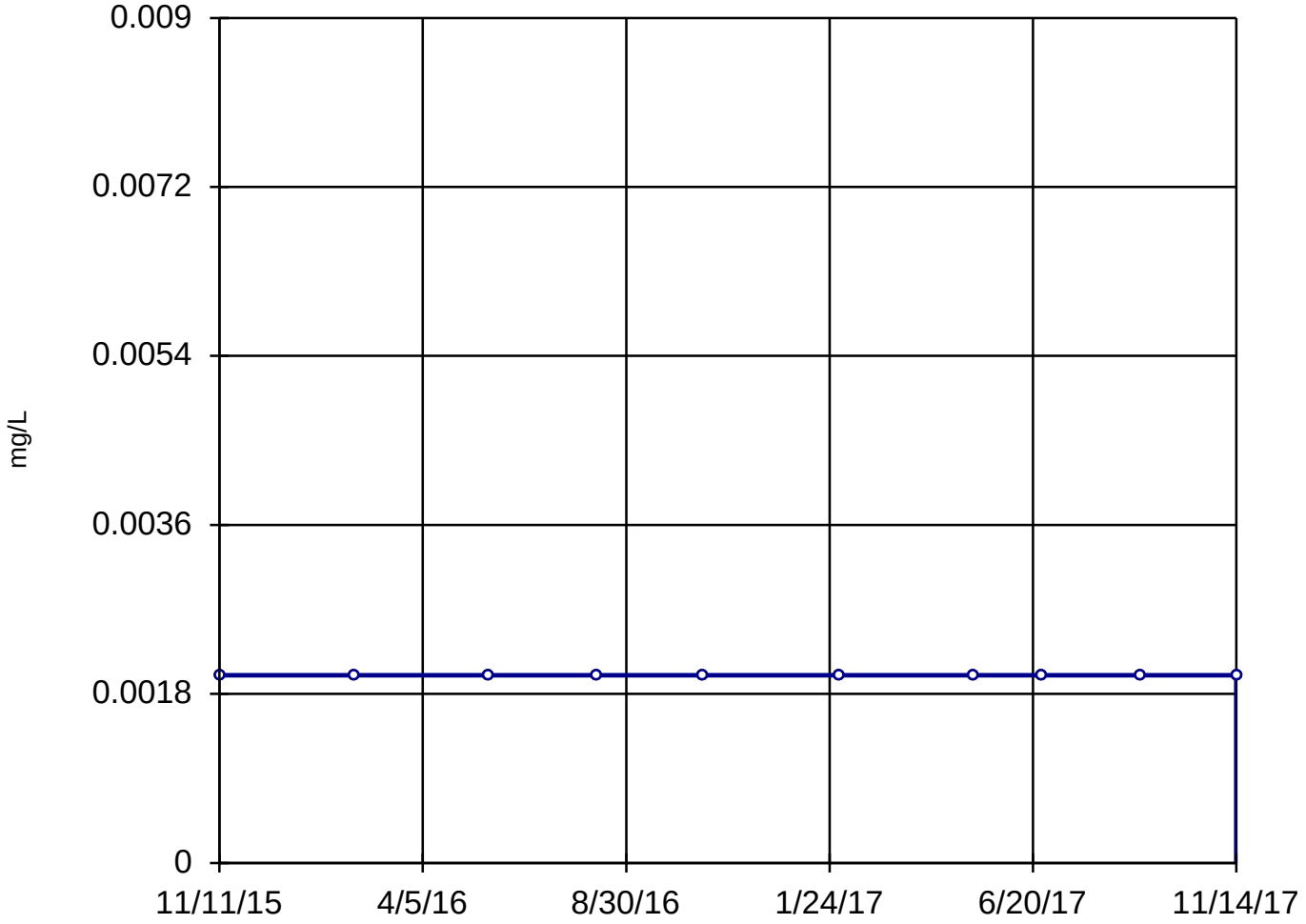
Constituent: Thallium, Dissolved Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-09



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

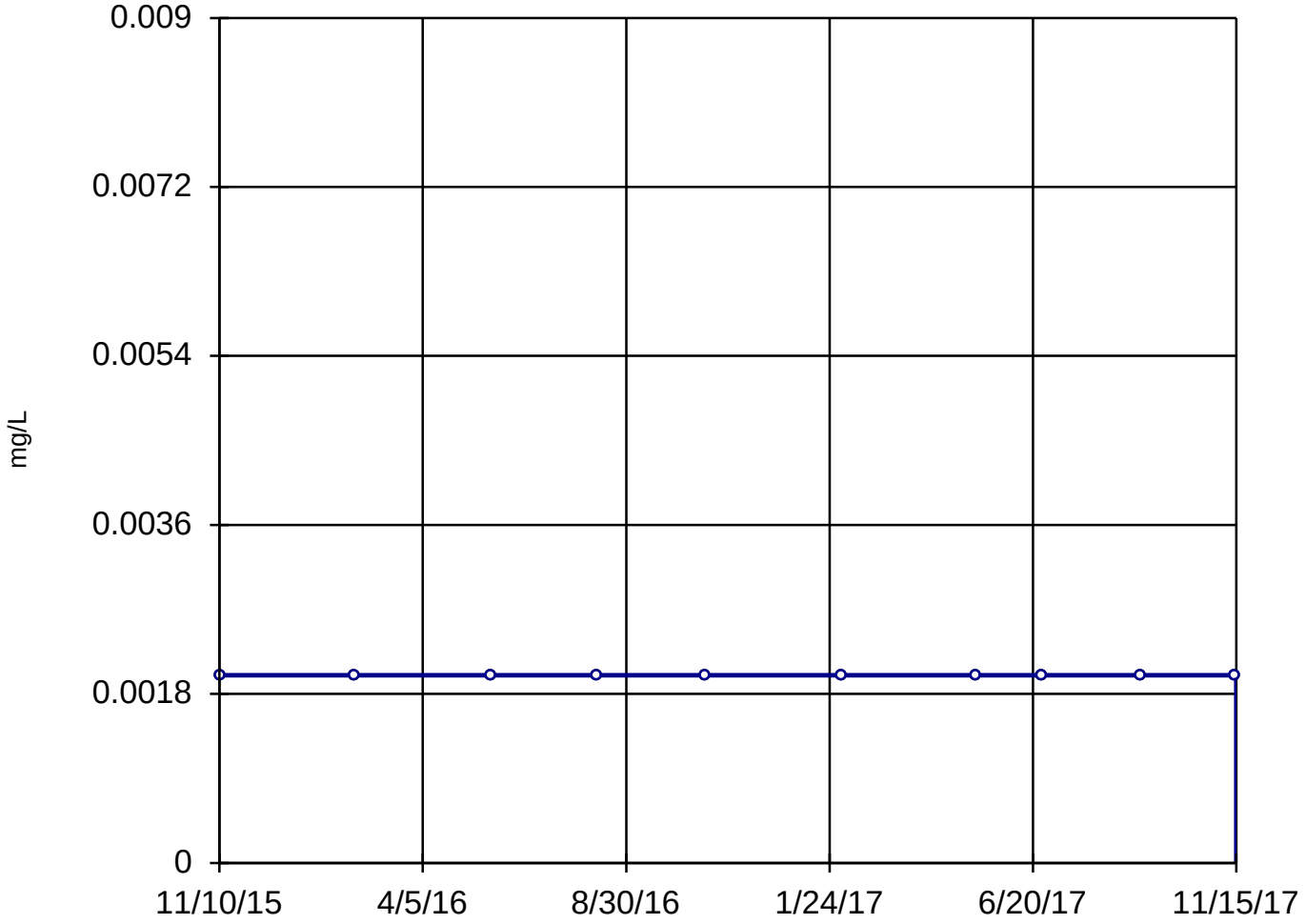
Constituent: Thallium, Total Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

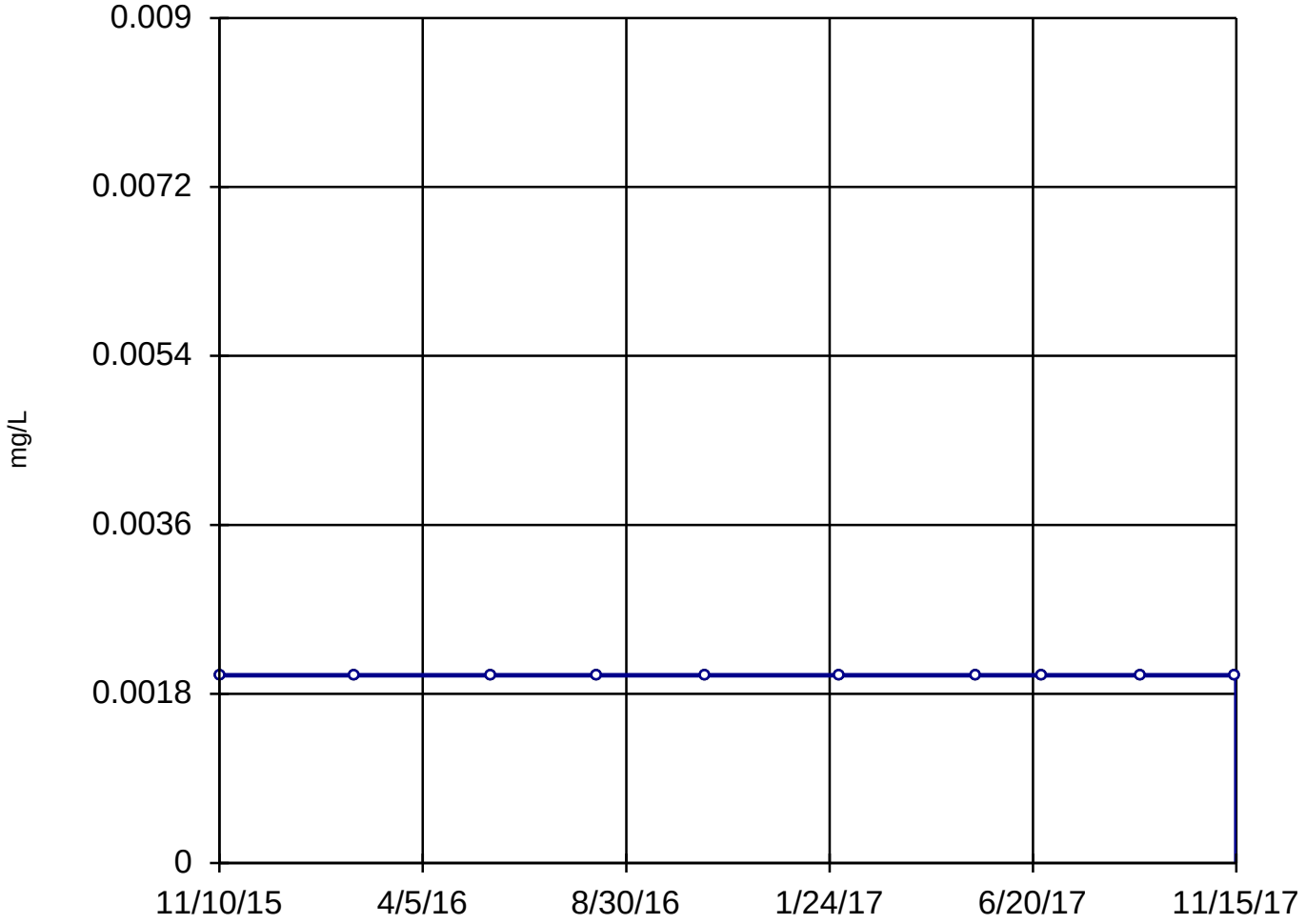
Constituent: Thallium, Total Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-11



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

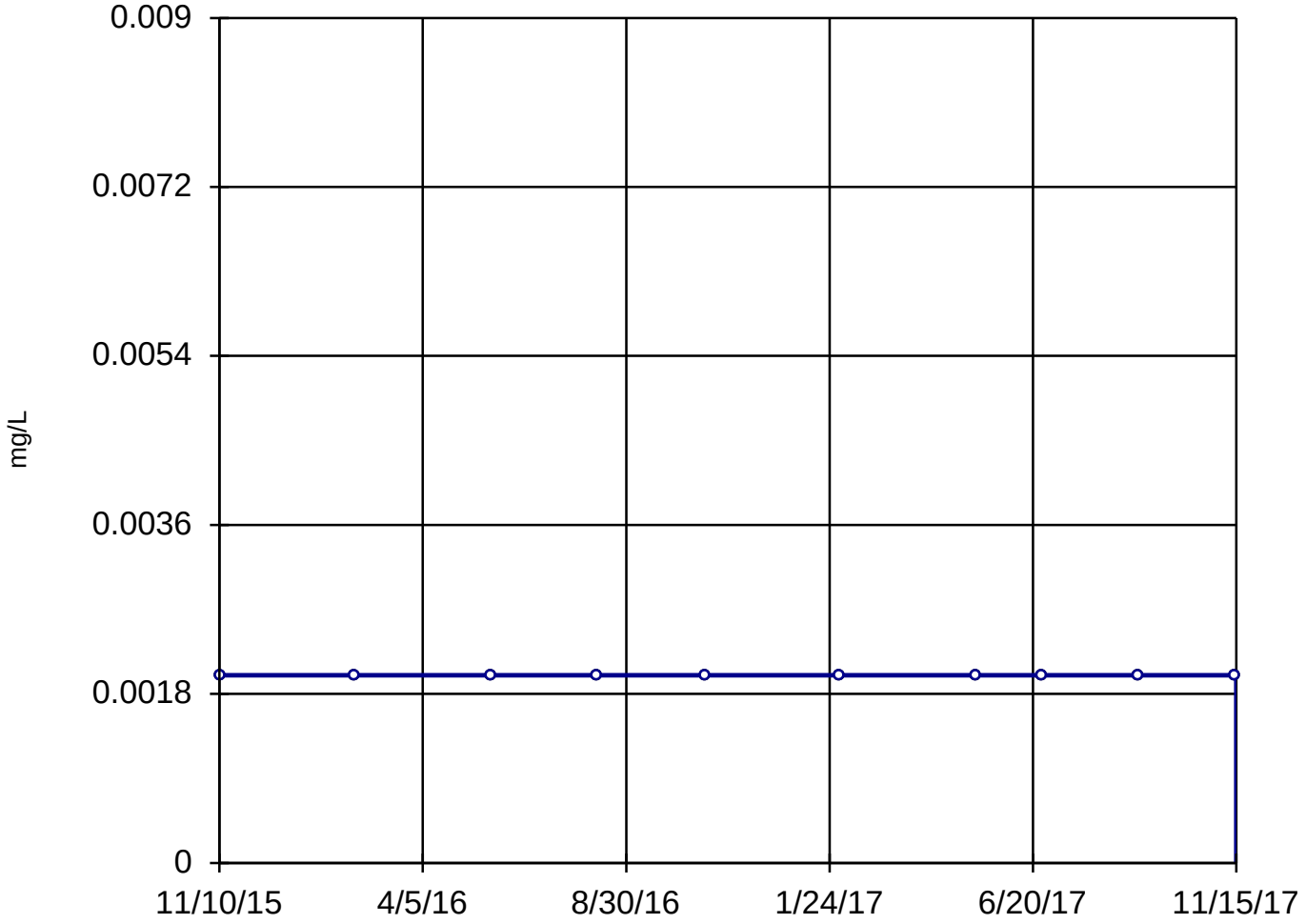
Constituent: Thallium, Total Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-12



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 30

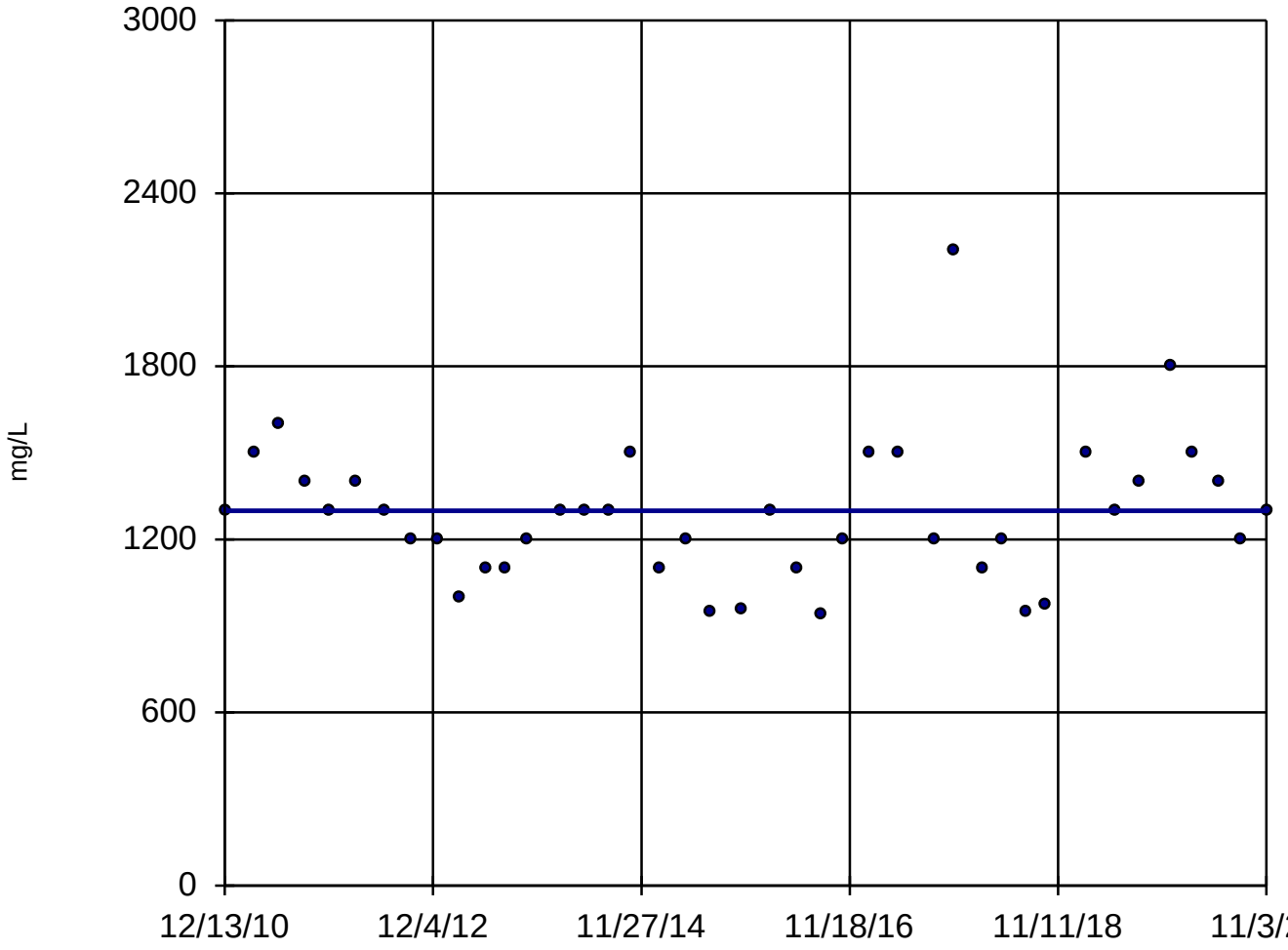
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Thallium, Total Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-07



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
-0.05693
critical = -2.58

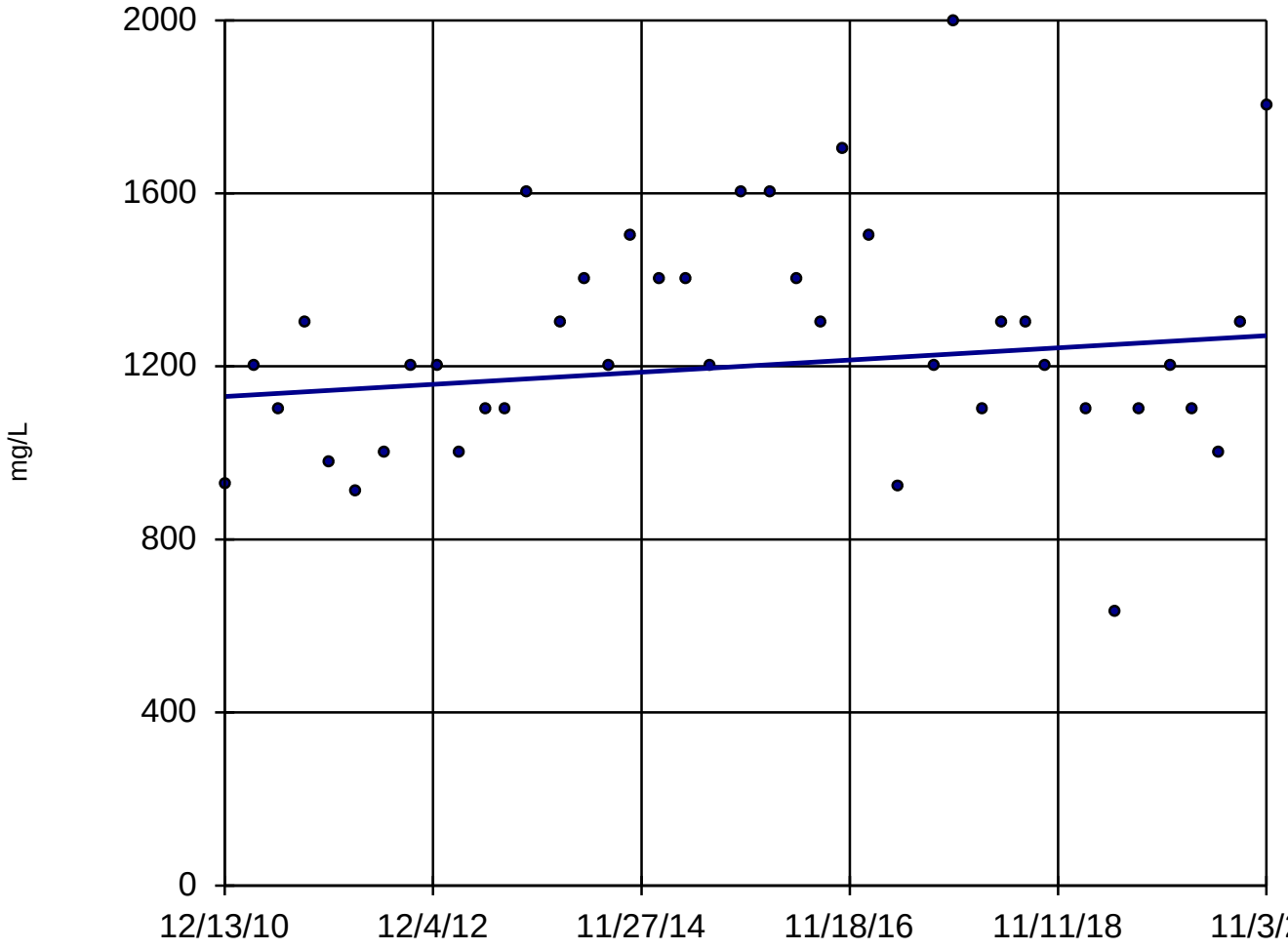
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Total Dissolved Solids Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-08



n = 41

Slope = 14.23 units per year.

Mann-Kendall normal approx. = 1.157
critical = 2.58

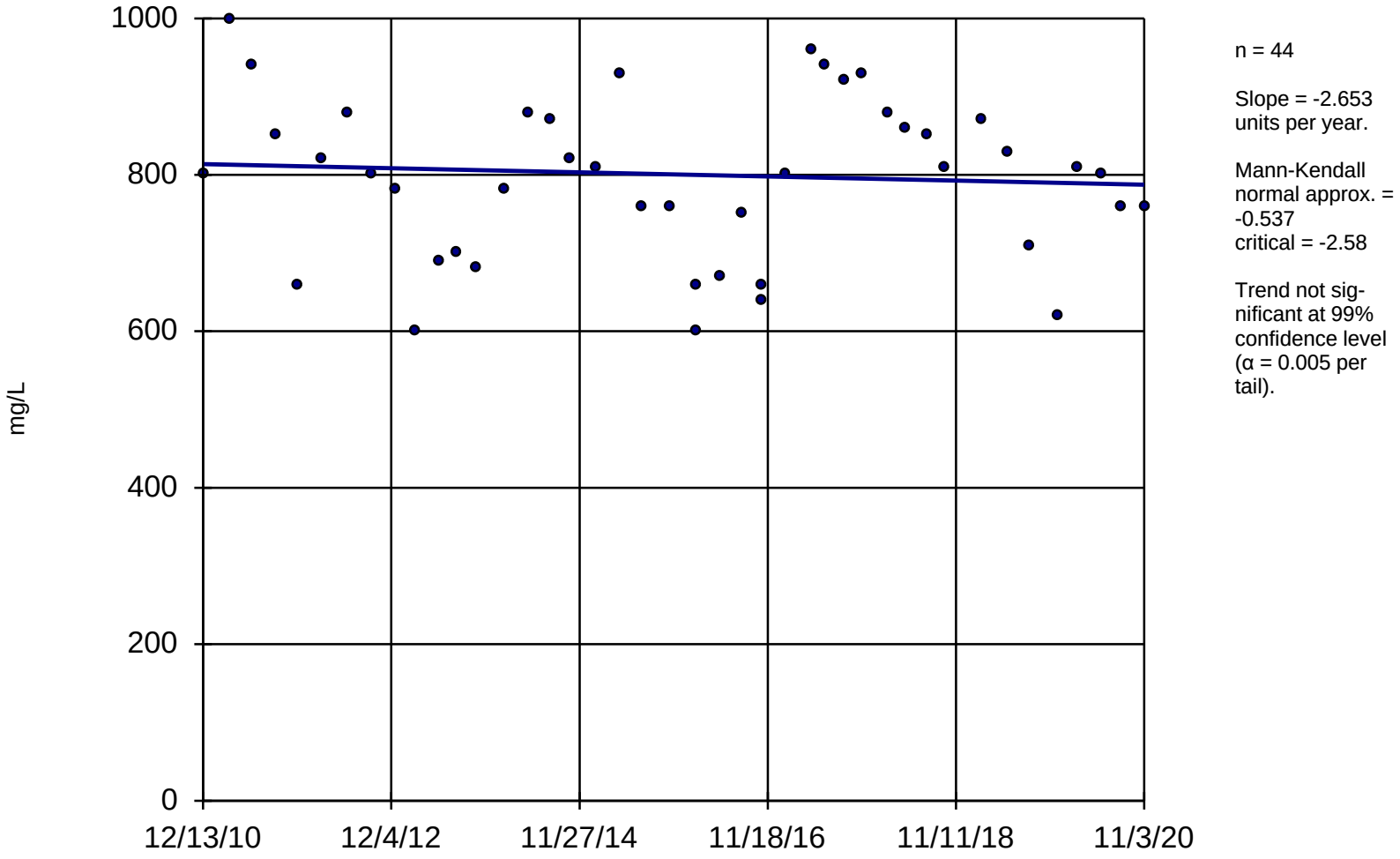
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Total Dissolved Solids Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-09



n = 44

Slope = -2.653 units per year.

Mann-Kendall normal approx. = -0.537
critical = -2.58

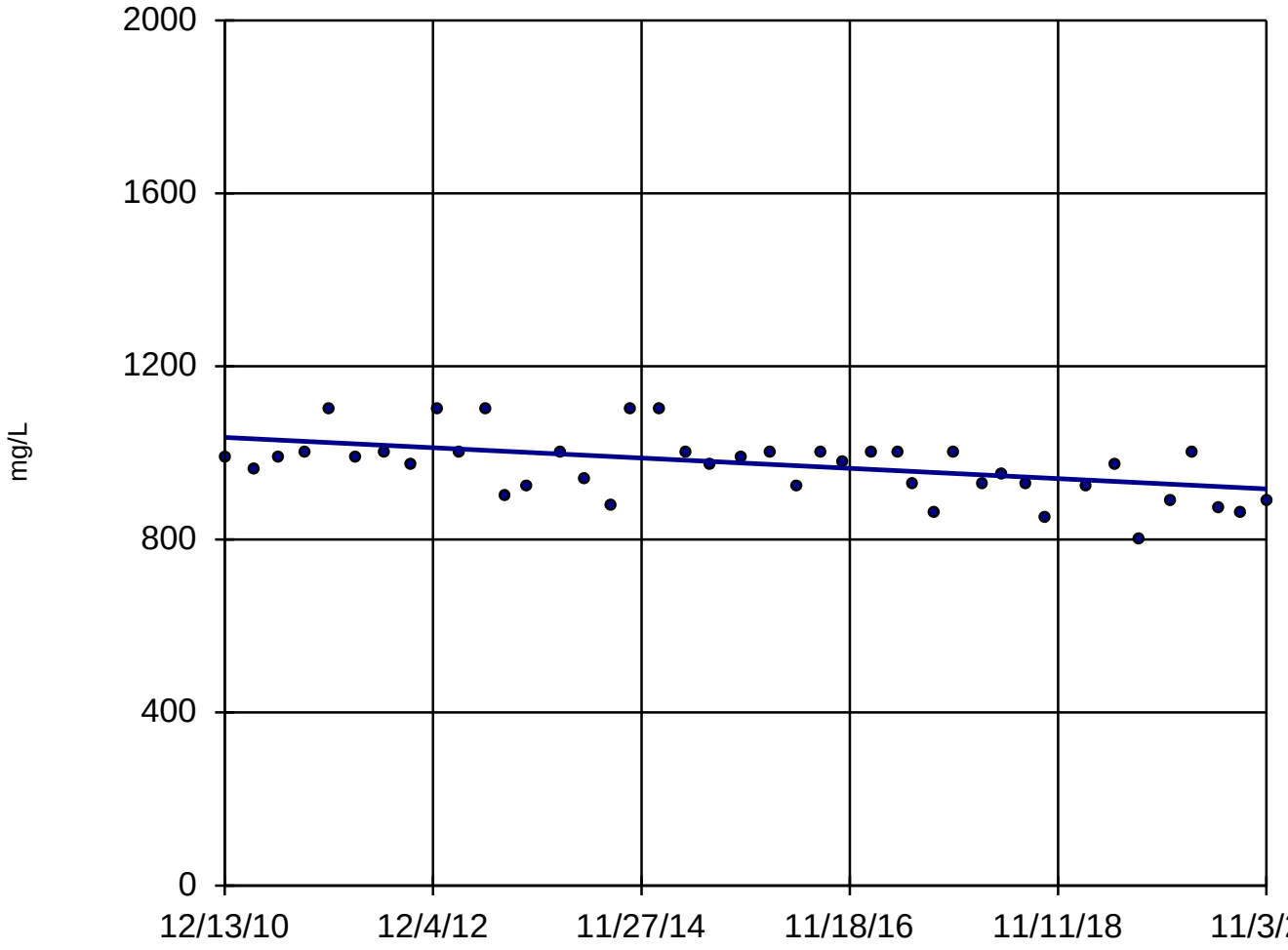
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Total Dissolved Solids Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-10



n = 42

Slope = -12.03 units per year.

Mann-Kendall normal approx. = -3.225
critical = -2.58

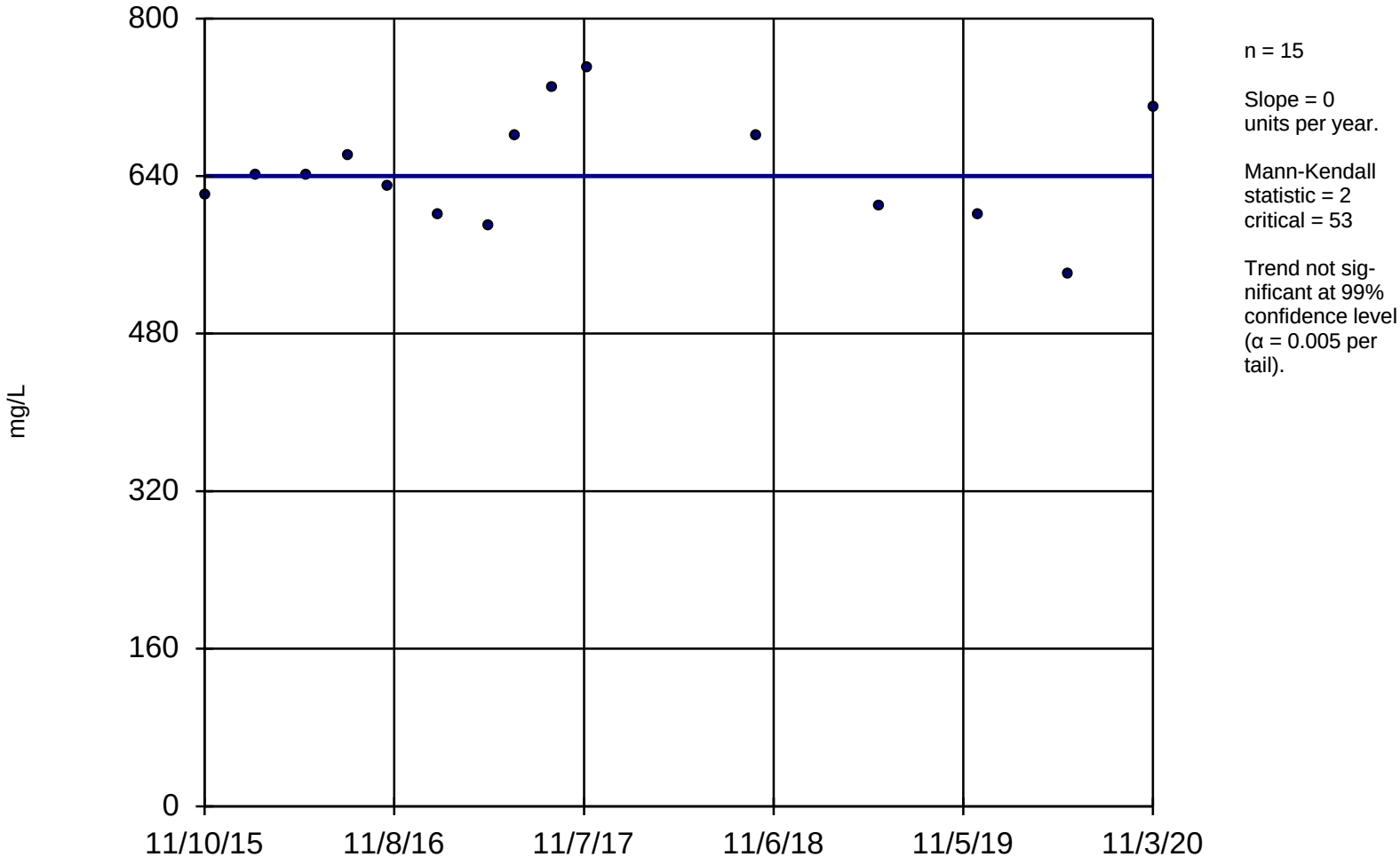
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Total Dissolved Solids Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-11

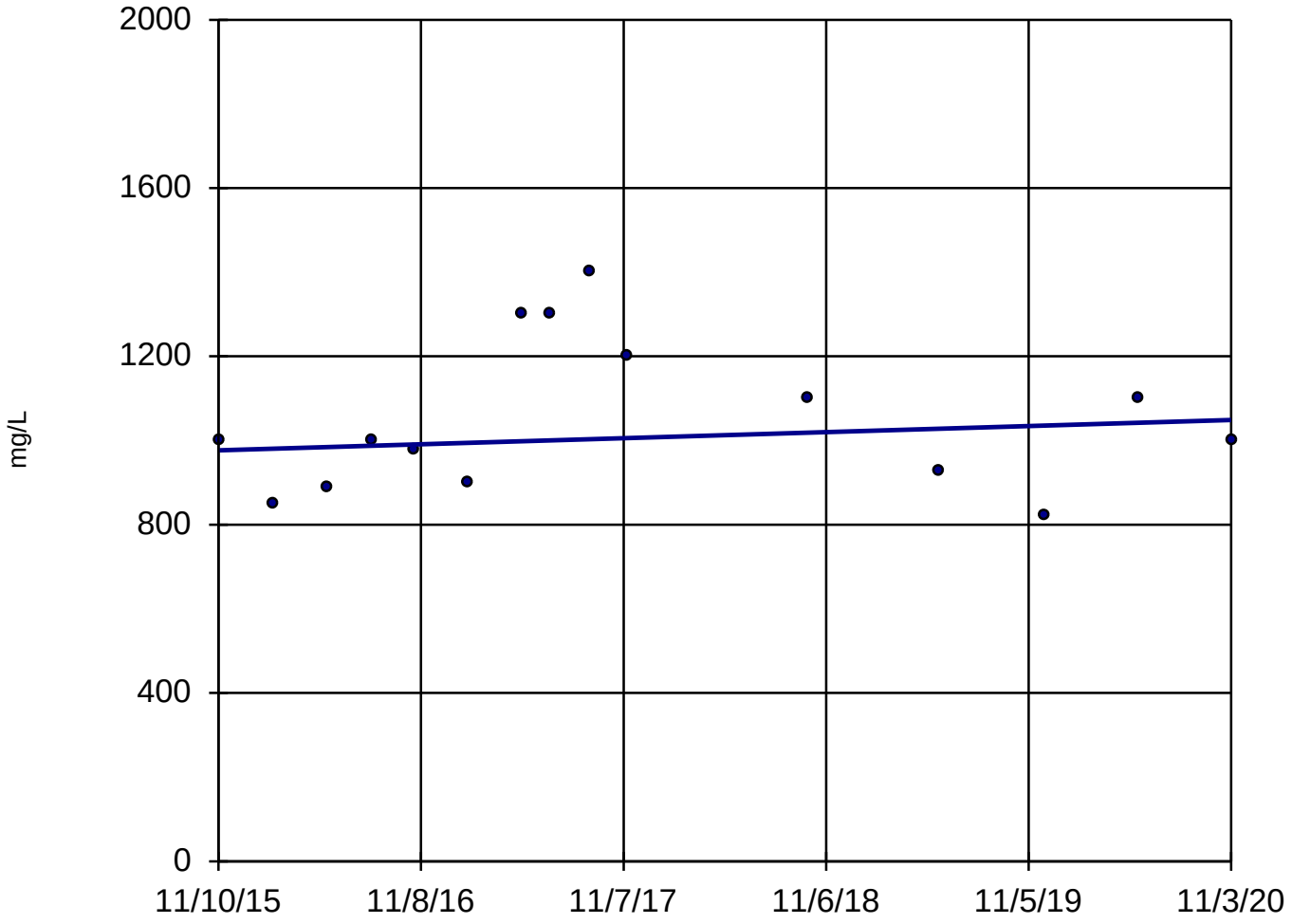


Constituent: Total Dissolved Solids Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Sen's Slope Estimator

MW-12



n = 15

Slope = 14.48 units per year.

Mann-Kendall statistic = 12
critical = 53

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Total Dissolved Solids Analysis Run 4/2/2021 12:07 PM

Utility Site WC Client: Weaver Consultants Group Data: Will County Sanitas Database

Trend Test

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database Printed 4/14/2021, 1:06 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Antimony, Dissolved (mg/L)	MW-01	0	-35	-111	No	25	92	n/a	n/a	0.01	NP
Antimony, Dissolved (mg/L)	MW-02	0	-24	-111	No	25	96	n/a	n/a	0.01	NP
Antimony, Dissolved (mg/L)	MW-03	0	-24	-111	No	25	96	n/a	n/a	0.01	NP
Antimony, Dissolved (mg/L)	MW-04	0	0	111	No	25	100	n/a	n/a	0.01	NP
Antimony, Total (mg/L)	MW-01	0	0	92	No	22	100	n/a	n/a	0.01	NP
Antimony, Total (mg/L)	MW-02	0	0	92	No	22	100	n/a	n/a	0.01	NP
Antimony, Total (mg/L)	MW-03	0	0	92	No	22	100	n/a	n/a	0.01	NP
Antimony, Total (mg/L)	MW-04	0	0	92	No	22	100	n/a	n/a	0.01	NP
Arsenic, Dissolved (mg/L)	MW-01	0.004007	31	111	No	25	0	n/a	n/a	0.01	NP
Arsenic, Dissolved (mg/L)	MW-02	-0.00...	-56	-111	No	25	0	n/a	n/a	0.01	NP
Arsenic, Dissolved (mg/L)	MW-03	0.000...	4	111	No	25	0	n/a	n/a	0.01	NP
Arsenic, Dissolved (mg/L)	MW-04	0.000...	71	111	No	25	0	n/a	n/a	0.01	NP
Arsenic, Total (mg/L)	**MW-01**	**-0.01647**	**-94**	**-92**	**Yes**	**22**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Arsenic, Total (mg/L)	**MW-02**	**-0.00...**	**-97**	**-92**	**Yes**	**22**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Arsenic, Total (mg/L)	MW-03	-0.00...	-21	-92	No	22	0	n/a	n/a	0.01	NP
Arsenic, Total (mg/L)	MW-04	-0.00...	-38	-92	No	22	0	n/a	n/a	0.01	NP
Barium, Dissolved (mg/L)	MW-01	-0.00...	-84	-111	No	25	0	n/a	n/a	0.01	NP
Barium, Dissolved (mg/L)	MW-02	0.000...	22	111	No	25	0	n/a	n/a	0.01	NP
Barium, Dissolved (mg/L)	MW-03	0.000...	50	111	No	25	0	n/a	n/a	0.01	NP
Barium, Dissolved (mg/L)	MW-04	0.000...	9	111	No	25	0	n/a	n/a	0.01	NP
Barium, Total (mg/L)	**MW-01**	**0.004937**	**100**	**92**	**Yes**	**22**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Barium, Total (mg/L)	MW-02	0.002744	64	92	No	22	0	n/a	n/a	0.01	NP
Barium, Total (mg/L)	MW-03	0.00474	84	92	No	22	0	n/a	n/a	0.01	NP
Barium, Total (mg/L)	MW-04	-0.00...	-42	-92	No	22	0	n/a	n/a	0.01	NP
Beryllium, Dissolved (mg/L)	MW-01	0	0	111	No	25	100	n/a	n/a	0.01	NP
Beryllium, Dissolved (mg/L)	MW-02	0	0	111	No	25	100	n/a	n/a	0.01	NP
Beryllium, Dissolved (mg/L)	MW-03	0	0	111	No	25	100	n/a	n/a	0.01	NP
Beryllium, Dissolved (mg/L)	MW-04	0	0	111	No	25	100	n/a	n/a	0.01	NP
Beryllium, Total (mg/L)	MW-01	0	0	92	No	22	100	n/a	n/a	0.01	NP
Beryllium, Total (mg/L)	MW-02	0	0	92	No	22	100	n/a	n/a	0.01	NP
Beryllium, Total (mg/L)	MW-03	0	0	92	No	22	100	n/a	n/a	0.01	NP
Beryllium, Total (mg/L)	MW-04	0	0	92	No	22	100	n/a	n/a	0.01	NP
Boron, Dissolved (mg/L)	**MW-01**	**-0.1131**	**-117**	**-111**	**Yes**	**25**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Boron, Dissolved (mg/L)	**MW-02**	**0.2228**	**167**	**111**	**Yes**	**25**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Boron, Dissolved (mg/L)	MW-03	0.06854	50	111	No	25	0	n/a	n/a	0.01	NP
Boron, Dissolved (mg/L)	MW-04	0	1	111	No	25	0	n/a	n/a	0.01	NP
Boron, Total (mg/L)	MW-01	0.09787	33	58	No	16	0	n/a	n/a	0.01	NP
Boron, Total (mg/L)	MW-02	-0.03136	-6	-58	No	16	0	n/a	n/a	0.01	NP
Boron, Total (mg/L)	MW-03	0.3447	48	58	No	16	0	n/a	n/a	0.01	NP
Boron, Total (mg/L)	MW-04	0.1715	39	58	No	16	0	n/a	n/a	0.01	NP
Cadmium, Dissolved (mg/L)	MW-01	0	0	111	No	25	100	n/a	n/a	0.01	NP
Cadmium, Dissolved (mg/L)	MW-02	0	0	111	No	25	100	n/a	n/a	0.01	NP
Cadmium, Dissolved (mg/L)	MW-03	0	0	111	No	25	100	n/a	n/a	0.01	NP
Cadmium, Dissolved (mg/L)	MW-04	0	0	111	No	25	100	n/a	n/a	0.01	NP
Cadmium, Total (mg/L)	MW-01	0	0	92	No	22	100	n/a	n/a	0.01	NP
Cadmium, Total (mg/L)	MW-02	0	0	92	No	22	100	n/a	n/a	0.01	NP
Cadmium, Total (mg/L)	MW-03	0	0	92	No	22	100	n/a	n/a	0.01	NP
Cadmium, Total (mg/L)	MW-04	0	0	92	No	22	100	n/a	n/a	0.01	NP

Trend Test

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database Printed 4/14/2021, 1:06 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Calcium, Total (mg/L)	MW-03	11.85	42	58	No	16	0	n/a	n/a	0.01	NP
Calcium, Total (mg/L)	MW-04	0	3	58	No	16	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-01	0.1215	0.1687	2.58	No	41	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-02	0	0.1353	2.58	No	41	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-03	-2.053	-1.225	-2.58	No	41	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-04	-1.93	-2.26	-2.58	No	41	0	n/a	n/a	0.01	NP
Chromium, Dissolved (mg/L)	MW-01	0	0	111	No	25	100	n/a	n/a	0.01	NP
Chromium, Dissolved (mg/L)	MW-02	0	0	111	No	25	100	n/a	n/a	0.01	NP
Chromium, Dissolved (mg/L)	MW-03	0	0	111	No	25	100	n/a	n/a	0.01	NP
Chromium, Dissolved (mg/L)	MW-04	0	0	111	No	25	100	n/a	n/a	0.01	NP
Chromium, Total (mg/L)	MW-01	0	0	92	No	22	100	n/a	n/a	0.01	NP
Chromium, Total (mg/L)	MW-02	0	0	92	No	22	100	n/a	n/a	0.01	NP
Chromium, Total (mg/L)	MW-03	0	0	92	No	22	100	n/a	n/a	0.01	NP
Chromium, Total (mg/L)	MW-04	0	0	92	No	22	100	n/a	n/a	0.01	NP
Cobalt, Dissolved (mg/L)	MW-01	0	0	111	No	25	100	n/a	n/a	0.01	NP
Cobalt, Dissolved (mg/L)	MW-02	0	0	111	No	25	100	n/a	n/a	0.01	NP
Cobalt, Dissolved (mg/L)	MW-03	0	0	111	No	25	100	n/a	n/a	0.01	NP
Cobalt, Dissolved (mg/L)	MW-04	0	0	111	No	25	100	n/a	n/a	0.01	NP
Cobalt, Total (mg/L)	MW-01	0	0	92	No	22	100	n/a	n/a	0.01	NP
Cobalt, Total (mg/L)	MW-02	0	0	92	No	22	100	n/a	n/a	0.01	NP
Cobalt, Total (mg/L)	MW-03	0	0	92	No	22	100	n/a	n/a	0.01	NP
Cobalt, Total (mg/L)	MW-04	0	4	92	No	22	86.36	n/a	n/a	0.01	NP
Fluoride (mg/L)	**MW-01**	**-0.03192**	**-5.049**	**-2.58**	**Yes**	**41**	**2.439**	**n/a**	**n/a**	**0.01**	**NP**
Fluoride (mg/L)	MW-02	0	0.08998	2.58	No	41	0	n/a	n/a	0.01	NP
Fluoride (mg/L)	**MW-03**	**-0.03942**	**-2.99**	**-2.58**	**Yes**	**41**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Fluoride (mg/L)	MW-04	-0.01311	-0.8769	-2.58	No	41	0	n/a	n/a	0.01	NP
Lead, Dissolved (mg/L)	MW-01	0	0	111	No	25	100	n/a	n/a	0.01	NP
Lead, Dissolved (mg/L)	MW-02	0	0	111	No	25	100	n/a	n/a	0.01	NP
Lead, Dissolved (mg/L)	MW-03	0	8	111	No	25	96	n/a	n/a	0.01	NP
Lead, Dissolved (mg/L)	MW-04	0	0	111	No	25	100	n/a	n/a	0.01	NP
Lead, Total (mg/L)	MW-01	0	1	92	No	22	95.45	n/a	n/a	0.01	NP
Lead, Total (mg/L)	MW-02	0	0	92	No	22	100	n/a	n/a	0.01	NP
Lead, Total (mg/L)	MW-03	0	0	92	No	22	100	n/a	n/a	0.01	NP
Lead, Total (mg/L)	MW-04	0	0	92	No	22	100	n/a	n/a	0.01	NP
Lithium, Total (mg/L)	MW-02	0	0	34	No	11	100	n/a	n/a	0.01	NP
Lithium, Total (mg/L)	MW-03	0	0	34	No	11	100	n/a	n/a	0.01	NP
Lithium, Total (mg/L)	MW-04	0	0	34	No	11	100	n/a	n/a	0.01	NP
Mercury, Dissolved (mg/L)	MW-01	0	0	111	No	25	100	n/a	n/a	0.01	NP
Mercury, Dissolved (mg/L)	MW-02	0	0	111	No	25	100	n/a	n/a	0.01	NP
Mercury, Dissolved (mg/L)	MW-03	0	0	111	No	25	100	n/a	n/a	0.01	NP
Mercury, Dissolved (mg/L)	MW-04	0	0	111	No	25	100	n/a	n/a	0.01	NP
Mercury, Total (mg/L)	MW-01	0	0	92	No	22	100	n/a	n/a	0.01	NP
Mercury, Total (mg/L)	MW-02	0	0	92	No	22	100	n/a	n/a	0.01	NP
Mercury, Total (mg/L)	MW-03	0	0	92	No	22	100	n/a	n/a	0.01	NP
Mercury, Total (mg/L)	MW-04	0	-3	-92	No	22	95.45	n/a	n/a	0.01	NP
Molybdenum, Total (mg/L)	MW-01	-0.00...	-15	-34	No	11	0	n/a	n/a	0.01	NP
Molybdenum, Total (mg/L)	MW-02	-0.00...	-21	-34	No	11	0	n/a	n/a	0.01	NP
Molybdenum, Total (mg/L)	MW-03	0.003691	11	34	No	11	0	n/a	n/a	0.01	NP

Trend Test

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database Printed 4/14/2021, 1:06 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
pH, Field (Standard Units)	MW-02	-0.06572	-1.696	-2.58	No	41	0	n/a	n/a	0.01	NP
pH, Field (Standard Units)	**MW-03**	**-0.1512**	**-3.168**	**-2.58**	**Yes**	**41**	**0**	**n/a**	**n/a**	**0.01**	**NP**
pH, Field (Standard Units)	**MW-04**	**-0.07213**	**-3.091**	**-2.58**	**Yes**	**41**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Radium-226 (pCi/L)	MW-01	0	7	58	No	16	62.5	n/a	n/a	0.01	NP
Radium-226 (pCi/L)	MW-02	0	3	58	No	16	62.5	n/a	n/a	0.01	NP
Radium-226 (pCi/L)	MW-03	0	9	58	No	16	62.5	n/a	n/a	0.01	NP
Radium-228 (pCi/L)	MW-01	0	-9	-58	No	16	93.75	n/a	n/a	0.01	NP
Radium-228 (pCi/L)	MW-02	0	-16	-58	No	16	75	n/a	n/a	0.01	NP
Radium-228 (pCi/L)	MW-03	0	-4	-58	No	16	75	n/a	n/a	0.01	NP
Radium-228 (pCi/L)	MW-04	-0.00...	-32	-58	No	16	50	n/a	n/a	0.01	NP
Selenium, Dissolved (mg/L)	MW-01	-0.00...	-84	-111	No	25	16	n/a	n/a	0.01	NP
Selenium, Dissolved (mg/L)	**MW-02**	**-0.00...**	**-112**	**-111**	**Yes**	**25**	**44**	**n/a**	**n/a**	**0.01**	**NP**
Selenium, Dissolved (mg/L)	**MW-03**	**-0.00...**	**-122**	**-111**	**Yes**	**25**	**28**	**n/a**	**n/a**	**0.01**	**NP**
Selenium, Dissolved (mg/L)	MW-04	-0.00027	-86	-111	No	25	52	n/a	n/a	0.01	NP
Selenium, Total (mg/L)	MW-01	-1.4e-11	-43	-92	No	22	50	n/a	n/a	0.01	NP
Selenium, Total (mg/L)	MW-02	0	1	92	No	22	54.55	n/a	n/a	0.01	NP
Selenium, Total (mg/L)	MW-03	0.000...	67	92	No	22	36.36	n/a	n/a	0.01	NP
Selenium, Total (mg/L)	MW-04	0	-3	-92	No	22	22.73	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-01	6.09	1.5	2.58	No	41	7.317	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-02	9.876	2.346	2.58	No	41	7.317	n/a	n/a	0.01	NP
Sulfate (mg/L)	**MW-03**	**16.66**	**4.033**	**2.58**	**Yes**	**41**	**7.317**	**n/a**	**n/a**	**0.01**	**NP**
Sulfate (mg/L)	MW-04	12.94	2.206	2.58	No	41	7.317	n/a	n/a	0.01	NP
Thallium, Dissolved (mg/L)	MW-01	0	0	111	No	25	100	n/a	n/a	0.01	NP
Thallium, Dissolved (mg/L)	MW-02	0	0	111	No	25	100	n/a	n/a	0.01	NP
Thallium, Dissolved (mg/L)	MW-03	0	0	111	No	25	100	n/a	n/a	0.01	NP
Thallium, Dissolved (mg/L)	MW-04	0	0	111	No	25	100	n/a	n/a	0.01	NP
Thallium, Total (mg/L)	MW-01	0	0	92	No	22	100	n/a	n/a	0.01	NP
Thallium, Total (mg/L)	MW-02	0	0	92	No	22	100	n/a	n/a	0.01	NP
Thallium, Total (mg/L)	MW-03	0	0	92	No	22	100	n/a	n/a	0.01	NP
Thallium, Total (mg/L)	MW-04	0	0	92	No	22	100	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-01	5.458	1.138	2.58	No	41	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	**MW-02**	**15.76**	**2.778**	**2.58**	**Yes**	**41**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Total Dissolved Solids (mg/L)	**MW-03**	**34.41**	**4.97**	**2.58**	**Yes**	**41**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Total Dissolved Solids (mg/L)	**MW-04**	**32.68**	**3.417**	**2.58**	**Yes**	**41**	**0**	**n/a**	**n/a**	**0.01**	**NP**

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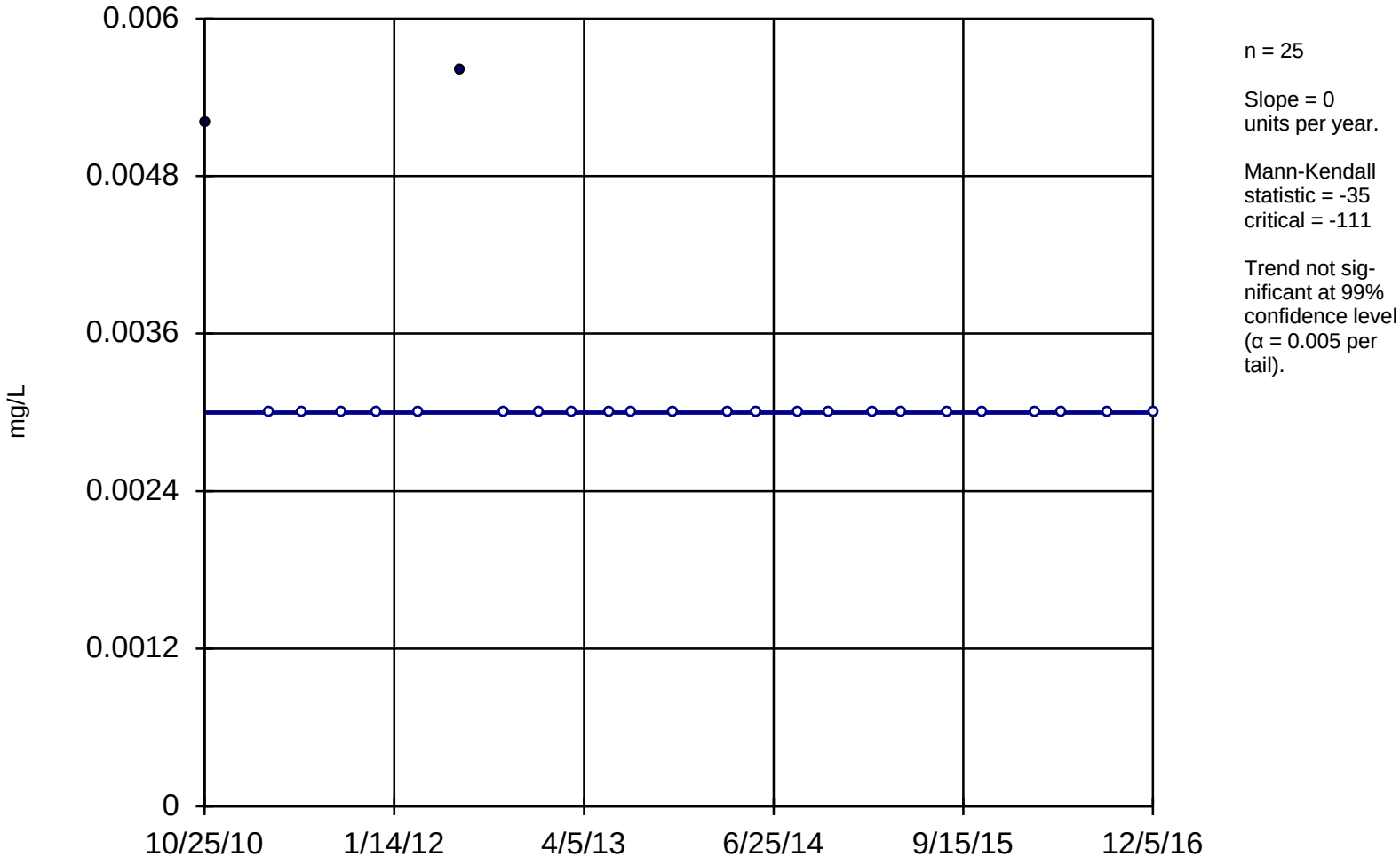
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-01



n = 25

Slope = 0
units per year.

Mann-Kendall
statistic = -35
critical = -111

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Antimony, Dissolved Analysis Run 4/14/2021 1:00 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

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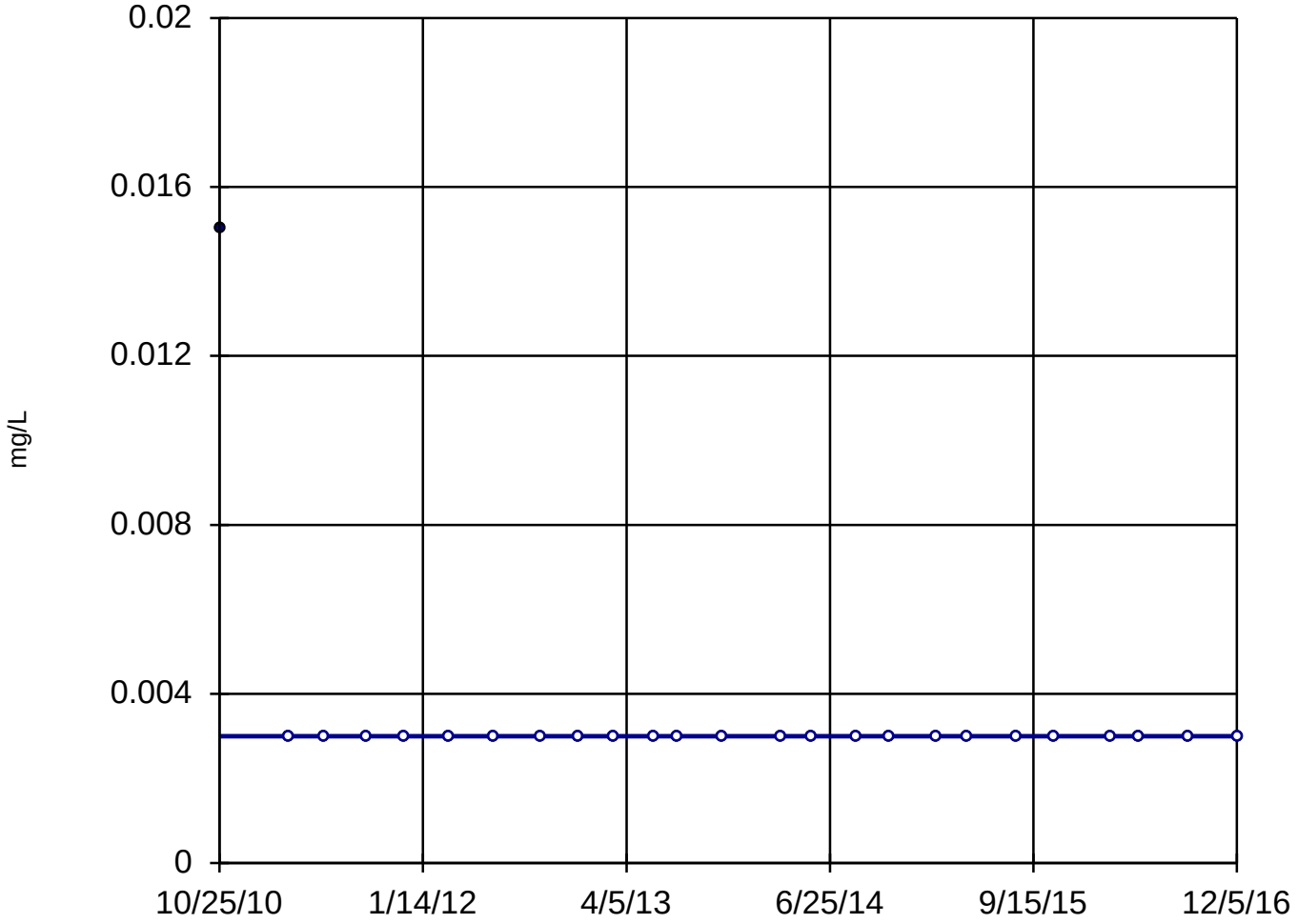
Sen's Slope Estimator

MW-02



n = 25

Slope = 0
units per year.

Mann-Kendall
statistic = -24
critical = -111

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Antimony, Dissolved Analysis Run 4/14/2021 1:00 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

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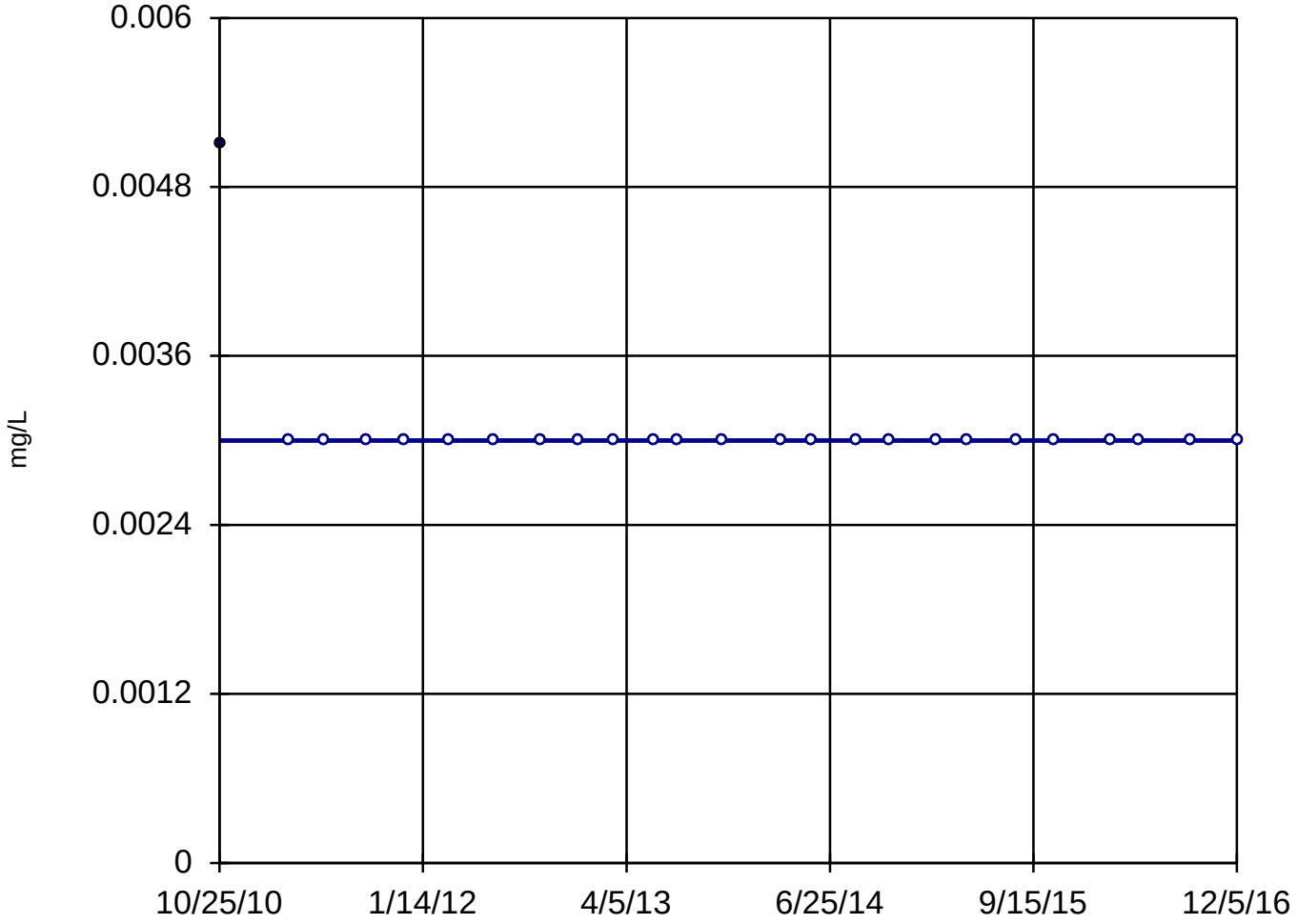
Sen's Slope Estimator

MW-03



n = 25

Slope = 0
units per year.

Mann-Kendall
statistic = -24
critical = -111

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Antimony, Dissolved Analysis Run 4/14/2021 1:00 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

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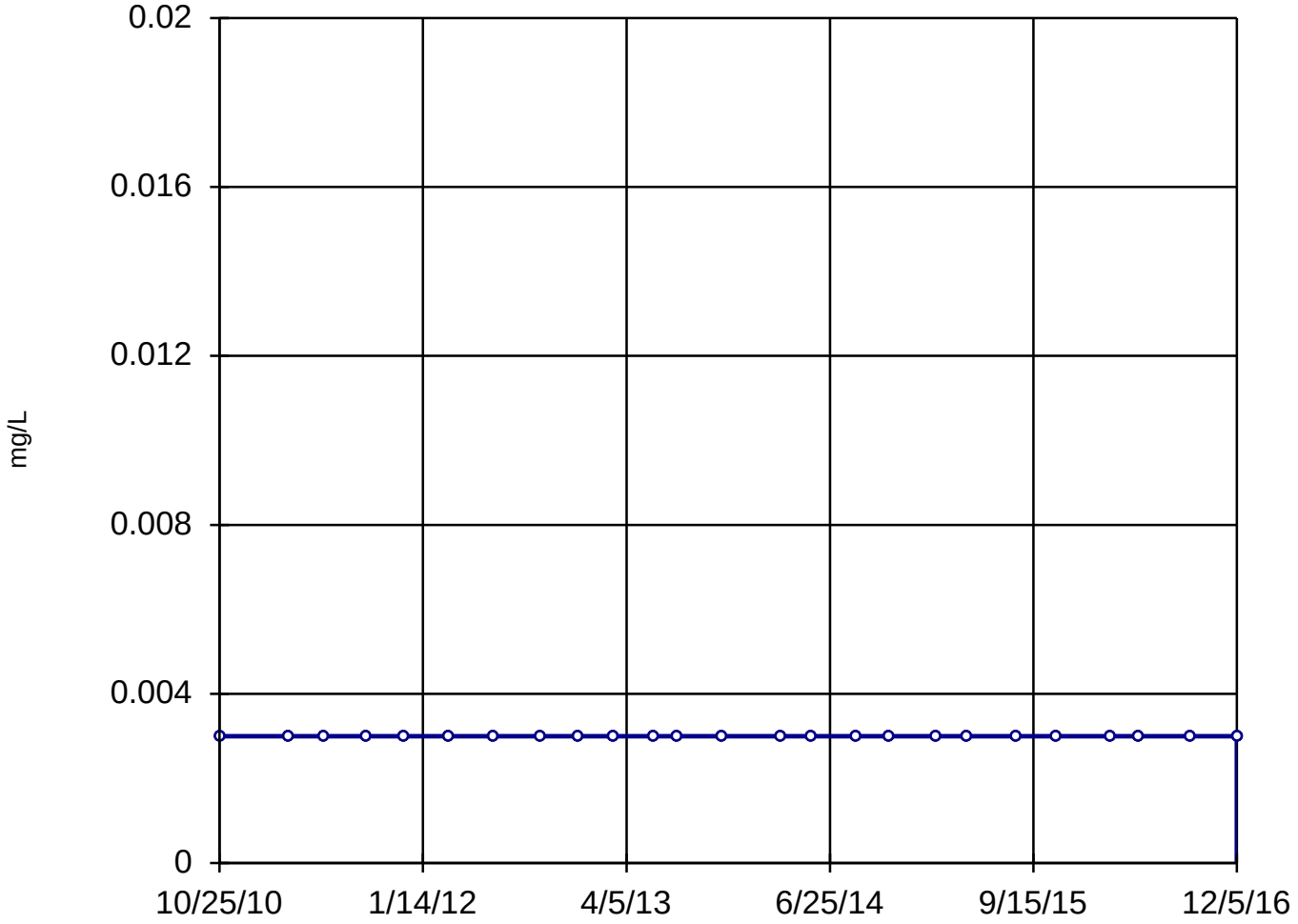
Sen's Slope Estimator

MW-04



n = 25

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 111

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Antimony, Dissolved Analysis Run 4/14/2021 1:00 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

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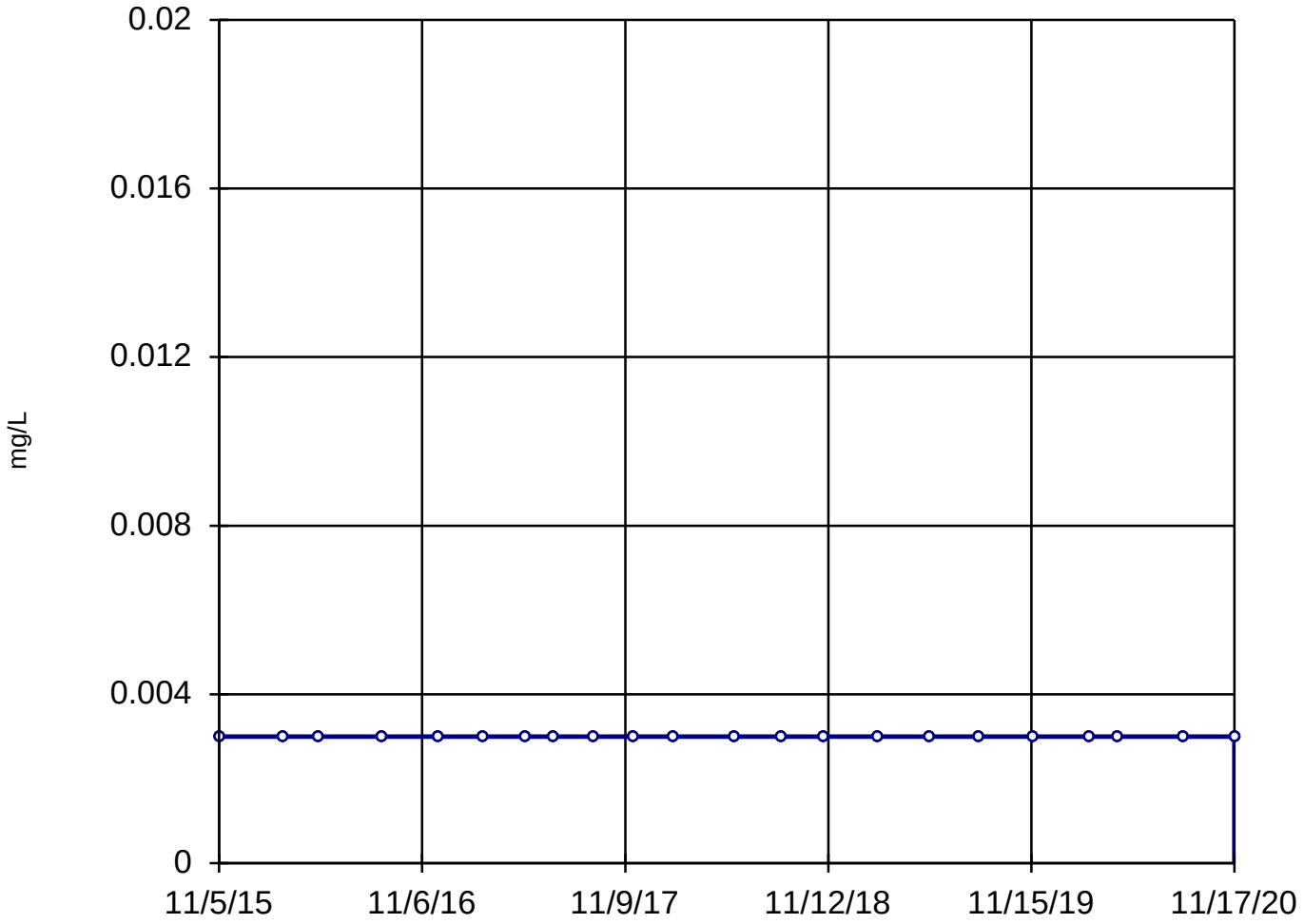
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-01



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 92

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Antimony, Total Analysis Run 4/14/2021 1:00 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

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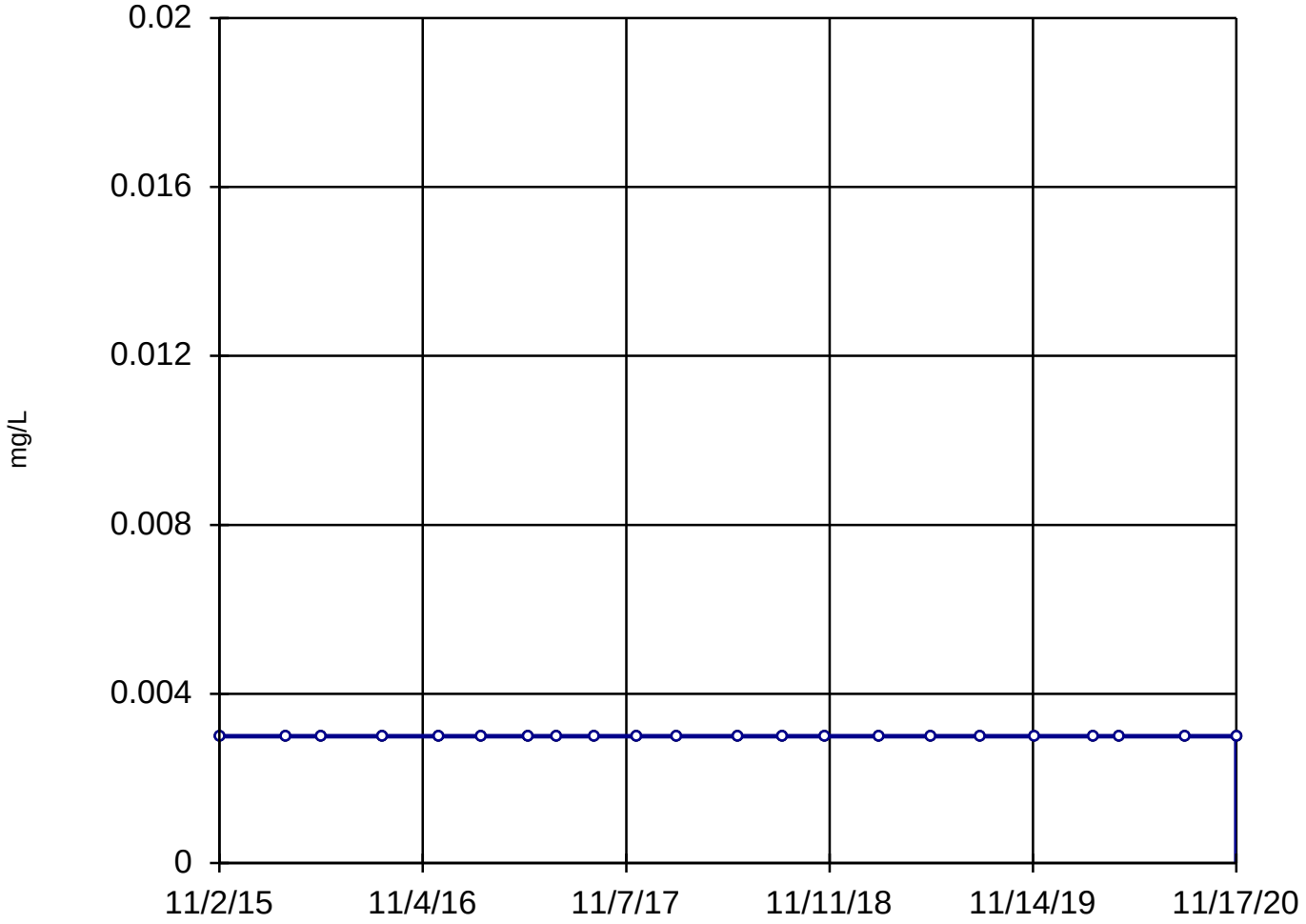
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-02



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 92

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Antimony, Total Analysis Run 4/14/2021 1:00 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

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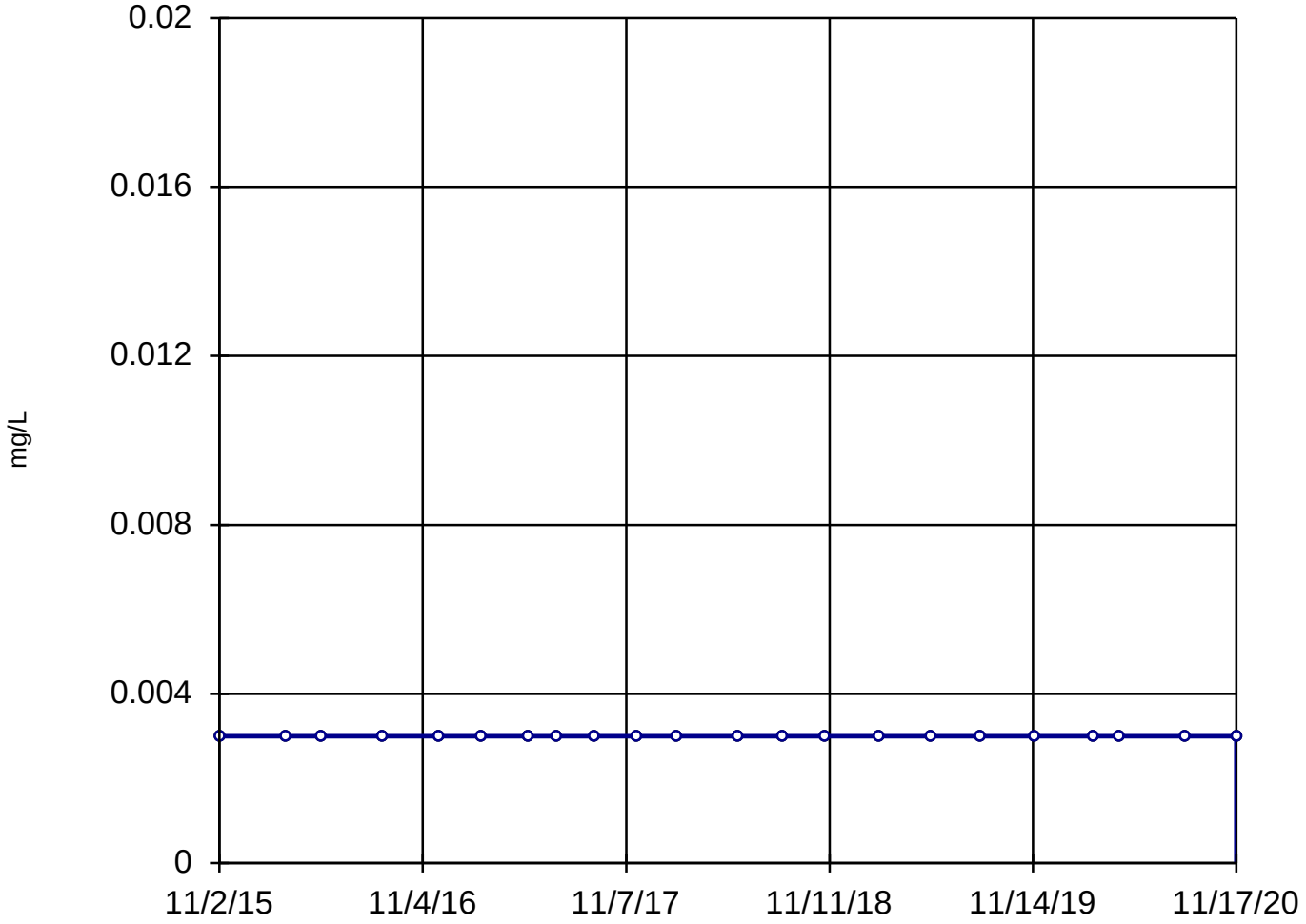
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 92

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Antimony, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

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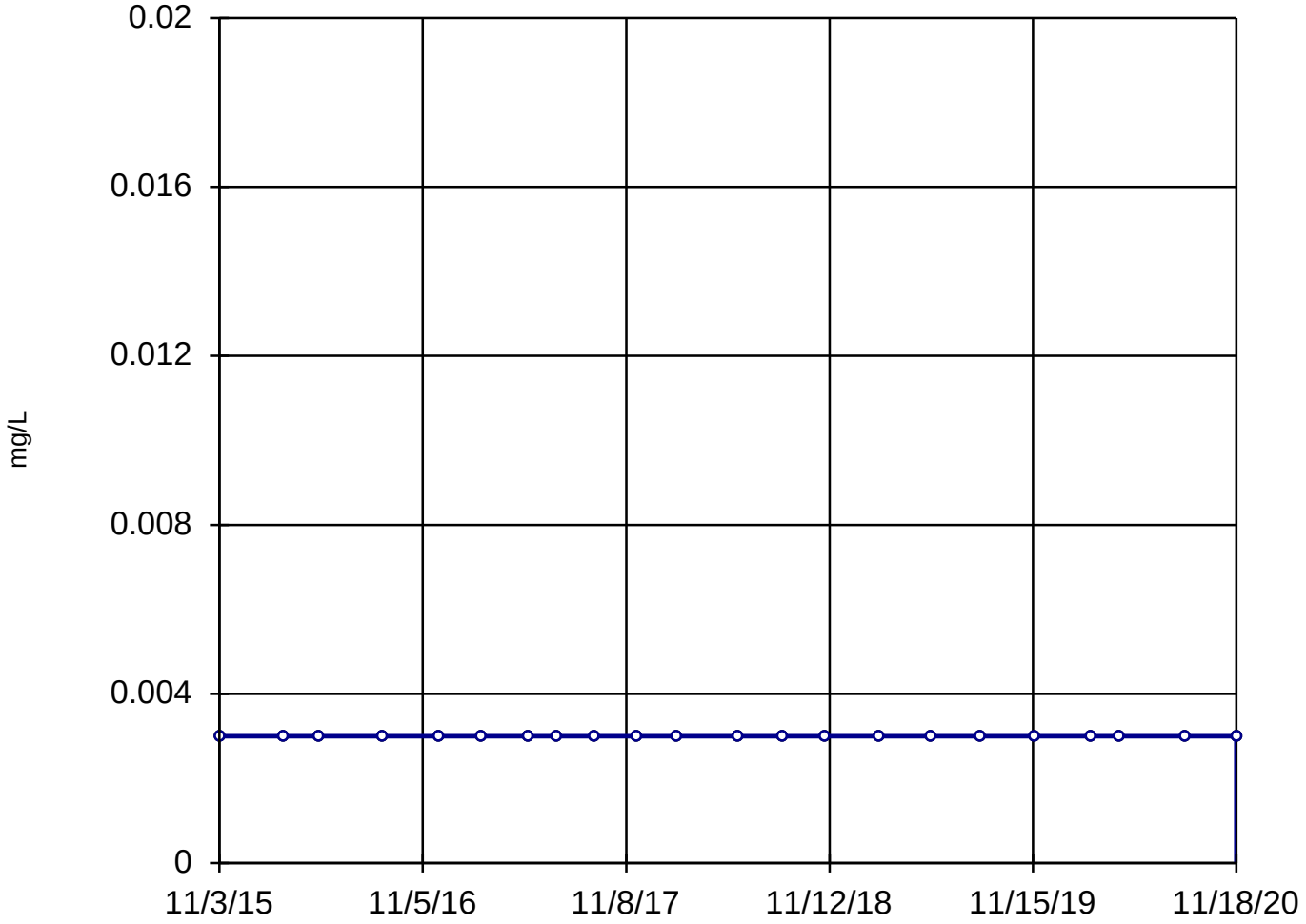
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 92

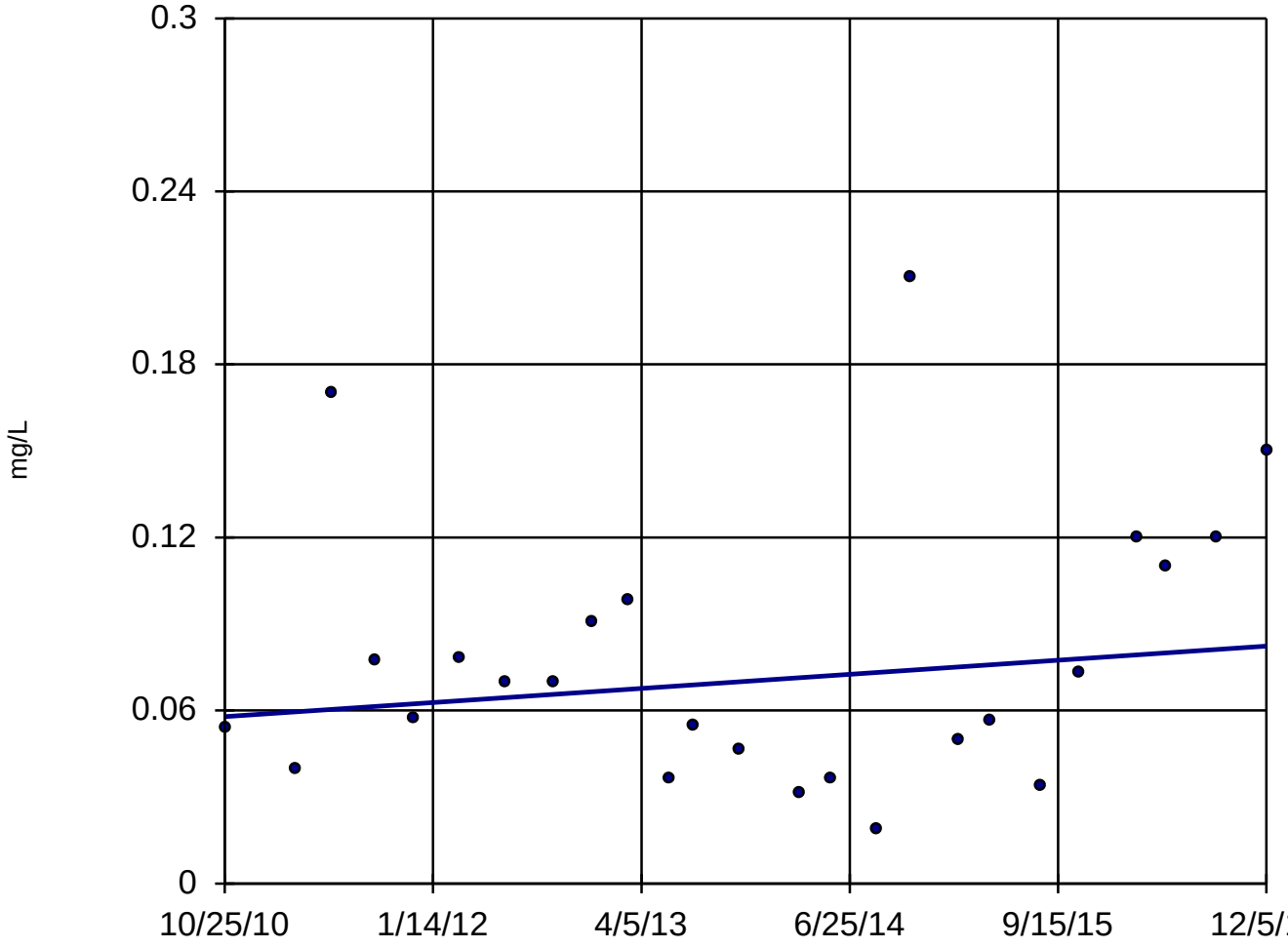
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Antimony, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-01



n = 25

Slope = 0.004007 units per year.

Mann-Kendall statistic = 31
critical = 111

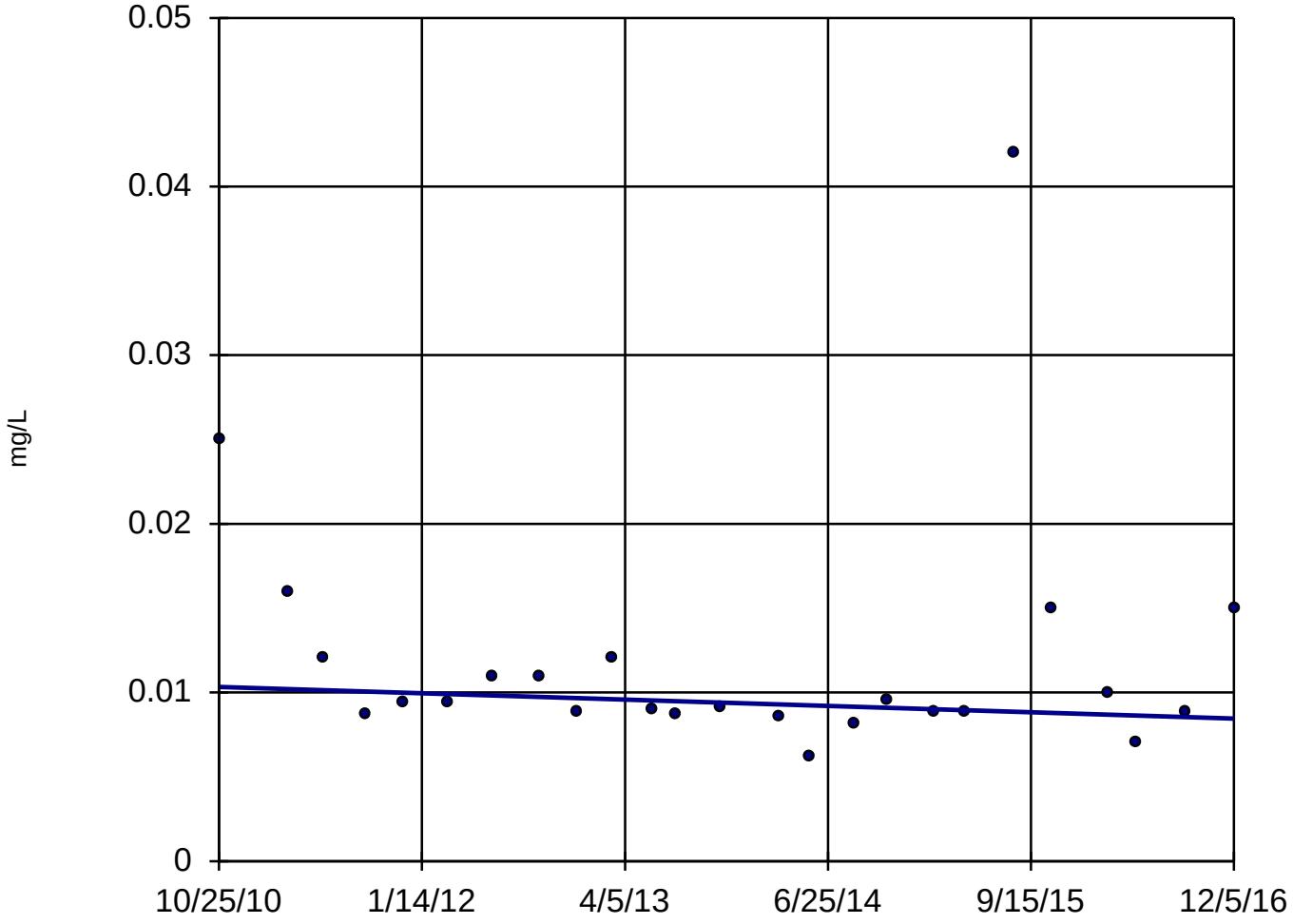
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Arsenic, Dissolved Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-02



n = 25

Slope = -0.0003061 units per year.

Mann-Kendall statistic = -56
critical = -111

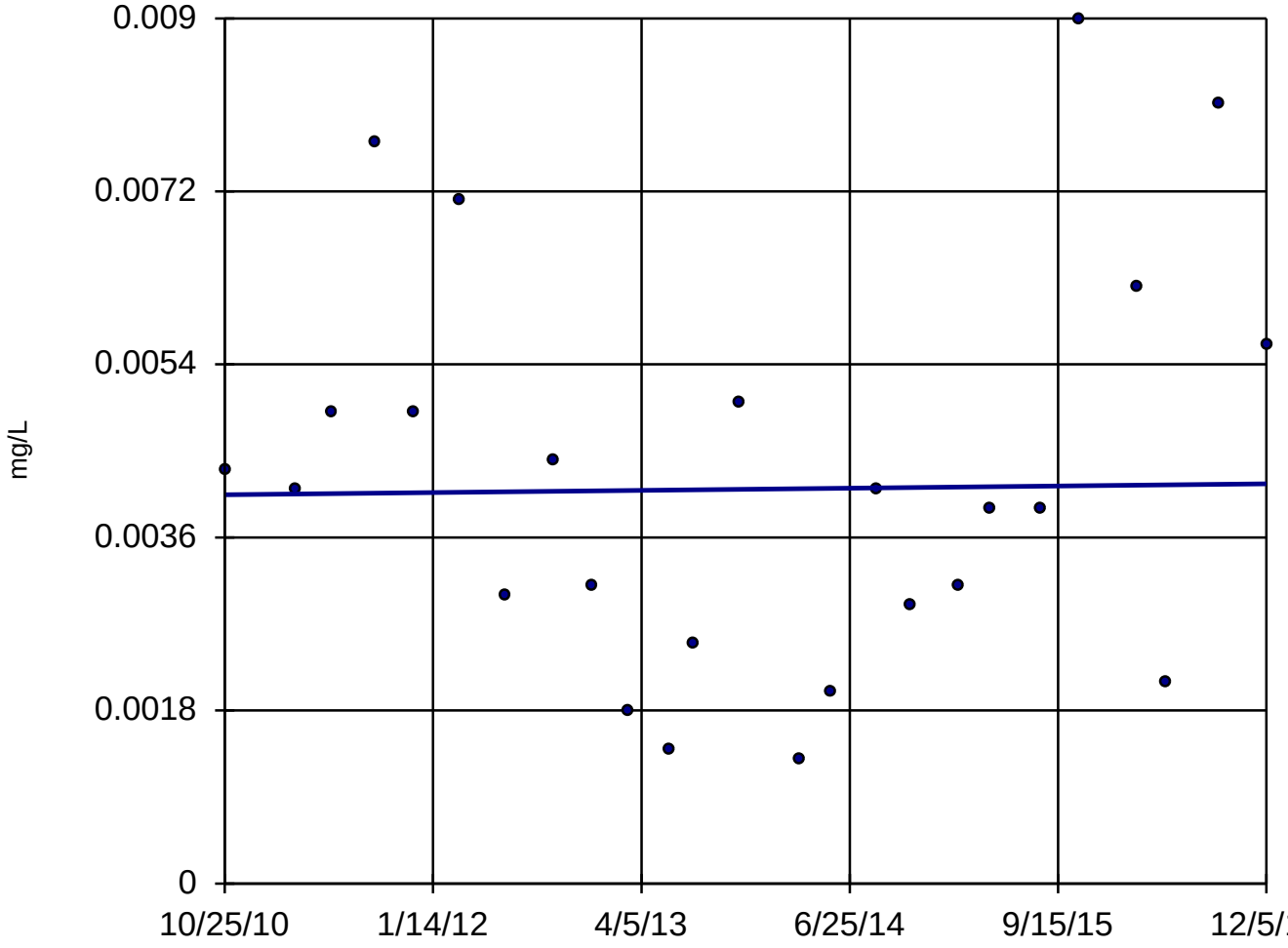
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Arsenic, Dissolved Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-03



n = 25

Slope = 0.00001874 units per year.

Mann-Kendall statistic = 4
critical = 111

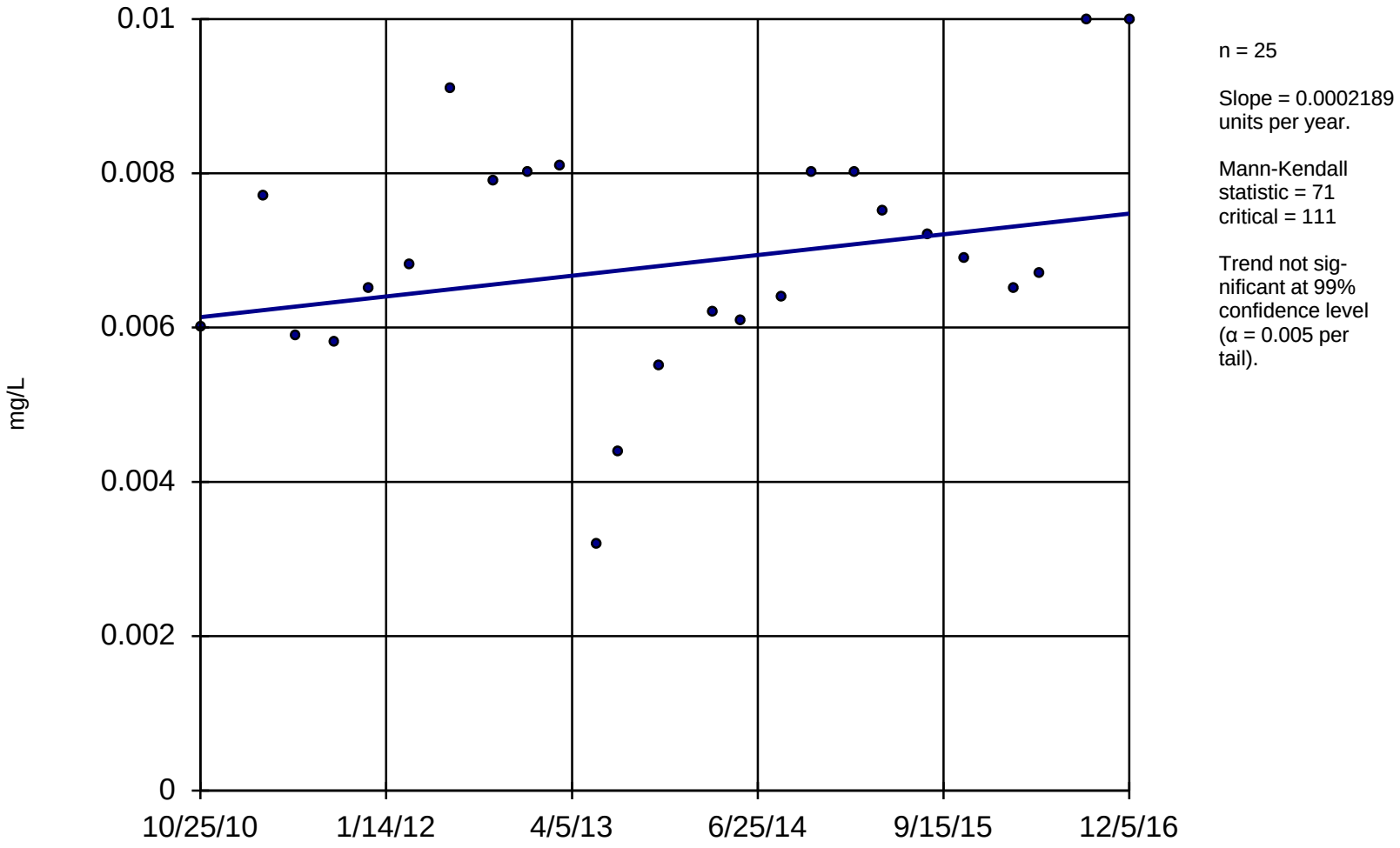
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Arsenic, Dissolved Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-04



n = 25

Slope = 0.0002189 units per year.

Mann-Kendall statistic = 71
critical = 111

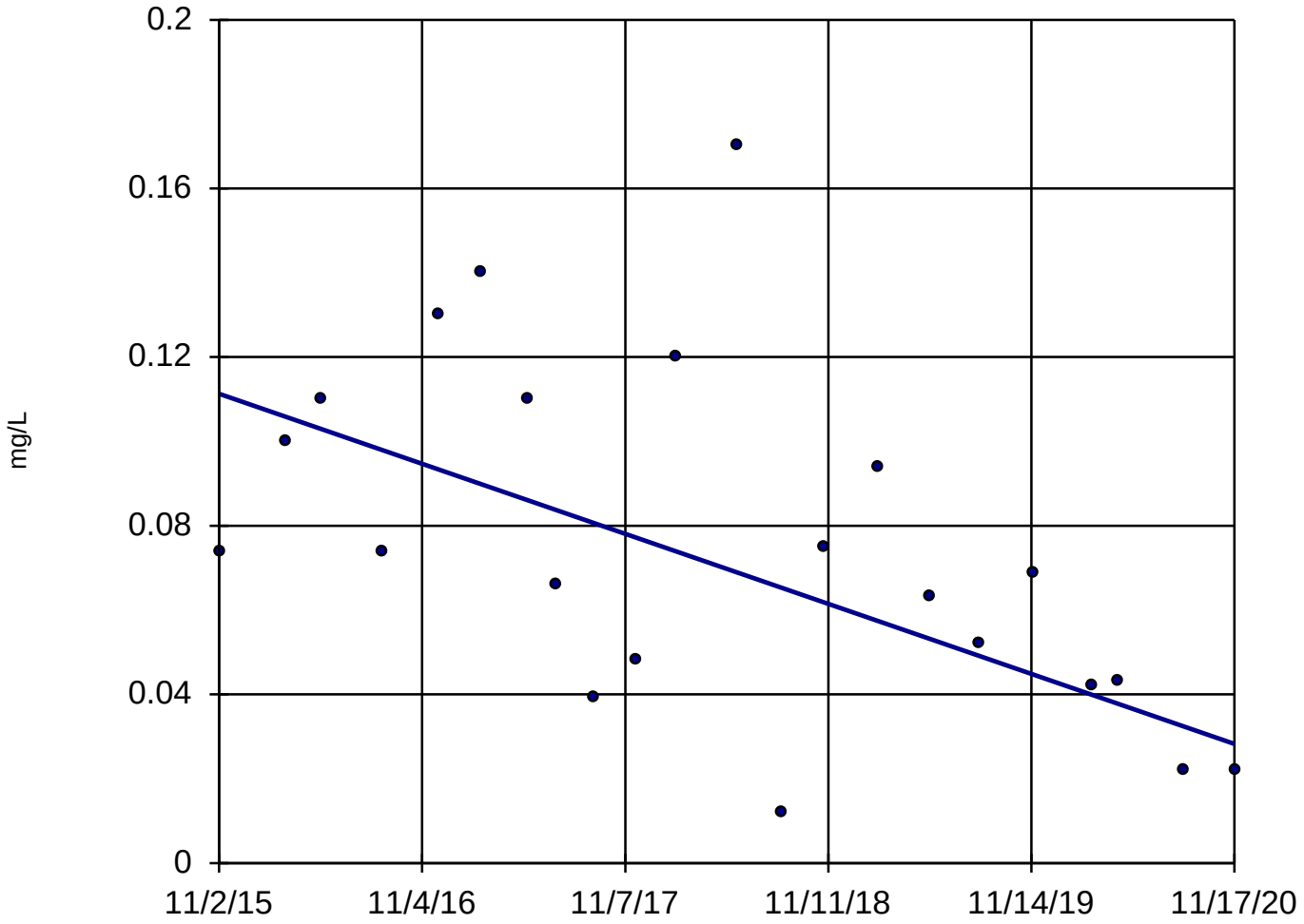
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Arsenic, Dissolved Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-01



n = 22

Slope = -0.01647 units per year.

