

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF: )  
 )  
PETITION OF MIDWEST GENERATION, LLC, ) AS 21-1  
FOR AN ADJUSTED STANDARD FROM )  
35 ILL. ADM. CODE 854.740(a) AND )  
FINDING OF INAPPLICABILITY OF )  
35 ILL. ADM. CODE,

REPORT OF THE PROCEEDINGS held in the  
above-entitled cause before Hearing Officer  
BRADLEY P. HALLORAN, called by the Illinois  
Pollution Control Board, taken by Raelene Stamm,  
CSR, for the State of Illinois, Will County Office  
Building, 302 North Chicago, Street, 2nd Floor,  
Joliet, Illinois, on the 28th day of June, 2022,  
commencing at the hour of 9:00 a.m.

Reported By: Raelene Stamm, CSR

License No.: 084-004445

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24

APPEARANCES:

MR. BRADLEY P. HALLORAN, Hearing Officer

MR. ANAND RAO, Board Member

MS. ESSENCE BROWN, Board Member

MS. VANESSA HORTON, Staff Attorney

NIJMAN FRANZETTI, LLP

BY: MS. KRISTIN LAUGHRIDGE GALE

MS. SUSAN M. FRANZETTI

10 South LaSalle Street

Suite 3600

Chicago, Illinois 60603

On behalf of Midwest Generation, LLC;

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

BY: MS. STEFANIE N. DIERS

MS. SARA TERRANOVA

1021 North Grand Avenue East

P.O. Box 19276

Springfield, Illinois 62794

On behalf of the IEPA.

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24

I N D E X

WITNESS	DX	CX	RDX	RCX
WILLIAM NAGLOSKY				
By Ms. Gale	13			
By Ms. Diers		23		
PATRICK ALLENSTEIN				
By Ms. Gale	25			
By Ms. Diers		33		
STEVEN KROLL				
By Ms. Gale	34			
By Ms. Diers		41		
MARK WILSON				
By Ms. Gale	43			
By Ms Terranova		49		
RICHARD GNAT				
By Ms. Gale	50			
By Ms. Diers		66		

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24

I N D E X

WITNESS	DX	CX	RDX	RCX
MATEUSZ RADLINSKI				
By Ms. Gale	68			
By Ms. Terranova		91		
MICHAEL MAXWELL				
By Ms. Gale	96			
By Ms. Diers		163		
THOMAS DEHLIN				
By Ms. Gale	168			

E X H I B I T S

NUMBER	MARKED	ADMITTED
Midwest Genaration Exhibit		
No. 29		67
No. 30	127	
No. 31	175	

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

2 Good morning. My name is Bradley  
3 Halloran. I'm a hearing officer with the Illinois  
4 Pollution Control Board. Today is June 28, 2022.  
5 I'm also assigned to this matter. It's entitled,  
6 In the Matter of Midwest Gen, LLC, Petition For  
7 Adjusted Standard For the Joliet 29 Station, and  
8 it's Docket AS 2021-1. There are -- I'm not sure  
9 if there's any members of the public here, but I  
10 think this is all the attorneys and representatives  
11 of the parties.

12 Before I move on, I notice on the docket  
13 sheet on February 15, 2022, the Agency filed a  
14 motion to supplement the recommendation. I'm not  
15 sure if I addressed that. I see no objection.  
16 None, okay. Miss Gale says no objection, so that  
17 is admitted.

18 This hearing today is being held pursuant  
19 to Section 104.400, Subpart D, of the Board's  
20 procedural rules regarding adjusted standards.  
21 It's also governed in accordance with the, excuse  
22 me, Illinois Environmental Protection Act, Board's  
23 procedural rules, specifically Section 101,  
24 Subpart F, and has been noticed up appropriately.

1           We do have members of our board here. We  
2 have two members of the technical unit. We have  
3 Anand Rao, Essence Brown. We also have staff  
4 attorney Vanessa Horton. Appreciate you being  
5 here.

6           All right. Miss Gale, you want to  
7 introduce yourself and your co-counsel?

8           MS. GALE: Yeah. I also have an opening  
9 statement. Is this a good opportunity to do that  
10 or --

11           HEARING OFFICER HALLORAN: I'm sorry?

12           MS. GALE: I have an opening as well.

13           HEARING OFFICER HALLORAN: After you introduce  
14 yourself.

15           MS. GALE: Good morning, Mr. Hearing Officer  
16 and Members of the Board. I am Kristin Gale, and  
17 with me is Susan Franzetti. We're the attorneys  
18 with Nijman Franzetti on behalf of the petitioner,  
19 Midwest Generation, LLC.