Mann-Kendall statistic = -94
critical = -92

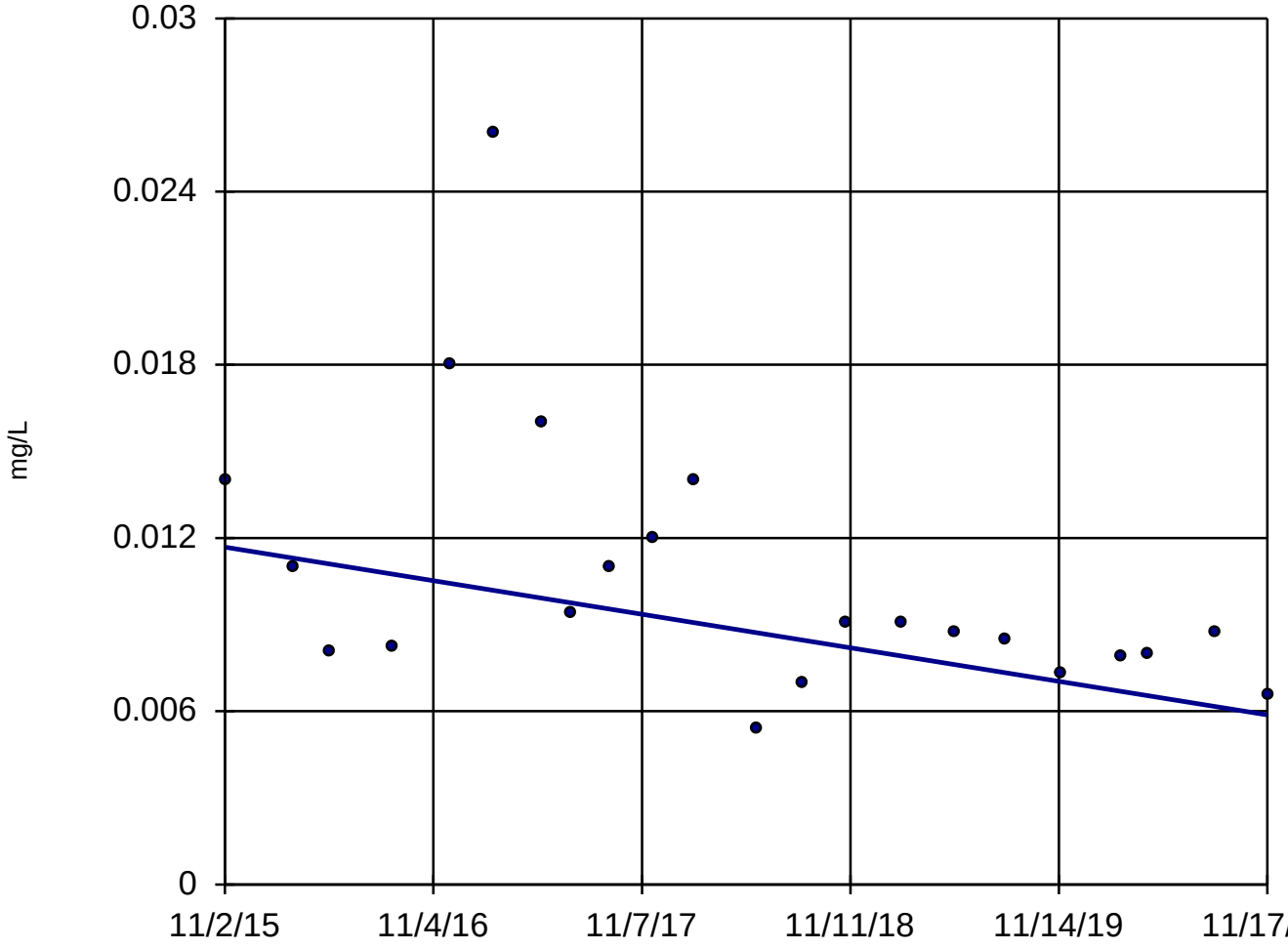
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Arsenic, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-02



n = 22

Slope = -0.001153 units per year.

Mann-Kendall statistic = -97
critical = -92

Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Arsenic, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

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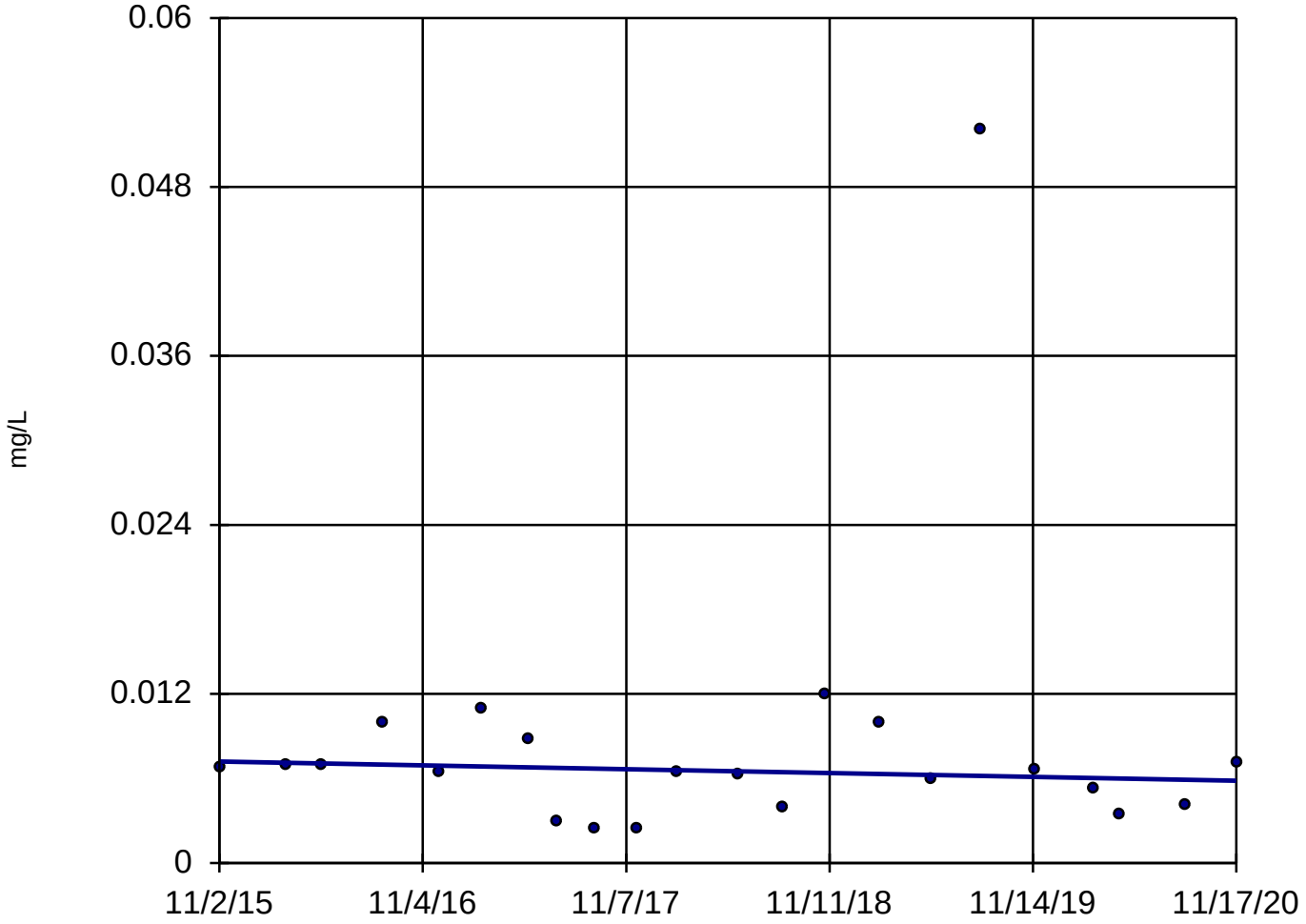
Sen's Slope Estimator

MW-03



n = 22

Slope = -0.0002674 units per year.

Mann-Kendall statistic = -21
critical = -92

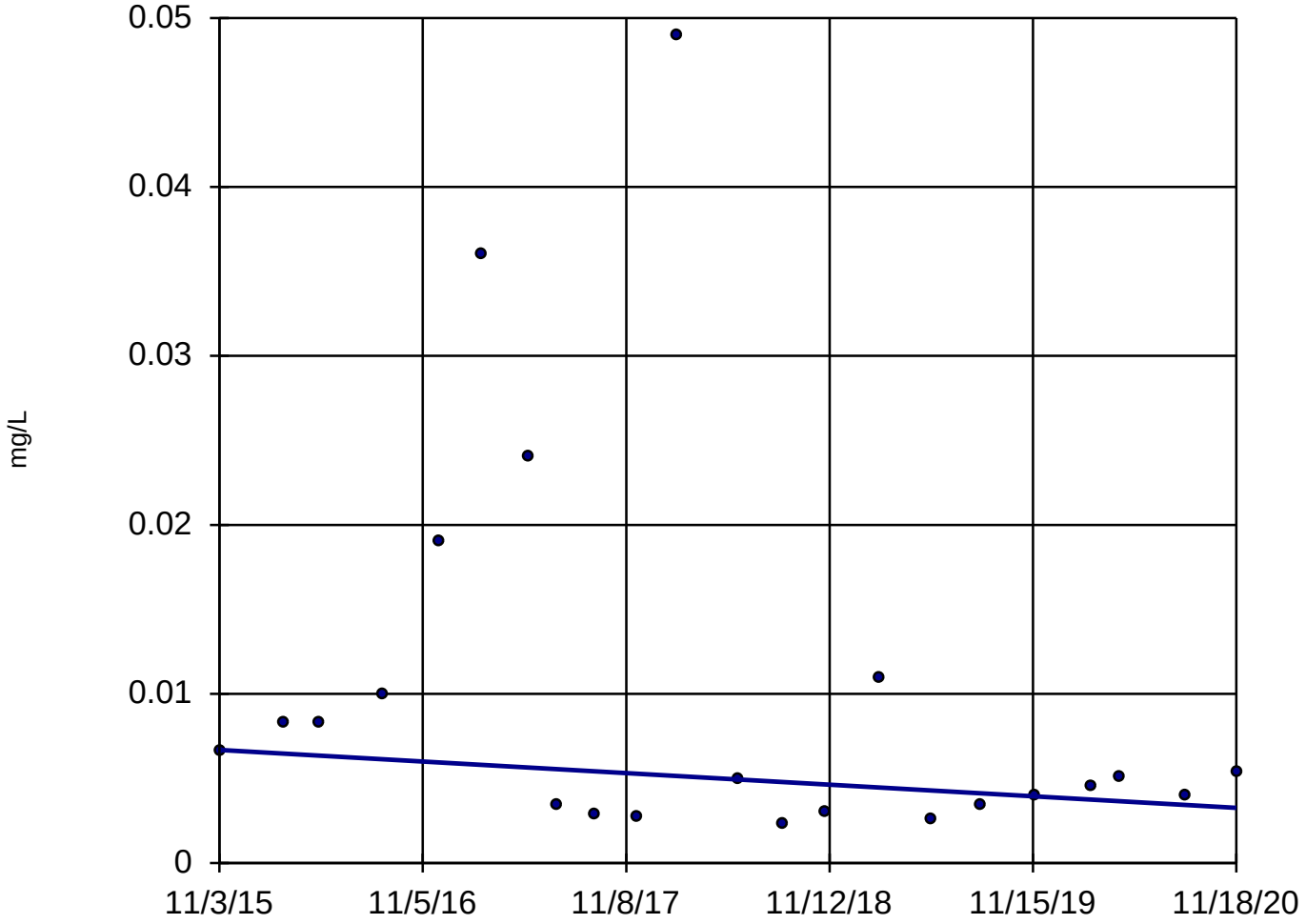
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Arsenic, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-04



n = 22

Slope = -0.0006784 units per year.

Mann-Kendall statistic = -38
critical = -92

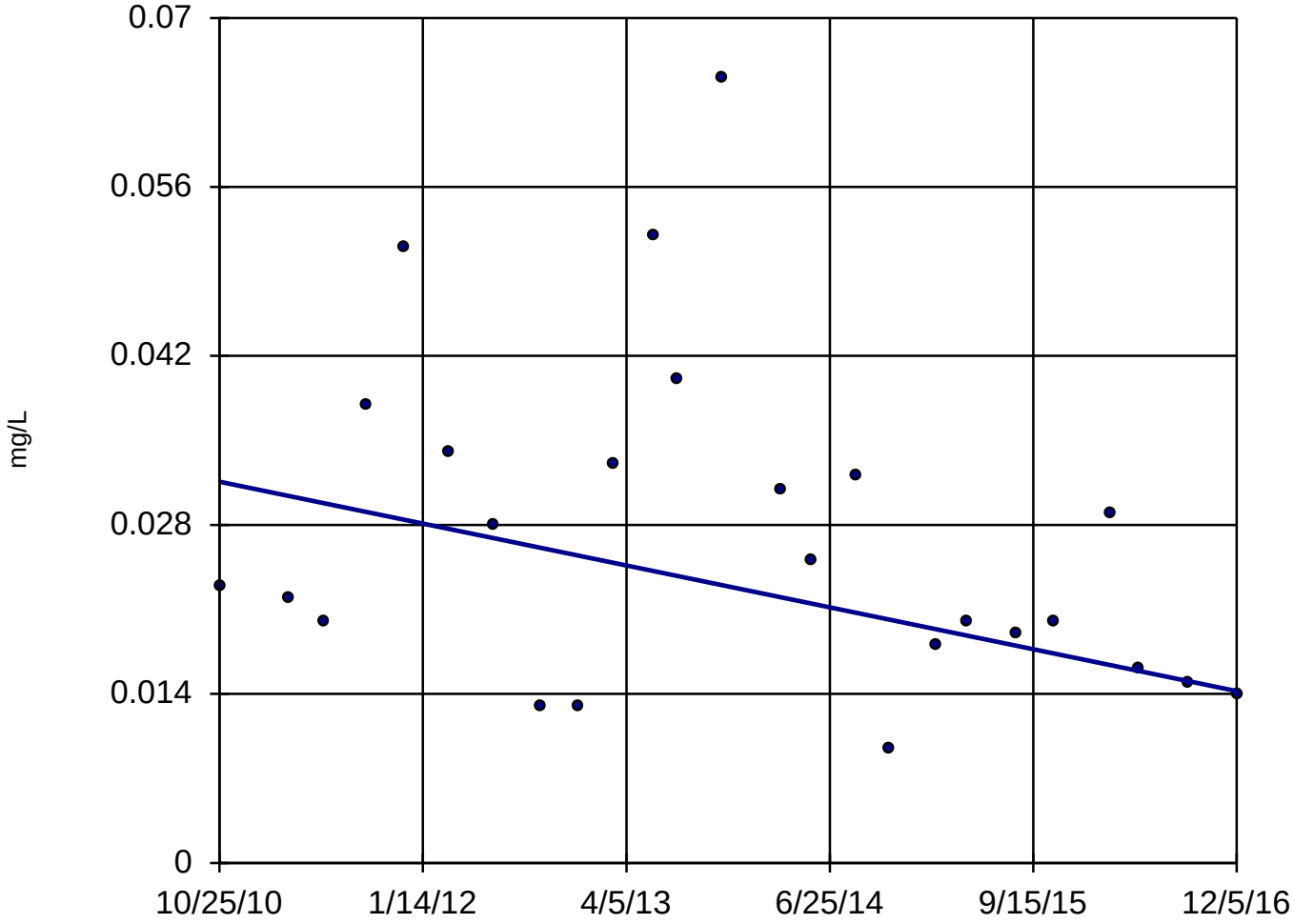
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Arsenic, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-01



n = 25

Slope = -0.002836 units per year.

Mann-Kendall statistic = -84
critical = -111

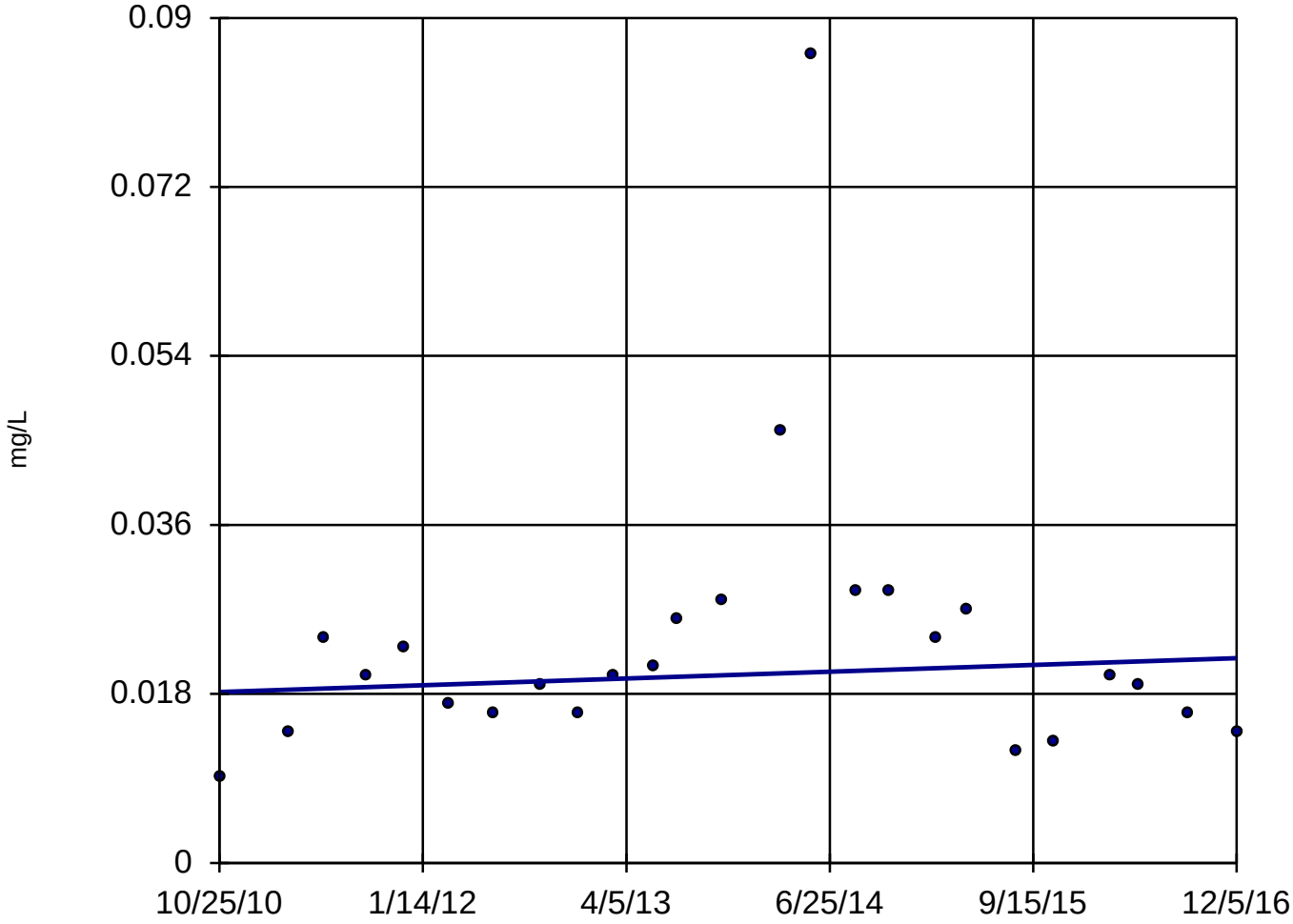
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Dissolved Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-02



n = 25

Slope = 0.0005904 units per year.

Mann-Kendall statistic = 22
critical = 111

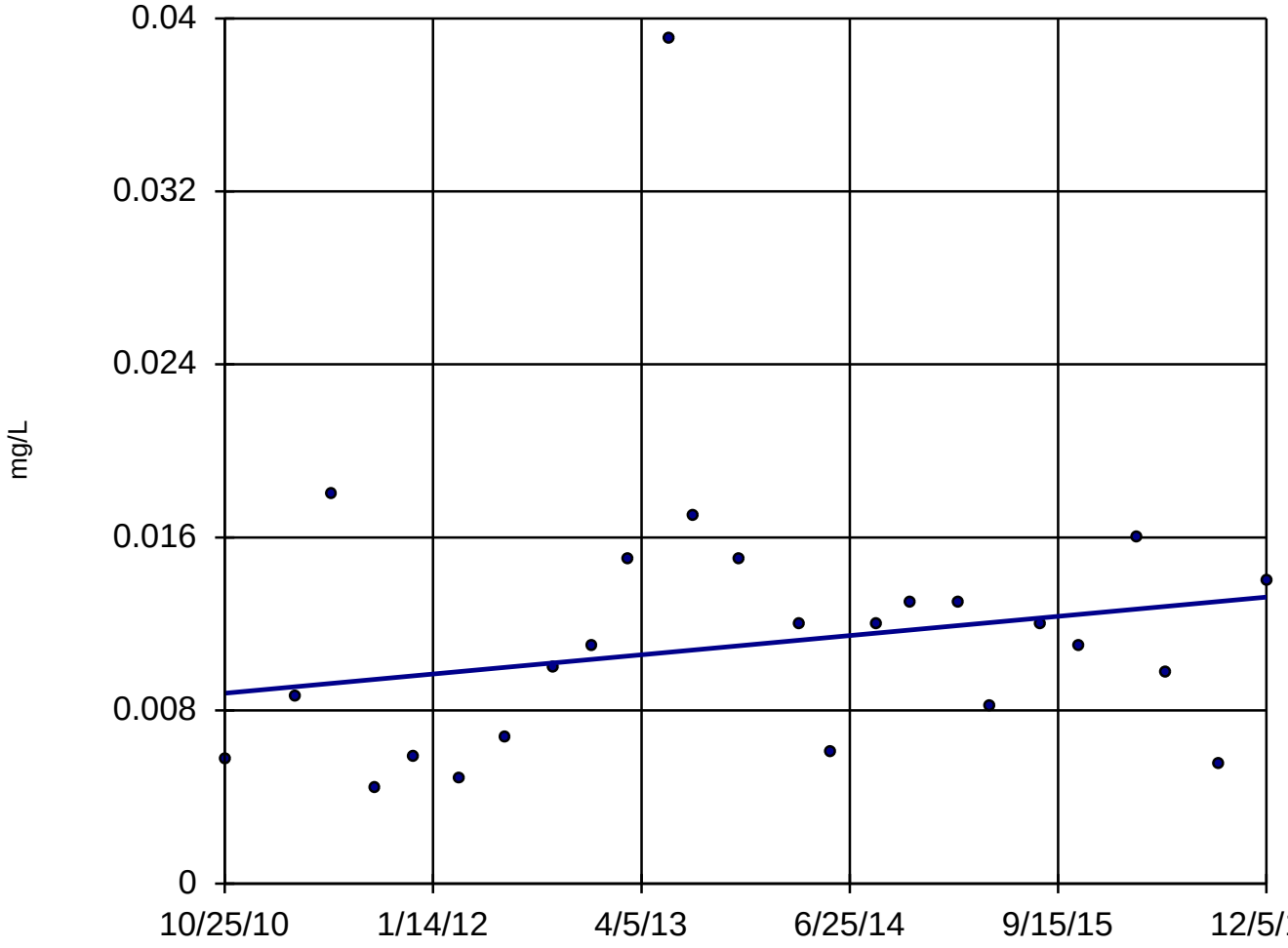
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Dissolved Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-03



n = 25

Slope = 0.0007264 units per year.

Mann-Kendall statistic = 50
critical = 111

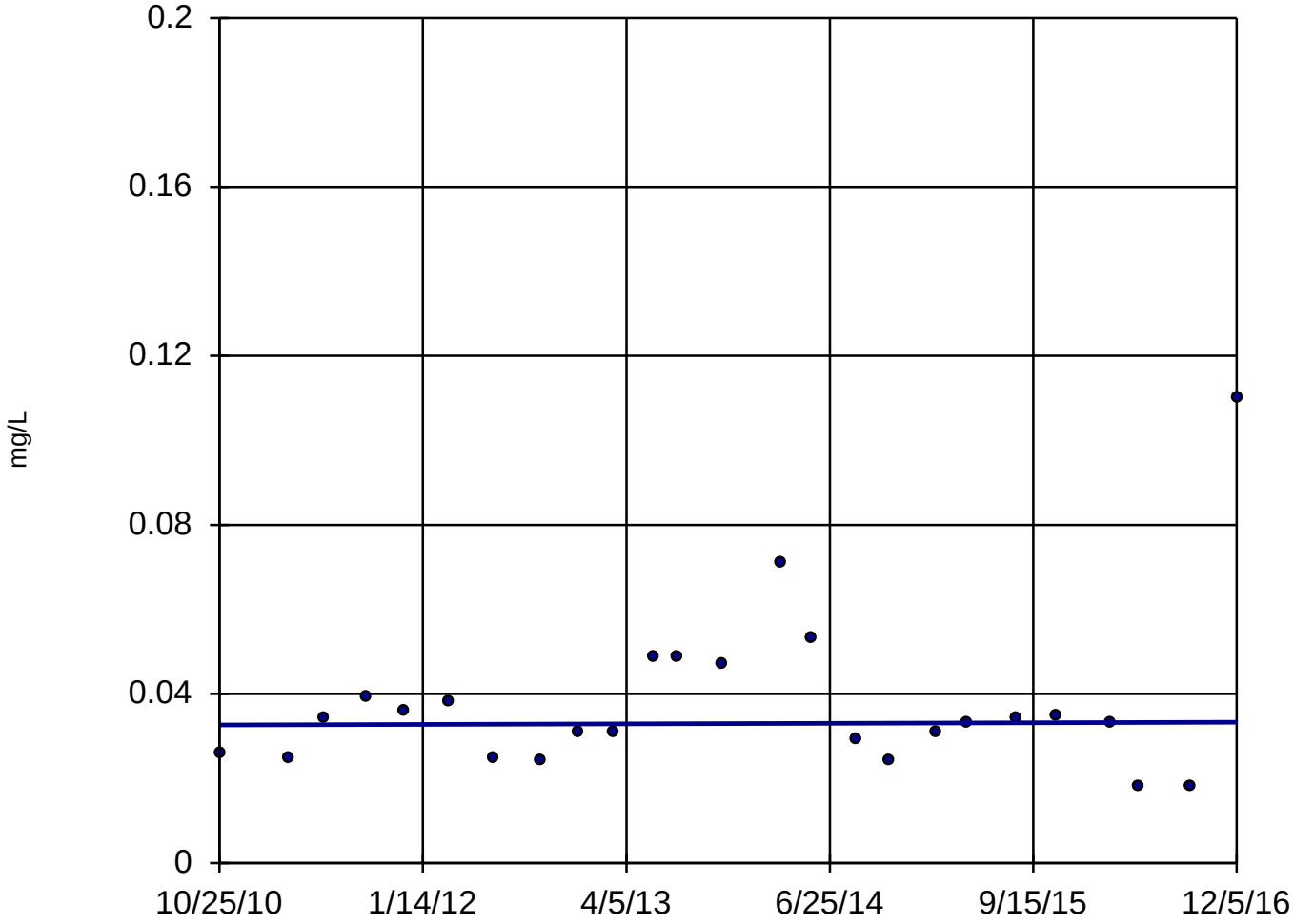
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Dissolved Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-04



n = 25

Slope = 0.0001138 units per year.

Mann-Kendall statistic = 9
critical = 111

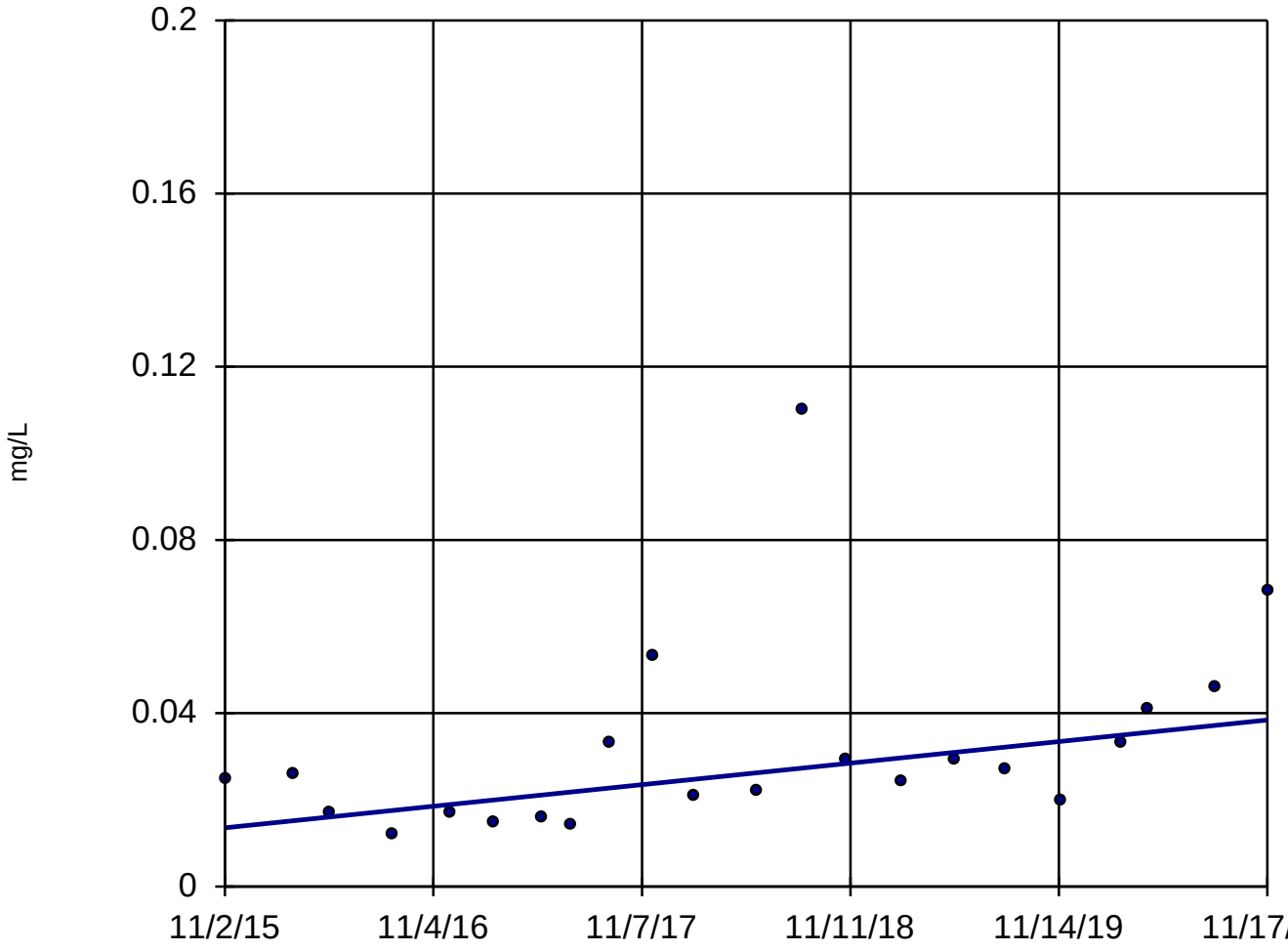
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Dissolved Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-01



n = 22

Slope = 0.004937 units per year.

Mann-Kendall statistic = 100
critical = 92

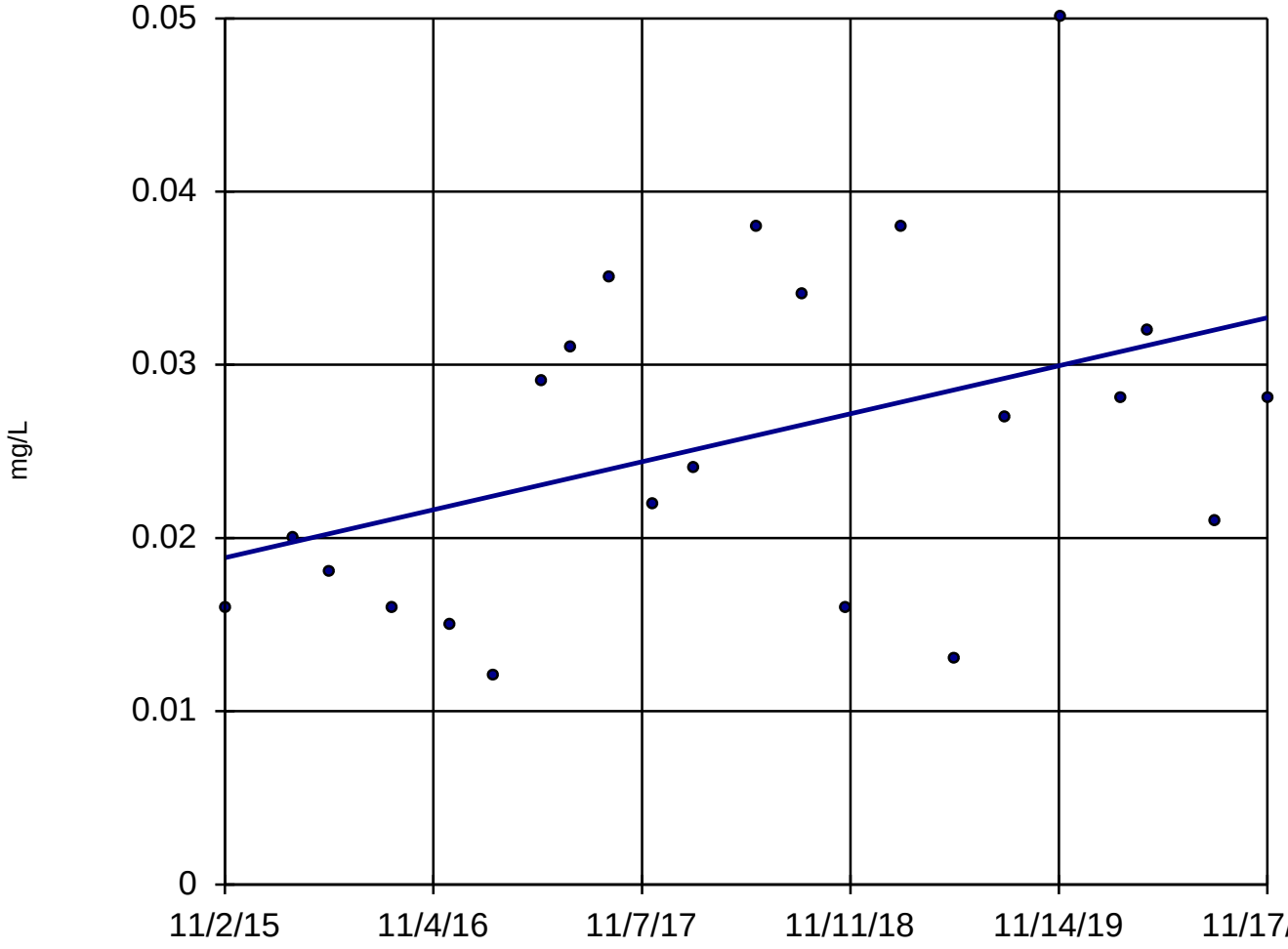
Increasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-02



n = 22

Slope = 0.002744 units per year.

Mann-Kendall statistic = 64
critical = 92

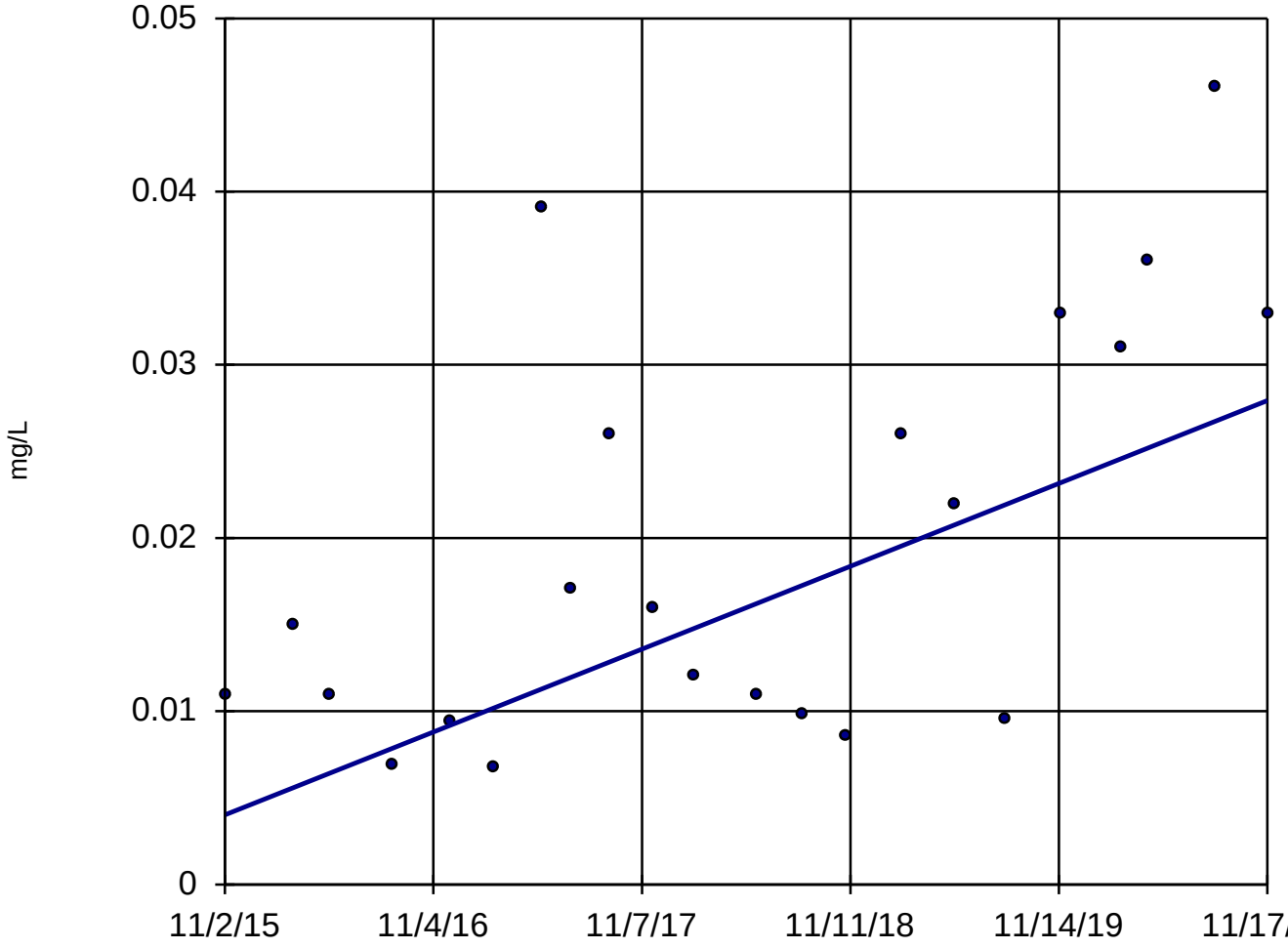
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-03



n = 22

Slope = 0.00474 units per year.

Mann-Kendall statistic = 84
critical = 92

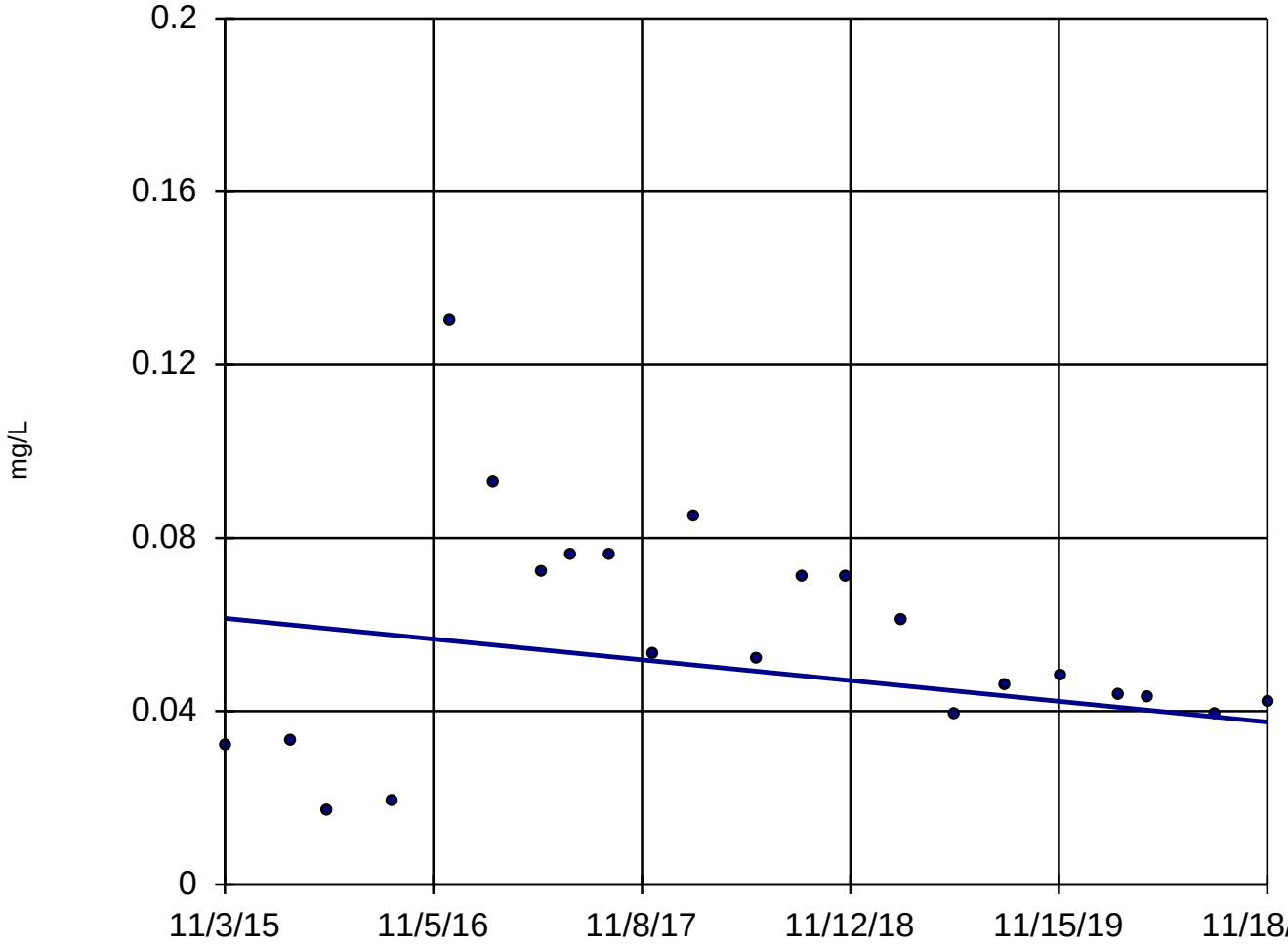
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-04



n = 22

Slope = -0.004747 units per year.

Mann-Kendall statistic = -42
critical = -92

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

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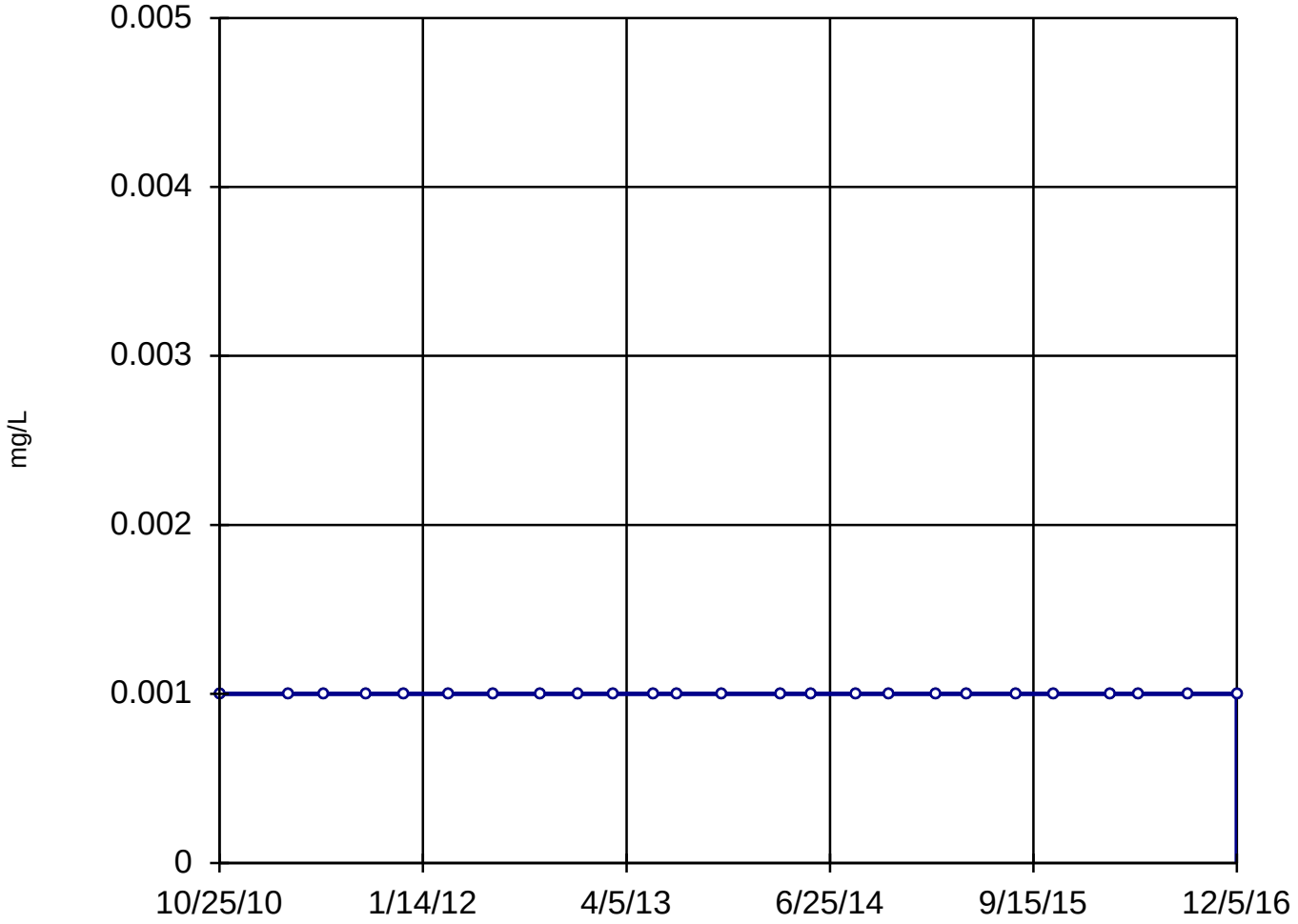
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-01



n = 25

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 111

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Beryllium, Dissolved Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

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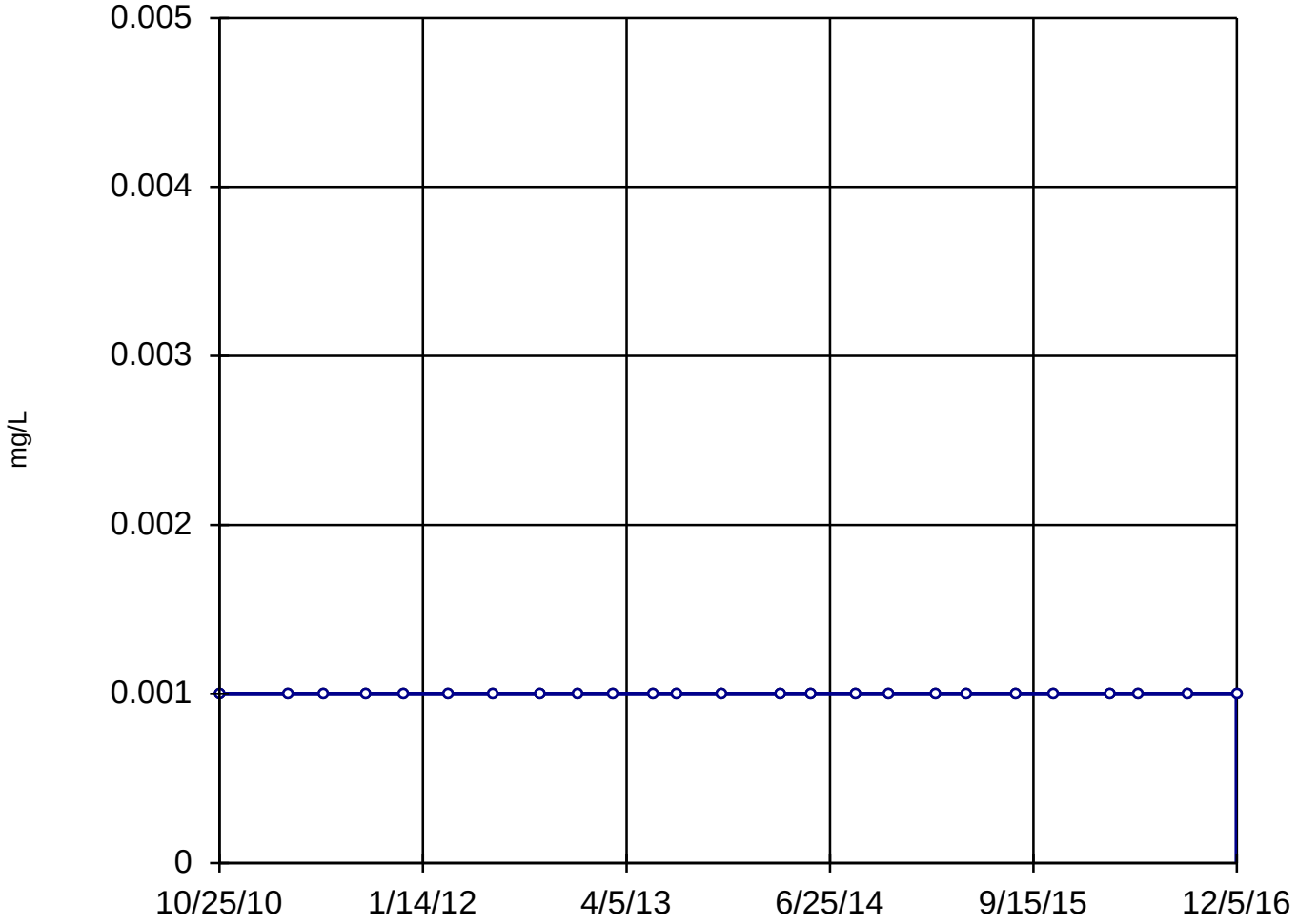
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-02



n = 25

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 111

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Beryllium, Dissolved Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

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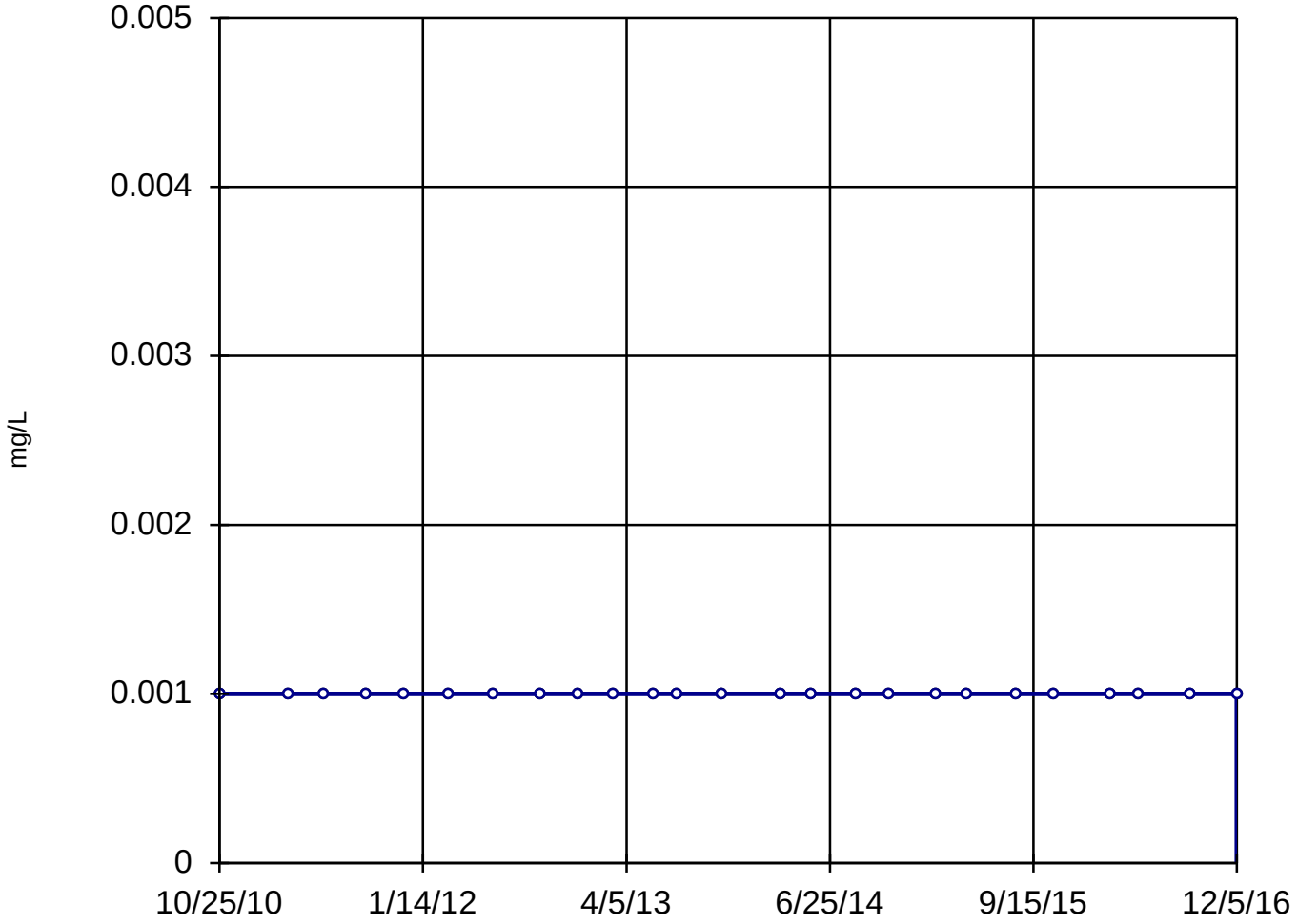
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 25

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 111

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Beryllium, Dissolved Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

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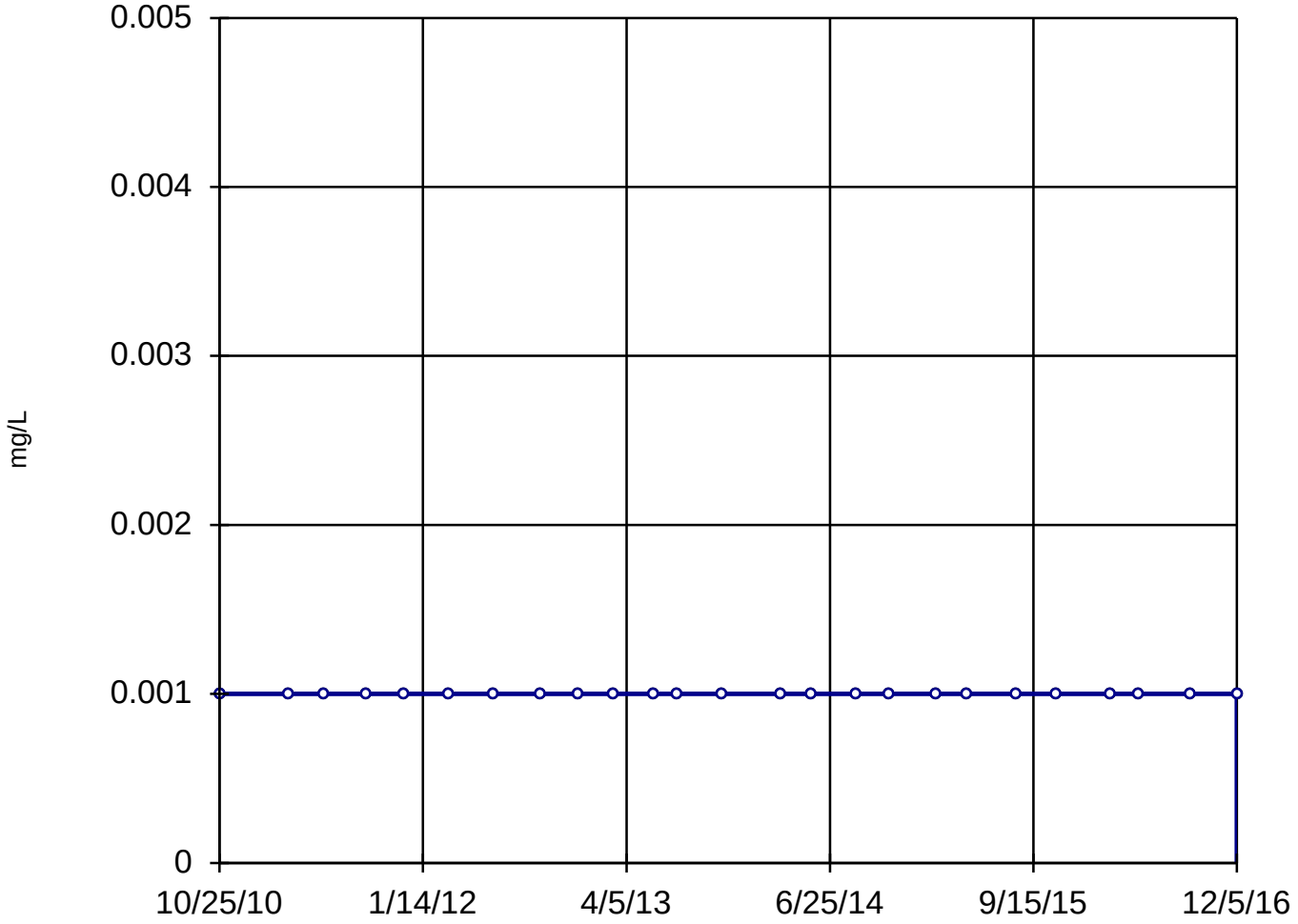
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 25

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 111

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Beryllium, Dissolved Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

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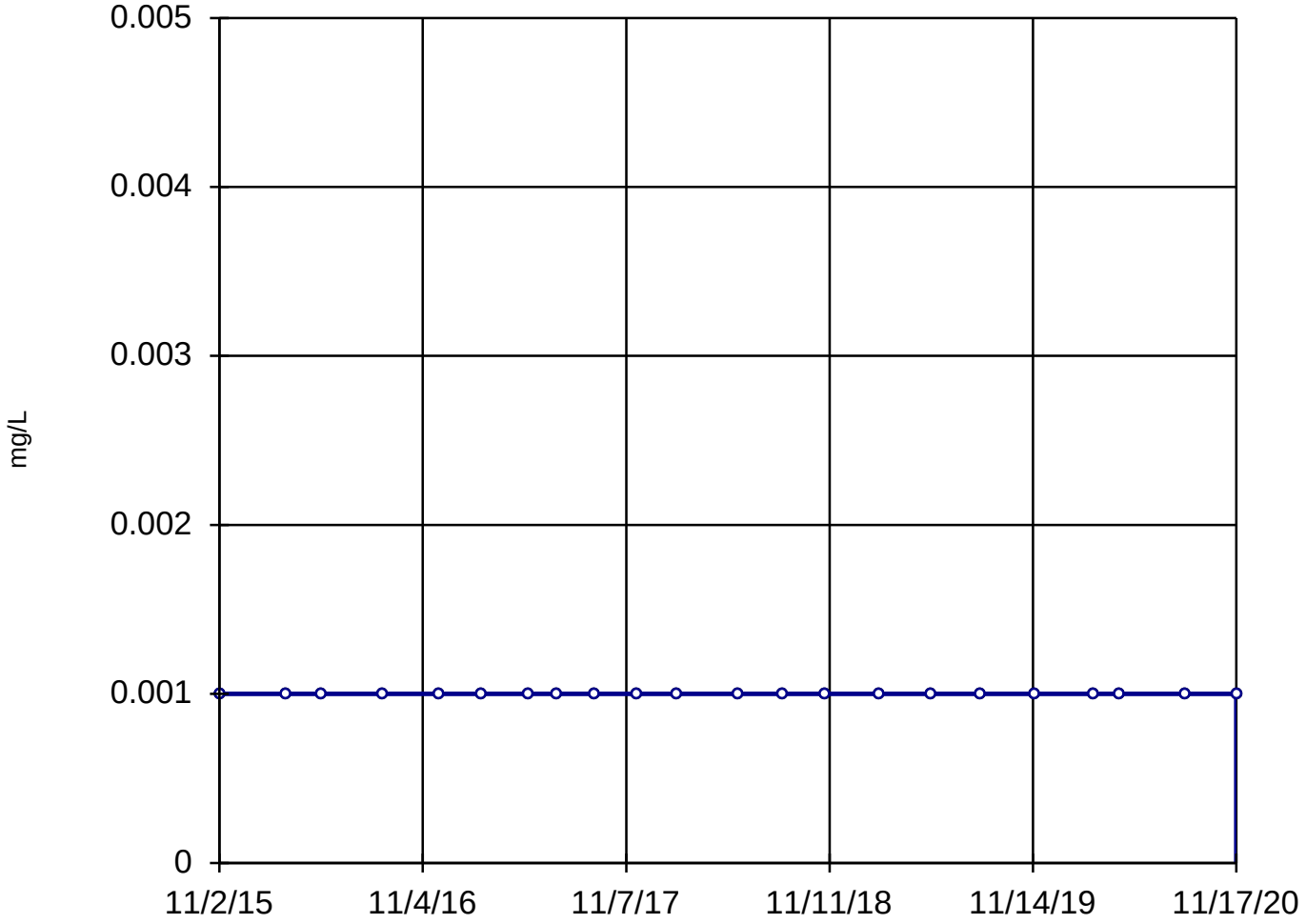
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-01



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 92

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Beryllium, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

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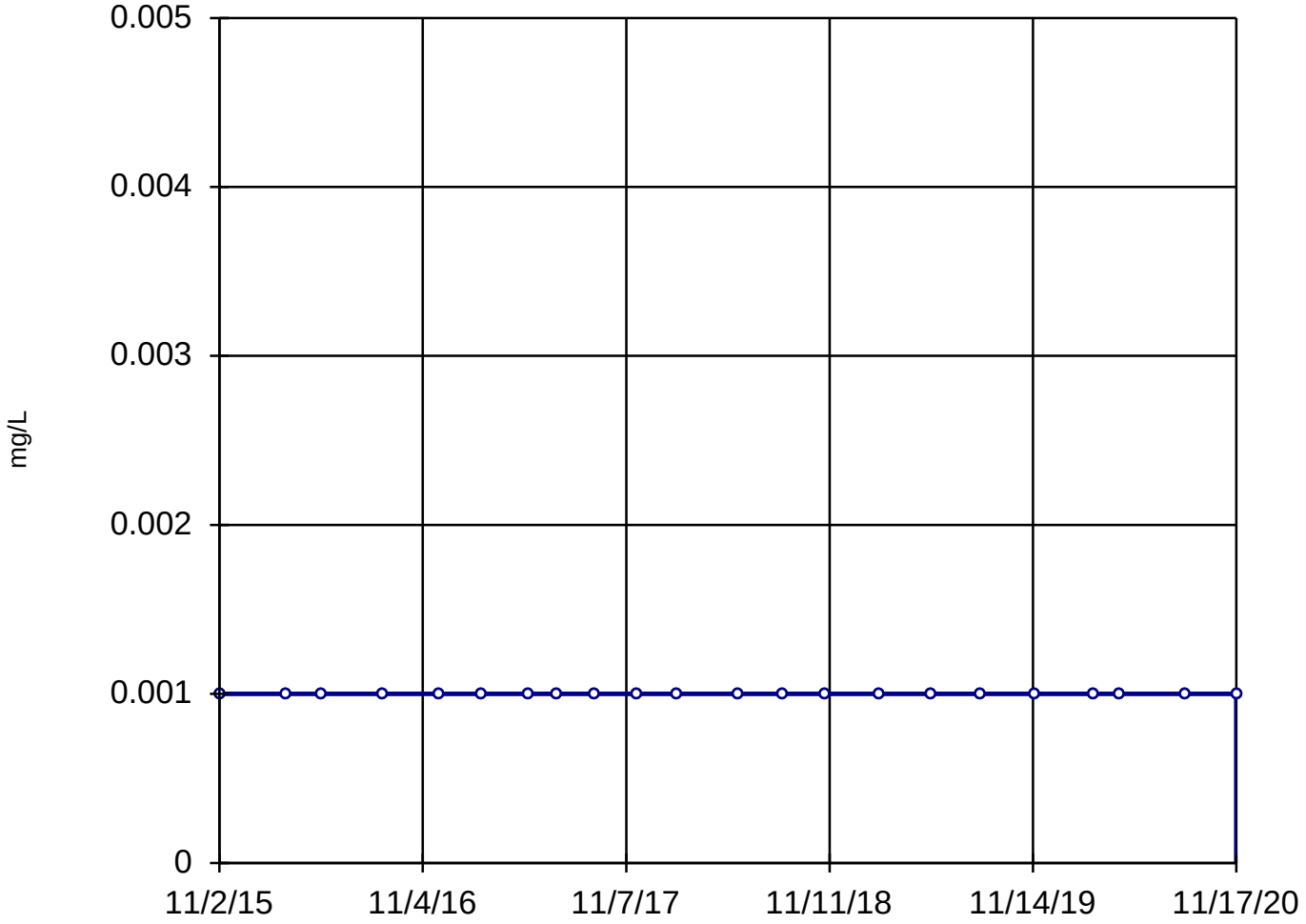
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-02



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 92

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

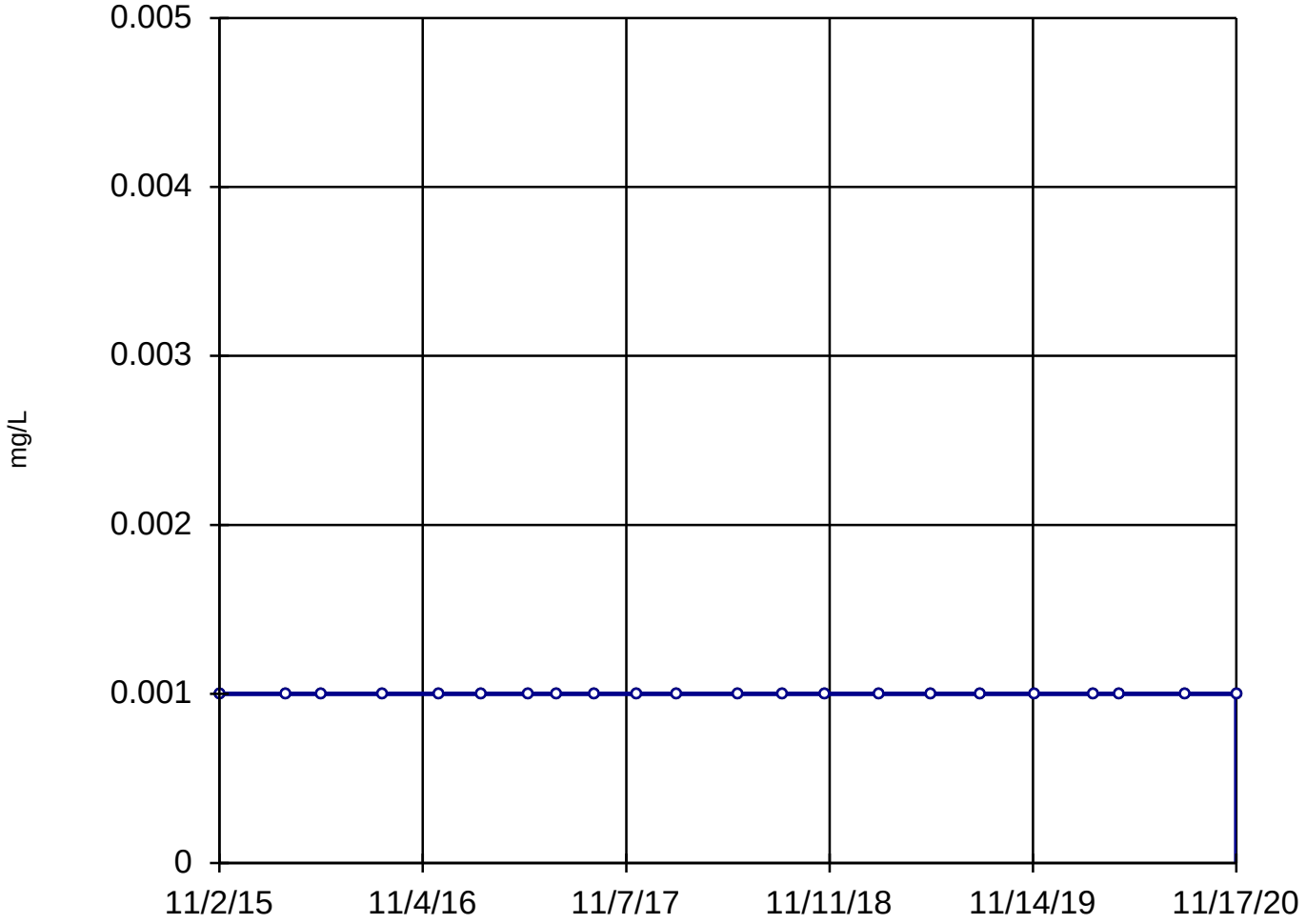
Constituent: Beryllium, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 92

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

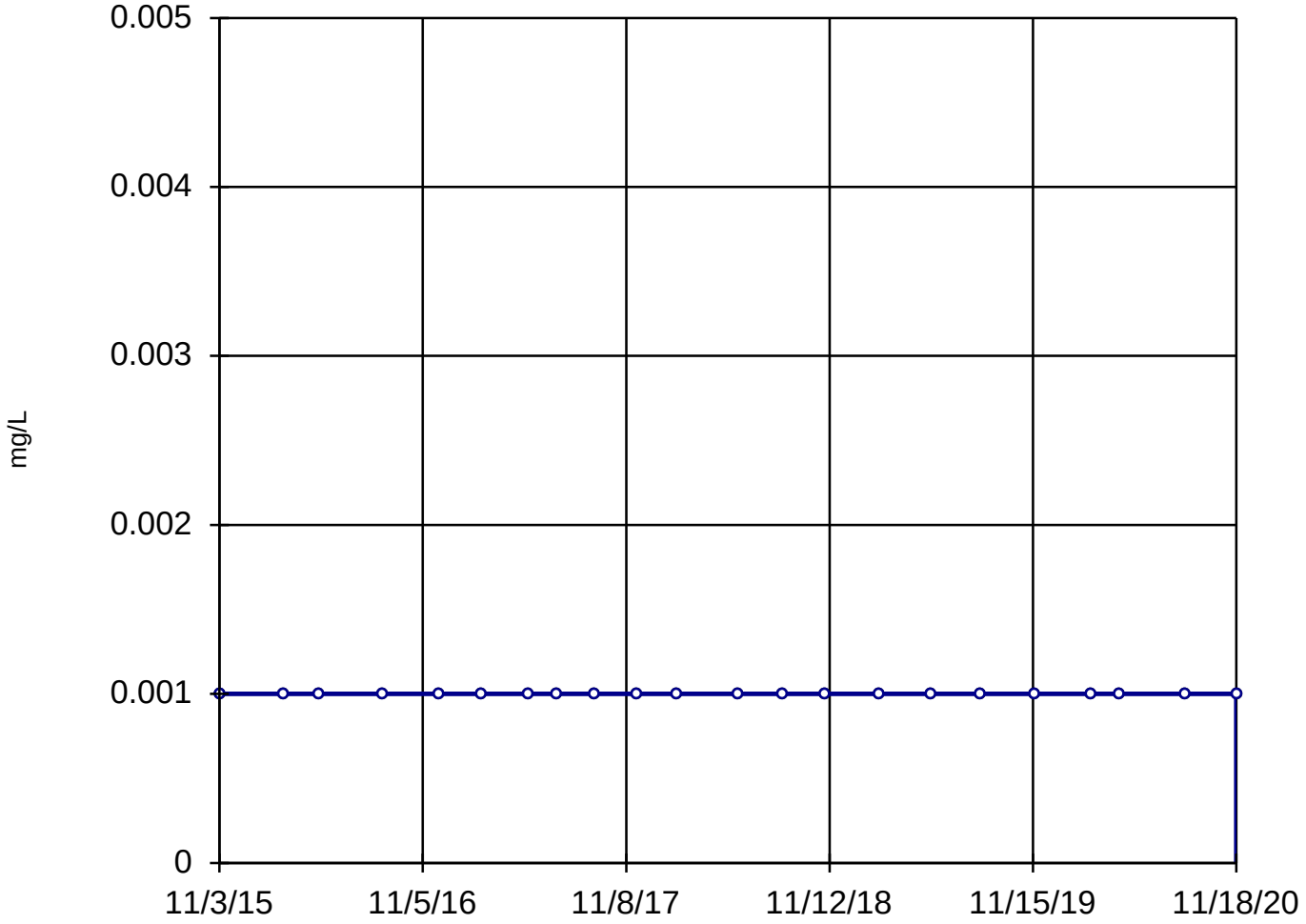
Constituent: Beryllium, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 92

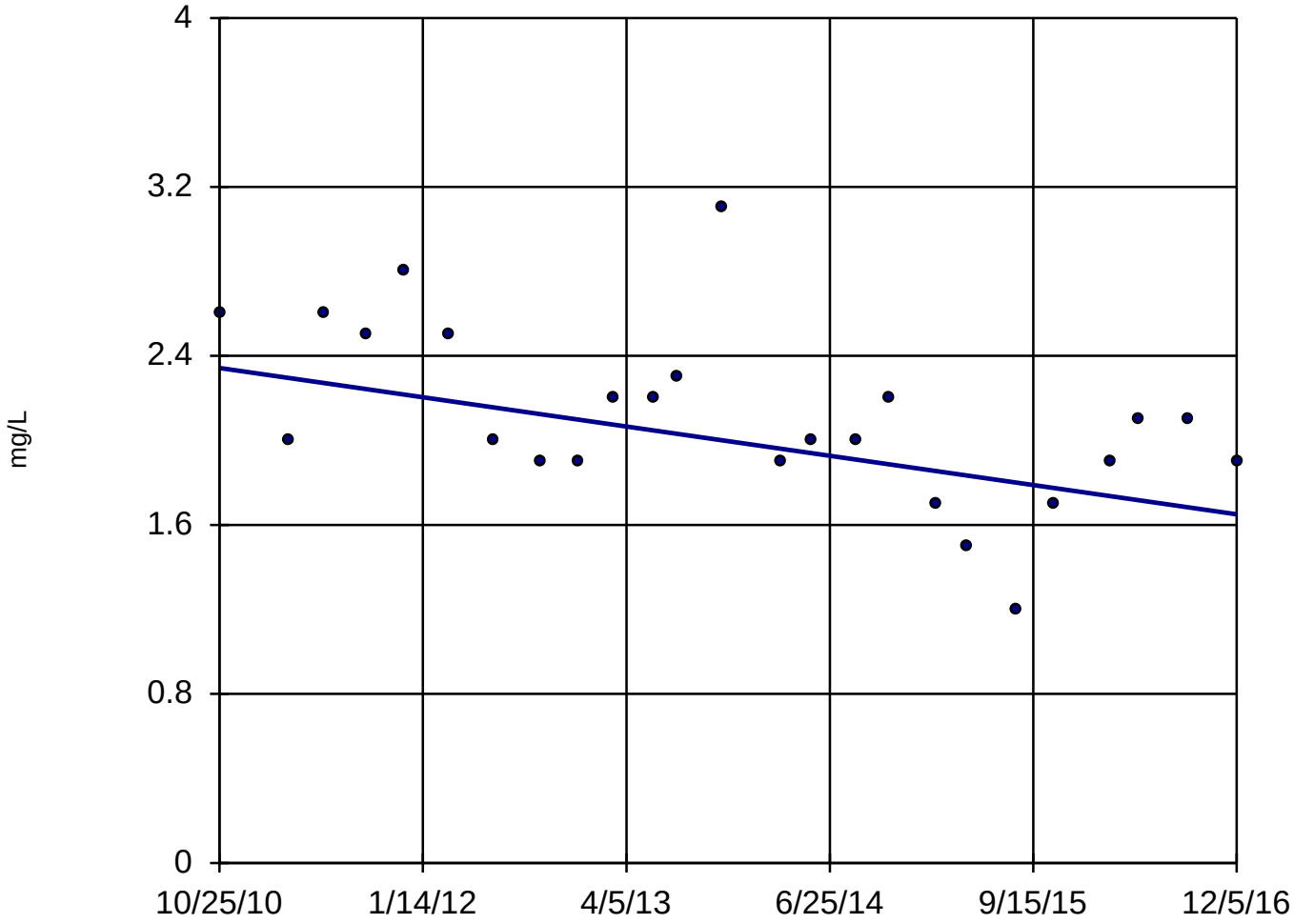
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Beryllium, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-01



n = 25

Slope = -0.1131 units per year.

Mann-Kendall statistic = -117
critical = -111

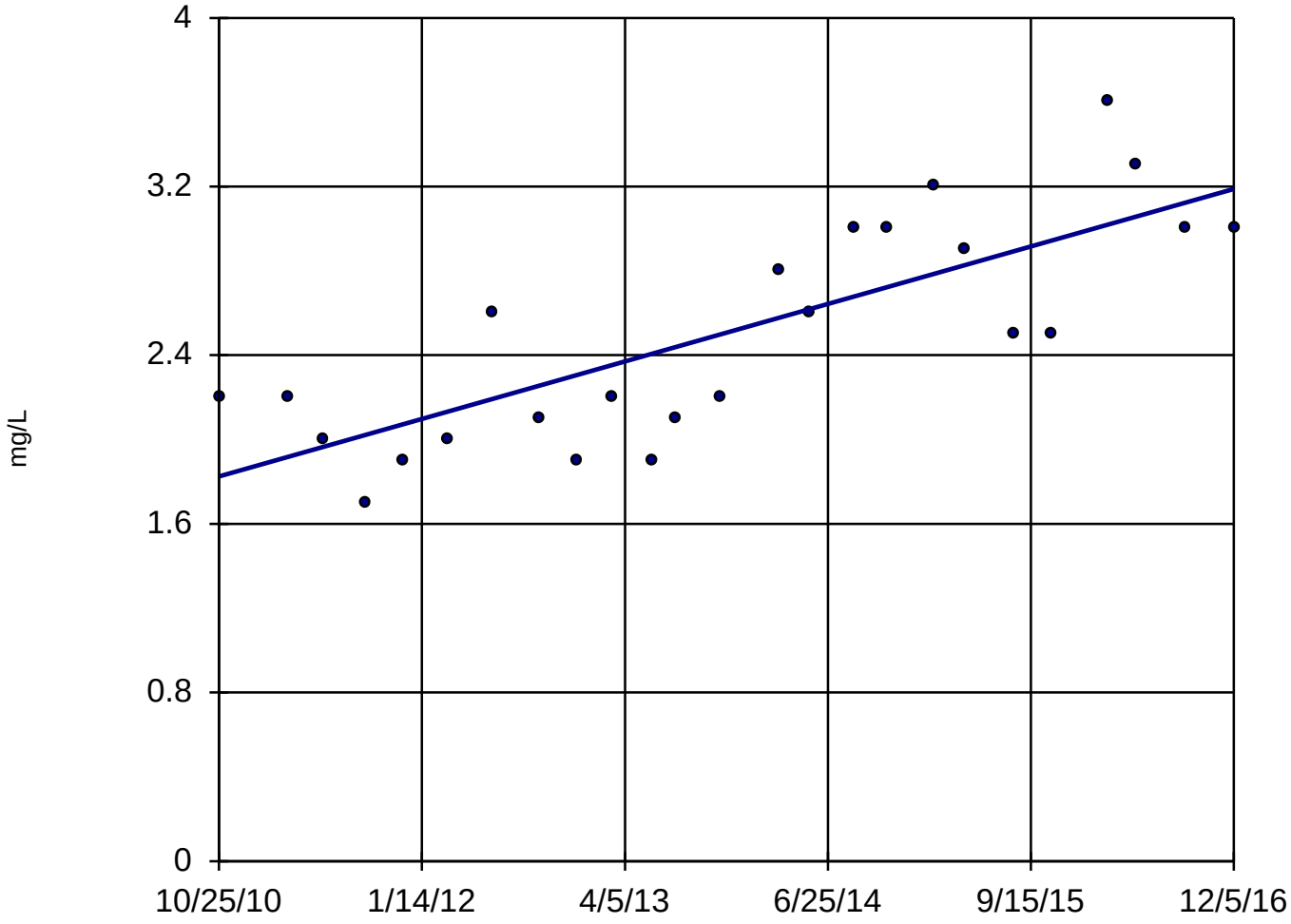
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, Dissolved Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-02



n = 25

Slope = 0.2228 units per year.

Mann-Kendall statistic = 167
critical = 111

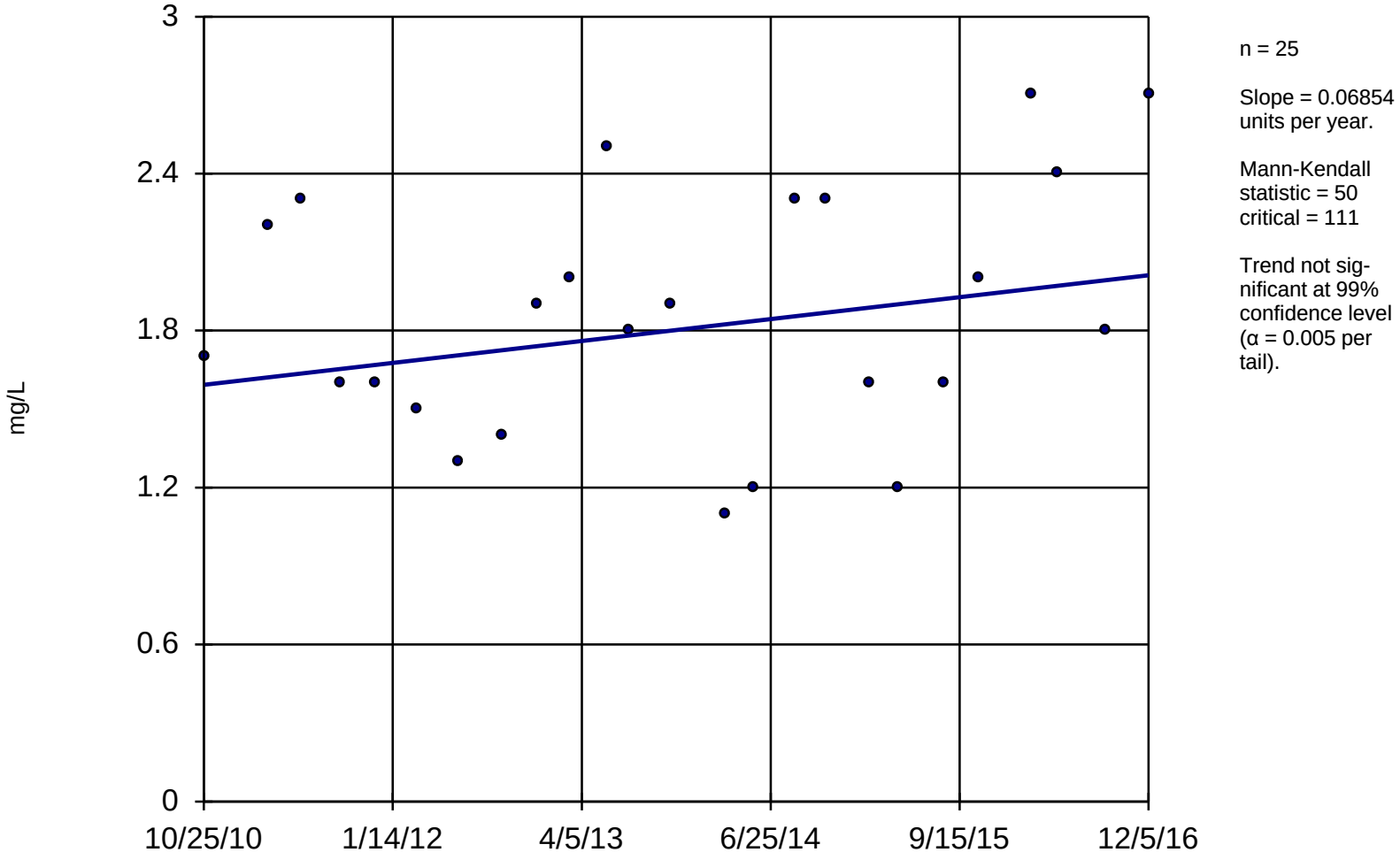
Increasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, Dissolved Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-03



n = 25

Slope = 0.06854 units per year.

Mann-Kendall statistic = 50
critical = 111

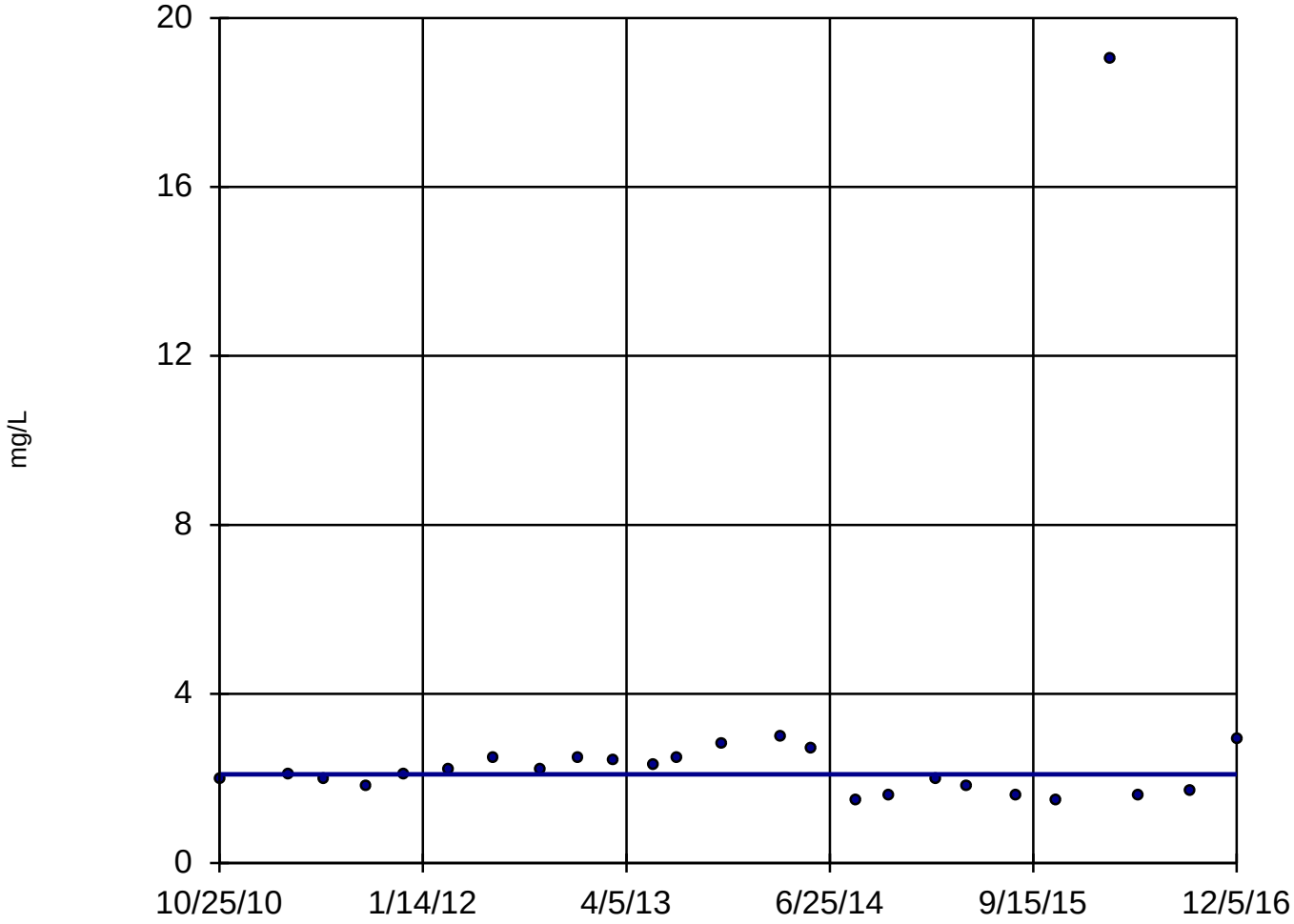
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, Dissolved Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-04



n = 25

Slope = 0
units per year.

Mann-Kendall
statistic = 1
critical = 111

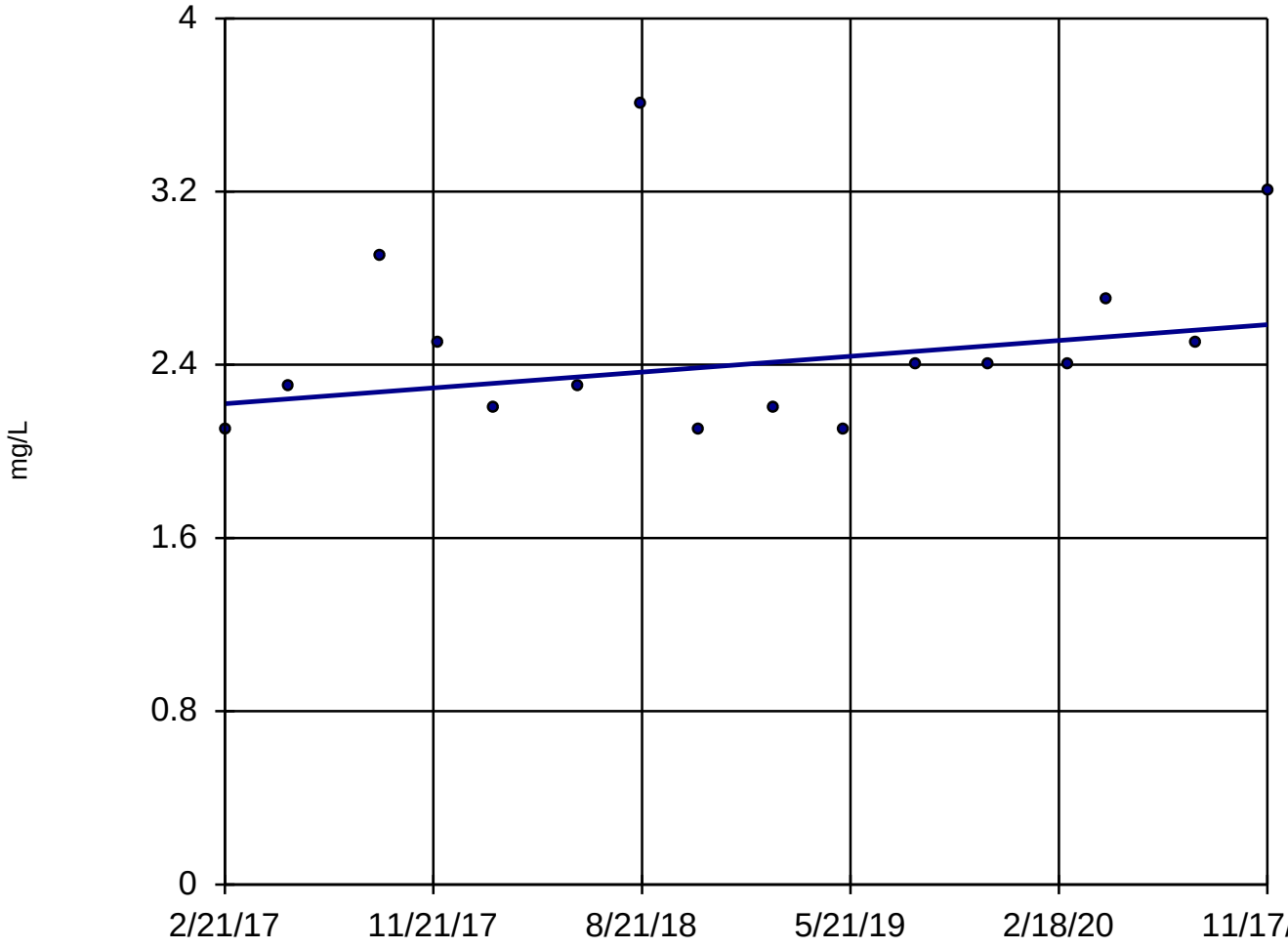
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Boron, Dissolved Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-01



n = 16

Slope = 0.09787 units per year.

Mann-Kendall statistic = 33
critical = 58

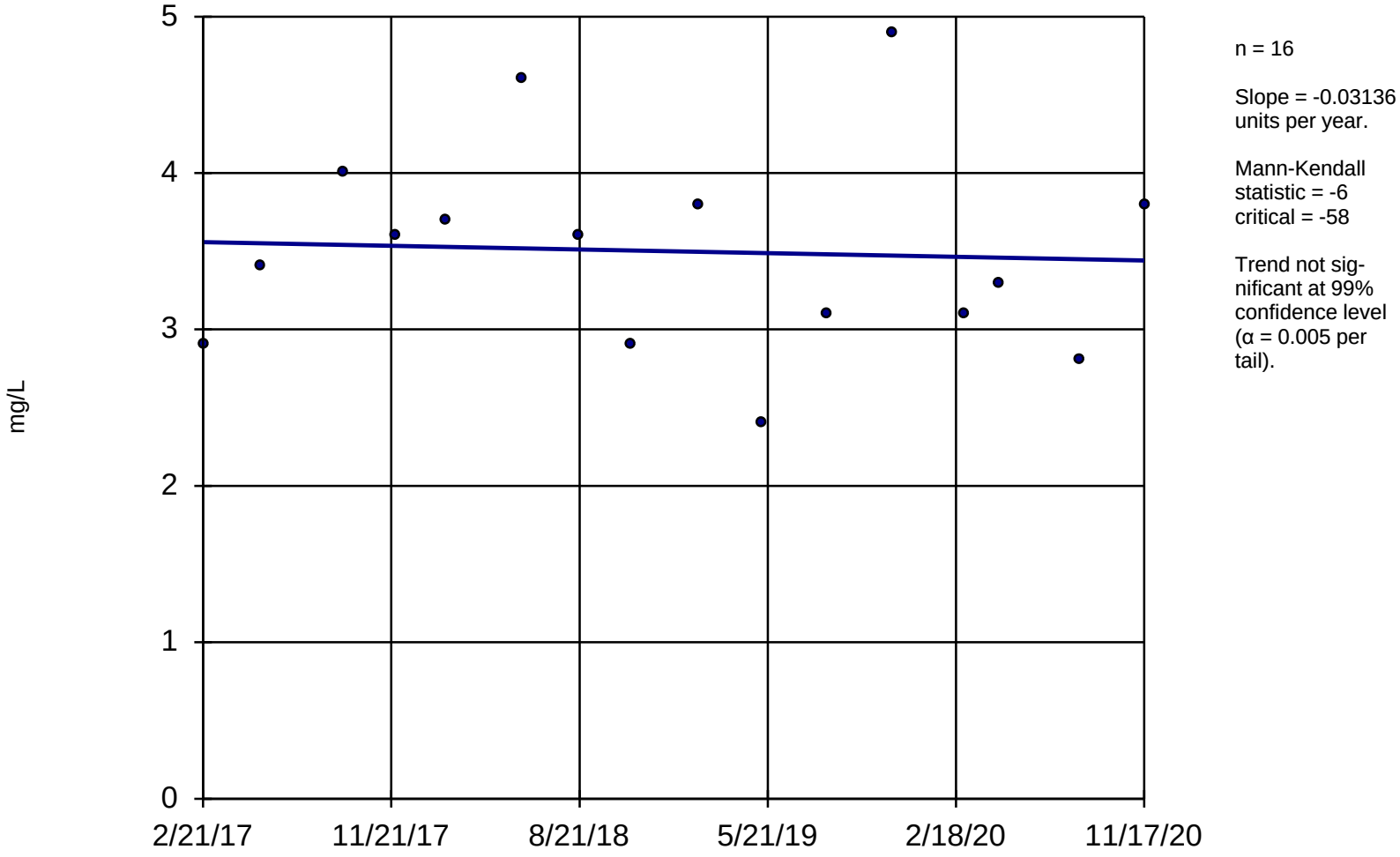
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-02



n = 16

Slope = -0.03136 units per year.

Mann-Kendall statistic = -6
critical = -58

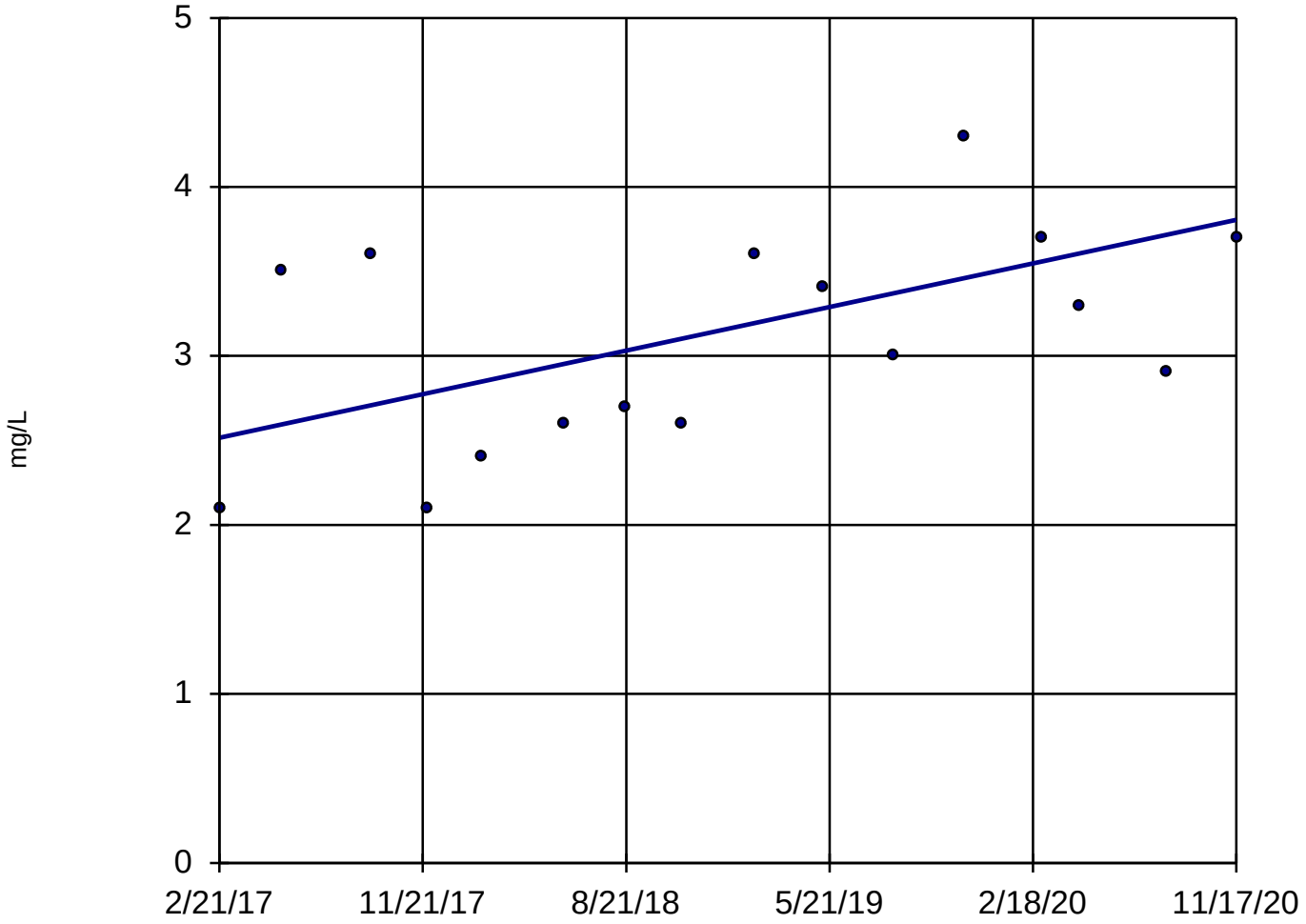
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-03



n = 16

Slope = 0.3447 units per year.

Mann-Kendall statistic = 48
critical = 58

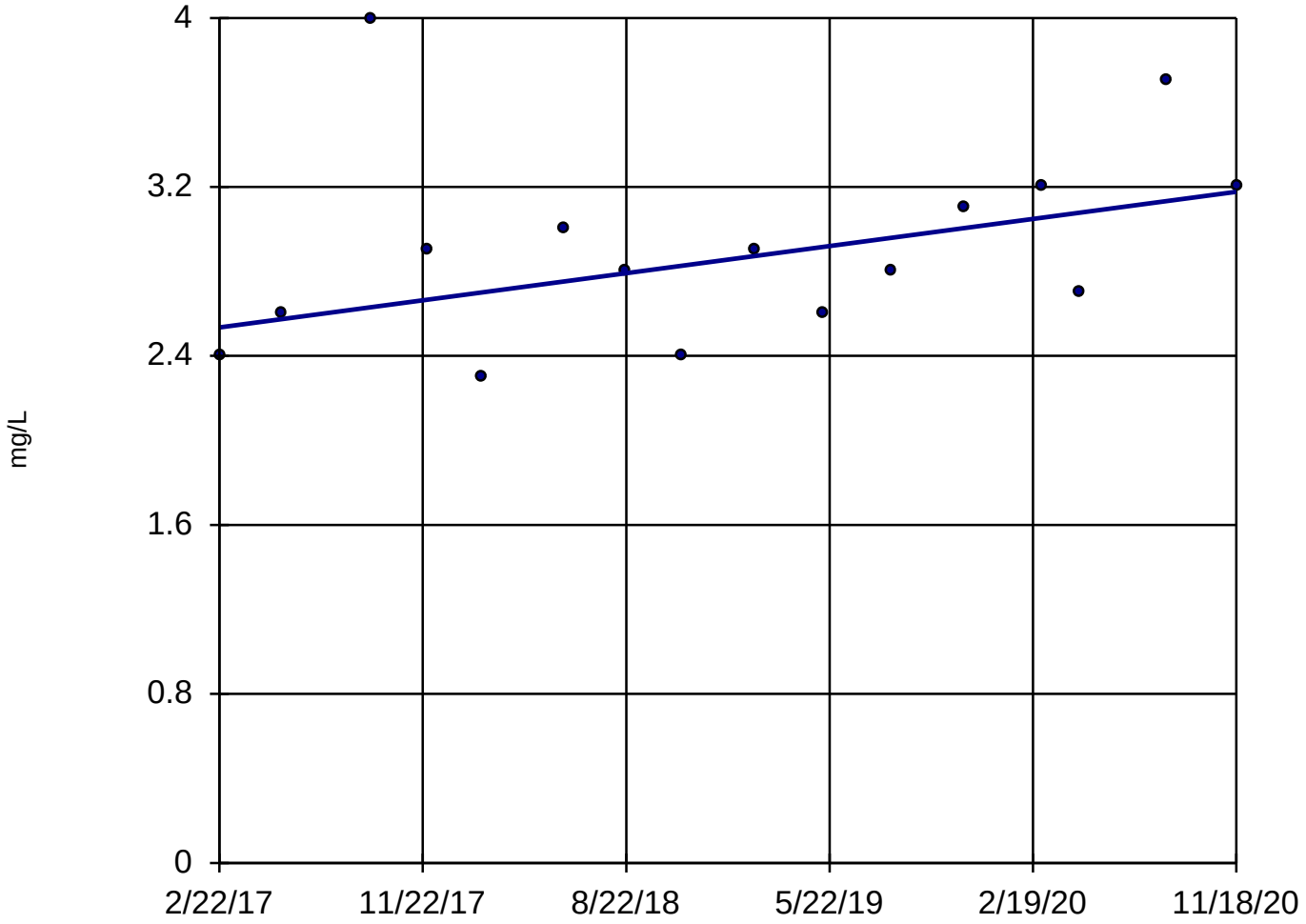
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-04



n = 16

Slope = 0.1715 units per year.

Mann-Kendall statistic = 39
critical = 58

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

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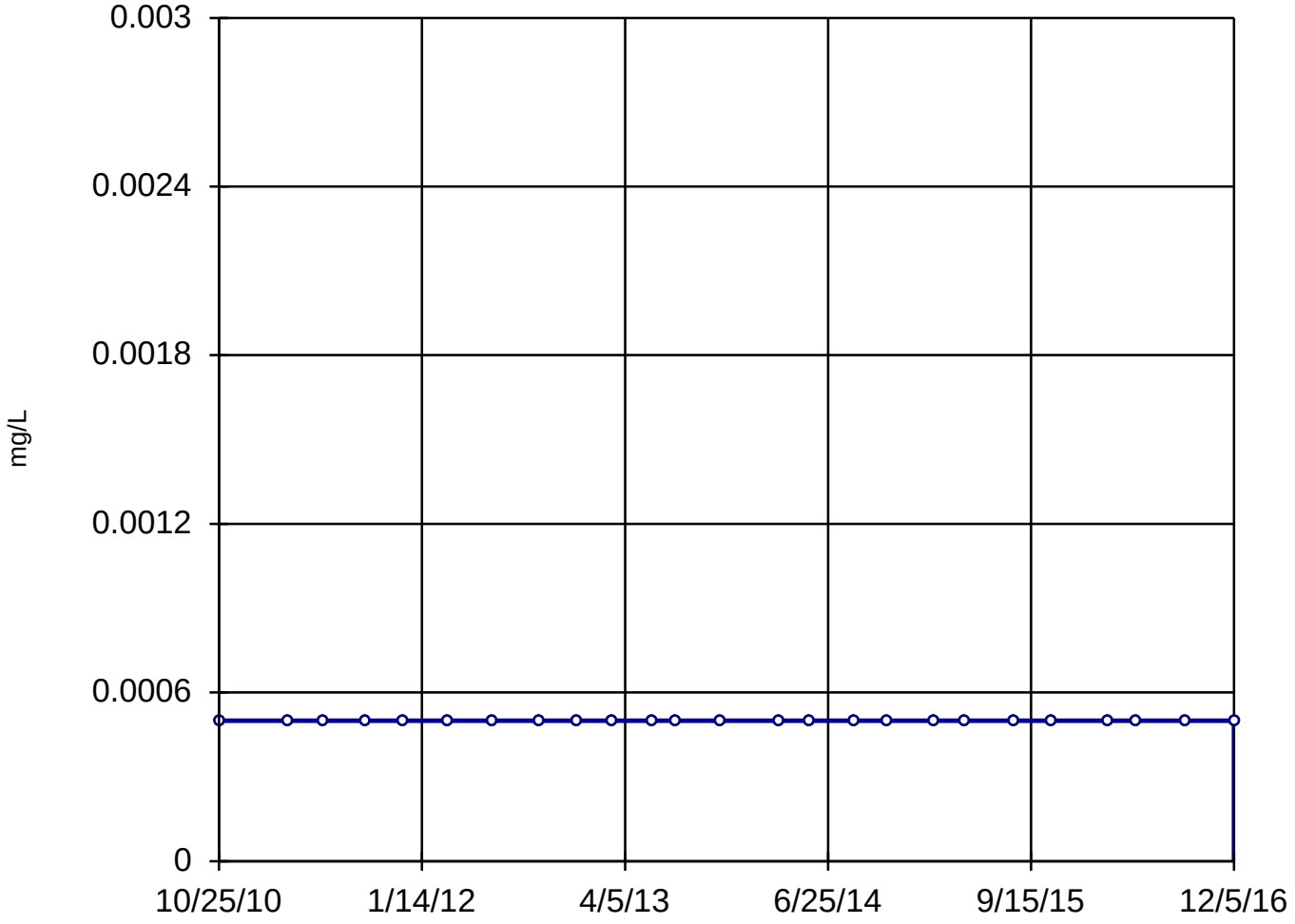
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-01



n = 25

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 111

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Cadmium, Dissolved Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

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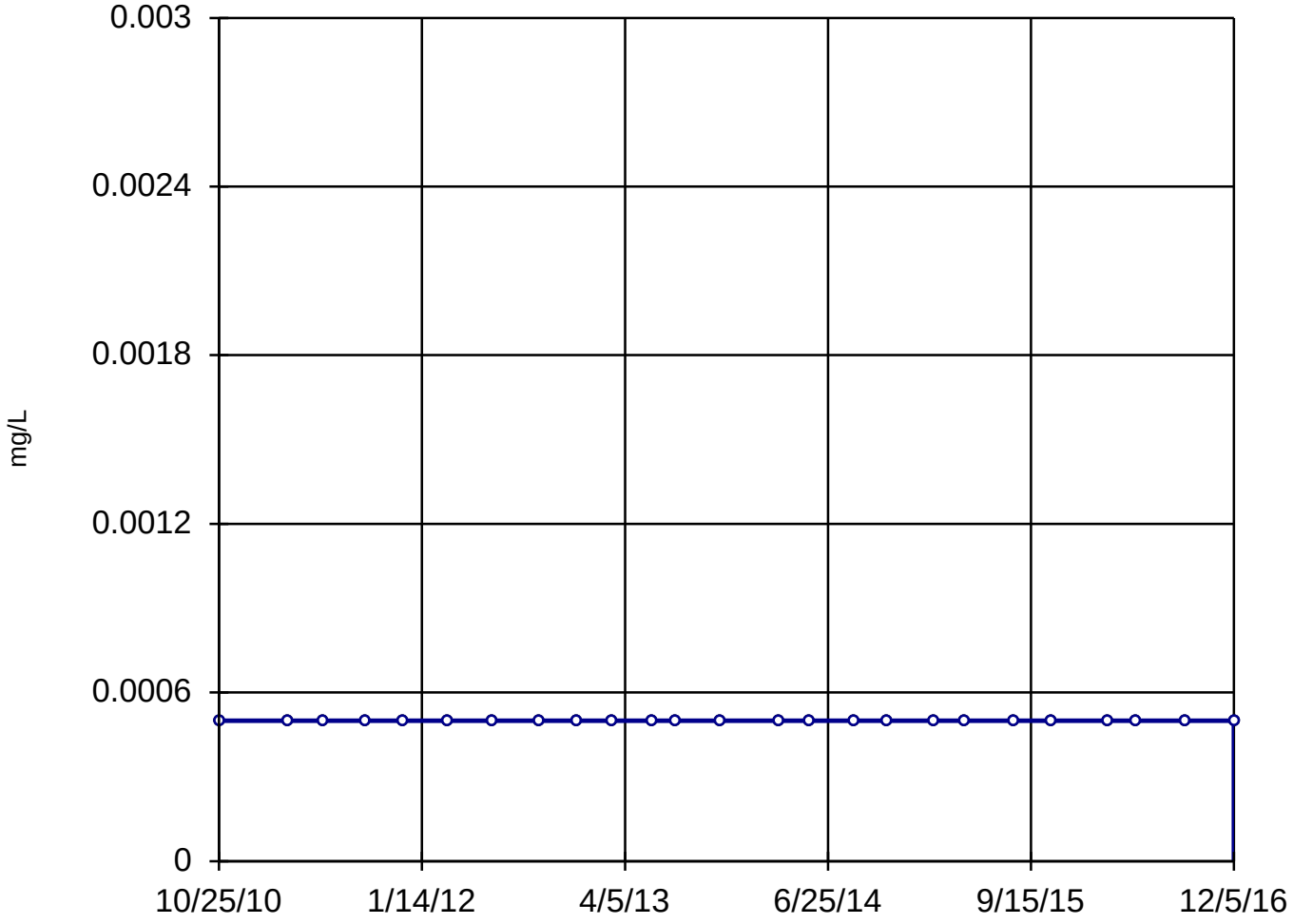
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-02



n = 25

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 111

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Cadmium, Dissolved Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

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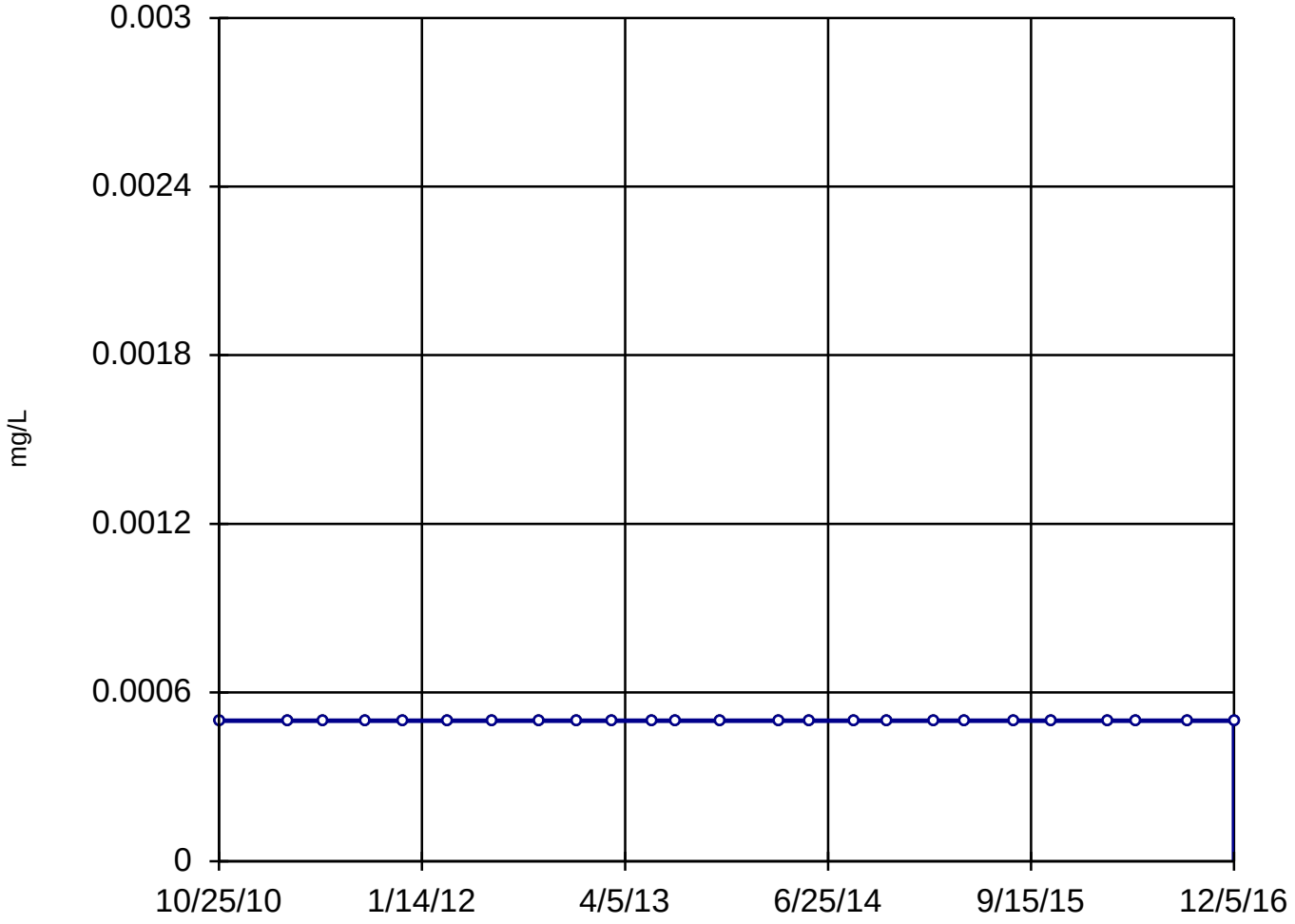
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 25

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 111

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Cadmium, Dissolved Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

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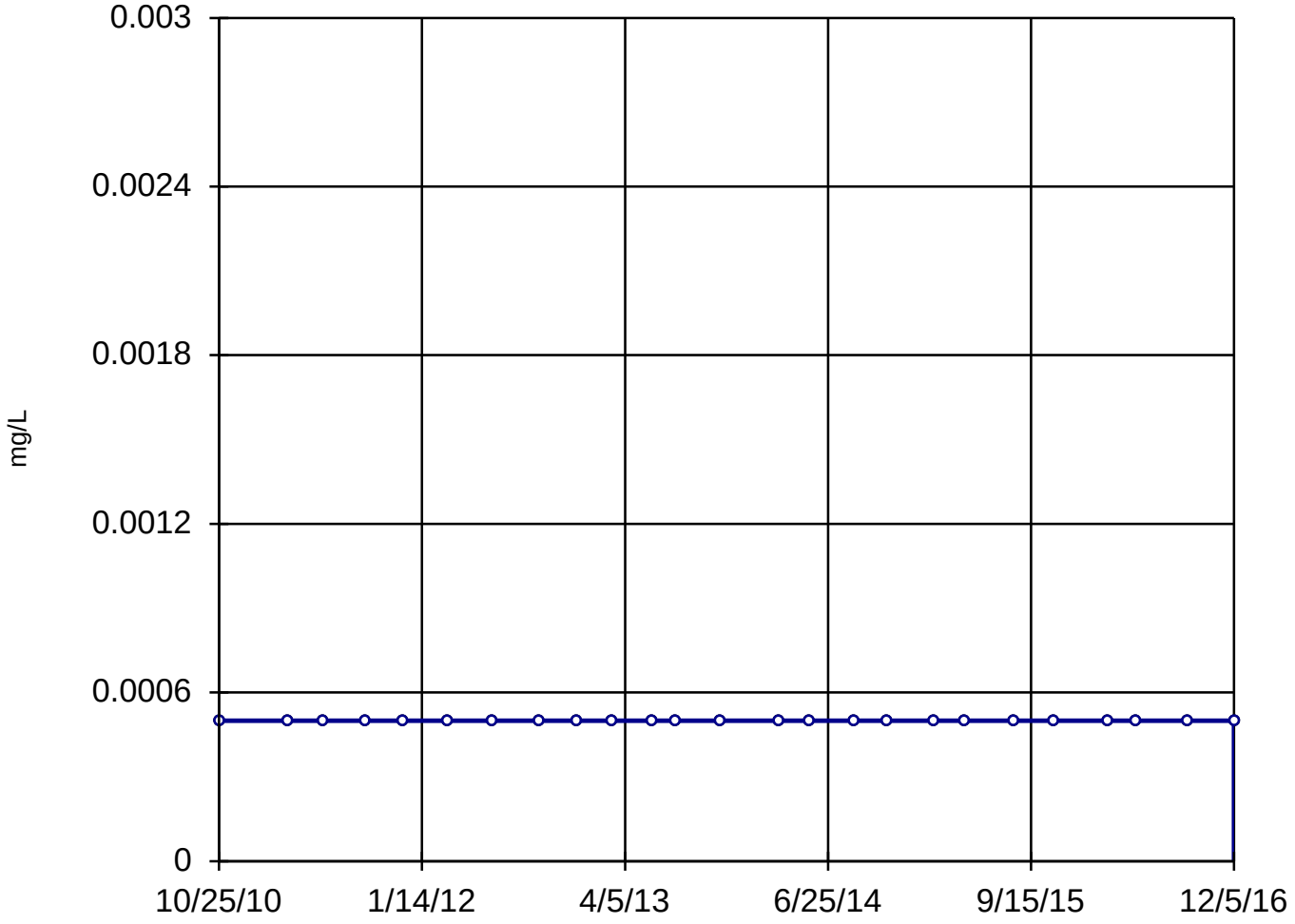
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 25

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 111

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

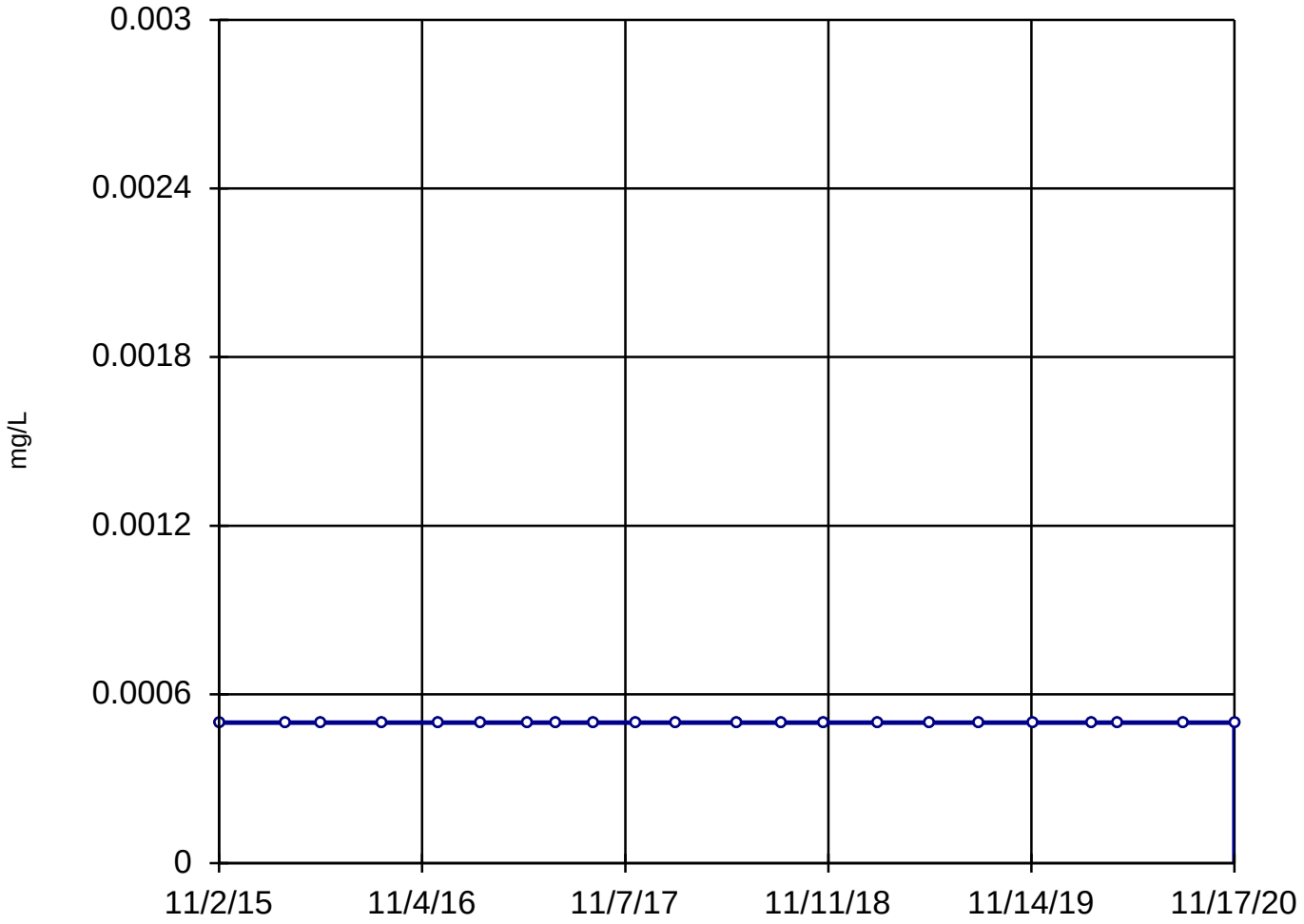
Constituent: Cadmium, Dissolved Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-01



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 92

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

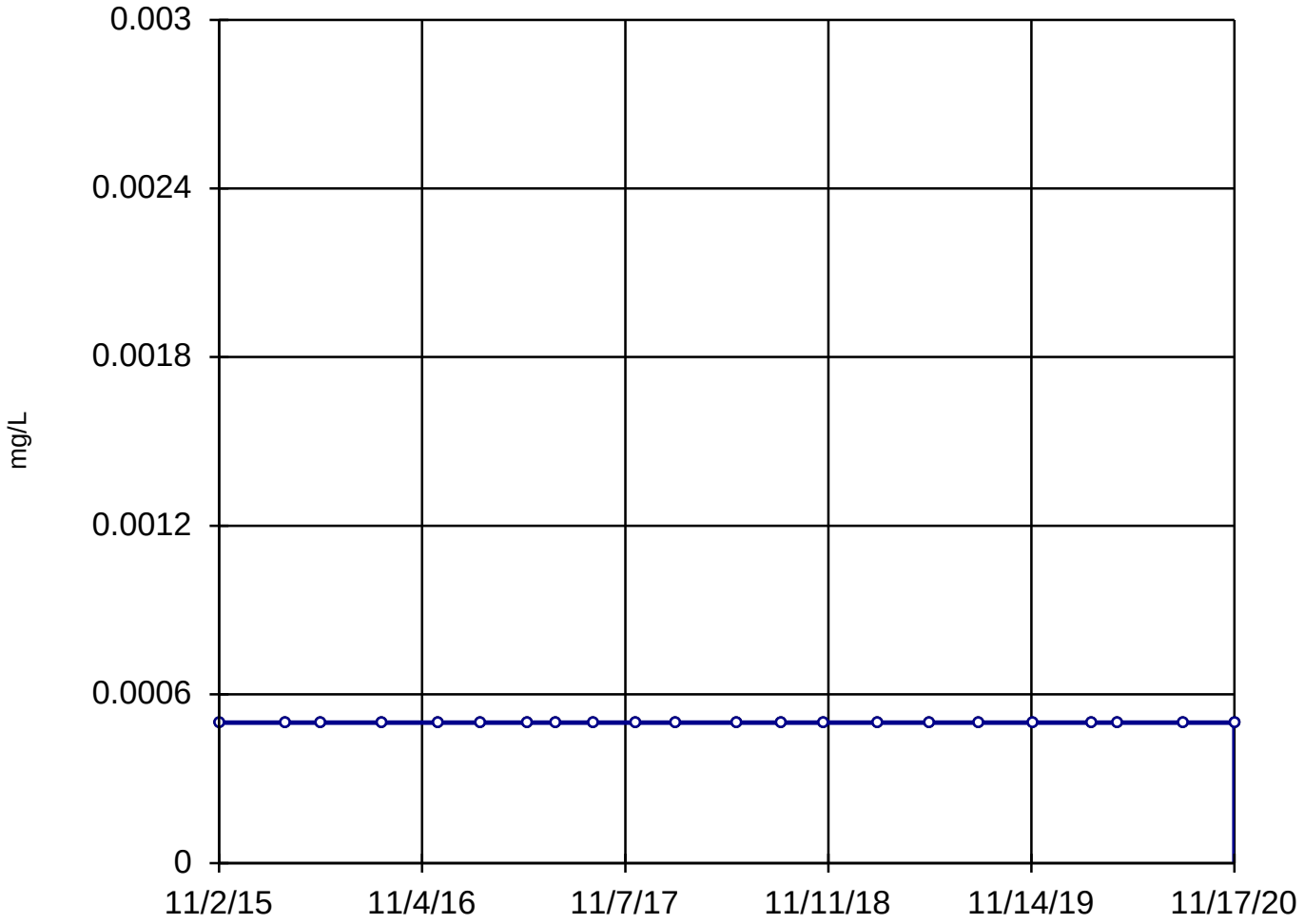
Constituent: Cadmium, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-02



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 92

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

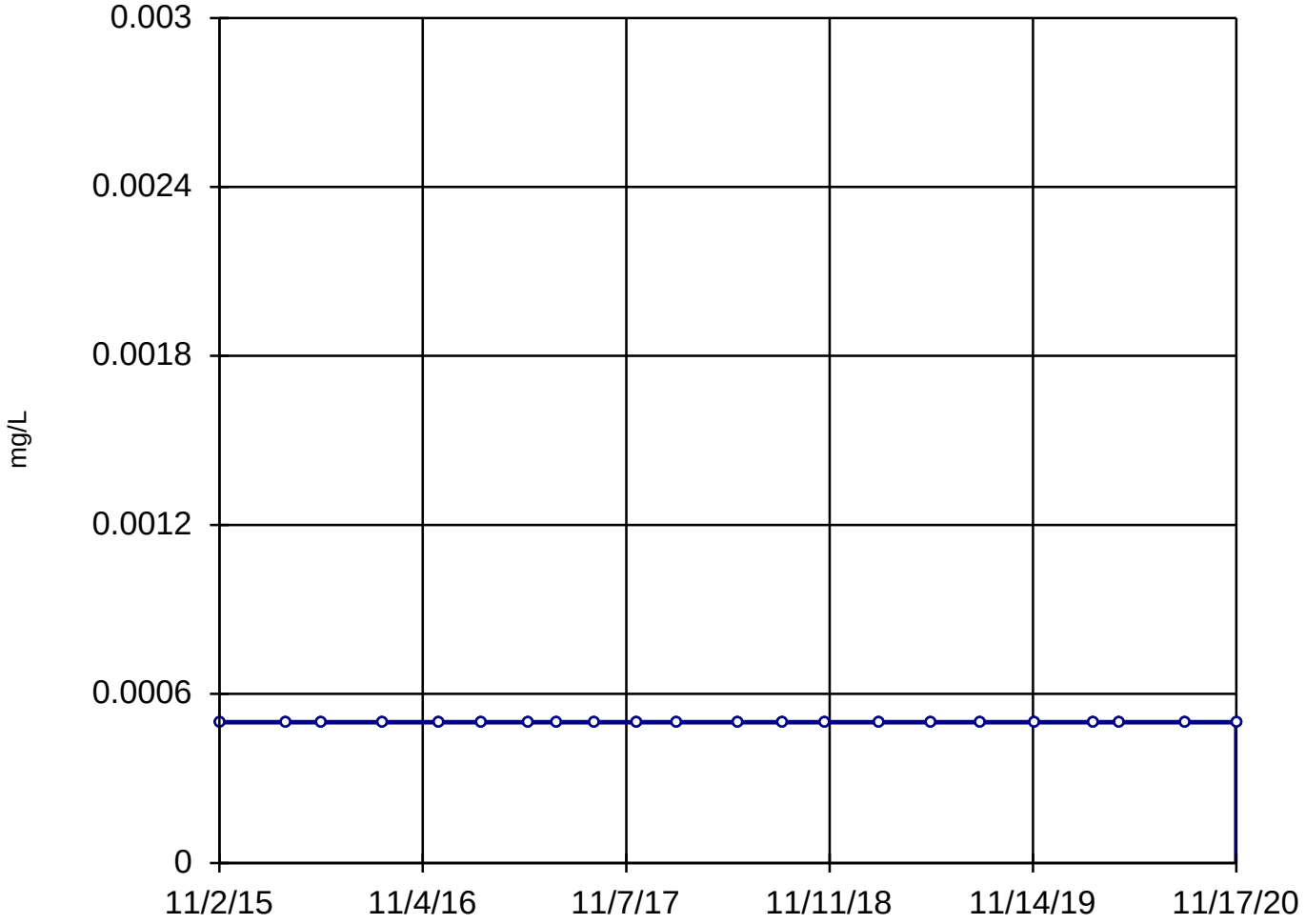
Constituent: Cadmium, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 92

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

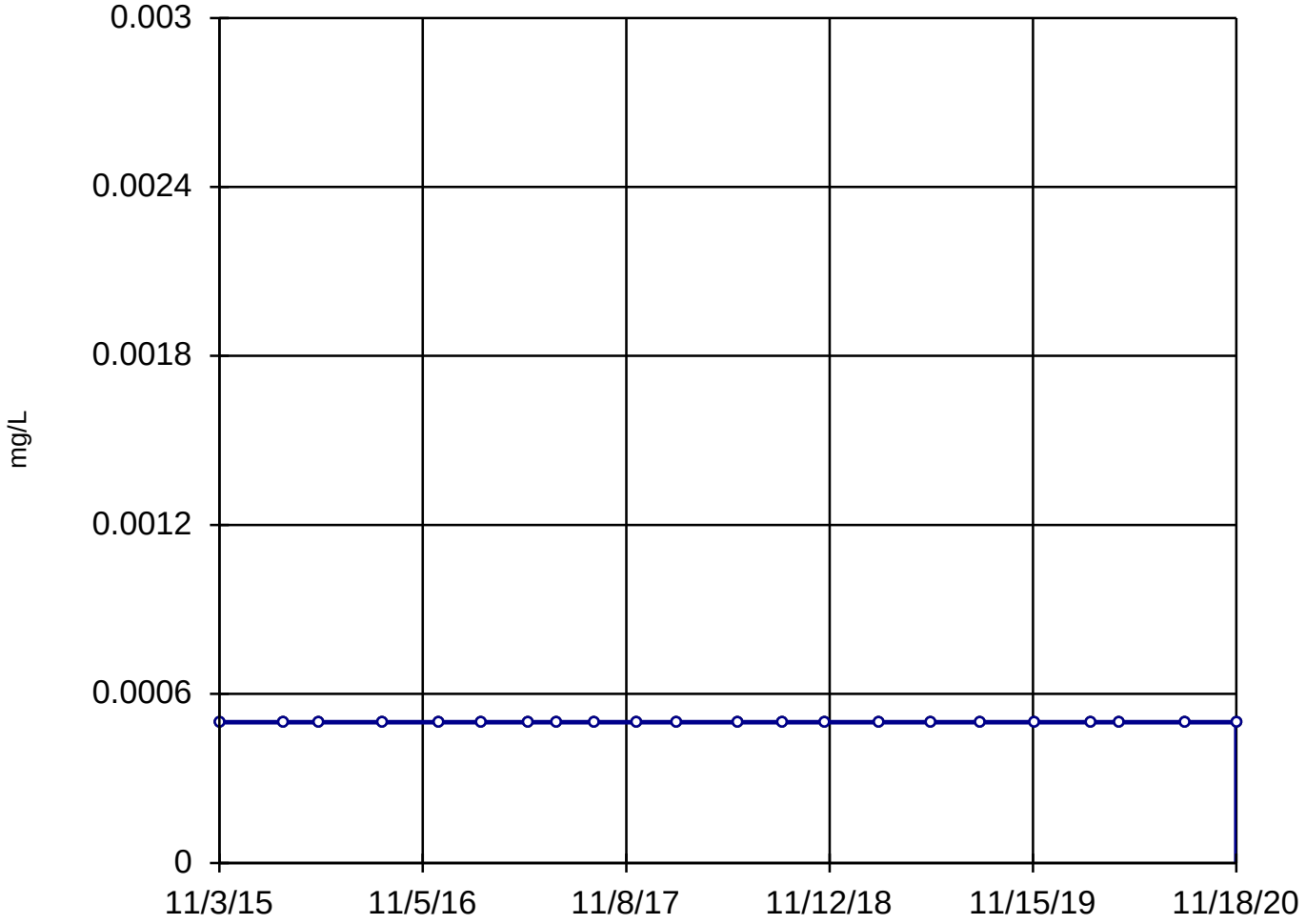
Constituent: Cadmium, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 92

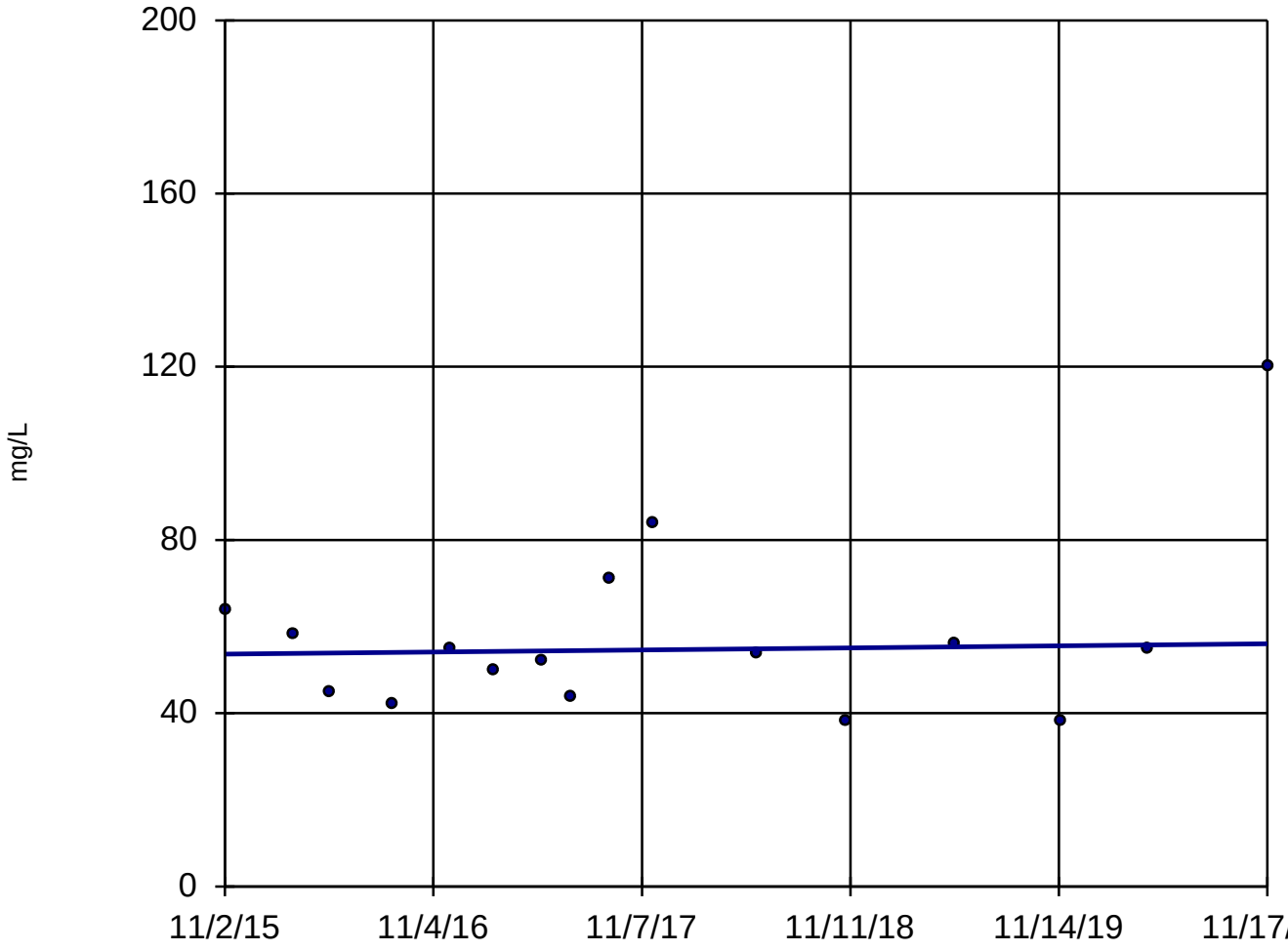
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Cadmium, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-01



n = 16

Slope = 0.4684 units per year.

Mann-Kendall statistic = 4
critical = 58

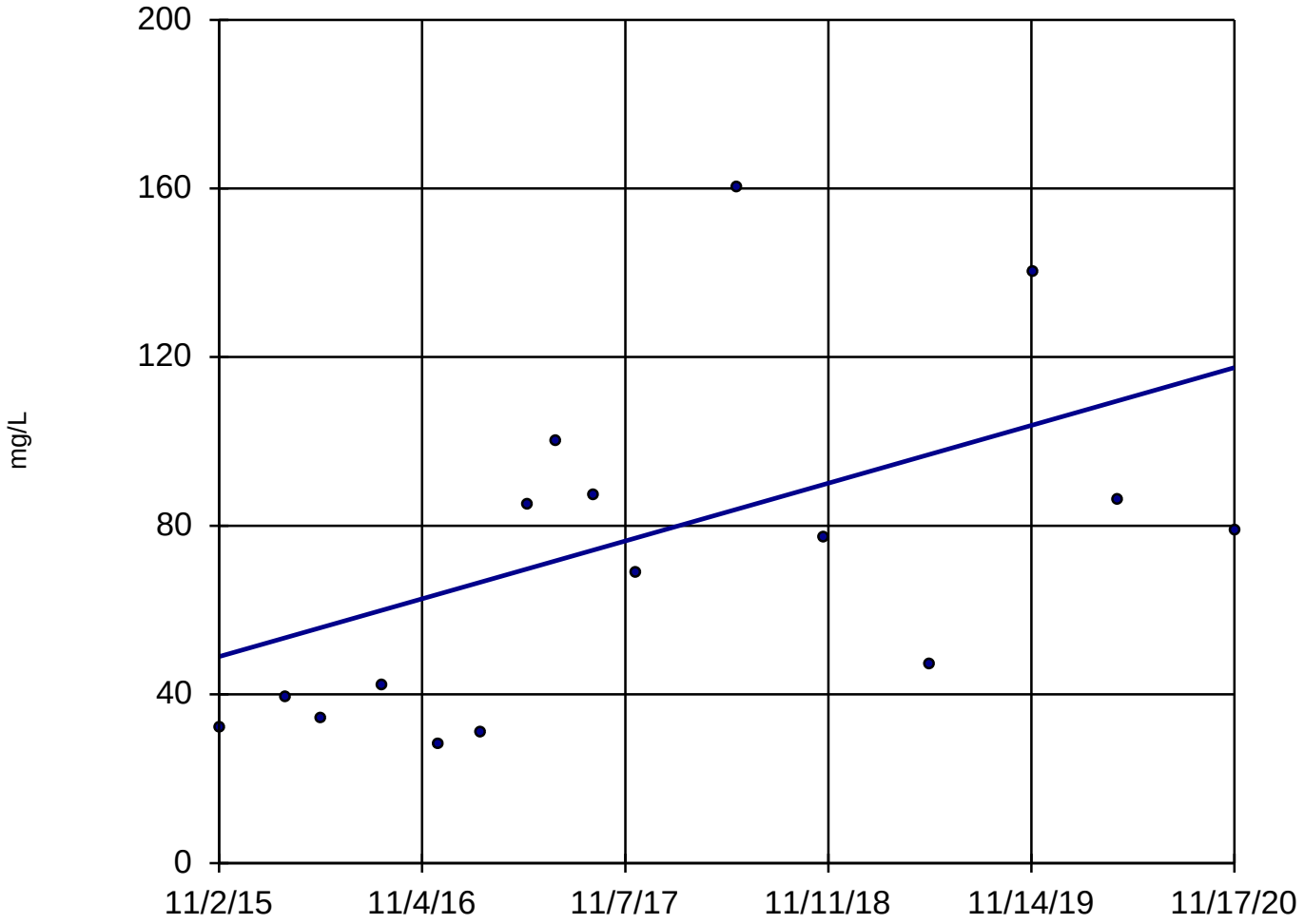
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Calcium, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-02



n = 16

Slope = 13.57 units per year.

Mann-Kendall statistic = 52
critical = 58

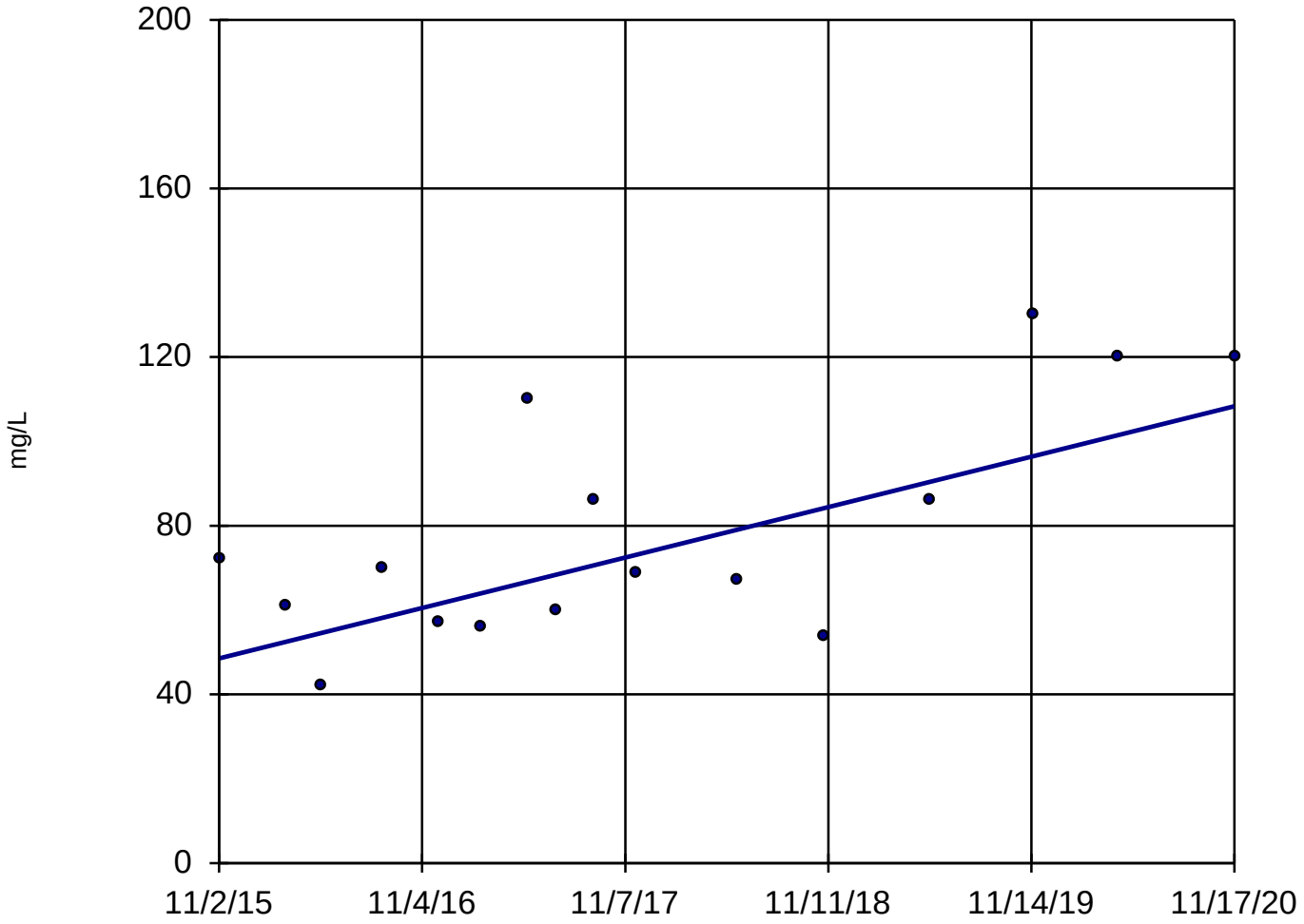
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Calcium, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-03



n = 16

Slope = 11.85 units per year.

Mann-Kendall statistic = 42
critical = 58

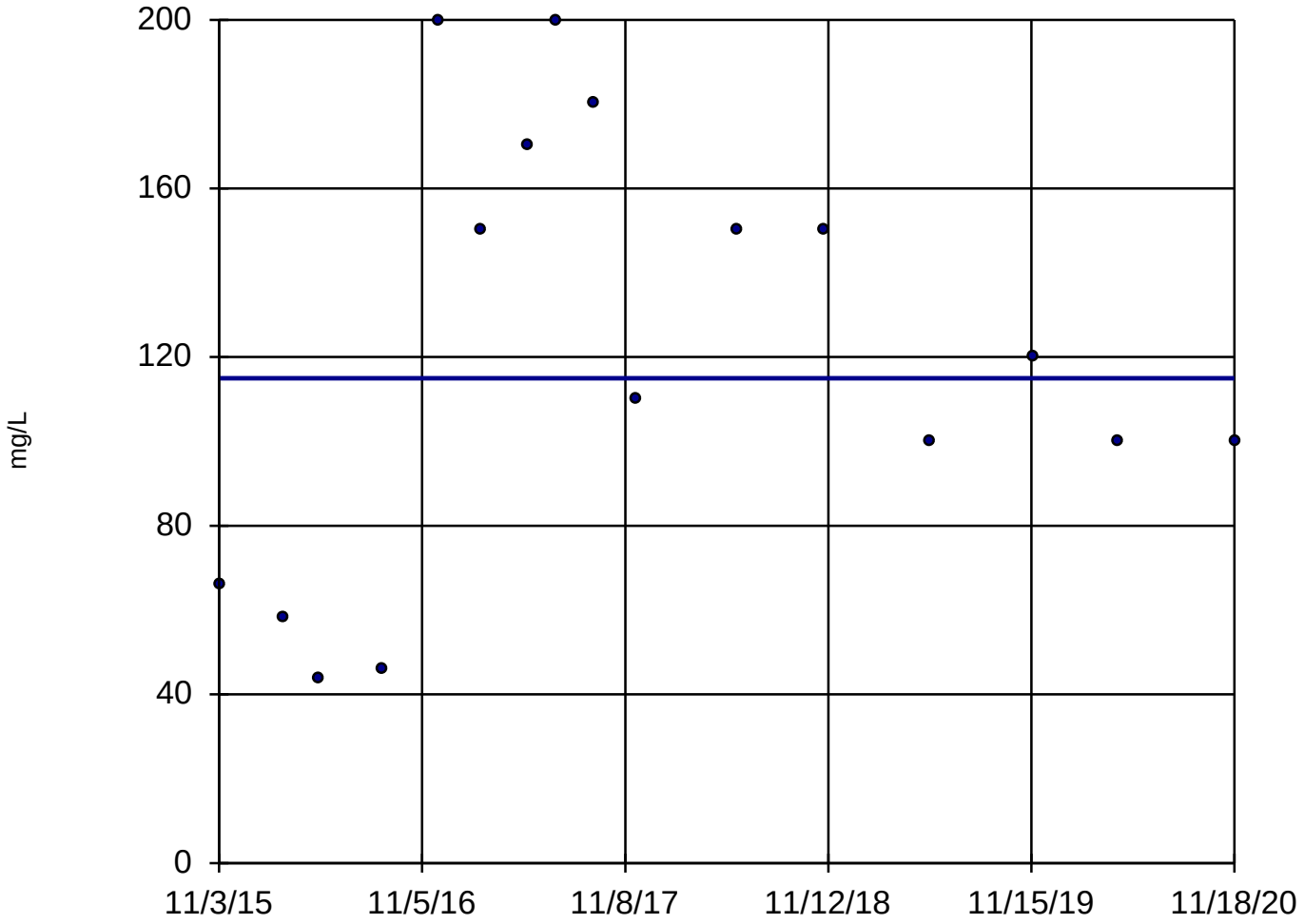
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Calcium, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-04



n = 16

Slope = 0
units per year.

Mann-Kendall
statistic = 3
critical = 58

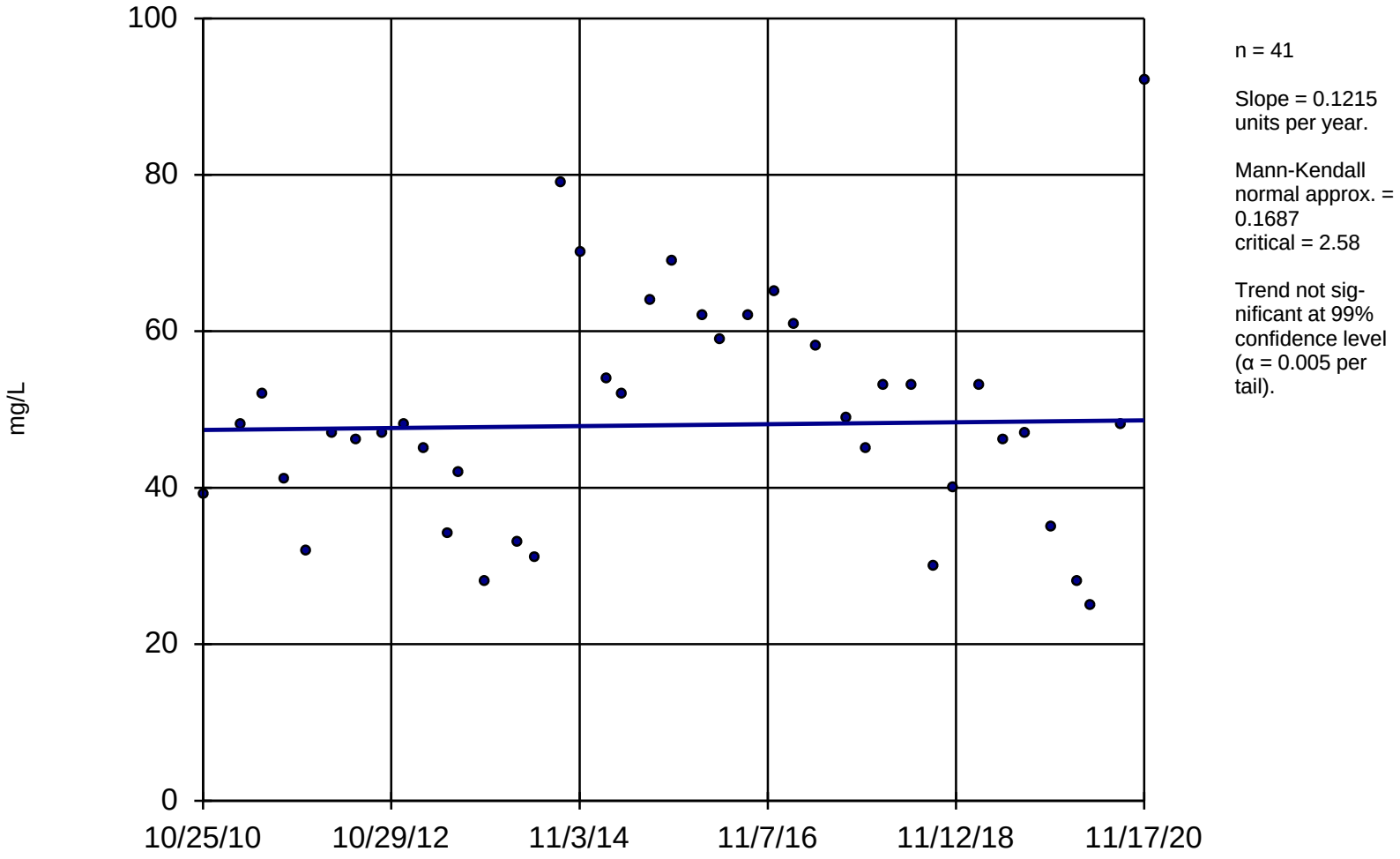
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Calcium, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-01



n = 41

Slope = 0.1215 units per year.

Mann-Kendall normal approx. = 0.1687
critical = 2.58

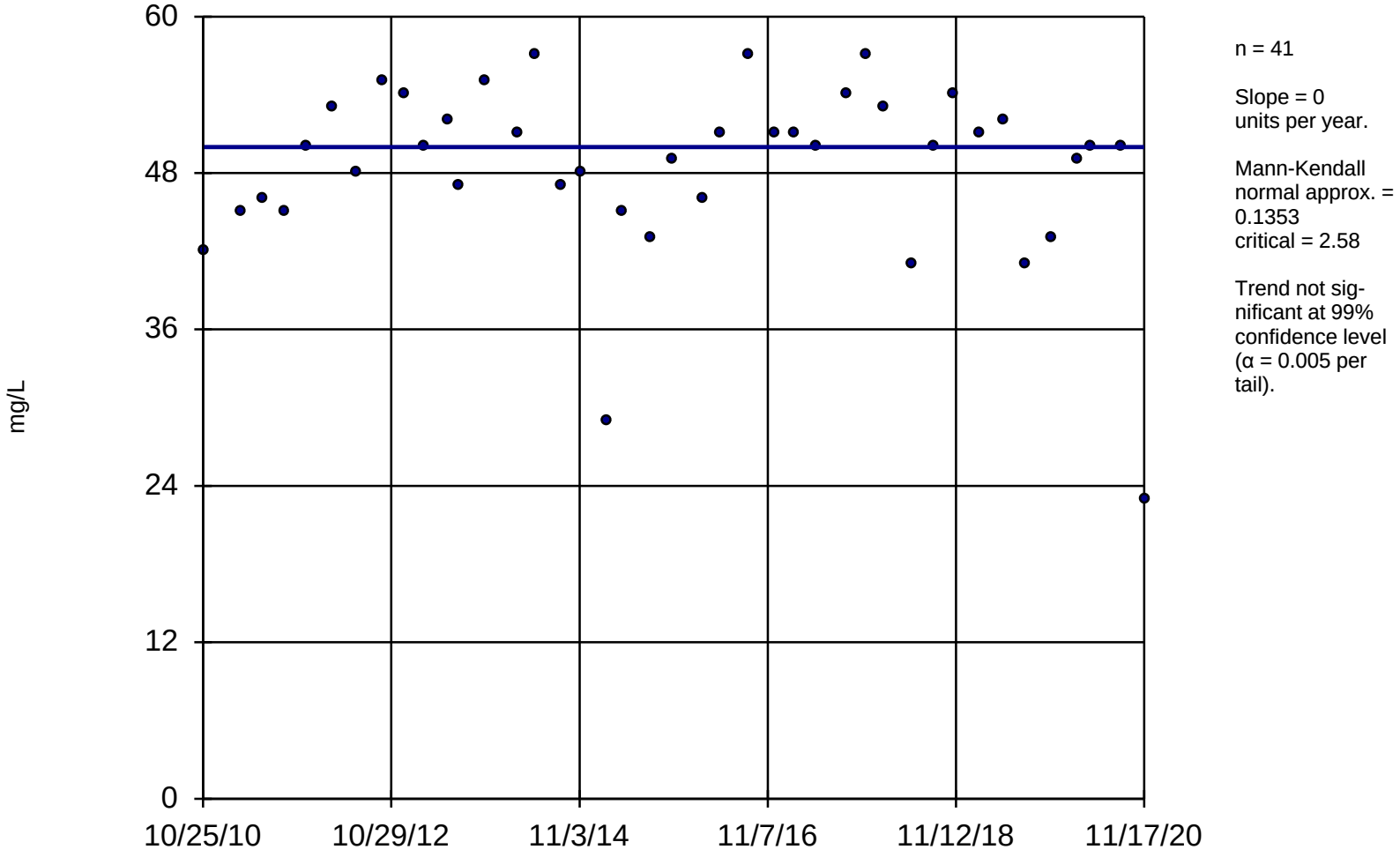
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-02



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0.1353
critical = 2.58

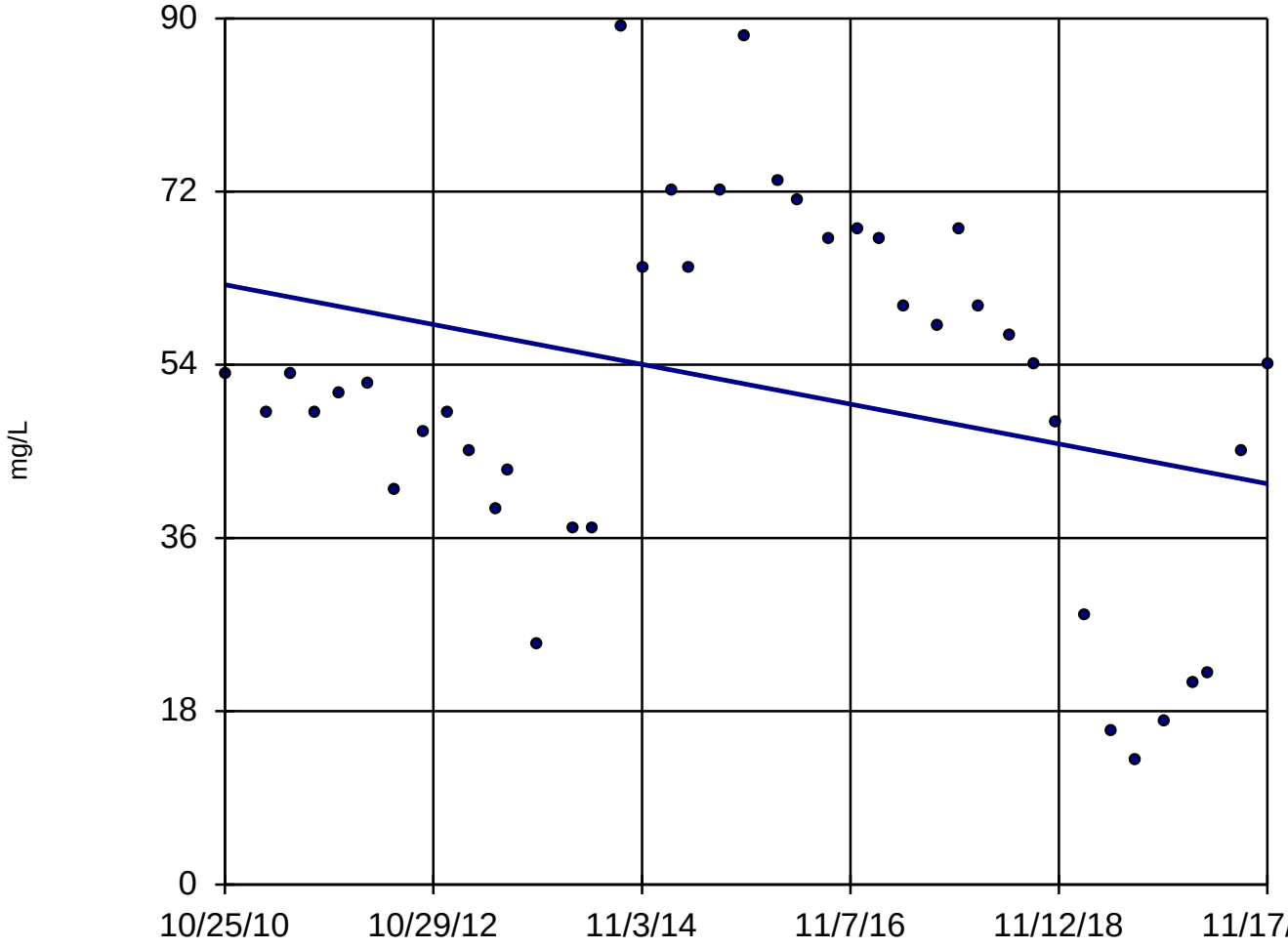
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Chloride Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-03



n = 41

Slope = -2.053 units per year.

Mann-Kendall normal approx. = -1.225
critical = -2.58

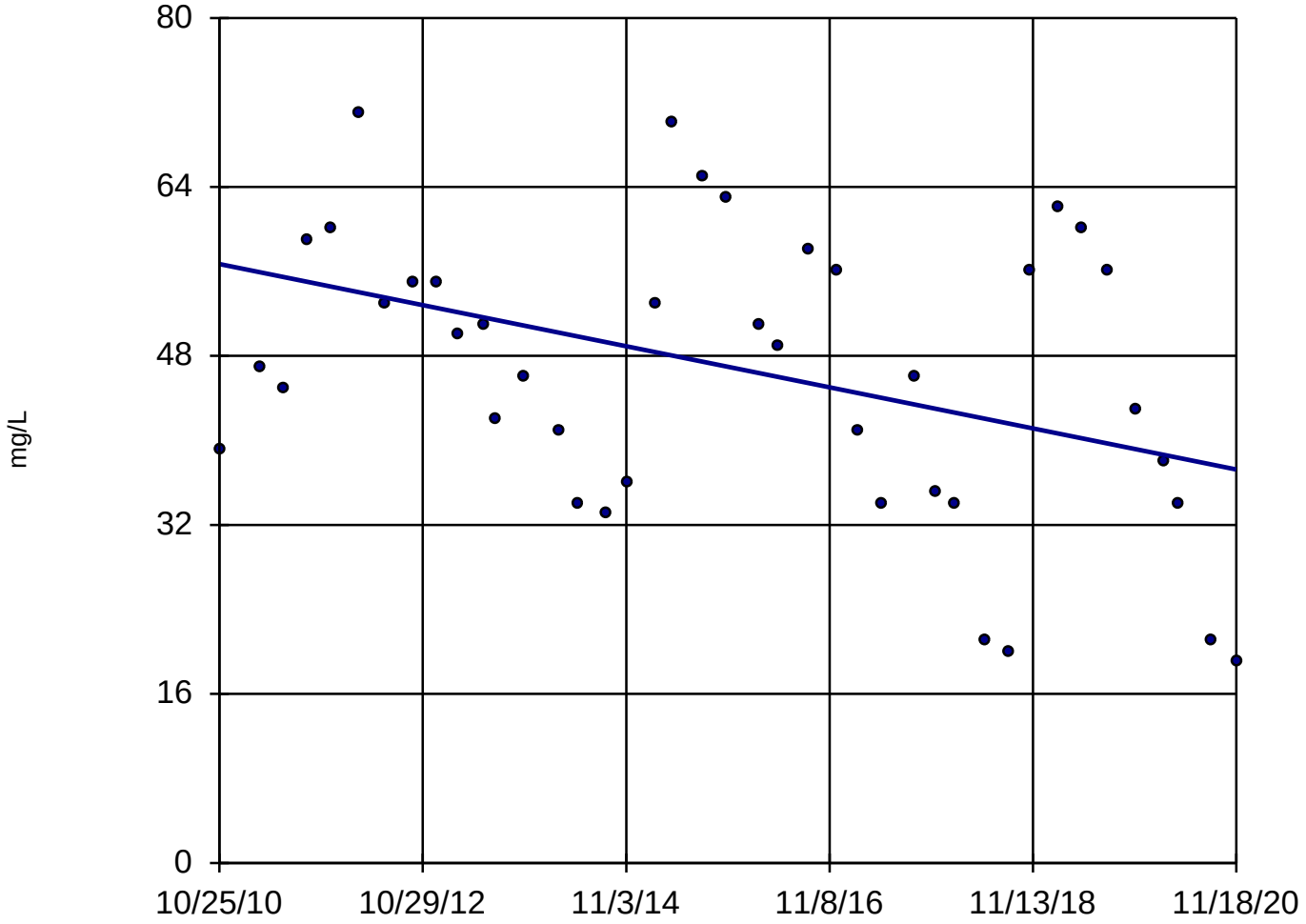
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-04



n = 41

Slope = -1.93 units per year.

Mann-Kendall normal approx. = -2.26
critical = -2.58

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

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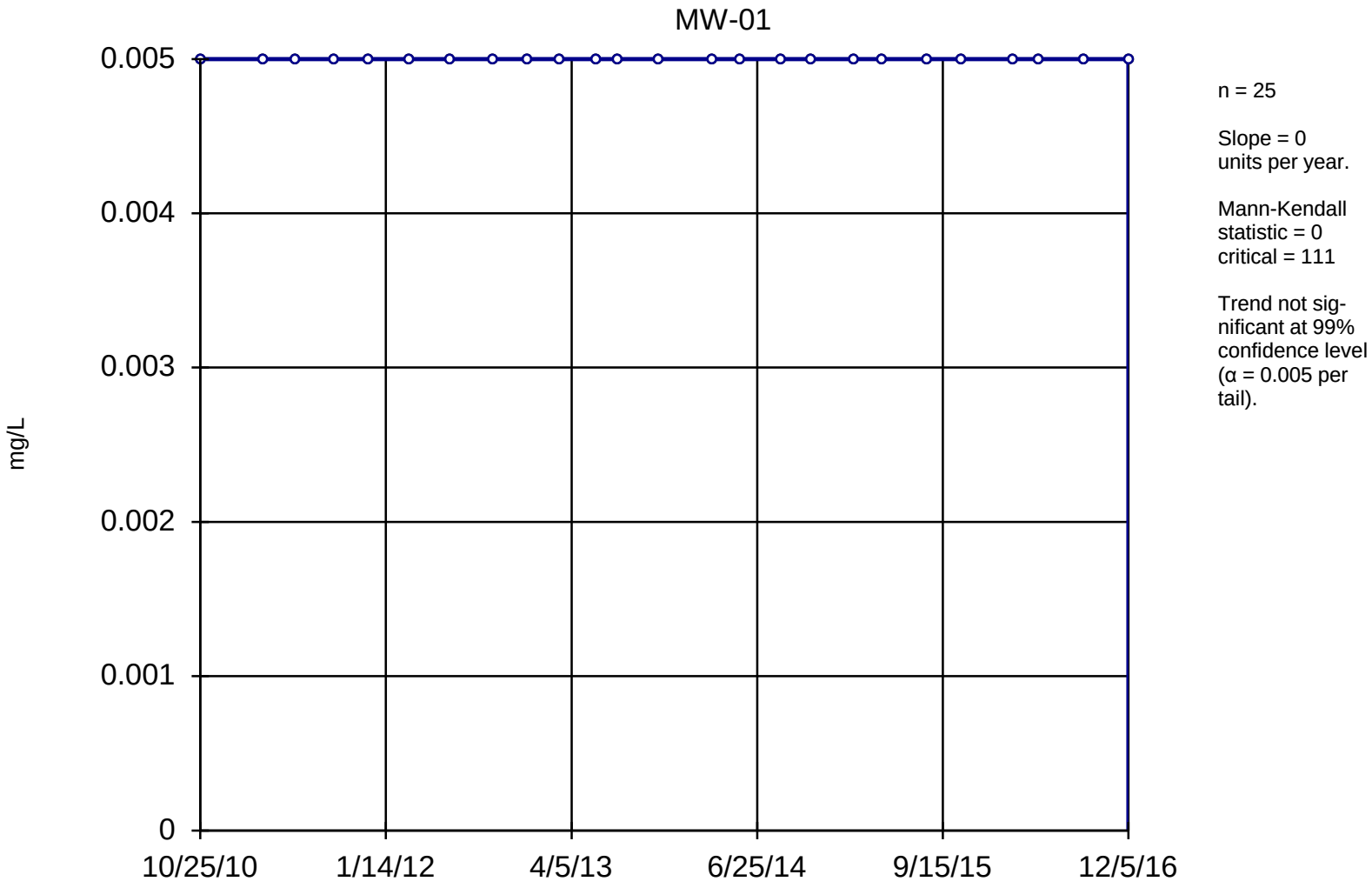
Hollow symbols indicate censored values.

Sen's Slope Estimator



Constituent: Chromium, Dissolved Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

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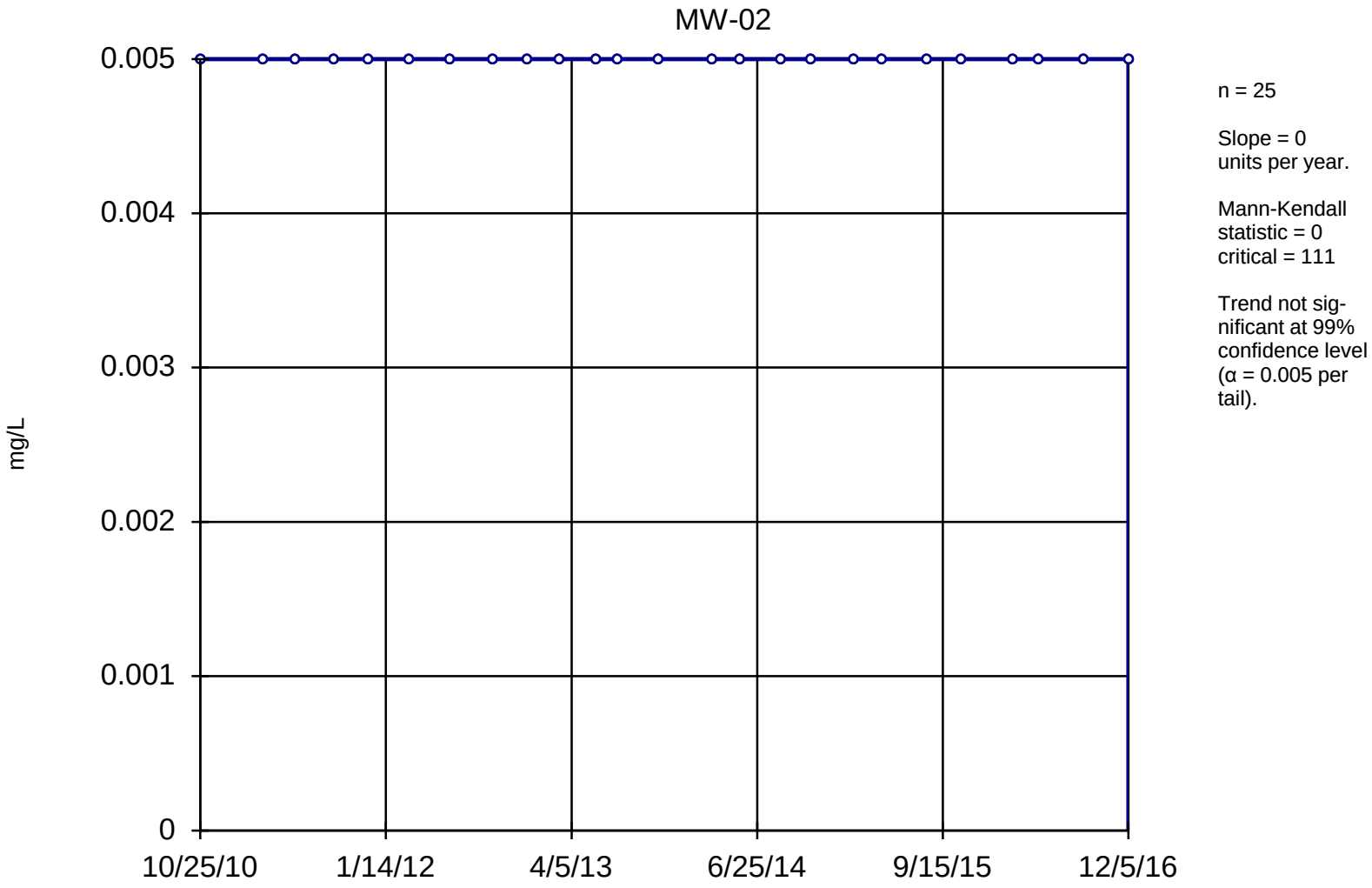
Hollow symbols indicate censored values.

Sen's Slope Estimator

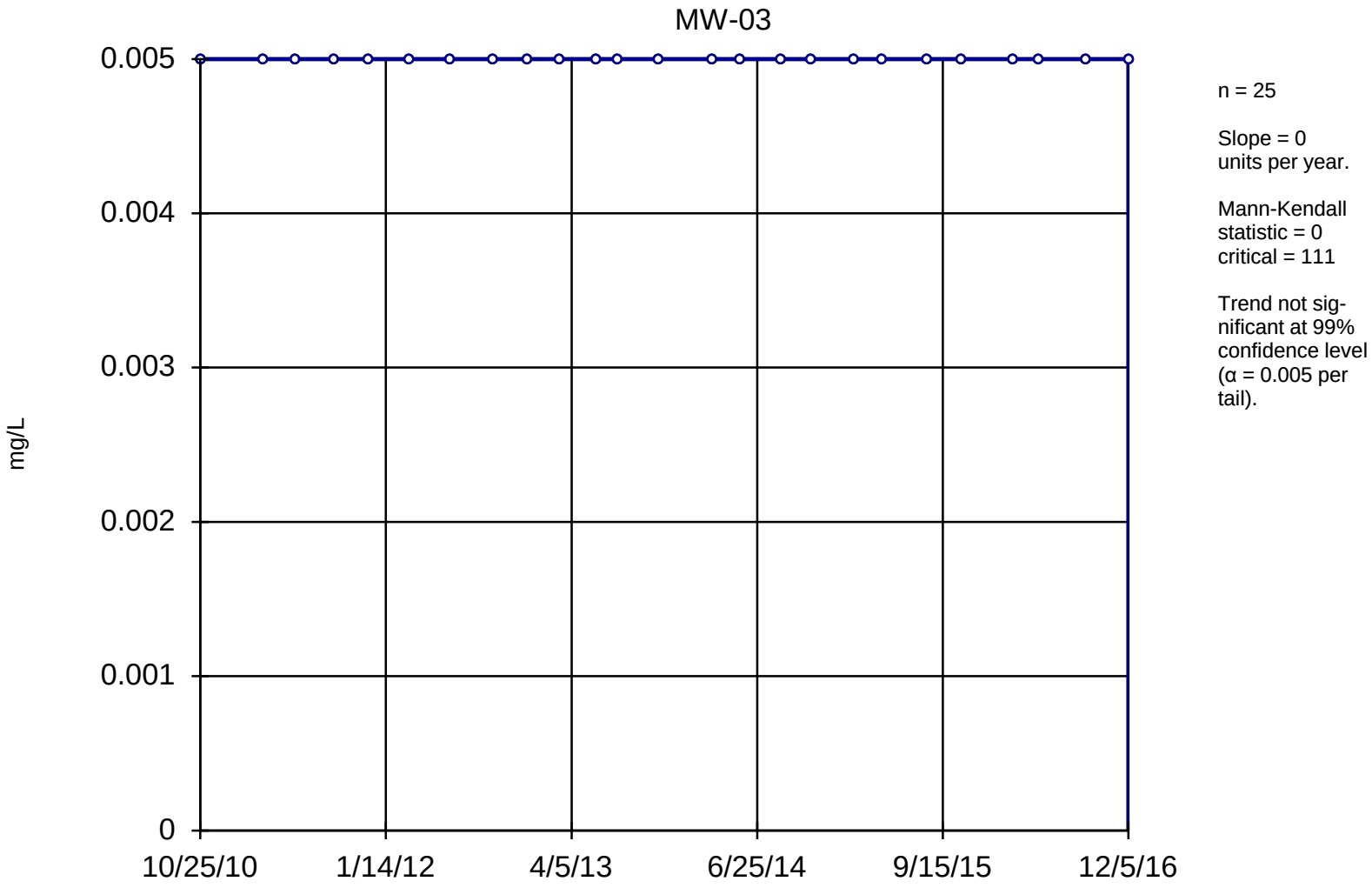


Constituent: Chromium, Dissolved Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

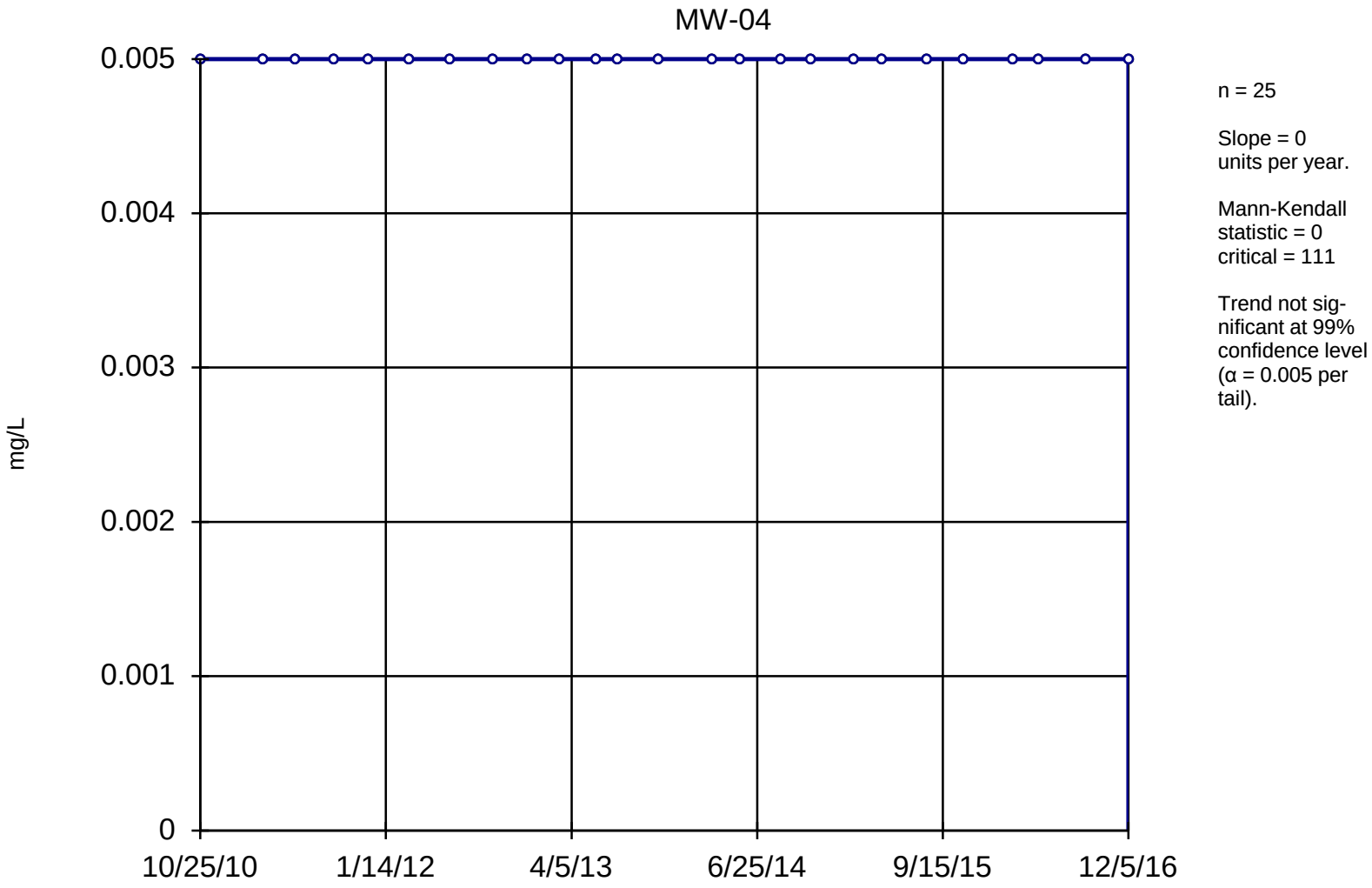


Constituent: Chromium, Dissolved Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

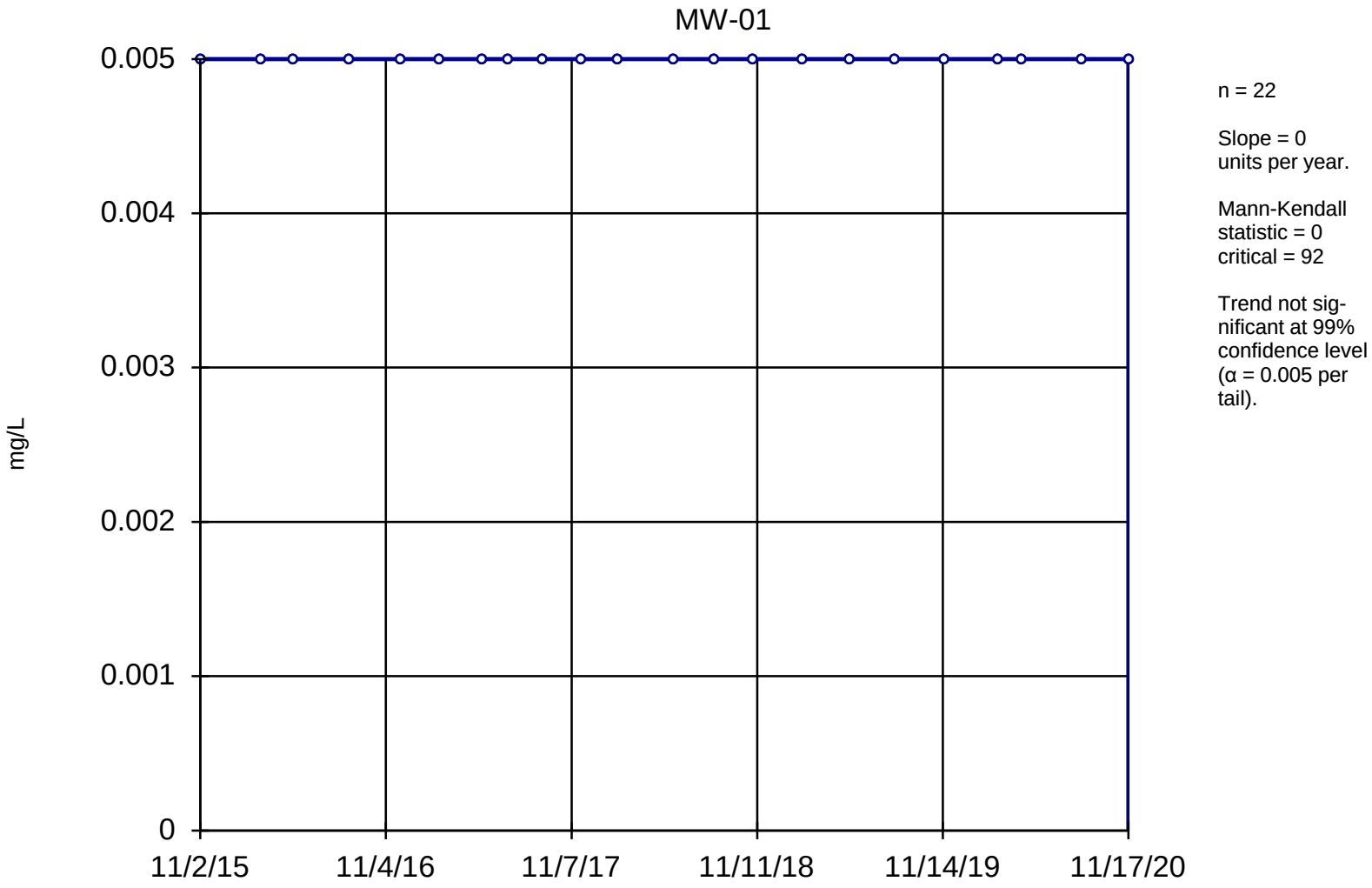


Constituent: Chromium, Dissolved Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

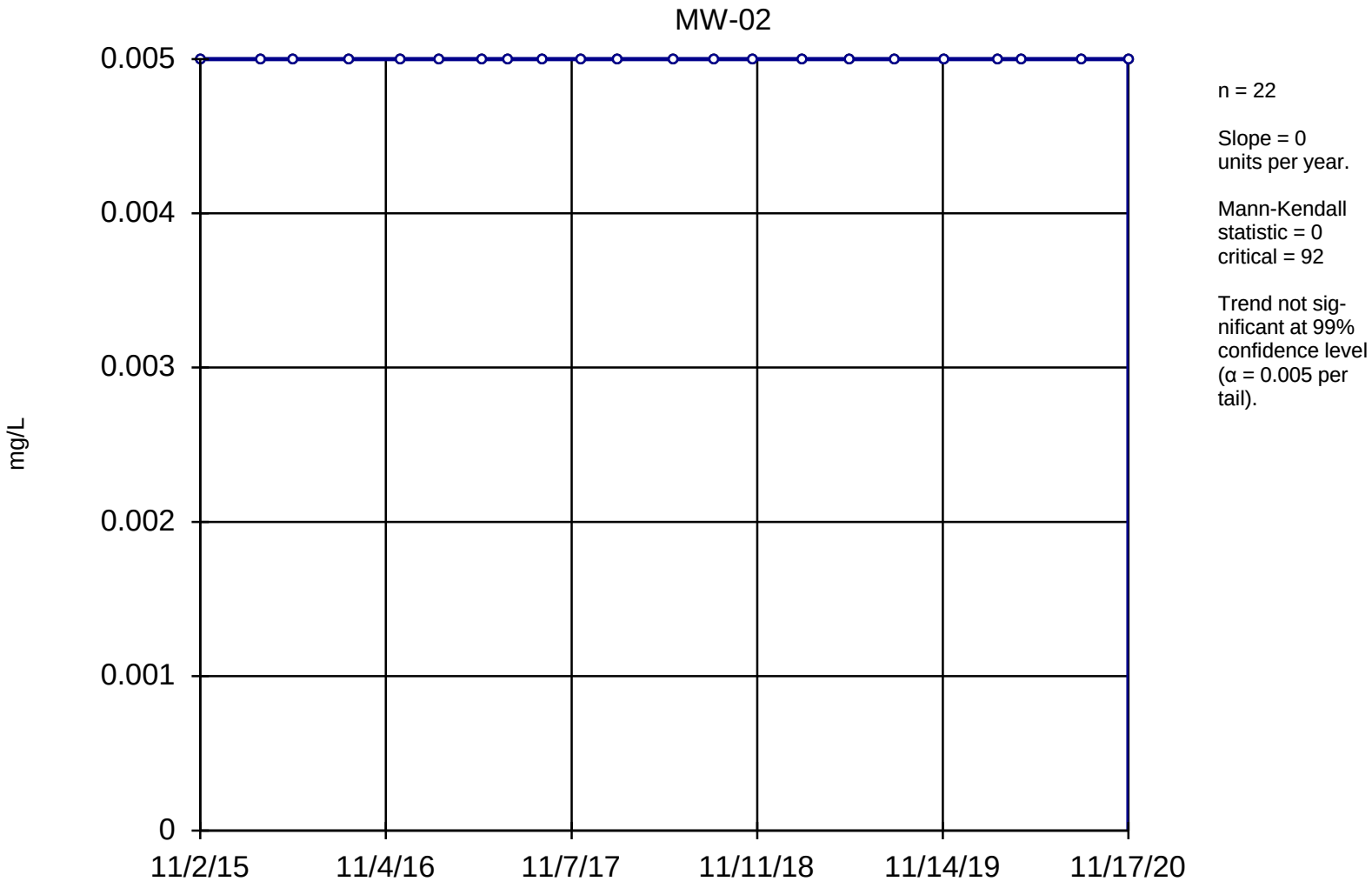


Constituent: Chromium, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

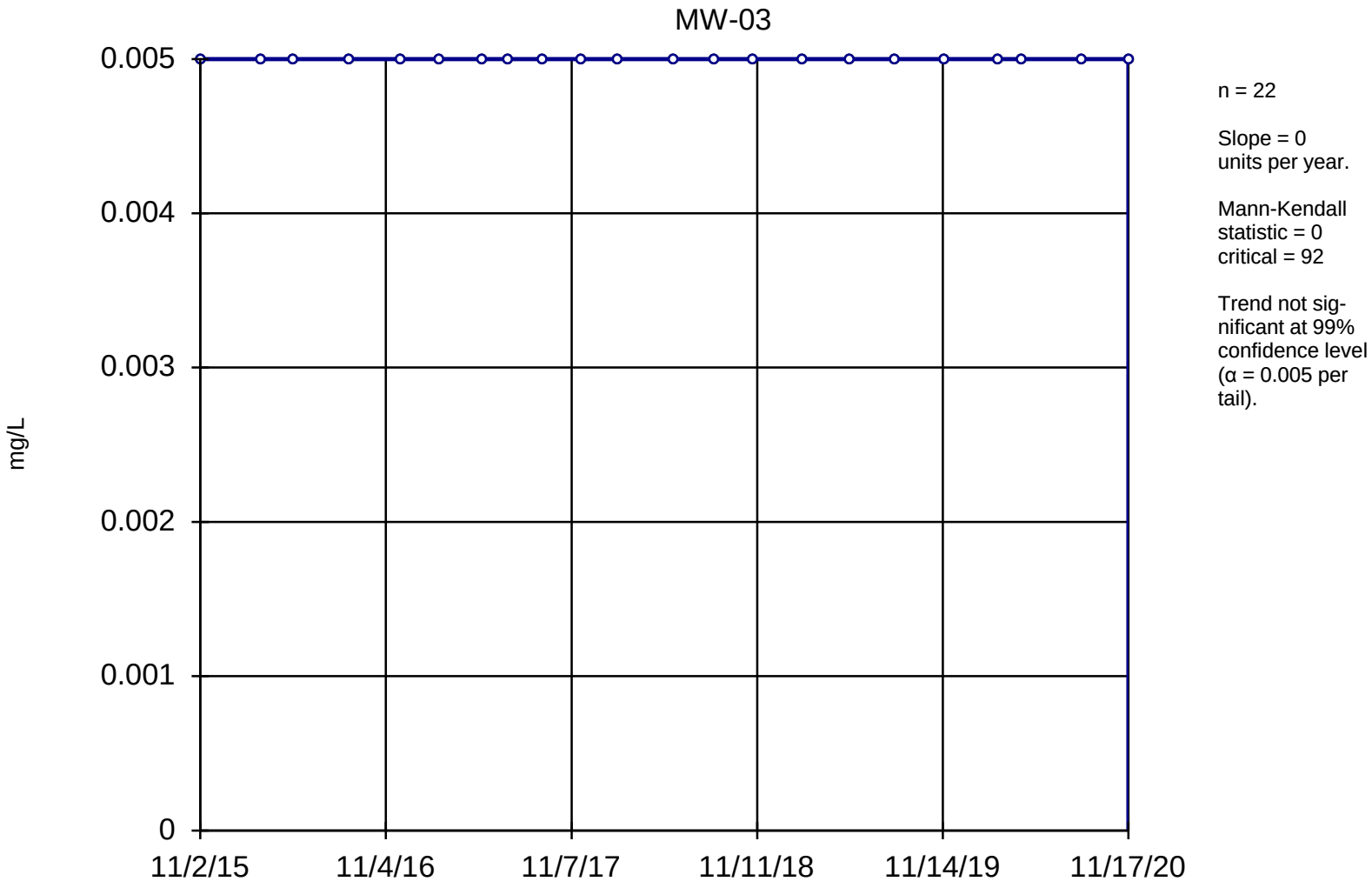


Constituent: Chromium, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

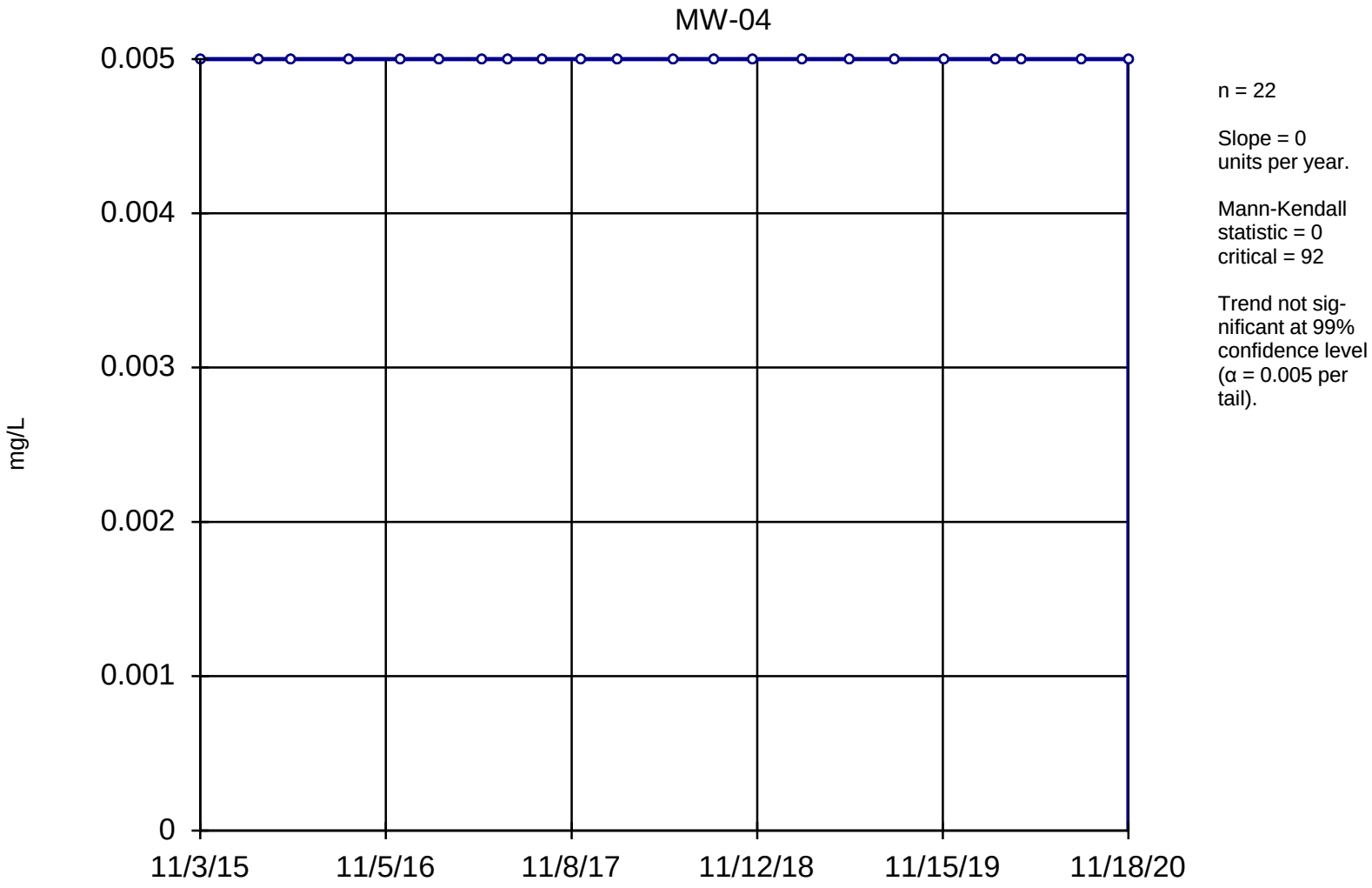


Constituent: Chromium, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator



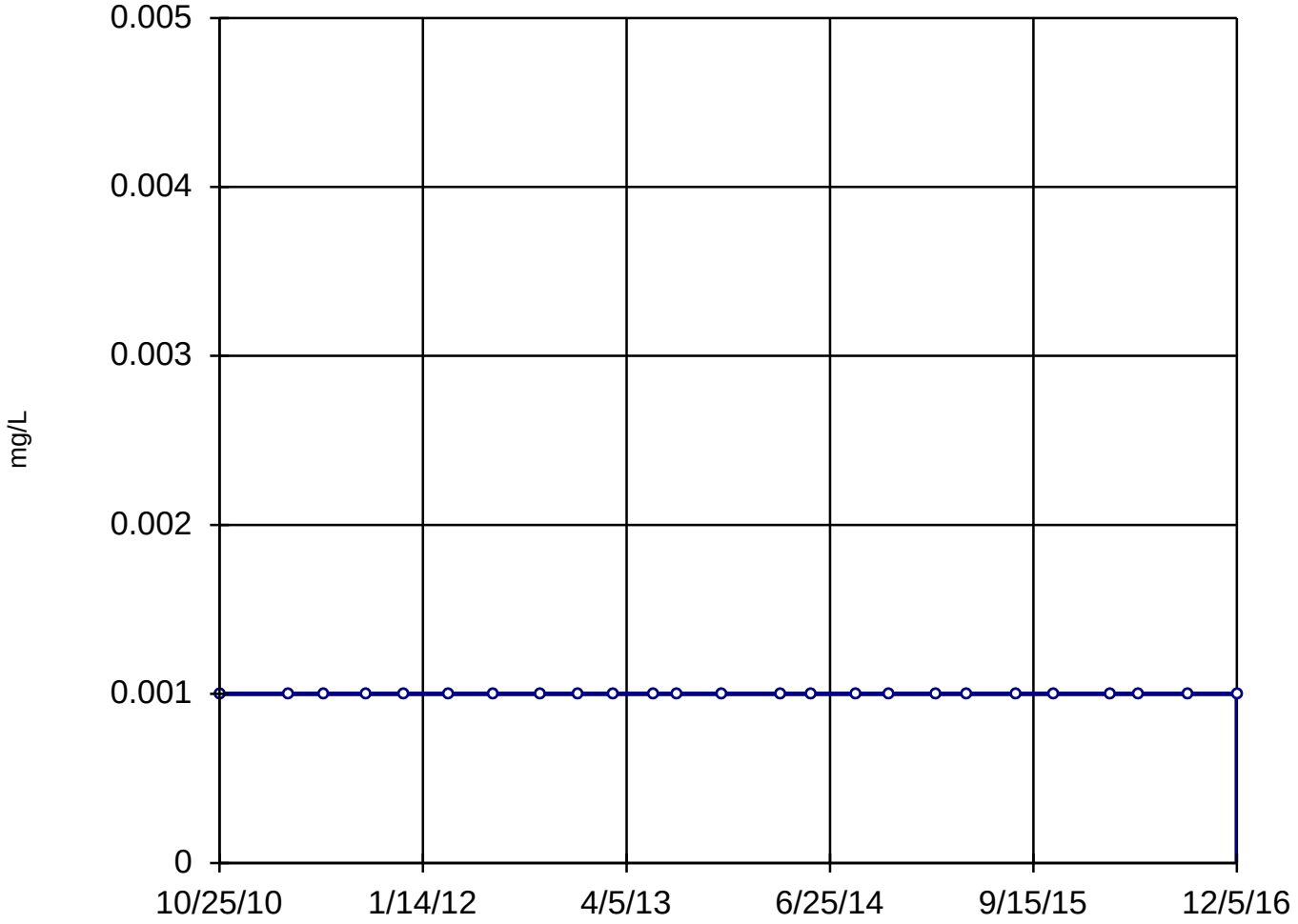
Constituent: Chromium, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-01



n = 25

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 111

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

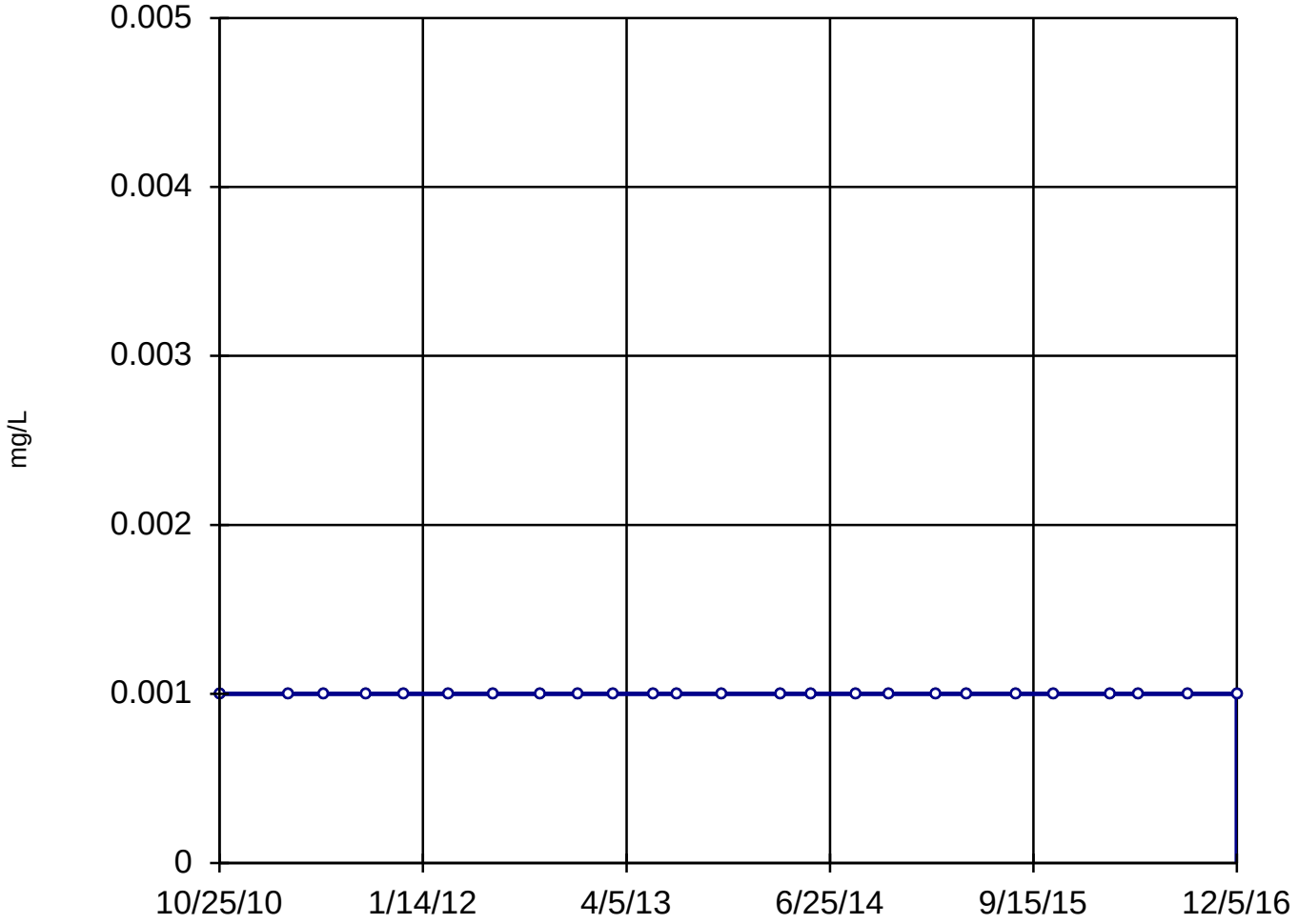
Constituent: Cobalt, Dissolved Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-02



n = 25

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 111

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

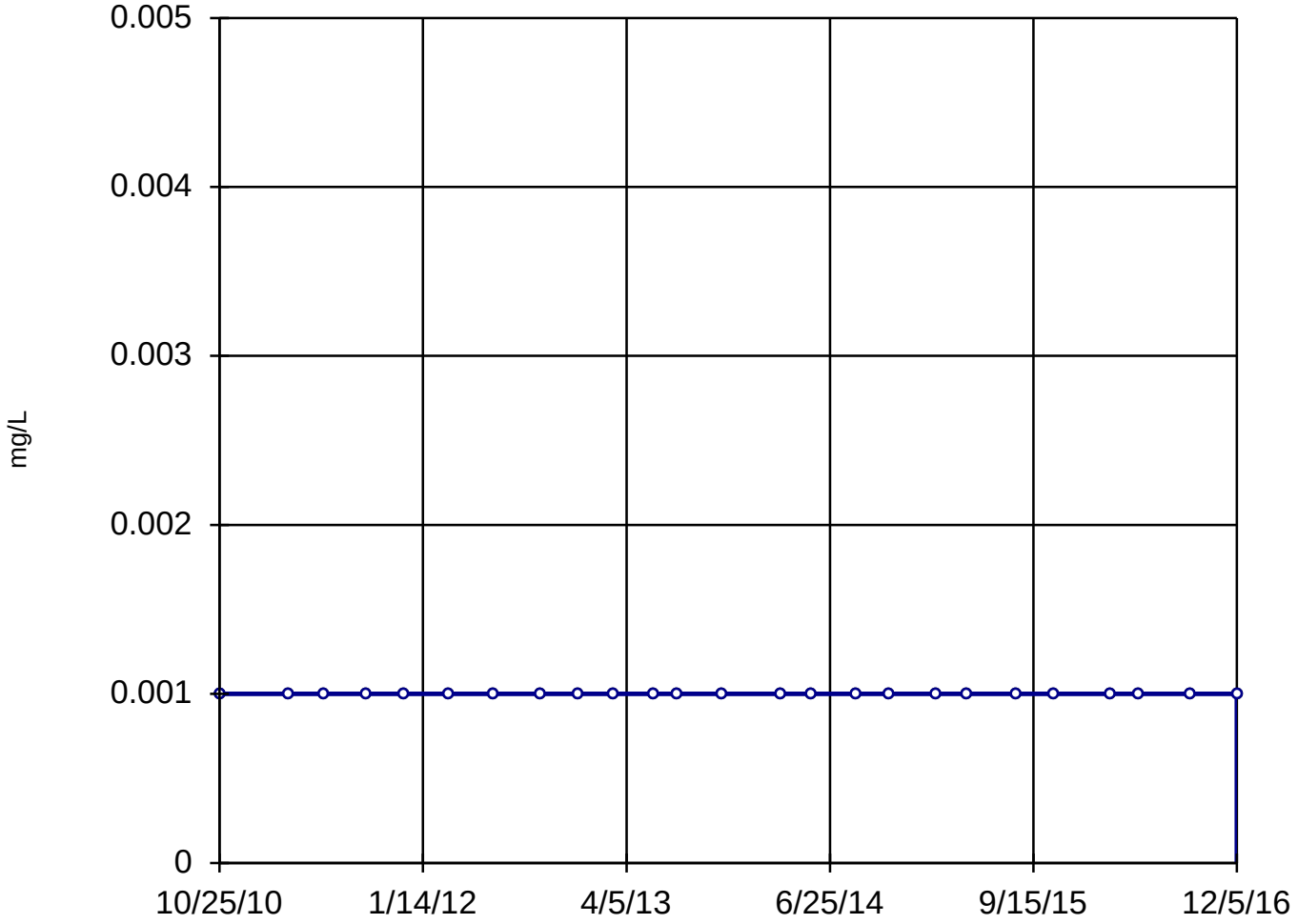
Constituent: Cobalt, Dissolved Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 25