20           HEARING OFFICER HALLORAN: Thank you. IEPA?

21           MS. DIERS: Stefanie Diers, S-t-e-f-a-n-i-e,  
22 Diers is D-i-e-r-s, and co-counsel is Sara  
23 Terranova, S-a-r-a, T-e-r-r-a-n-o-v-a. We're  
24 counsel for Illinois EPA.

1 HEARING OFFICER HALLORAN: Thank you both.

2 Okay. Miss Gale, you want to give a short  
3 opening or a long one.

4 MS. GALE: I think it will be short, but we  
5 shall see. We are here on Midwest Generation's  
6 petition for an adjusted standard from the  
7 requirement to remove the liner and ancillary  
8 equipment in Pond 2 at the Joliet 29 Station as  
9 part of Midwest Generation's closure of the pond.  
10 Midwest Generation's petition also requests that  
11 the Board find Ponds 1 and 3 not to be CCR surface  
12 impoundments and thus not subject to Part 845. The  
13 Illinois EPA does not object to that request, and  
14 the parties have agreed that today's hearing will  
15 focus only on Pond 2.

16 Joliet 29 is a power generating station  
17 that now burns natural gas. Mr. Bill Naglosky, the  
18 station manager, is here to tell us a little  
19 history of the pond at the station. He will tell  
20 us that when the station burned coal, a vast  
21 majority of the coal ash was sluiced in a pipe  
22 across the river to the Lincoln Stone Quarry.

23 However, on the rare occasion when the  
24 pipe was unavailable, the coal ash was sluiced to

1 the impoundment at the station, including Pond 2,  
2 for temporary storage. He will also tell us that  
3 Midwest Generation relined Pond 2 with a  
4 high-density polyethylene liner, commonly called  
5 HDPE in 2008. Midwest Generation emptied Pond 2 of  
6 the coal ash in 2019 and will close it pursuant to  
7 the Illinois CCR rule.

8           When Pond 2 was first built in 1978, it  
9 had a Poz-O-Pac liner. We're gonna hear from  
10 Dr. Matt Radlinski, an expert in concrete and  
11 pozzolanic reactions about Poz-O-Pac. And I have a  
12 sample here, it's kind of dirty, but we can pass it  
13 around later and during his testimony. And he's  
14 gonna describe how the pozzolanic reaction between  
15 fly ash, lime and water chemically changes those  
16 three ingredients and how as part of the process  
17 the aggregate, in this case boiler slag, is  
18 physically bound in the matrix that's formed.

19           He's going to explain that the chemical  
20 and physical process changes the fly ash and bottom  
21 ash such that the Poz-O-Pac does not fall within  
22 the definition of coal combustion residual.

23           When Midwest Generation purchased the  
24 station, it took an active interest in its CCR



1 surface impoundments to ensure that they were  
2 operating properly long before any government  
3 regulation. In the mid 2000s, Midwest Gen began a  
4 company-wide evaluation and maintenance program for  
5 all of its impoundments. One of its first projects  
6 was a geotechnical investigation of the soils in  
7 the pond embankment. Mr. Patrick Allenstein who  
8 logged the soil borings taken during that  
9 investigation is here to describe his findings,  
10 including that he did not log any coal ash in the  
11 borings at Joliet 29 around Pond 2 other than a few  
12 inches at the top.

13 In further -- excuse me. In furtherance  
14 of its interest in the operation and maintenance of  
15 the pond, when Illinois EPA asked Midwest  
16 Generation to analyze the groundwater around its  
17 impoundment in 2010, Midwest Gen agreed. It  
18 engaged Patrick Engineering to install the  
19 groundwater monitoring wells. As part of the well  
20 installation, additional soil borings around Pond 2  
21 were taken. And we will hear today from Mr. Steve  
22 Kroll of Patrick Engineering on how those borings  
23 also did not find CCR in the embankment.

24 We also have one more set of borings

1 collected by Geosyntec in 2016. Mr. Dehlin will  
2 discuss each of those borings in his testimony  
3 about what the embankments were composed with and  
4 how they -- the absence of CCR.

5 Since the installation of the wells in  
6 2010, Midwest Generation has analyzed the  
7 groundwater on a quarterly basis. At first the  
8 groundwater was analyzed for dissolved solid  
9 metals, excuse me, dissolved metals, but following  
10 passage of the of federal CCR rule in 2015, Midwest  
11 Generation analyzed the groundwater for both  
12 dissolved metals and total metals. The groundwater  
13 sampling was conducted by KPRG and Associates, and  
14 we will hear from Mr. Mark Wilson and Mr. Rich Gnat  
15 about how both the dissolved and total metal  
16 samples are collected.