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 111

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

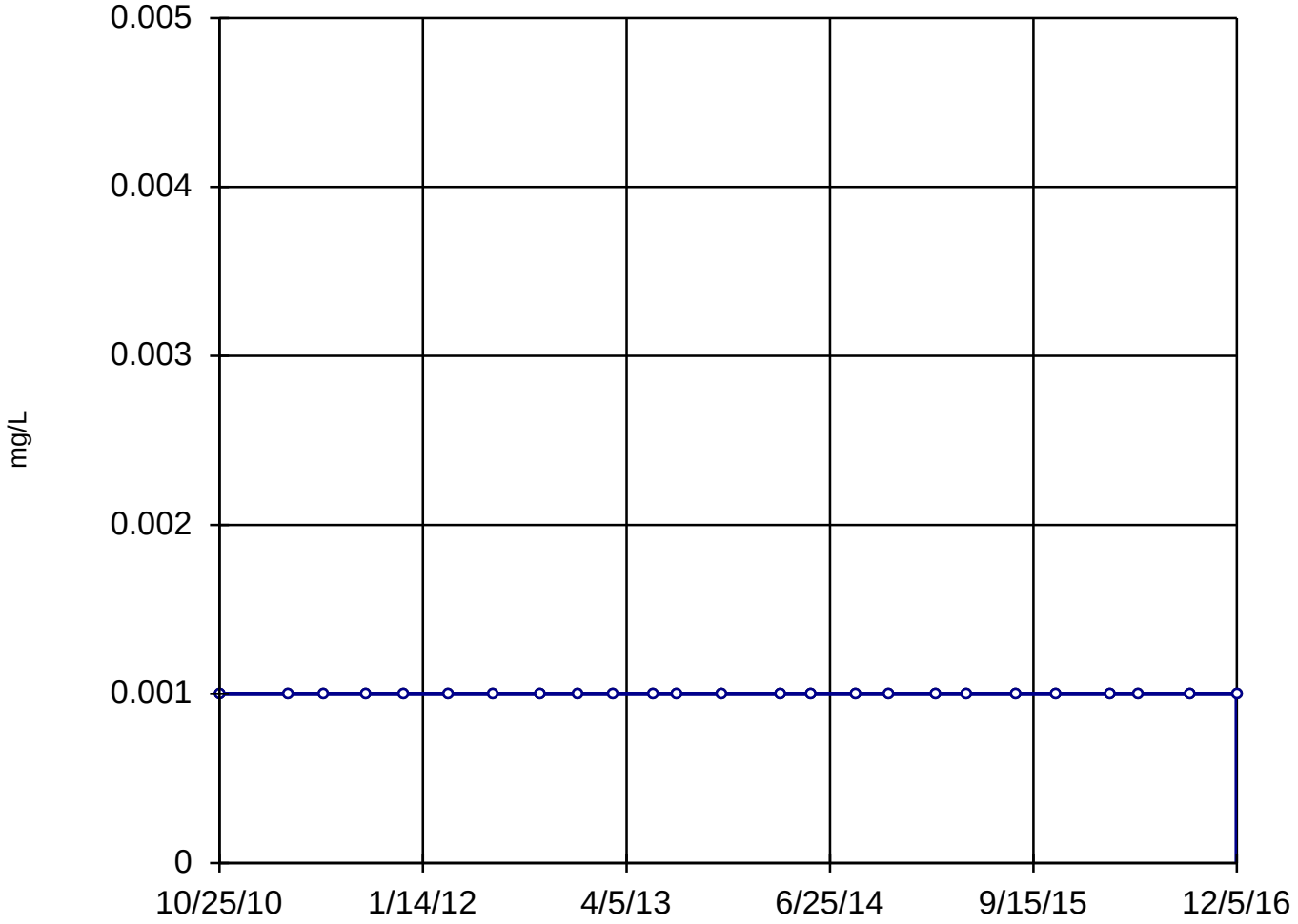
Constituent: Cobalt, Dissolved Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 25

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 111

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

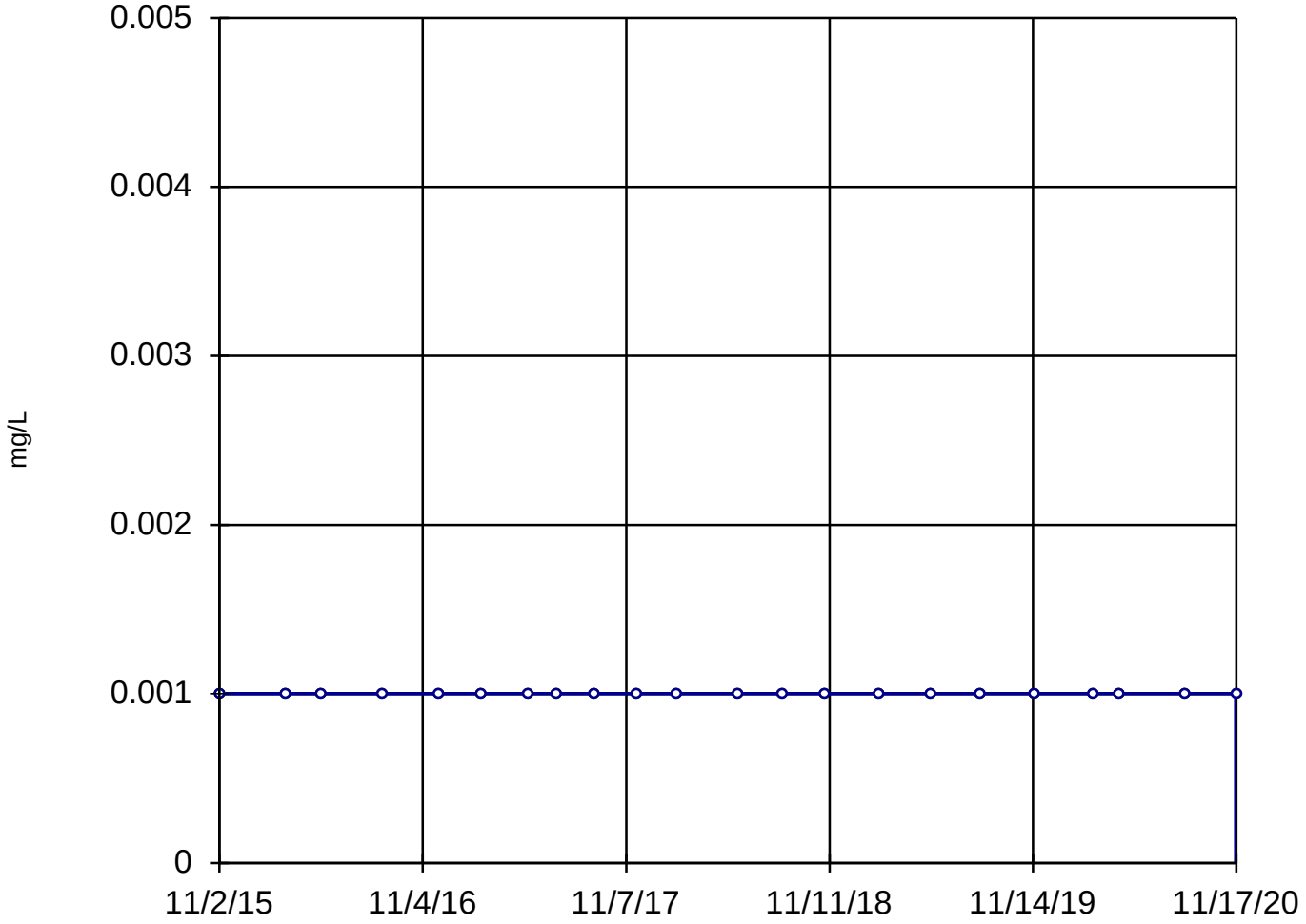
Constituent: Cobalt, Dissolved Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-01



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 92

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

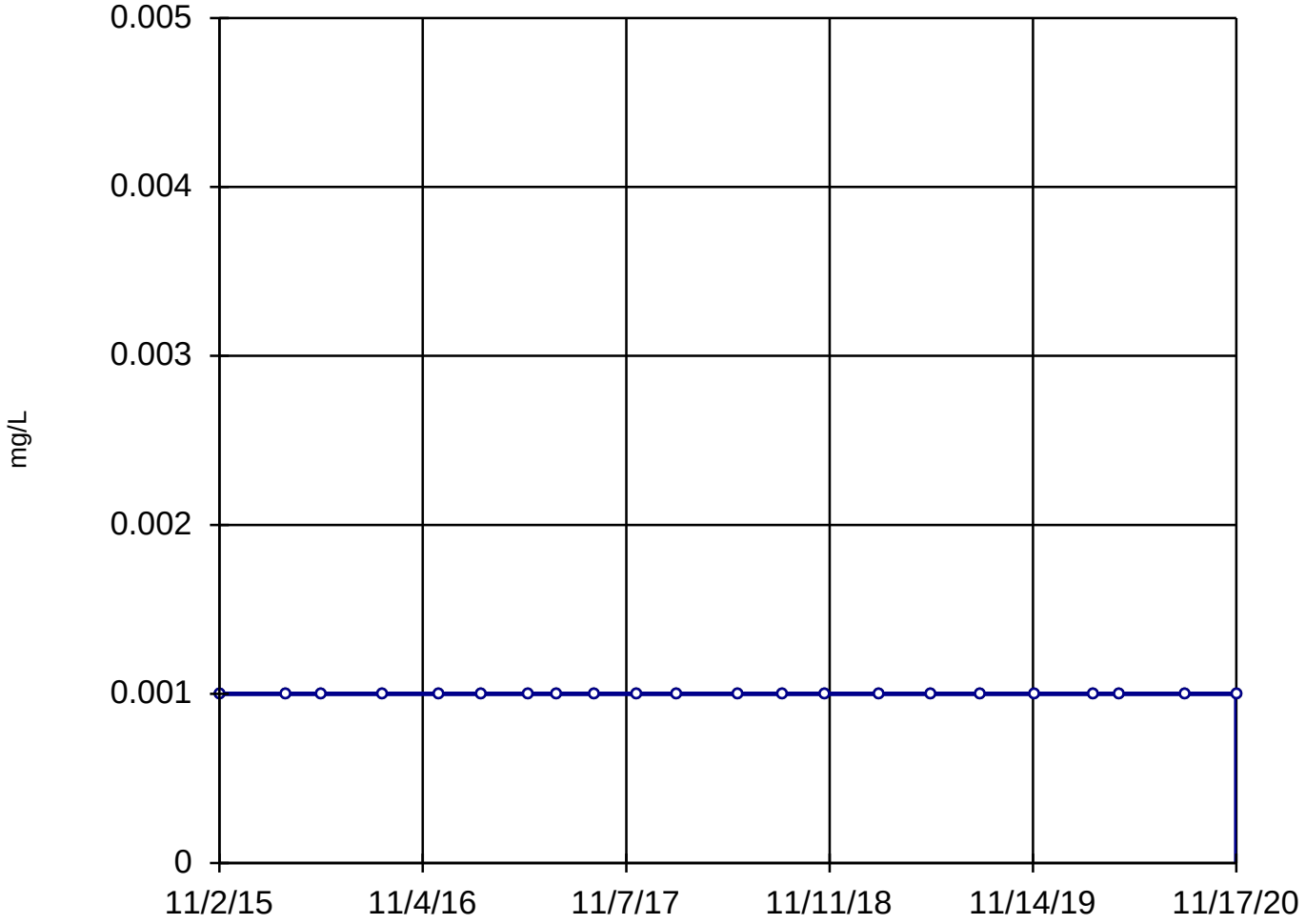
Constituent: Cobalt, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-02



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 92

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

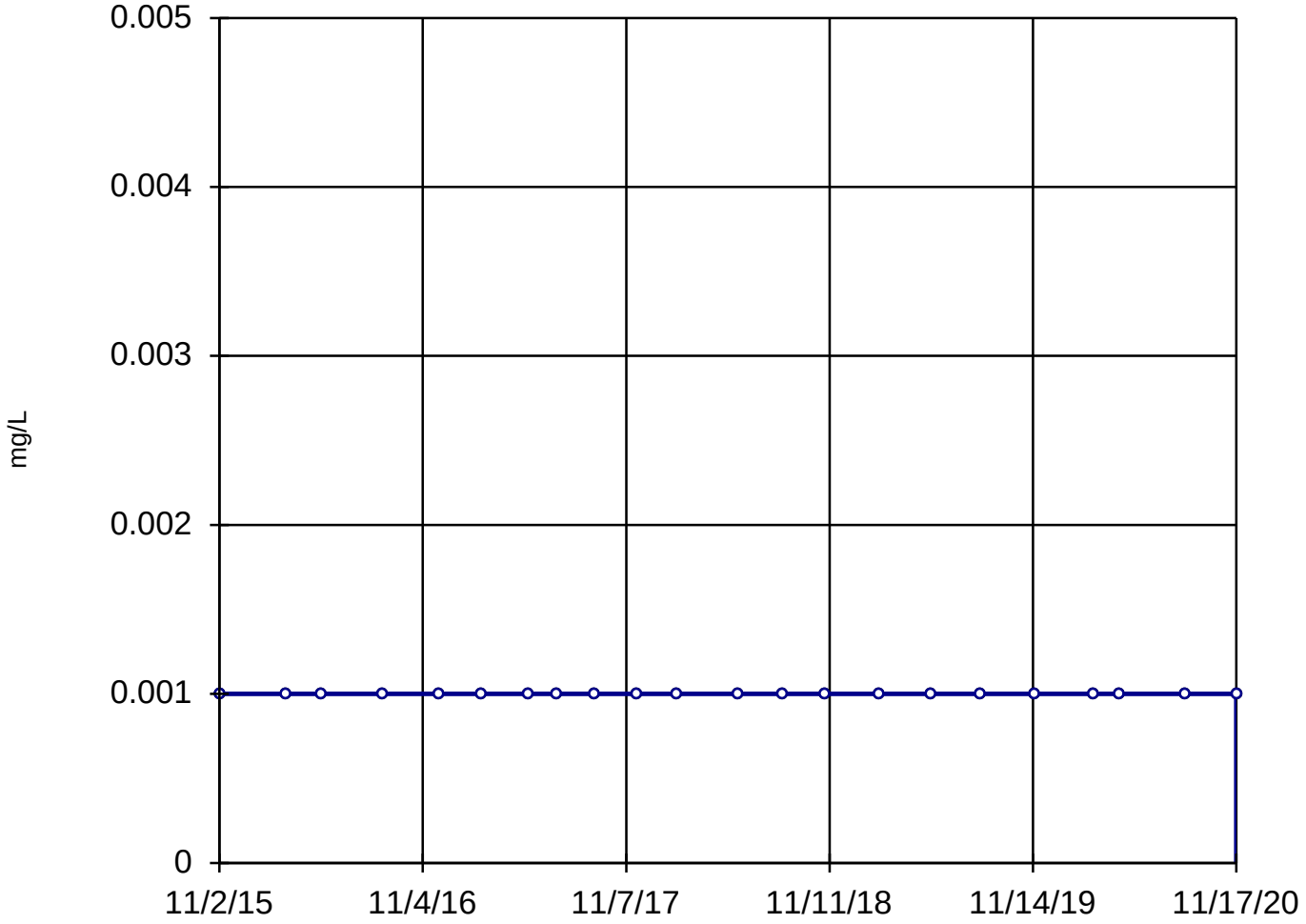
Constituent: Cobalt, Total Analysis Run 4/14/2021 1:01 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 92

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

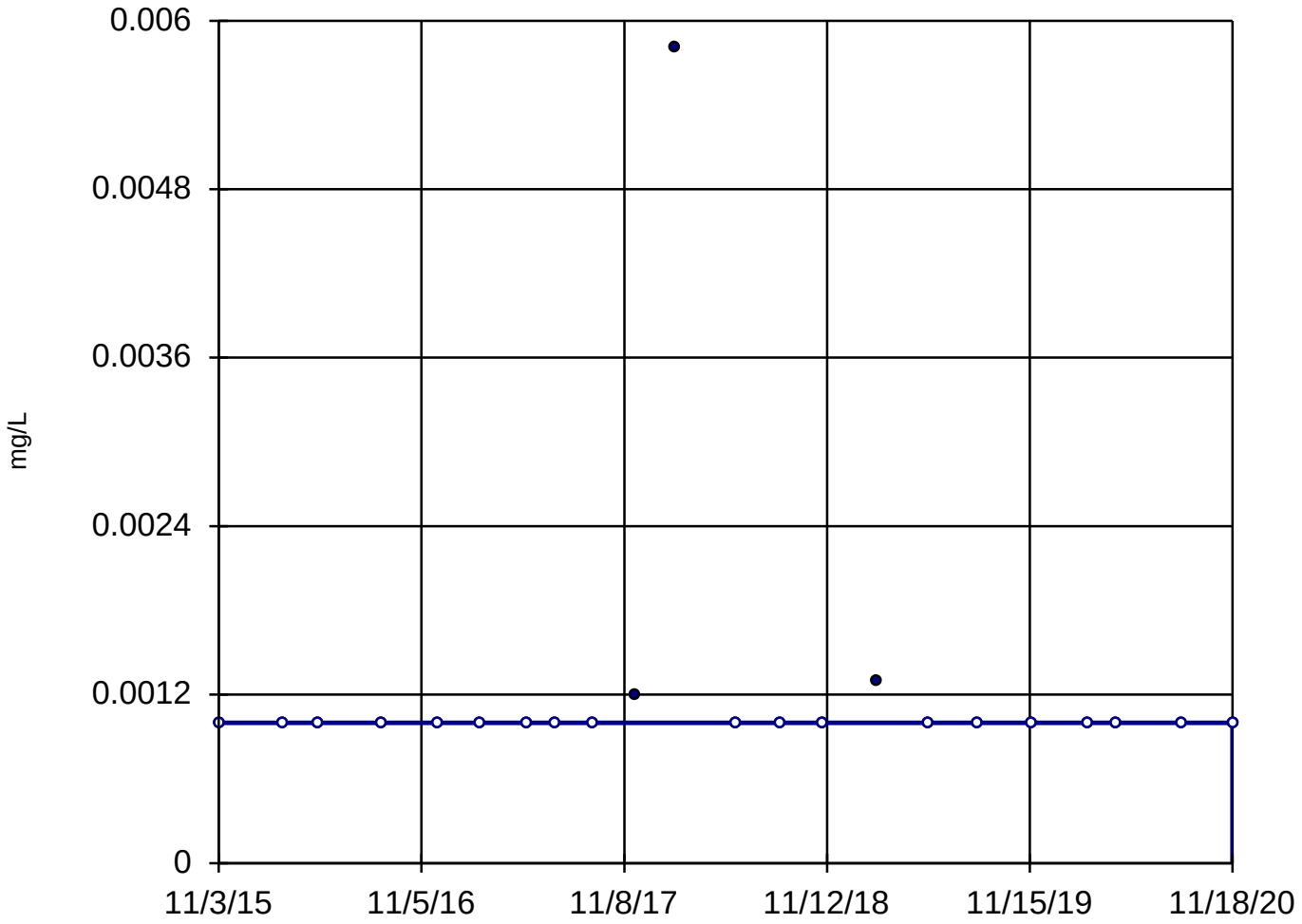
Constituent: Cobalt, Total Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = 4
critical = 92

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

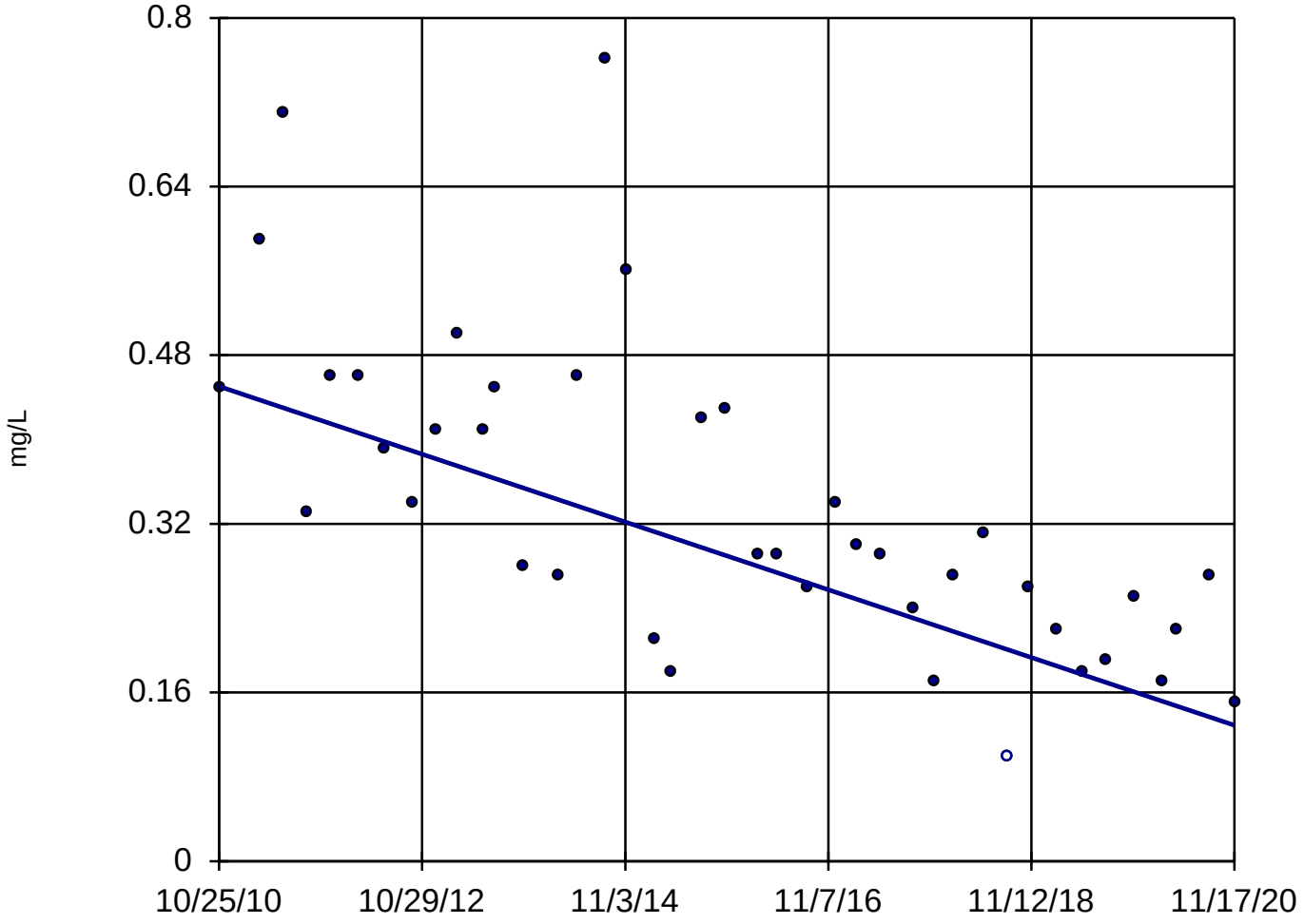
Constituent: Cobalt, Total Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-01



n = 41

Slope = -0.03192 units per year.

Mann-Kendall normal approx. = -5.049
critical = -2.58

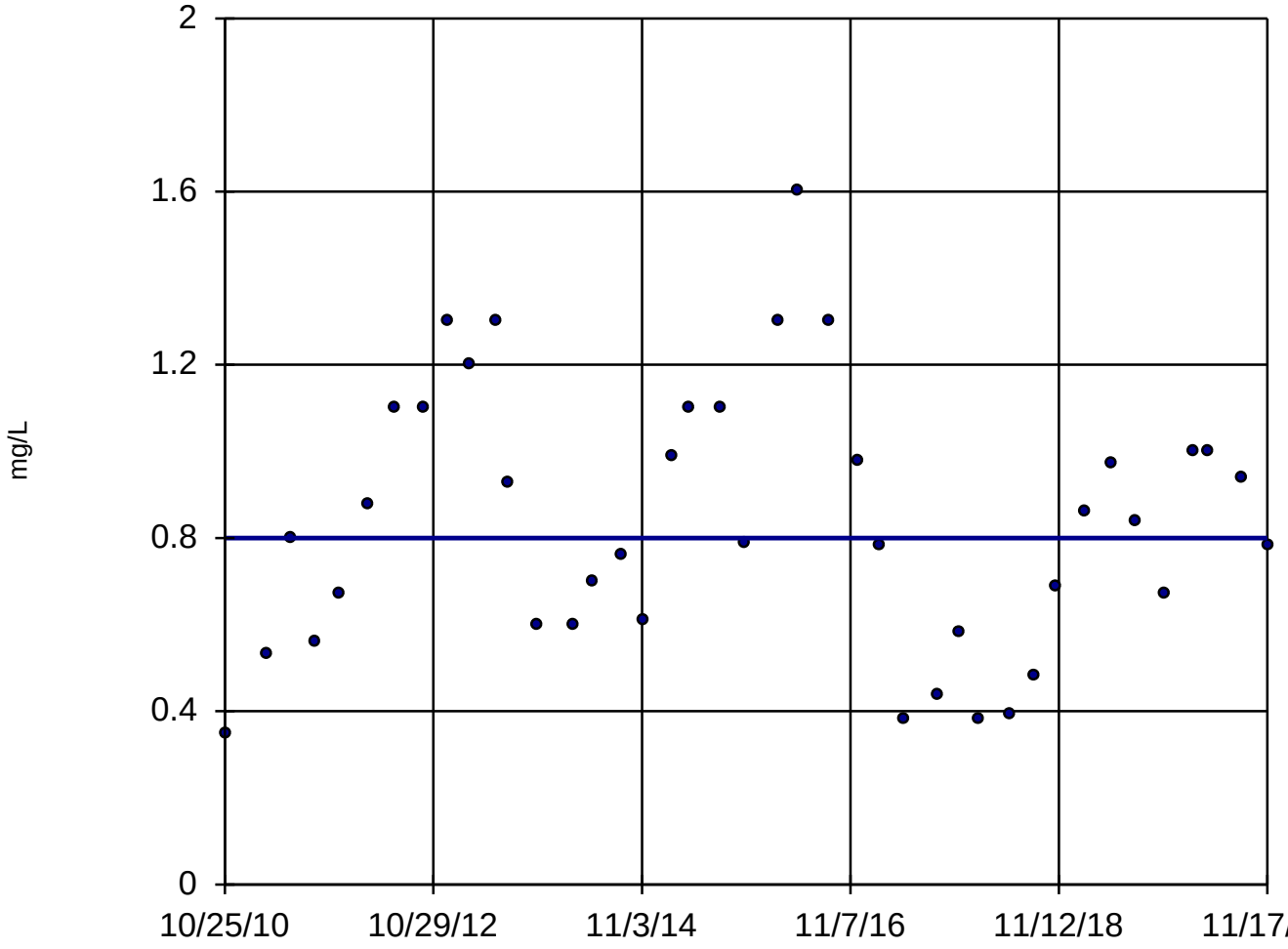
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Fluoride Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-02



n = 41

Slope = 0
units per year.

Mann-Kendall
normal approx. =
0.08998
critical = 2.58

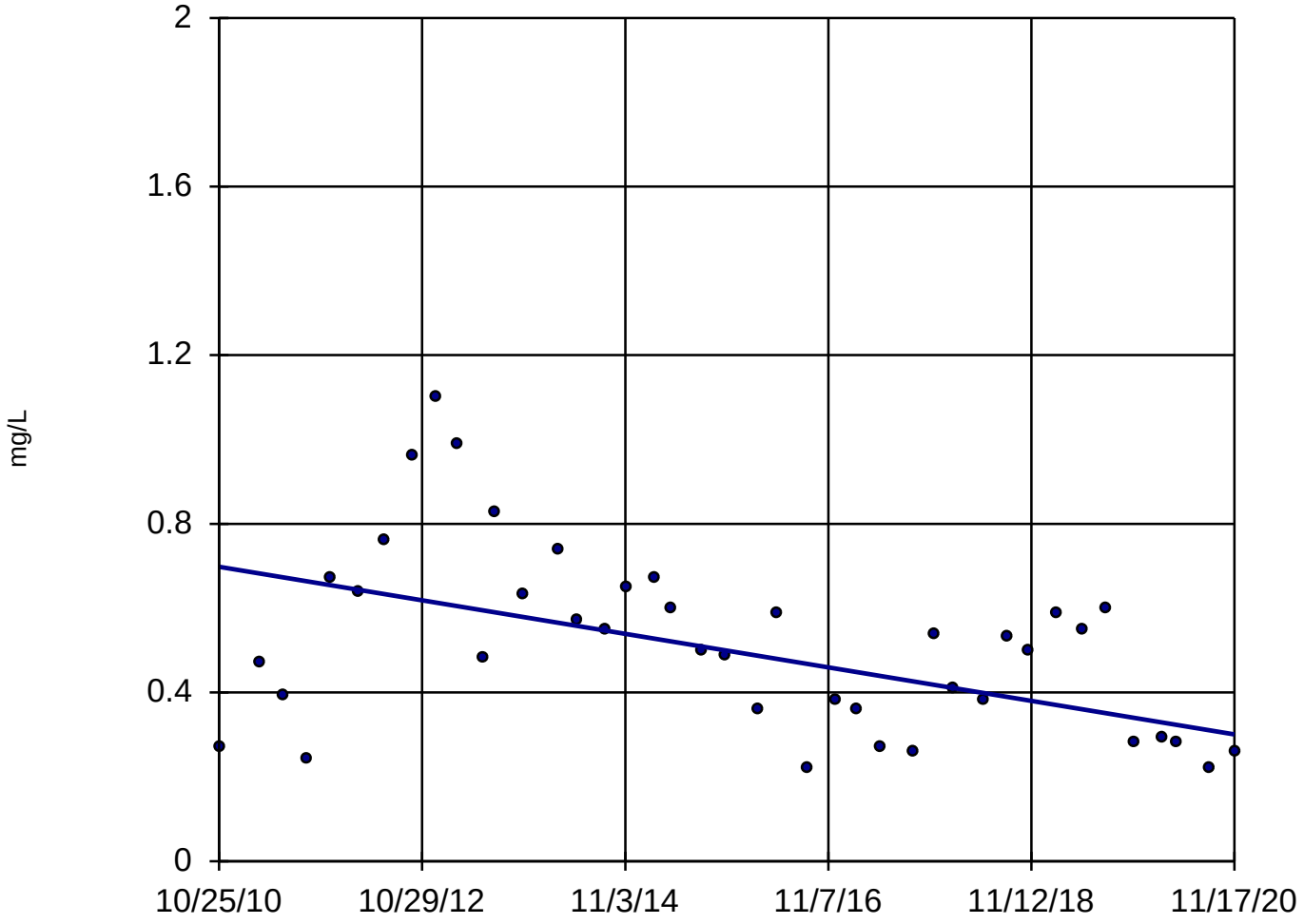
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Fluoride Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-03



n = 41

Slope = -0.03942 units per year.

Mann-Kendall normal approx. = -2.99
critical = -2.58

Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Fluoride Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

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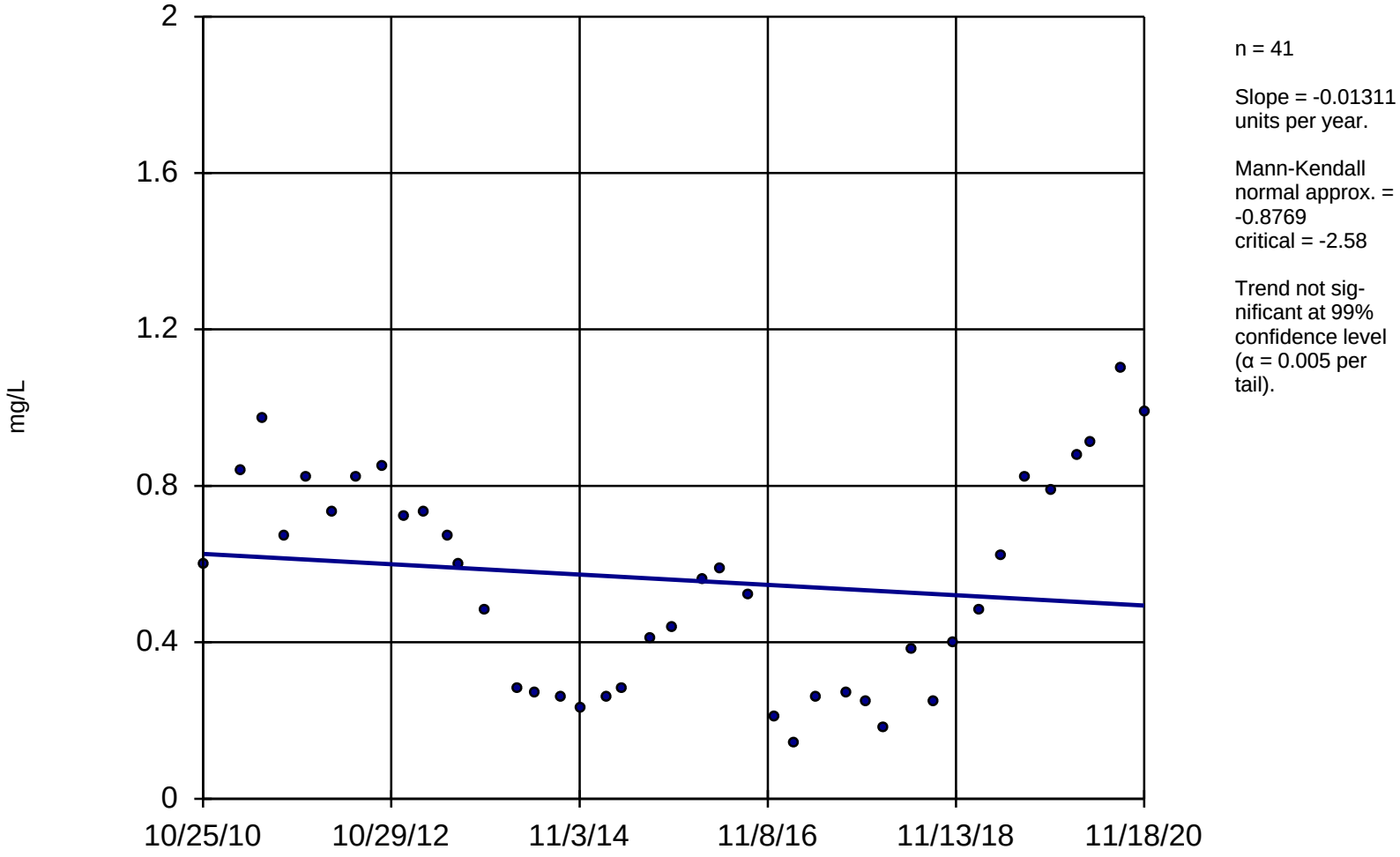
Sen's Slope Estimator

MW-04



n = 41

Slope = -0.01311 units per year.

Mann-Kendall normal approx. = -0.8769
critical = -2.58

Trend not significant at 99% confidence level (α = 0.005 per tail).

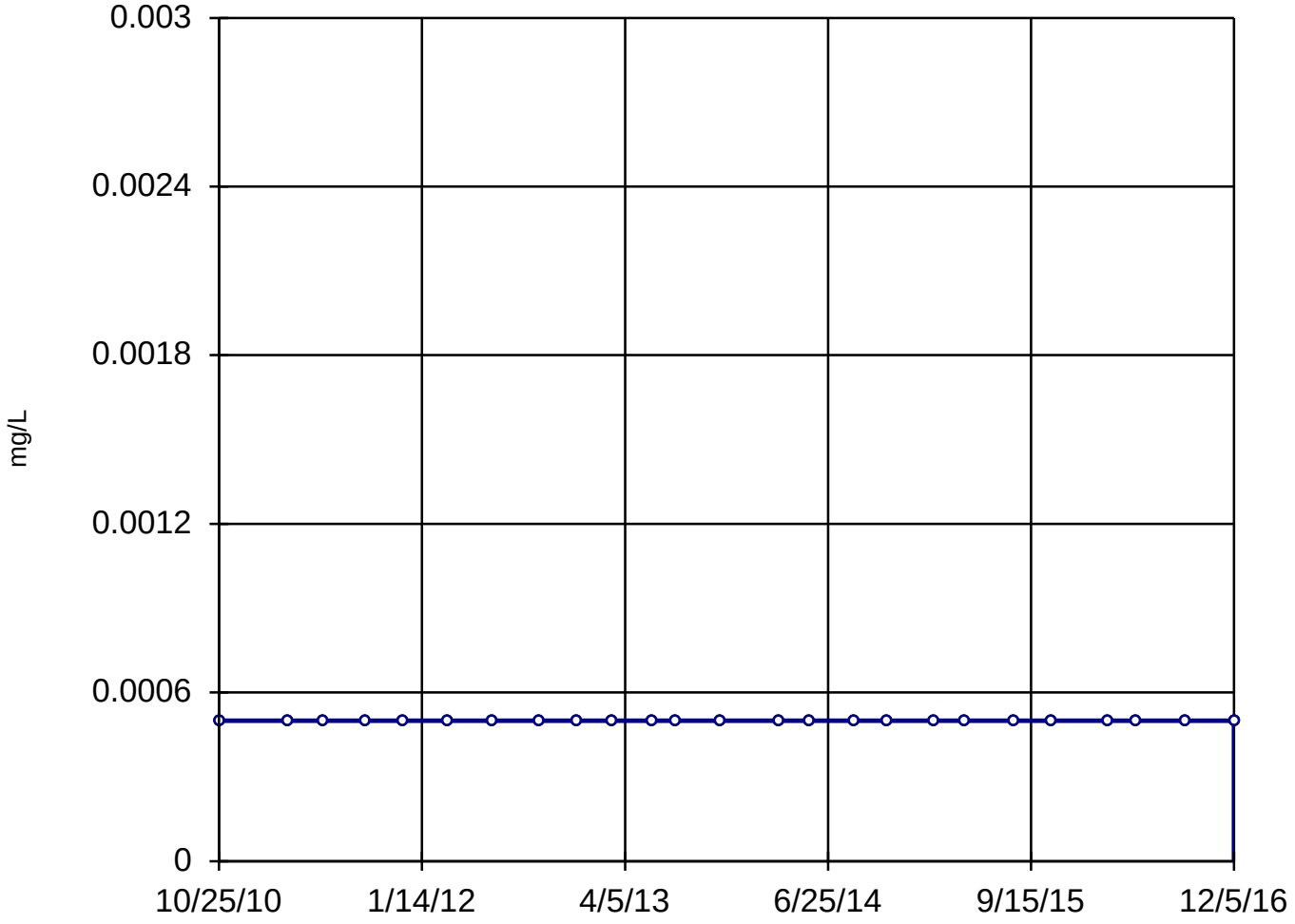
Constituent: Fluoride Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-01



n = 25

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 111

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

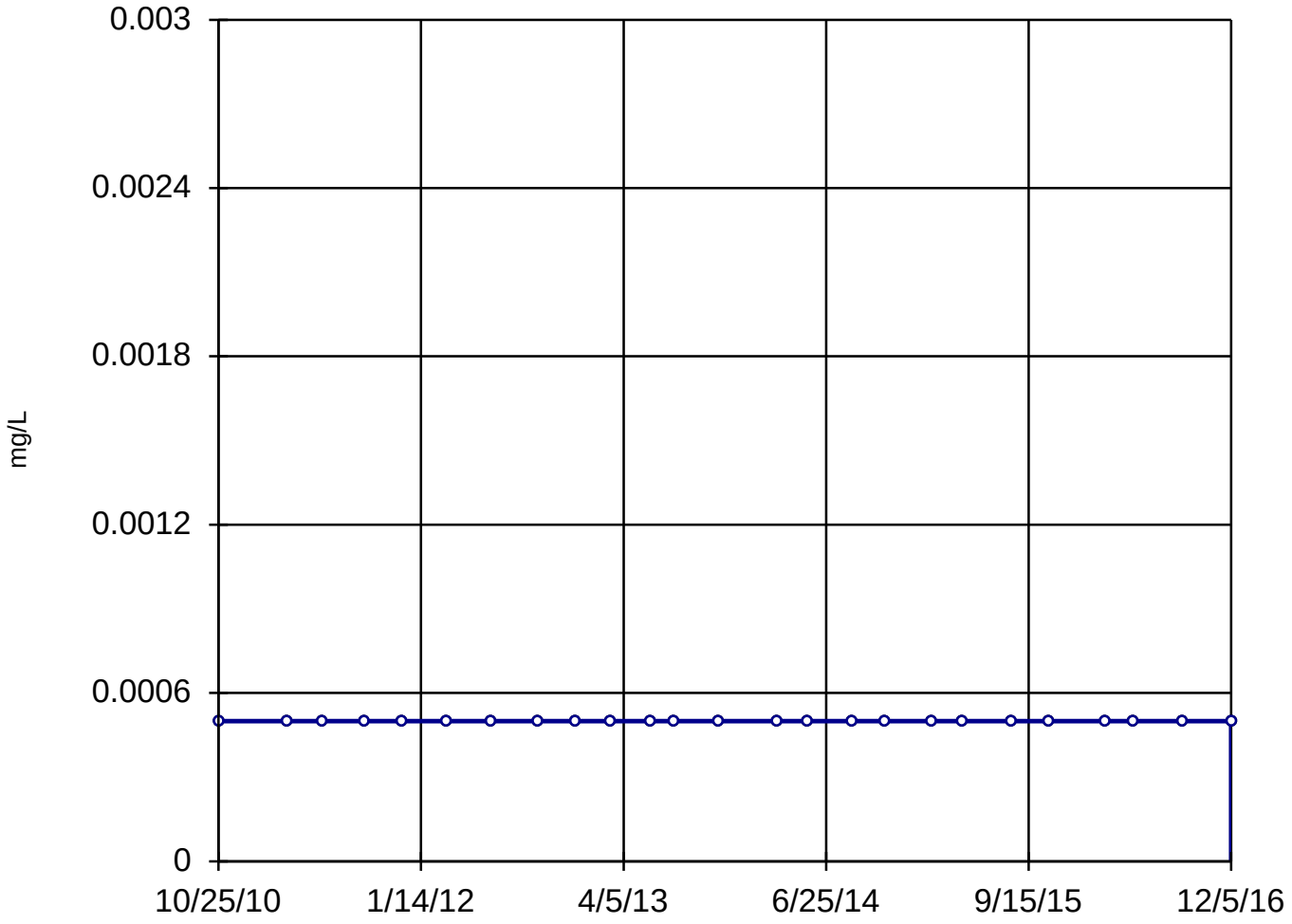
Constituent: Lead, Dissolved Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-02



n = 25

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 111

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

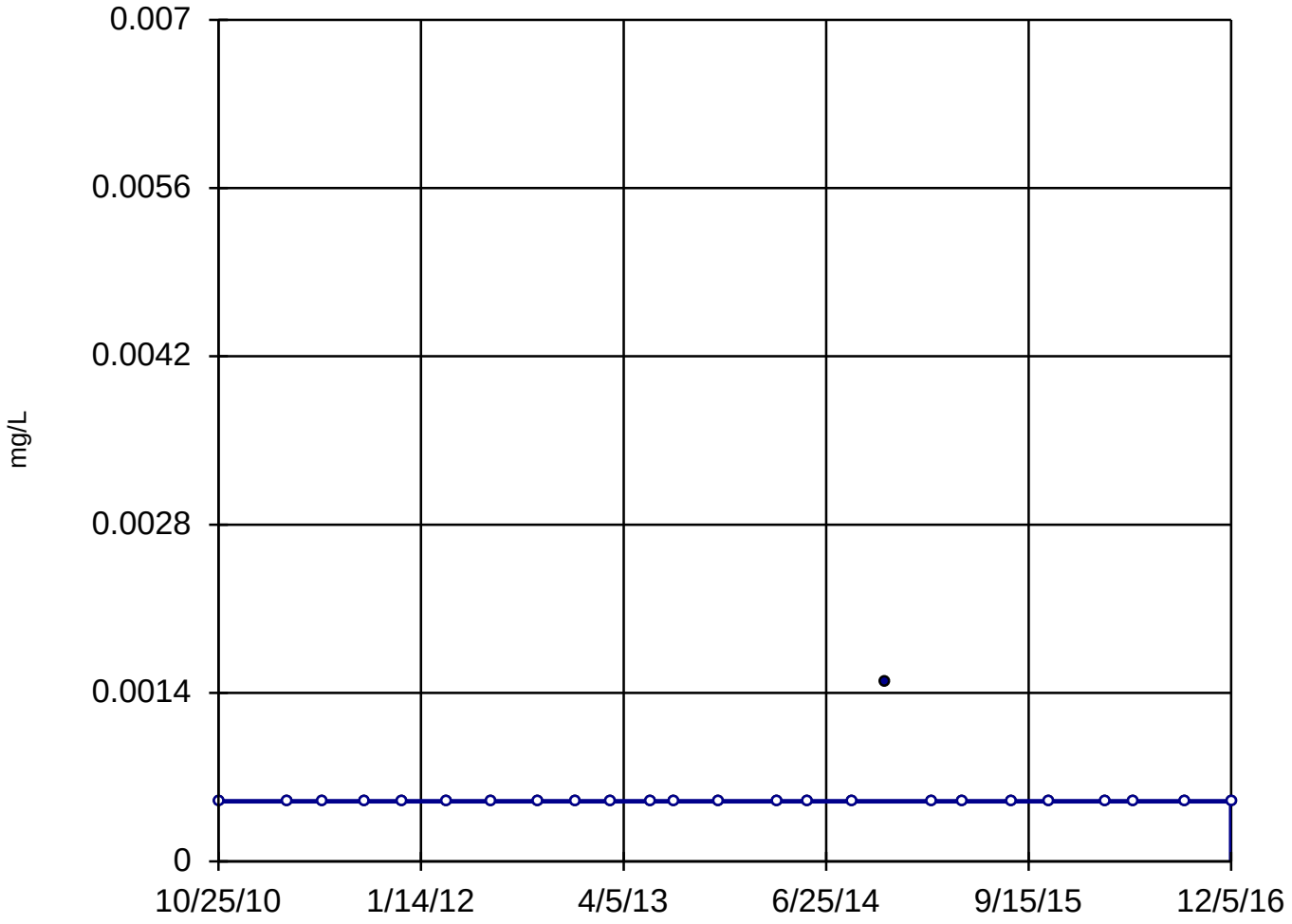
Constituent: Lead, Dissolved Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 25

Slope = 0
units per year.

Mann-Kendall
statistic = 8
critical = 111

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

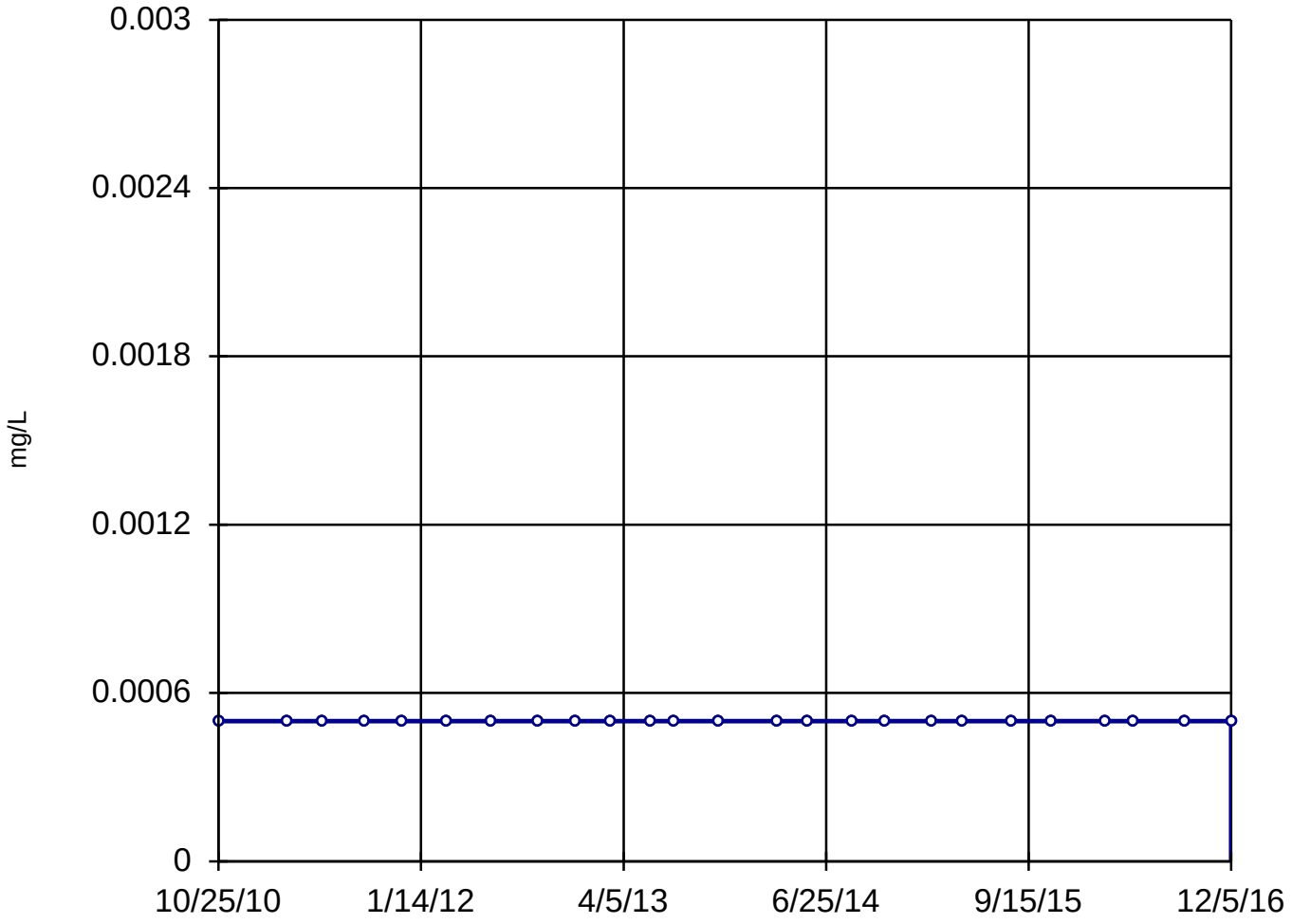
Constituent: Lead, Dissolved Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 25

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 111

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

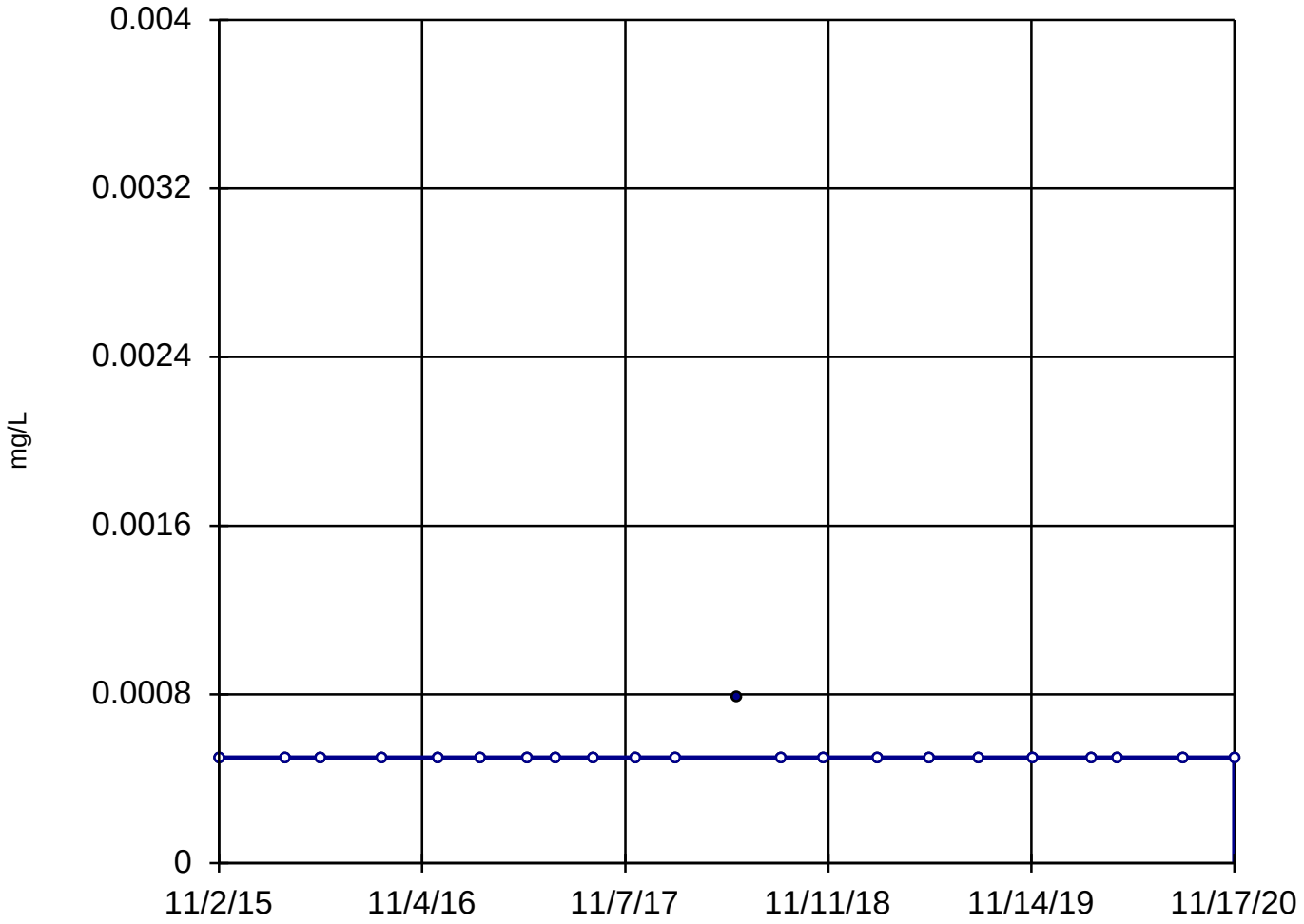
Constituent: Lead, Dissolved Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-01



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = 1
critical = 92

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

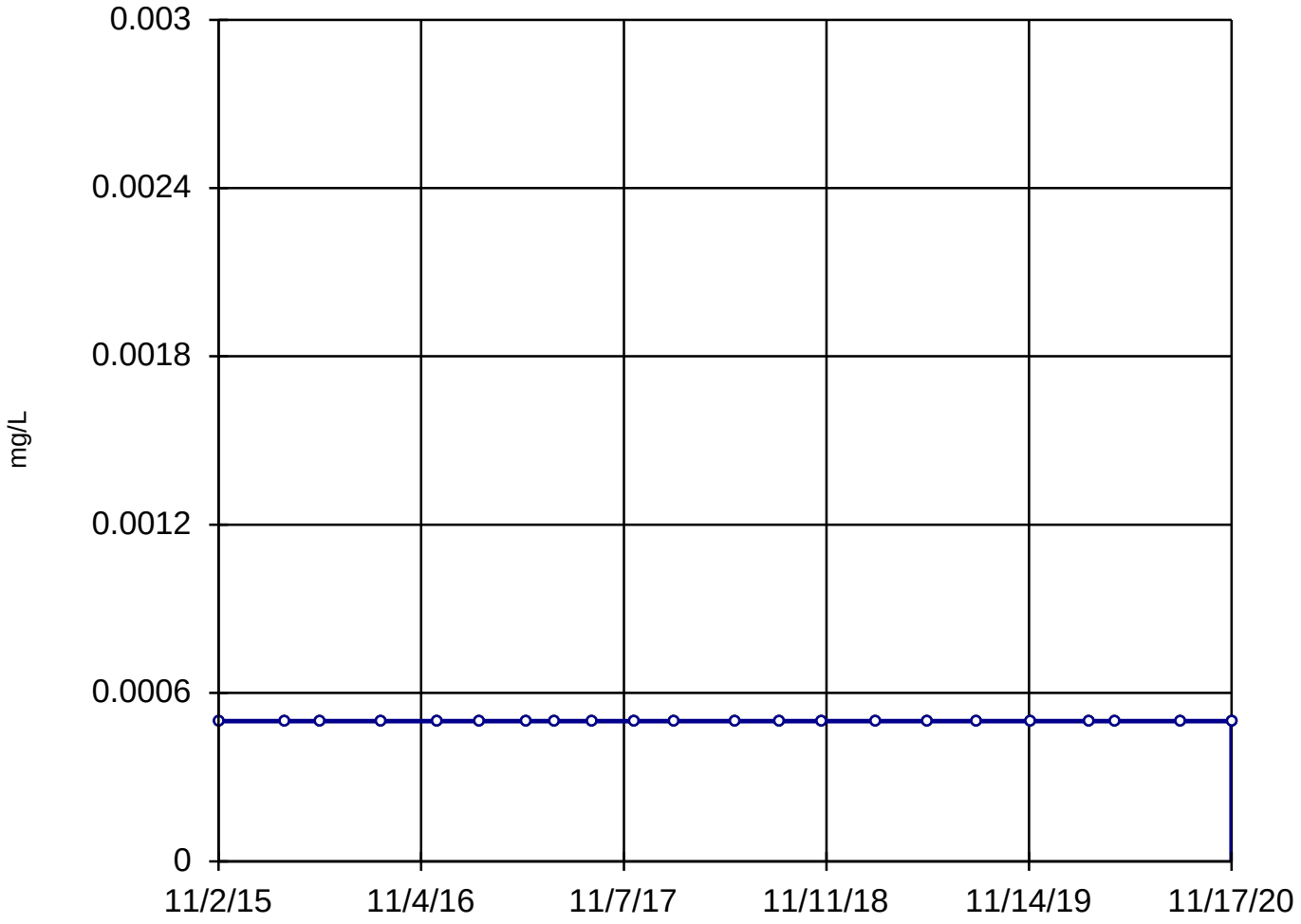
Constituent: Lead, Total Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-02



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 92

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

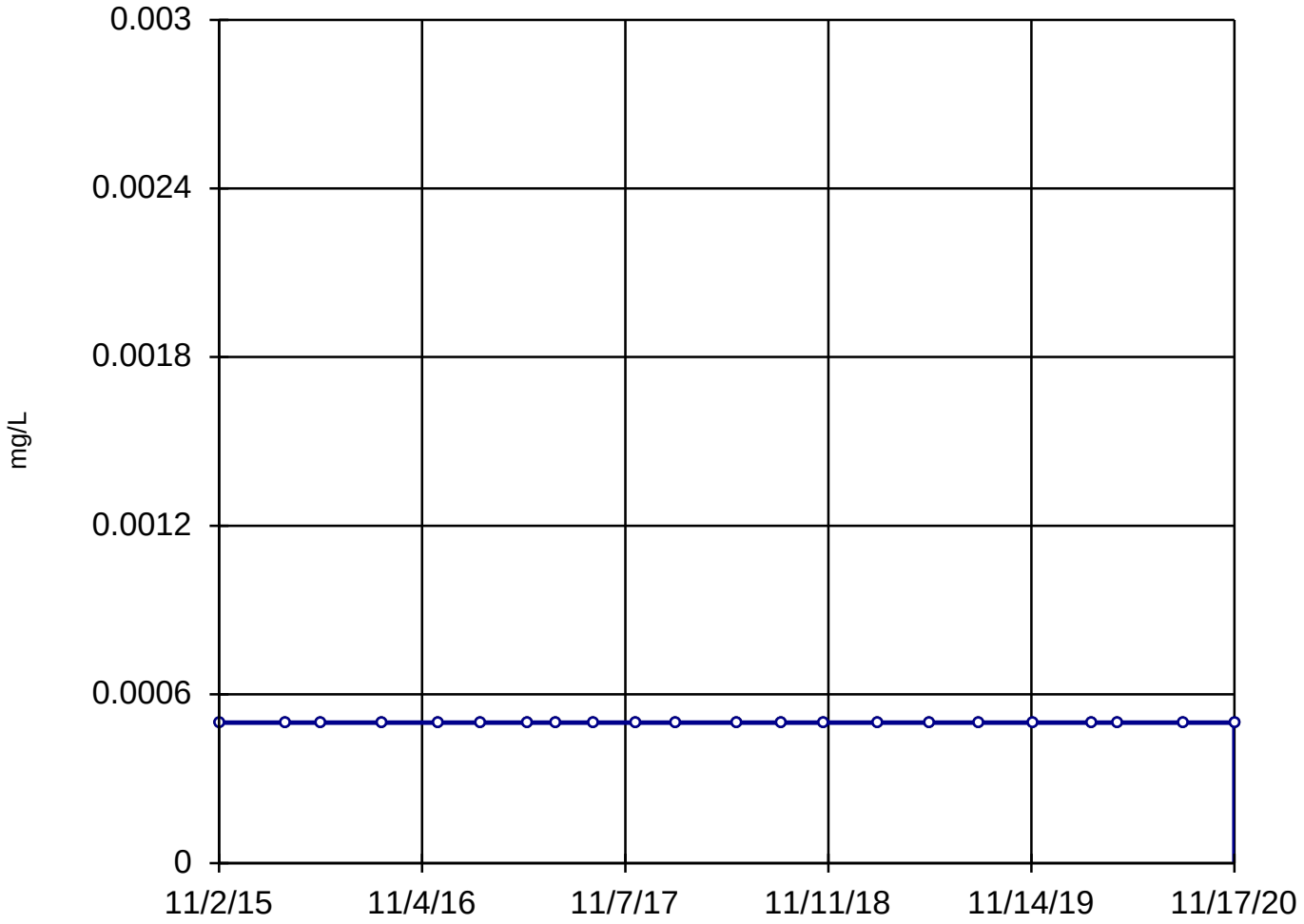
Constituent: Lead, Total Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 92

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

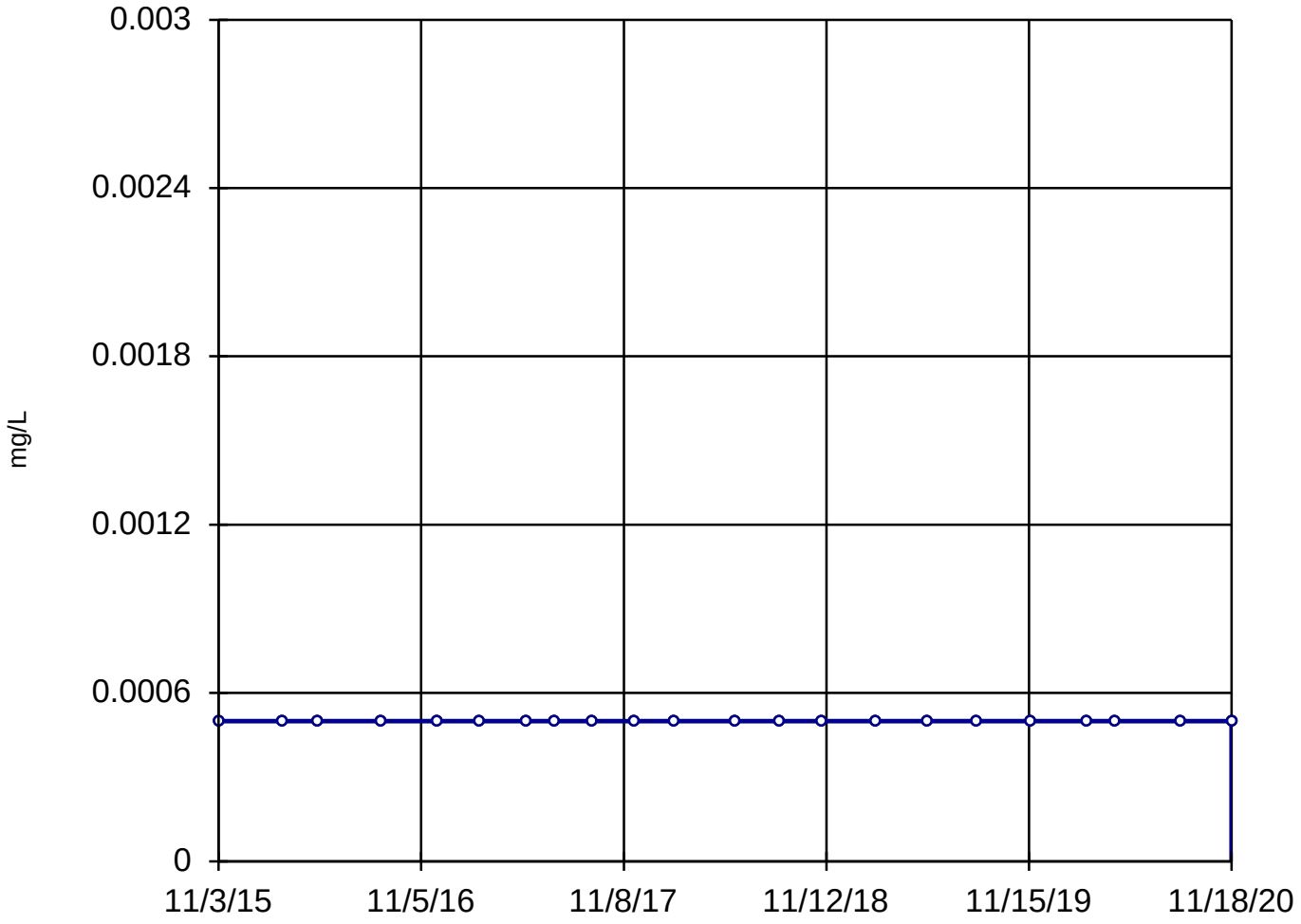
Constituent: Lead, Total Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 92

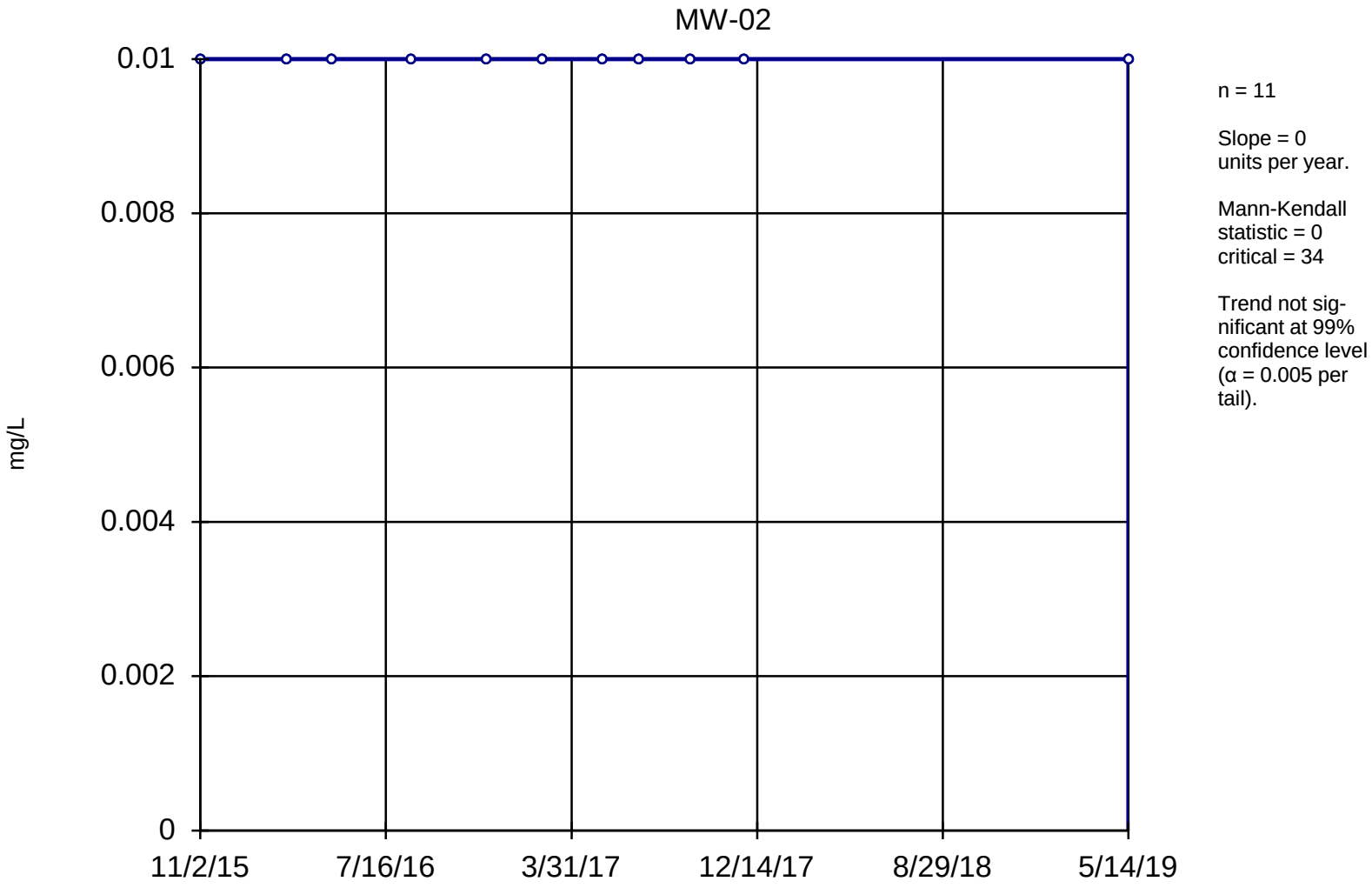
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Lead, Total Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

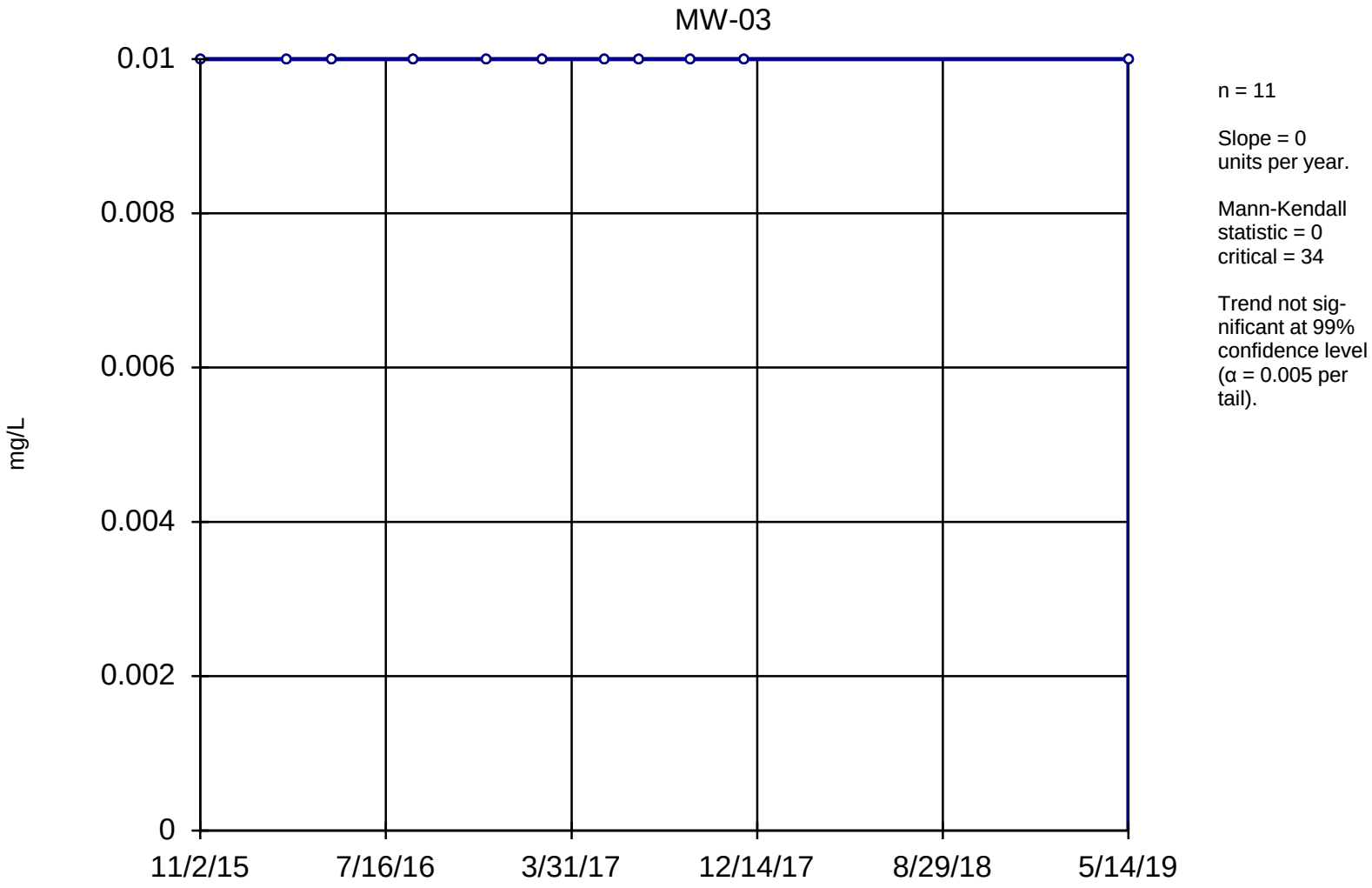


Constituent: Lithium, Total Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

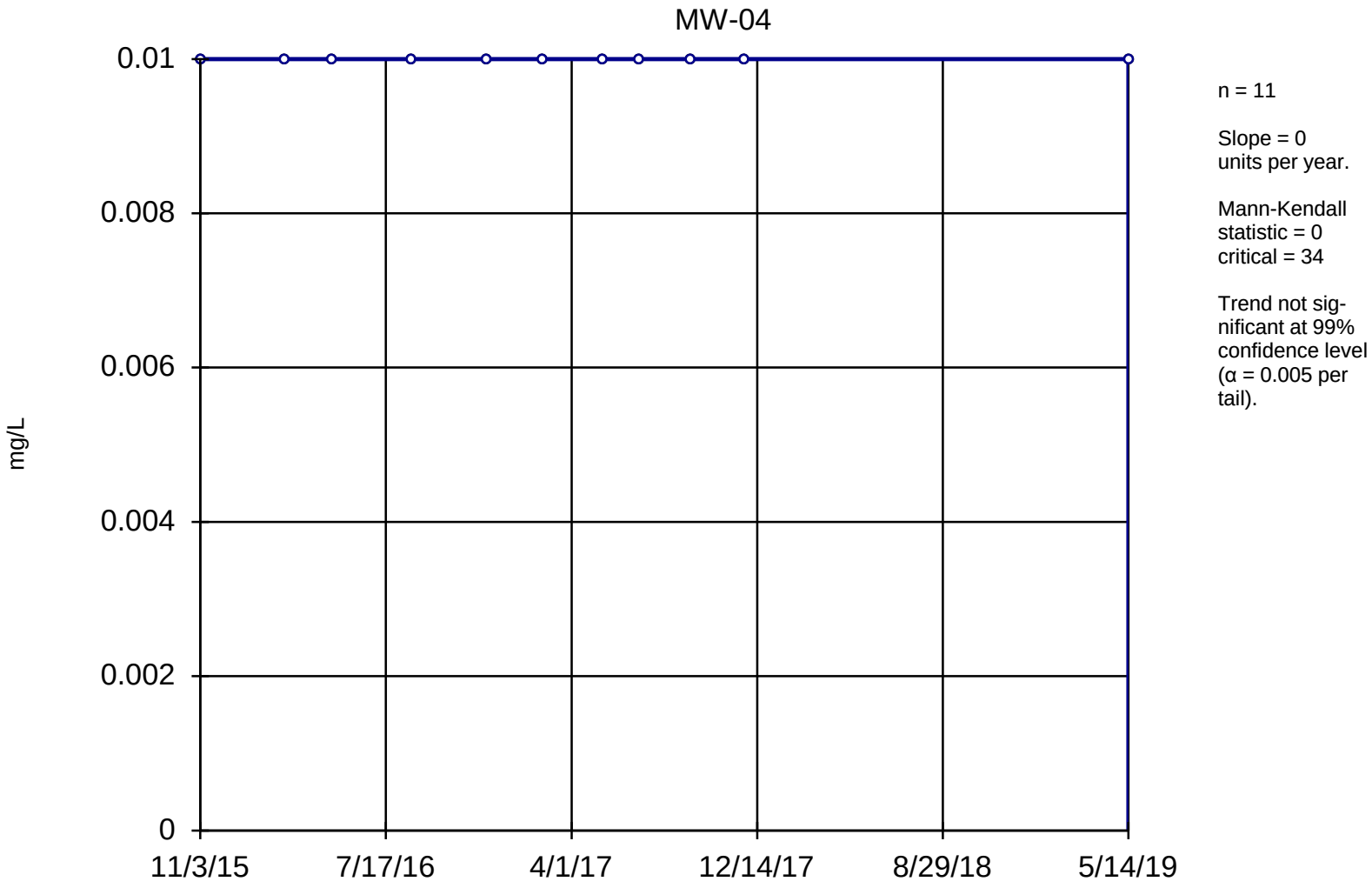


Constituent: Lithium, Total Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator



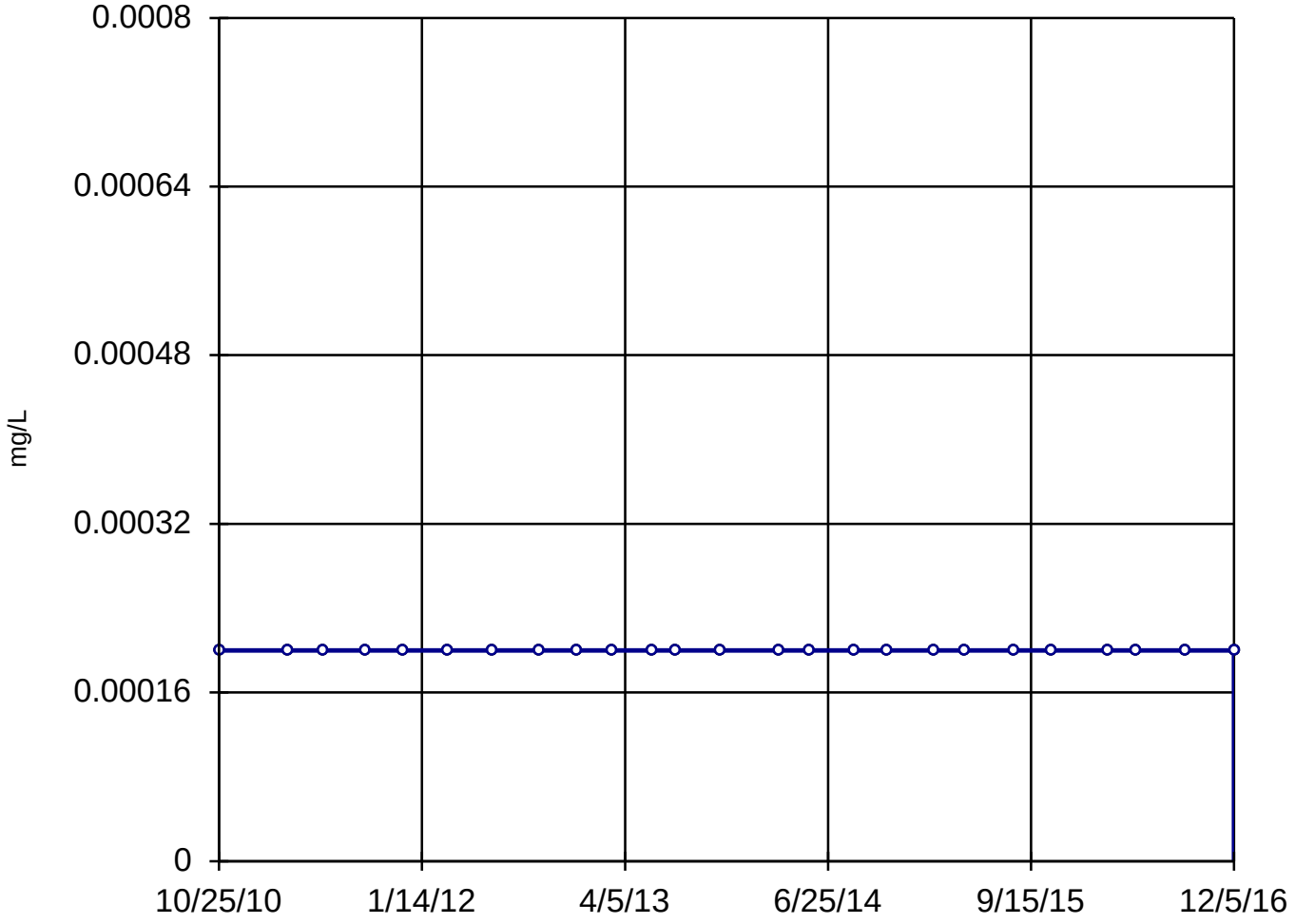
Constituent: Lithium, Total Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-01



n = 25

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 111

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

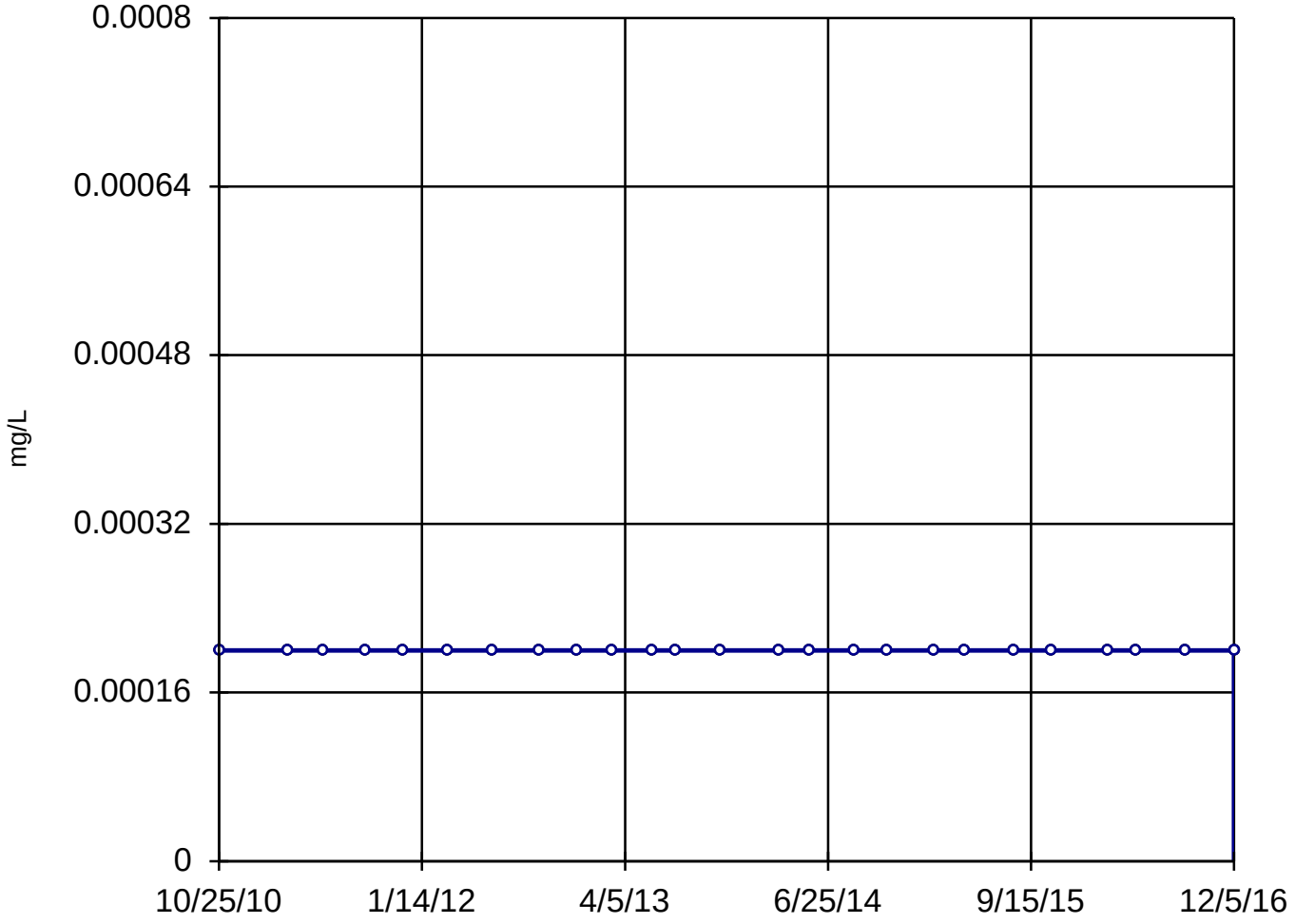
Constituent: Mercury, Dissolved Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-02



n = 25

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 111

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

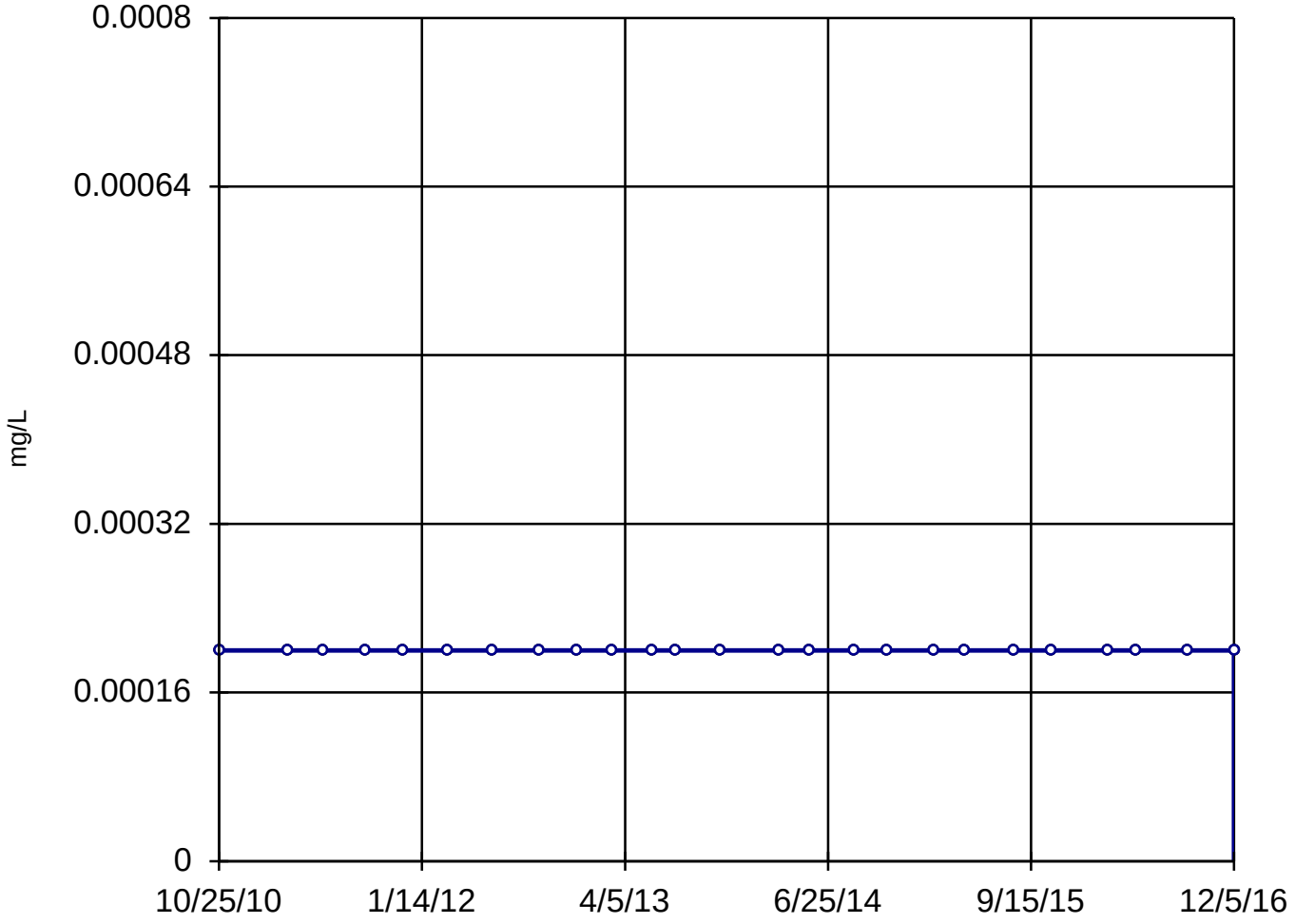
Constituent: Mercury, Dissolved Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 25

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 111

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

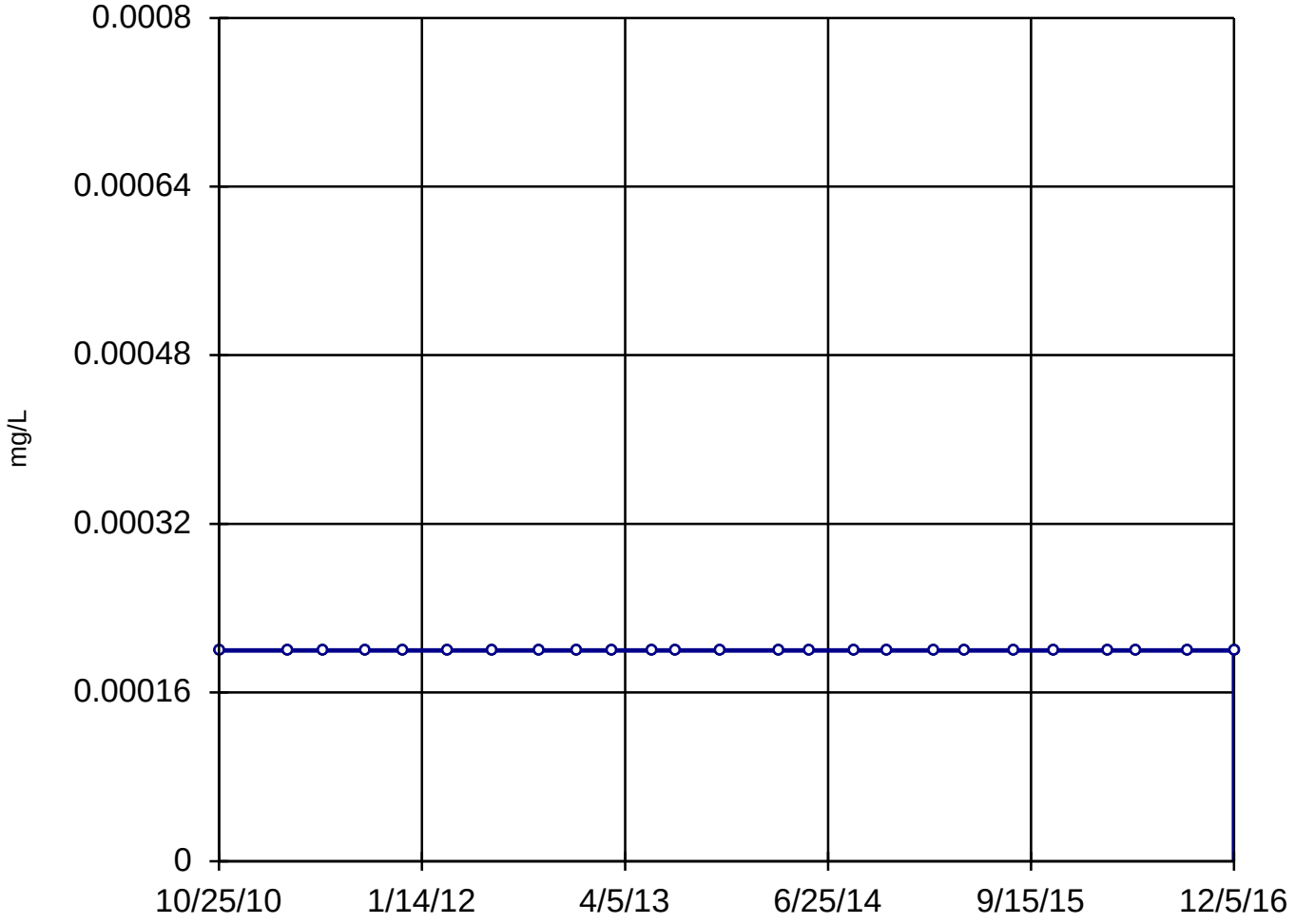
Constituent: Mercury, Dissolved Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 25

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 111

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

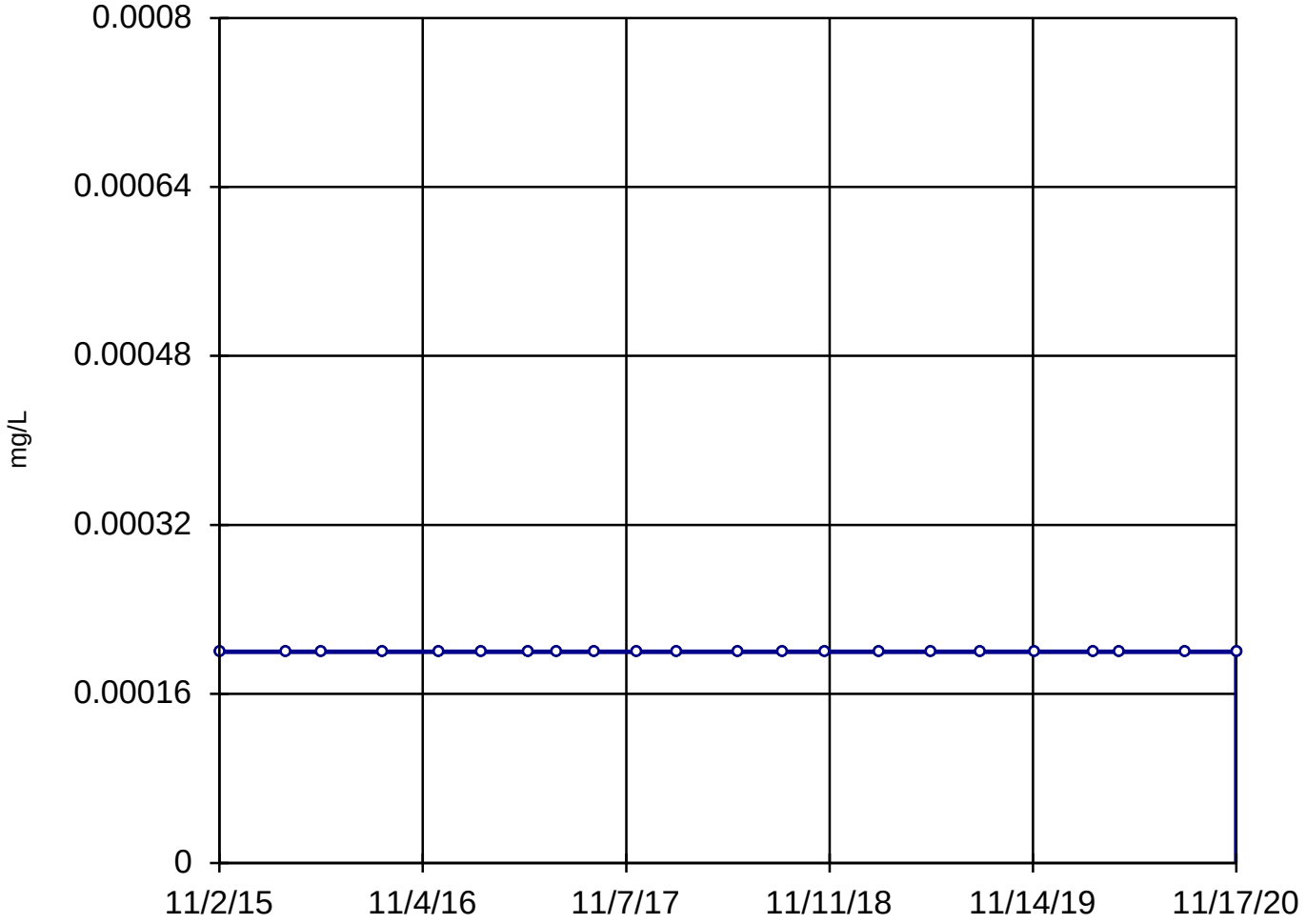
Constituent: Mercury, Dissolved Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-01



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 92

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

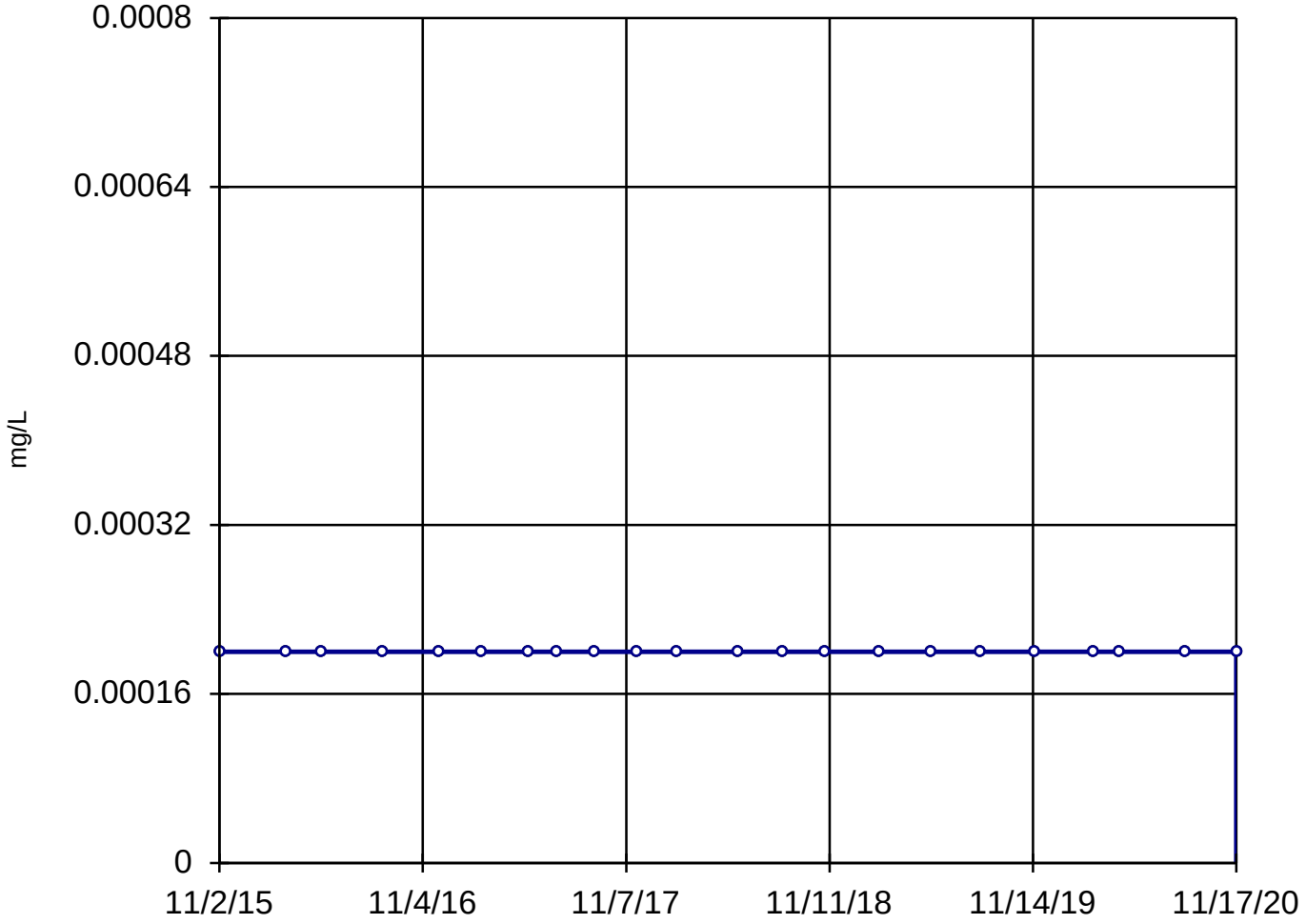
Constituent: Mercury, Total Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-02



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 92

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

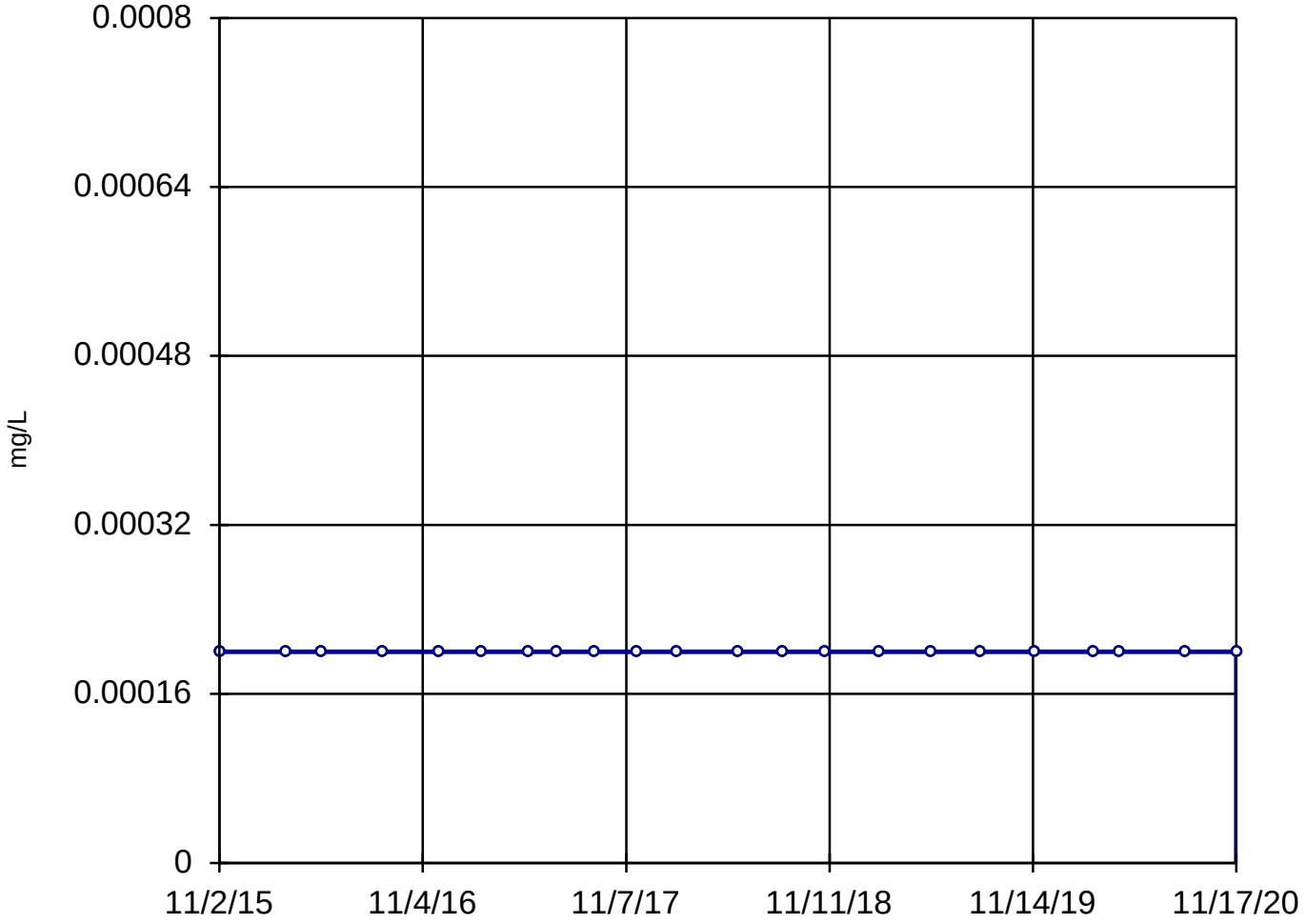
Constituent: Mercury, Total Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 92

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

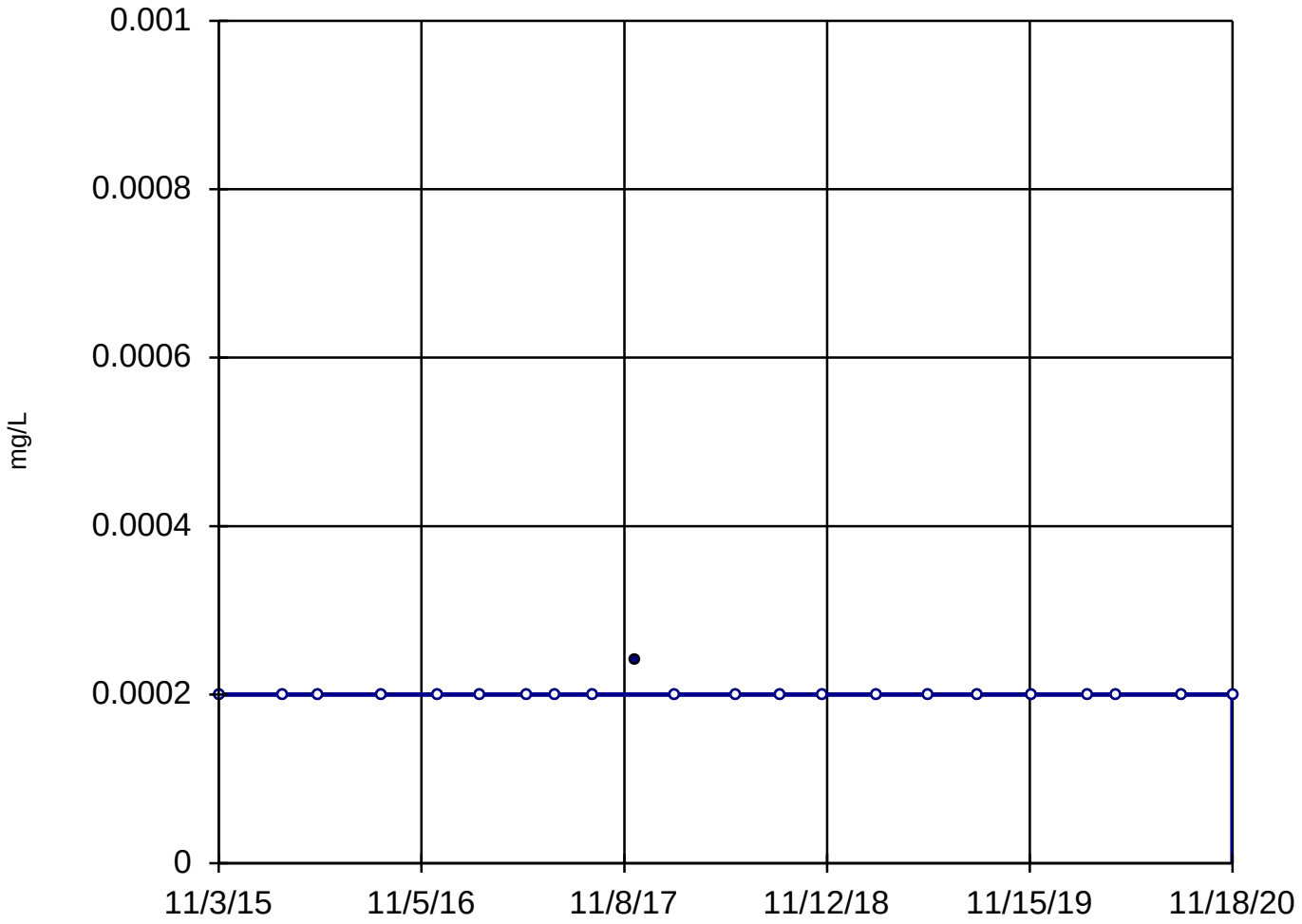
Constituent: Mercury, Total Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = -3
critical = -92

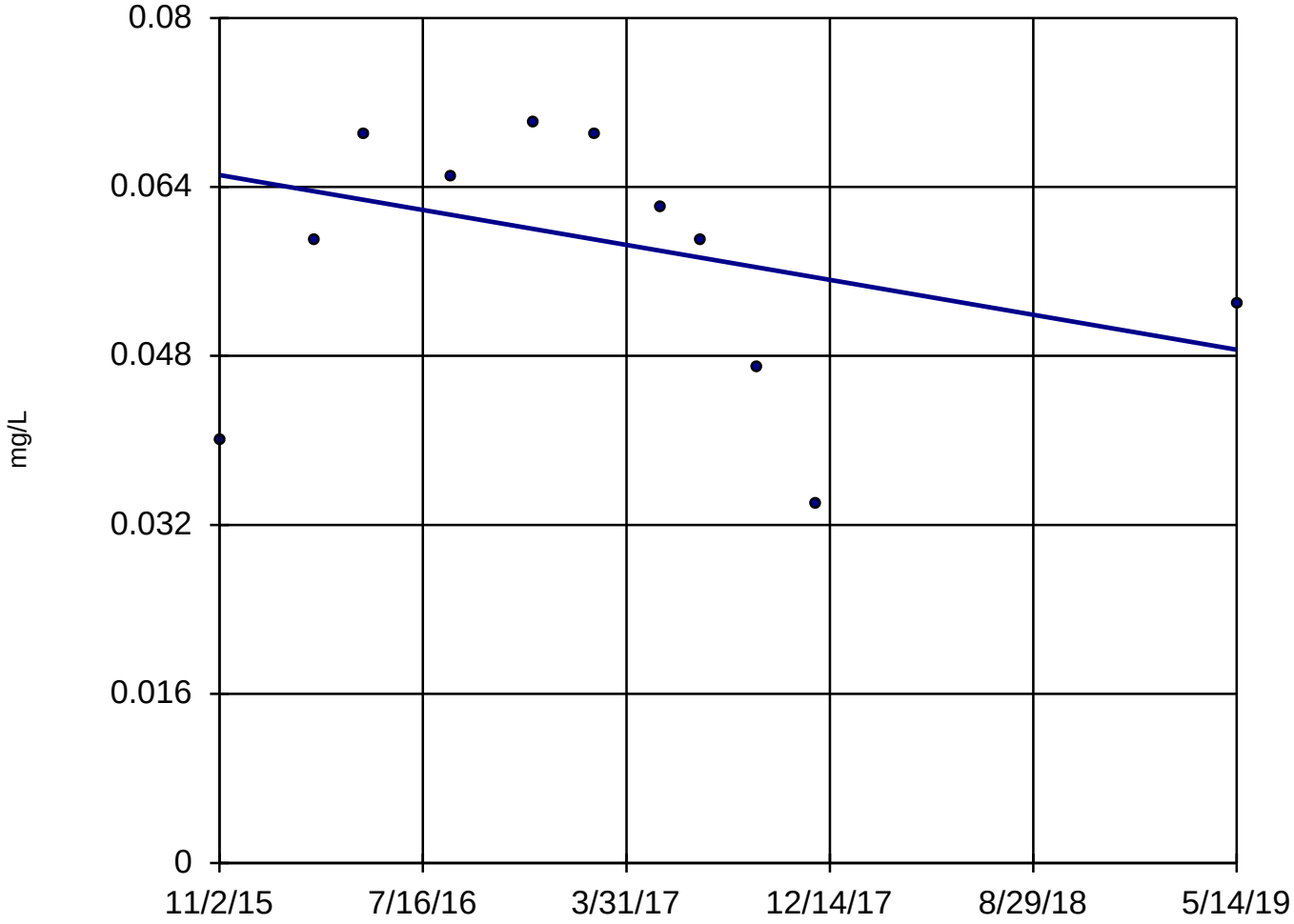
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Mercury, Total Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-01



n = 11

Slope = -0.004679 units per year.

Mann-Kendall statistic = -15
critical = -34

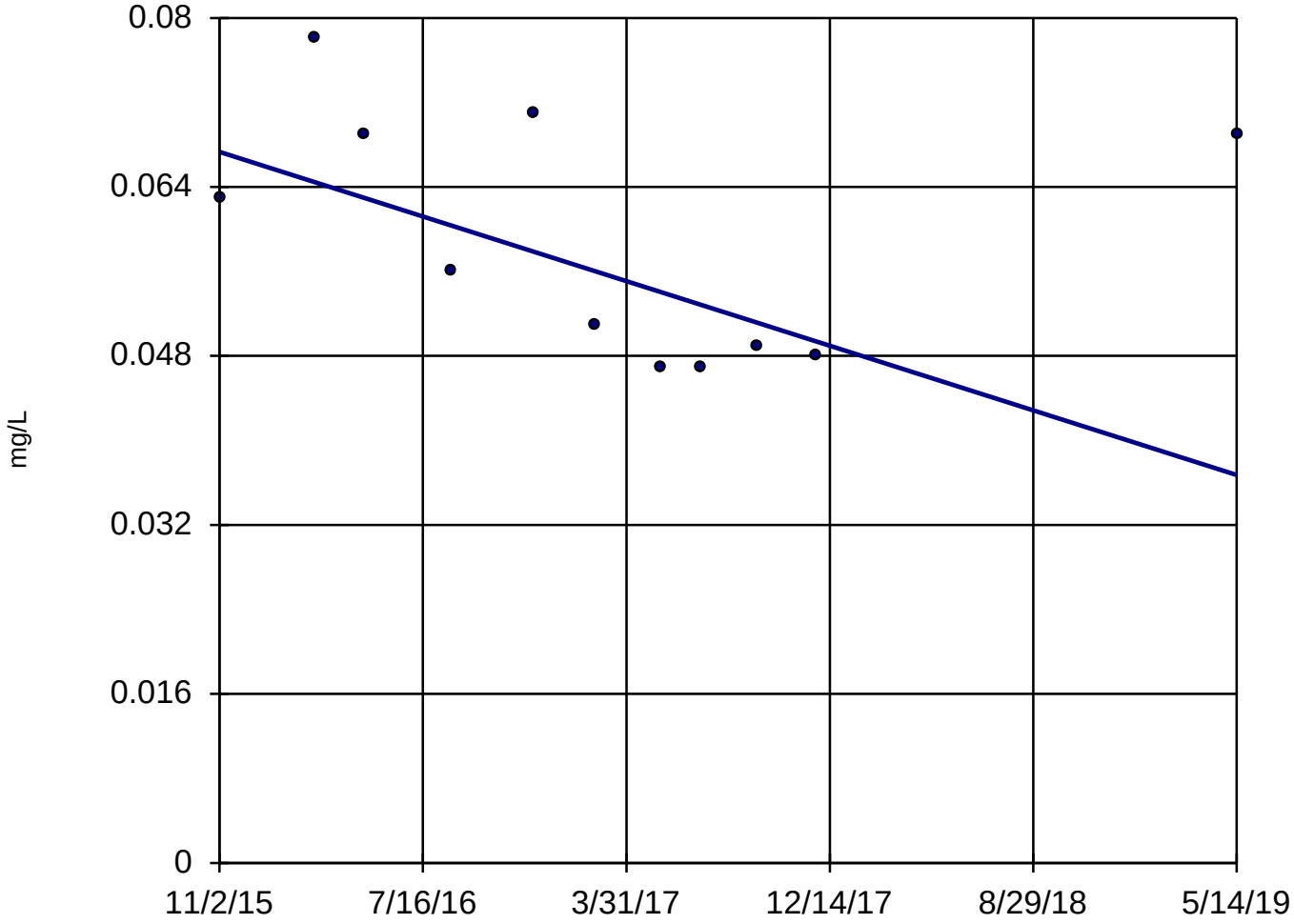
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Molybdenum, Total Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-02



n = 11

Slope = -0.008661 units per year.

Mann-Kendall statistic = -21
critical = -34

Trend not significant at 99% confidence level (α = 0.005 per tail).

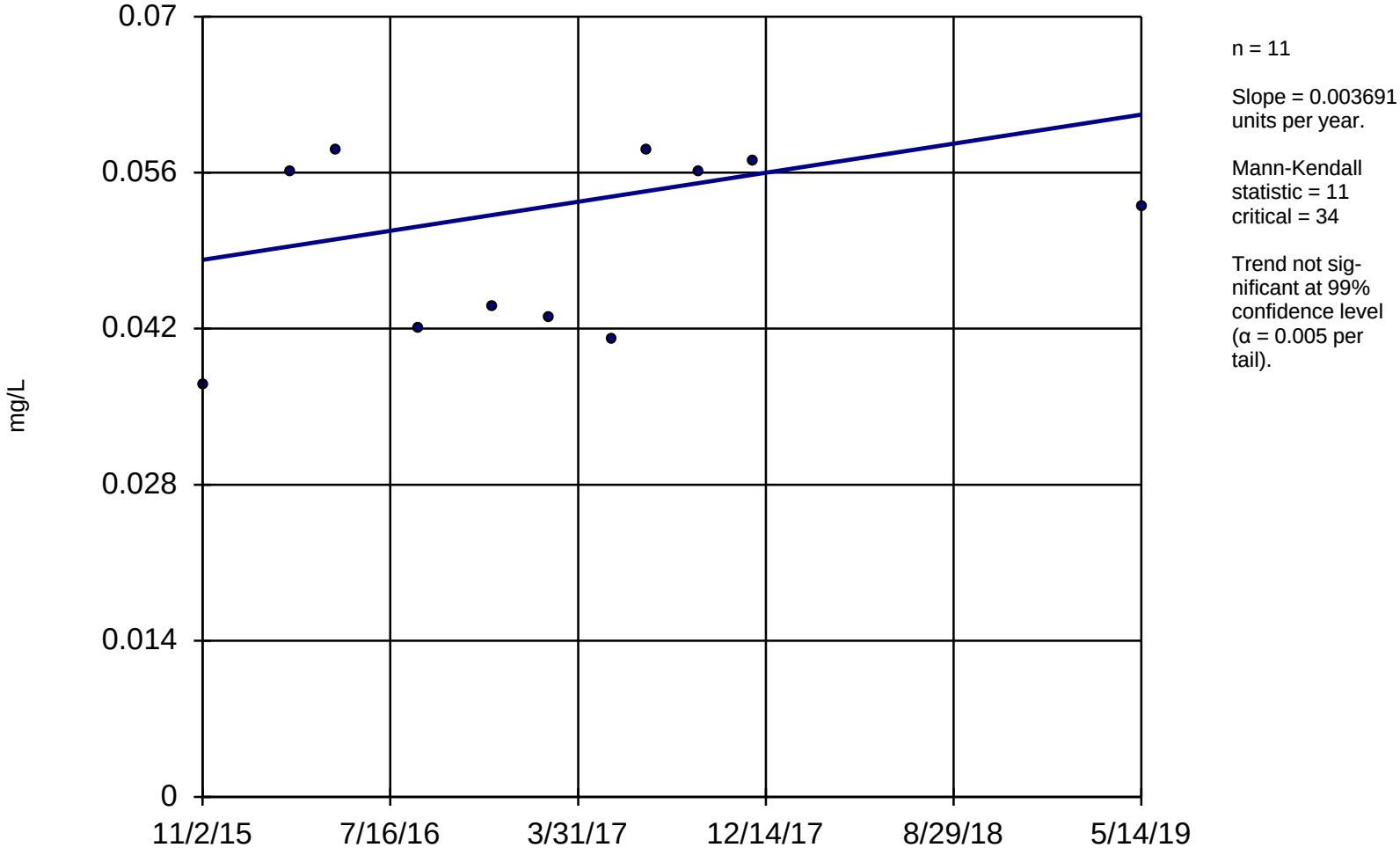
Constituent: Molybdenum, Total Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA

Sen's Slope Estimator

MW-03



n = 11

Slope = 0.003691 units per year.

Mann-Kendall statistic = 11
critical = 34

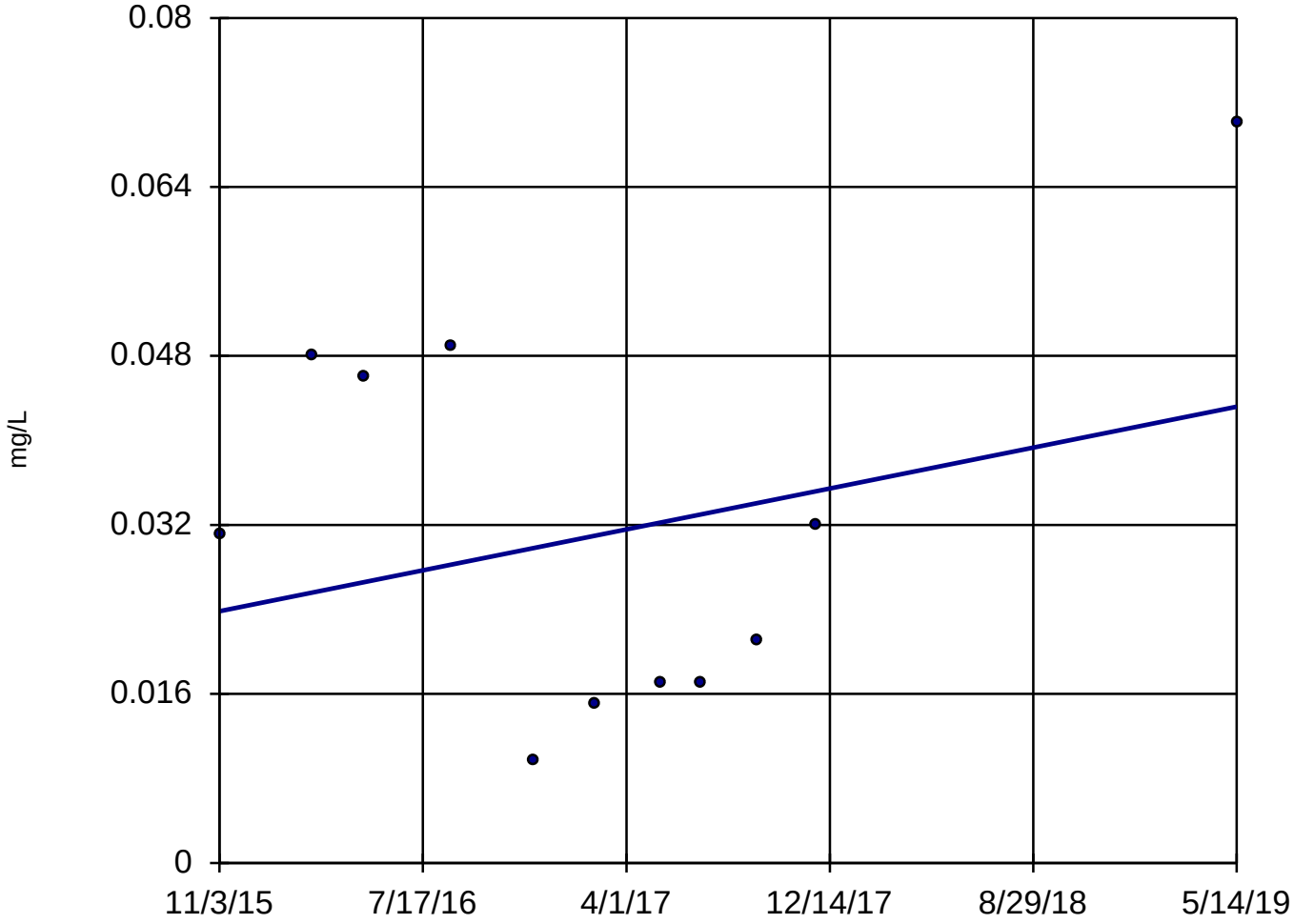
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Molybdenum, Total Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-04



n = 11

Slope = 0.005489 units per year.

Mann-Kendall statistic = 6
critical = 34

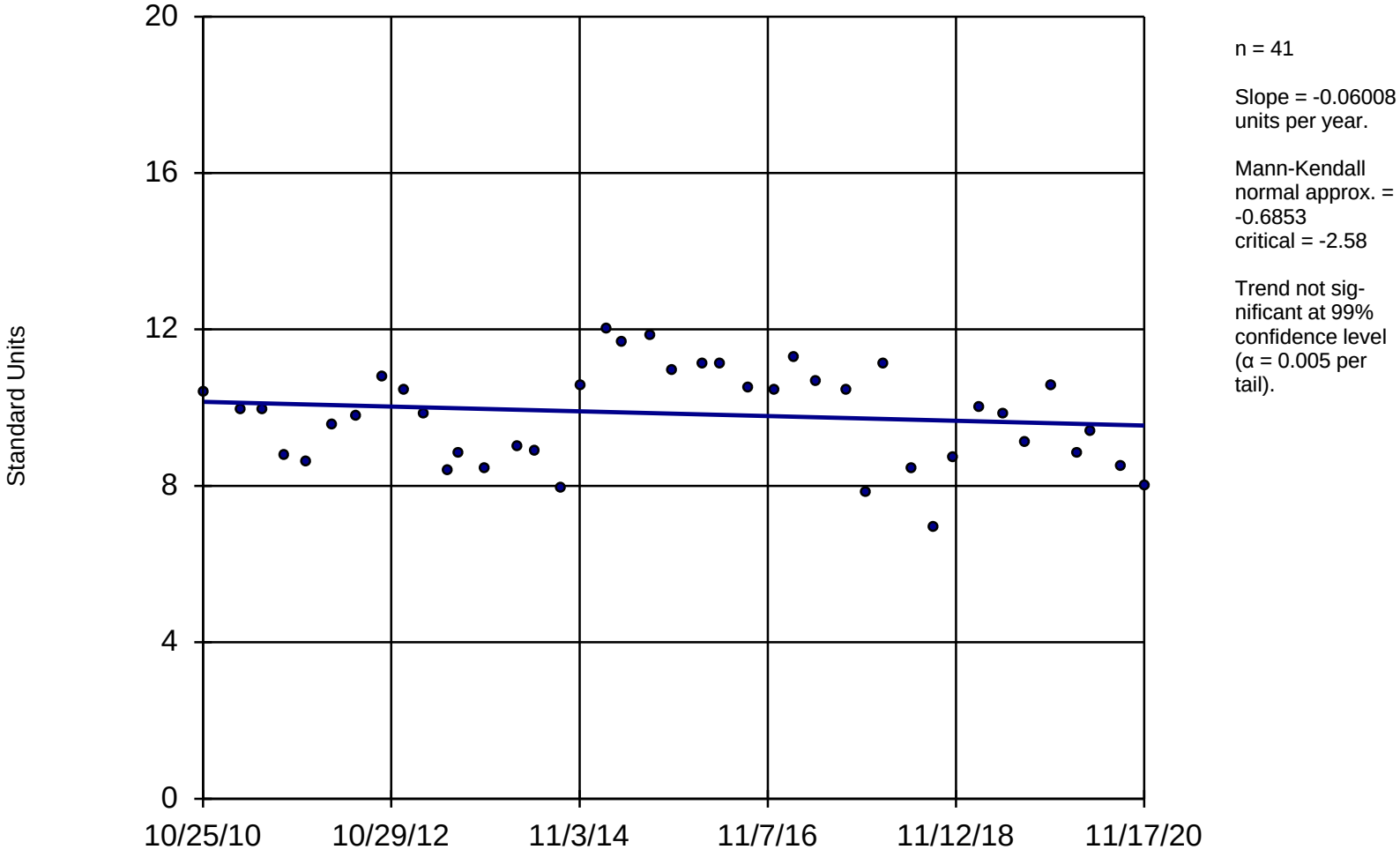
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Molybdenum, Total Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-01



n = 41

Slope = -0.06008 units per year.

Mann-Kendall normal approx. = -0.6853
critical = -2.58

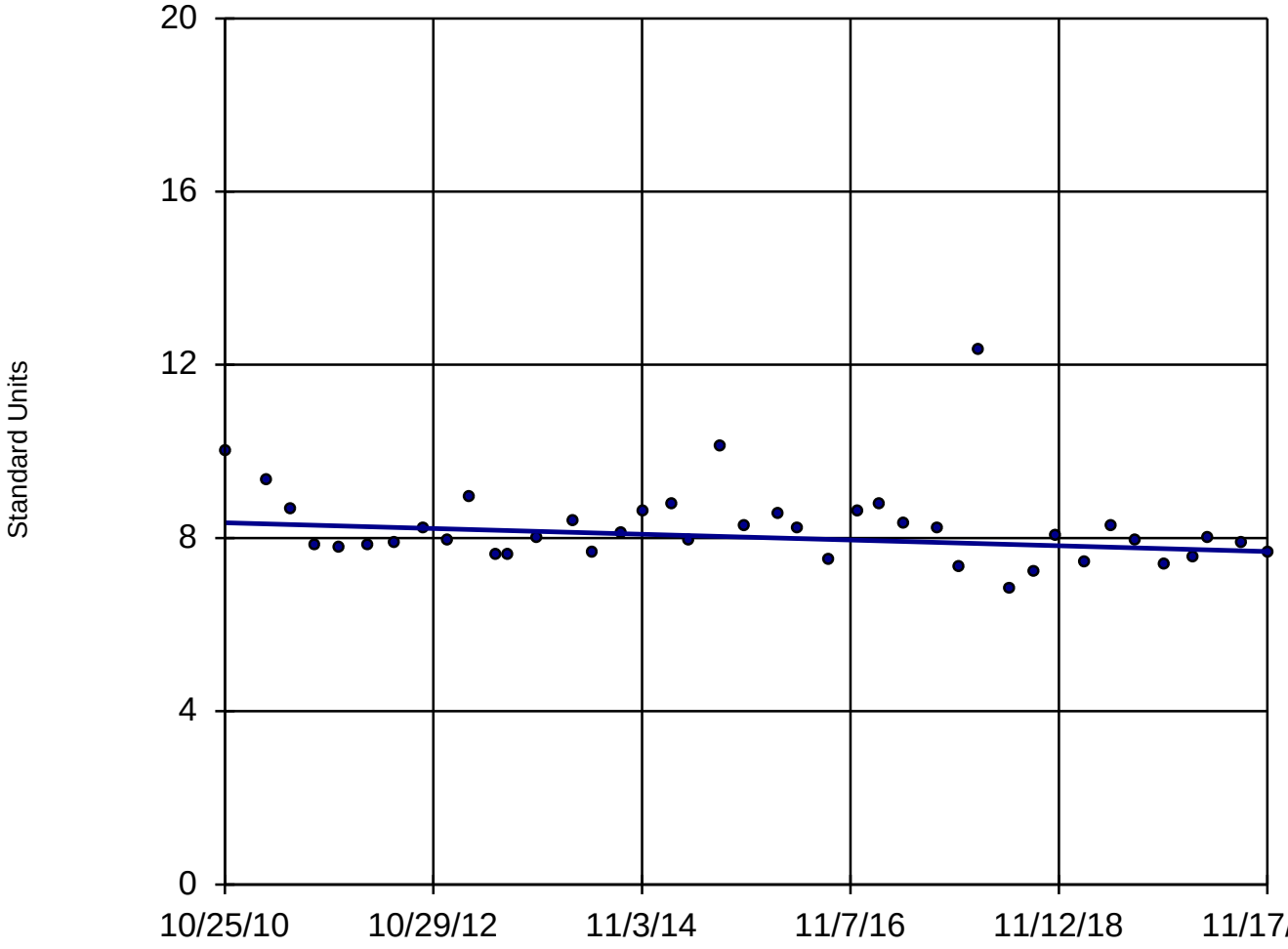
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: pH, Field Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-02



n = 41

Slope = -0.06572 units per year.

Mann-Kendall normal approx. = -1.696
critical = -2.58

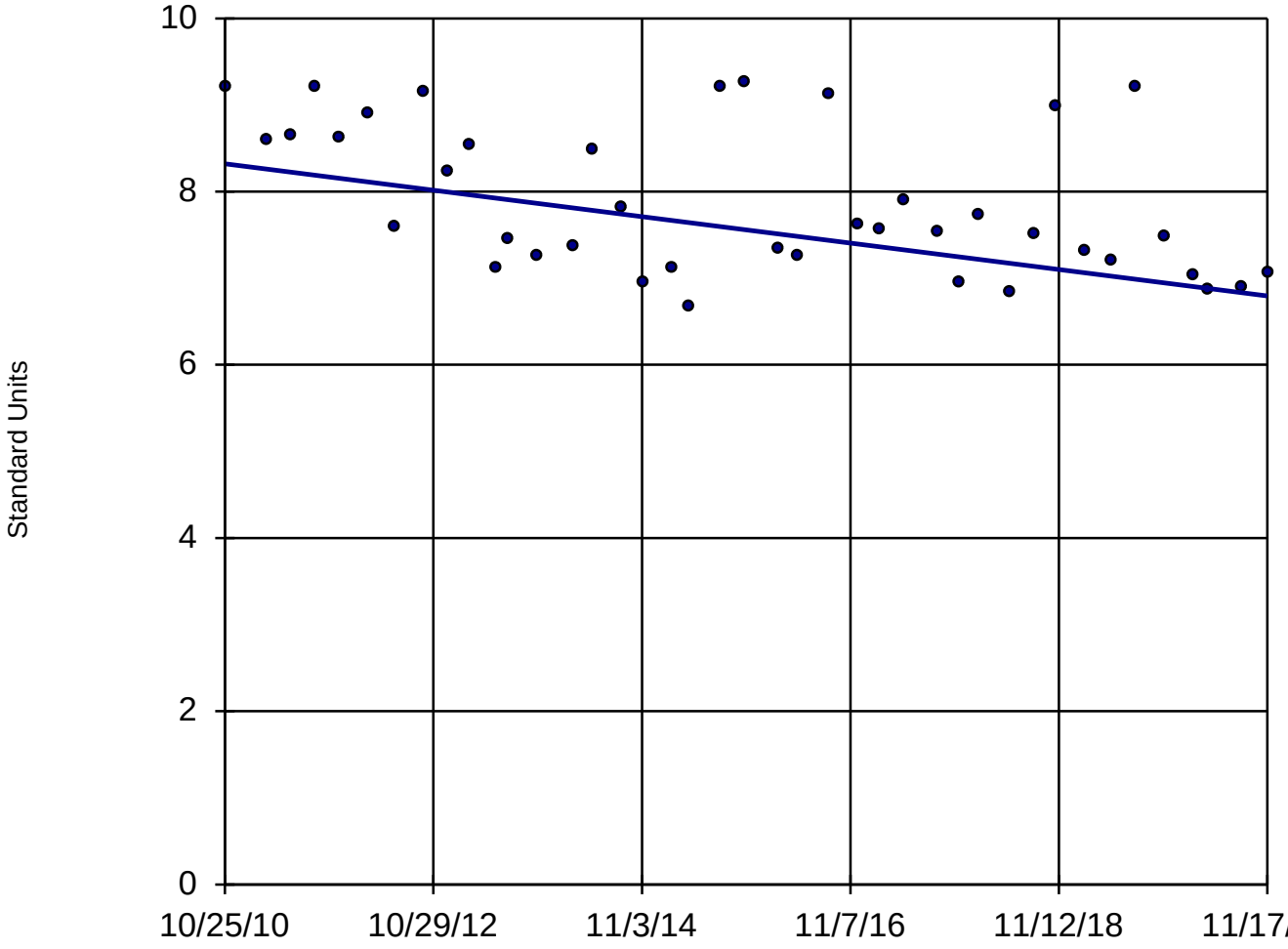
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: pH, Field Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-03



n = 41

Slope = -0.1512 units per year.

Mann-Kendall normal approx. = -3.168
critical = -2.58

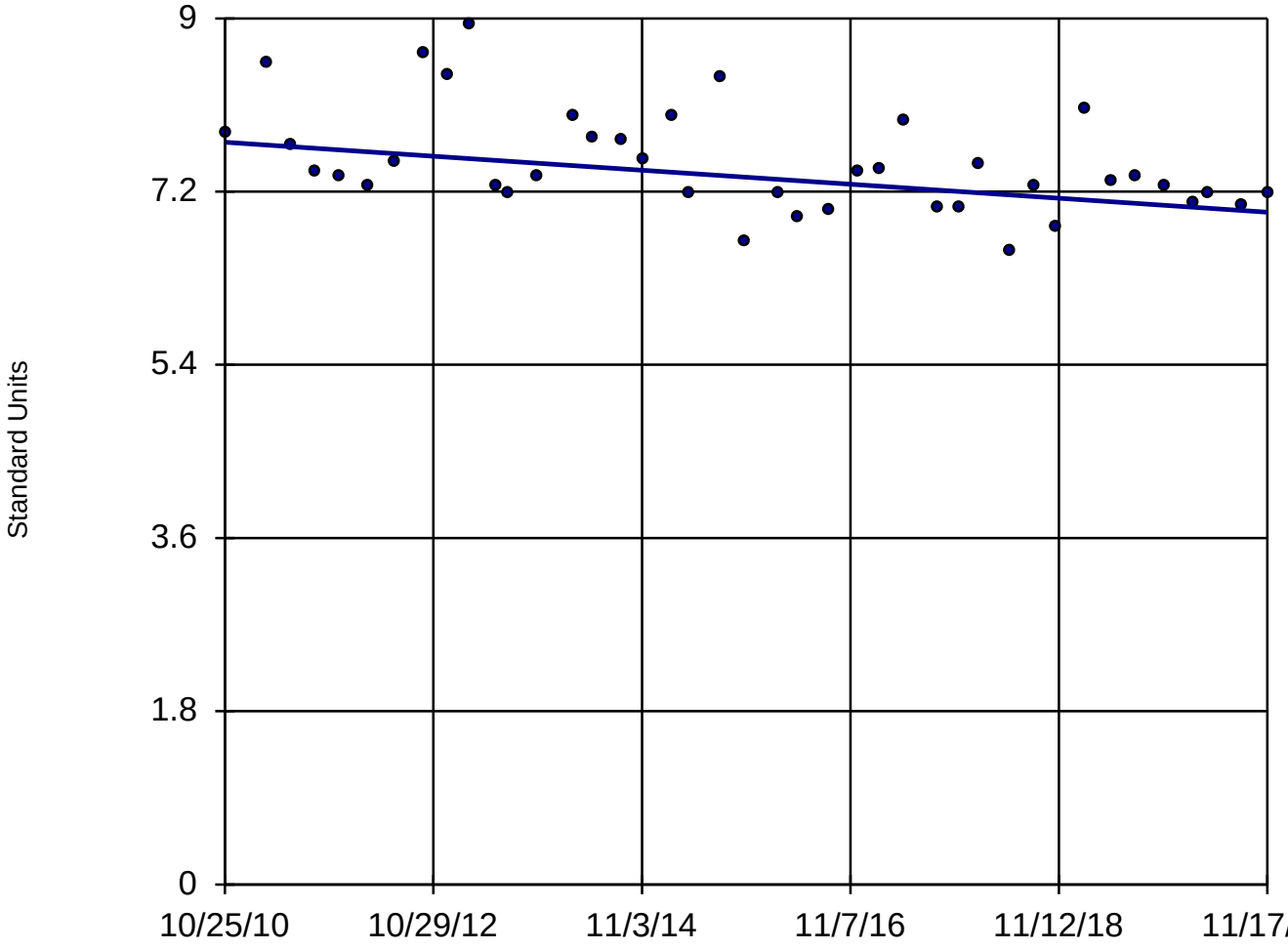
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: pH, Field Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-04



n = 41

Slope = -0.07213 units per year.

Mann-Kendall normal approx. = -3.091
critical = -2.58

Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: pH, Field Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

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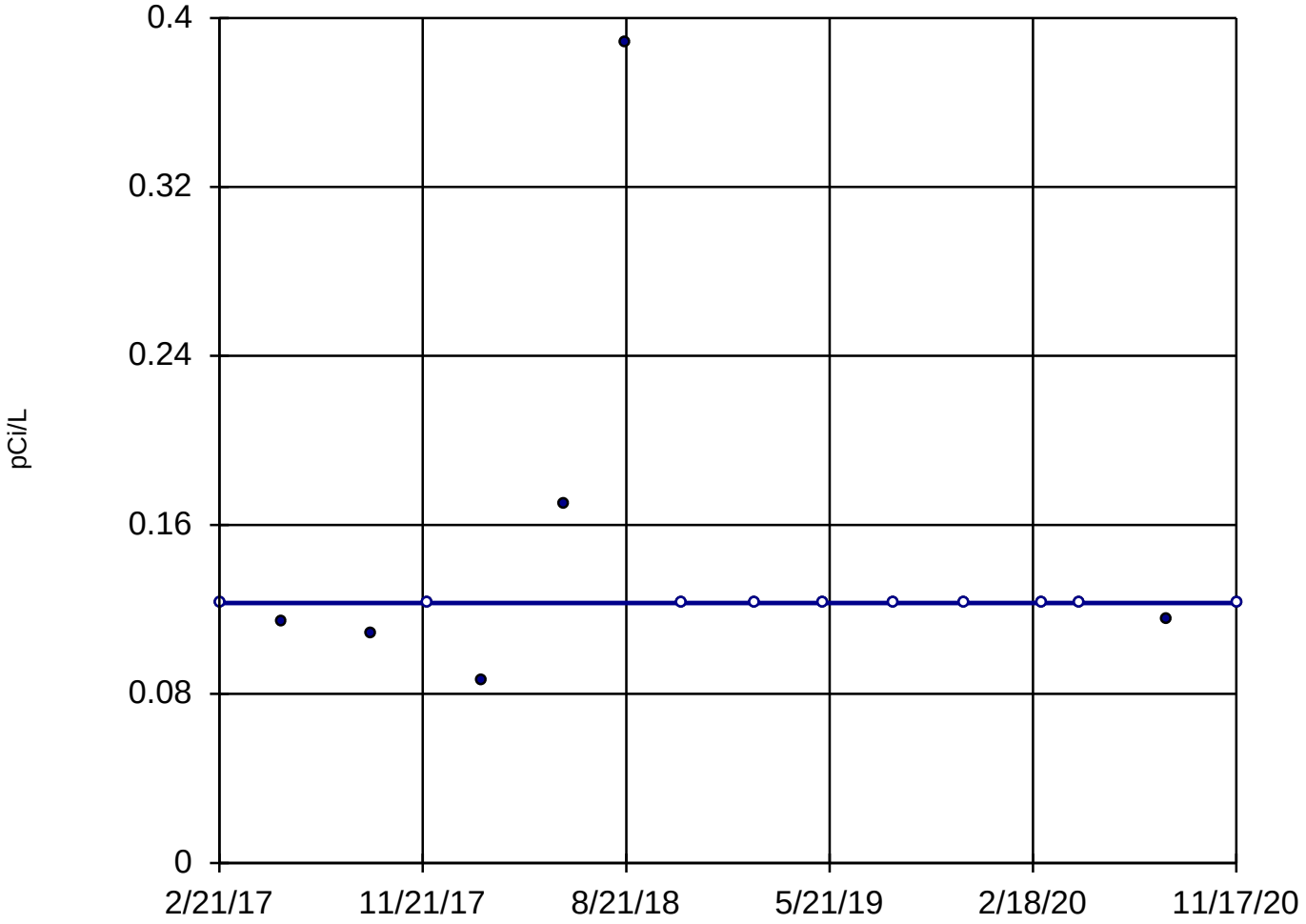
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-01



n = 16

Slope = 0
units per year.

Mann-Kendall
statistic = 7
critical = 58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

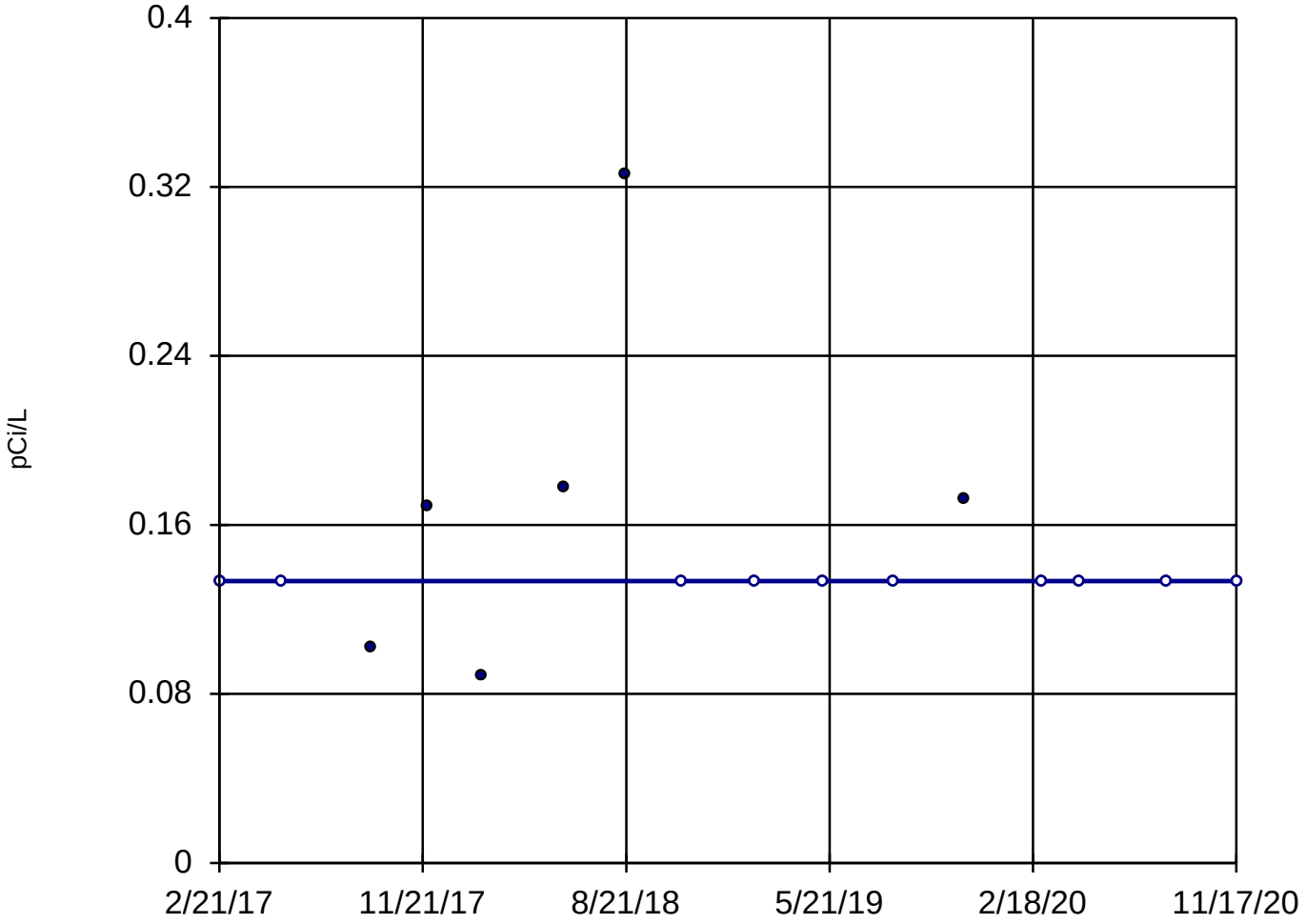
Constituent: Radium-226 Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-02



n = 16

Slope = 0
units per year.

Mann-Kendall
statistic = 3
critical = 58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

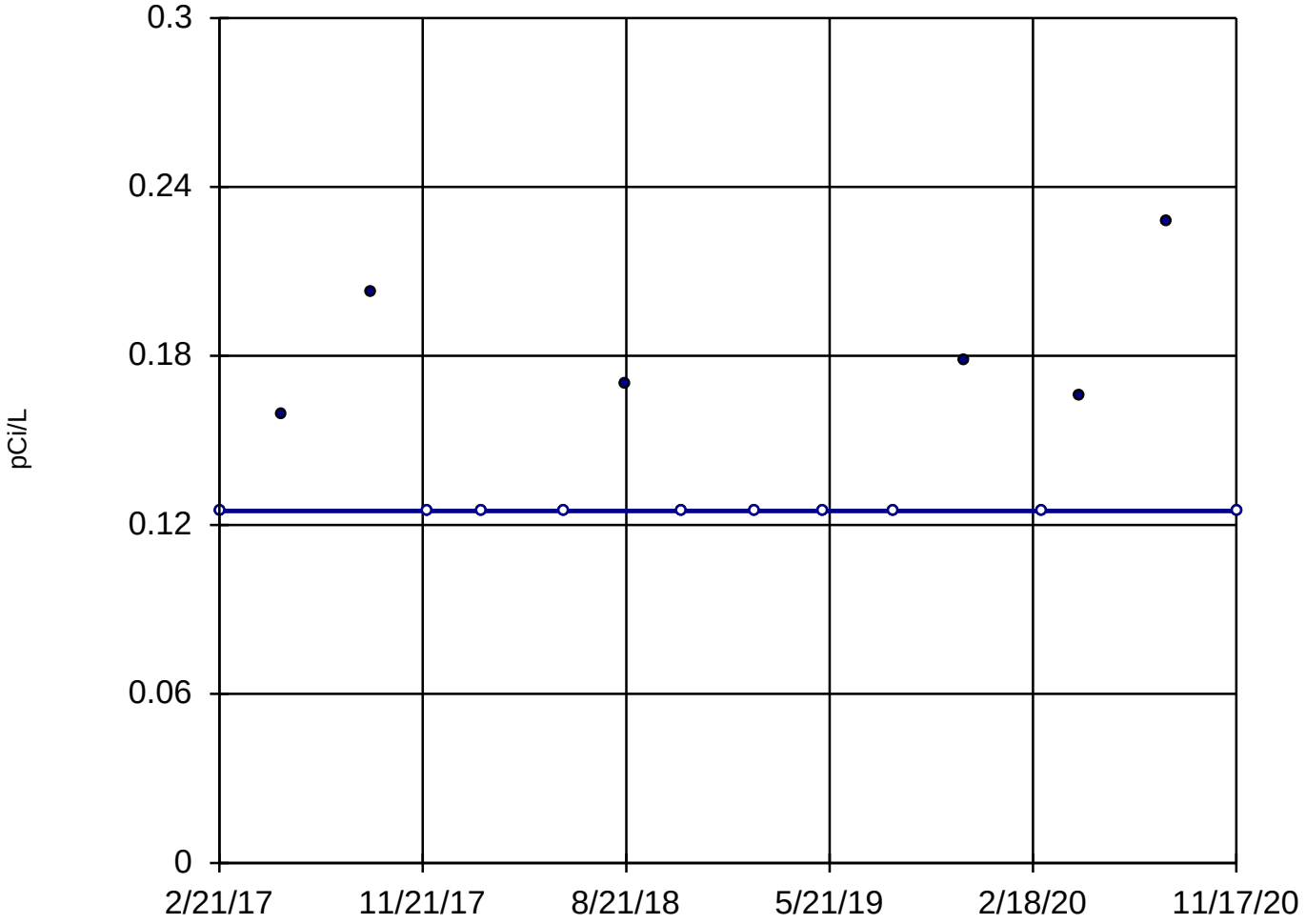
Constituent: Radium-226 Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 16

Slope = 0
units per year.

Mann-Kendall
statistic = 9
critical = 58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

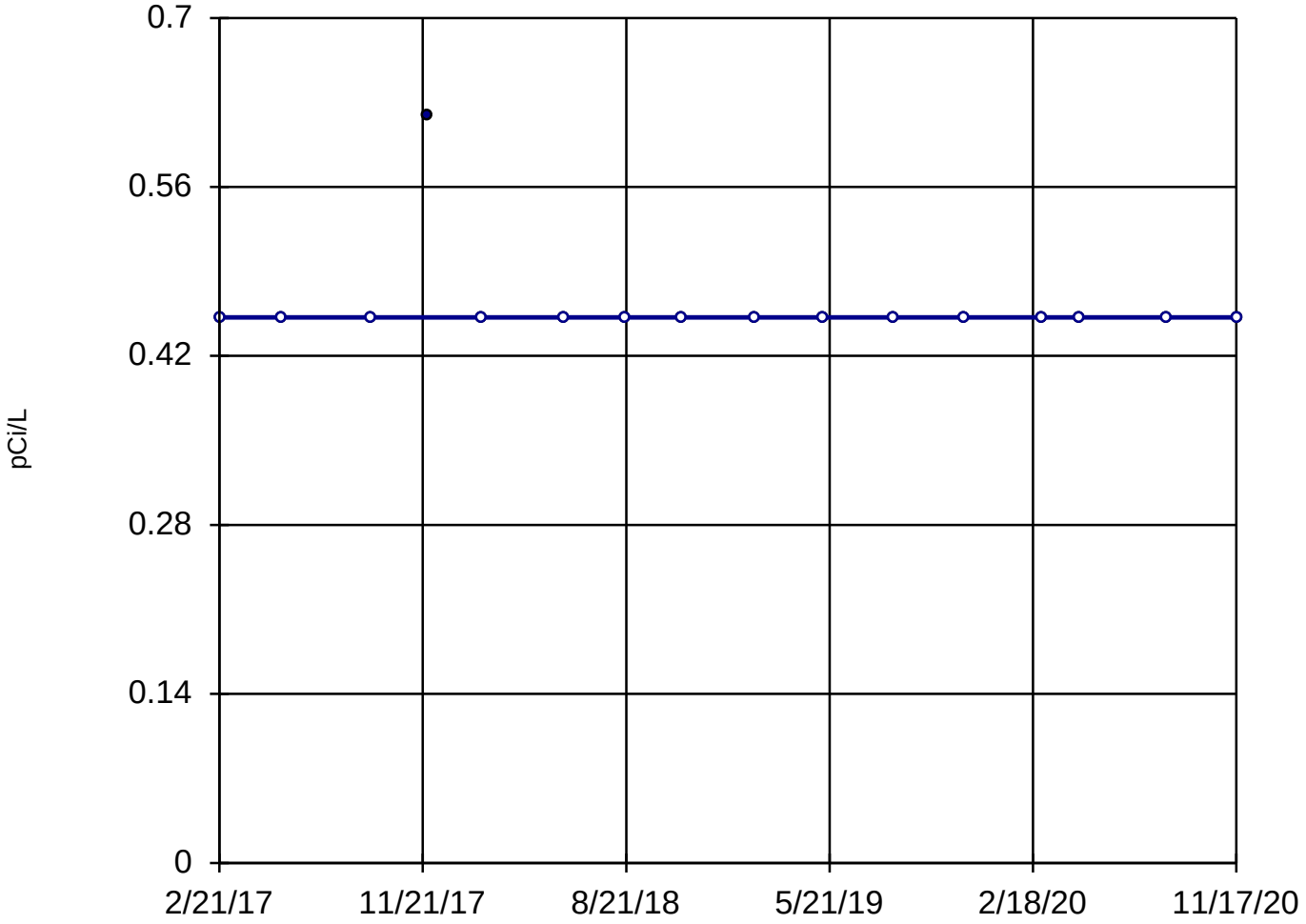
Constituent: Radium-226 Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-01



n = 16

Slope = 0
units per year.

Mann-Kendall
statistic = -9
critical = -58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

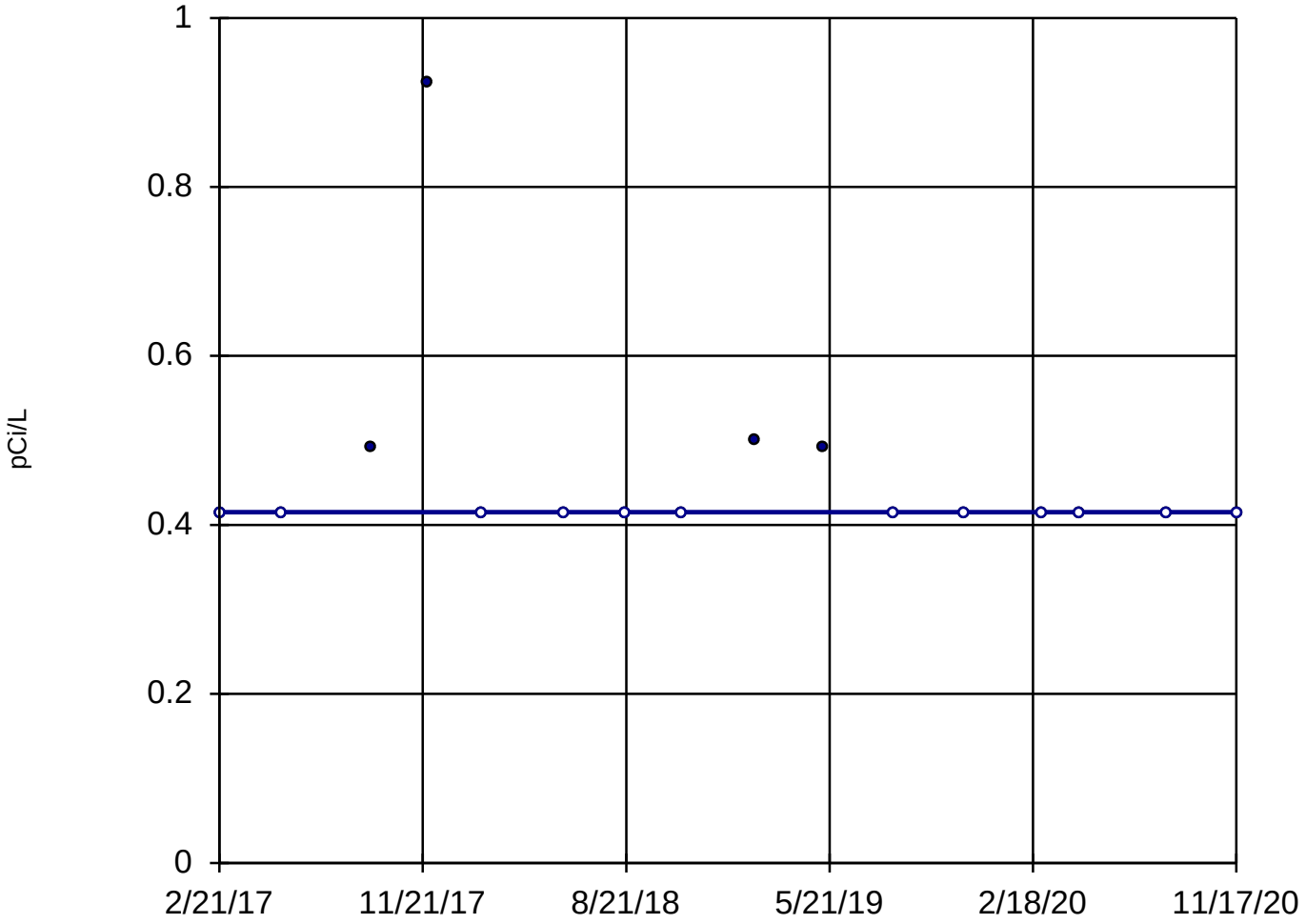
Constituent: Radium-228 Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-02



n = 16

Slope = 0
units per year.

Mann-Kendall
statistic = -16
critical = -58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

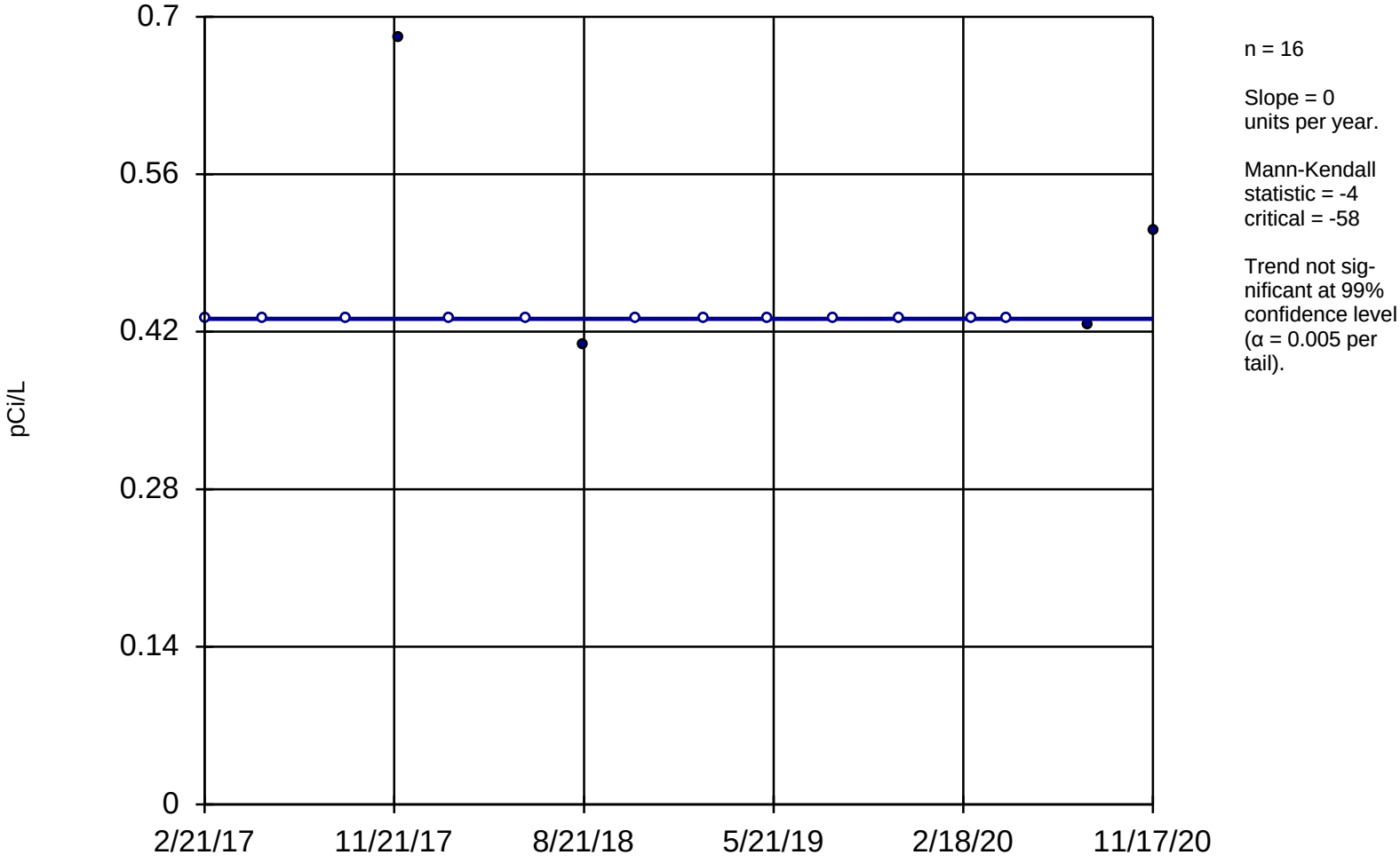
Constituent: Radium-228 Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 16

Slope = 0
units per year.

Mann-Kendall
statistic = -4
critical = -58

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

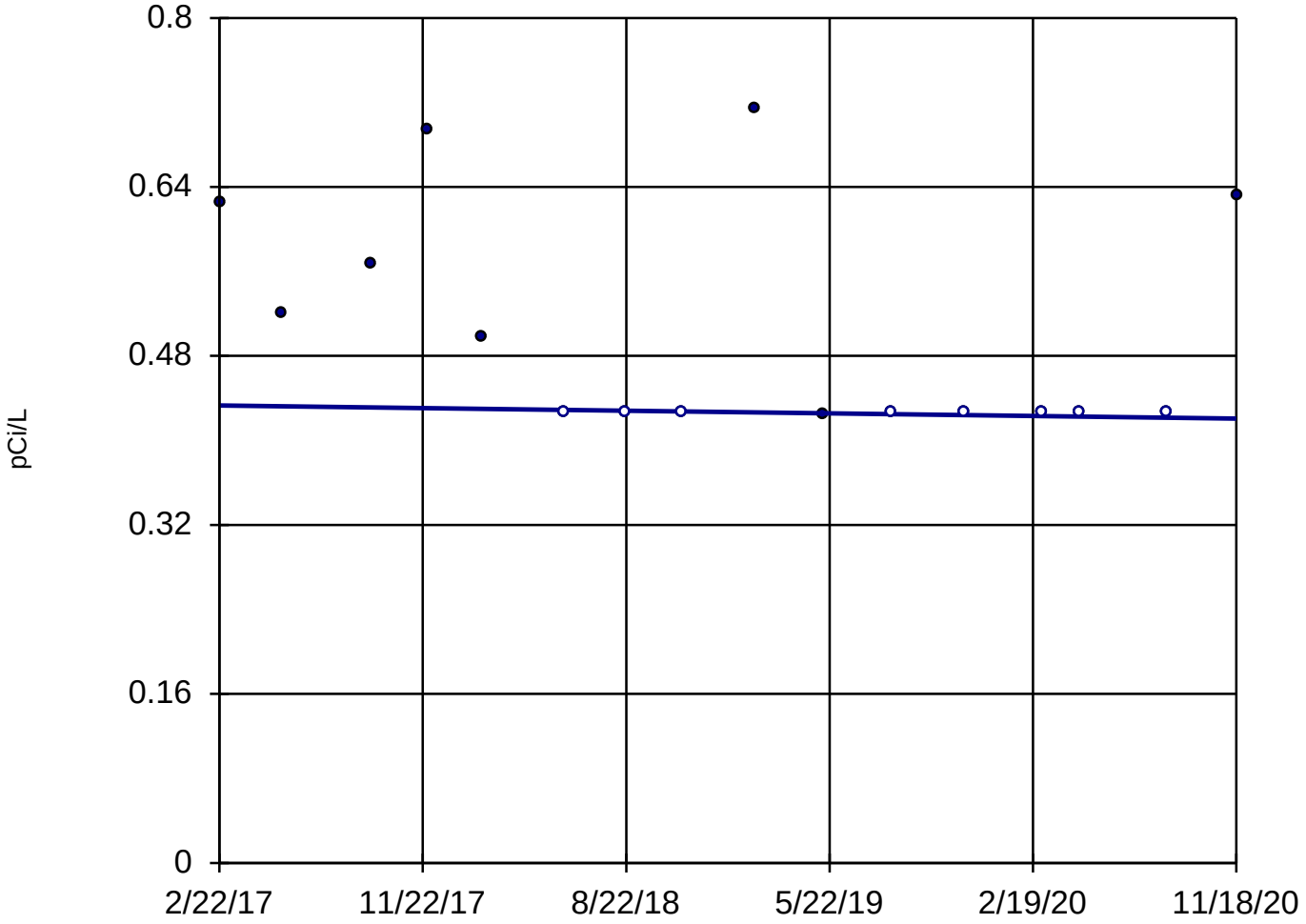
Constituent: Radium-228 Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 16

Slope = -0.003298 units per year.

Mann-Kendall statistic = -32
critical = -58

Trend not significant at 99% confidence level (α = 0.005 per tail).

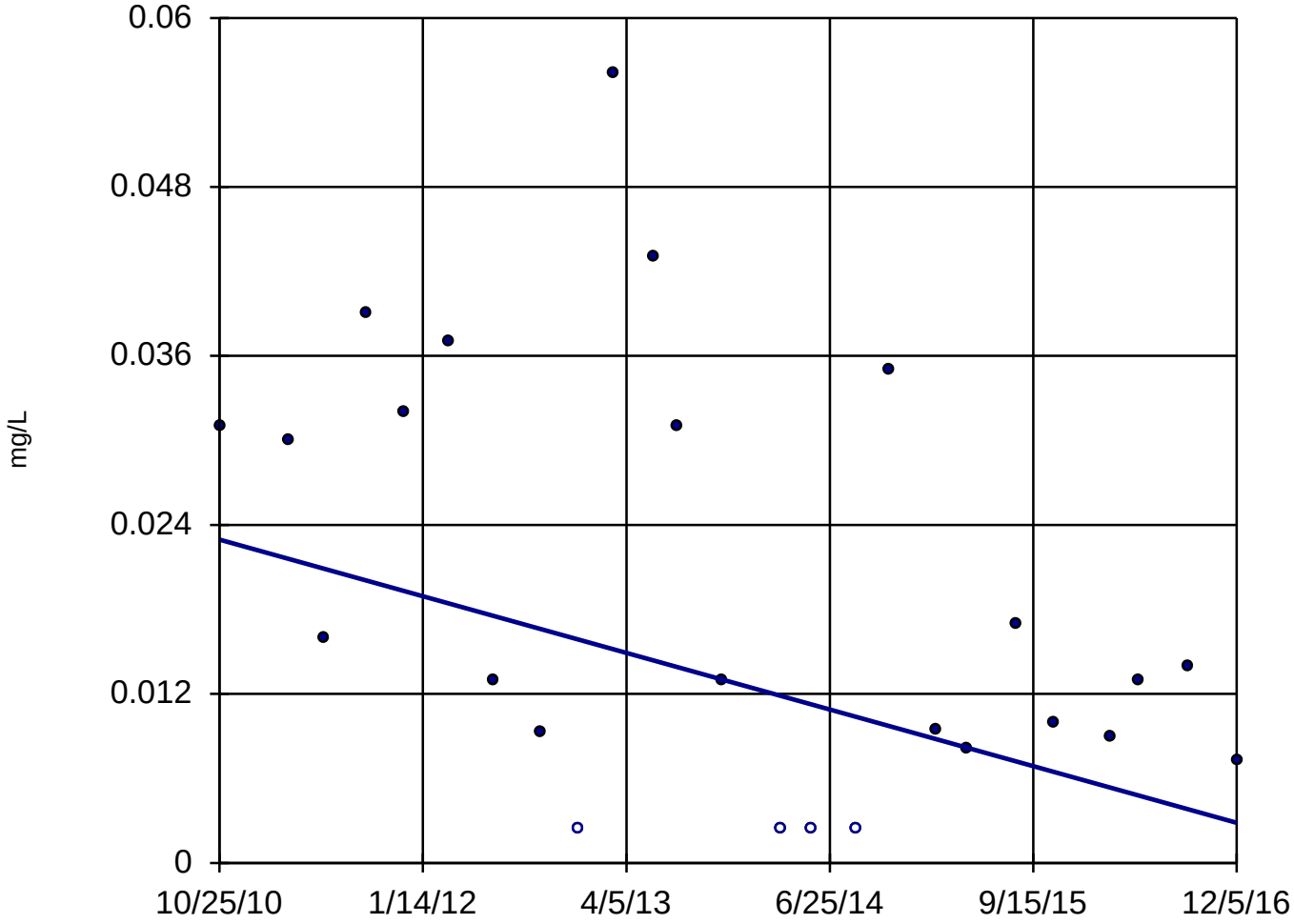
Constituent: Radium-228 Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-01



n = 25

Slope = -0.003289 units per year.

Mann-Kendall statistic = -84
critical = -111

Trend not significant at 99% confidence level (α = 0.005 per tail).

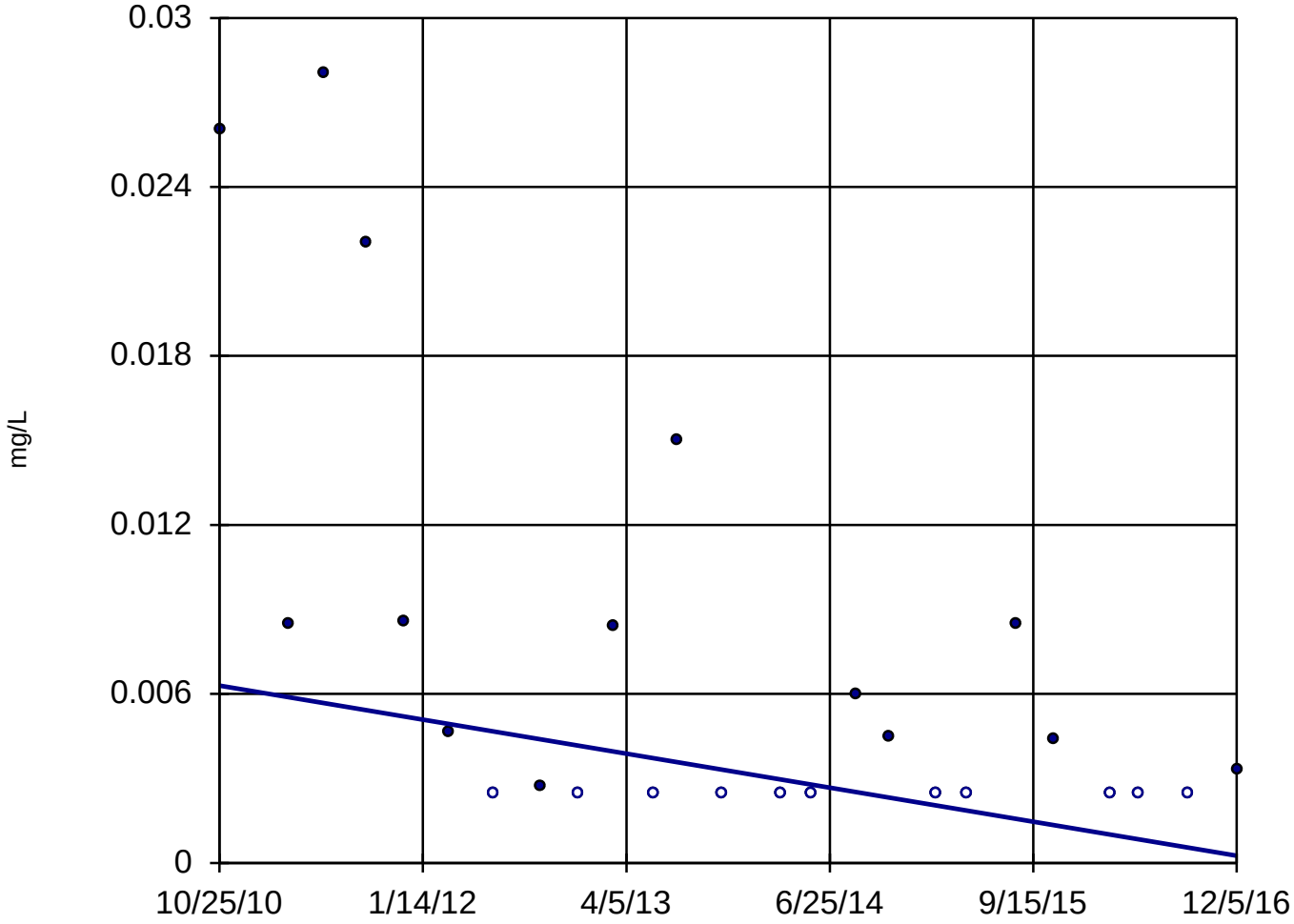
Constituent: Selenium, Dissolved Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-02



n = 25

Slope = -0.000987 units per year.

Mann-Kendall statistic = -112
critical = -111

Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

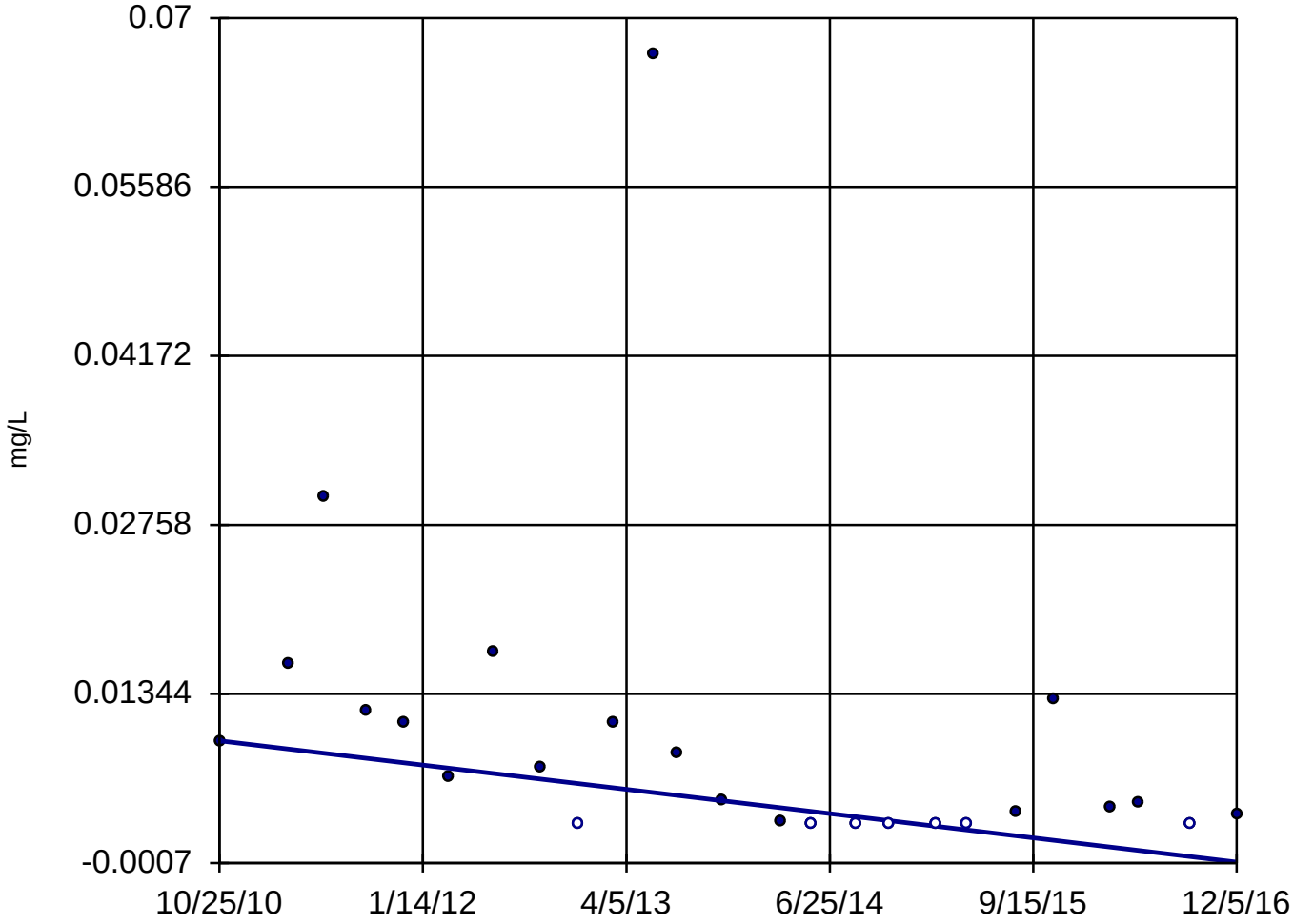
Constituent: Selenium, Dissolved Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 25

Slope = -0.001661 units per year.

Mann-Kendall statistic = -122
critical = -111

Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

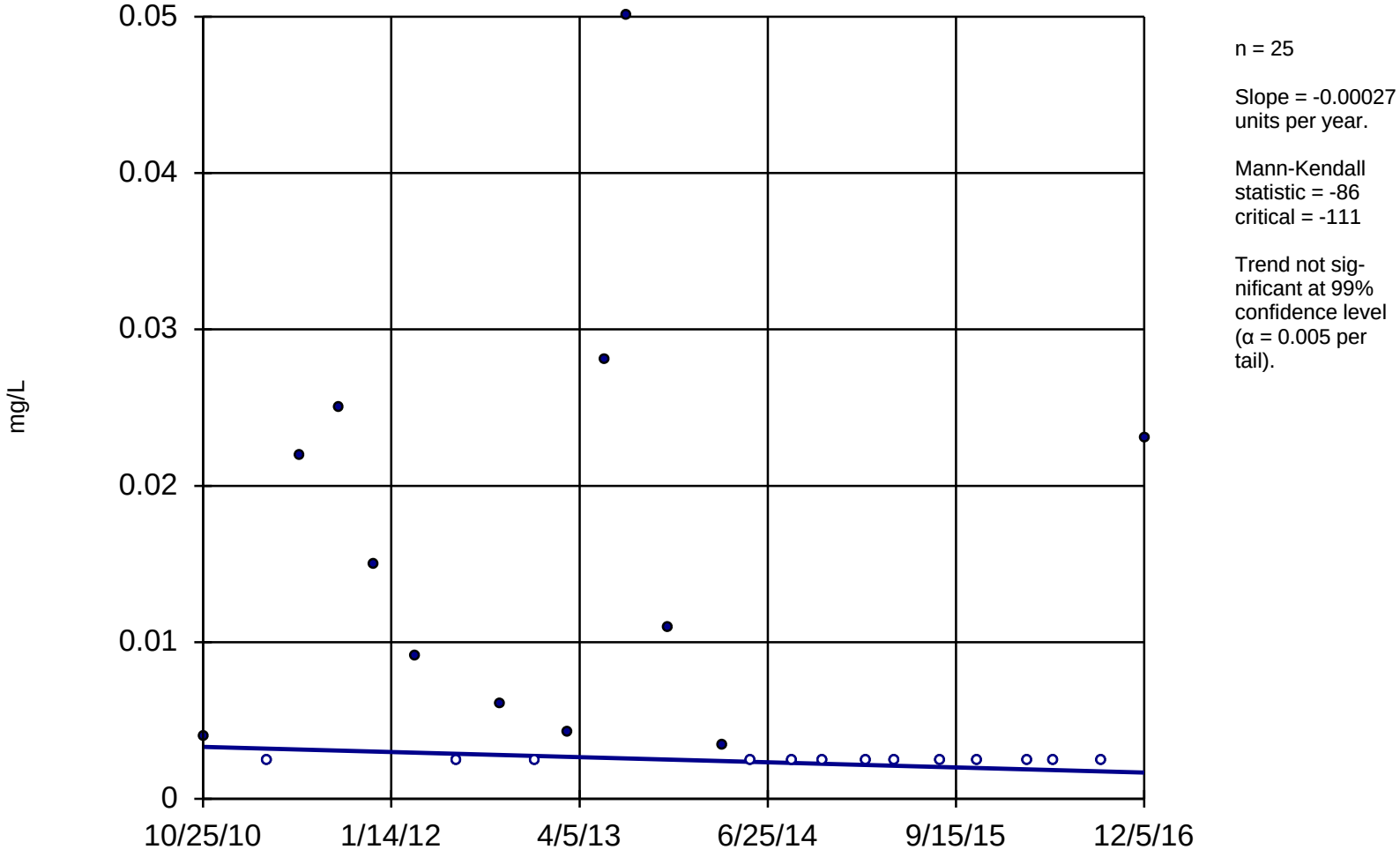
Constituent: Selenium, Dissolved Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 25

Slope = -0.00027 units per year.

Mann-Kendall statistic = -86
critical = -111

Trend not significant at 99% confidence level (α = 0.005 per tail).

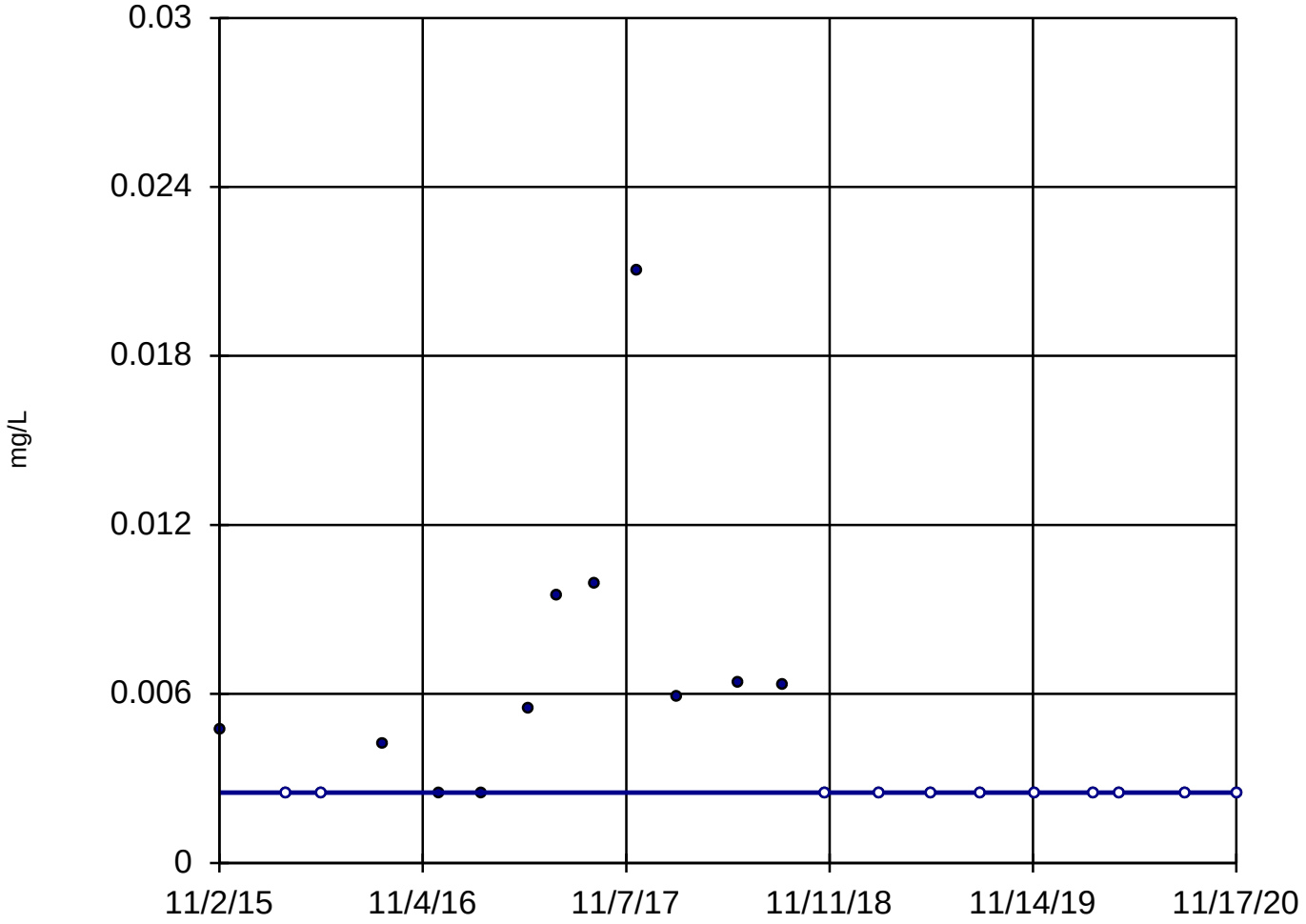
Constituent: Selenium, Dissolved Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-01



n = 22

Slope = -1.4e-11 units per year.

Mann-Kendall statistic = -43
critical = -92

Trend not significant at 99% confidence level (α = 0.005 per tail).

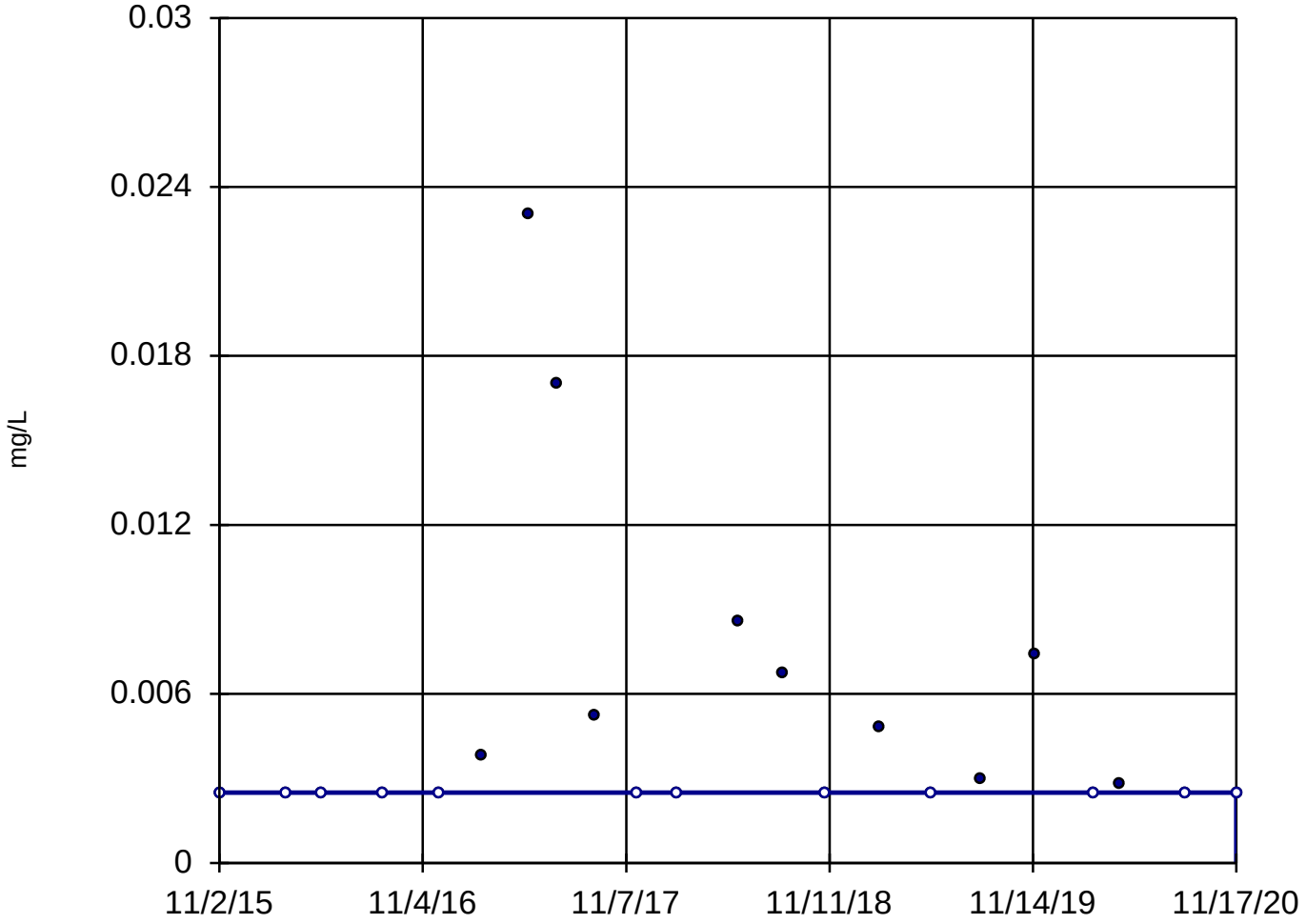
Constituent: Selenium, Total Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-02



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = 1
critical = 92

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

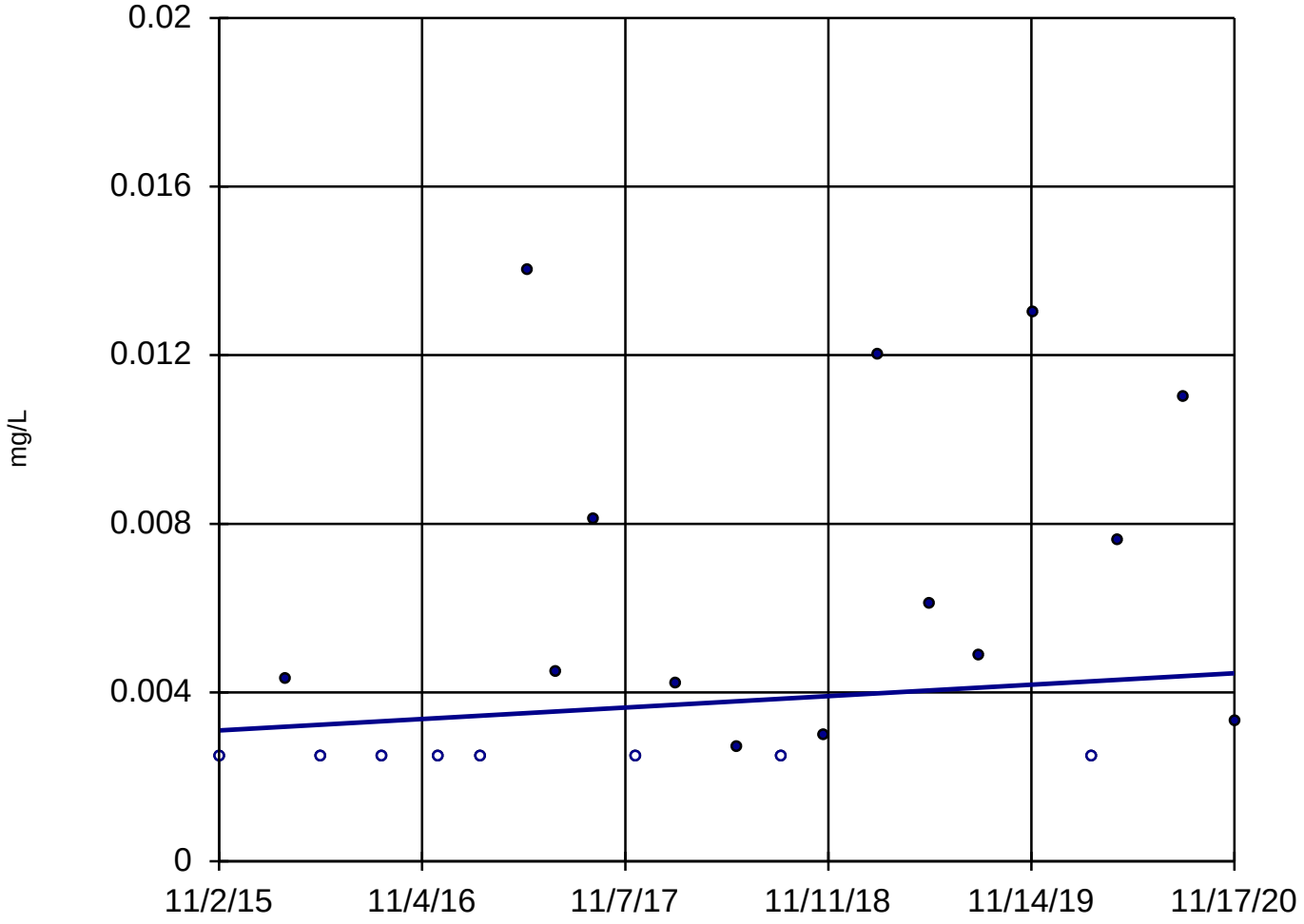
Constituent: Selenium, Total Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 22

Slope = 0.0002691 units per year.

Mann-Kendall statistic = 67
critical = 92

Trend not significant at 99% confidence level (α = 0.005 per tail).

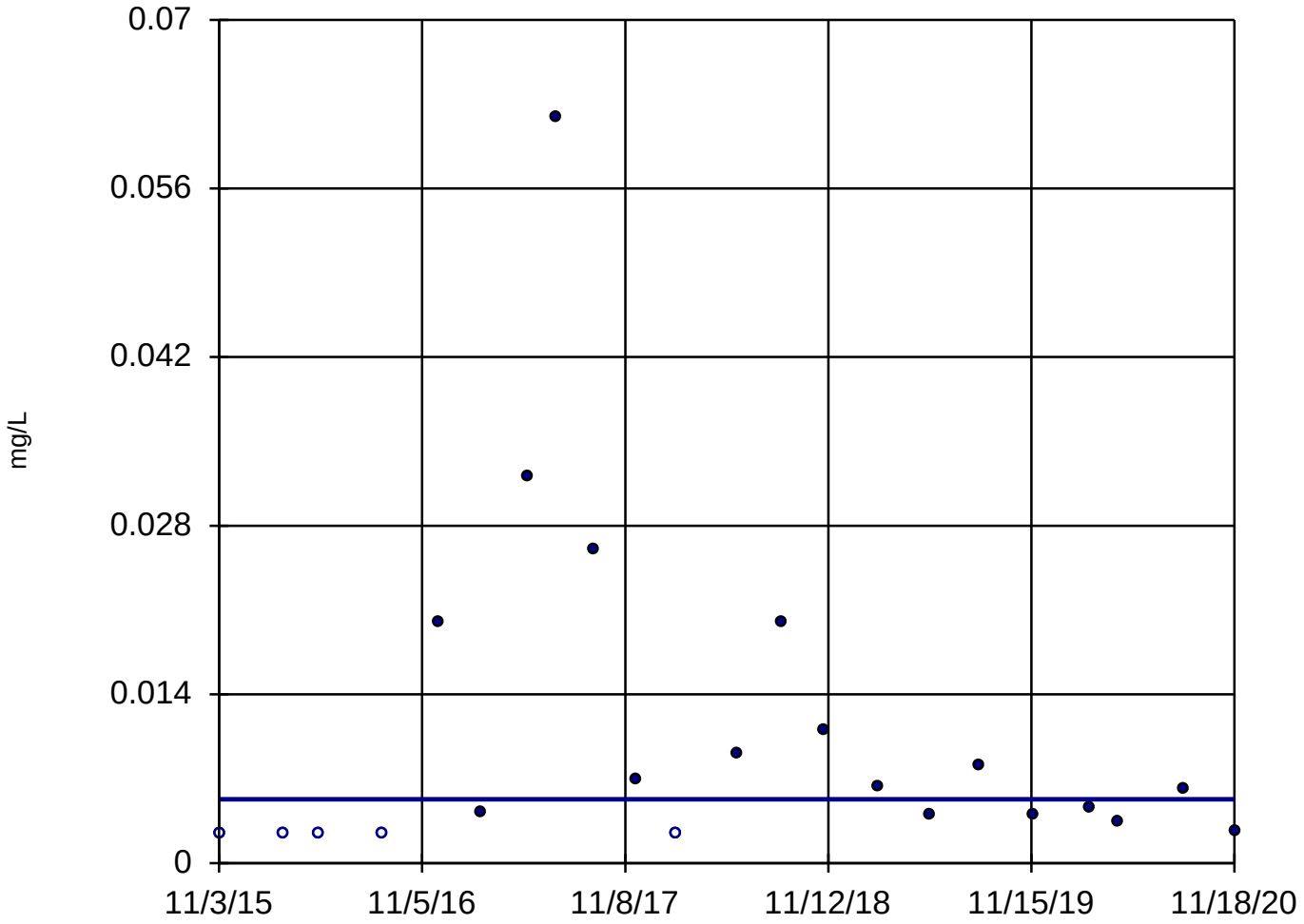
Constituent: Selenium, Total Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = -3
critical = -92

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

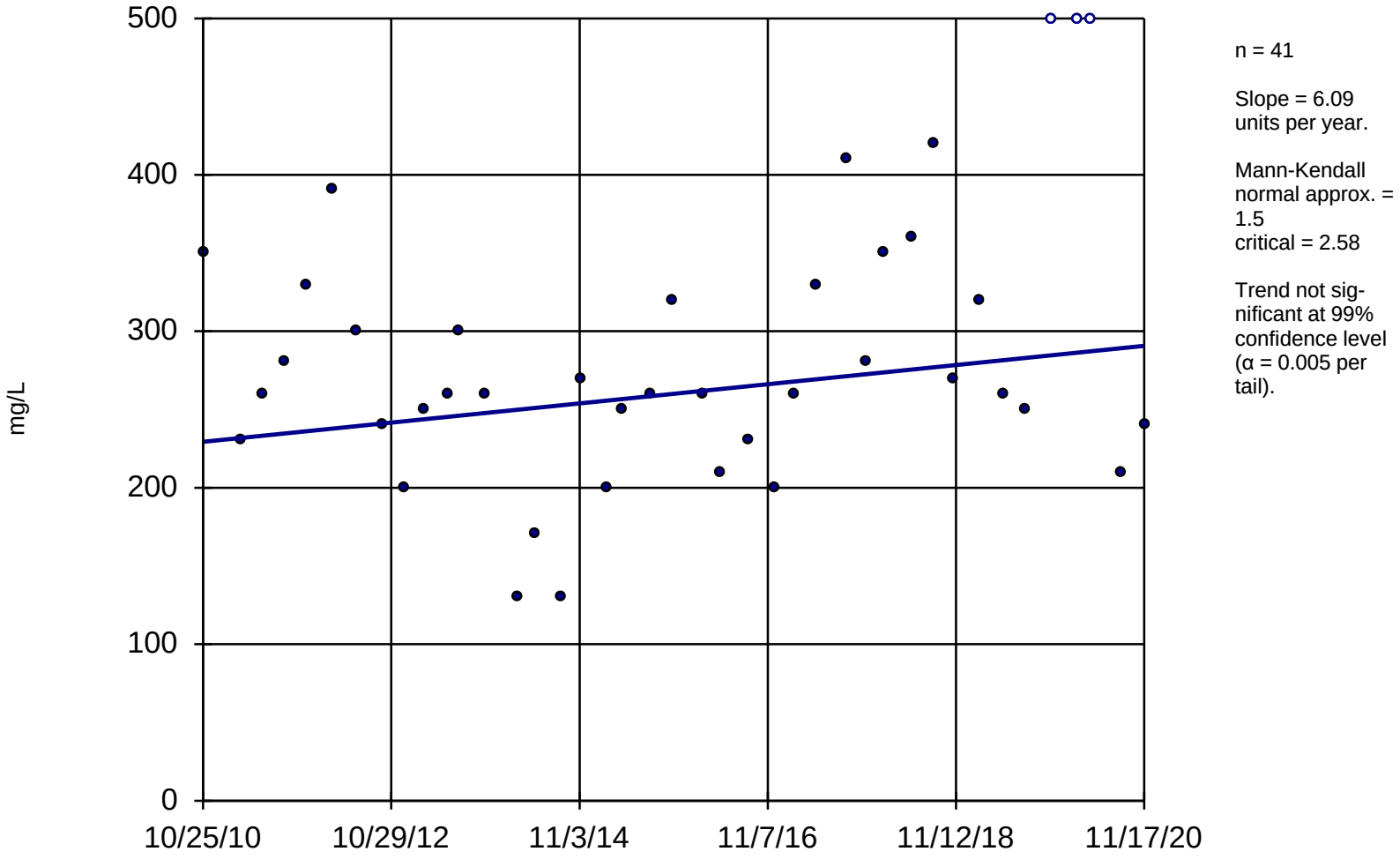
Constituent: Selenium, Total Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-01



n = 41

Slope = 6.09 units per year.

Mann-Kendall normal approx. = 1.5
critical = 2.58

Trend not significant at 99% confidence level (α = 0.005 per tail).