17 We will end with two experts, Mr. Michael  
18 Maxwell, a professional geologist, and Mr. Thomas  
19 Dehlin, a professional engineer. Mr. Maxwell  
20 evaluated the 12 years of groundwater data at  
21 Pond 2 and also the groundwater data and leachate  
22 data from the Lincoln Stone Quarry, and concludes  
23 that the groundwater in Pond 2 is not impacted by  
24 CCR. Instead, Mr. Maxwell concluded that the one

1 metal seen in the groundwater at Pond 2 above a  
2 groundwater protection standard, which is cobalt,  
3 is due to a national phenomena caused by the road  
4 salt applied on Channahon Road.

5           Following him will be Mr. Dehlin who will  
6 describe to us not only how Pond 2 was originally  
7 built, but also how it was relined in 2008. He  
8 will describe how he reviewed and compared the  
9 original drawings with the final as-built drawings  
10 to determine the final design of the pond and also  
11 invoices and change orders that detailed changes  
12 made in the field during the construction. He  
13 reviewed also all of the boring logs to conclude  
14 that CCR was not used as part of the original  
15 construction of the pond, nor the relining in  
16 Pond 2.

17           Mr. Dehlin also has significant experience  
18 designing impoundments with HDPE liners and will  
19 tell us about the uses and properties of HDPE  
20 liners and that an HDPE liner may be reused. Both  
21 Mr. Maxwell and Mr. Dehlin will also respond to the  
22 Agency's presumptions in their response, excuse me,  
23 recommendations about the construction of Pond 2.  
24 And we will insert answers of the -- excuse me. We

1 will insert answers of the Board's questions into  
2 their testimony.

3 We have for you witness binders for the  
4 Midwest Generation witnesses you'll hear from  
5 today. The first binder you have has the exhibits  
6 of the first six witnesses. Because the record for  
7 this petition is rather large, each witness has a  
8 cover page that identifies the exhibit and its  
9 location in the record.

10 I'll end with the summation of why we're  
11 here. We want to avoid waste. The Joliet 29  
12 Station will continue to operate as a power station  
13 and wants to use Pond 2 as a low volume waste pond  
14 which includes storm water. The HDPE liner in  
15 Pond 2 is in good condition and would be a waste of  
16 time, energy and landfill space to destroy a  
17 competent liner when there's no evidence that the  
18 HDPE is contaminated with CCR, no evidence of  
19 contamination in the groundwater from CCR, and no  
20 evidence of CCR used to build the pond. Thank you.

21 HEARING OFFICER HALLORAN: Thank you,  
22 Miss Gale.

23 Miss Diers?

24 MS. DIERS: We do not have an opening

1 statement.

2 HEARING OFFICER HALLORAN: Perfect. We can  
3 start. Miss Gale, you can call your first witness,  
4 and I believe I guess the witness will sit up here  
5 next to the court reporter.

6 MS. GALE: Great. Yes. We call Mr. Bill  
7 Naglosky.

8 HEARING OFFICER HALLORAN: Thank you. The  
9 court reporter will swear you in.

10 (WHEREUPON, the witness was  
11 duly sworn.)

12 HEARING OFFICER HALLORAN: You may proceed.

13 WILLIAM NAGLOSKY,  
14 called as a witness herein, having been first duly  
15 sworn, was examined and testified as follows:

16 DIRECT EXAMINATION

17 BY MS. GALE:

18 **Q. Mr. Naglosky, can you say and spell your**  
19 **name for the court reporter, please?**

20 A. William, W-i-l-l-i-a-m, Naglosky,  
21 N-a-g-l-o-s-k-y.

22 **Q. Thank you.**

23 **Mr. Naglosky, who do you work for?**

24 A. I work for Midwest Generation.

1 Q. What do you do for them?

2 A. I'm the station manager for Joliet  
3 Station.

4 Q. And how long have you managed Joliet  
5 station?

6 A. I think 11 years.

7 Q. And, generally speaking, what do you do?  
8 What are your responsibilities as a station  
9 manager?

10 A. I manage the operations, the maintenance,  
11 the engineering and the compliance, both safety and  
12 environmental, of the station.

13 Q. And how long have you worked for Midwest  
14 Generation?

15 A. Since Midwest Gen acquired the sites in  
16 1999.

17 Q. So before you were a station manager,  
18 generally what did you do?

19 A. Before?

20 Q. Before you were a station manager at  
21 Joliet 29, what were your -- what else did you do  
22 for Midwest Gen?

23 A. I'm a degreed electrical engineer, and  
24 I've been the station manager at other plants, Fisk

1 and Crawford. I've been the director of  
2 engineering for the corporation.