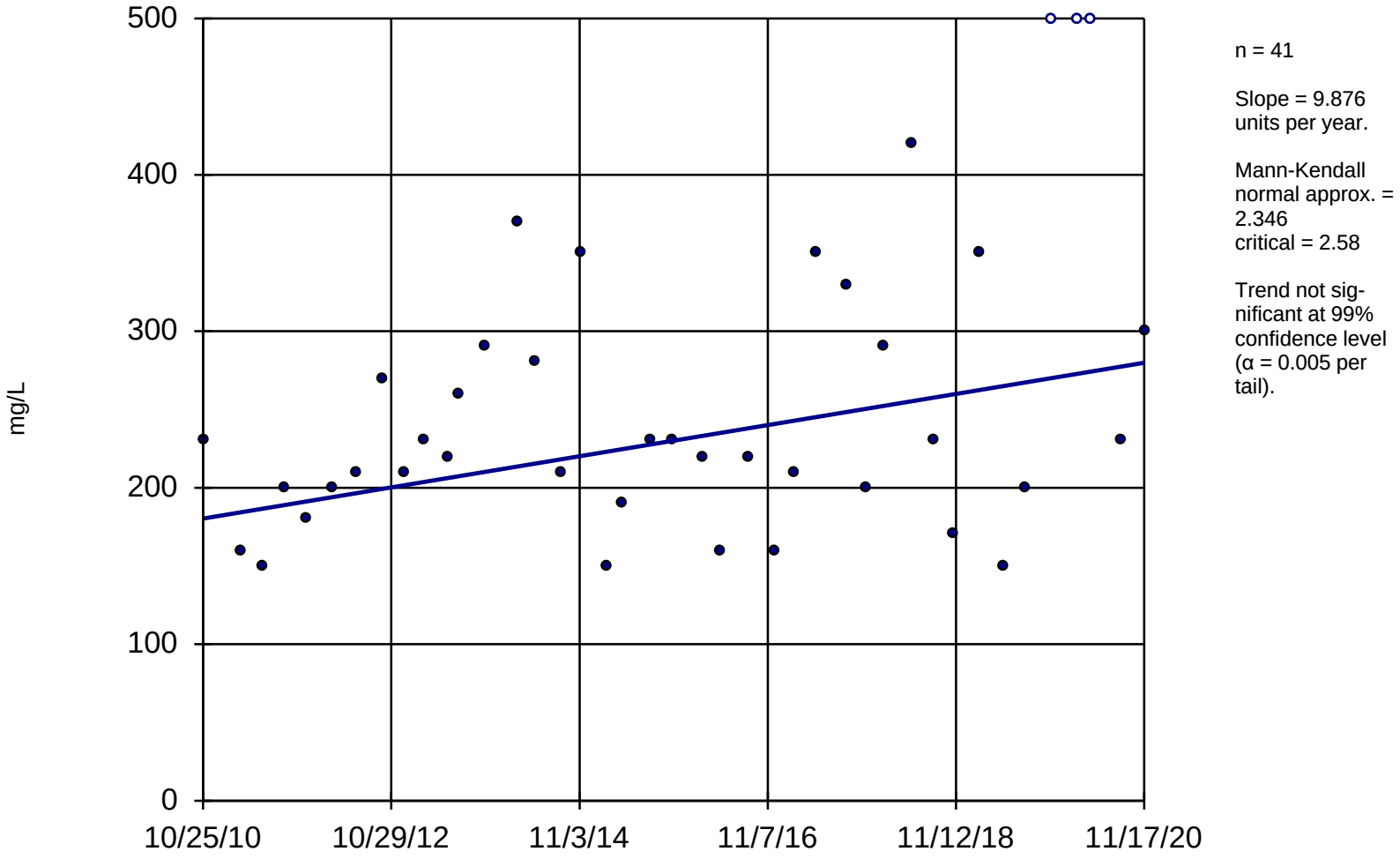
Constituent: Sulfate Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-02



n = 41

Slope = 9.876 units per year.

Mann-Kendall normal approx. = 2.346
critical = 2.58

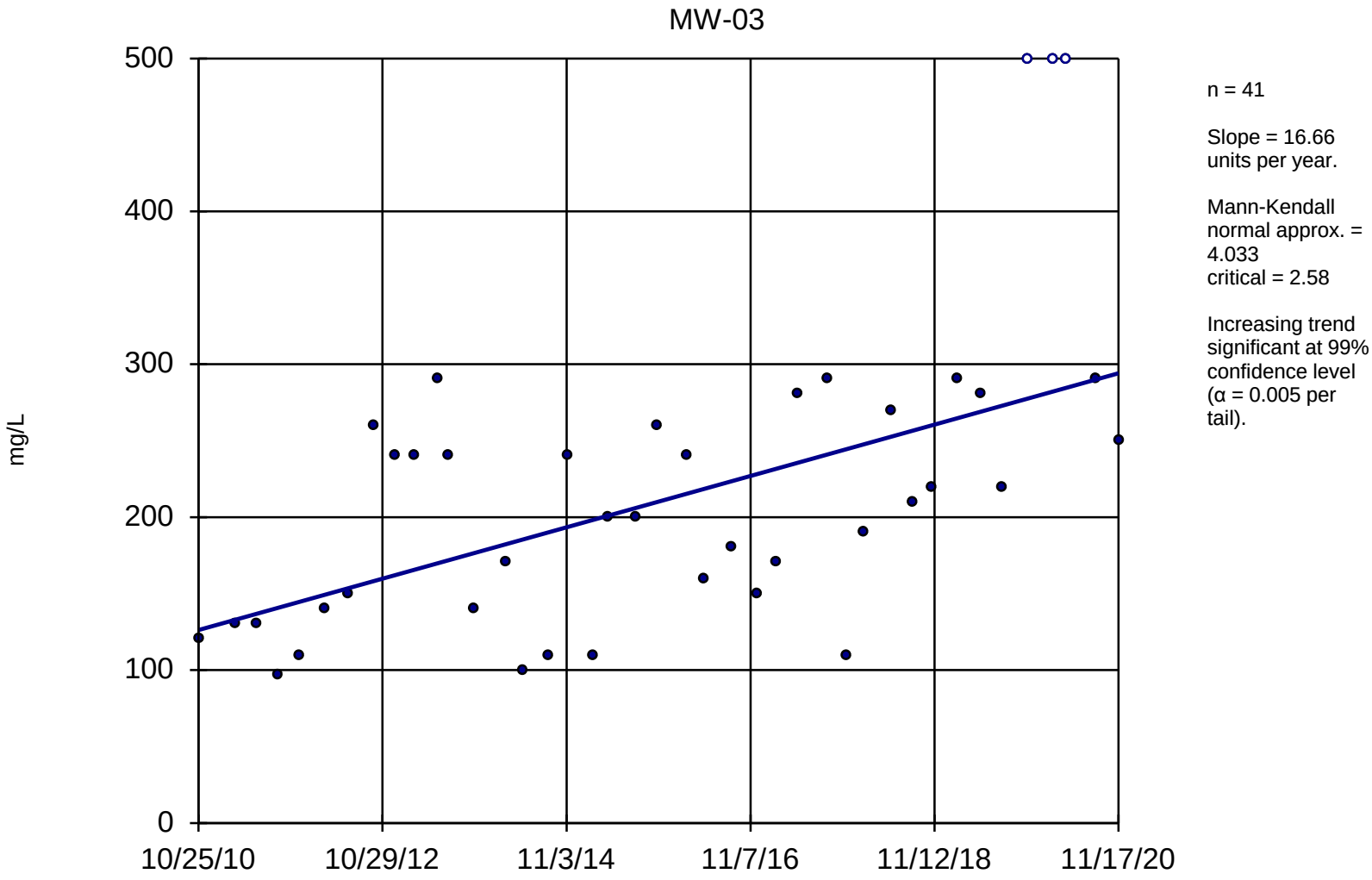
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Sulfate Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator



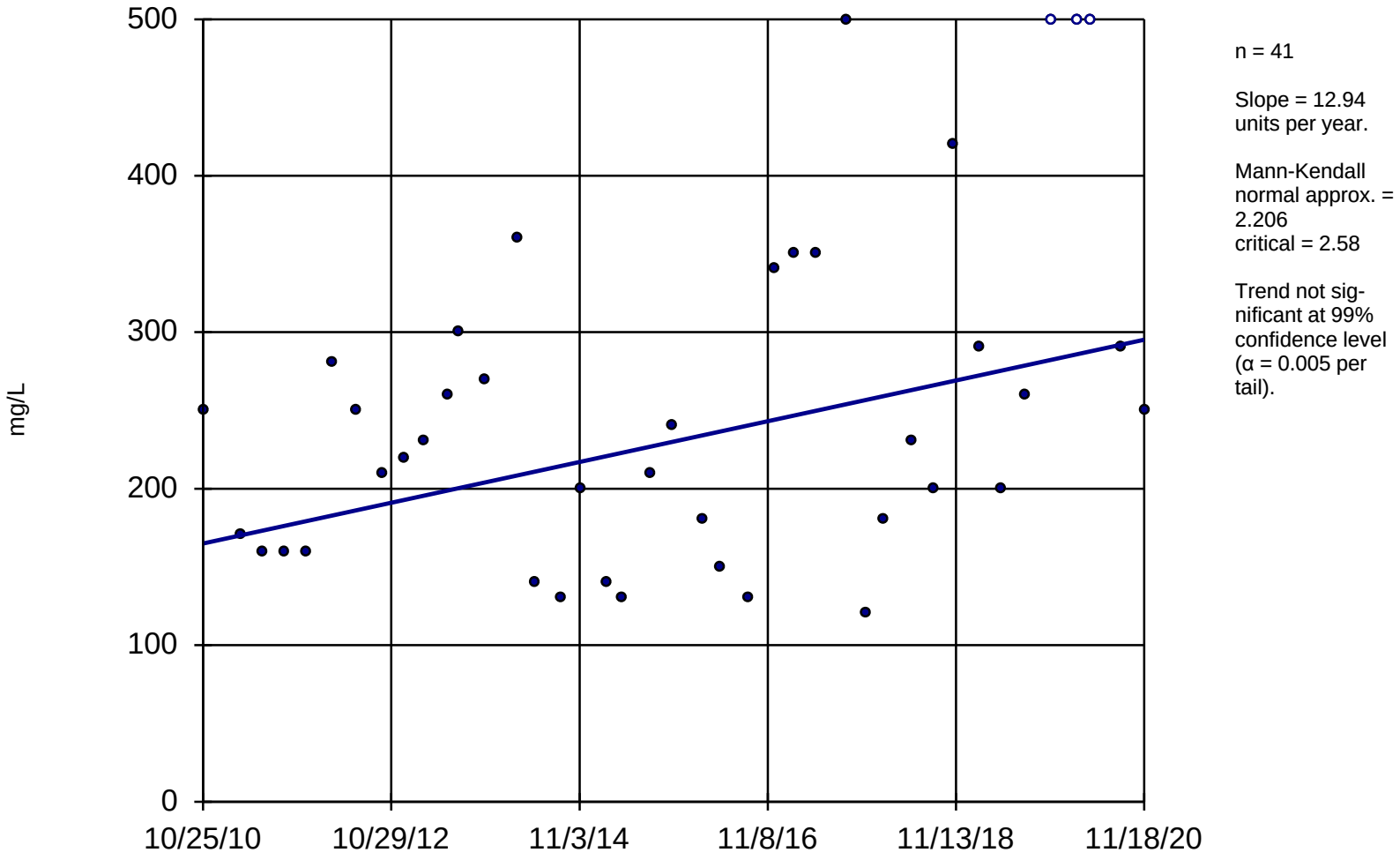
Constituent: Sulfate Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 41

Slope = 12.94 units per year.

Mann-Kendall normal approx. = 2.206
critical = 2.58

Trend not significant at 99% confidence level (α = 0.005 per tail).

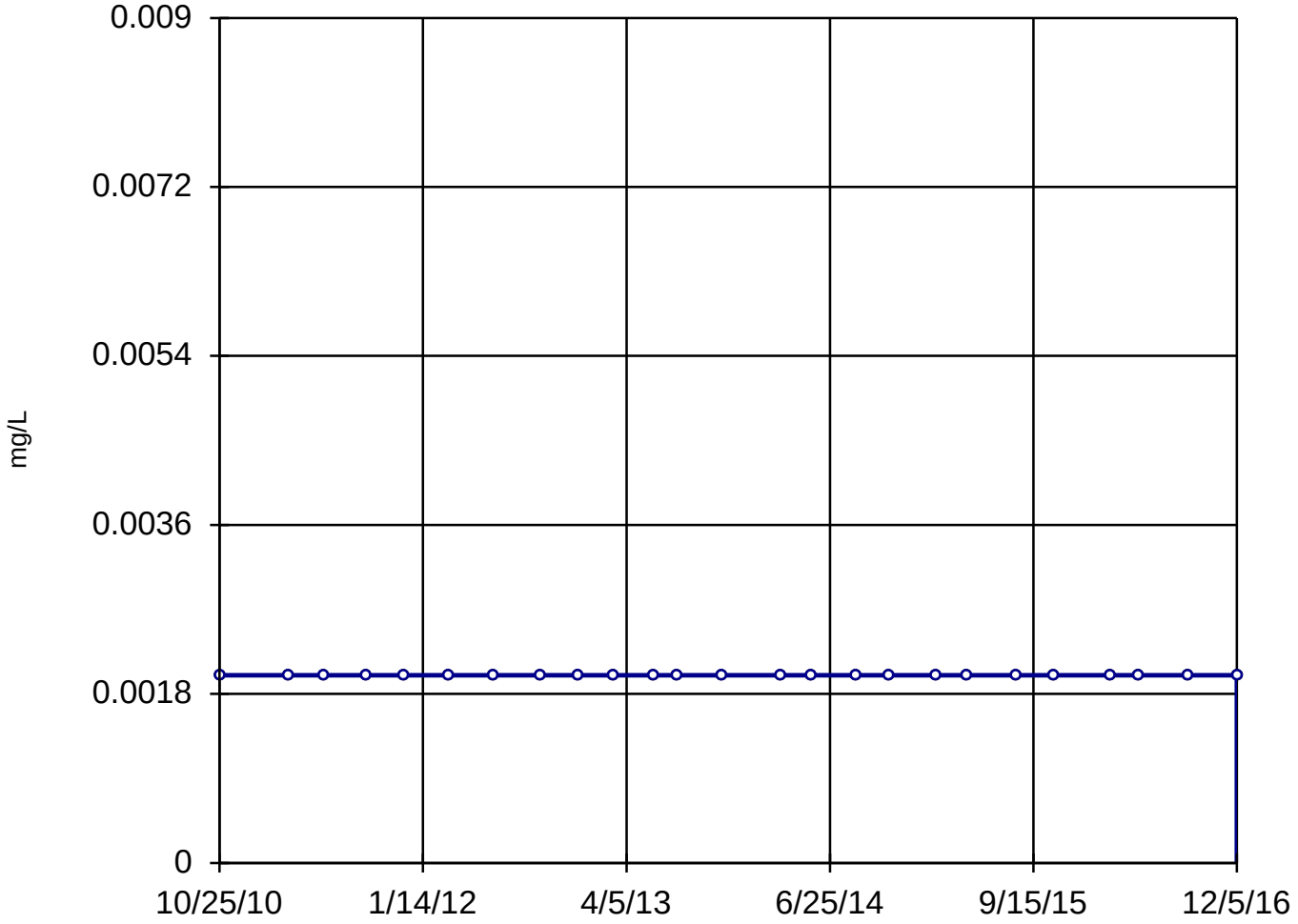
Constituent: Sulfate Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-01



n = 25

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 111

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

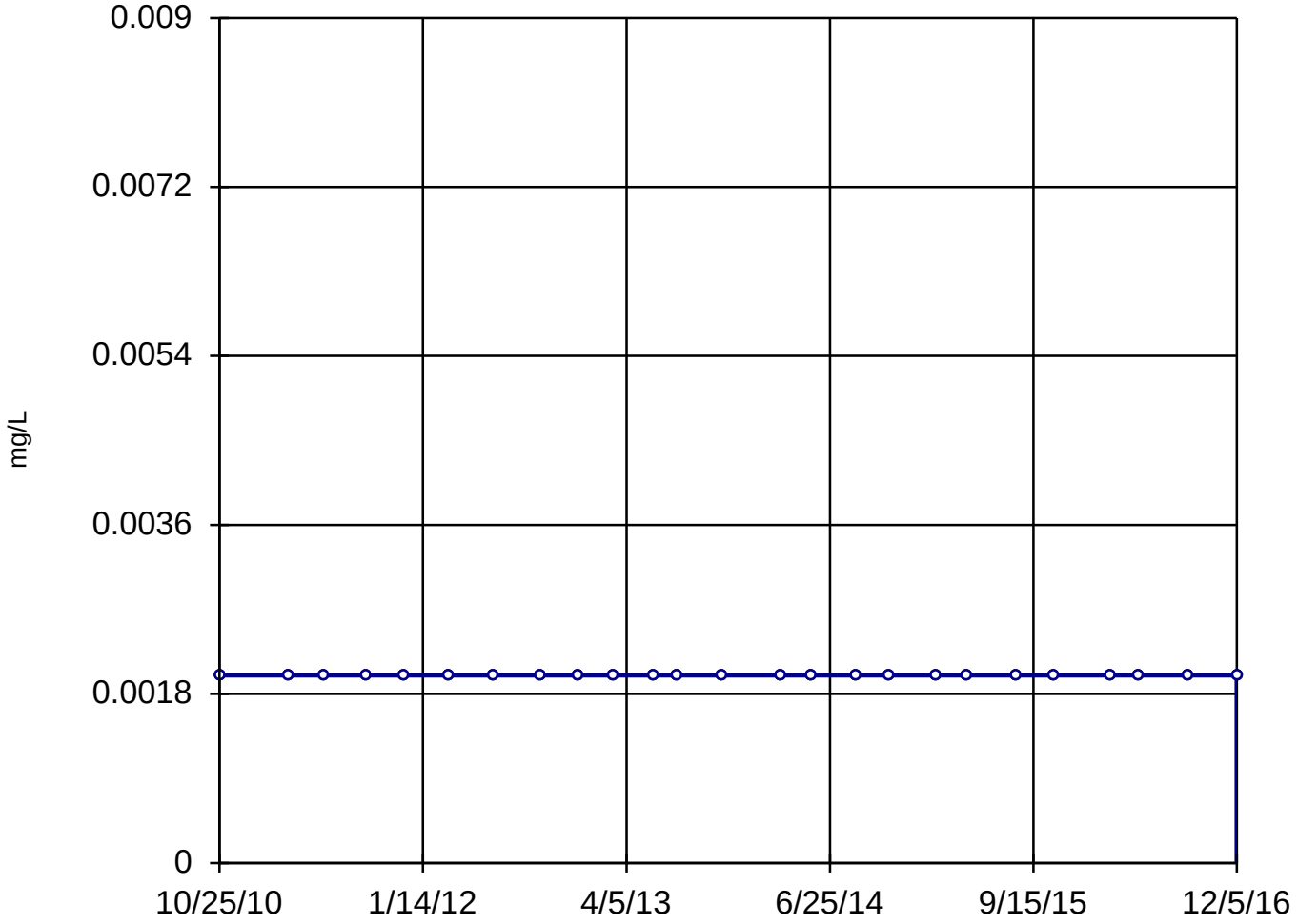
Constituent: Thallium, Dissolved Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-02



n = 25

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 111

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

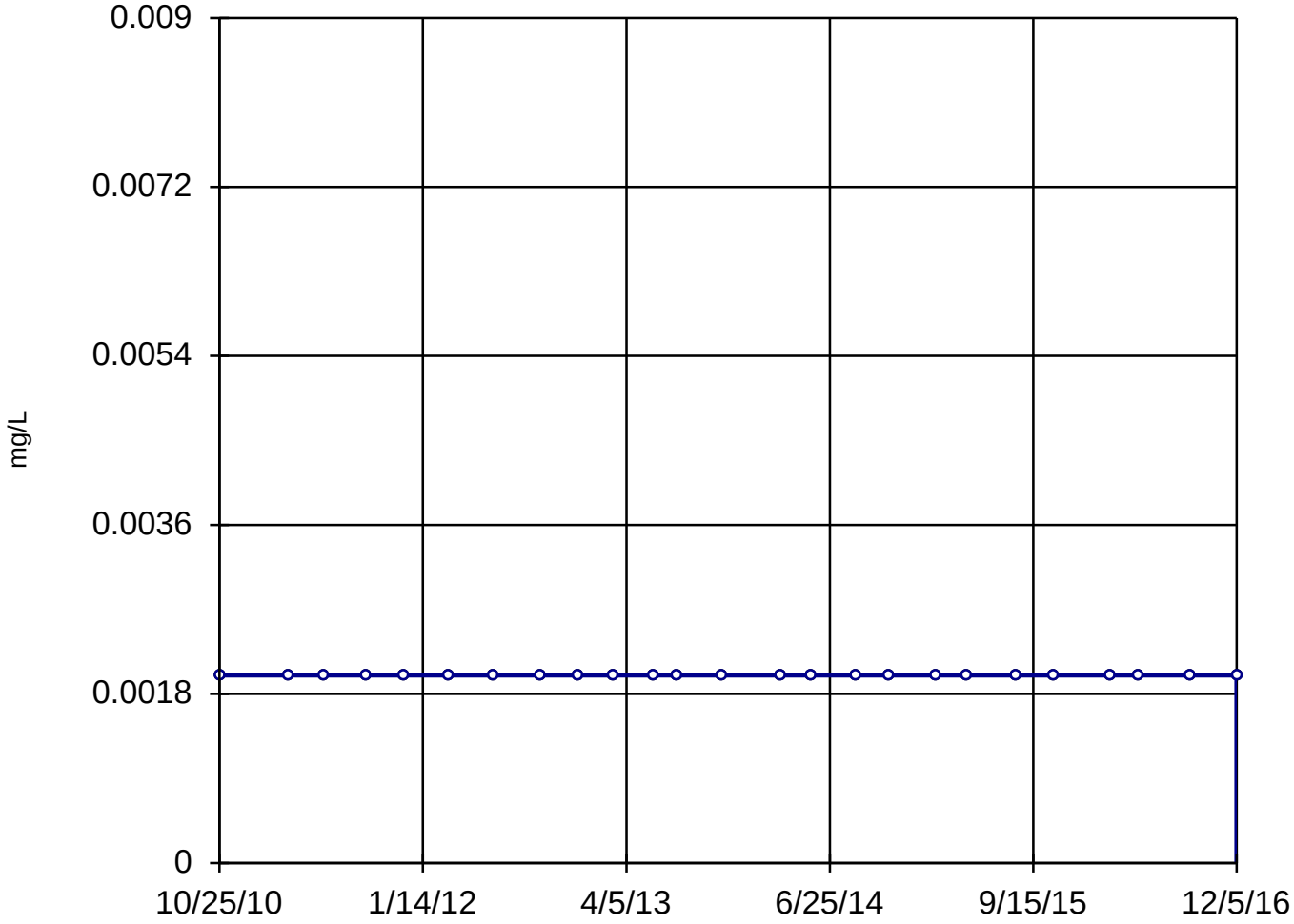
Constituent: Thallium, Dissolved Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 25

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 111

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

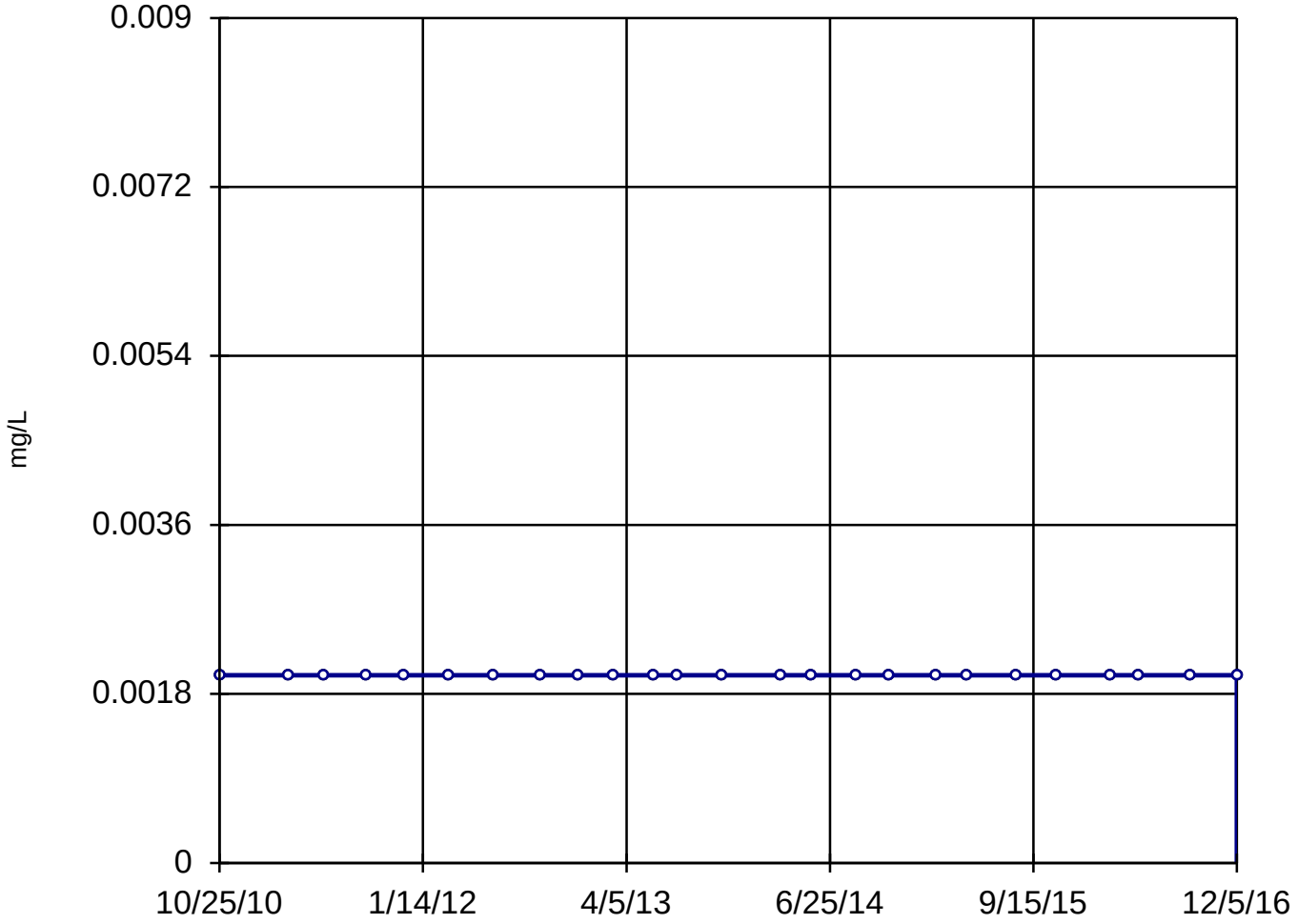
Constituent: Thallium, Dissolved Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 25

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 111

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

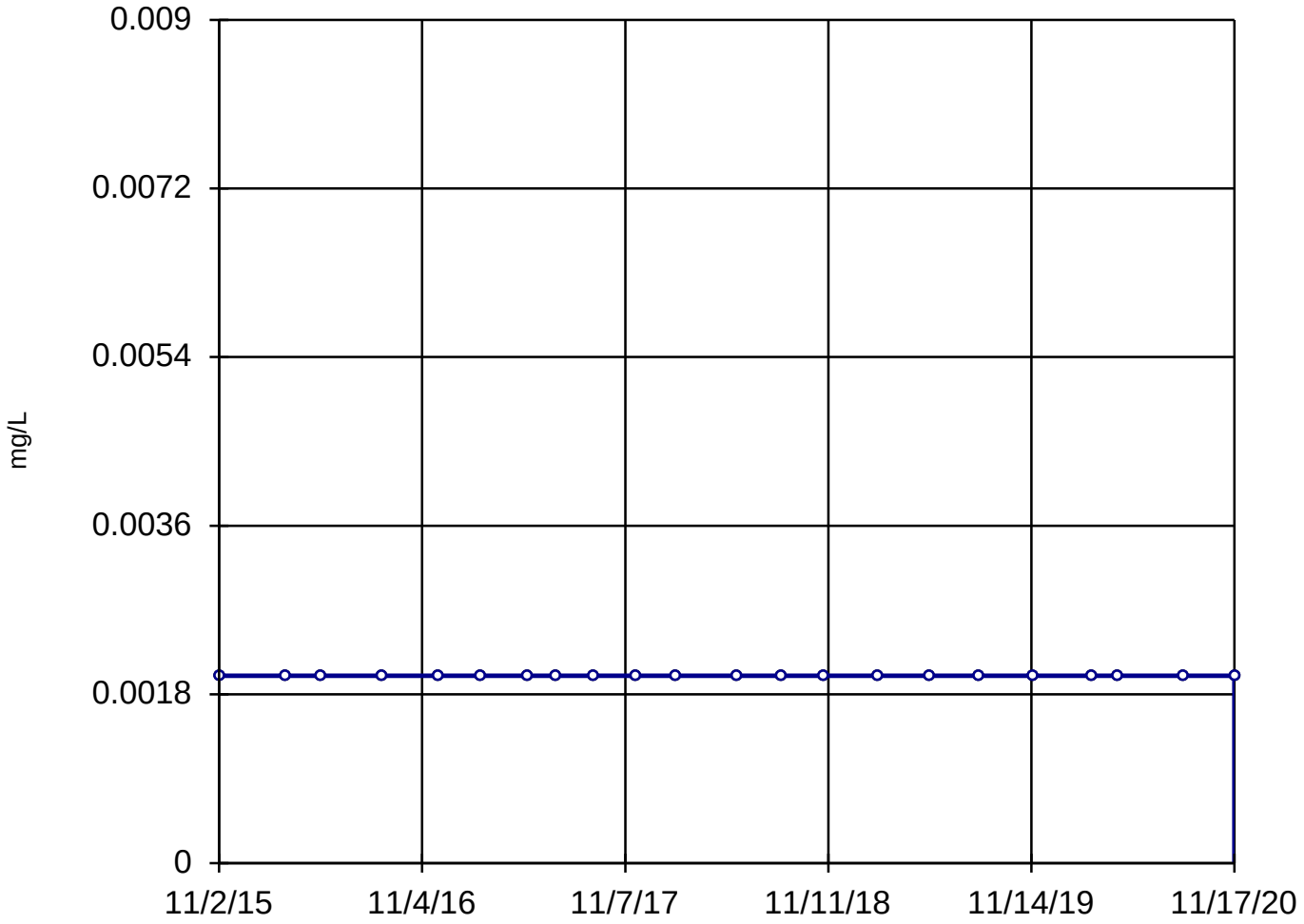
Constituent: Thallium, Dissolved Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-01



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 92

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

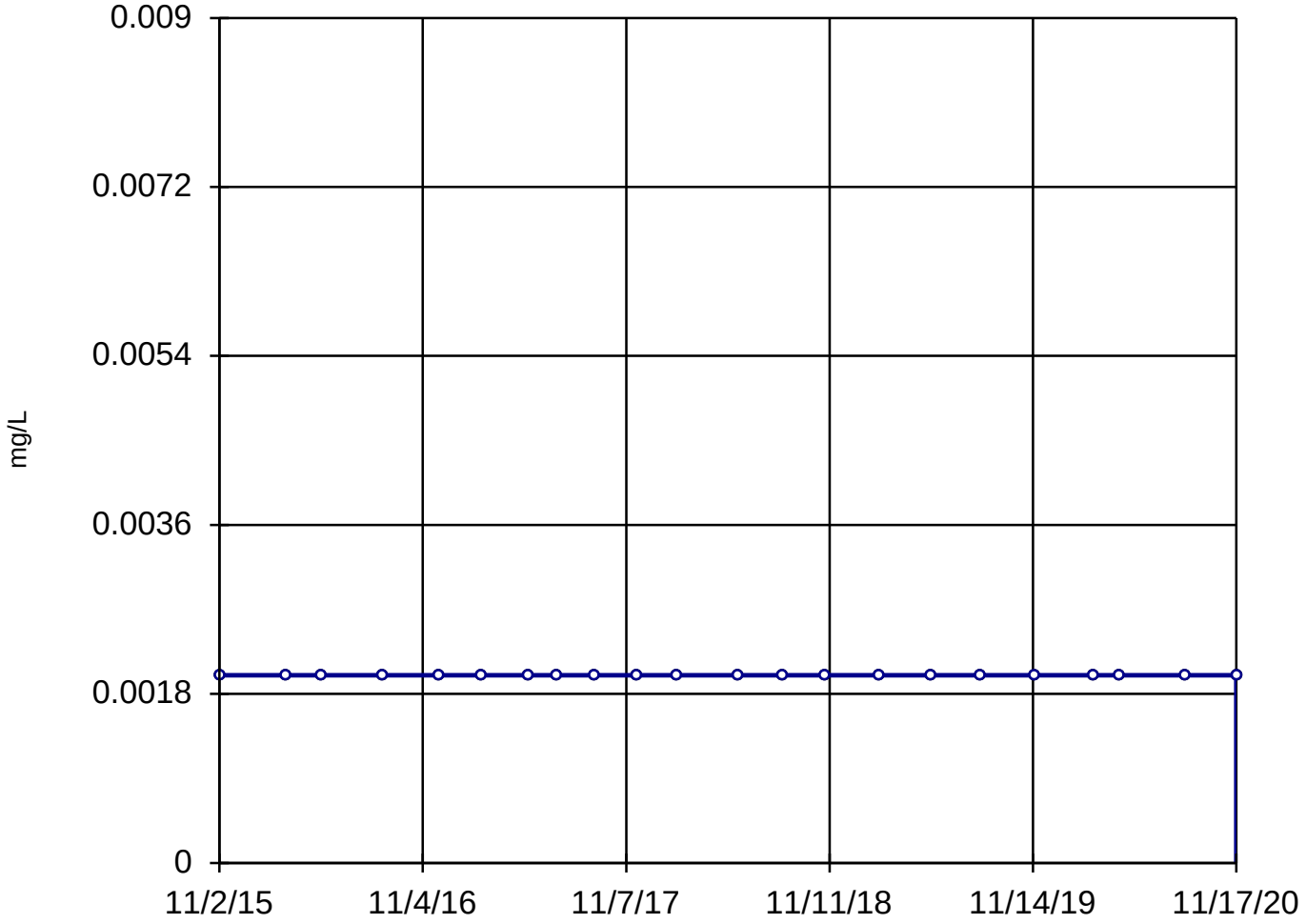
Constituent: Thallium, Total Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-02



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 92

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

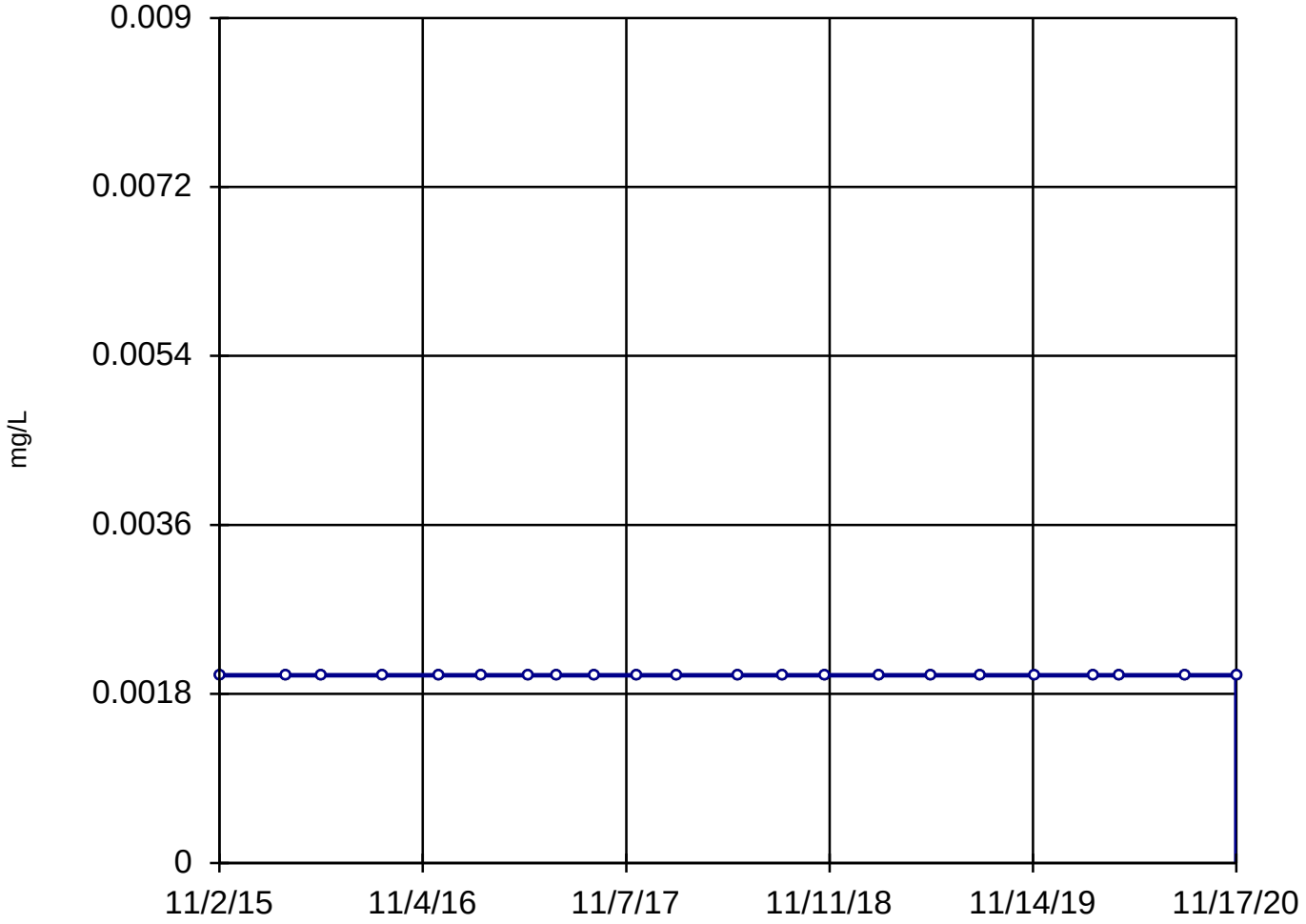
Constituent: Thallium, Total Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-03



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 92

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

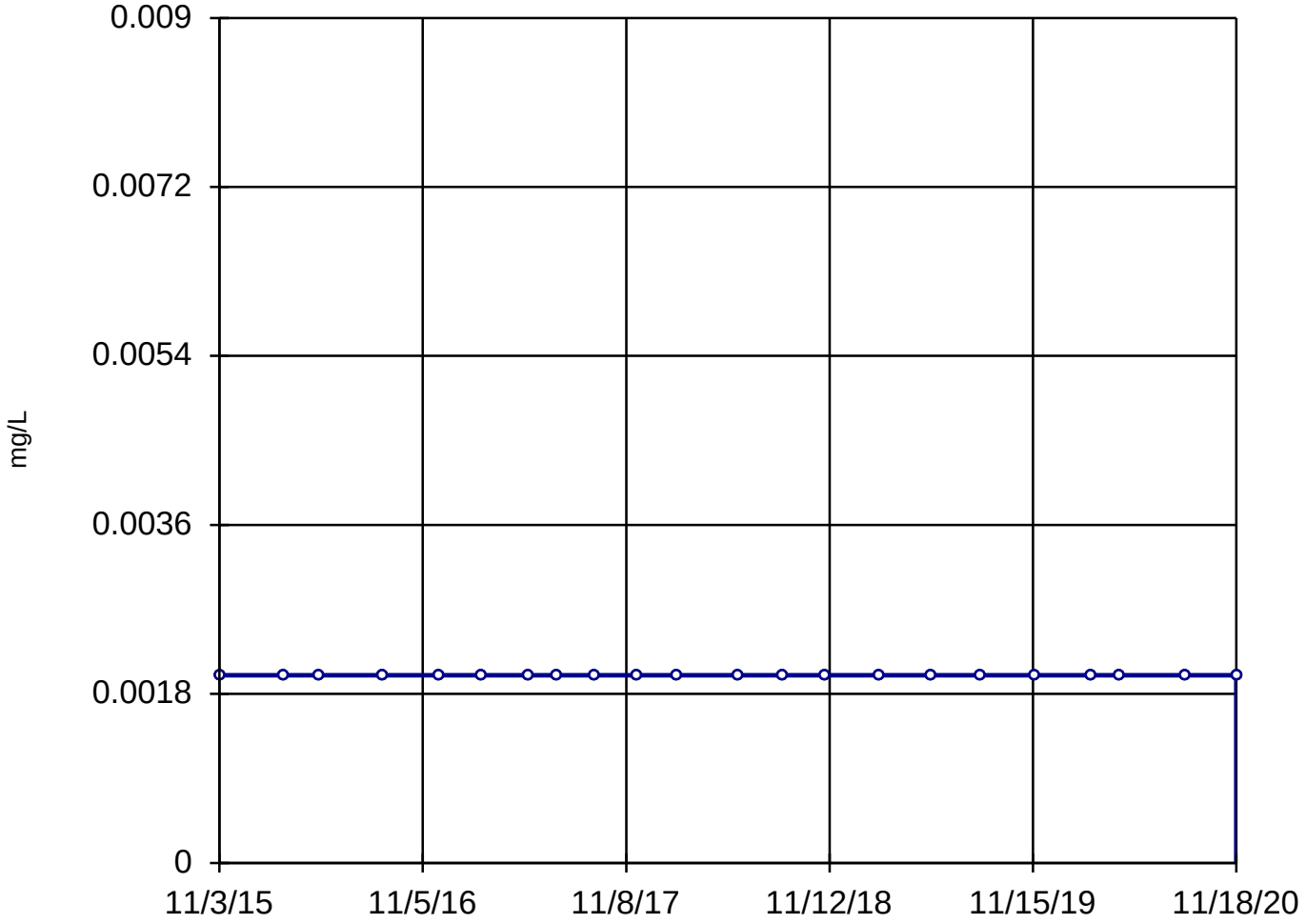
Constituent: Thallium, Total Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sanitas™ v.9.6.28 Software licensed to Weaver Consultants Group. EPA
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-04



n = 22

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 92

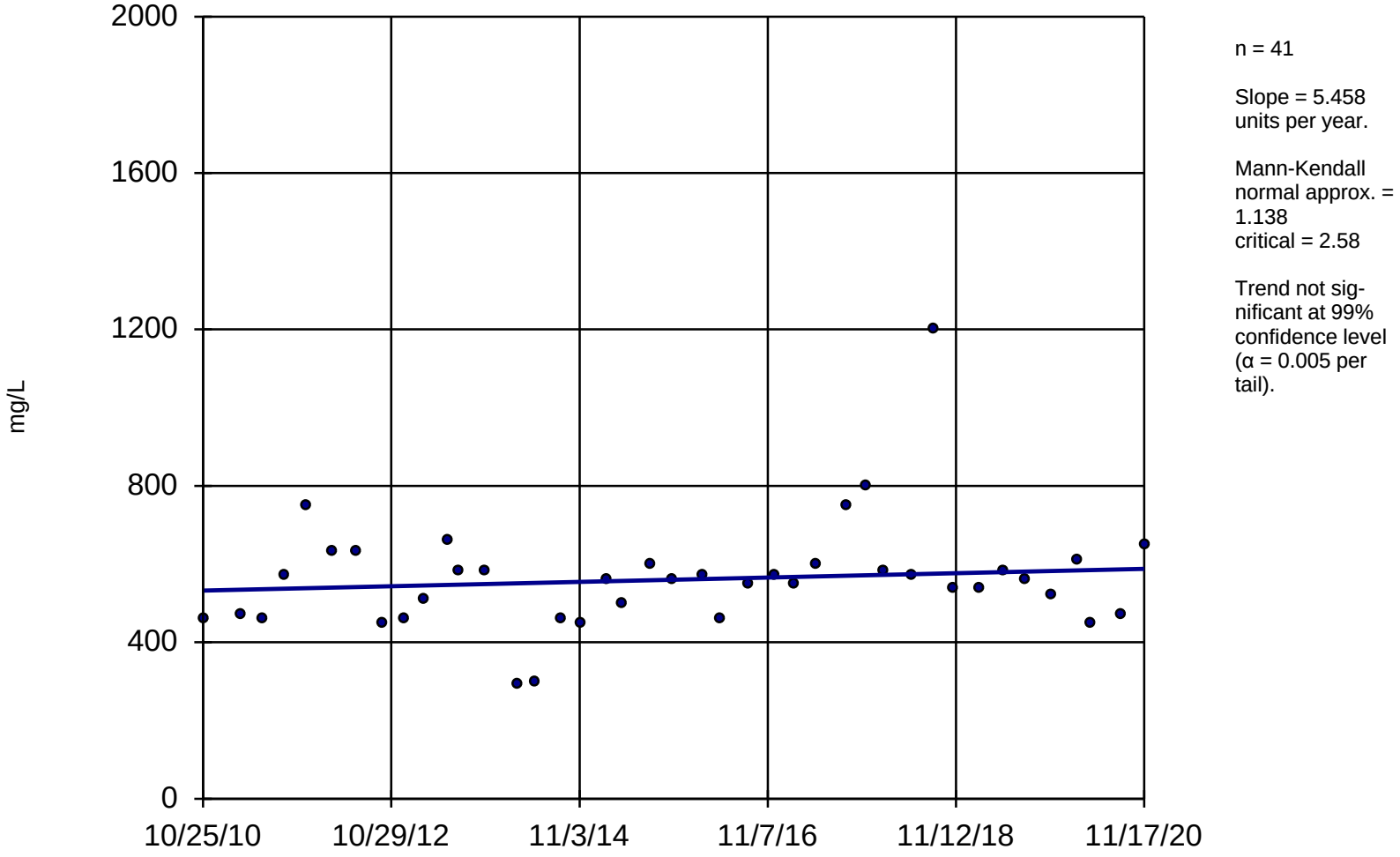
Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Thallium, Total Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-01



n = 41

Slope = 5.458 units per year.

Mann-Kendall normal approx. = 1.138
critical = 2.58

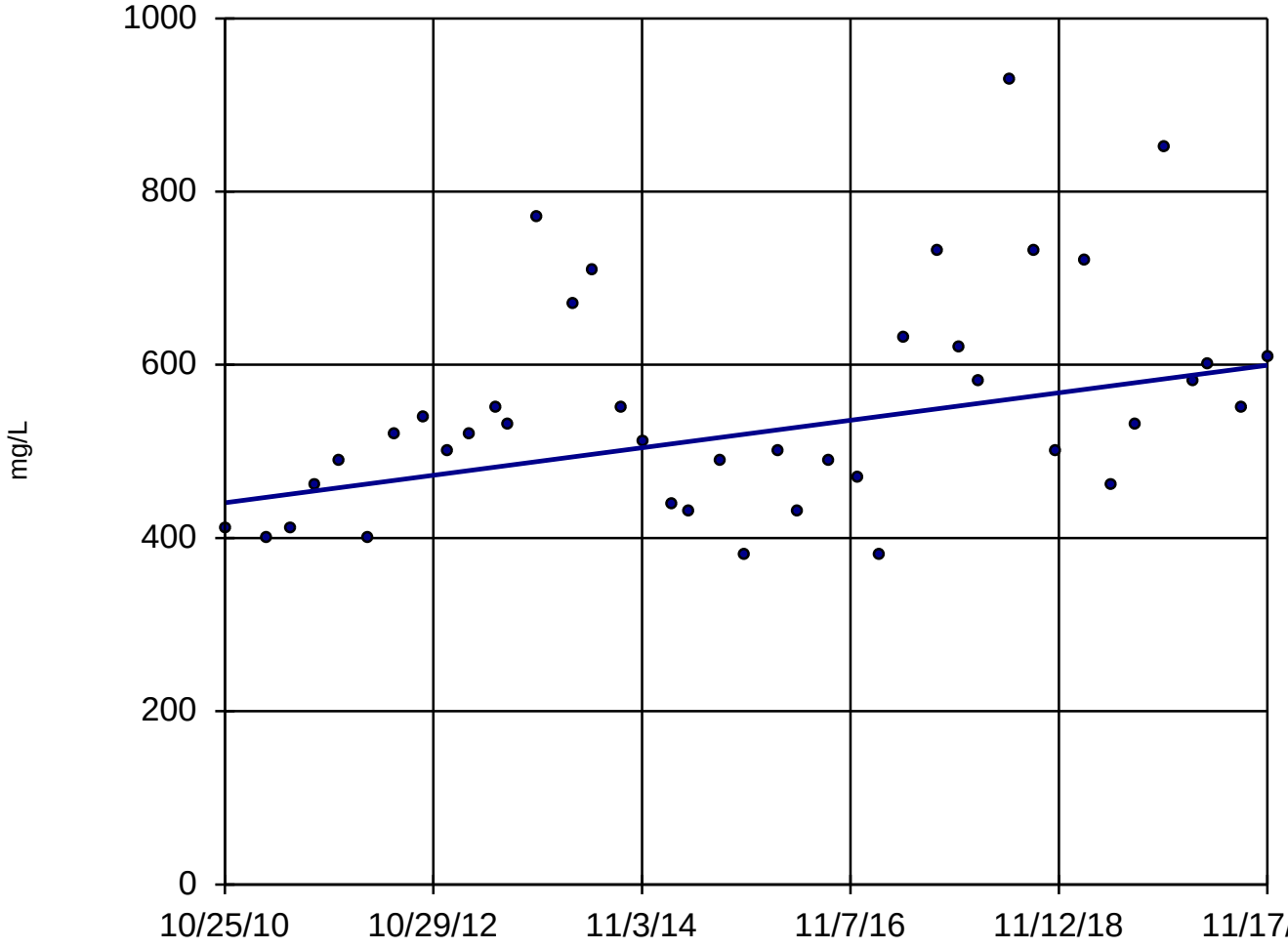
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Total Dissolved Solids Analysis Run 4/14/2021 1:02 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-02



n = 41

Slope = 15.76 units per year.

Mann-Kendall normal approx. = 2.778
critical = 2.58

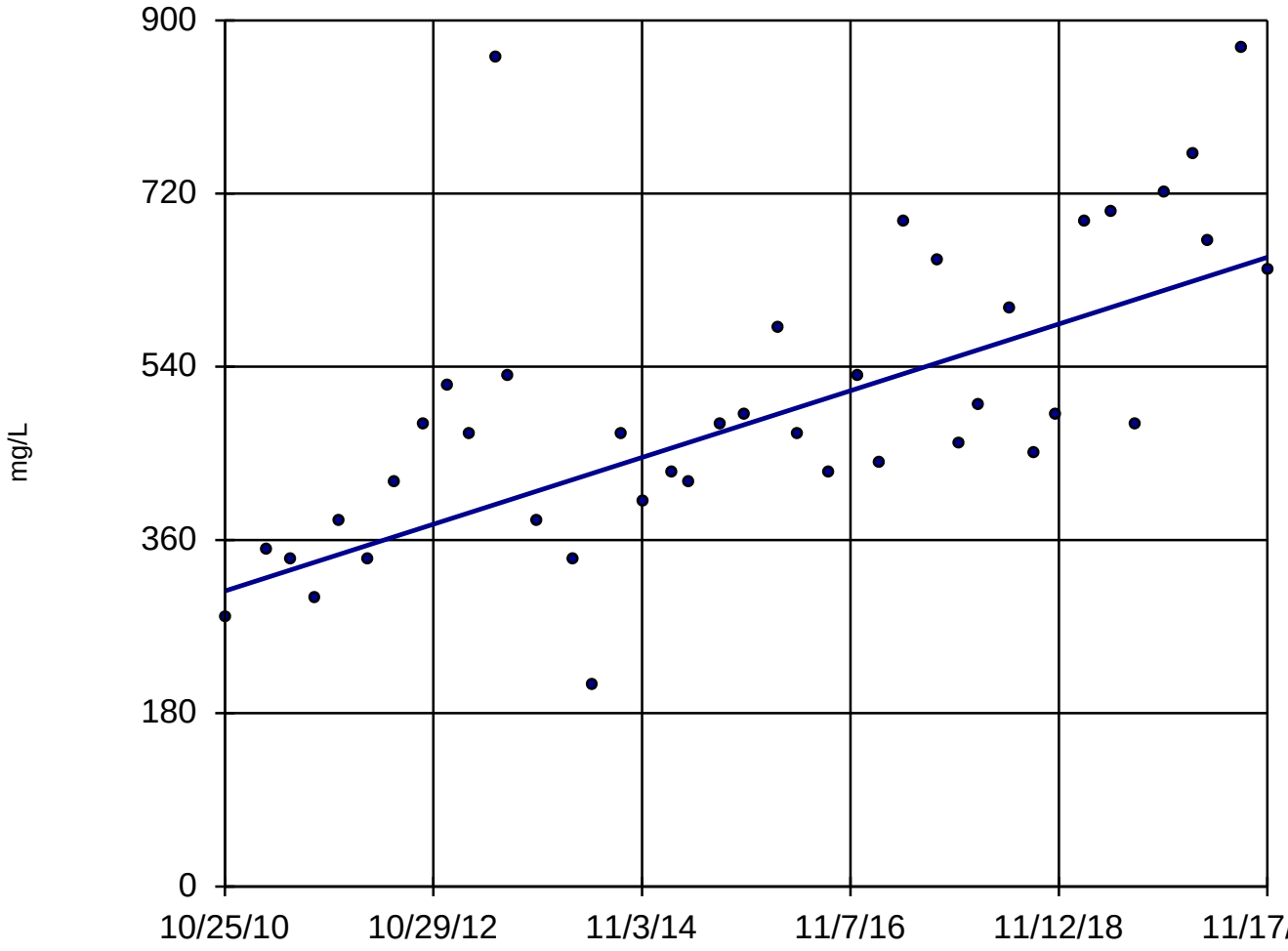
Increasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Total Dissolved Solids Analysis Run 4/14/2021 1:03 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-03



n = 41

Slope = 34.41 units per year.

Mann-Kendall normal approx. = 4.97
critical = 2.58

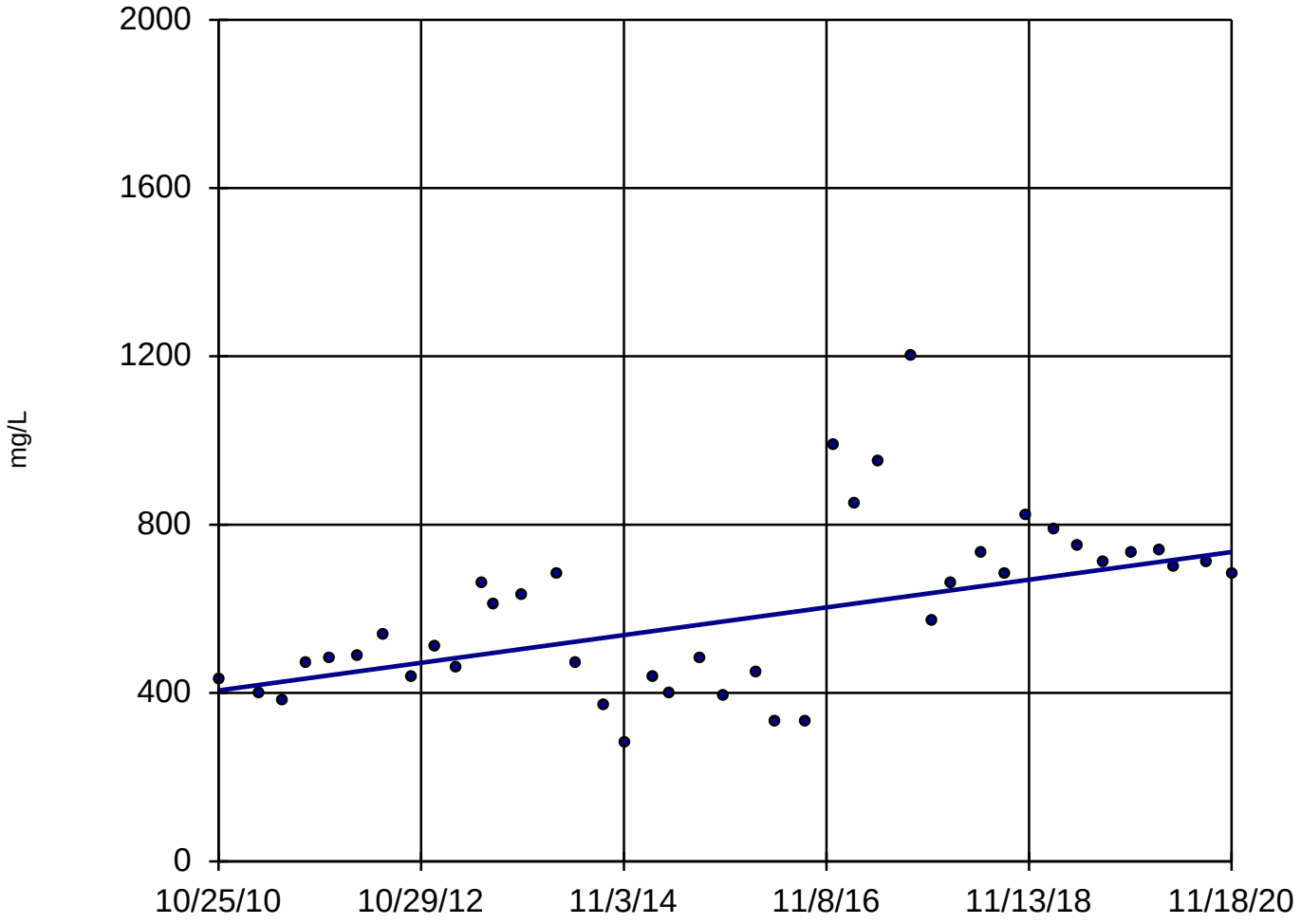
Increasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Total Dissolved Solids Analysis Run 4/14/2021 1:03 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Sen's Slope Estimator

MW-04



n = 41

Slope = 32.68 units per year.

Mann-Kendall normal approx. = 3.417
critical = 2.58

Increasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Total Dissolved Solids Analysis Run 4/14/2021 1:03 PM

Utility Site W Client: Weaver Consultants Group Data: Waukegan Sanitas Database

Appendix D

Comparison of Groundwater Concentrations to Surface Water Standards

Surface Water Standards
Midwest Generation

Constituent	CAS	Units	Surface Water Standards [1]							
			General Use [2]				Lake Michigan Basin [3]			
			Chronic		Acute [4]		Chronic		Acute [4]	
Antimony	7440-36-0	mg/L	0.32	(2e)	1.2	(2e)	--		--	
Arsenic	7440-38-2	mg/L	0.19	(2a)	0.36	(2a)	0.148	(3a)	0.34	(3a)
Barium	7440-39-3	mg/L	5.0	(2b)	--		5.0	(3b)	--	
Beryllium	7440-41-7	mg/L	--		--		--		--	
Boron	7440-42-8	mg/L	7.6	(2a)	40.1	(2a)	7.6	(3a)	40.1	(3a)
Cadmium	7440-43-9	mg/L	0.0017	(2a,i)	0.0195	(2a,i)	0.0037		0.0091	
Calcium	7440-70-2	mg/L	--		--		--		--	
Chloride	16887-00-6	mg/L	500	(2b)	--		500	(3b)	--	
Chromium	7440-47-3	mg/L	0.13	(2a,ii)	1.0	(2a,ii)	0.011		0.016	
Cobalt	7440-48-4	mg/L	--		--		--		--	
Fluoride	16984-48-8	mg/L	4.0	(2a,iii)	14.6	(2a,iii)	4.0		14.6	
Lead	7439-92-1	mg/L	0.033	(2a,iv)	0.160	(2a,iv)	0.011		0.204	
Lithium	7439-93-2	mg/L	--		--		--		--	
Mercury, dissolved	7439-97-6	mg/L	0.0011	(2a)	0.0022		--		--	
Mercury, total	7439-97-6	mg/L	0.000012	(2f)	--		0.00091	(3d)	0.0017	(3d)
Molybdenum	7439-98-7	mg/L	--		--		--		--	
pH	--	s.u.	6.5 - 9.0	(2d)	--		6.5 - 9.0	(3c)	--	
Radium 226 + 228	7440-14-4	pCi/L	3.75	(2a)	--		3.75		--	
Selenium	7782-49-2	mg/L	1.0		--		5.0	(3a)	n/a	
Sulfate	18785-72-3	mg/L	site-specific	(2c)	--		500	(3b)	--	
Joliet	18785-72-3	mg/L	1360	(2c)	--		500	(3b)	--	
Powerton	18785-72-3	mg/L	1440	(2c)	--		500	(3b)	--	
Waukegan	18785-72-3	mg/L	1440	(2c)	--		500	(3b)	--	
Will County	18785-72-3	mg/L	1460	(2c)	--		500	(3b)	--	
Thallium	7440-28-0	mg/L	0.003	(2f)	0.086	(2e)	n/a		n/a	
Total Dissolved Solids	--	mg/L	--		--		1,000	(3b)	--	

Notes:

(1) IL Water Quality Standards (WQS) used as surface water standard for evaluating hypothetical human/ecological exposure scenarios. In the absence of WQS, IL Water Quality Criteria (WQC) are

(2) Concentration represents an Illinois General Use WQS as defined in 35 IAC 302, Subpart B or an Illinois Derived WQC (lower of aquatic life and human health WQC):

(a) 35 IAC 302.208(e), Numerical Water Quality Standards for the Protection of Aquatic Life

(i) Standard for dissolved cadmium is a hardness (H)-dependent value, calculated as follows (see also footnote 5):

Chronic = exp[-3.490+0.7852*ln(H)]*(1.101672-[ln(H)(0.041383)])*1E-3 mg/µg

Acute = exp[-2.918+1.128*ln(H)]*(1.138672-[ln(H)(0.041383)])*1E-3 mg/µg

(ii) Standard for chromium is a hardness (H)-dependent value, calculated as follows (see also footnote 5):

Chronic = exp[0.6848+0.8190*ln(H)]*0.860*1E-3 mg/µg

Acute = exp[3.7256+0.8190*ln(H)]*0.316*1E-3 mg/µg

(iii) Standard for fluoride is a hardness (H)-dependent value, calculated as follows (see also footnote 5):

Chronic = exp[6.0445+0.5394*ln(H)]*1E-3 mg/µg, but shall not exceed 4.0 mg/L

Acute = exp[6.7319+0.5394*ln(H)]*1E-3 mg/µg

(iv) Standard for lead is a hardness (H)-dependent value, calculated as follows (see also footnote 5):

Chronic = exp[-2.863+1.273*ln(H)]*{1.46203-[(ln(H))(0.145712)]}*1E-3 mg/µg

Acute = exp[-1.301+1.273*ln(H)]*{1.46203-[(ln(H))(0.145712)]}*1E-3 mg/µg

(b) 35 IAC 302.208(g), Single-Value Standards

(c) 35 IAC 302.208(h)(2)(A), WQS for Sulfate; standard is hardness (H) and chloride (Cl) dependent, and calculated as follows (see also footnotes 5 and 6):

Chronic = exp[1276.7+5.508*(H)-1.457(Cl)]*0.65

(d) 35 IAC 302.204, pH

(e) Illinois WQC for the protection of aquatic life.

(f) Illinois WQC for the protection of human health (applicable to chronic values only).

(3) Concentration represents an Illinois Lake Michigan Basin WQS as defined in 35 IAC 302, Subpart E. Note that of the four subject sites, Lake Michigan Basin WQS are only applicable to the Waukegan Station.

(a) 35 IAC 302.504(a), Lake Michigan Basin Water Quality Standards for Chemical Constituents.

(b) 35 IAC 302.504(b)

(c) IAC 302.503, pH

(d) 35 IAC 302.504(e)

(4) Chronic values are used as the primary effects values for this evaluation; however, acute values are also presented for completeness.

(5) Site-specific hardness data is not available. Based on data from the IL Water Quality Database (http://ilrdss.isws.illinois.edu/WQ/), a value of 200 mg/L is . considered a conservative estimate for the Site

(6) Sulfate WQS calculated using the average chloride concentration for available data, which are as follows:

Joliet	201	mg/L
Powerton	115.4	mg/L
Waukegan	115.8	mg/L
Will County	92.7	mg/L

Definitions

"--" = value not available n/a = not applicable

mg/L = milligrams per liter s.u. = standard unit

MWG13-15_82173

Comparison of Downgradient Average Groundwater Analytical Results to Surface Water Standards
Joliet 29 Station

Constituent[1]	Units	Surface Water Standard[2]	Groundwater Analytical Results - Average Concentrations					
			MW-01	MW-02	MW-03	MW-04	MW-06	MW-07
Antimony, Dissolved	mg/L	0.32	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Antimony, Total	mg/L	0.32	--	--	<0.003	<0.003	--	--
Arsenic, Dissolved	mg/L	0.19	0.001	0.001	0.001	0.001	0.001	0.001
Arsenic, Total	mg/L	0.19	--	--	0.001	0.001	--	--
Barium, Dissolved	mg/L	5	0.109	0.096	0.094	0.082	0.123	0.116
Barium, Total	mg/L	5	--	--	0.095	0.086	--	--
Beryllium, Dissolved	mg/L	N/A	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Beryllium, Total	mg/L	N/A	--	--	<0.001	<0.001	--	--
Boron, Dissolved	mg/L	7.6	0.254	0.257	0.379	0.379	0.244	0.241
Boron, Total	mg/L	7.6	--	--	0.422	0.379	--	--
Cadmium, Dissolved	mg/L	0.0017	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0006
Cadmium, Total	mg/L	0.0017	--	--	<0.0005	<0.0005	--	--
Calcium, Total	mg/L	N/A	--	--	97.4	99.3	--	--
Chloride	mg/L	500	155	225	222	214	185	195
Chromium, Dissolved	mg/L	0.13	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Chromium, Total	mg/L	0.13	--	--	<0.005	<0.009	--	--
Cobalt, Dissolved	mg/L	N/A	<0.001	<0.001	<0.001	0.004	<0.001	<0.001
Cobalt, Total	mg/L	N/A	--	--	<0.001	0.008	--	--
Fluoride	mg/L	4	0.41	0.45	0.43	0.45	0.35	0.31
Lead, Dissolved	mg/L	0.03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0007
Lead, Total	mg/L	0.03	--	--	<0.0005	0.0006	--	--
Lithium, Total	mg/L	N/A	--	--	0.0115	0.0124	--	--
Mercury, Dissolved	mg/L	0.0011	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Mercury, Total	mg/L	0.000012	--	--	<0.0002	<0.0002	--	--
Molybdenum, Total	mg/L	N/A	--	--	0.0066	0.0076	--	--
pH, Field	S.U.	6.5 - 9.0	7.17	7.33	7.32	7.32	7.51	7.49
Radium 226 + 228, Combined	pCi/L	3.75	--	--	0.432	0.413	--	--
Selenium, Dissolved	mg/L	1.0	0.006	0.003	0.004	<0.003	--	--
Selenium, Total	mg/L	1.0	--	--	0.004	<0.003	--	--
Sulfate	mg/L	1360*	109	97	121	118	112	123
Thallium, Dissolved	mg/L	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Thallium, Total	mg/L	0.003	--	--	<0.002	<0.002	--	--
Total Dissolved Solids	mg/L	N/A	702	792	883	847	736	762

Exceeds Surface Water Standard

Average concentrations between December 2010 and October 2020 as calculated by Sanitas™ Software

"<" = Constituent non-detect in 75% or more samples; reporting limit presented as average.

"--" = Constituent not analyzed

N/A = Standard not established for this constituent

[1]Constituents analyzed are coal-combustion residual (CCR) constituents as identified in Appendices III and IV to 40 CFR Part 257.

[2] Surface Water Standard values obtained from the Illinois General Use Water Quality Standards (WQS) as defined in 35 IAC 302, Subpart B or, in the absence of Illinois WQS, the Illinois Water Quality Criteria (WQC) as shown in Table 1.

Site-specific Water Quality Standard for Sulfate per 35 IAC 302.208(h)(2)(A); standard is hardness (H) and chloride (Cl) dependent, and calculated as follows =exp[1276.7+5.508(H)-1.457(Cl)]*0.65

Comparison of Downgradient Average Groundwater Analytical Results to Surface Water Standards
Powerton Station

Constituent[1]	Units	Surface Water Standard[2]	Groundwater Analytical Results - Average Concentrations								
			MW-03	MW-04	MW-05	MW-06	MW-07	MW-08	MW-13	MW-14	MW-15
Antimony, Dissolved	mg/L	0.32	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Antimony, Total	mg/L	0.32	<0.003	<0.003	<0.003	--	--	<0.003	--	--	<0.003
Arsenic, Dissolved	mg/L	0.19	0.001	0.001	0.001	0.007	0.161	0.002	0.024	0.003	0.003
Arsenic, Total	mg/L	0.19	0.001	<0.001	<0.001	--	--	0.003	--	--	0.021
Barium, Dissolved	mg/L	5	0.060	0.038	0.057	0.103	0.471	0.106	0.163	0.051	0.072
Barium, Total	mg/L	5	0.064	0.035	0.054	--	--	0.103	--	--	0.065
Beryllium, Dissolved	mg/L	N/A	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Beryllium, Total	mg/L	N/A	<0.001	<0.001	<0.001	--	--	<0.001	--	--	<0.001
Boron, Dissolved	mg/L	7.6	0.373	0.667	1.485	0.474	1.664	0.889	3.022	1.924	1.562
Boron, Total	mg/L	7.6	0.318	0.596	0.633	--	--	1.129	--	--	1.793
Cadmium, Dissolved	mg/L	0.0017	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	<0.0005
Cadmium, Total	mg/L	0.0017	<0.0005	<0.0005	<0.0005	--	--	<0.0005	--	--	0.0007
Calcium, Total	mg/L	N/A	78	88	104	--	--	138	--	--	198
Chloride	mg/L	500	55	69	99	178	153	222	162	165	193
Chromium, Dissolved	mg/L	0.13	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Chromium, Total	mg/L	0.13	<0.005	<0.005	<0.005	--	--	<0.005	--	--	<0.005
Cobalt, Dissolved	mg/L	N/A	<0.001	<0.001	<0.001	<0.001	0.006	<0.001	<0.001	<0.001	<0.001
Cobalt, Total	mg/L	N/A	<0.001	<0.001	<0.001	--	--	<0.001	--	--	<0.001
Fluoride	mg/L	4	0.280	0.283	0.304	0.508	0.443	0.492	0.352	0.996	0.598
Lead, Dissolved	mg/L	0.03	<0.0005	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.0005	<0.0005	<0.0005
Lead, Total	mg/L	0.03	<0.0005	<0.0005	<0.0005	--	--	0.0006	--	--	<0.0005
Lithium, Total	mg/L	N/A	<0.01	<0.01	<0.01	--	--	0.02	--	--	0.03
Mercury, Dissolved	mg/L	0.0011	<0.0002	<0.0002	<0.0002	--	--	<0.0002	--	--	<0.0002
Mercury, Total	mg/L	0.000012	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum, Total	mg/L	N/A	<0.005	0.006	0.006	--	--	0.017	--	--	0.027
pH, Field	S.U.	6.5 - 9.0	7.33	7.18	7.11	7.62	6.81	7.61	7.73	7.13	7.11
Radium 226 + 228, Comb	pCi/L	3.75	0.516	0.507	0.456	--	--	0.539	--	--	0.459
Selenium, Dissolved	mg/L	1	0.003	0.003	0.003	0.003	0.004	0.003	0.007	0.011	0.018
Selenium, Total	mg/L	1	<0.0025	0.0032	<0.0025	--	--	<0.0025	--	--	0.0184
Sulfate	mg/L	1440*	62	108	177	367	67	243	1,187	946	513
Thallium, Dissolved	mg/L	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	<0.001
Thallium, Total	mg/L	0.003	<0.001	<0.001	<0.001	--	--	<0.001	--	--	<0.001
Total Dissolved Solids	mg/L	N/A	438	580	765	1,113	1,205	1,089	2,449	2,192	1,553

Exceeds Surface Water Standard

Average concentrations between March 2011 and December 2020 as calculated by Sanitas™ Software

"<" = Constituent non-detect in 75% or more samples; reporting limit presented as average.

"--" = Constituent not analyzed

N/A = Standard not established for this constituent

[1]Constituents analyzed are coal-combustion residual (CCR) constituents as identified in Appendices III and IV to 40 CFR Part 257.

[2] Surface Water Standard values obtained from the Illinois General Use Water Quality Standards (WQS) as defined in 35 IAC 302, Subpart B or, in the absence of Illinois WQS, the Illinois Water Quality Criteria (WQC) as shown in **Table 1**.

Site-specific Water Quality Standard for Sulfate per 35 IAC 302.208(h)(2)(A); standard is hardness (H) and chloride (Cl) dependent, and calculated as follows =exp[1276.7+5.508(H)-1.457(Cl)]*0.65

Comparison of Downgradient Average Groundwater Analytical Results to Surface Water Standards
Will Co. Station

Constituent[1]	Units	Surface Water Standard[2]	Groundwater Analytical Results - Average Concentrations					
			MW-07	MW-08	MW-09	MW-10	MW-11	MW-12
Antimony, Dissolved	mg/L	0.32	<0.003	<0.003	<0.003	<0.003	--	--
Antimony, Total	mg/L	0.32	--	--	<0.003	<0.003	<0.003	<0.003
Arsenic, Dissolved	mg/L	0.19	0.003	0.007	0.005	0.008	--	--
Arsenic, Total	mg/L	0.19	--	--	0.005	0.020	0.008	0.002
Barium, Dissolved	mg/L	5	0.057	0.076	0.028	0.094	--	--
Barium, Total	mg/L	5	--	--	0.039	0.105	0.118	0.109
Beryllium, Dissolved	mg/L	N/A	<0.001	<0.001	<0.001	<0.001	--	--
Beryllium, Total	mg/L	N/A	--	--	<0.001	<0.001	<0.001	<0.001
Boron, Dissolved	mg/L	7.6	3.97	2.38	1.75	2.92	--	--
Boron, Total	mg/L	7.6	--	--	1.91	3.32	2.93	2.15
Cadmium, Dissolved	mg/L	0.001720142	<0.0005	<0.0005	<0.0005	<0.0005	--	--
Cadmium, Total	mg/L	0.001720142	--	--	<0.0005	<0.0005	<0.0005	<0.0005
Calcium, Total	mg/L	N/A	--	--	59	133	95	152
Chloride	mg/L	500	149	146	214	128	94	167
Chromium, Dissolved	mg/L	0.13	<0.005	<0.005	<0.005	<0.005	--	--
Chromium, Total	mg/L	0.13	--	--	<0.005	<0.005	<0.005	<0.005
Cobalt, Dissolved	mg/L	N/A	<0.001	0.001	<0.001	<0.001	--	--
Cobalt, Total	mg/L	N/A	--	--	<0.001	<0.001	<0.001	<0.001
Fluoride	mg/L	4	0.750	0.563	0.457	0.713	0.612	0.478
Lead, Dissolved	mg/L	0.03	<0.0005	<0.0005	<0.0005	<0.0005	--	--
Lead, Total	mg/L	0.03	--	--	0.0006	0.0006	0.0005	0.0005
Lithium, Total	mg/L	N/A	--	--	0.01	0.02	0.01	0.01
Mercury, Dissolved	mg/L	0.0011	<0.002	<0.002	<0.002	<0.002	--	--
Mercury, Total	mg/L	0.000012	--	--	<0.002	<0.002	<0.002	<0.002
Molybdenum, Total	mg/L	N/A	--	--	0.096	0.066	0.071	0.040
pH, Field	S.U.	6.5 - 9.0	7.90	7.18	9.22	7.43	--	--
Radium 226 + 228, Comb	pCi/L	3.75	--	--	0.429	0.819	0.832	0.514
Selenium, Dissolved	mg/L	1	0.0047	0.0048	0.0030	0.0030	--	--
Selenium, Total	mg/L	1	--	--	0.0029	<0.0025	<0.0025	0.0047
Sulfate	mg/L	1460*	565	486	278	292	135	214
Thallium, Dissolved	mg/L	0.003	<0.002	<0.002	<0.002	<0.002	--	--
Thallium, Total	mg/L	0.003	--	--	<0.002	<0.002	<0.002	<0.002
Total Dissolved Solids	mg/L	N/A	1,287	1,253	793	966	645	1,051

Exceeds Surface Water Standard

Average concentrations between December 2010 and November 2020 as calculated by Sanitas™ Software

"<" = Constituent non-detect in 75% or more samples; reporting limit presented as average.

"--" = Constituent not analyzed

N/A = Standard not established for this constituent

[1]Constituents analyzed are coal-combustion residual (CCR) constituents as identified in Appendices III and IV to 40 CFR Part 257.

[2] Surface Water Standard values obtained from the Illinois General Use Water Quality Standards (WQS) as defined in 35 IAC 302, Subpart B or, in the absence of Illinois WQS, the Illinois Water Quality Criteria (WQC) as shown in **Table 1**.

Comparison of Downgradient Average Groundwater Analytical Results to Surface Water Standards
Waukegan Station

Constituent[1]	Units	Surface Water Standard[2]	Groundwater Analytical Results - Average Concentrations			
			MW-01	MW-02	MW-03	MW-04
Antimony, Dissolved	mg/L	0.32	<0.003	<0.003	<0.003	<0.003
Antimony, Total	mg/L	0.32	<0.003	<0.003	<0.003	<0.003
Arsenic, Dissolved	mg/L	0.148	0.078	0.012	0.004	0.007
Arsenic, Total	mg/L	0.148	0.076	0.011	0.001	0.010
Barium, Dissolved	mg/L	5	0.027	0.024	0.012	0.038
Barium, Total	mg/L	5	0.032	0.026	0.020	0.056
Beryllium, Dissolved	mg/L	N/A	<0.001	<0.001	<0.001	<0.001
Beryllium, Total	mg/L	N/A	<0.001	<0.001	<0.001	<0.001
Boron, Dissolved	mg/L	7.6	2.11	2.50	1.86	2.81
Boron, Total	mg/L	7.6	2.49	3.49	3.09	2.91
Cadmium, Dissolved	mg/L	0.0037	<0.0005	<0.0005	<0.0005	<0.0005
Cadmium, Total	mg/L	0.0037	<0.0005	<0.0005	<0.0005	<0.0005
Chloride	mg/L	500	49	48	51	46
Chromium, Dissolved	mg/L	0.011	<0.005	<0.005	<0.005	<0.005
Chromium, Total	mg/L	0.011	<0.005	<0.005	<0.005	<0.005
Cobalt, Dissolved	mg/L	N/A	<0.001	<0.001	<0.001	<0.001
Cobalt, Total	mg/L	N/A	<0.001	<0.001	<0.001	<0.001
Fluoride	mg/L	4	0.338	0.837	0.514	0.550
Lead, Dissolved	mg/L	0.011	<0.0005	<0.0005	<0.0005	<0.0005
Lead, Total	mg/L	0.011	<0.0005	<0.0005	<0.0005	<0.0005
Lithium, Total	mg/L	N/A	--	0.01 U	0.01 U	0.01 U
Mercury, Dissolved	mg/L	0.0000031	<0.0002	<0.0002	<0.0002	<0.0002
Mercury, Total	mg/L	0.00091	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum, Total	mg/L	N/A	0.057	0.059	0.050	0.032
pH, Field	S.U.	6.5 - 9.0	9.74	8.24	7.87	7.49
Radium-226	pCi/L	3.75	0.140	0.143	0.147	--
Radium-228	pCi/L	3.75	0.438	0.470	0.446	0.505
Selenium, Dissolved	mg/L	5	0.0193	0.0071	0.0099	0.0093
Selenium, Total	mg/L	5	0.0048	0.0051	0.0054	0.0110
Sulfate	mg/L	500	286	256	219	254
Thallium, Dissolved	mg/L	N/A	<0.002	<0.002	<0.002	<0.002
Thallium, Total	mg/L	N/A	<0.002	<0.002	<0.002	<0.002
Total Dissolved Solids	mg/L	1000	562	551	505	595

Exceeds Surface Water Standard

Average concentrations between October 2010 and November 2020 as calculated by Sanitas™ Software

"<" = Constituent non-detect in 75% or more samples; reporting limit presented as average.

"--" = Constituent not analyzed

N/A = Standard not established for this constituent

[1]Constituents analyzed are coal-combustion residual (CCR) constituents as identified in Appendices III and IV to 40 CFR Part 257.

[2] Surface Water Standard values obtained from the Illinois General Use Water Quality Standards (WQS) as defined in 35 IAC 302, Subpart B or, in the absence of Illinois WQS, the Illinois Water Quality Criteria (WQC) as shown in **Table 1**.

Appendix E

HELP Model

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**********************************************************************
**********************************************************************
**                                                                  **
**                                                                  **
**               HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE       **
**                 HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)       **
**                   DEVELOPED BY ENVIRONMENTAL LABORATORY          **
**                     USAE WATERWAYS EXPERIMENT STATION            **
**              FOR USEPA RISK REDUCTION ENGINEERING LABORATORY      **
**                                                                  **
**                                                                  **
**********************************************************************
**********************************************************************



PRECIPITATION DATA FILE:    C:Waukegan\PREC30.D4
TEMPERATURE DATA FILE:      C:Waukegan\TEMP30.D7
SOLAR RADIATION DATA FILE:  C:Waukegan\SOLAR30.D13
EVAPOTRANSPIRATION DATA:    C:Waukegan\EVAP30.D11
SOIL AND DESIGN DATA FILE:  C:Waukegan\BASE_3.D10
OUTPUT DATA FILE:           C:Waukegan\BASE_3.OUT


TIME:  10:57     DATE:   4/ 6/2021



**********************************************************************

     TITLE:  Midwest Generation (Waukegan) - Base Cond. - 1"/1" Soil

**********************************************************************



     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
               COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.



                                LAYER  1
                                --------

                    TYPE 1 - VERTICAL PERCOLATION LAYER
                        MATERIAL TEXTURE NUMBER   9
          THICKNESS                     =      1.00   INCHES
          POROSITY                      =      0.5010 VOL/VOL
          FIELD CAPACITY                =      0.2840 VOL/VOL
          WILTING POINT                 =      0.1350 VOL/VOL
          INITIAL SOIL WATER CONTENT    =      0.4648 VOL/VOL
          EFFECTIVE SAT. HYD. COND.     =  0.190000006000E-03 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  4.63
                  FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.
```

LAYER 2

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 9

THICKNESS	=	1.00 INCHES
POROSITY	=	0.5010 VOL/VOL
FIELD CAPACITY	=	0.2840 VOL/VOL
WILTING POINT	=	0.1350 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.5010 VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.190000006000E-03 CM/SEC

LAYER 3

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 31

THICKNESS	=	120.00 INCHES
POROSITY	=	0.5780 VOL/VOL
FIELD CAPACITY	=	0.0760 VOL/VOL
WILTING POINT	=	0.0250 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1966 VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.410000002000E-02 CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 9 WITH A GOOD STAND OF GRASS, A SURFACE SLOPE OF 1.% AND A SLOPE LENGTH OF 500. FEET.

SCS RUNOFF CURVE NUMBER	=	74.30	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	1.000	ACRES
EVAPORATIVE ZONE DEPTH	=	1.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	0.465	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	0.501	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	0.135	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	24.555	INCHES
TOTAL INITIAL WATER	=	24.555	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
CHICAGO ILLINOIS

STATION LATITUDE	=	41.78 DEGREES
MAXIMUM LEAF AREA INDEX	=	3.50
START OF GROWING SEASON (JULIAN DATE)	=	117
END OF GROWING SEASON (JULIAN DATE)	=	290
EVAPORATIVE ZONE DEPTH	=	1.0 INCHES
AVERAGE ANNUAL WIND SPEED	=	10.30 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	71.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	65.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	70.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	72.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR CHICAGO ILLINOIS

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
1.60	1.31	2.59	3.66	3.15	4.08
3.63	3.53	3.35	2.28	2.06	2.10

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR CHICAGO ILLINOIS

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
21.40	26.00	36.00	48.80	59.10	68.60
73.00	71.90	64.70	53.50	39.80	27.70

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR CHICAGO ILLINOIS
AND STATION LATITUDE = 41.78 DEGREES

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 30

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	1.47	1.46	2.39	3.26	3.34	4.22
	3.43	3.42	3.11	2.19	2.10	2.22
STD. DEVIATIONS	0.68	0.71	1.18	1.52	1.65	2.14
	1.83	1.76	1.76	1.22	1.06	0.97
RUNOFF						
TOTALS	0.413	1.356	2.098	0.305	0.062	0.105
	0.096	0.111	0.062	0.036	0.023	0.239
STD. DEVIATIONS	0.596	0.974	1.675	0.517	0.181	0.199
	0.111	0.179	0.097	0.063	0.051	0.385
EVAPOTRANSPIRATION						
TOTALS	0.534	0.453	0.547	1.427	1.502	1.721
	1.554	1.347	1.072	0.747	0.704	0.521
STD. DEVIATIONS	0.111	0.085	0.208	0.556	0.610	0.730
	0.645	0.604	0.482	0.345	0.230	0.144
PERCOLATION/LEAKAGE THROUGH LAYER 2						
TOTALS	0.0621	0.1168	0.4469	1.6497	1.7830	2.3693
	1.8055	1.9666	1.9958	1.3610	1.3568	0.6368
STD. DEVIATIONS	0.0597	0.0709	0.3026	1.0458	1.1514	1.3195
	1.3224	1.1766	1.3682	0.9273	0.9174	0.5390
PERCOLATION/LEAKAGE THROUGH LAYER 3						
TOTALS	1.3450	0.9033	0.7227	0.4399	0.5618	1.0476
	1.9459	1.8423	1.8643	1.9094	1.5873	1.4743
STD. DEVIATIONS	0.4007	0.1882	0.1180	0.0877	0.3700	0.7246
	1.4347	0.8598	0.7849	0.6882	0.5740	0.5352

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 2						
AVERAGES	0.0020	0.0028	0.0100	0.0325	0.0335	0.0437
	0.0293	0.0315	0.0359	0.0266	0.0259	0.0134
STD. DEVIATIONS	0.0034	0.0026	0.0062	0.0207	0.0216	0.0204
	0.0187	0.0186	0.0238	0.0182	0.0168	0.0095

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 30

	INCHES	CU. FEET	PERCENT
PRECIPITATION	32.60 (5.565)	118325.9	100.00
RUNOFF	4.906 (2.0599)	17809.38	15.051
EVAPOTRANSPIRATION	12.130 (2.0324)	44030.22	37.211
PERCOLATION/LEAKAGE THROUGH LAYER 2	15.55042 (3.57521)	56448.012	47.70554
AVERAGE HEAD ON TOP OF LAYER 2	0.024 (0.005)		
PERCOLATION/LEAKAGE THROUGH LAYER 3	15.64379 (3.64652)	56786.945	47.99198
CHANGE IN WATER STORAGE	-0.083 (1.3175)	-300.65	-0.254

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 30

	(INCHES)	(CU. FT.)
PRECIPITATION	4.09	14846.700
RUNOFF	1.681	6103.1455
PERCOLATION/LEAKAGE THROUGH LAYER 2	3.152224	11442.57130
AVERAGE HEAD ON TOP OF LAYER 2	0.500	
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.405263	1471.10535
SNOW WATER	4.86	17649.8242

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.5010
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.1350

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FINAL WATER STORAGE AT END OF YEAR 30

LAYER	(INCHES)	(VOL/VOL)
1	0.4648	0.4648
2	0.5010	0.5010
3	20.7881	0.1732
SNOW WATER	0.316	

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**                                                                           **
**                                                                           **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE                **
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                 **
**                   DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                     USAE WATERWAYS EXPERIMENT STATION                     **
**               FOR USEPA RISK REDUCTION ENGINEERING LABORATORY             **
**                                                                           **
**                                                                           **
*******************************************************************************
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```

PRECIPITATION DATA FILE: C:Waukegan\PREC30.D4
TEMPERATURE DATA FILE: C:Waukegan\TEMP30.D7
SOLAR RADIATION DATA FILE: C:Waukegan\SOLAR30.D13
EVAPOTRANSPIRATION DATA: C:Waukegan\EVAP30.D11
SOIL AND DESIGN DATA FILE: C:Waukegan\CAP_3A.D10
OUTPUT DATA FILE: C:Waukegan\CAP_3A.OUT

TIME: 13:47 DATE: 4/ 7/2021

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TITLE: Midwest Generation (Waukegan) - Cap Cond. - w/ Geomembrane

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NOTE: INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.

LAYER 1

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 9

THICKNESS	=	6.00	INCHES
POROSITY	=	0.5010	VOL/VOL
FIELD CAPACITY	=	0.2840	VOL/VOL
WILTING POINT	=	0.1350	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.3427	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.190000006000E-03	CM/SEC

NOTE: SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY 4.63

FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.

LAYER 2

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 12

THICKNESS	=	12.00	INCHES
POROSITY	=	0.4710	VOL/VOL
FIELD CAPACITY	=	0.3420	VOL/VOL
WILTING POINT	=	0.2100	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.3583	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.419999997000E-04	CM/SEC

LAYER 3

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 20

THICKNESS	=	0.20	INCHES
POROSITY	=	0.8500	VOL/VOL
FIELD CAPACITY	=	0.0100	VOL/VOL
WILTING POINT	=	0.0050	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0189	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	10.0000000000	CM/SEC
SLOPE	=	5.00	PERCENT
DRAINAGE LENGTH	=	250.0	FEET

LAYER 4

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 36

THICKNESS	=	0.40	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.399999993000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.75	HOLES/ACRE
FML INSTALLATION DEFECTS	=	2.50	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 5

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 9

THICKNESS	=	1.00	INCHES
POROSITY	=	0.5010	VOL/VOL
FIELD CAPACITY	=	0.2840	VOL/VOL
WILTING POINT	=	0.1350	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.5010	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.190000006000E-03	CM/SEC

LAYER 6

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 31

THICKNESS	=	120.00	INCHES
POROSITY	=	0.5780	VOL/VOL
FIELD CAPACITY	=	0.0760	VOL/VOL
WILTING POINT	=	0.0250	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0760	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.410000002000E-02	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 9 WITH A GOOD STAND OF GRASS, A SURFACE SLOPE OF 5.% AND A SLOPE LENGTH OF 250. FEET.

SCS RUNOFF CURVE NUMBER	=	76.10	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	1.000	ACRES
EVAPORATIVE ZONE DEPTH	=	2.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	0.920	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	1.002	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	0.270	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	15.980	INCHES
TOTAL INITIAL WATER	=	15.980	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM CHICAGO ILLINOIS

STATION LATITUDE	=	41.78	DEGREES
MAXIMUM LEAF AREA INDEX	=	3.50	
START OF GROWING SEASON (JULIAN DATE)	=	117	
END OF GROWING SEASON (JULIAN DATE)	=	290	
EVAPORATIVE ZONE DEPTH	=	2.0	INCHES
AVERAGE ANNUAL WIND SPEED	=	10.30	MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	71.00	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	65.00	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	70.00	%
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	72.00	%

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR CHICAGO ILLINOIS

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
1.60	1.31	2.59	3.66	3.15	4.08
3.63	3.53	3.35	2.28	2.06	2.10

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR CHICAGO ILLINOIS

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
21.40	26.00	36.00	48.80	59.10	68.60
73.00	71.90	64.70	53.50	39.80	27.70

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR CHICAGO ILLINOIS
AND STATION LATITUDE = 41.78 DEGREES

****

AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 30

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	1.47	1.46	2.39	3.26	3.34	4.22

	3.43	3.42	3.11	2.19	2.10	2.22
STD. DEVIATIONS	0.68	0.71	1.18	1.52	1.65	2.14
	1.83	1.76	1.76	1.22	1.06	0.97

RUNOFF

TOTALS	0.400	1.390	2.266	0.318	0.008	0.060
	0.053	0.033	0.016	0.002	0.000	0.205
STD. DEVIATIONS	0.630	1.041	1.753	0.590	0.034	0.231
	0.161	0.082	0.074	0.009	0.001	0.354

EVAPOTRANSPIRATION

TOTALS	0.539	0.453	0.630	1.820	1.965	2.240
	2.014	1.821	1.442	1.011	0.912	0.573
STD. DEVIATIONS	0.117	0.084	0.286	0.681	0.759	0.786
	0.807	0.780	0.628	0.465	0.248	0.161

LATERAL DRAINAGE COLLECTED FROM LAYER 3

TOTALS	0.1163	0.0012	0.1514	1.1998	1.4708	1.7004
	1.6026	1.5145	1.5676	1.2379	1.1522	0.7157
STD. DEVIATIONS	0.1641	0.0064	0.2024	0.9201	1.1226	1.1022
	1.2231	1.0275	1.1934	0.7596	0.7969	0.5451

PERCOLATION/LEAKAGE THROUGH LAYER 5

TOTALS	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001
	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000

PERCOLATION/LEAKAGE THROUGH LAYER 6

TOTALS	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001
	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 4

AVERAGES	0.0003	0.0000	0.0004	0.0035	0.0042	0.0050
	0.0046	0.0043	0.0046	0.0035	0.0034	0.0020
STD. DEVIATIONS	0.0005	0.0000	0.0006	0.0027	0.0032	0.0032

0.0035 0.0029 0.0035 0.0022 0.0023 0.0016

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 30

	INCHES	CU. FEET	PERCENT
PRECIPITATION	32.60 (5.565)	118325.9	100.00
RUNOFF	4.750 (2.1588)	17244.21	14.573
EVAPOTRANSPIRATION	15.419 (2.4608)	55972.44	47.304
LATERAL DRAINAGE COLLECTED FROM LAYER 3	12.43034 (3.12447)	45122.129	38.13377
PERCOLATION/LEAKAGE THROUGH LAYER 5	0.00081 (0.00018)	2.924	0.00247
AVERAGE HEAD ON TOP OF LAYER 4	0.003 (0.001)		
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.00081 (0.00018)	2.925	0.00247
CHANGE IN WATER STORAGE	-0.004 (1.3462)	-15.80	-0.013

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 30

	(INCHES)	(CU. FT.)
PRECIPITATION	4.09	14846.700
RUNOFF	1.715	6224.0708
DRAINAGE COLLECTED FROM LAYER 3	1.40194	5089.04932
PERCOLATION/LEAKAGE THROUGH LAYER 5	0.000070	0.25589
AVERAGE HEAD ON TOP OF LAYER 4	0.124	
MAXIMUM HEAD ON TOP OF LAYER 4	0.245	
LOCATION OF MAXIMUM HEAD IN LAYER 3 (DISTANCE FROM DRAIN)	2.0 FEET	
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.000030	0.10777
SNOW WATER	4.86	17649.8242

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.5010
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.1350

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

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FINAL WATER STORAGE AT END OF YEAR 30

LAYER	(INCHES)	(VOL/VOL)
1	1.8061	0.3010
2	4.1040	0.3420
3	0.0020	0.0100
4	0.0000	0.0000
5	0.5010	0.5010
6	9.1200	0.0760
SNOW WATER	0.316	

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Exhibit 38

Weaver Consultants Group

REMEDY ASSESSMENT

MIDWEST GENERATION

Douglas G. Dorgan, Jr., LPG

Michael B. Maxwell, LPG, CHMM

General Approach

Weaver Consultants Group

General Approach

1. **Regulatory Framework**
   - Federal/State CCR Surface Impoundments
   - Historic Fill Areas
2. **Background/site conditions and investigation**
   - Potential exposures to human and ecological receptors
   - Groundwater quality trends through statistical analysis
   - Evaluation of downgradient groundwater quality
3. **Remedial Assessment**
   - CCR Regulations/Illinois Act
   - Risk
   - Trend
   - Comparisons

1. Regulatory Framework

- **CCR Surface Impoundments**
  - Federal and State CCR Rules
    - Federal CCR Rules: 40 CFR 257
    - Illinois CCR Rules: 35 IAC 845
  - Board Orders
  - 2012 CCAs; GMZs/ELUCs
  - Ongoing data collection

- **Historic Fill Areas**
  - Illinois Groundwater Standards
  - Illinois SRP (TACO)
  - Board Orders
  - Illinois sub docket; Federal proposed fill rules
  - Lines of evidence

2. Background / Site Conditions

- **Previous investigations**
  - Hydrogeologic setting
  - Surrounding land use
  - Identification of potential receptors
  - Groundwater analytical results for historic and ongoing monitoring
- **Data analysis**
  - Evaluate risk
  - Evaluate data trends

Evaluation of Risk to Surface Water

- **Comparison of groundwater data to surface water standards**
  - 35 IAC Part 302 Illinois Water Quality Standards (WQS)
  - Illinois Water Quality Criteria (WQC) for surface water
    - Downgradient data compared to Illinois chronic WQS or if WQS not available, the Illinois chronic WQC
  - Comparisons performed for 40 CFR 257 Appendix III and Appendix IV
  - Average downgradient concentrations calculated
  - Potable well use

Groundwater Data Evaluation

- **Substantial quantity of groundwater quality data**
  - CCA Groundwater Monitoring
  - CCR Groundwater Monitoring
- **Included 40 CFR 257 Appendix III (detection) and Appendix IV (assessment) constituents**
- **Monitoring well locations**
  - Best represent groundwater quality after natural mechanisms of advection, dispersion, and attenuation
  - Approach consistent with TACO evaluation
  - Conservative evaluation

Statistical Trend Testing of Groundwater Analytes

- Mann-Kendall Test for Trend
- Referenced in **USEPA Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Unified Guidance,** March 2009
- Testing commonly employed to assess effectiveness of a groundwater remedy/corrective action
- Quantitative method of assessing upward/downward trends

3. Remedial Assessment Process

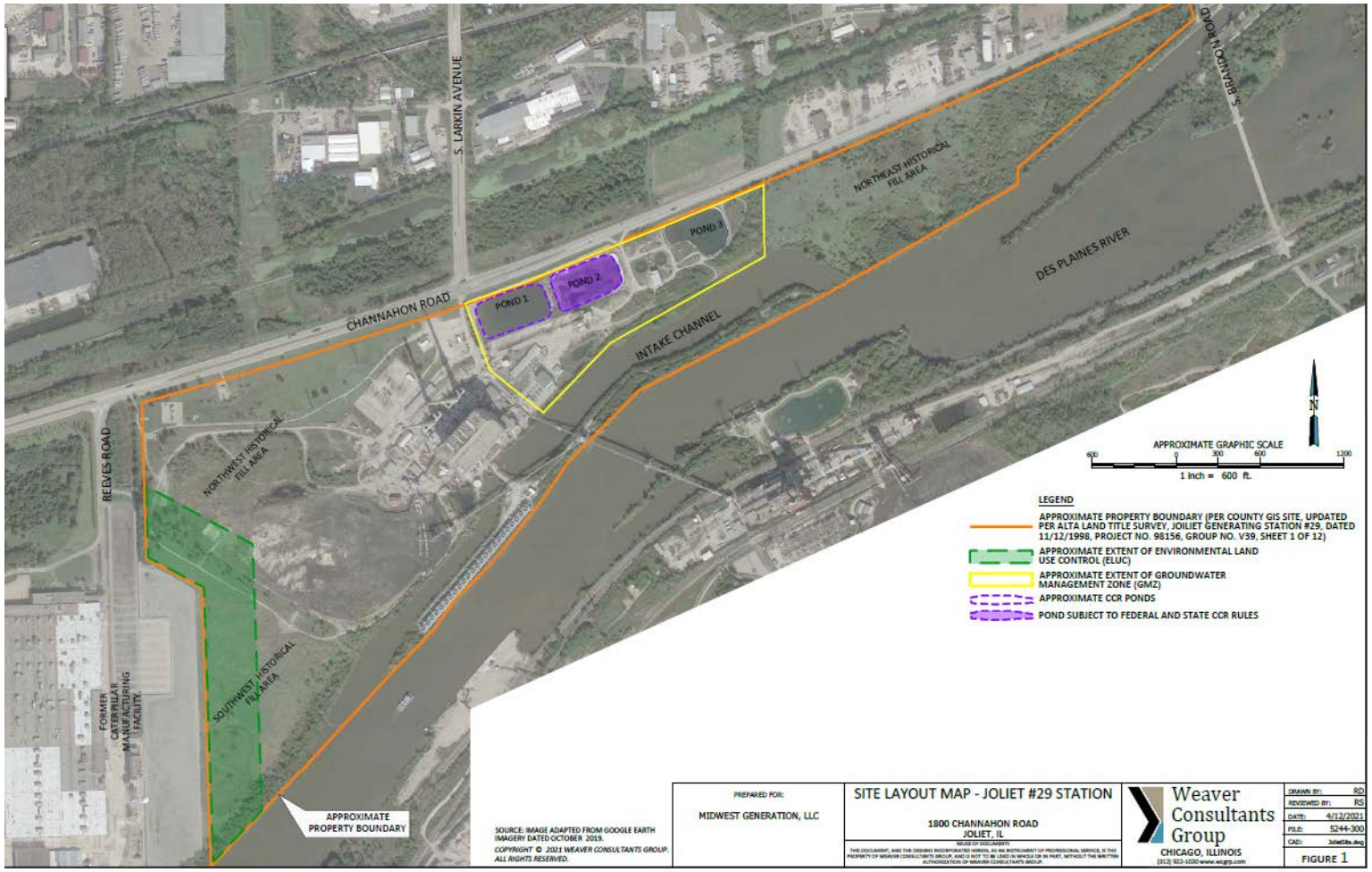
- Historic nature of CCR at Stations/mass
- Prior assessments
- CCR regulations for further control of surface impoundments
- Risk-based approach consistent with applicable regulations
- In absence of existing regulatory control for historic fill - risk based approach

Joliet 29 Station

Weaver Consultants Group

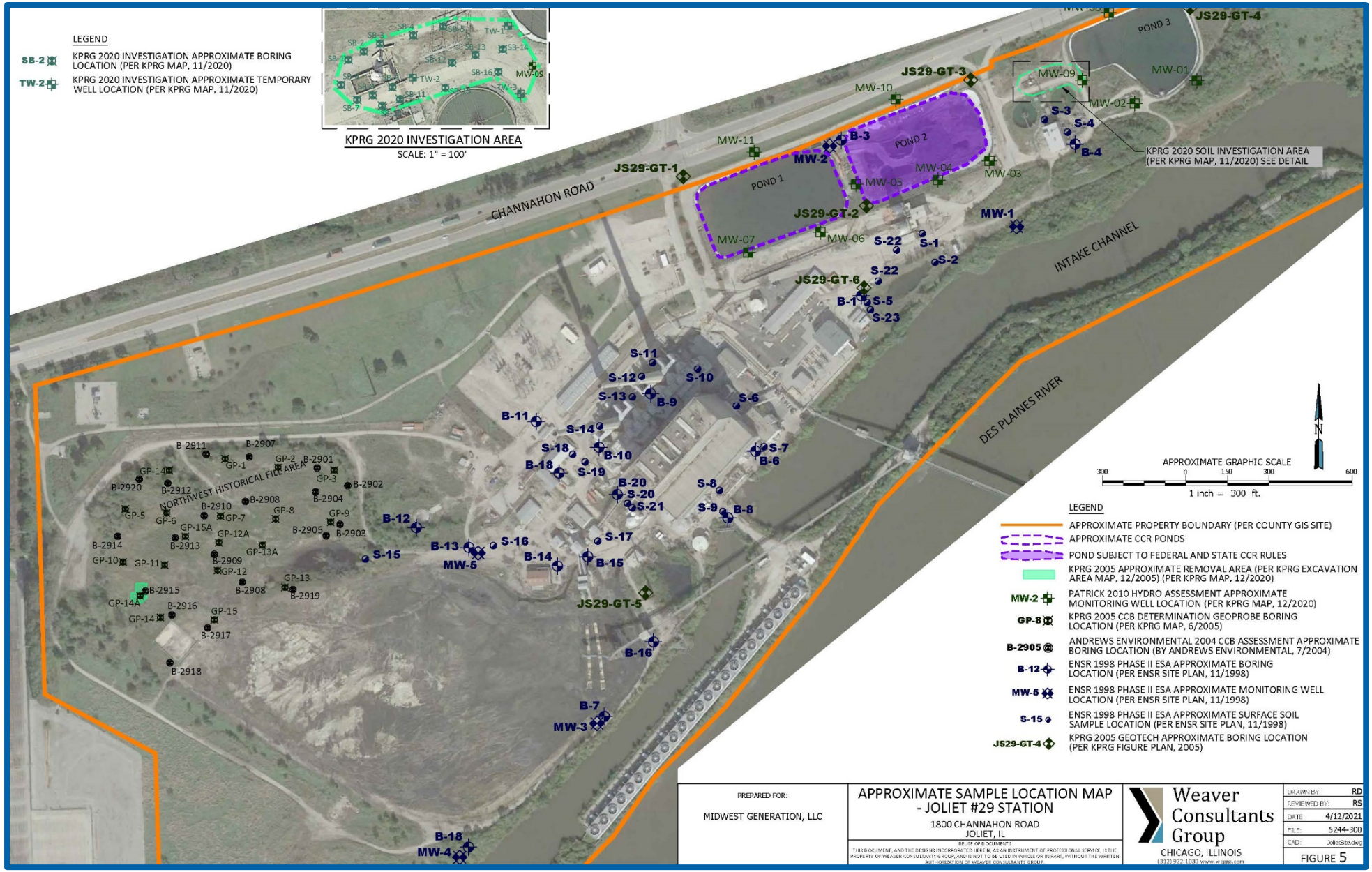
Joliet 29 - Background and Setting

- **Began operating in mid-1960s**
- **Acquired by MWG in 1999**
- **Ceased burning coal and moved to natural gas in 2016**
- **Located in predominantly Industrial Area**
- North - Channahon Rd./vacant land/Industrial-Commercial facilities
- South - Des Plaines River and Joliet 9 Generating Station
- East - Brandon Rd. (Lock and Dam on Des Plaines River)
- West - Former Caterpillar Manufacturing (prior SRP Site)
- **Scheduled to cease burning natural gas in 2023**



Joliet 29

Investigation Locations



Joliet 29 - Investigations

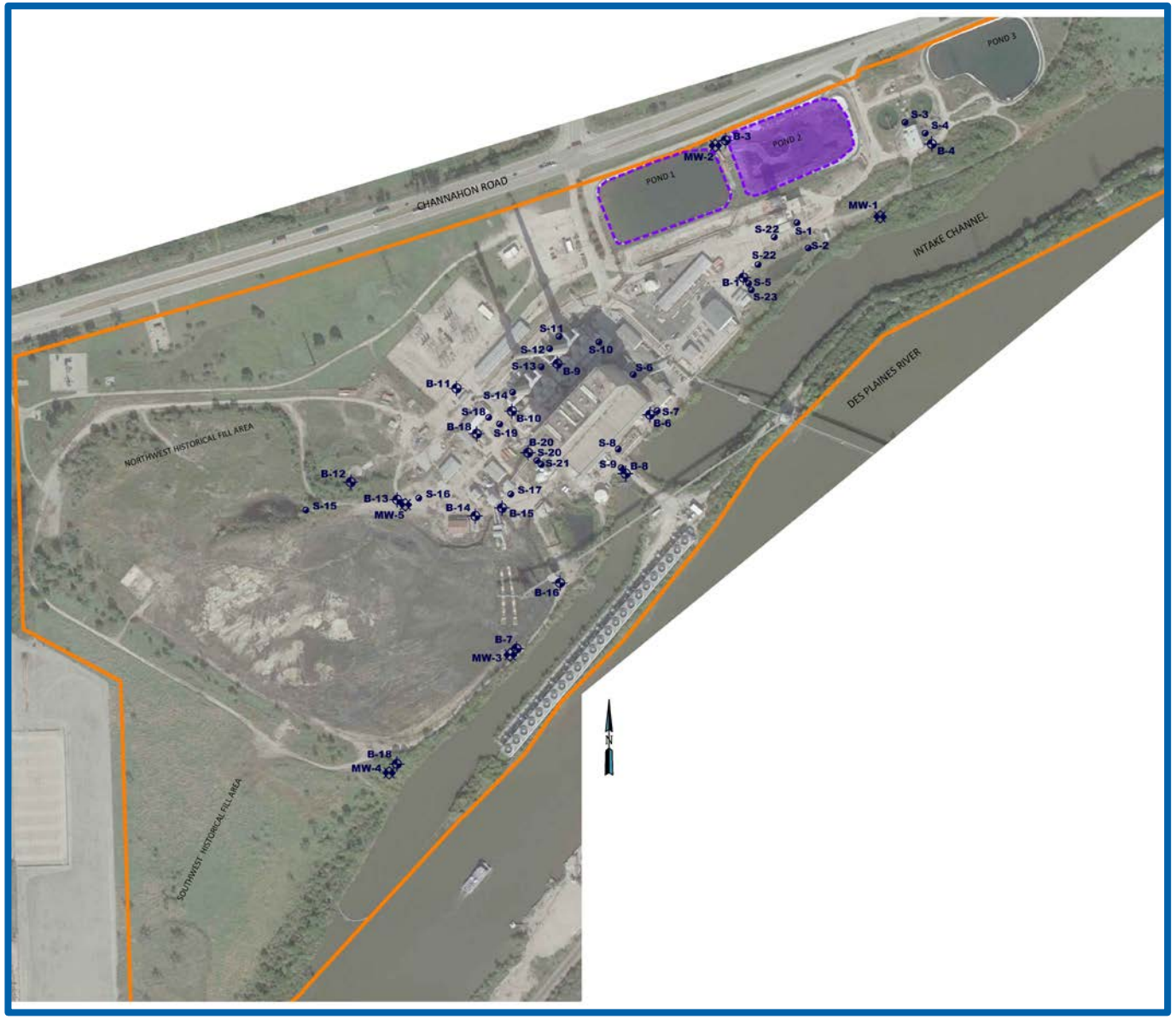
- **1998** Phase II ESA by ENSR
- **2004** CCB Preliminary Investigation by Andrews
- **2005** Geotechnical Investigation by KPRG
- **2005** Follow-Up CCB Investigation by KPRG
- **2005** Supplemental Delineation and Remediation near GP-14A by KPRG
- **2010** Hydrogeologic Assessment by Patrick Engineering
- **2020** Investigation Near MW-09 by KPRG
- Ongoing groundwater monitoring under CCR Rules/CCA
- Information concerning NE Historic Fill Area
- Des Plaines River assessment

Joliet 29 –
1998 Phase II ESA

- **17 borings, 5 MWs, 23 surface soil samples, 6 sediment samples collected**
- **MW-3 and MW-5:** none of 8 RCRA metals at concentrations above IL Class 1 Groundwater Standards
  - Insufficient groundwater to sample at MW-4

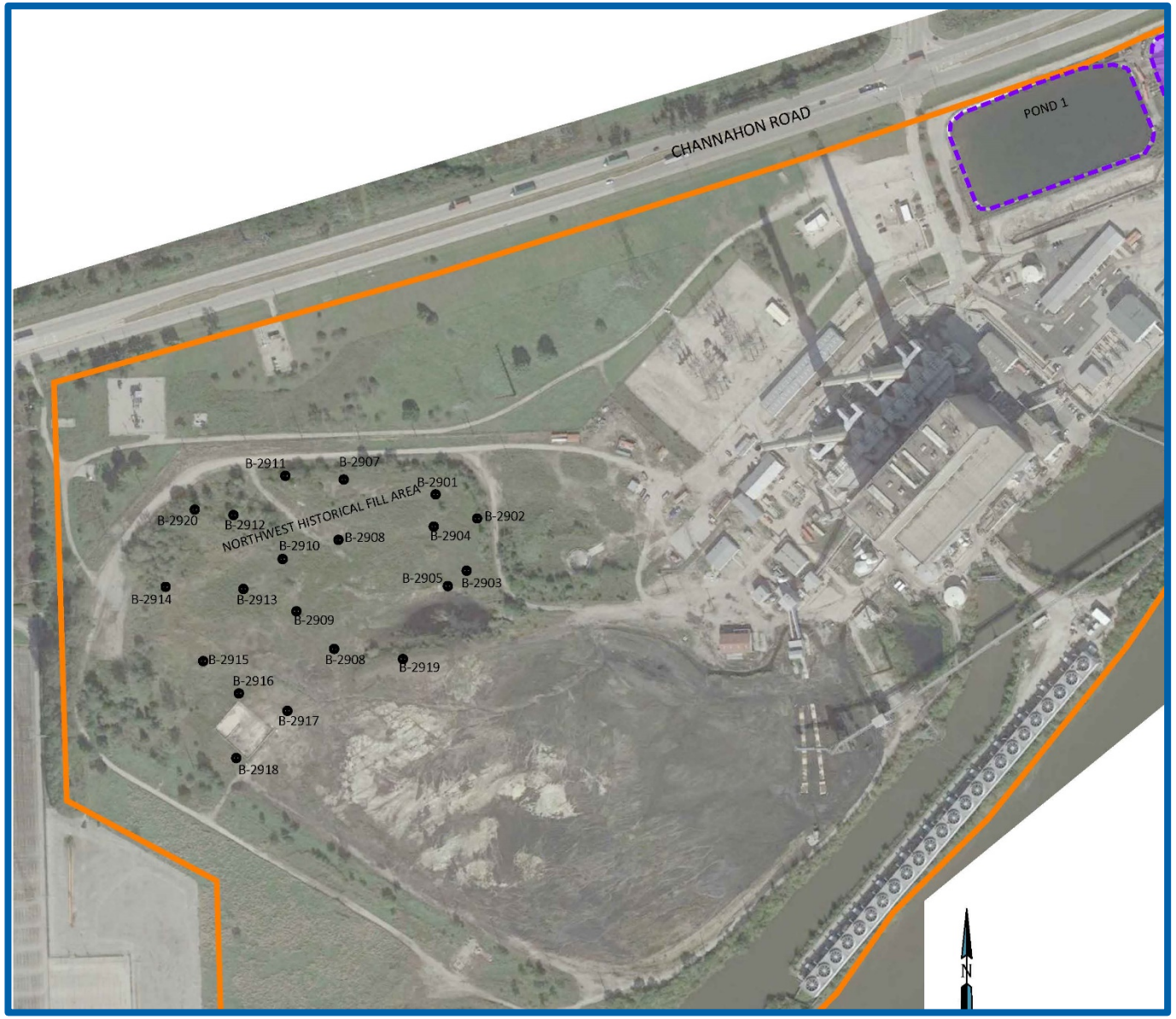
CONCLUSIONS:

- Groundwater ingestion not a potential exposure pathway
- Based on industrial land use, low potential for human exposure to constituents of concern
- No requirement under Illinois environmental law to further investigate or remediate property



Joliet 29 – NW Area - 2004 Preliminary CCB Investigation

- **Study feasibility of CCB demonstration -** NW Fill Area
- **Composite sample from 20 grab samples** over aprox.13 ac. area
- **Analyzed for NLET metals and "Code R" parameters** (TCLP metals, VOCs/SVOCs, ignitability, reactive CN and sulfide)
- **No leachable NLET** (ASTM D3987-85) metals concentrations above Class I Groundwater Standards
- **Material characterized as non-hazardous** for disposal purposes
- **CCB classification deemed feasible**



Joliet 29 – 2005 Geotechnical Investigation

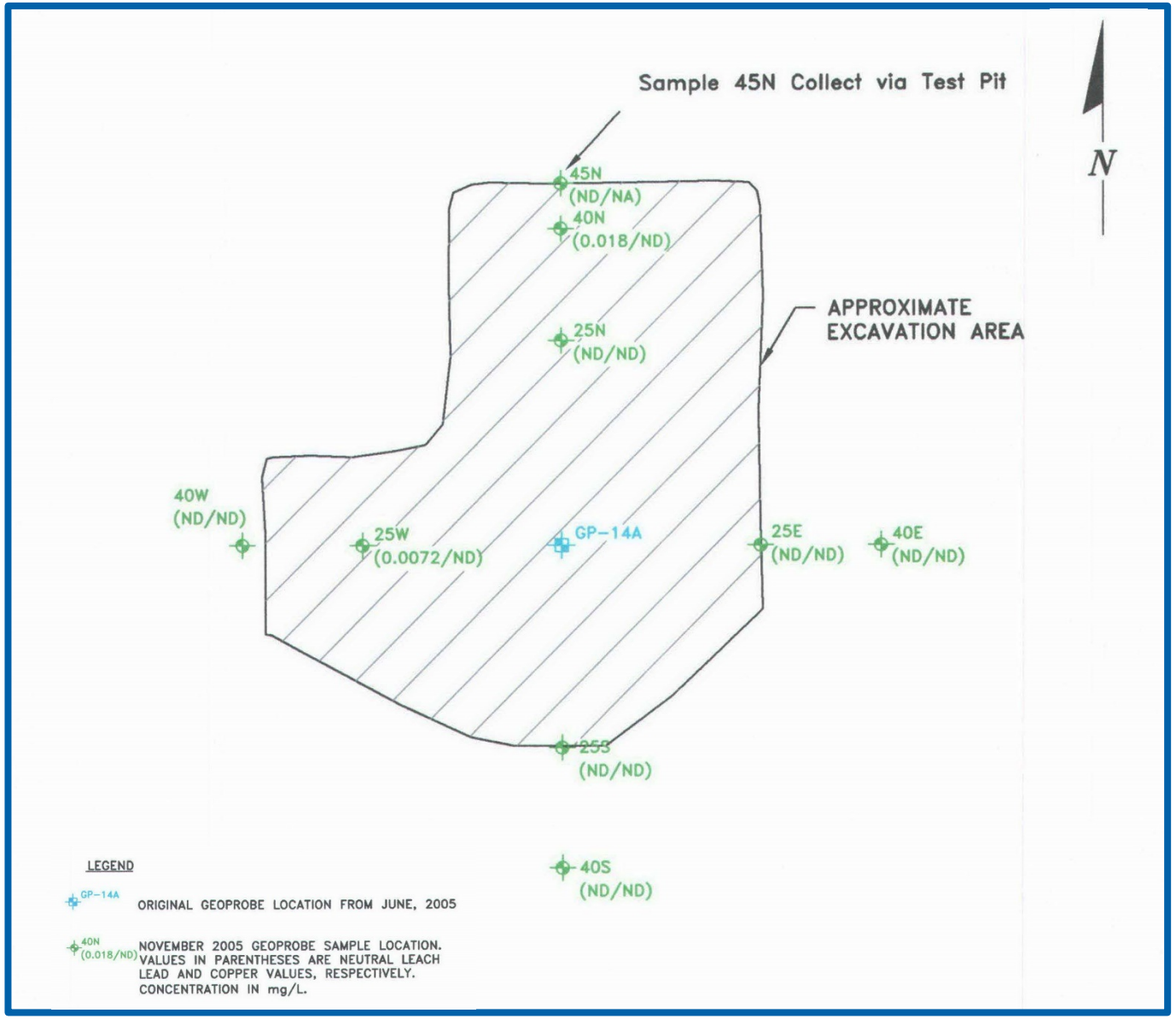
- Provide information on **physical characteristics of soils**
- **Six soil probes**
- **Bedrock encountered** at one boring at 15 ft. below ground surface

Joliet 29 NW area - 2005 2nd CCB Investigation

- **15 Geoprobes**
- **Coal ash encountered** consistent/homogeneous, interlayered fly ash/bottom ash
- **Composite samples collected** from vertical profile at each location
- **All but one area considered CCB,** based on statistical analysis of NLET data in comparison to Class I groundwater quality standard (GWQS)
- **NLET concentrations of copper/lead >** Class I GWQS at one location (GP-14A)
- **GP-14A excluded** from beneficial use designation and removed

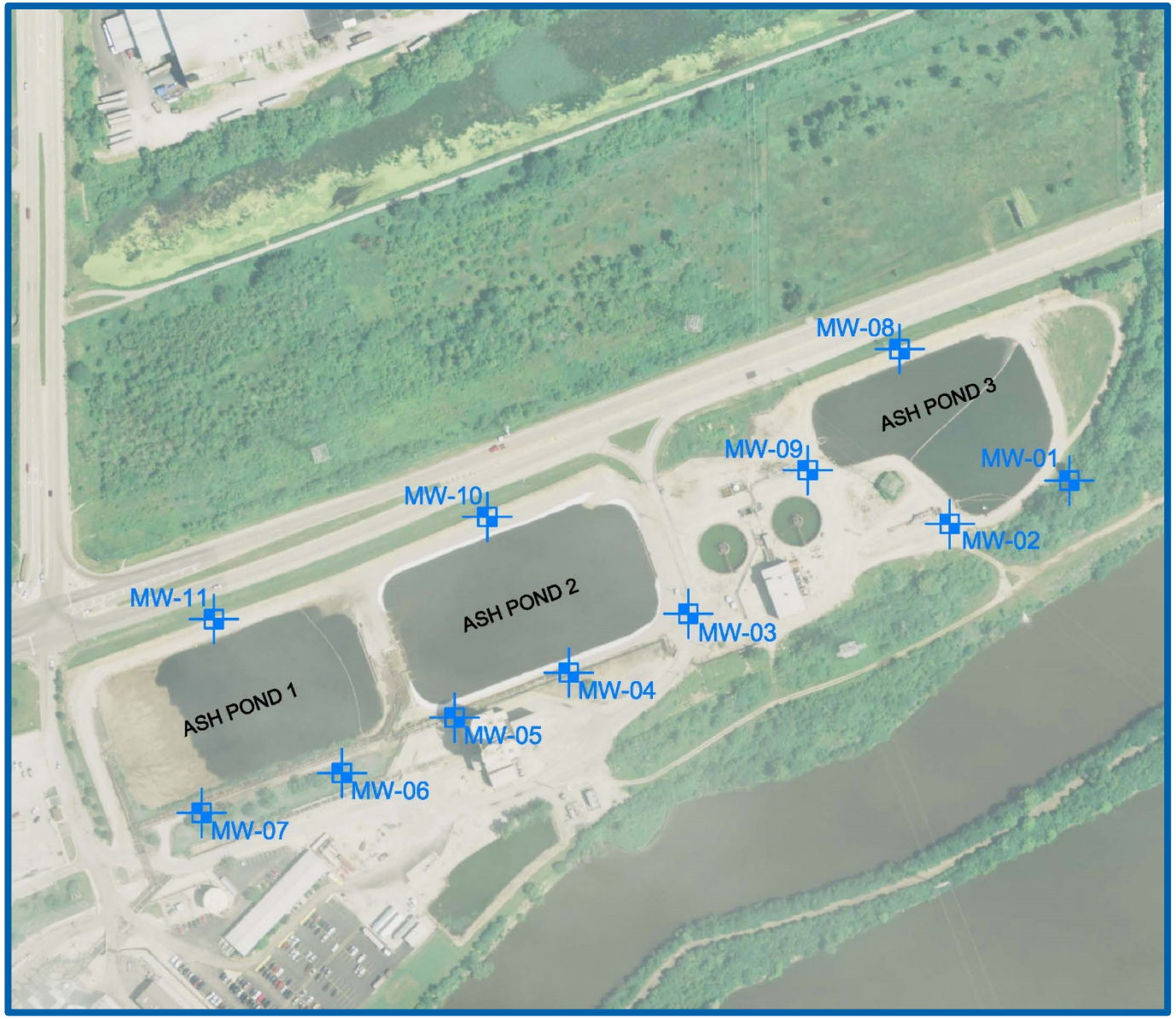
Joliet 29-
2005 Remediation of GP-14A Area

- **Additional delineation activities** N-S-E-W of GP-14A
- **Composite samples** from vertical interval submitted for **NLET copper/lead**
- **52 truckloads excavated** hauled to permitted landfill (1,062.88 tons)



Joliet 29 – 2010 Hydrogeologic Investigation

- **Voluntary investigation,** pre-CCR regulations
- **Installation of 11 MWs**
- **Groundwater samples collected**
- **11 potential CCR-related analytes not detected**
- **Boron concentrations below Part 620 Class 1 GWQS**
- ***Key CCR indicator***
- **Chloride present upgradient at the Class 1 GWQS (200 mg/L)**

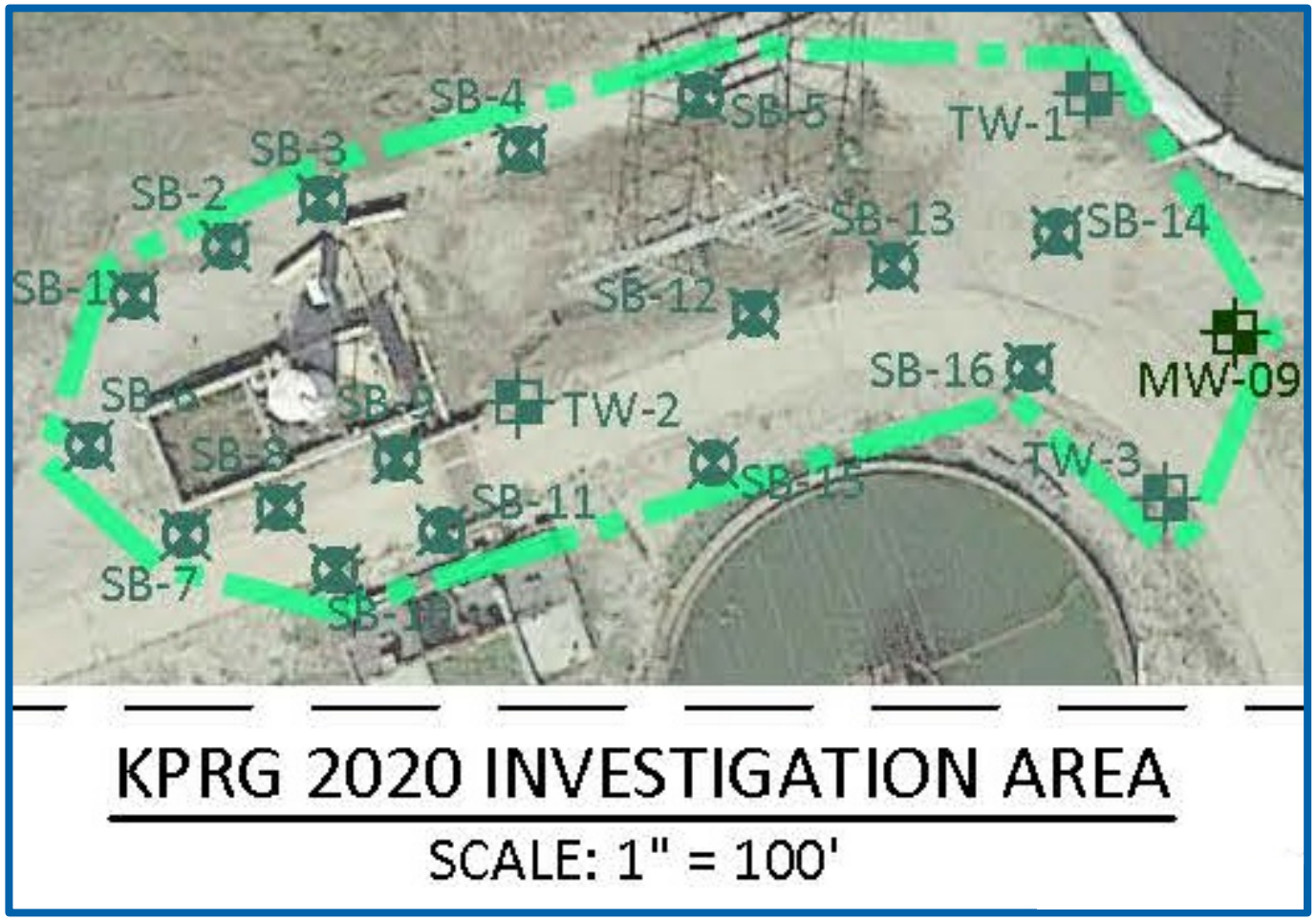


Joliet 29 – 2010 Hydrogeologic Investigation

- **Water well search (2500 ft radius):**
  - No potable wells downgradient of station on north side of Des Plaines River
- **Uppermost groundwater unit at depths ranging from 29 to 34 feet bgs**
- **Direction of groundwater flow towards the Des Plaines River**
  - Some groundwater flow from NE towards river

Joliet 29 – 2020 Investigation Near MW-09

- **18 soil probes, soil samples analyzed for sulfate, Fe, Mn**
- **Only area identified by the Board with Class 1 GWQS exceedances**
- **No coal ash identified in probes**
- **pH of groundwater at MW-09 is acidic**
- **CCR materials commonly exhibit basic pH** (LEAF data)
- **Acidity from oxidation of natural sulfide minerals forms sulfuric acid**
  - TDS and sulfate in soil mobilized to the groundwater by this acidity



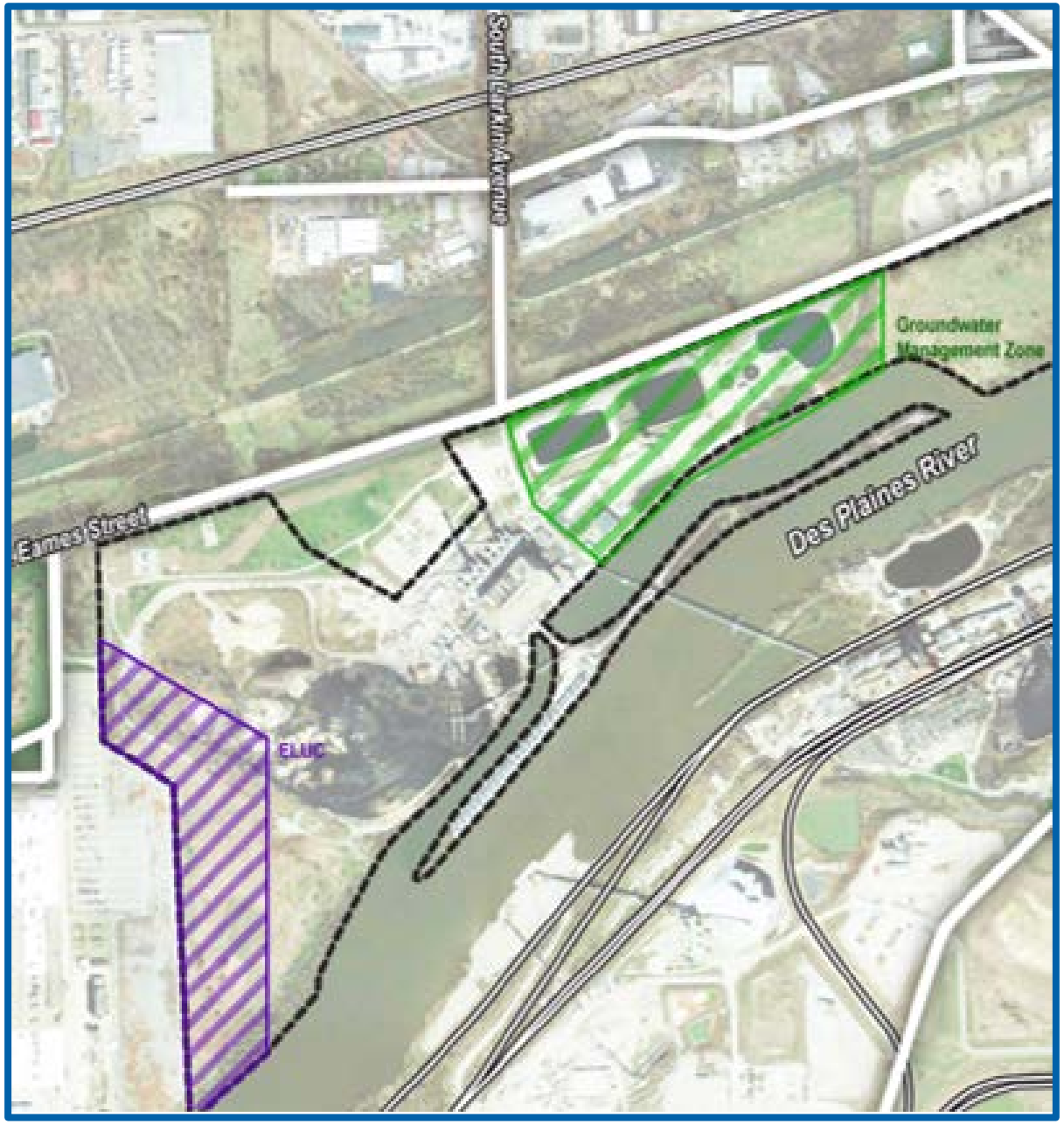
Joliet 29 –
Ongoing Groundwater Monitoring

- **12 monitoring wells installed around ponds**
- **Federal Appendix III (detection) constituents**
- **Federal Appendix IV (assessment) constituents**
- **Constituents required by IL CCR Rules (both detection and assessment constituents)**
- **Quarterly monitoring since CCAs implemented in 2012**
- **Sampling/analysis of 34 constituents 4x per year x 12 MWs**

Joliet 29 –
NE Historic Fill Area

- **Annual inspections of existing topsoil/vegetative cover performed in accordance with NPDES Permit**
  - If erosional features identified, they are repaired
- **KPRG reports no soil staining or seeps along riverbank,**
- **Heavy vegetation/no stressed vegetation**
- **Groundwater Flow**
- **Des Plaines River assessments**

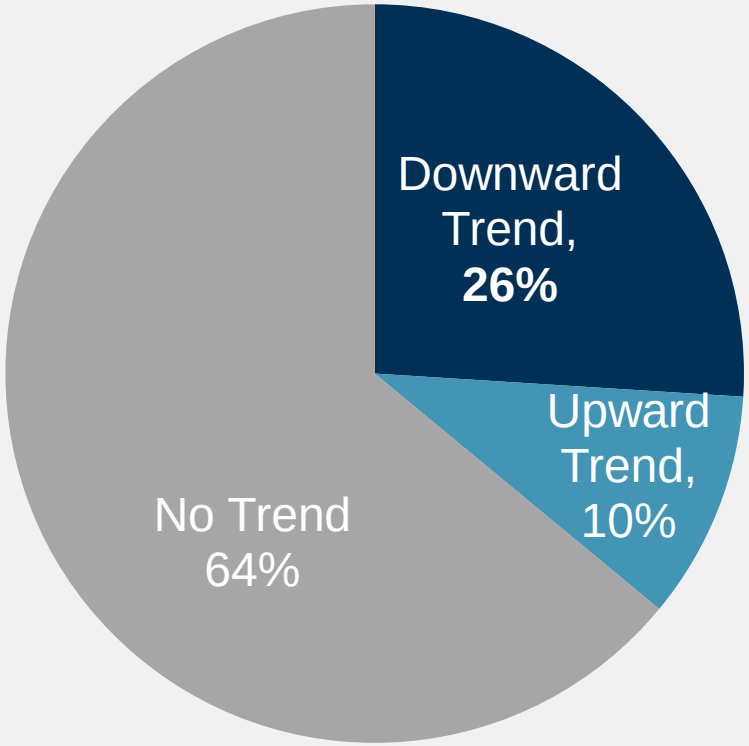
Joliet 29 -
GMZ and ELUC



Joliet 29 -
Data Analysis - Potential Receptors

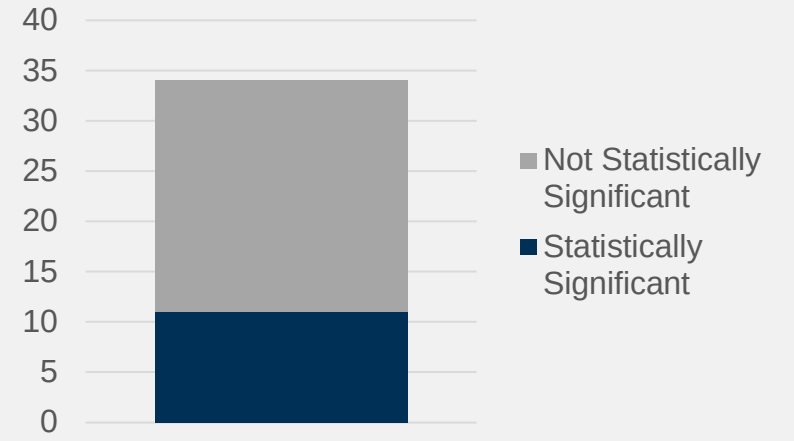
- **Onsite and Surrounding Industrial Land Use**
  - Industrial land use expected onsite into foreseeable future
  - Channahon Rd./industrial facilities to north
  - Former Caterpillar Manufacturing to west (SRP site)
- **No potable use of groundwater downgradient of Station**
  - Potable well search in Patrick report on 2010 Hydrogeologic Investigation (2500 ft radius)
  - City of Joliet in process of converting to Lake Michigan water as potable source
  - On-site potable wells prohibited by ELUC
  - GMZ established
- **Potential ecological receptors**
  - Des Plaines River Downgradient/South/Southeast of Station

Joliet 29 - Groundwater Trend Testing

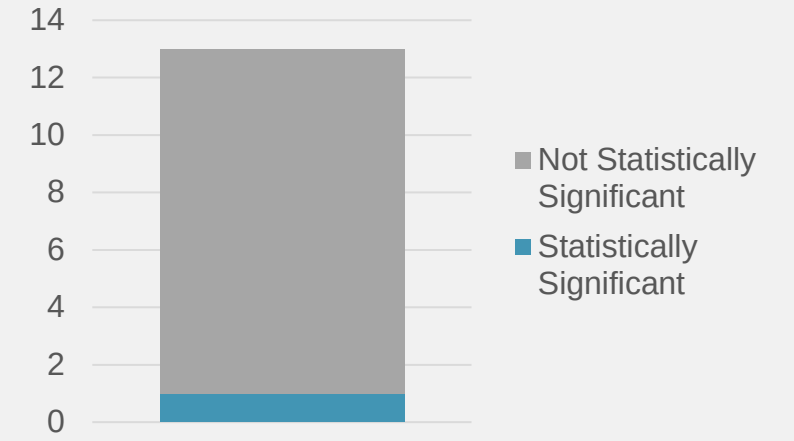


- Trend testing at downgradient MWs indicates improving groundwater quality over long term.
- No well with statistically significant upward trend has ever exceeded a Class I GW standard.

DOWNWARD TREND

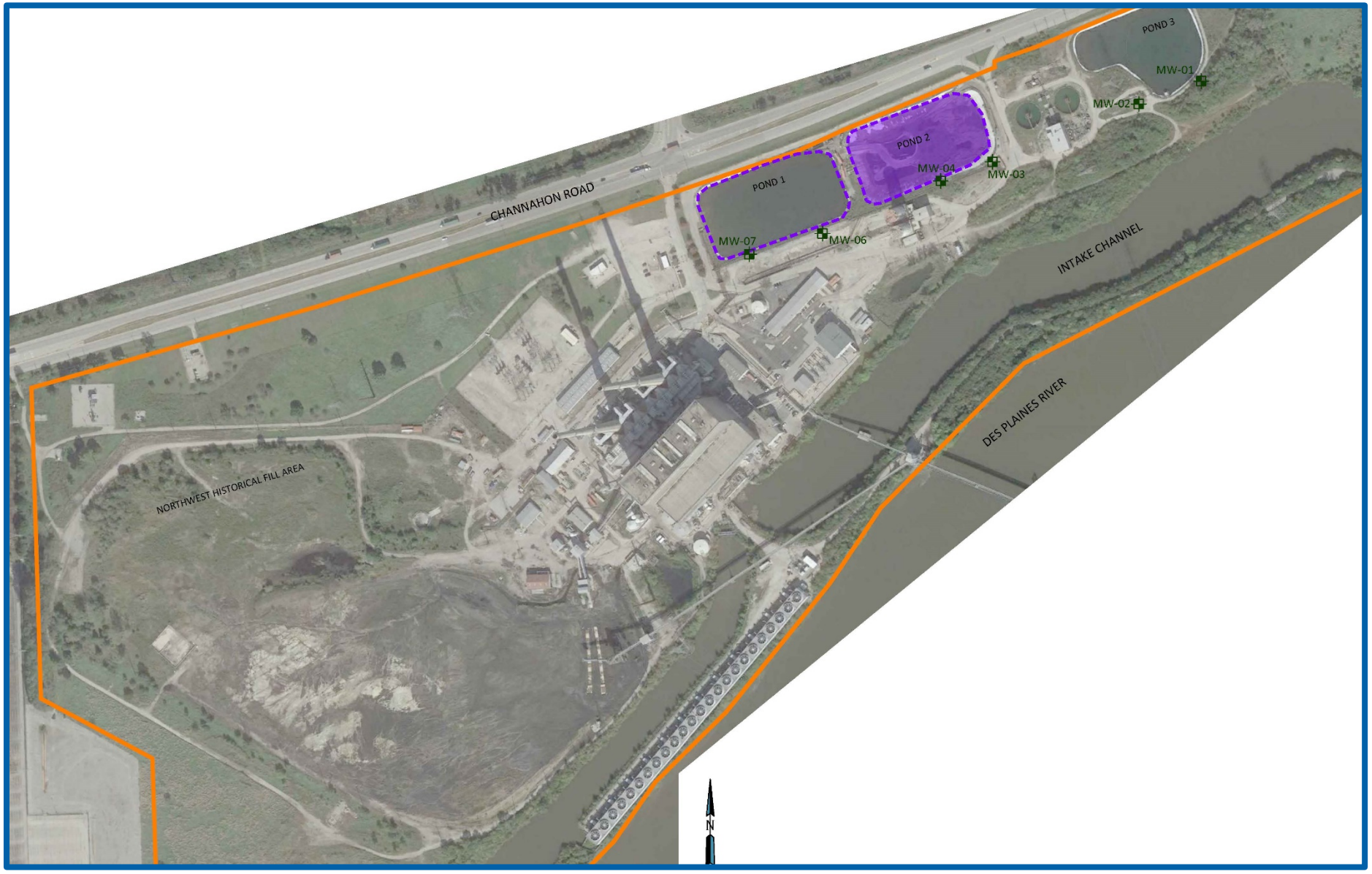


UPWARD TREND



Joliet 29

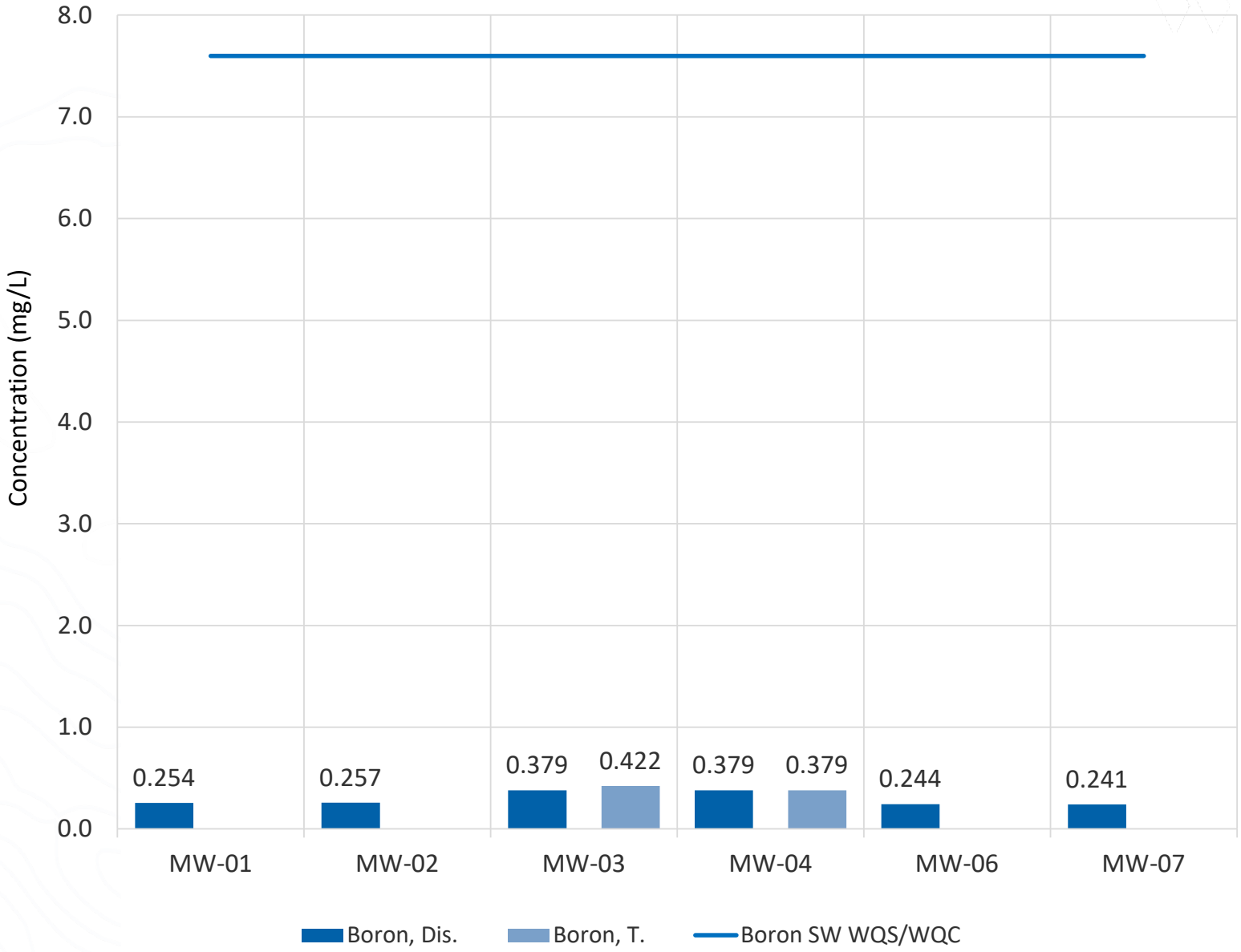
Potential Groundwater Impact to Surface Water Analysis



Joliet 29 -
Groundwater to Surface Water Analysis

- **Average groundwater concentrations from December 2010 to Q4 2020 as calculated by Sanitas™ Software**
- **Non detect (ND) 75% or more samples;** reporting limit (RL) presented as average, otherwise RL used in calculations (conservative)
- **CCR constituents from Appendices III and IV to 40 CFR Part 257**
- **Surface Water Standard (SWS)** obtained from the Illinois General Use Water Quality Standards (WQS) as defined in 35 IAC 302, Subpart B or the Illinois Water Quality Criteria (WQC) - if no WQS.
- No groundwater concentrations at downgradient monitoring wells exceeded the IL Water Quality Standard (WQS)/Water Quality Criteria (WQC)

Joliet 29: Average **Boron in Groundwater** Compared to Surface Water Standards



Joliet 29 Station - Summary

- **Ponds not adversely impacting groundwater**
  - No CCR constituents consistently present at concentrations > Class 1 GWQS related to the ponds
- **One identified area (MW-09) investigated**
- Trend analysis indicates **groundwater concentrations decreasing and expected to continue/below Class 1**
- **No unacceptable risk posed** to onsite or offsite receptors at Joliet 29 Station
- **No impacts to adjacent Des Plaines River**
- **Groundwater at depth**
- NW area meets CCB; SW area monitoring wells
- NE area lines of evidence

Joliet 29 Station - Summary

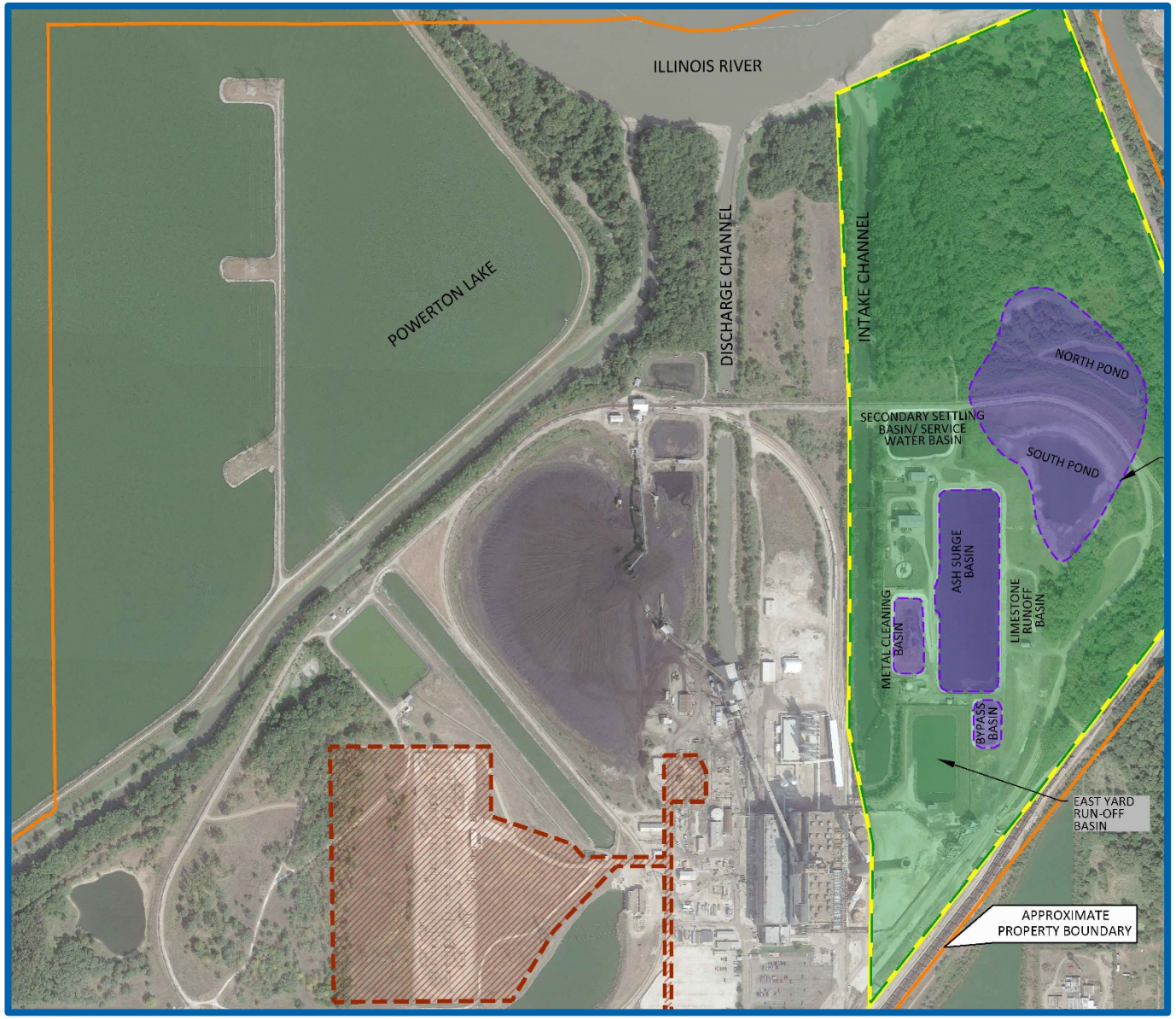
- **Continue to follow Federal/State CCR Rules**
- **Continue groundwater monitoring as required by CCR Rules per GMZ**
- **Comply with potential new federal or state regulations for historic fill areas**
- **Close Remaining Impoundment**

Powerton Station

Weaver Consultants Group

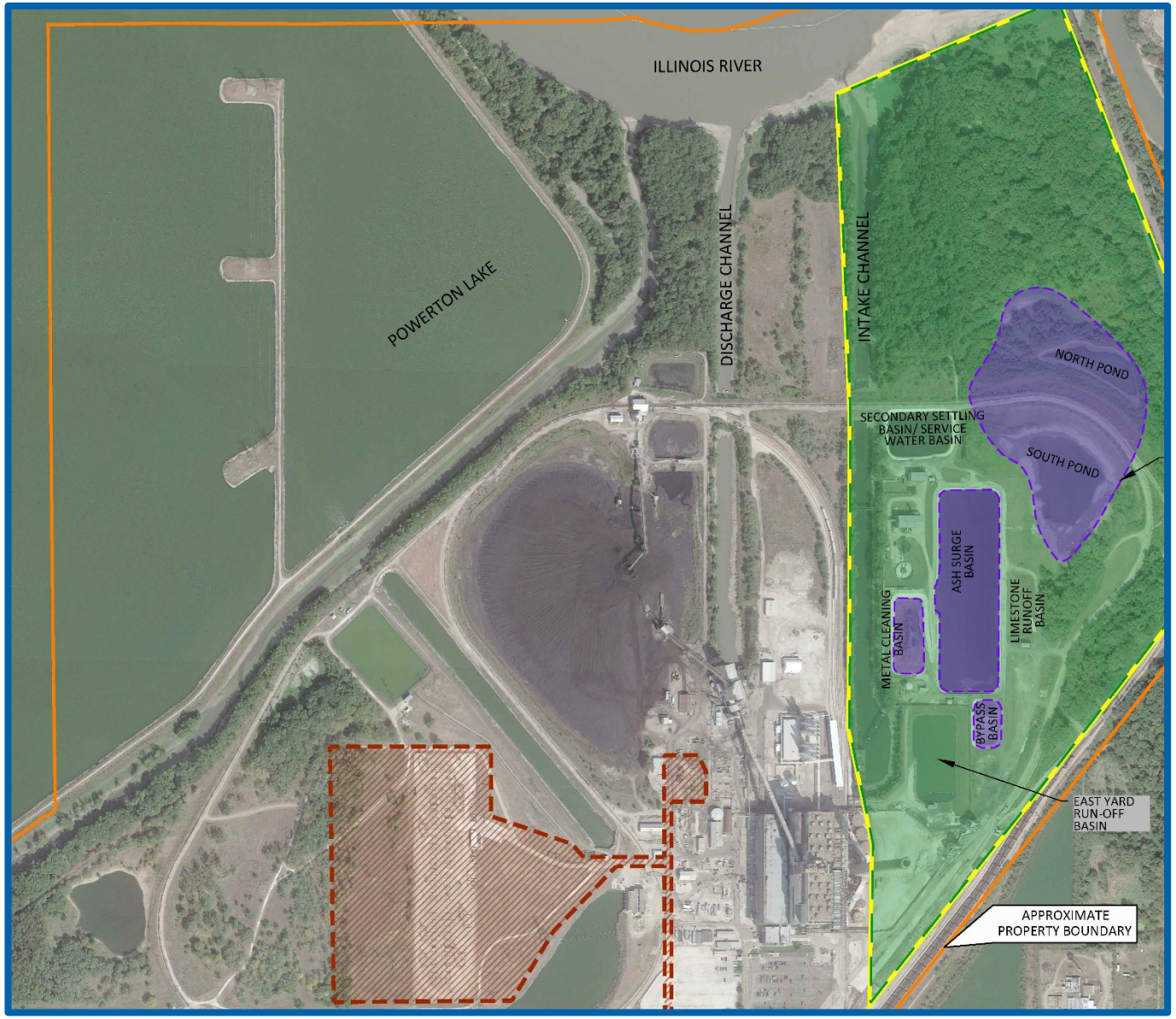
Powerton Station – Background + Setting

- **Began operating in 1920s**
- **Acquired by MWG in 1999**
- **Bordered by:**
  - **North –** Illinois River
  - **South -** Agricultural
  - **East –** mostly industrial/some residential
  - **West -** Powerton Lake, & Wildlife Area
- **Impoundments:**
  - Ash Surge Basin (ASB)
  - Ash Bypass Basin (ABB)
  - Metal Cleaning Basin
  - Secondary Ash Basin/Service Water Basin
  - Former Ash Basin (FAB)
  - East Yard Runoff Basin
  - Limestone Runoff Basin



Powerton – Historic Fill Area

- **Just one area mentioned by the Board**
- **Area south of Bypass Basin**
  - Cinders temporarily stored in the winter
  - Removed by MWG within 2-3 months of placement



Powerton - Investigation Locations

LEGEND

APPROXIMATE PROPERTY BOUNDARY (PER COUNTY GIS SITE)

PROPERTY NOT OWNED BY MWG

APPROXIMATE CCR PONDS

POND SUBJECT TO FEDERAL AND/OR STATE CCR RULES

NOTE: ASH SURGE BASIN, BYPASS BASIN, AND FORMER ASH BASIN ARE SUBJECT TO FEDERAL AND STATE CCR RULES. METAL CLEANING BASIN IS SUBJECT TO STATE CCR RULES.

MW-2 — PATRICK 2010 HYDRO ASSESSMENT/KPRG 2012-2019 CCR APPROXIMATE MONITORING WELL LOCATION (PER KPRG MAP, 12/2020)

B-12 — ENSR 1998 PHASE II ESA APPROXIMATE BORING LOCATION (PER ENSR SITE PLAN, 11/1998)

MW-5 — ENSR 1998 PHASE II ESA APPROXIMATE MONITORING WELL LOCATION (PER ENSR SITE PLAN, 11/1998)

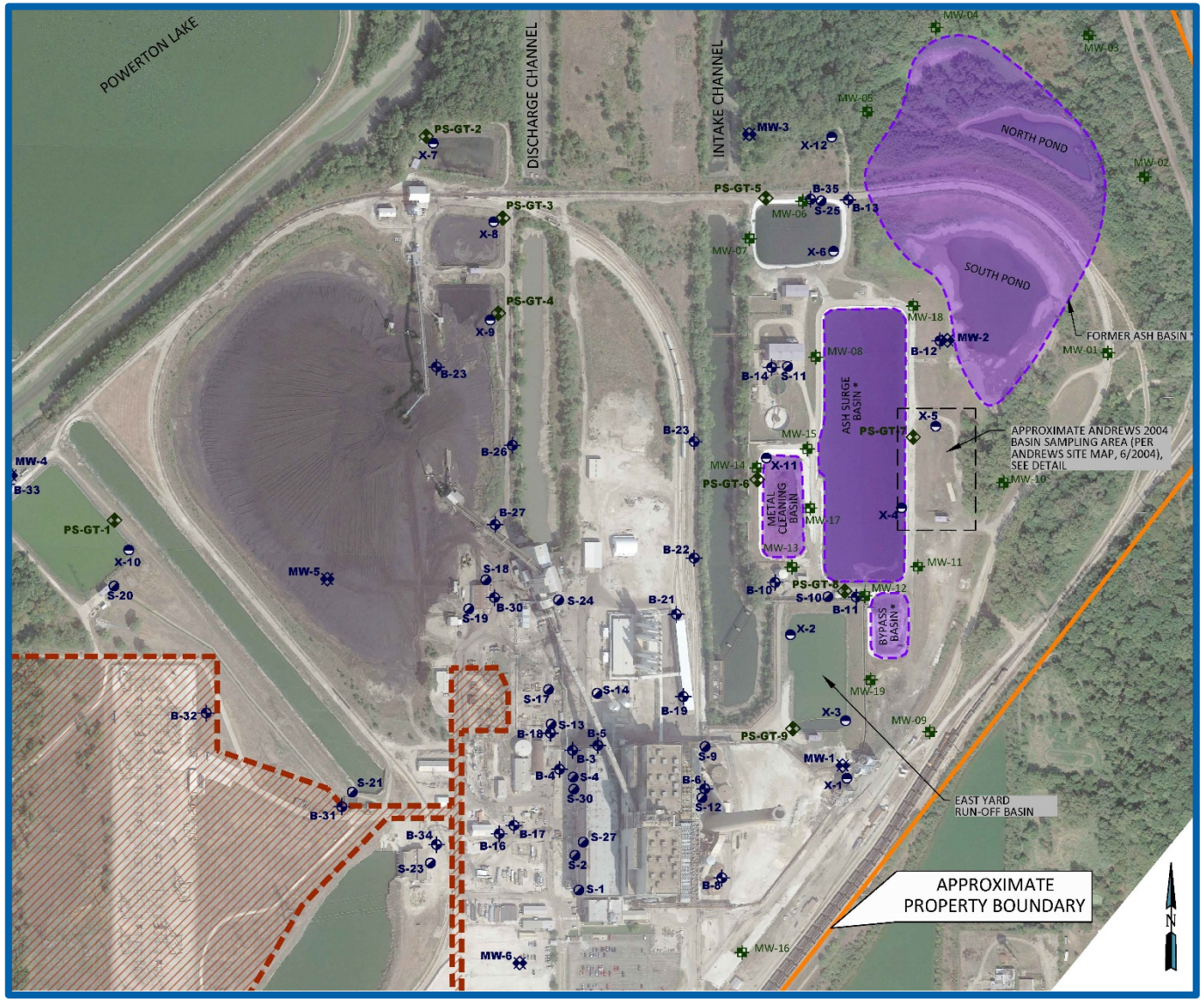
S-15 — ENSR 1998 PHASE II ESA APPROXIMATE SURFACE SOIL SAMPLE LOCATION (PER ENSR SITE PLAN, 11/1998)

X-8 — ENSR 1998 PHASE II ESA APPROXIMATE SEDIMENT SAMPLE LOCATION (PER ENSR SITE PLAN, 11/1998)

ANDREWS 2004 BASIN SAMPLING APPROXIMATE TEST PIT LOCATION (PER ANDREWS SITE MAP, 6/2004)

PS-GT-4 — KPRG 2005 GEOTECH APPROXIMATE BORING LOCATION (PER KPRG FIGURE PLAN, 2005)

NOTE:
* ASH AND WATER SAMPLES COLLECTED FROM THE BYPASS BASIN AND ASH SURGE BASIN IN 2018 AND 2019 AS PART OF 2019 AND 2020 KPRG ASDs.



Powerton - Investigations

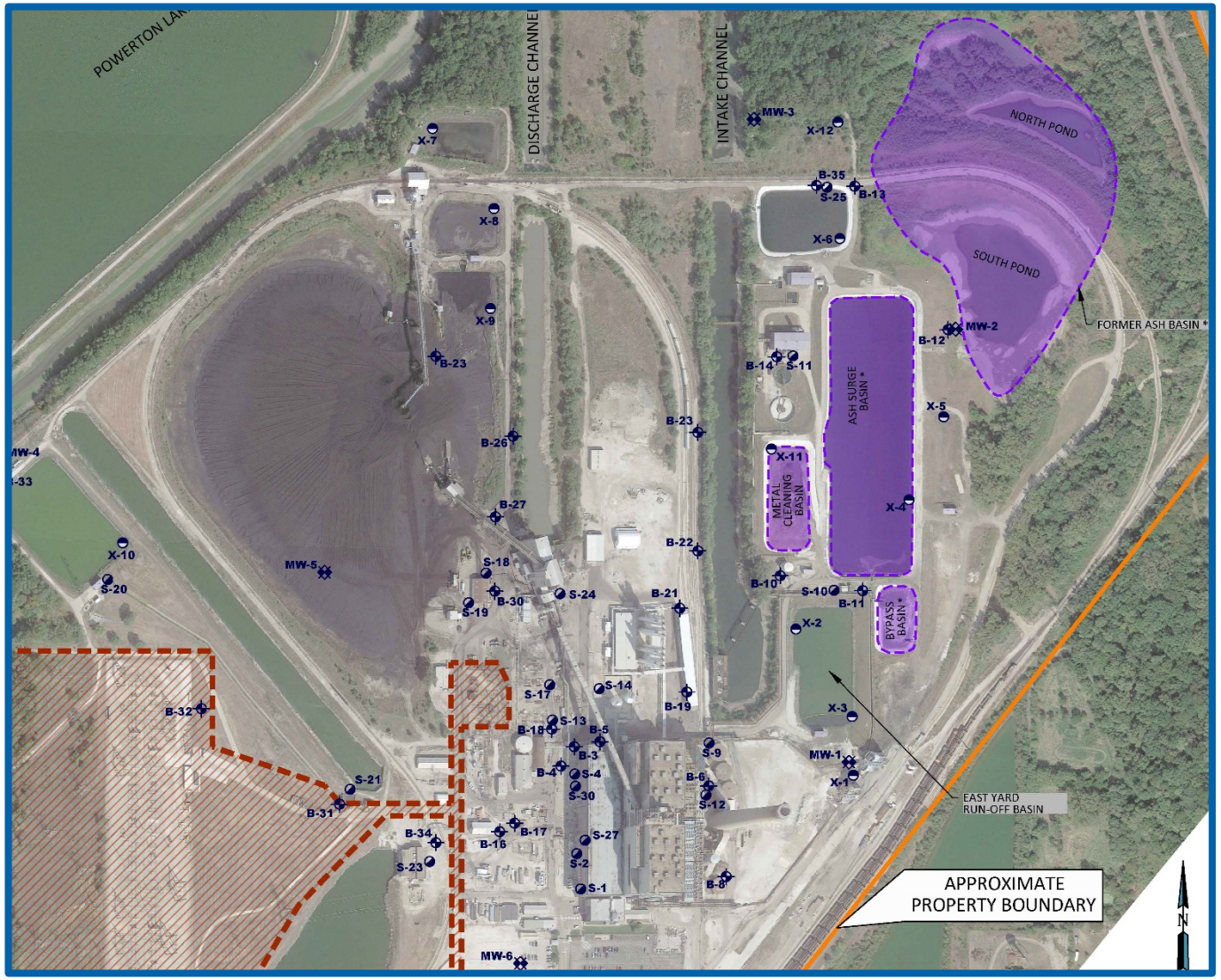
- **1998** Phase II Environmental Site Assessment by ENSR (due diligence, prior to MWG acquisition of station)
- **2005** **Geotechnical Investigation by KPRG**
- **2010** **Hydrogeologic Assessment by Patrick Engineering**
- **Ongoing groundwater monitoring under CCR Rules and CCA**

Powerton – 1998 Phase II ESA

- **28 soil borings, 6 MWs, 17 surface soil samples, 12 sediment samples**
- **MW-1 and MW-2 (near East Yard Runoff Basin and Former Ash Basin):** no RCRA Metals above Class I GWQS

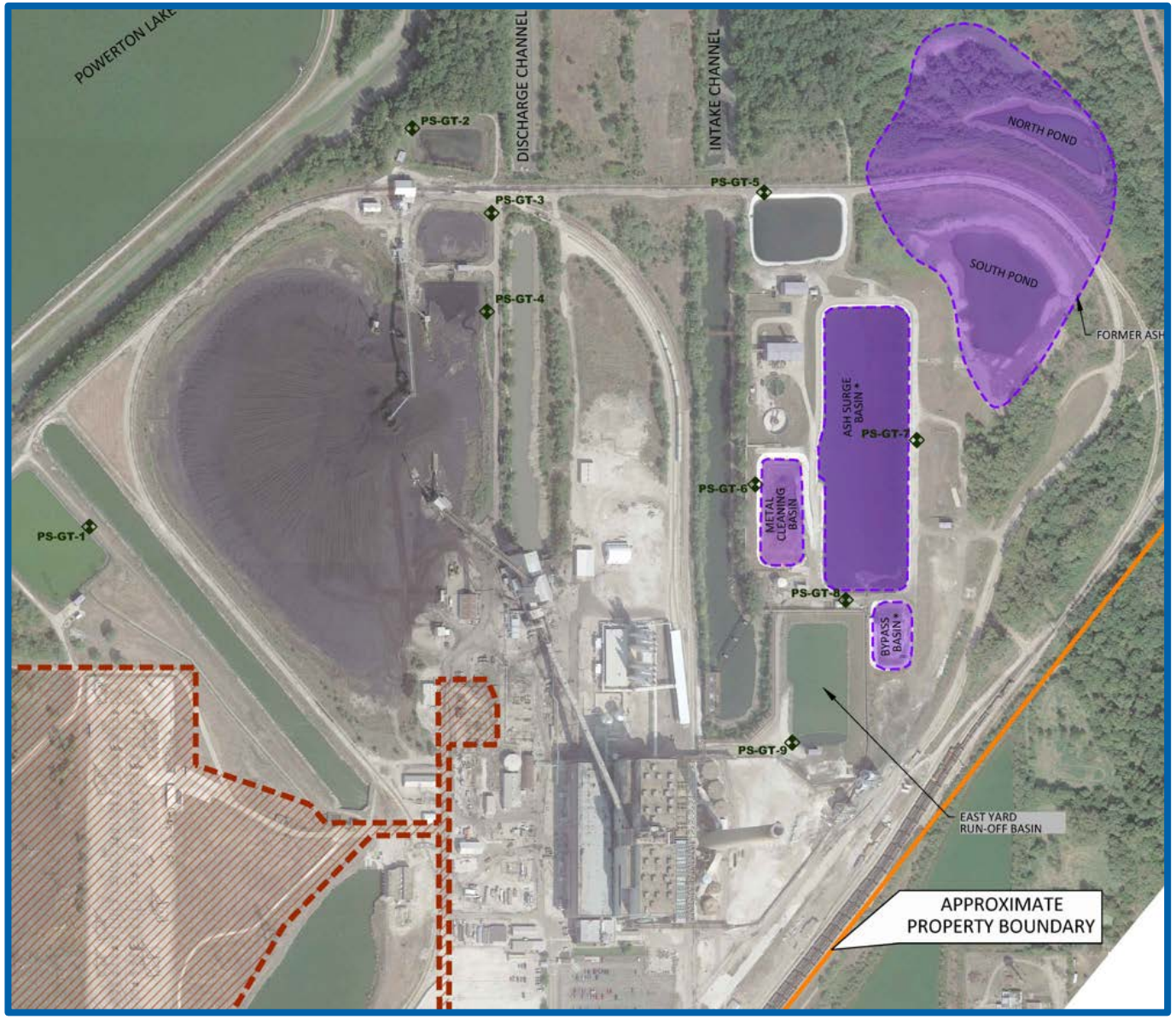
Conclusions:

- Groundwater ingestion not a potential exposure pathway
- Based on industrial land use/low potential for human exposure
- No requirement under Illinois environmental law to further investigate or remediate this property



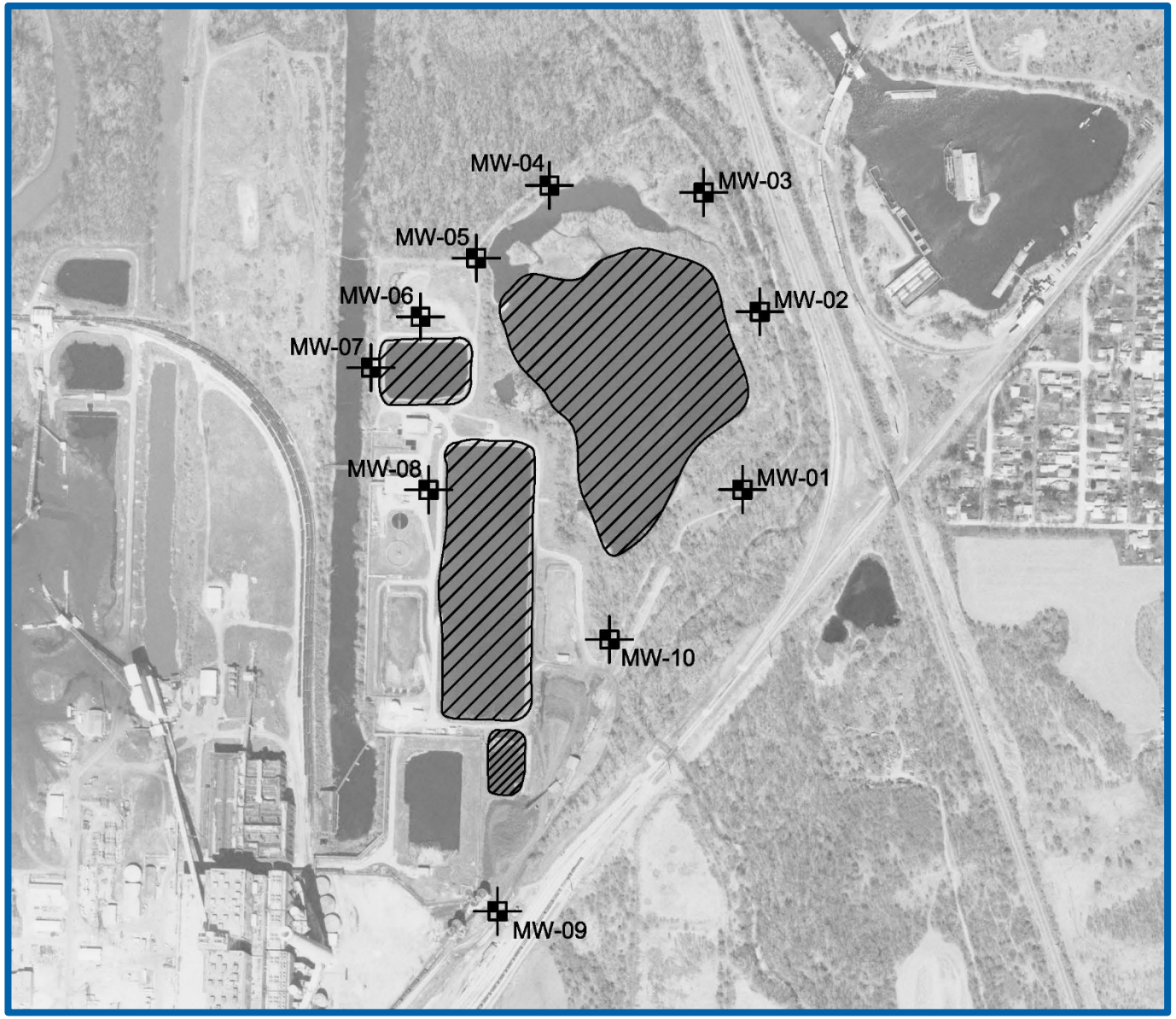
Powerton – 2005 Geotechnical Investigation

- **Provide information on physical characteristics of soils**
- **Nine soil probes**



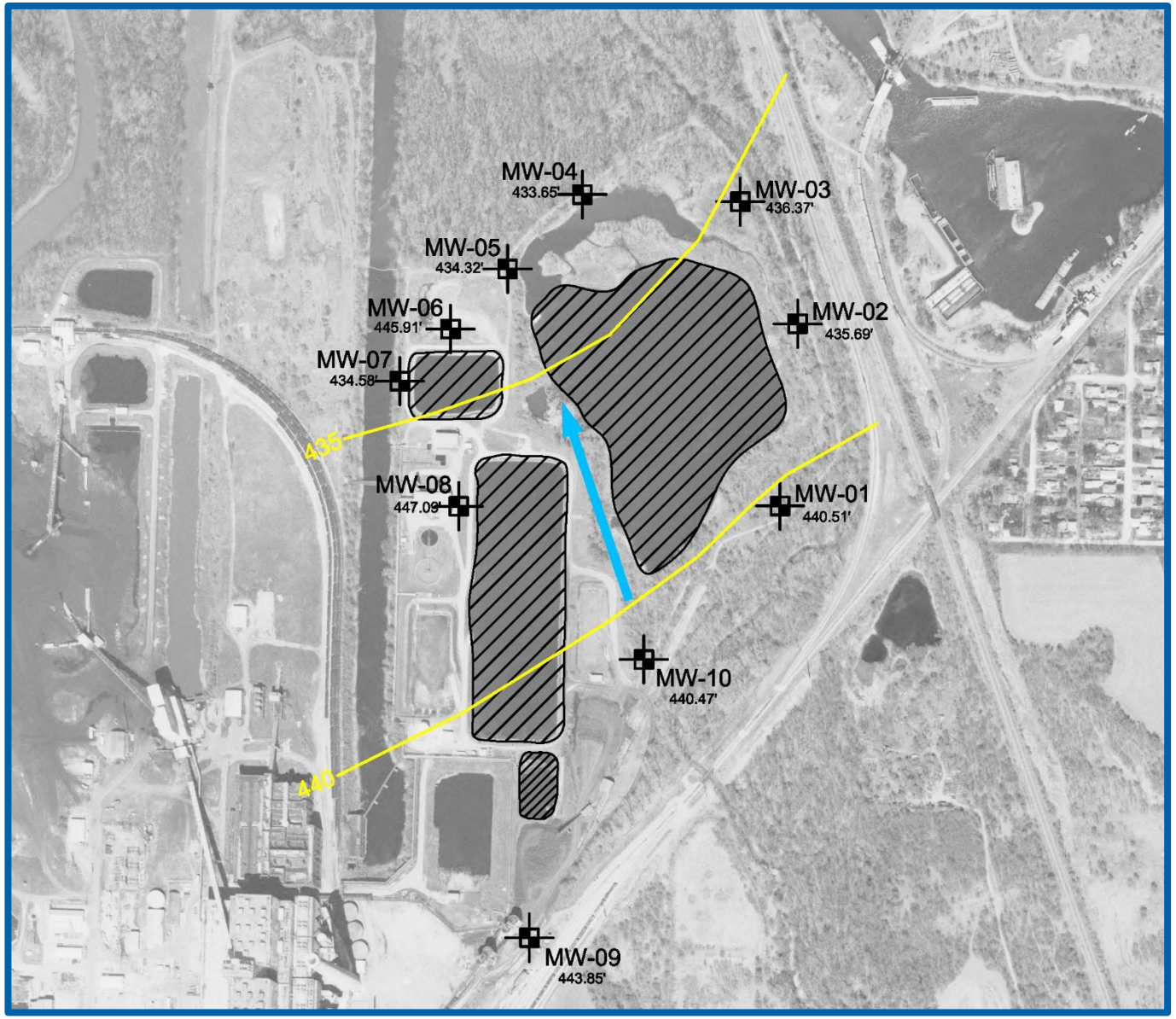
Powerton – 2010 Hydrogeologic Investigation

- **Voluntary investigation pre-CCR rules**
- **Installation of 10 MWs**
- **Groundwater samples collected**
- **12 potential CCR-related analytes not detected**
- **Boron and manganese were detected** above Part 620 Class I GWQS upgradient and downgradient of ponds
  - Only one sampling event
- **In the case of boron, sole exceedance was identified in an upgradient well**

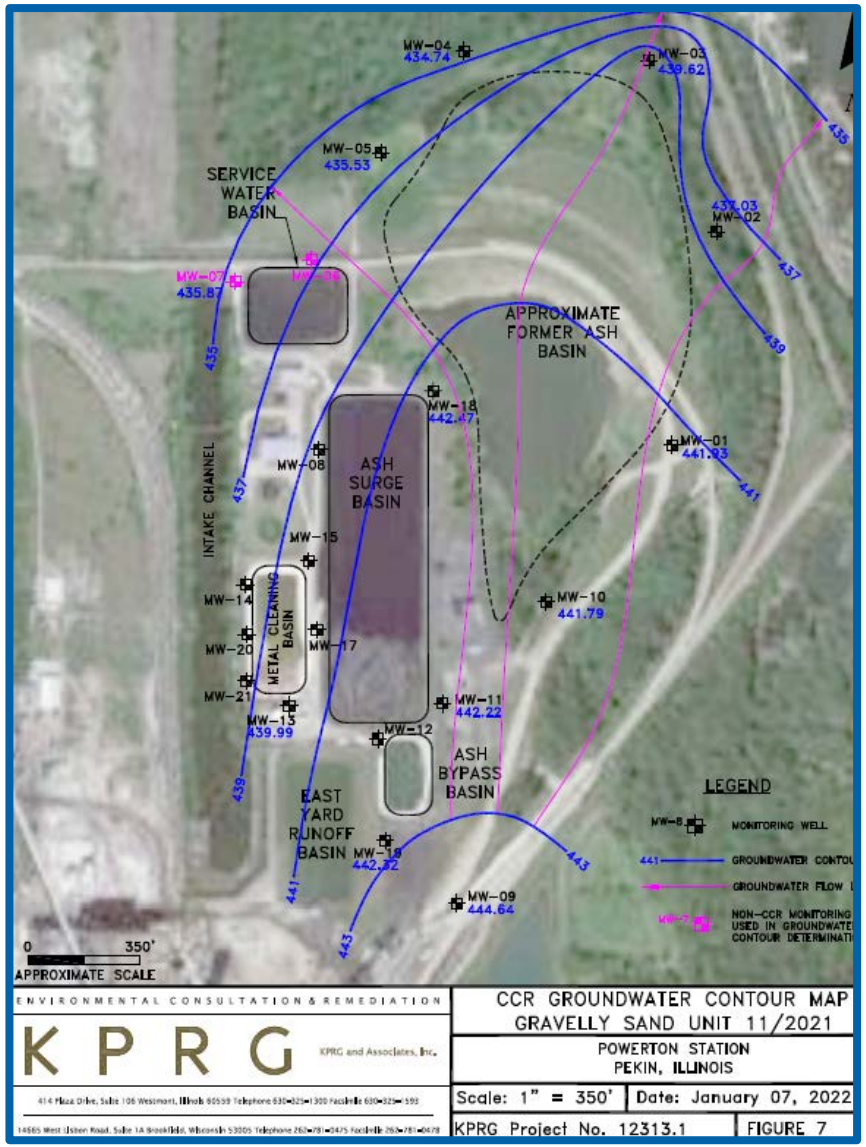


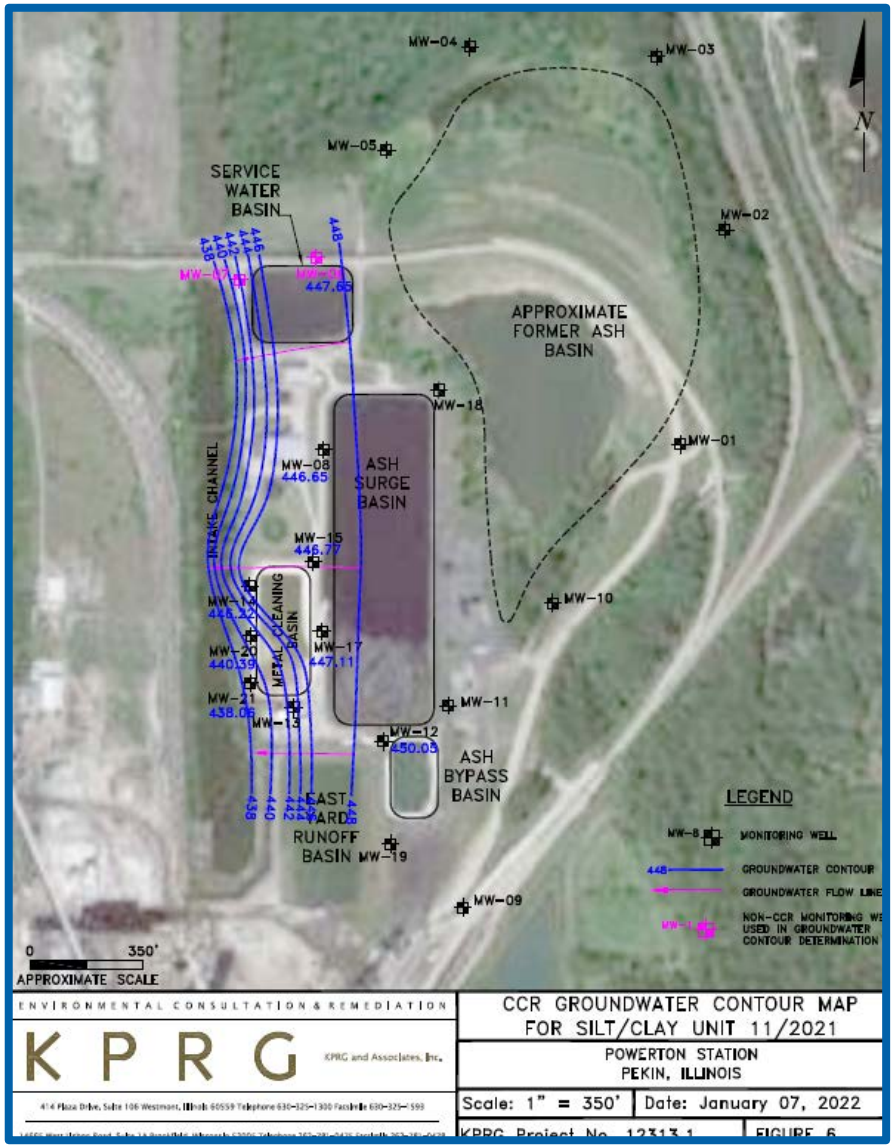
Powerton – 2010 Hydrogeologic Investigation (cont.)

- **Lithology predominantly sand and gravel, with a silt seam running through a portion of the Site**
- **Groundwater flow initially understood to the north**
- **Water Well Search**
  - No water wells downgradient of the ash ponds (between ponds Illinois River)
  - Two wells supply water to the station (greater than 50 ft. deep and west of intake/discharge channels)



Powerton – Ongoing Groundwater Monitoring

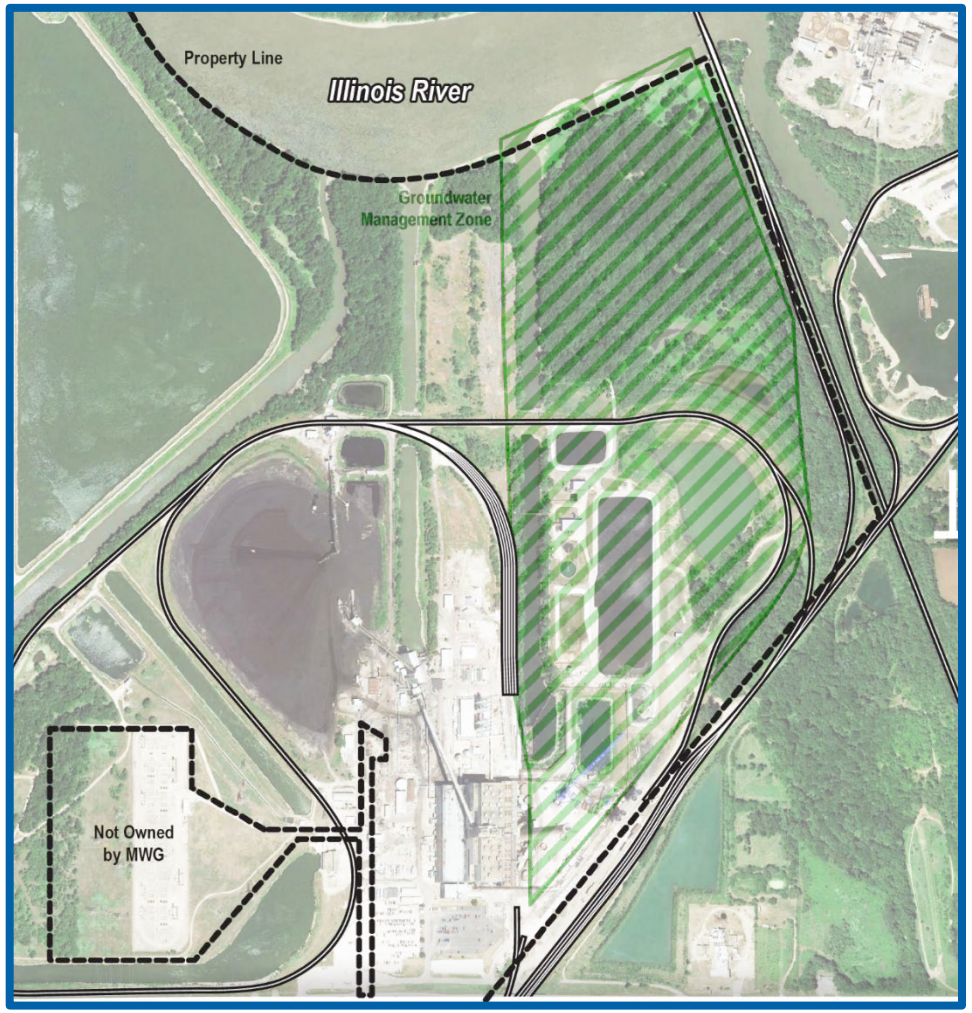


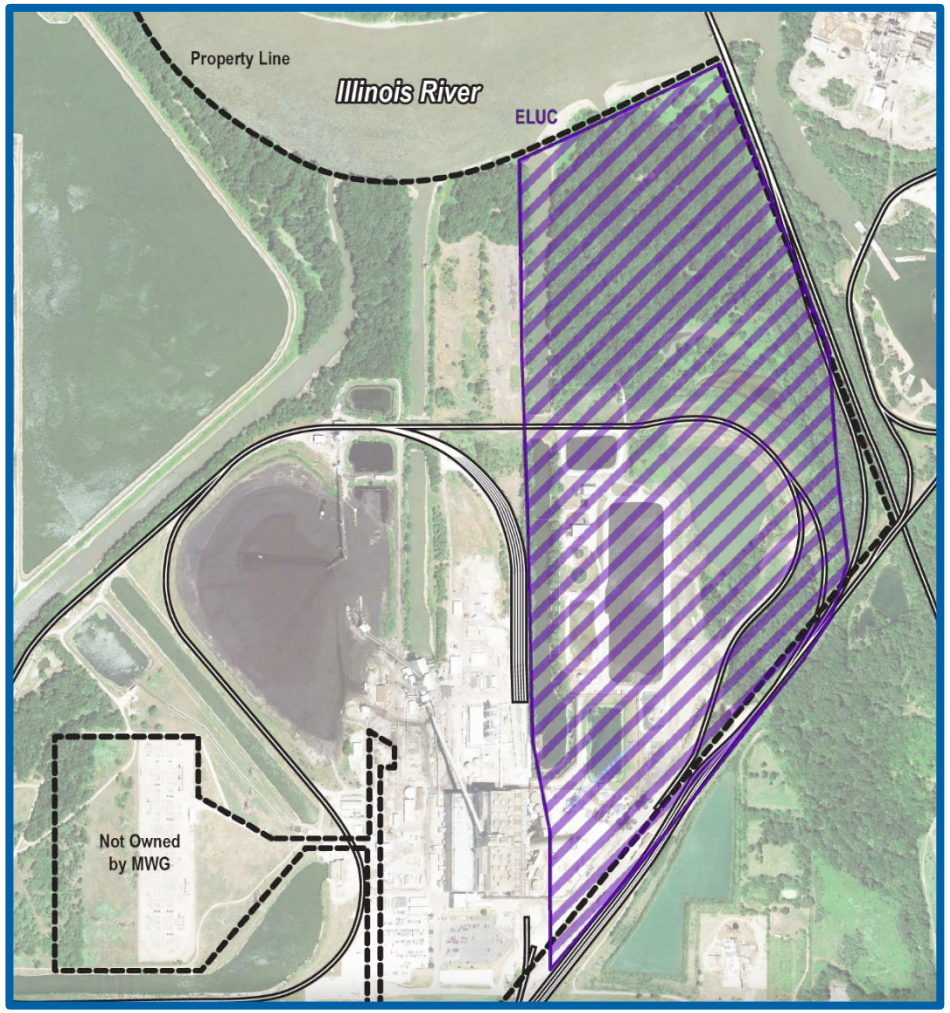


Powerton - Ongoing Groundwater Monitoring

- **Quarterly sampling of established groundwater monitoring network since CCA implemented in 2012**
  - 12 monitoring wells installed around ponds
- **Also to comply with Federal CCR Rules and IL CCR Rules**
- **Additional MWs installed after 2010 resulted in better understanding of GW flow**
- **Two units identified for development of groundwater elevation contour maps:**
  - Upper Silt/Clay Unit: Flow to the west, towards Powerton Lake
  - Lower Gravely Sand Unit: Flow west, northwest, north, northeast
- **Sampling/analysis of 34 constituents 4x per year**

Powerton - GMZ and ELUC

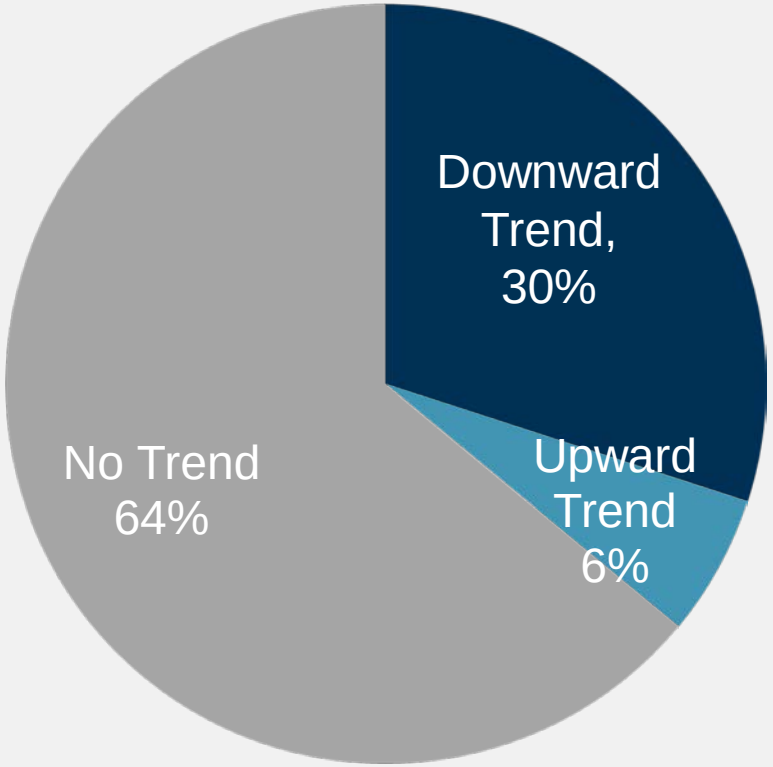




Powerton - Potential Receptors

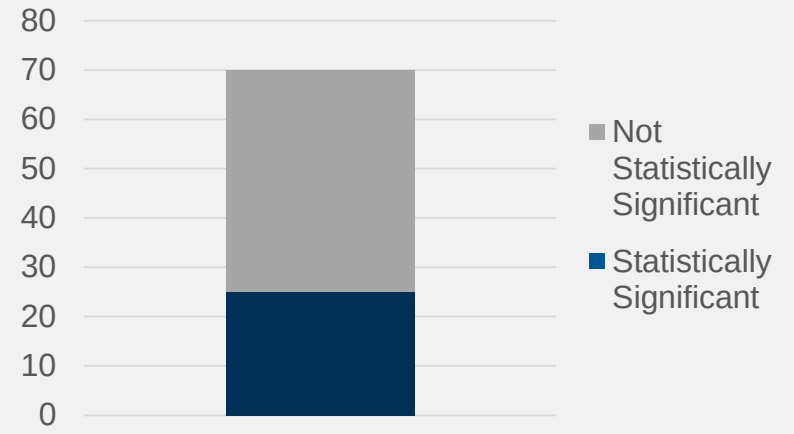
- **Onsite and Surrounding Industrial Land Use**
  - Industrial land use expected onsite into foreseeable future
  - Industrial properties to the east
- **No potable use of downgradient groundwater**
  - Based on water well search presented in Patrick Report on 2010 Hydrogeologic Investigation (2500 ft radius)
  - Prohibited by ELUC
  - GMZ established
- **Potential ecological receptors**
  - Illinois River located downgradient, to the North

Powerton - Groundwater Trend Testing

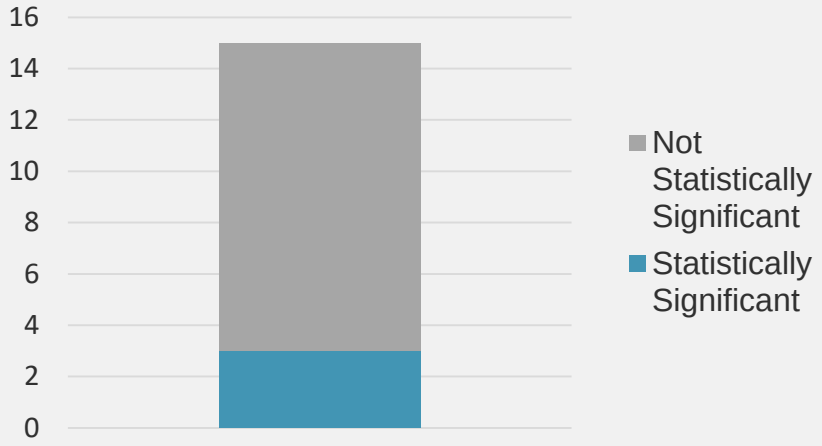


- Two constituents at one well with statistically significant upward trend exhibit concentrations above Class I GW standard (sulfate and TDS at MW-13)

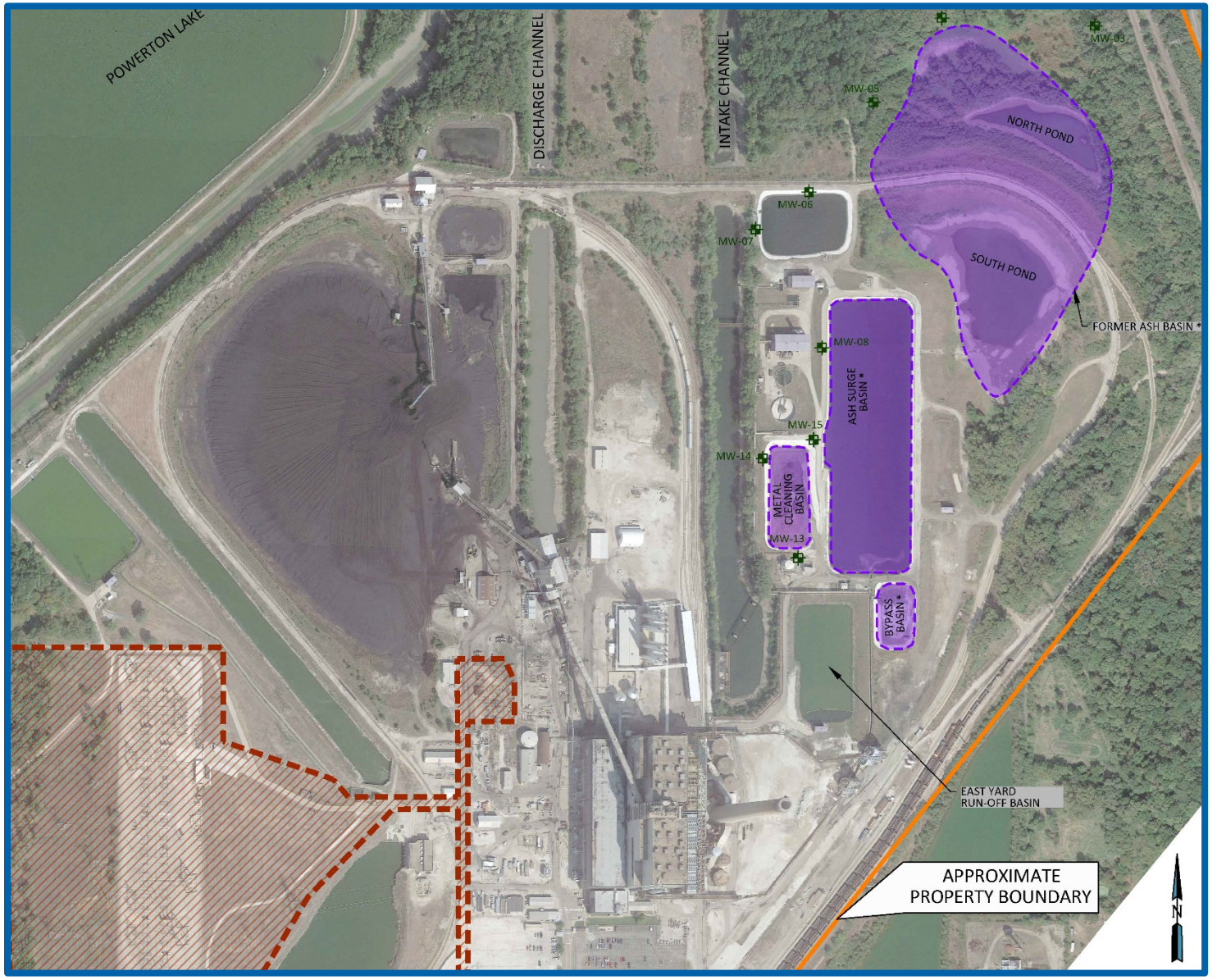
DOWNWARD TREND



UPWARD TREND



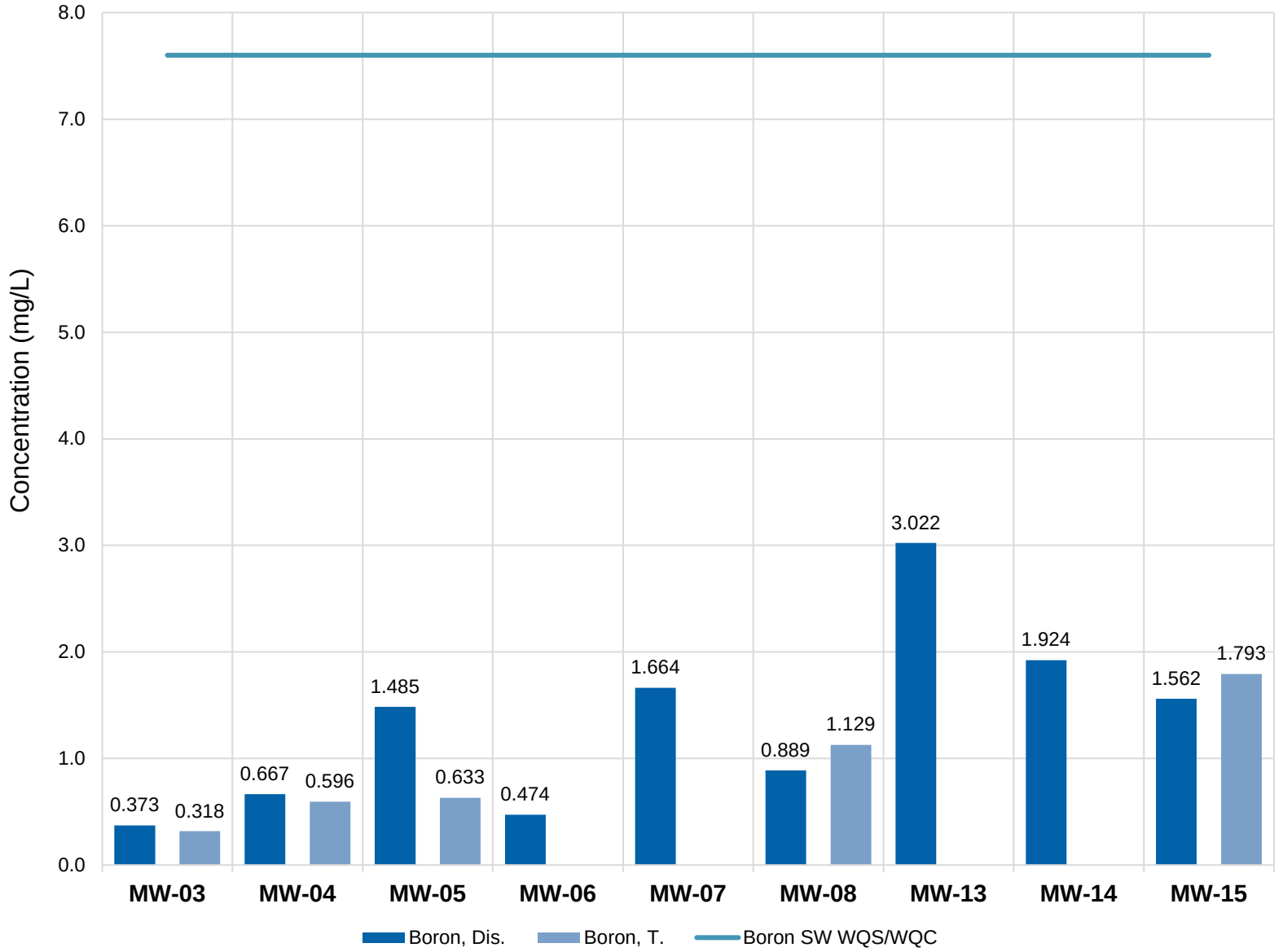
Powerton- Groundwater to Surface Water Analysis



Powerton –
Groundwater to Surface Water Analysis

- **Average groundwater concentrations from December 2010 to Q4 2020 as calculated by SanitasTM Software**
- **Constituent non-detect in 75% or more samples;** reporting limit presented as average
- **Constituents analyzed are CCR constituents from Appendices III and IV to 40 CFR Part 257**
- **Surface Water Standard (SWS) obtained from the Illinois General Use Water Quality Standards (WQS) as defined in 35 IAC 302, Subpart B or the Illinois Water Quality Criteria (WQC) - if no WQS.**

Powerton: Average **Boron in Groundwater** Compared to Surface Water Standards



Powerton - Summary

- **Background data from upgradient wells to assess regulated units**
  - Remaining units to be CCR compliant
  - Regular inspections, notifications
- **Trend testing at downgradient MWs indicates improving groundwater quality over long term**
- **No unacceptable risk posed to onsite or offsite receptors**
  - groundwater concentrations at downgradient monitoring wells did not exceed surface water standards
- **Board determined FAB not a source/closure**
- **One ash placement area/storage for 2 months only and removed**
- **No seeps/distance to Illinois River**

Powerton - Summary

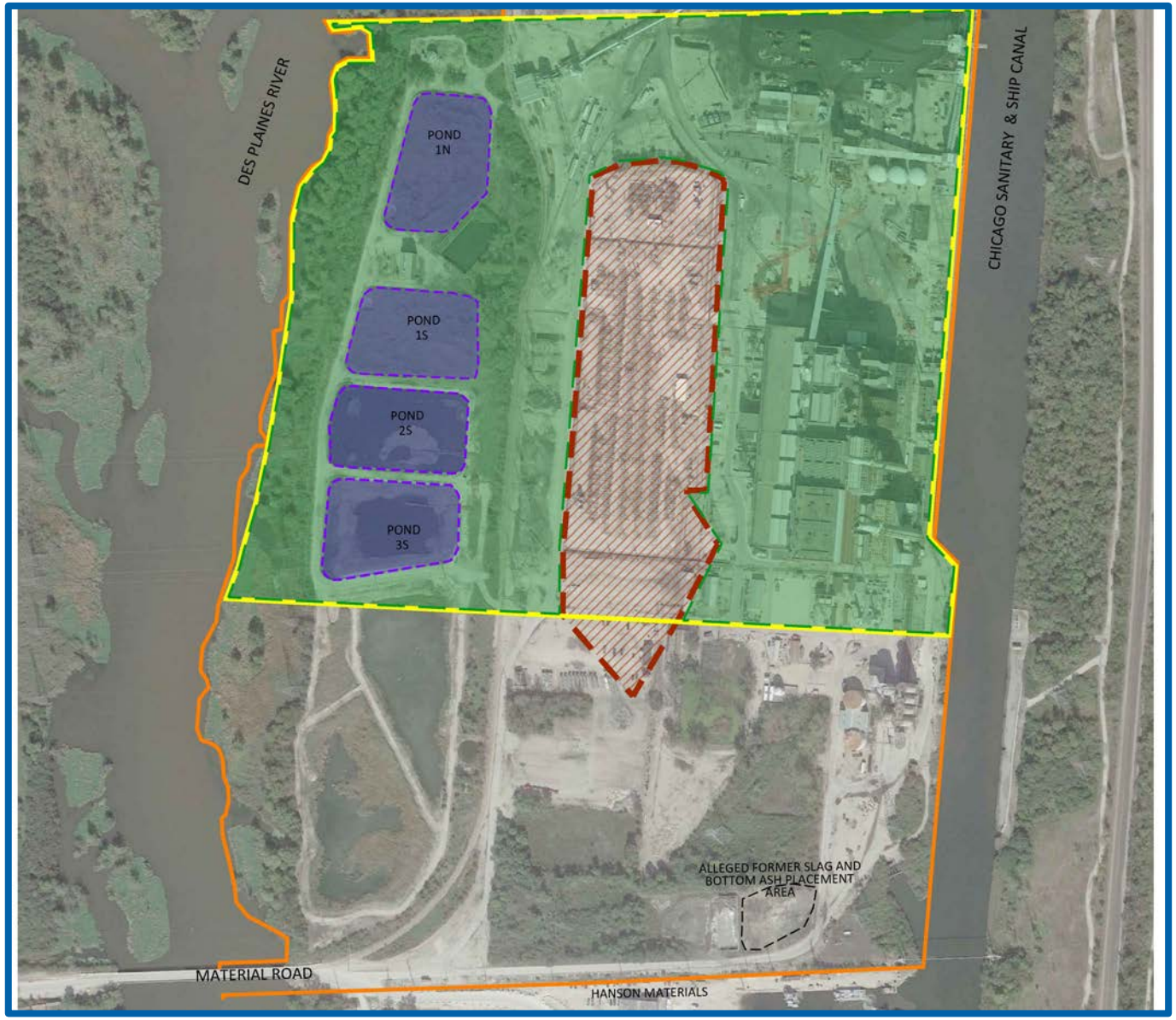
- **Continue to follow the Federal/State CCR surface impoundment rules**
- **Continue regular groundwater monitoring under CCR rules**
  - Assessment Monitoring
  - Corrective Action if GWPS exceeded and attributable to CCR Surface Impoundments
- **Implement closure/retrofits of CCR Surface Impoundments**
- **Comply with potential new Federal/State regulations for historic fill areas**

Will County Station

Weaver Consultants Group

Will County- Background + Setting

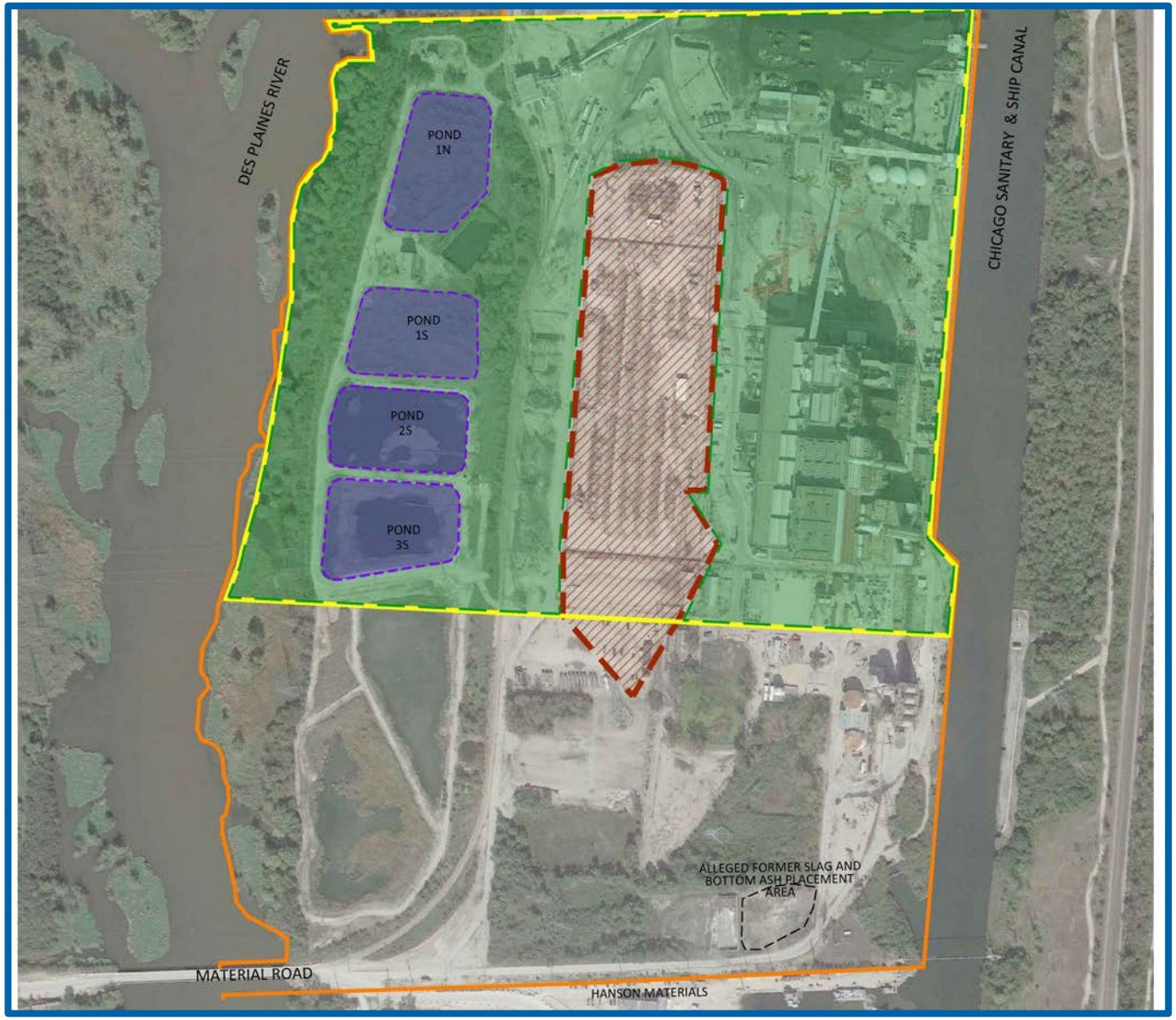
- **Began operating in 1955**
- **Four CCR Surface Impoundments**
  - Each constructed in 1977
- **Ceased burning coal June 2022**
- **Surrounding land use:**
  - Chicago Sanitary and Ship Canal to east
  - Des Plaines River to west
  - Citco refinery to north
  - Hanson Materials/Lafarge to south



Will County -
Location of Impoundments

Will County – Historic Fill Areas

- **Two areas of alleged historic fill placement:**
  - Around Surface Impoundments
  - SE Area



Will County -
Investigation Locations

LEGEND

APPROXIMATE PROPERTY BOUNDARY (PER COUNTY GIS SITE)

PROPERTY NOT OWNED BY MWG

APPROXIMATE CCR PONDS

PONDS SUBJECT TO FEDERAL AND/OR STATE CCR RULES

NOTE: POND 2S AND POND 3S ARE SUBJECT TO FEDERAL AND STATE CCR RULES. POND 1N AND POND 1S ARE SUBJECT TO STATE CCR RULES.

MW-2 PATRICK 2010 HYDRO ASSESSMENT/ KPRG 2015 CCR APPROX. MONITORING WELL LOCATION (PER KPRG MAP, 12/2020)

B-12 ENSR 1998 PHASE II ESA APPROXIMATE BORING LOCATION (PER ENSR SITE PLAN, 11/1998)

MW-5 ENSR 1998 PHASE II ESA APPROXIMATE MONITORING WELL LOCATION (PER ENSR SITE PLAN, 11/1998)

S-15 ENSR 1998 PHASE II ESA APPROXIMATE SURFACE SOIL SAMPLE LOCATION (PER ENSR SITE PLAN, 11/1998)

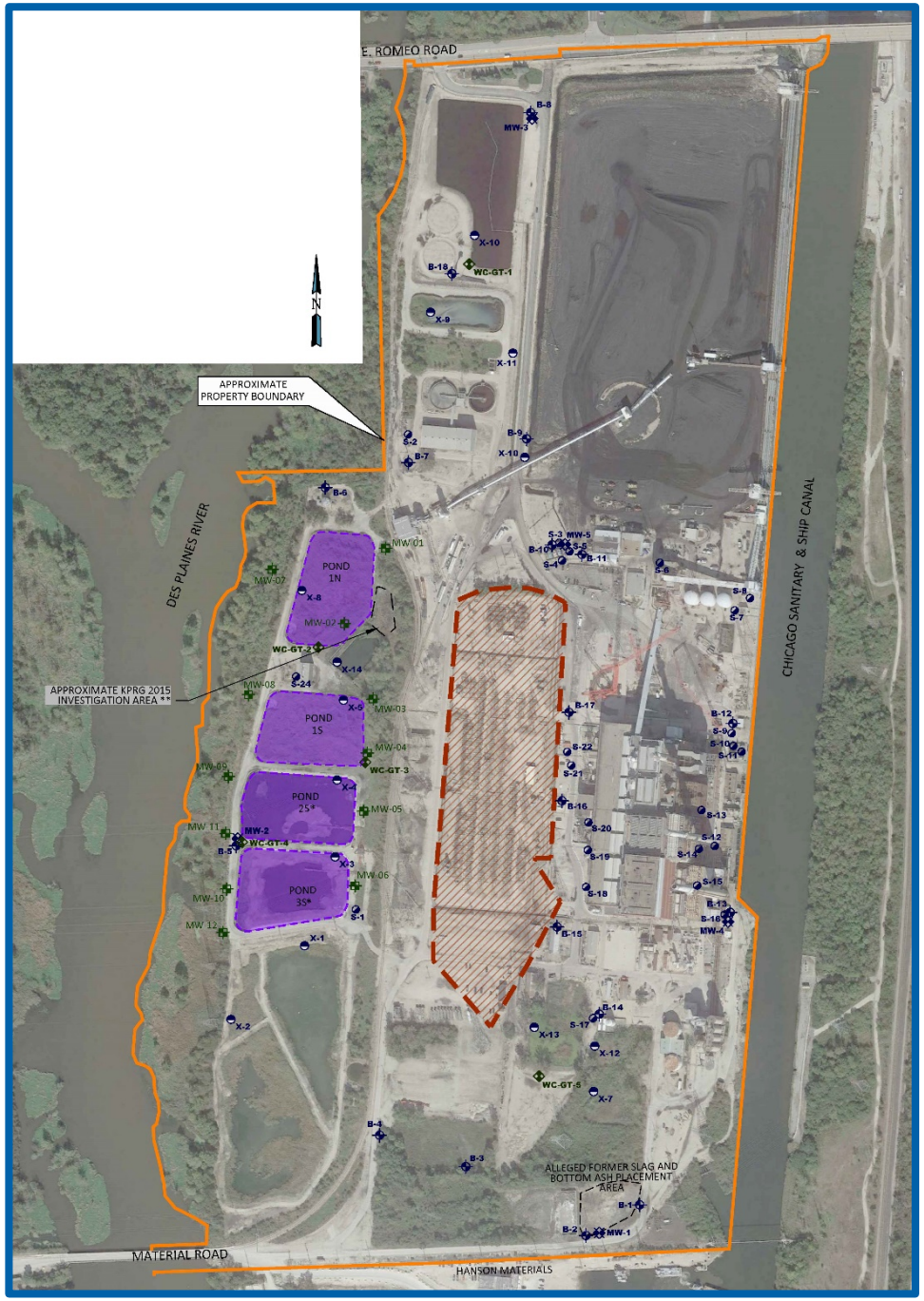
X-8 ENSR 1998 PHASE II ESA APPROXIMATE SEDIMENT SAMPLE LOCATION (PER ENSR SITE PLAN, 11/1998)

WC-GT-4 KPRG 2005 GEOTECH APPROXIMATE BORING LOCATION (PER KPRG FIGURE PLAN, 2005)

NOTES:

* ASH AND WATER SAMPLES COLLECTED FROM POND 2S AND POND 3S IN 2018 AS PART OF 2019 KPRG ASD.

** COAL ASH SAMPLES COLLECTED FROM THIS AREA FROM 20 BORINGS (A1 TO D7) AS PART OF 2014 KPRG CCB DETERMINATION

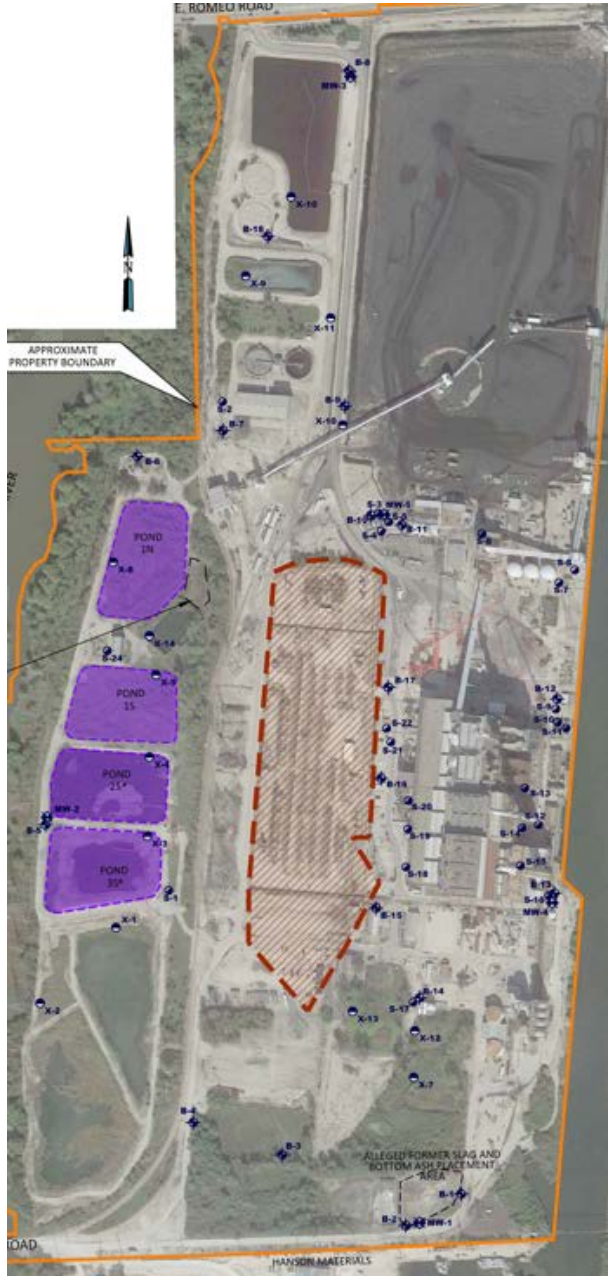


Will County - Investigations

- **1998** Phase II Environmental Site Assessment by ENSR (due diligence, prior to MWG acquisition of station)
- **2005** Geotechnical Investigation by KPRG
- **2010** Hydrogeologic Assessment by Patrick Engineering
- **2015** CCB Investigation
- Ongoing groundwater monitoring under the CCA and CCR Rules (Federal and IL)

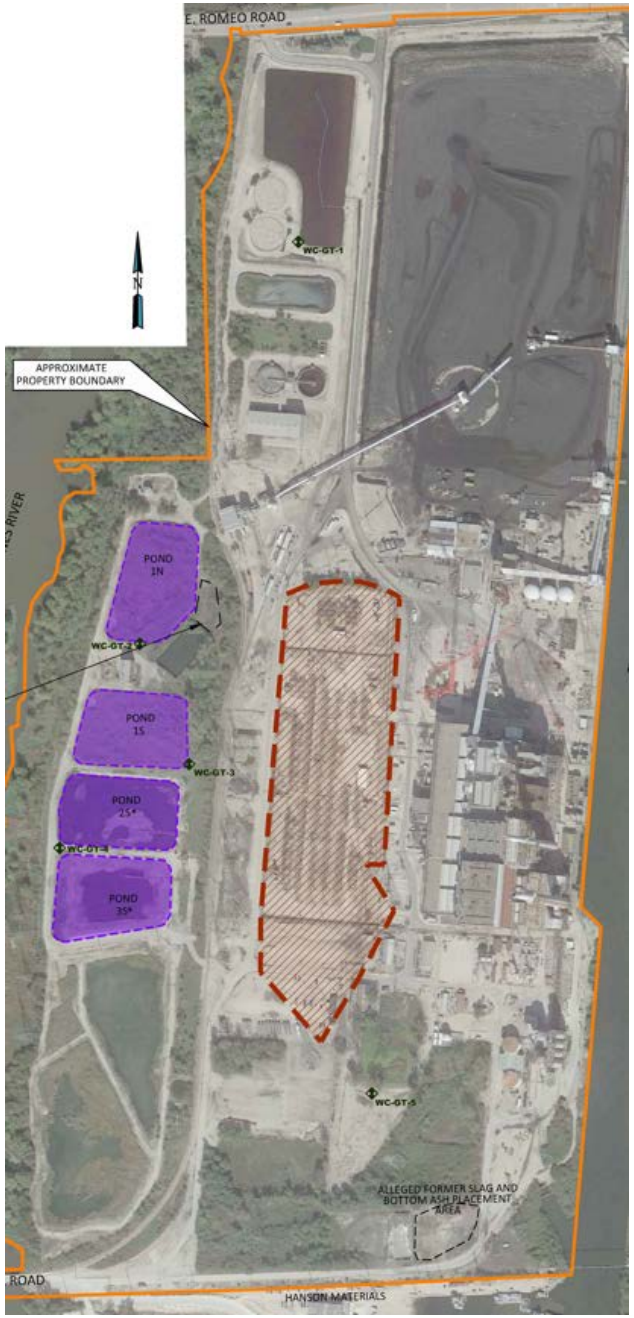
Will County – 1998 Phase II ESA

- **18 soil borings, 5 MWs, 23 surface soil, 14 sediment samples**
- **B-1/B-2/MW-1 near SE Fill Area -** coal ash mixed with soils
  - RCRA metals in SE Area soil (incl. arsenic) below TACO Tier 1 SRO
- **MW-1 groundwater did not exhibit RCRA** Metals > Class I Groundwater Standards
- **Soil and groundwater concentrations in SE Fill Area do not pose unacceptable risk** to human health and the environment
- Groundwater ingestion not a potential exposure pathway
- Based on industrial land use/low potential for human exposure to constituents of concern:
- No requirement under Illinois environmental law to further investigate or remediate property



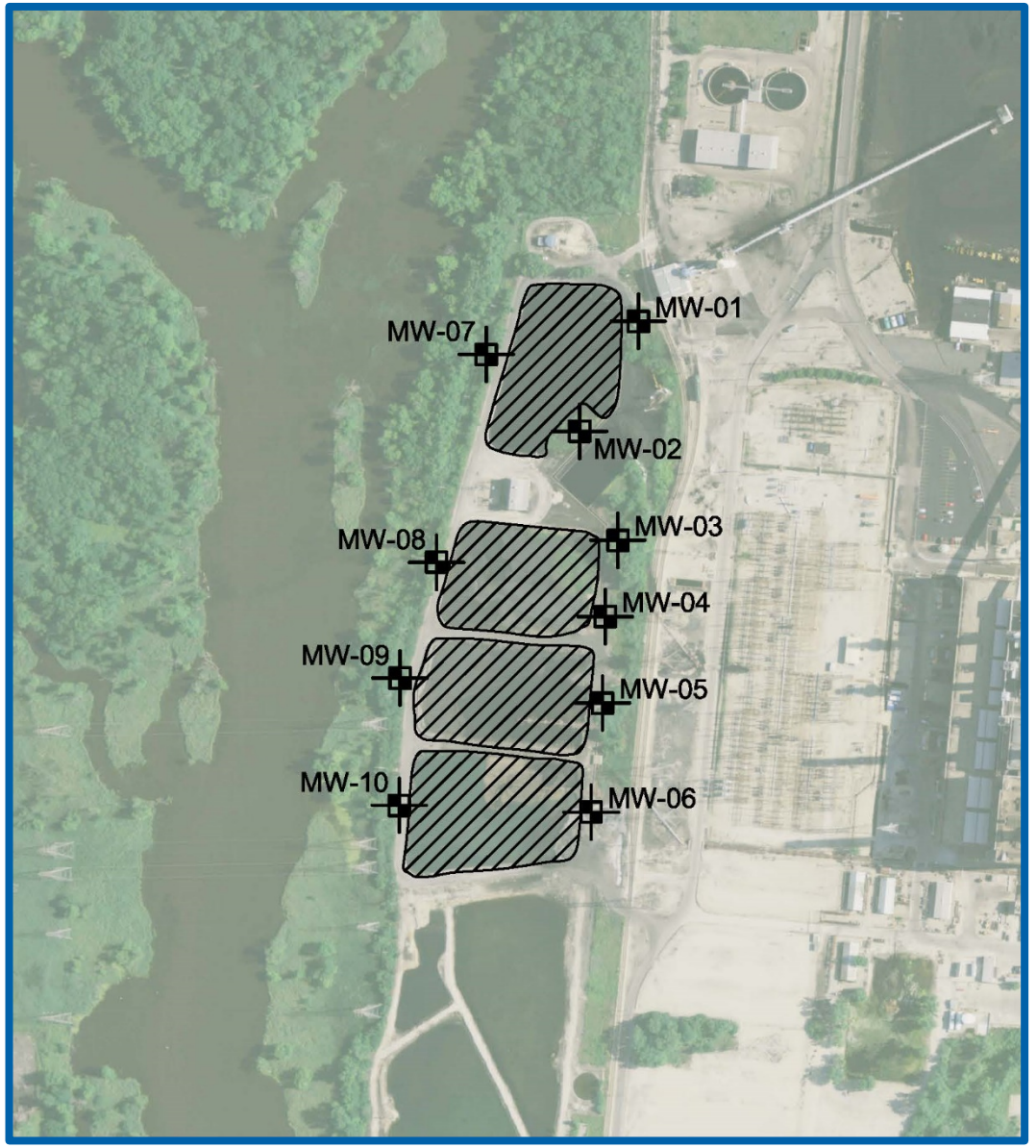
Will County - 2005 Geotechnical Investigation

- Provide information on physical characteristics of soils
- Five soil probes
- Bedrock encountered in the probes at 3-10 ft. below ground surface



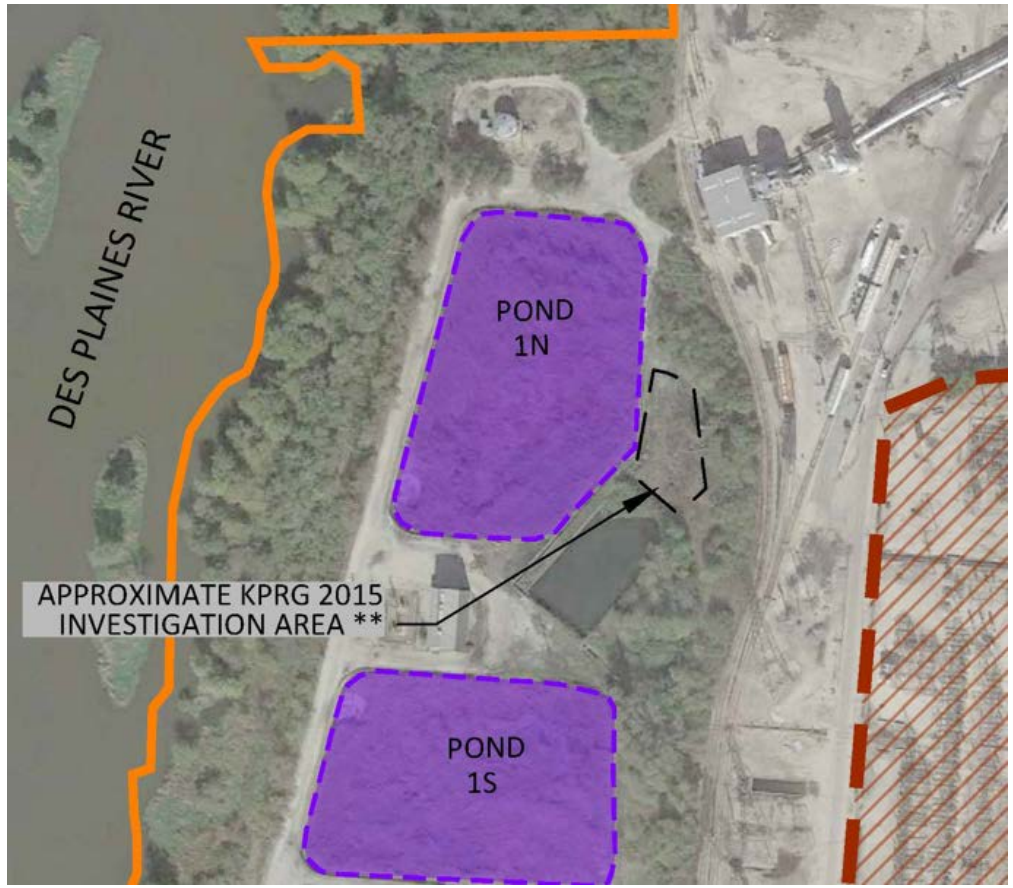
Will County - 2010 Hydrogeologic Investigation

- **Voluntary investigation pre-CCR regulations**
- **Installation of 10 MWs**
- **Uppermost groundwater unit at depths ranging from 8-11 feet bgs**
- **Groundwater samples collected**
- **12 analytes not detected**
- Manganese, boron, sulfate, and TDS detected above Part 620 Class I GWQS east and west of ponds
  - One sampling event only
- Potable well search (2500 ft radius):
  - No potable well use within the shallow monitored aquifer



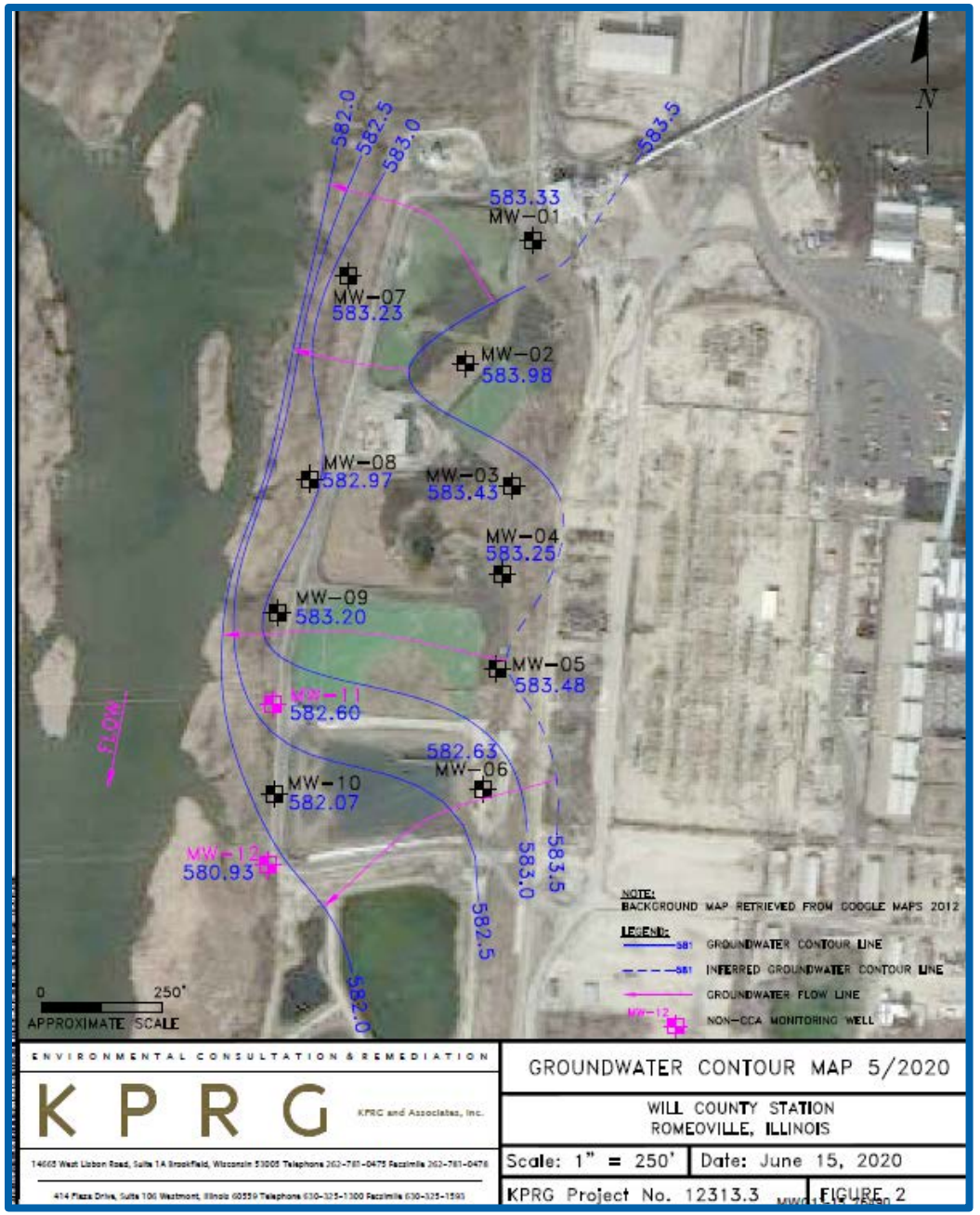
Will County - 2015 CCB Investigation

- **20 Geoprobes east of Pond 1N**
- **Soils homogeneous bottom ash/slag from coal combustion**
- **NLET testing of 20 composite samples from vertical profile**
  - **Most metals not detected** (Sb, As, Ba, Be, Cd, Cr Co, Pb, Mn, Hg, Mo, Ni, K, Se, Ag, Tl, Zn)
  - **Naturally occurring metal**s (B, Fe, Na) **detected** (below Class I GWQS)
  - **Statistical analysis presented to support conclusion that constituents are not present** in the material above Class I groundwater standard
- **KPRG concluded that material meets the 3.135 criteria** and may be considered CCB, and eligible for beneficial uses specified in the Act

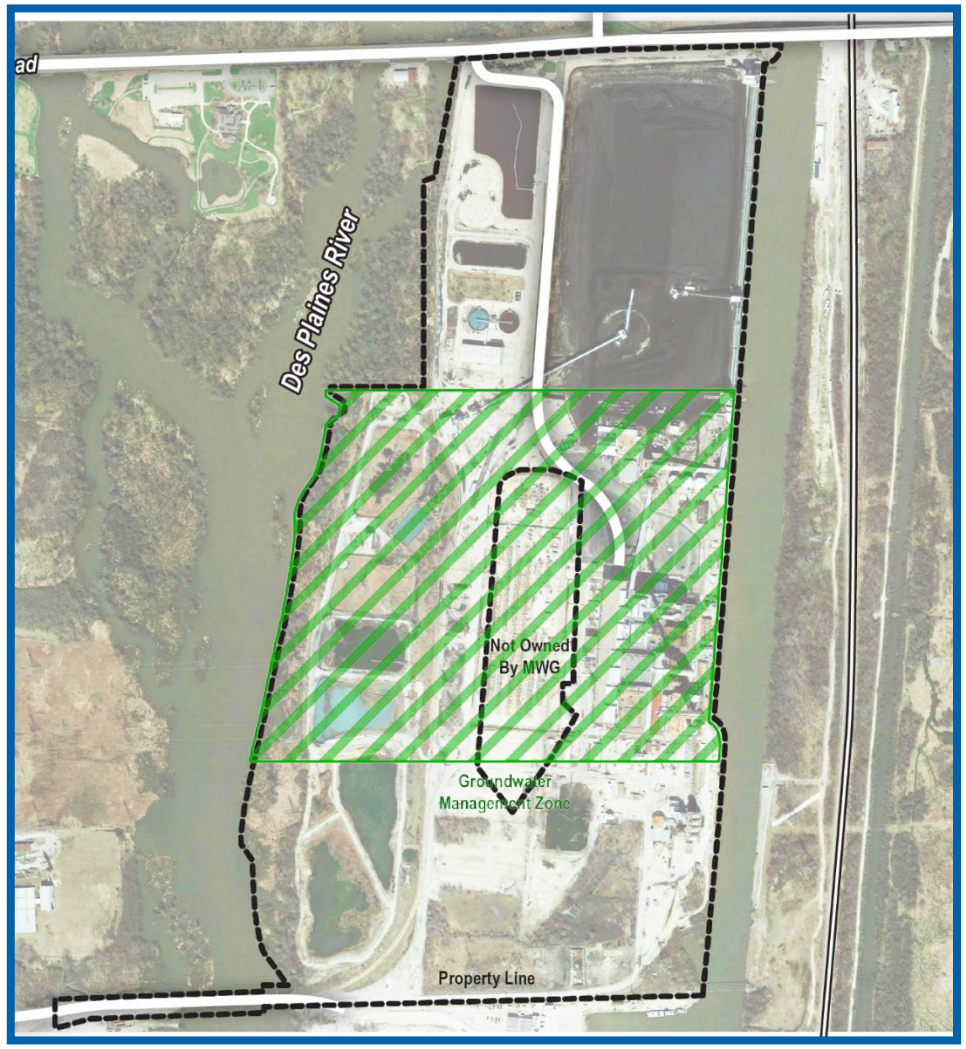


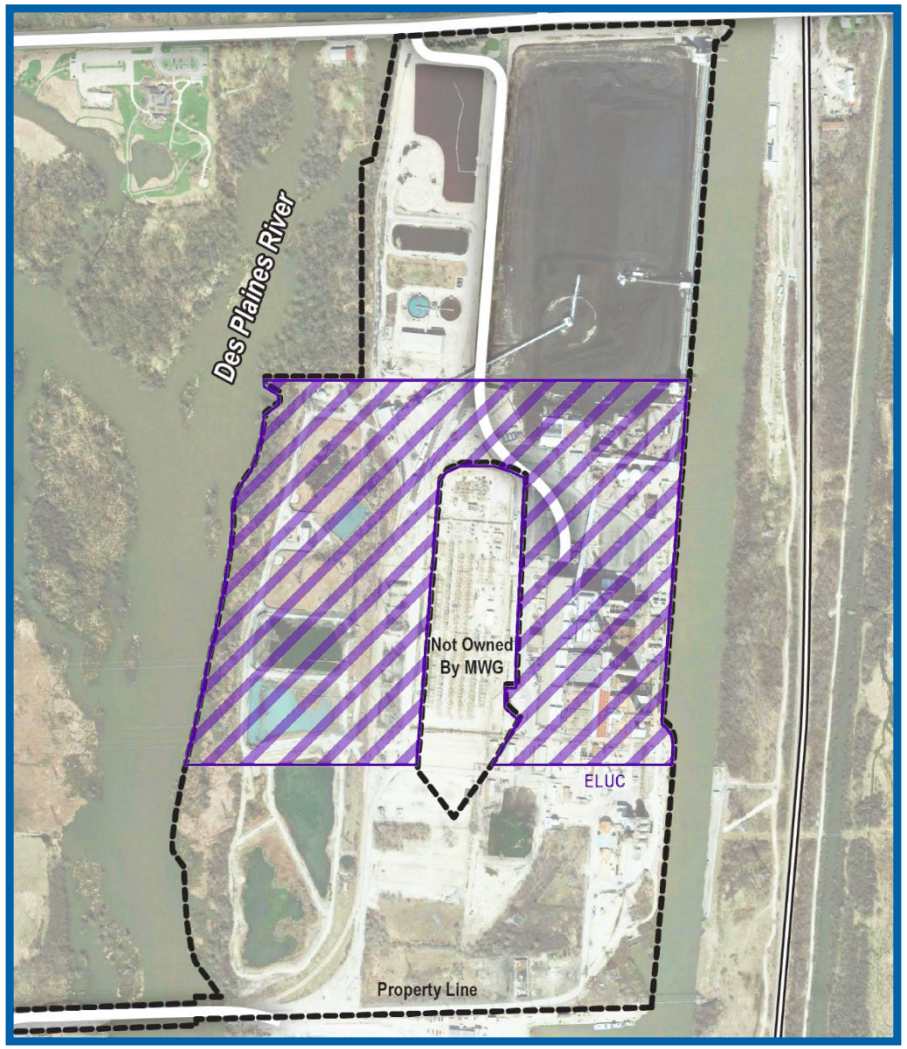
Will County - Ongoing Groundwater Monitoring

- **Quarterly sampling of established groundwater monitoring network since CCA implemented in 2012**
- **10 MWs x 34 constituents 4x per year**
- Also to **comply with Federal CCR Rules and IL CCR Rules**
- **Groundwater flow predominantly from mid-site to the west, towards Des Plaines River**



Will County - GMZ and ELUC

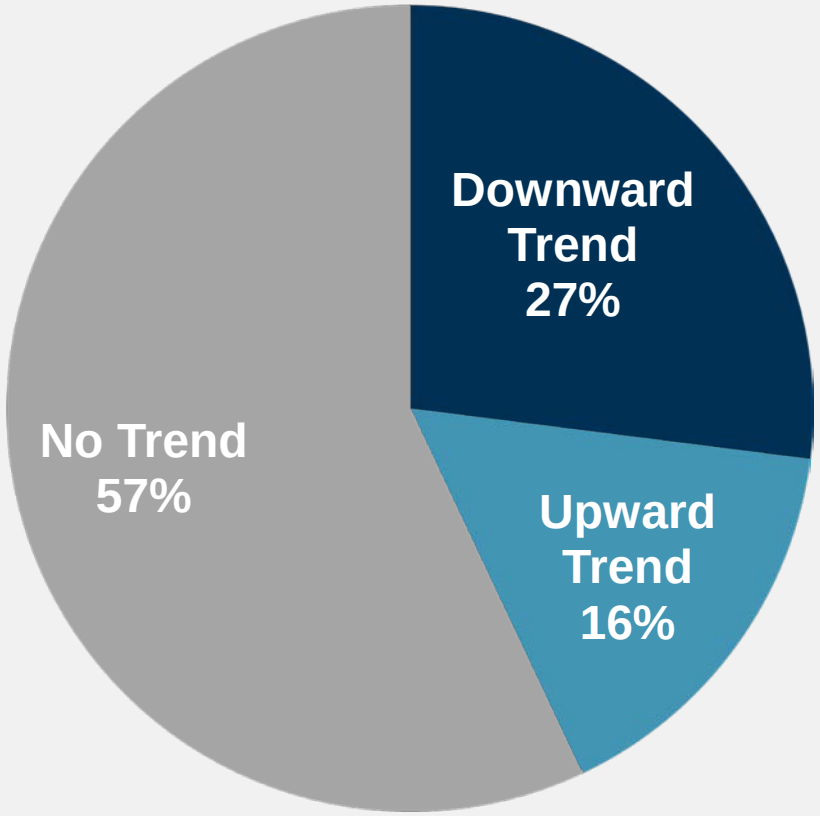




Will County - Potential Receptors

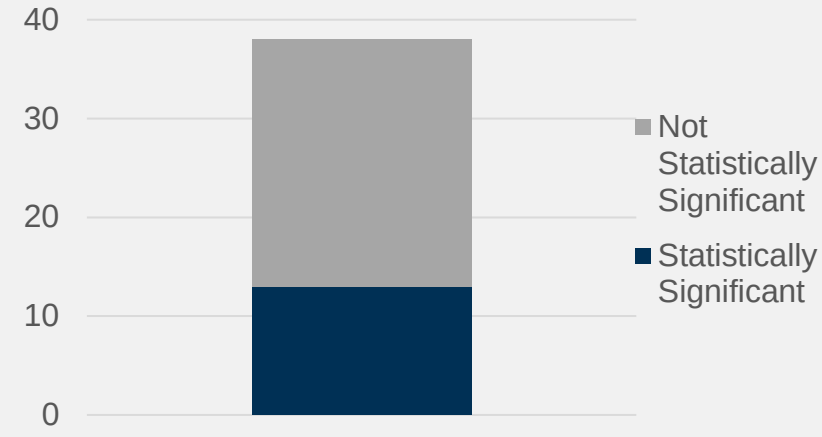
- **Onsite and Surrounding Industrial Land Use**
  - Industrial land use expected onsite into the foreseeable future
  - Chicago Sanitary and Ship Canal to east
  - Des Plaines River to west
  - Hanson Materials/Lafarge to south
- **No potable use of shallow groundwater**
  - Previous water well search presented in Patrick Report on 2010 Hydrogeologic Investigation (2500 ft radius)
  - Prohibited by ELUC
  - GMZ established
- **Potential ecological receptors**
  - Des Plaines River to west

Will County - Groundwater Trend Testing

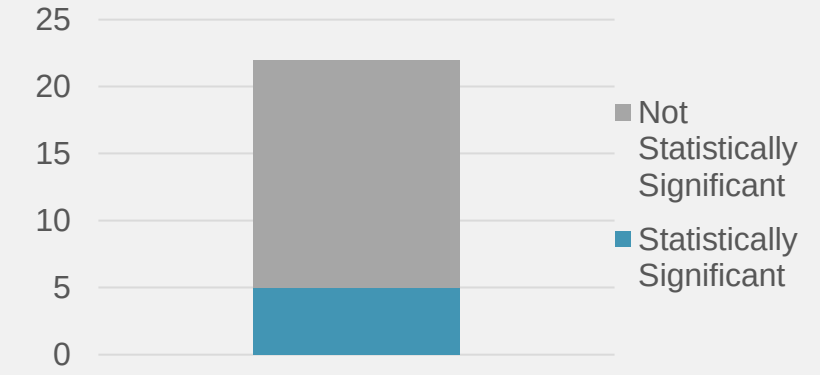


With the exception of chloride at MW-09, no well with stat. sig upward trend has ever exceeded a Class I GW standard.

DOWNWARD TREND



UPWARD TREND

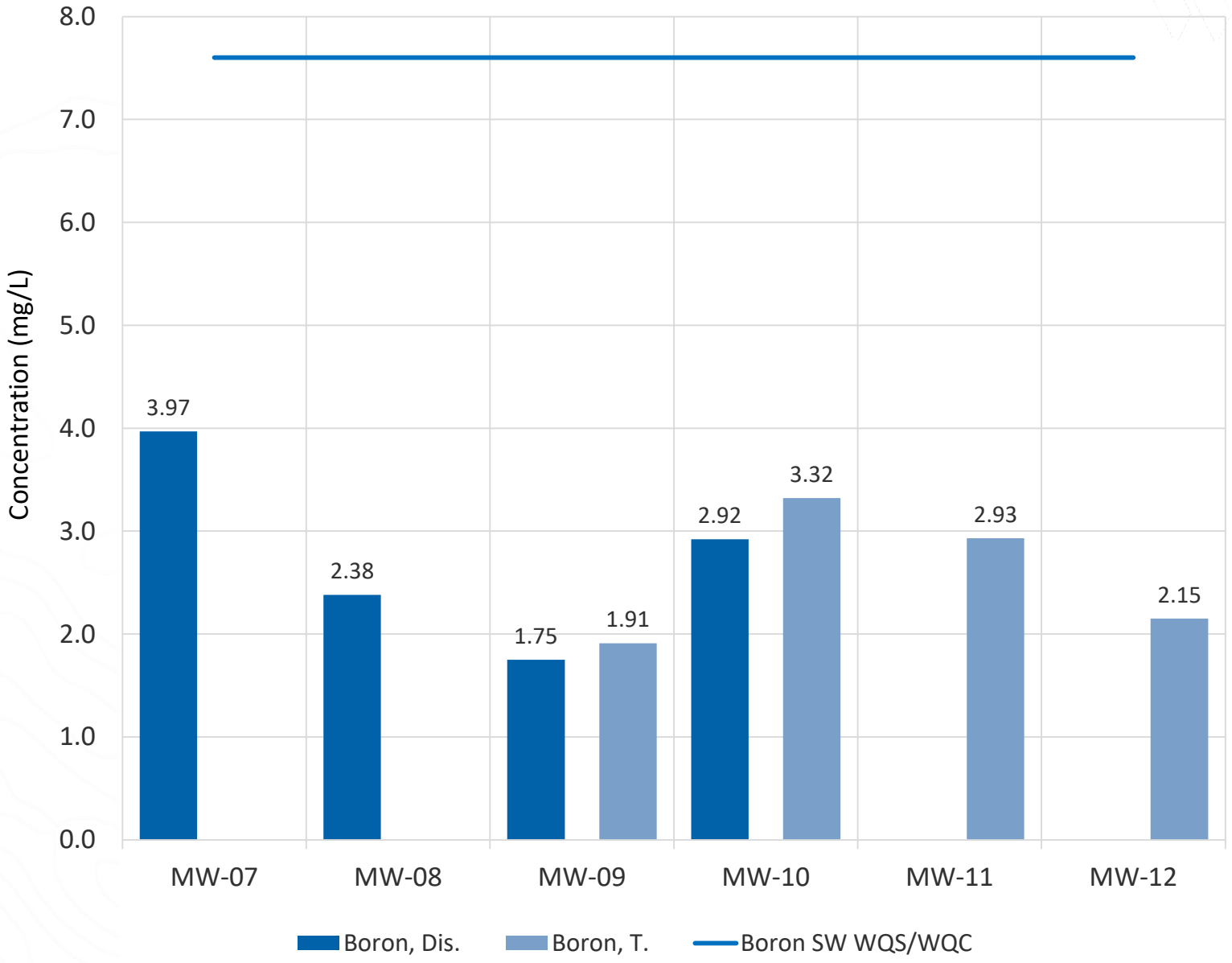


Will County - Groundwater to Surface Water Analysis

Will County -
Groundwater to Surface Water Analysis

- **Average groundwater concentrations from December 2010 to 4th Quarter 2020 as calculated by SanitasTM Software**
- **Constituent non-detect in 75% or more samples;** reporting limit presented as average
- **CCR constituents from Appendices III and IV to 40 CFR Part 257**
- **Surface Water Standard (SWS) obtained from the Illinois General Use Water Quality Standards (WQS) as defined in 35 IAC 302, Subpart B or the Illinois Water Quality Criteria (WQC) - if no WQS.**

Will County: Average **Boron in Groundwater** Compared to Surface Water Standards



Will County - Summary

- **Background data from upgradient wells to assess regulated units**
  - Regular groundwater elevation contour maps
  - No evidence of groundwater flow from ponds to upgradient wells
  - Units to close
- **Trend testing at downgradient MWs indicates improving groundwater quality over long term**
  - Downward trends expected to continue, given station no longer burns coal and ponds being closed
- **No unacceptable risk to onsite or offsite potential receptors**

Will County - Summary

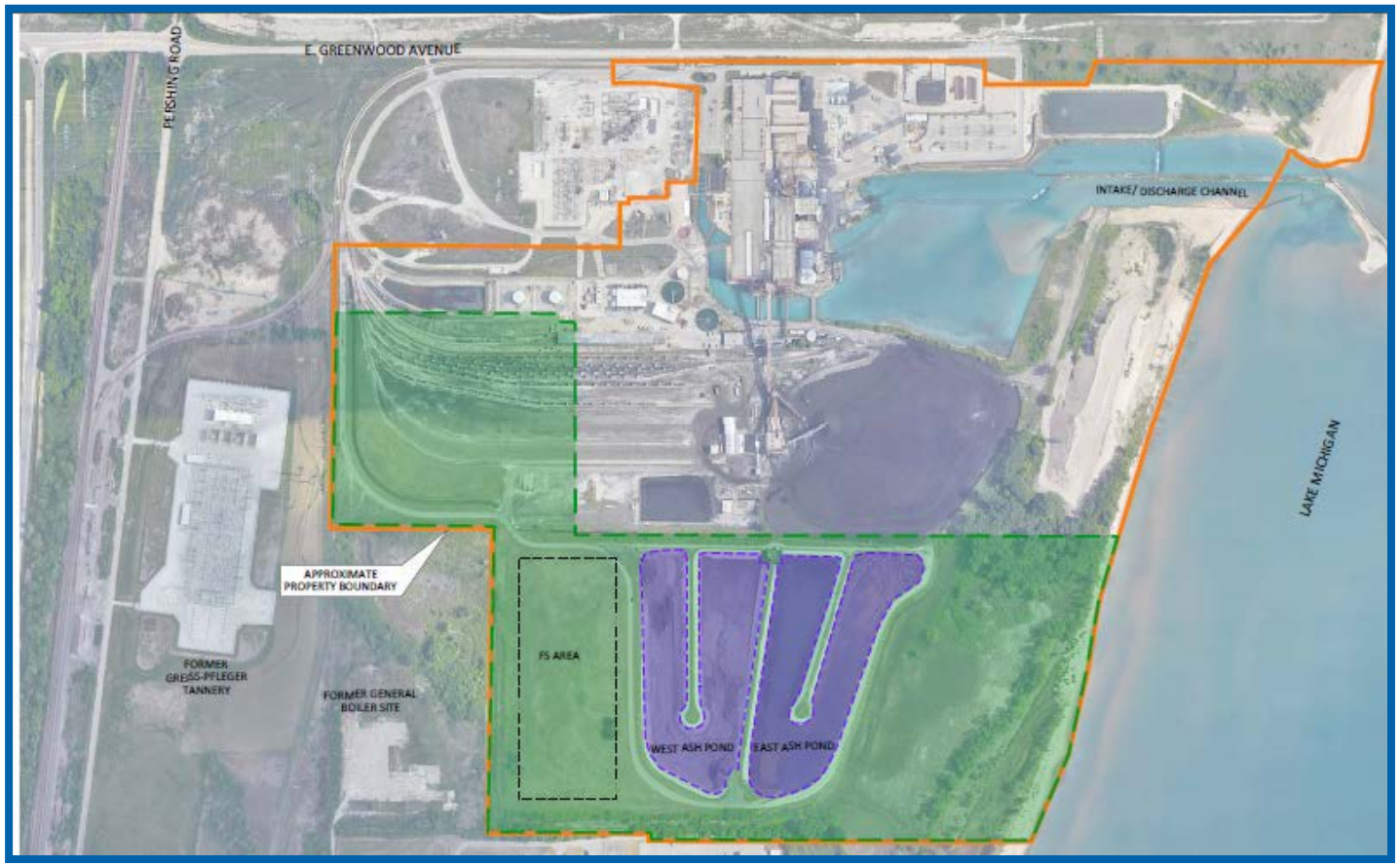
- Continue to follow Federal/State CCR Rules
- Continue regular groundwater monitoring under CCR rules
- Implement closure of CCR Surface Impoundments
- Comply with potential new Federal or State regulations for historic fill areas

Waukegan Station

Weaver Consultants Group

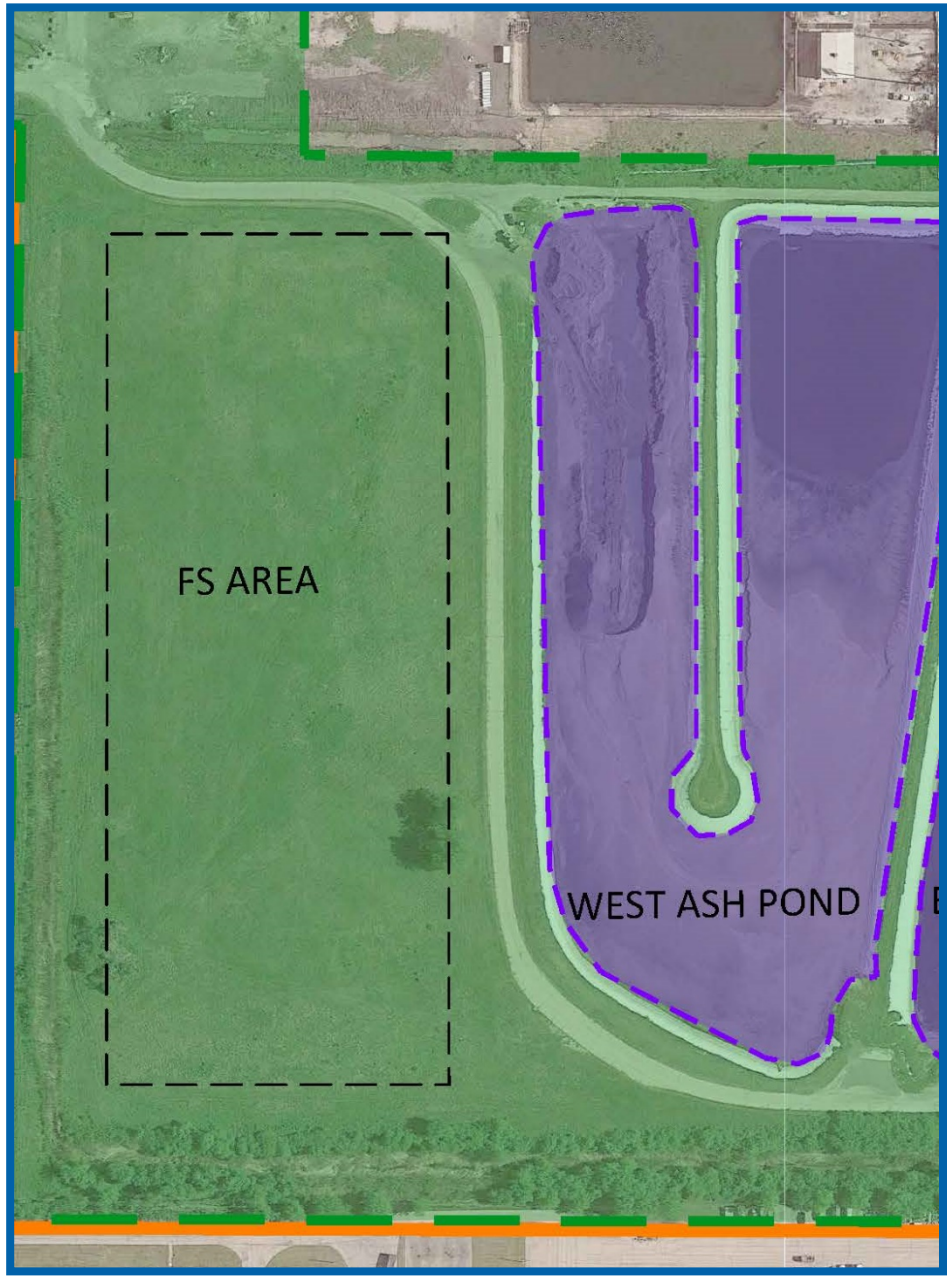
Waukegan -
Background + Setting

- **Began operation in 1923**
- **MWG acquired in 1999**
- **Ceased burning coal June 2022**
- **Surrounding area used for industrial purposes since 1930**
  - Superfund site to the north
  - Former Greiss-Pfleger Leather Tanning Facility to the west
  - Sewage plant to the south



Waukegan –
Alleged Historic Fill Area

Former Slag Area (aka FS Area)



Waukegan County - Investigation Locations

LEGEND

- APPROXIMATE PROPERTY BOUNDARY (PER COUNTY GIS SITE, IN ADDITION, FOLLOWING CURRENT LAKE SHORE LINE)
- APPROXIMATE CCR PONDS
- POND SUBJECT TO FEDERAL AND STATE CCR RULES
- MW-2 — PATRICK 2010 HYDRO ASSESSMENT/KPRG 2010-2014 CCR APPROX. MONITORING WELL LOCATION (PER KPRG MAP, 11/2020)
- B-12 — ENSR 1998 PHASE II ESA APPROXIMATE BORING LOCATION (PER ENSR SITE PLAN, 11/1998)
- MW-5 — ENSR 1998 PHASE II ESA APPROXIMATE MONITORING WELL LOCATION (PER ENSR SITE PLAN, 11/1998)
- S-15 — ENSR 1998 PHASE II ESA APPROXIMATE SURFACE SOIL SAMPLE LOCATION (PER ENSR SITE PLAN, 11/1998)
- X-8 — ENSR 1998 PHASE II ESA APPROXIMATE SEDIMENT SAMPLE LOCATION (PER ENSR SITE PLAN, 11/1998)
- A4 — KPRG 2020 INVESTIGATION APPROXIMATE SAMPLING LOCATION (PER RUETTIGER, TONELLI & ASSOC. INC. PLAN, 11/2020)
- WS-GT-4 — KPRG 2005 GEOTECH APPROXIMATE BORING LOCATION (PER KPRG FIGURE PLAN, 2005)

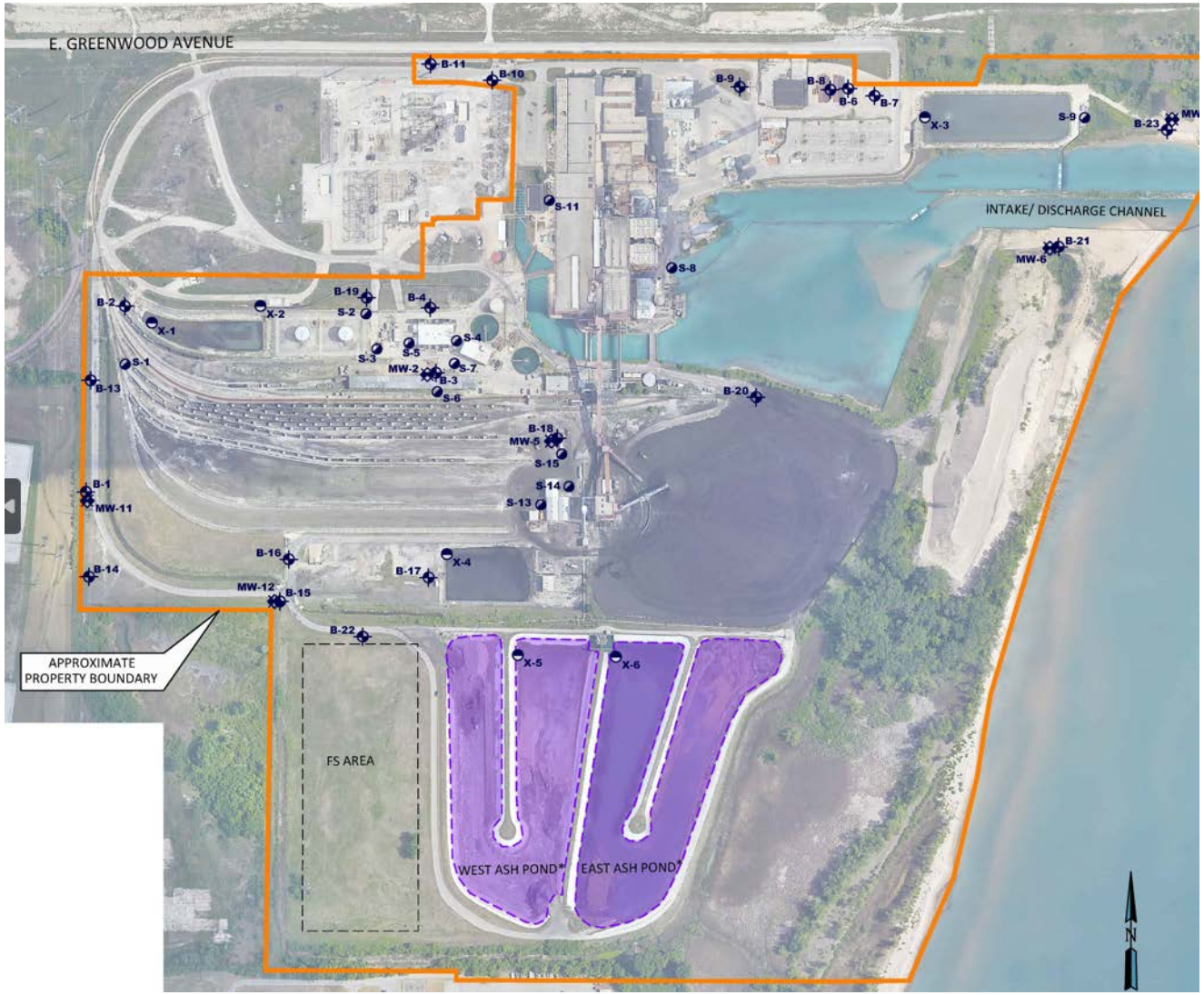
NOTES:
* ASH AND WATER SAMPLES COLLECTED FROM THE EAST AND WEST ASH PONDS IN 2018 AS PART OF 2019 KPRG ASD.
BOTTOM ASH SAMPLES (BOTTOM ASH-1, BOTTOM ASH-2, AND BOTTOM ASH1/2) COLLECTED FROM EAST AND WEST ASH PONDS AS PART OF KPRG 2004 SAMPLING.

Waukegan - Investigations

- **1998** Phase II Environmental Site Assessment by ENSR (due diligence, prior to MWG acquisition of station)
- **2005** Geotechnical Investigation by KPRG
- **2010** Hydrogeologic Assessment by Patrick Engineering
- **2020** FS Area Investigation by KPRG
- Ongoing groundwater monitoring under CCR Rules and CCA

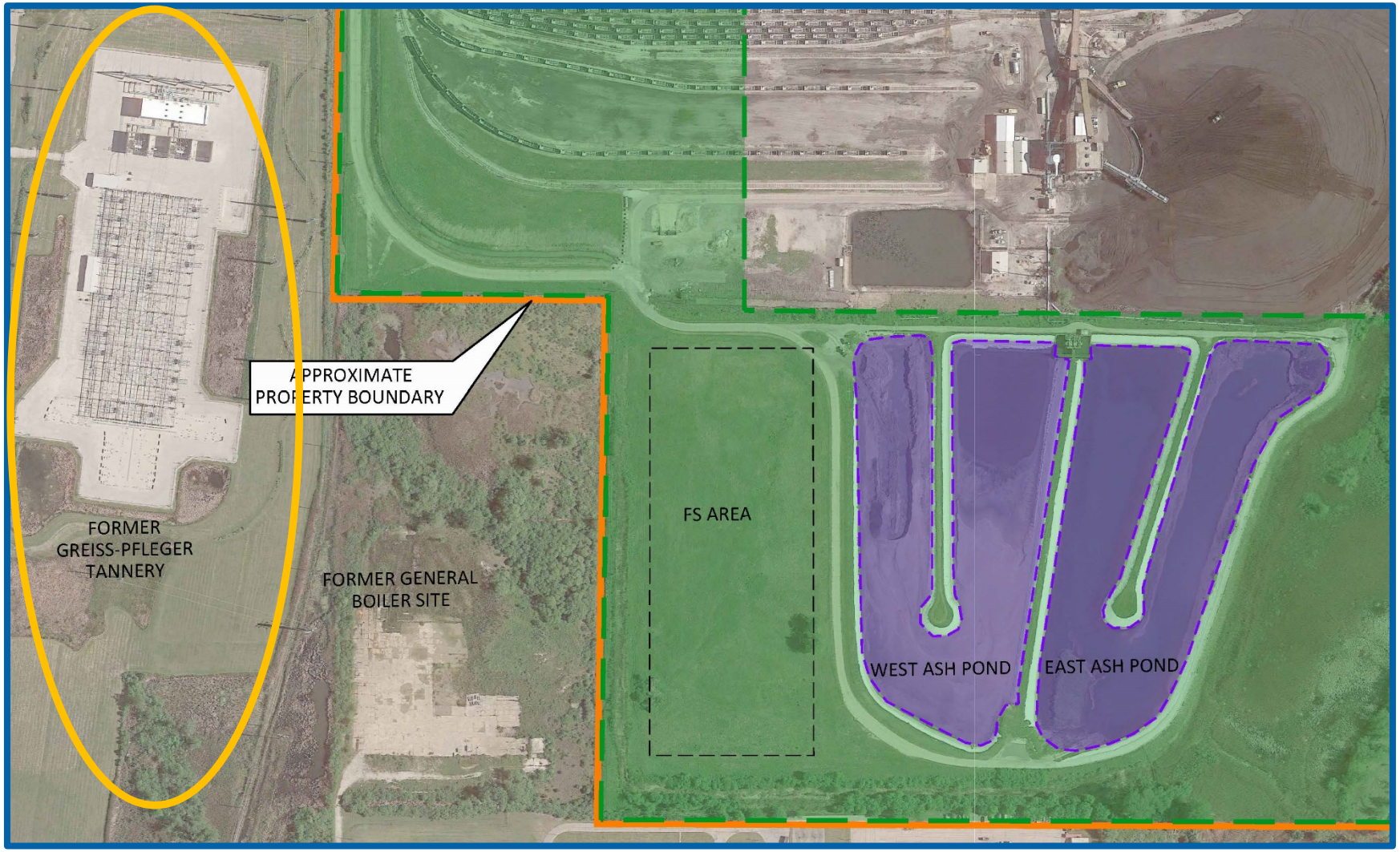
Waukegan –
1998 Phase II ESA

- **22 soil borings, 5 MWs, 13 surface soil, 6 sediment samples**
- **B-22: northern portion of FS Area (coal/ash):**
  - Other than arsenic, RCRA metals in soil below TACO Tier 1 SRO
  - Arsenic 14 mg/kg (TACO SRO=13 mg/kg)
- **Groundwater ingestion not a concern** (no potable wells)
- **Based on industrial land use/low potential for human exposure to constituents of concern**
- **No requirement under Illinois environmental law to further investigate or remediate this property**



Waukegan - Upgradient Sources

Former tannery and General Boiler causing GW contamination on MWG property

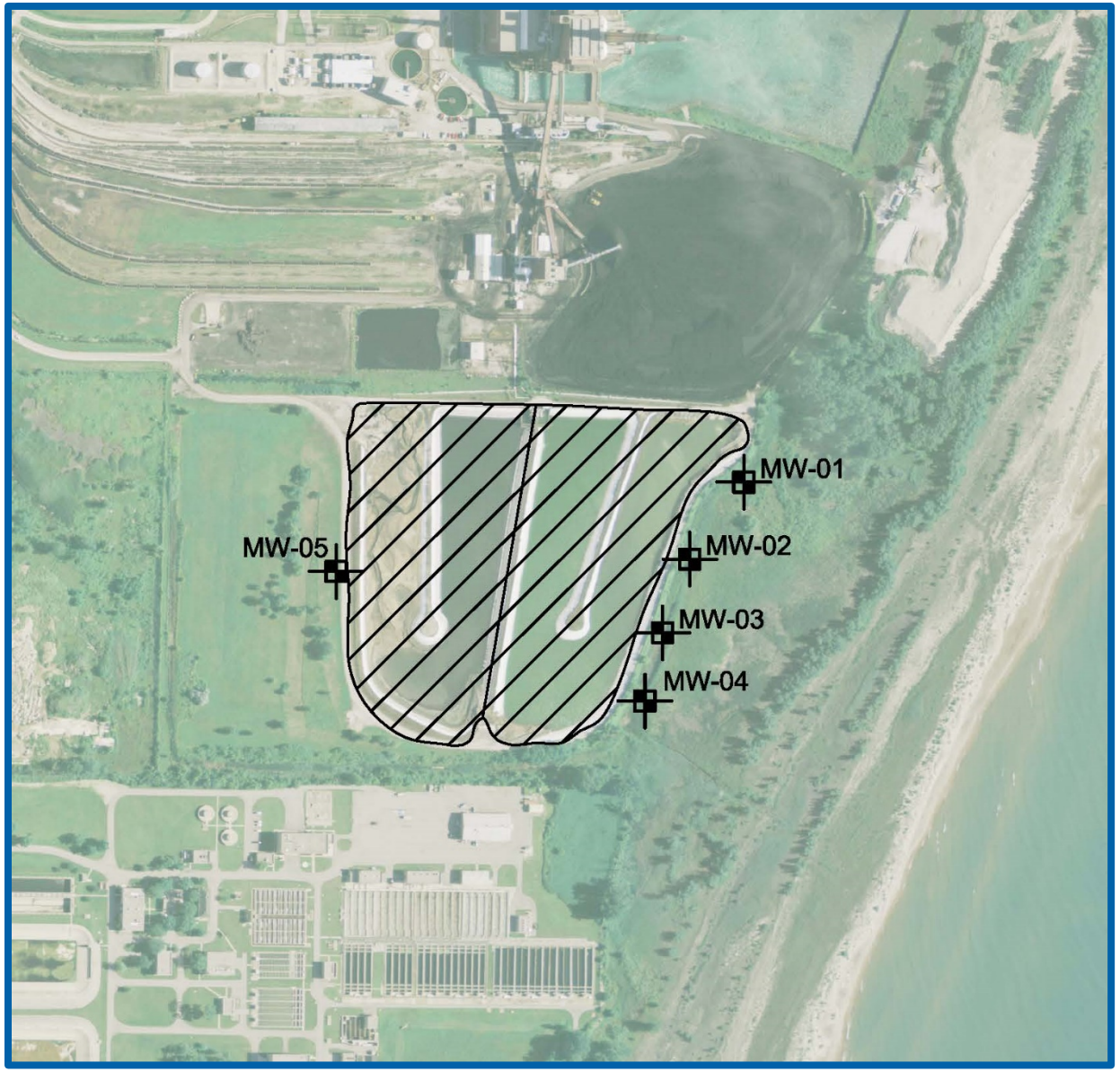


Waukegan – 2005 Geotechnical Investigation By KPRG

- **Provide information on physical characteristics of soils**

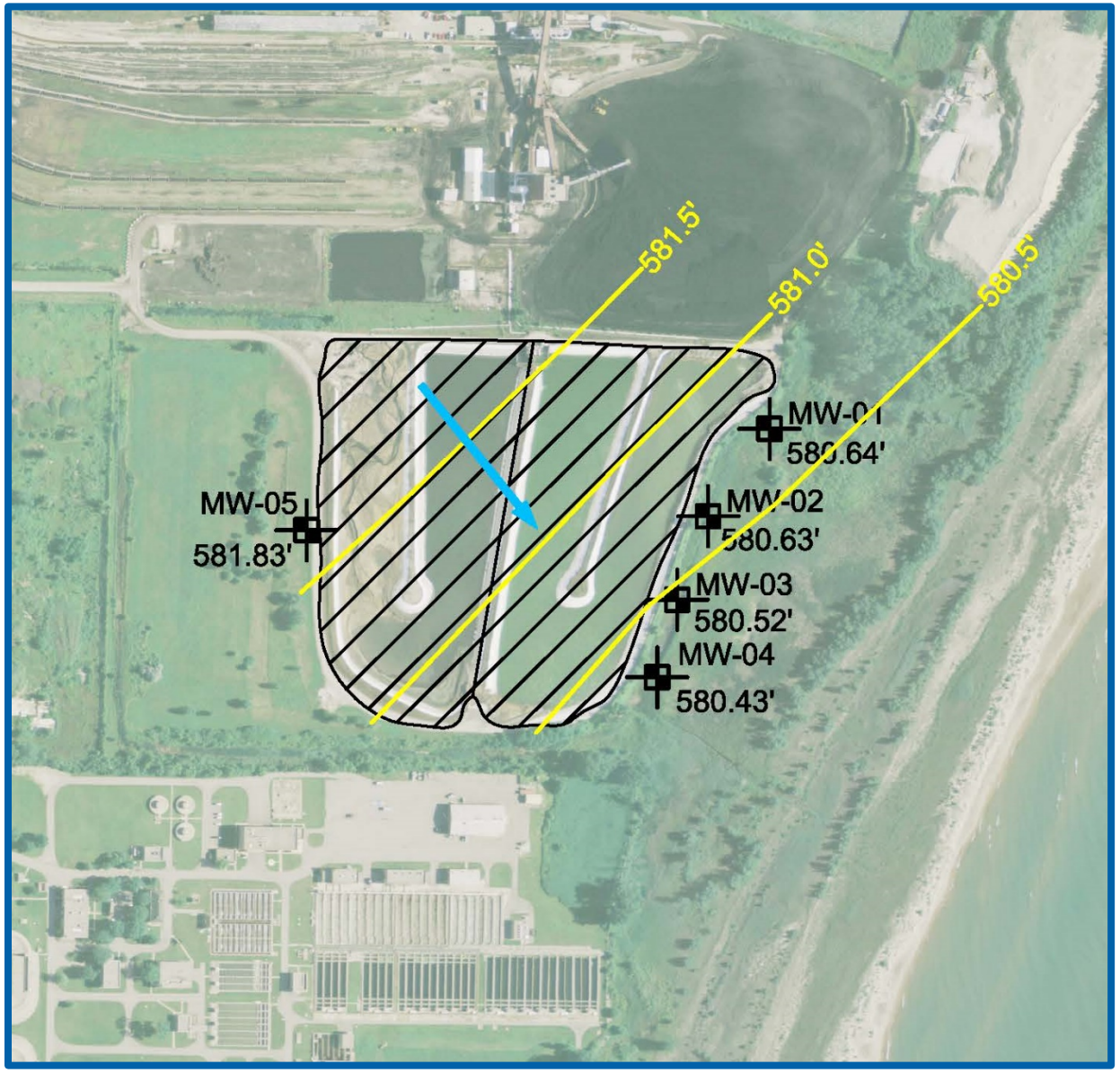
Waukegan – 2010 Hydrogeologic Investigation

- **Voluntary investigation pre-CCR regulations**
- **Installation of 5 MWs**
- **Groundwater samples collected**
- **14 potential CCR-related analytes not detected**
- **Antimony, arsenic, boron above Part 620 Class I GWQS downgradient**
  - Only one sampling event
- **Upgradient concentrations > Class I GWQS**
  - B, Mn, SO4, TDS



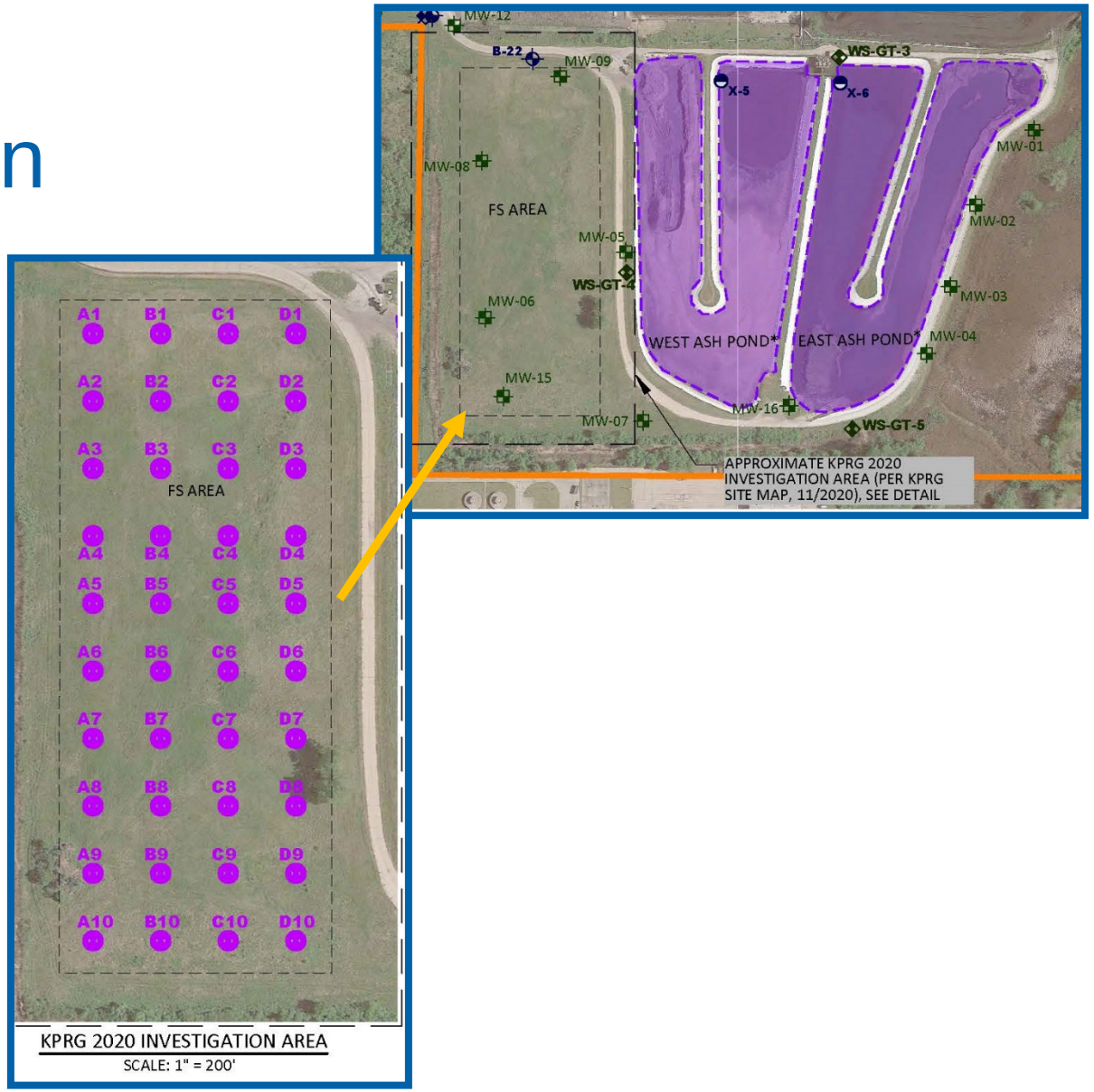
Waukegan – 2010 Hydrogeologic Investigation (cont.)

- **Lithology predominantly sand and silt underlain by sand and gravel**
- **Uppermost groundwater unit at depths ranging from 22 to 23 feet bgs**
- **Direction of groundwater flow: southeast toward Lake Michigan**
- **Water Well Search (2500 ft radius)**
  - No potable wells downgradient of ash ponds (between ponds and L. Michigan)



Waukegan –
2020 FS Area Investigation

- **40 probes 1,000' x 400' grid**
- **Coal ash ranging from near ground to 7-17 ft. below ground**
- **Natural pH LEAF for various metals associated with CCR**
- **Natural pH LEAF concentrations below Class I GQQS, except:**
  - Boron at 3 locations
  - Arsenic at 1 location

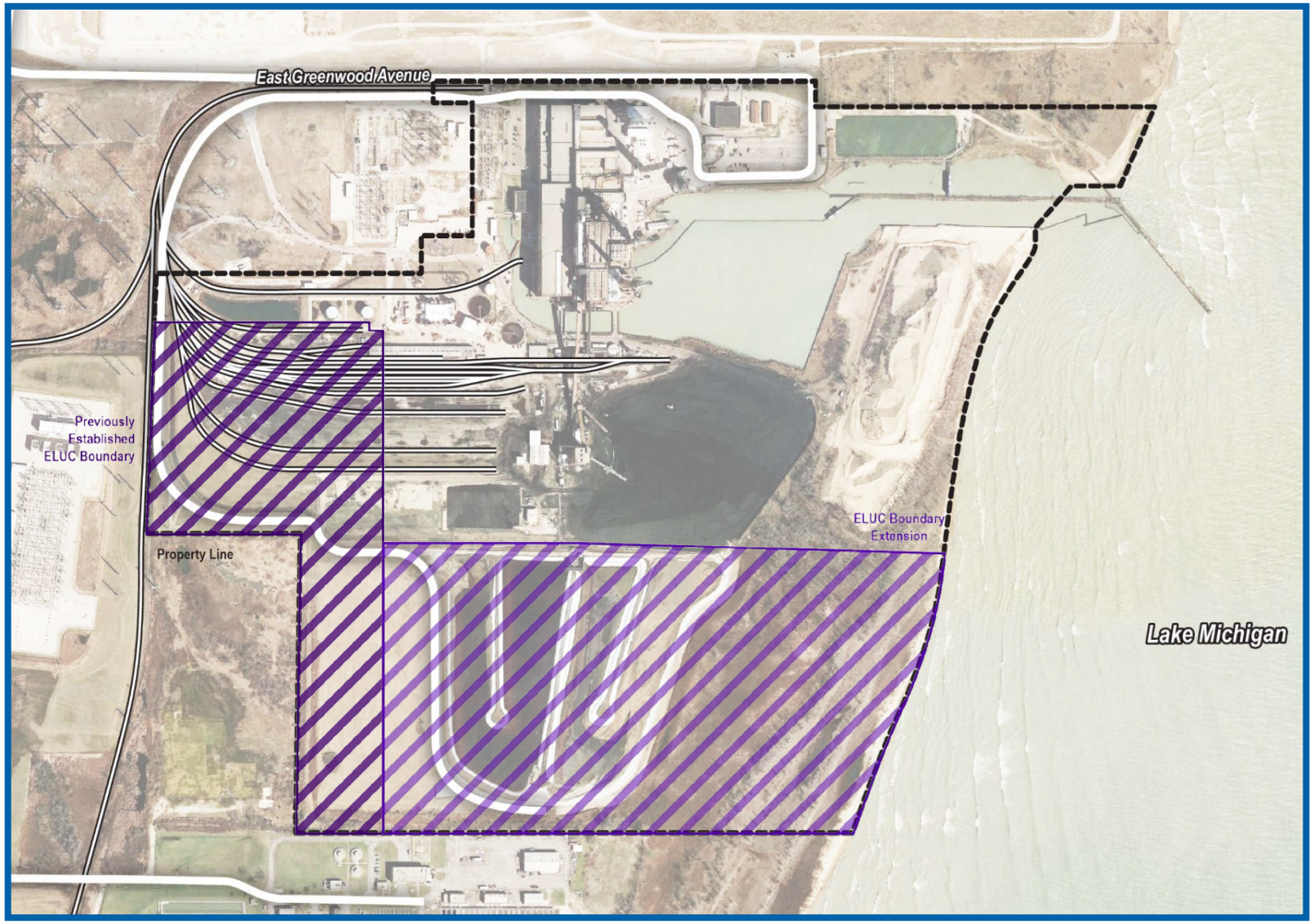


Waukegan –
Ongoing Groundwater Monitoring

- **12 monitoring wells installed around ponds and FS Area**
- **Federal Appendix III (detection) constituents**
- **Federal Appendix IV (assessment) constituents**
- **Constituents required by IL CCR Rules (both detection and assessment constituents)**
- **Quarterly monitoring since CCAs implemented in 2012**
- **Sampling/analysis of 34 constituents 4x per year x 12 MWs**

Waukegan - ELUC

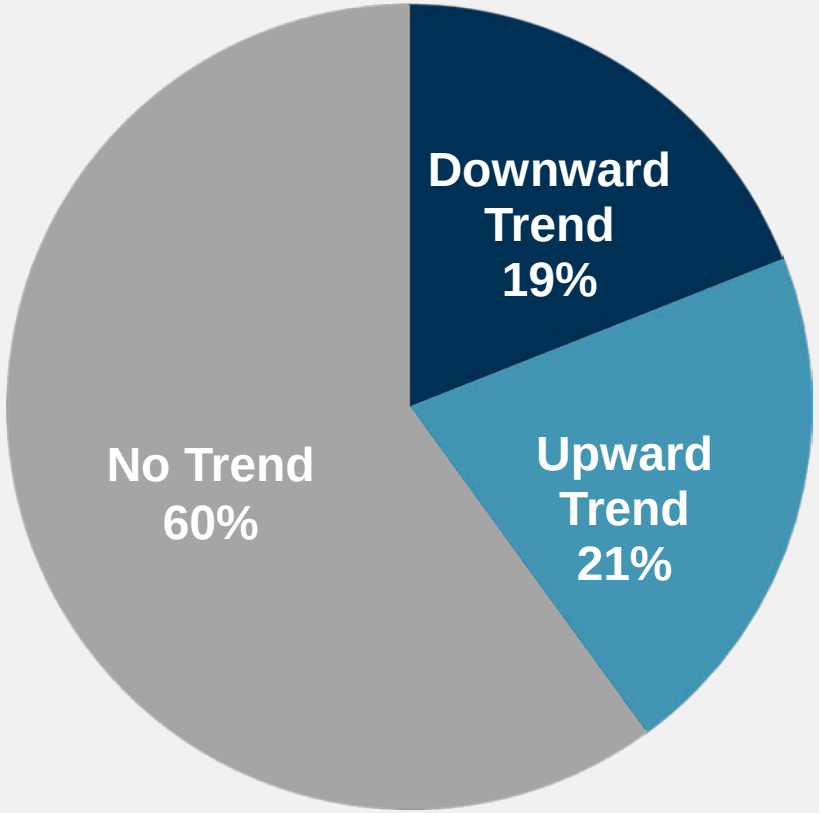
- ELUC on west side to address off-site groundwater impacts (ComEd Former Tannery)
- ELUC on east side established pursuant to 2012 CCA



Waukegan - Potential Receptors

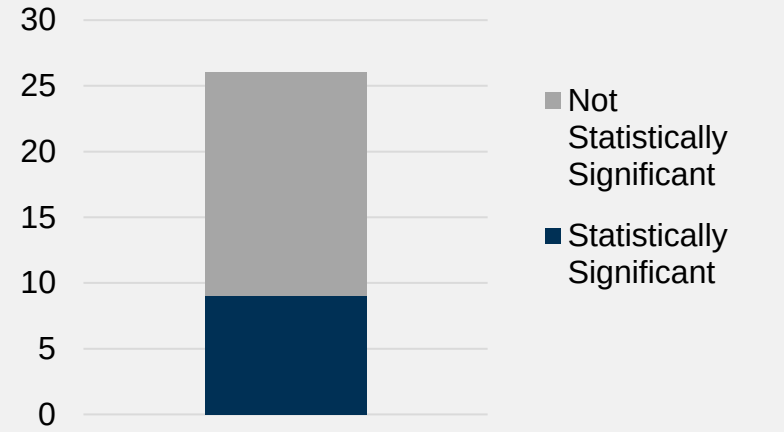
- **Surrounding Industrial Land Use**
  - Superfund site to the north
  - Former Greiss-Pfleger Leather Tanning Facility and General Boiler to the west
  - Known contamination migrating on to Station property
  - Sewage plant to the south
- **No potable use of groundwater**
  - Water well search in Patrick 2010 Hydrogeologic Report
  - Prohibited by ELUC
- **Potential ecological receptors**
  - Lake Michigan located to the East

b. Waukegan - Groundwater Trend Testing

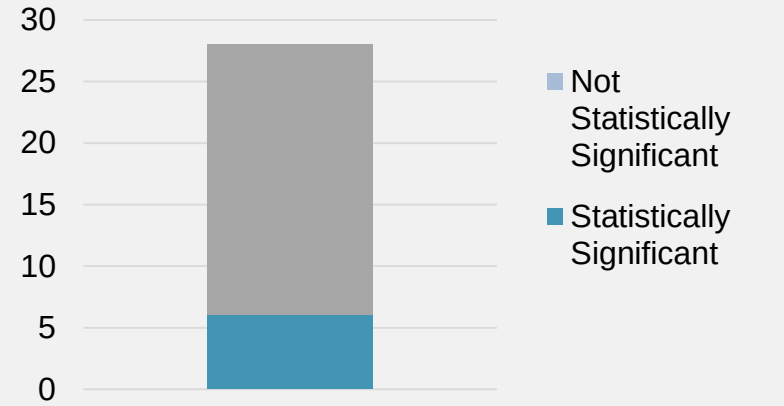


With the exception of boron at MW-2, no well with stat. sig upward trend has ever exceeded Class I GW standard.

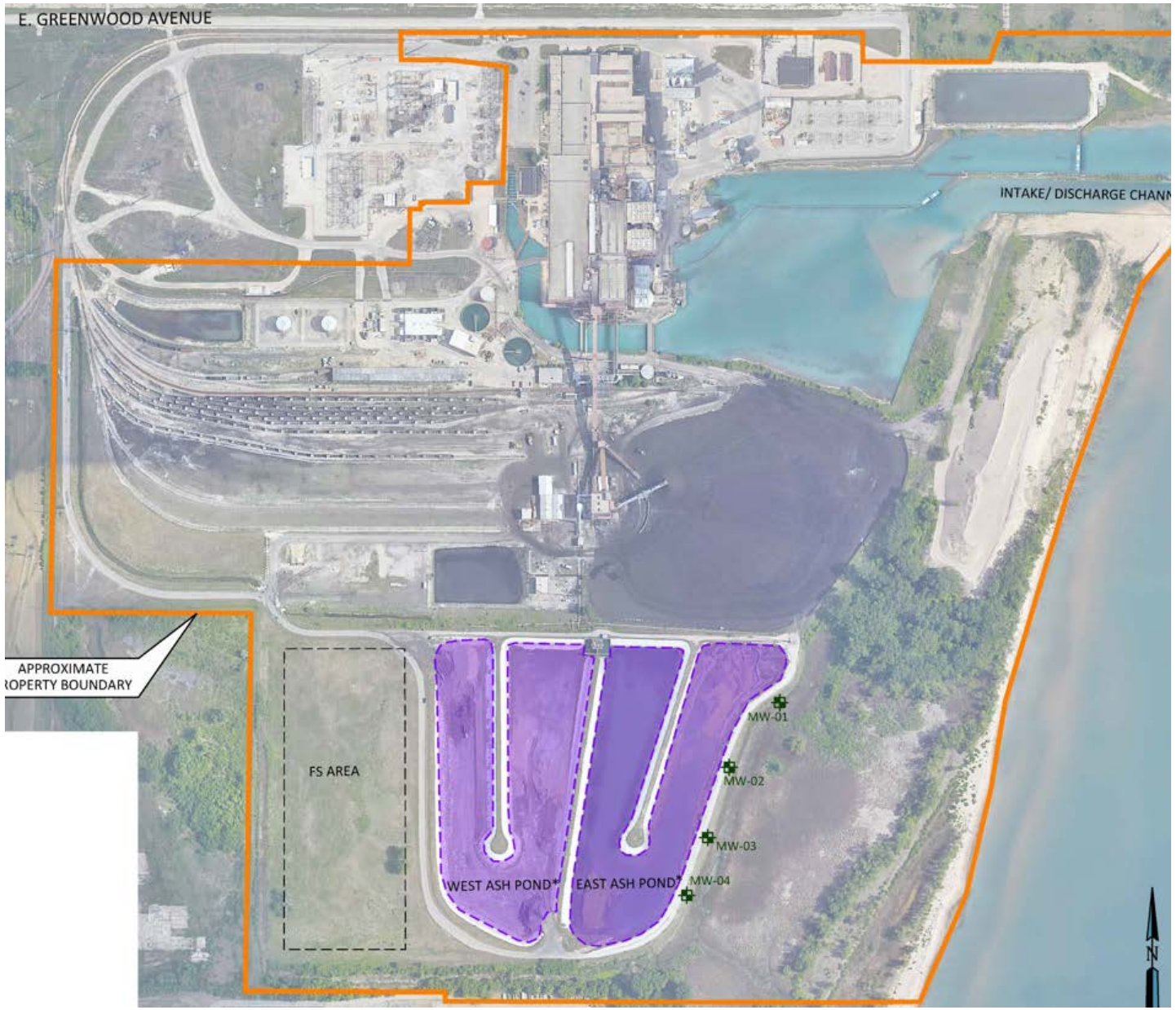
DOWNWARD TREND



UPWARD TREND



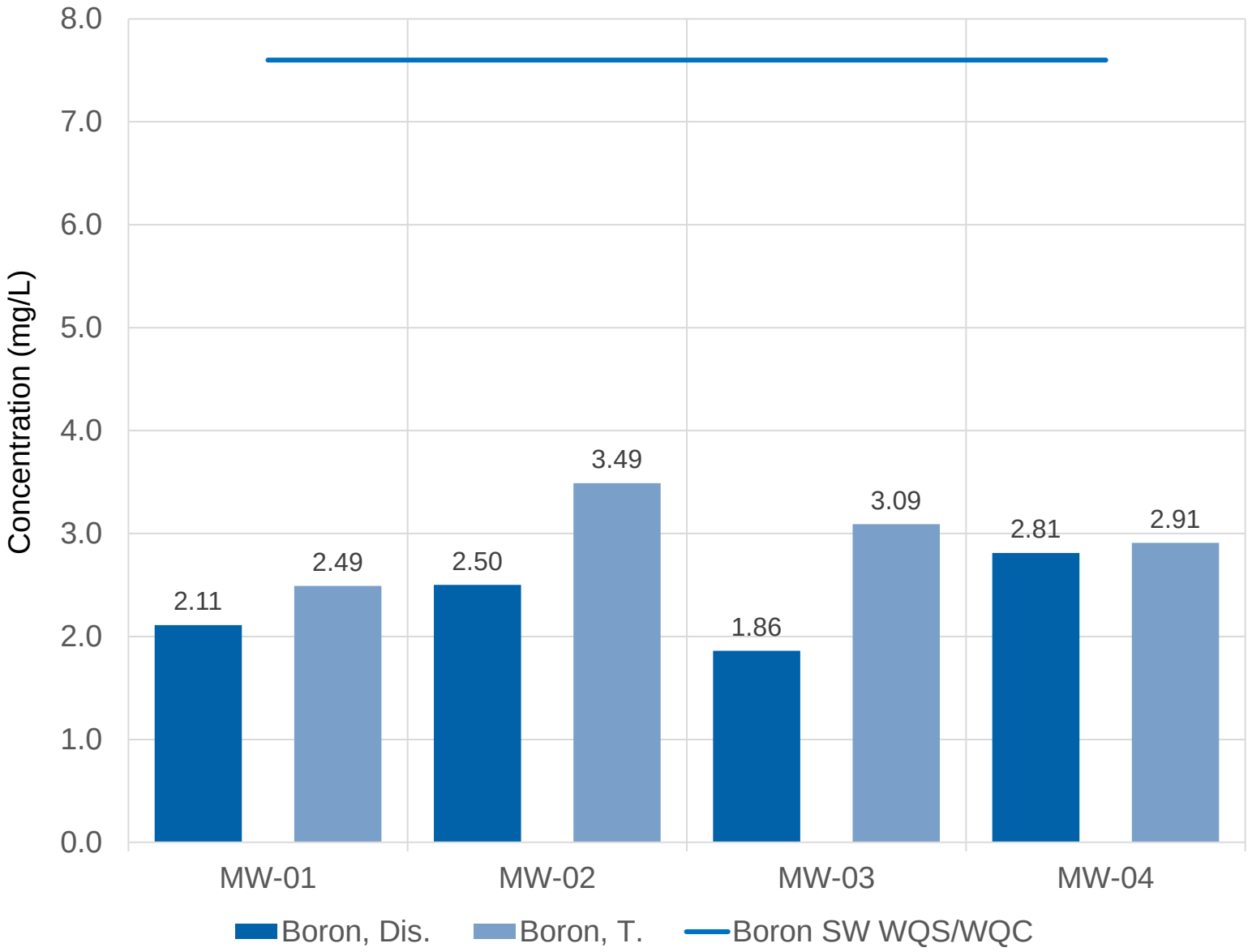
c. **Waukegan -** Potential Groundwater Impact to Surface Water Analysis



Waukegan -
Groundwater to Surface Water Analysis

- **Average groundwater concentrations from December 2010 to Q4 2020 as calculated by Sanitas™ Software**
- **Constituent non-detect in 75% or more samples;** reporting limit presented as average
- **Constituents analyzed are CCR constituents from Appendices III and IV to 40 CFR Part 257**
- **Surface Water Standard (SWS) obtained from the Illinois General Use Water Quality Standards (WQS) as defined in 35 IAC 302, Subpart B or the Illinois Water Quality Criteria (WQC) - if no WQS.**

Waukegan: Average **Boron in Groundwater** Compared to Surface Water Standards



Waukegan - Summary

- **Background data from upgradient wells appropriate to assess if regulated units impacting groundwater**
  - Regular groundwater elevation contour maps
  - No evidence of groundwater flow from ponds to upgradient wells
  - Units to be closed/repurposed
- **Trend testing of downgradient groundwater quality data indicates slightly more upward trends than downward**
  - Not entirely unexpected, given presence of off-site/upgradient impacts and uncapped FS Area
  - Remedy warranted for FS Area, so that a GMZ can be instituted
- **No unacceptable risk to onsite or offsite potential receptors**

Waukegan - Summary

- Continue to follow Federal/State CCR Impoundment Rules
- Continue groundwater monitoring
- Implement closure/repurpose of surface water impoundments
- Presumptive Remedy for FS Area
- Comply with potential new Federal/State regulations for historic fill areas

Waukegan - Presumptive Remedy: Low Permeability Cap over FS Area

- **Common closure option**
- **Cap will effectively eliminate infiltration through CCR above water table**
  - Hydrologic Evaluation of Landfill Performance (HELP) Model
  - Existing Conditions: 0.4 inches infiltration to groundwater per year
  - Proposed cap: 0.0003 inches infiltration per year (99.9% reduction)
- **Reduce time required for natural attenuation to return groundwater concentrations to Class I Groundwater Standards**
- **Pending State/Federal historic fill area rules**

Conclusions/Opinions

Weaver Consultants Group

Appropriate Action/Remedy

- Continue ongoing groundwater monitoring under Federal/State CCR Rules
- Close/retrofit surface impoundments under CCR rules
- Continue monitoring under CCAs for GMZs
- Continue evaluation of MNA
- Maintain institutional controls
- Presumptive remedy – Waukegan FS Area
- New regulations related to historic fill areas

Character/degree injury

- **Longevity and location:**
  - Stations at current locations for decades
    - 50+ years - Joliet 29/Will County
    - 100+ years - Powerton/Waukegan
  - Waukegan Station surrounded by sites with known contamination, including multiple Superfund sites
  - IL SRP site adjoining Joliet 29 Station
  - Aggregate/cement site adjoining Will County Station and CITGO Petroleum Refinery across Romeo Rd. to NE
  - Powerton located in primarily industrial area

Technical Practicability/Economic Reasonableness

- **Recommended actions are consistent with well-established Illinois TACO Regulations**
  - Typically remedy assessment per IL regulations
  - Trend testing, risk analysis and institutional controls
- **Monitoring and controls per CCR Rules**
- **Alternate remedies considered**
- **Proposed ash fill area rules**

Subsequent Compliance/Due Diligence

- **MWG voluntarily began investigation shortly after assuming operations**
- **MWG voluntarily agreed to install monitoring wells and conduct hydrogeologic investigation to cooperate with IEPA**
- **MWG voluntarily entered CCAs at each station in 2012**
- **MWG relined ponds prior to CCR rules**
- **Actively complying with CCA monitoring**
- **No enforcement action from Agency since CCAs instituted**

Duration/Gravity

- **MWG's voluntary work under CCAs led to GMZs to allow MNA**
- **Limited duration**
- **Comparison of groundwater data to surface water standards – no observed risk**
- **ELUCs preclude future exposure**
- **No downgradient receptors for potable groundwater**
- **Section 12(d) violation at Powerton brief duration (2-3 months) during winter months**

Station	Unit	Still Rec CCR?	CCR Reg Status	Previous Liner	Upgrades	Current Closure/Op Plans*	Comments	GW Mon Program	ASD
Joliet 29 (not burned coal since 2016) (possible cease burning nat gas 2023)	Pond 1	N	NA	Poz 1978	HDPE 2008 protection, warning layers	NA	CCR removed before Oct 2015 2020 study: no CCR present, IPCB affirmed inapplicability	CCA	NA
	Pond 2	N	Fed and State	Poz 1978	HDPE 2008 protection, warning layers	Pond Closure: Decon liner and repurpose pond for stormwater	CCR removed by Nov 2019 Adj Std Ap Pending before IPCB	Detection (CCR) and CCA	2021 (Cl, TDS, SO4)
	Pond 3	N	NA	Poz 1978	HDPE 2013 protection, warning layers	NA	Never rec'd CCR 2020 study: no CCR present, IPCB affirmed inapplicability	CCA	NA
Powerton	Ash Surge Basin	Y (ACD)	Fed and State	Poz bottom, hypalon sides, 1978	HDPE 2013 protection, warning layers	Retrofit dual liner/leachate collection system	Primary basin used for CCR mgmt.	Assessment (CCR) and CCA	2018 (Ap III) 2019 (As, Ba, Mo, Se, Th)
	Ash Bypass Basin	N	Fed and State	Poz bottom, hypalon sides, 1978	HDPE 2010 protection, warning layers	Retrofit dual liner/leachate collection system	Only used when ASB emptied	Assessment (CCR) and CCA	2018 (Ap III) 2019 (As, Ba, Mo, Se, Th)
	Metal Cleaning Basin	Limited use for process water - no comingled ash/water	State	Poz bottom, hypalon sides, 1978	HDPE 2010 protection, warning layers	Retrofit dual liner/leachate collection system	Not part of sluice system - used during outages as temp lay-down for dry ash. Occasionally holds process water	CCA/CCR	NA
	Secondary Ash Basin/Service Water Basin	N (Received no ash)	NA	Hypalon, before 1999	HDPE 2013 protection layers	NA	Finishing pond, Underdrain system Not intended to be regularly cleaned 2020 Study: material not CCR	CCA	NA
	Former Ash Basin (FAB)	N	Fed and State	NA	NA	North: closure by removal South: closure in-place	Bifurcated by on-site rail. CCR from north consolidated with south. IPCB found not a source.	Assessment (CCR) and CCA	NA
	Limestone Runoff Basin	N	NA	Poz bottom, hypalon sides, 1978	NA	NA	Not used for CCR since 2013 (unused and empty).	CCA	NA
	East Yard Runoff Basin	N	NA	NA	NA	NA	Used for stormwater runoff from east half of station	CCA	NA
Waukegan (no longer burns coal as of June 2022)	East Pond	N	Fed and State	Hypalon, 1977	HDPE 2003 protection, warning layers	Cap In-Place (35 IAC 845.750 and 257.102)	ACD	Detection (CCR) and modified CCA	2018 (B, pH, SO4)
	West Pond	N	Fed and State	Hypalon, 1977	HDPE 2004 protection, warning layers	Pond Closure: Decon liner and repurpose pond	Adj Std Ap pending before IPCB	Detection (CCR) and modified CCA	2018 (B, pH, SO4)
Will Co. (no longer burns coal as of June 2022)	Pond 1N	N	State	Poz 1977	Dewatering System 2013	Cap In-Place (35 IAC 845.750)	Not used since 2010. System designed to drain surface water-CCA.	CCA/CCR	NA
	Pond 1S	N	State	Poz 1977	Dewatering System 2013	Cap In-Place (35 IAC 845.750)	Not used since 2010. System designed to drain surface water-CCA.	CCA/CCR	NA
	Pond 2S	N	Fed and State	Poz 1977	HDPE 2013 protection, warning layers	Cap In-Place (257.102 and 35 IAC 845.750)	ACD withdrawn	Assessment (CCR) and CCA	2018 (Cl, F, TDS)
	Pond 3S	N	Fed and State	Poz 1977	HDPE 2009 protection, warning layers	Cap In-Place (257.102 and 35 IAC 845.750)		Assessment (CCR) and CCA	2018 (Cl, F, TDS)

*IEPA Construction Permit needed to perform pond closures. No action from IEPA on Permit Applications to date.

LEAF: Leaching Environmental Assessment Framework
ACD: Alternate Closure Demonstration
Poz: Poz-o-Pac
NLET: Neutral Leaching Extraction Test
CCR: Coal Combustion Residuals
HDPE: High Density Polyethylene
ASD: Alternate Source Demonstration

2022 Sediment Sampling/Analysis - Des Plaines River

Downstream (nearest ponds) to Upstream (towards Brandon Rd.)

	BR-2021-110	**BR-2021-109**	**BR-2021-108**	**BR-2021-107**	**BR-2021-106**	**BR-2021-105**	**BR-2021-104**	**BR-2021-103**	**BR-2021-102**	**BR-2021-101**	**BR-2021-100**
Arsenic*	<1.33	<1.31	<1.41	<1.27	<1.31	<1.33	<1.14	<1.18	<1.43	<1.32	<1.32
Cadmium*	<0.133	0.624	0.277	0.306	0.216	0.21	0.171	<0.118	<0.143	<0.132	<0.132
Chromium*	2.98	6.52	5.29	5.48	5.86	6.13	3.0	4.78	44.1	3.04	13.5
Copper	<1.33	6.48	6.05	9.68	5.08	7.98	3.83	3.87	4.34	1.36	9.98
Lead*	2.27	23	13.4	14.8	17.9	13.6	5.0	21.3	**154**	3.51	*111*
Mercury*	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Nickel	2.8	7.84	6.5	4.22	4.56	4.66	1.95	3.67	3.19	2.03	9.65
Silver	<1.33	<1.31	<1.41	<1.27	<1.31	<1.33	<1.14	<1.18	<1.43	<1.32	<1.32
Zinc	6.89	56.7	28.4	31.9	29.8	41.4	19.1	37.3	28.9	11	46.4

Units: mg/kg

Threshold Effect-Concentration (TEC) and Probable Effect Concentration (PEC)

	TEC	**PEC**
Arsenic*	9.79	33
Cadmium*	0.99	4.98
Chromium*	43.4	111
Copper	31.6	149
Lead*	35.8	128
Mercury*	0.18	1.06
Nickel	22.7	48.6
Silver	-	-
Zinc	121	459

Source: Table 7A, Appendix C, 2008 Pre-filed Burton Testimony, PCB 02-08

Units: mg/kg

*CCR constituent under 35 IAC 845.