3 Q. Okay. Great.

4 Mr. Naglosky, can you first turn to the  
5 first tab in front of you in your witness binder?  
6 This is the affidavit you signed in this matter,  
7 correct?

8 A. Yes.

9 Q. Okay. I just wanted to confirm that.

10 Mr. Naglosky, what does Joliet 29 Power  
11 Generating Station do? What does it make?

12 A. Well, it makes just under 1400 megawatts  
13 of electricity. It serves the Northern Illinois  
14 load, and it's part of the PJM transmission  
15 distribution management system.

16 Q. And today how does it make that  
17 electricity? What does it use?

18 A. Natural gas.

19 Q. But it used to burn coal, right?

20 A. Yes.

21 Q. When did that conversion happen?

22 A. 2016.

23 Q. And when coal was used to -- excuse me.  
24 When coal was used to generate

1 **electricity, it also generated coal ash, right?**

2 A. Correct.

3 **Q. Including bottom ash?**

4 A. Correct.

5 **Q. And when it generated bottom ash, where**  
6 **did that bottom ash go?**

7 A. Well, the majority of it, all of it, went  
8 to Lincoln Stone Quarry. Unless there was a  
9 problem with the transport system, which was rare,  
10 and then it would go to pond -- it would go to one  
11 of the ponds.

12 **Q. And Lincoln Stone Quarry is across the**  
13 **river, correct?**

14 A. Yes.

15 **Q. Okay. So when one of the ponds were full**  
16 **of ash, where did the ash go?**

17 A. The ash was physically removed and  
18 transported to Lincoln Stone Quarry.

19 **Q. Okay. So we're here discussing Pond 2.**  
20 **What happened with Pond 1?**

21 A. Pond 1 before the regulations in 2015 had  
22 already been cleaned and turned into a natural  
23 purpose pond, a rainwater pond. So it had already  
24 been cleaned before the regulation.



1 Q. Okay. Great.

2 So this is a good opportunity to pull out  
3 Board Question Number 5. There's a copy of it in  
4 front of you?

5 A. Okay.

6 Q. I'll read it into the record, and then you  
7 can give the answer, if that's all right.

8 So Board Question Number 5, please clarify  
9 whether the approximate permitting costs of \$65,000  
10 estimated for Ponds One and 3, citing petition at  
11 18, is for each pond or combined for both ponds.

12 Mr. Naglosky, can you clarify that,  
13 please?

14 A. Yes. It's -- it was for -- it is for both  
15 ponds. However, it was -- it was made over a year  
16 ago, and I'm sure prices have escalated somewhat,  
17 but it also only included one set of public  
18 hearings.

19 Q. And we'll move on to Board Question  
20 Number 20, and again I'll read it into the record,  
21 and then you can answer it.

22 Okay. Board Question Number 20, on  
23 Page 6, you note that Pond 1 at Joliet 29 was  
24 repurposed with existing liner for the existing

1 non-CCR impoundment. Question A, please clarify  
2 whether Pond 1 was repurposed for non-CCR use under  
3 the federal CCR regulations or under the Board's  
4 regulations?

5 A. I believe the answer to that is neither.  
6 It was before the regulations occurred.

7 Q. Okay. Question 20B, prior to repurposing  
8 Pond 1 did Midwest Generation decontaminate the  
9 liner using a methodology like the one being  
10 discussed in this proceeding?

11 A. We remove material to the warning layer  
12 it's called, to the warning layer, so we did not  
13 remove material down to the liner.

14 Q. And what else did you do?

15 A. Wash the sides down with fire hose. The  
16 traditional way we clean the pond there, we wash  
17 the sides down with fire hose, and then we use  
18 heavy machinery to remove any ash that's in the  
19 bottom down to the warning layer.

20 Q. And Question 20C, did the repurposing of  
21 Pond 1 require the Agency's approval?

22 A. No, it did not.

23 MS. GALE: Question 20D will be asked by  
24 Mr. Thomas Dehlin during his testimony.

1 BY MS. GALE:

2 Q. All right. I don't know if you can see it  
3 from here, but Mr. Naglosky, we have up there an  
4 easel, may be we'll --

5 A. I see it.

6 Q. What is that? What is depicted in that  
7 picture?

8 A. That is Pond 2, aerial view.

9 Q. I'm sorry. I missed what you said.

10 A. That is Pond 2.

11 Q. Thank you, sir.

12 And to your recollection, generally when  
13 was Pond 2 originally constructed?

14 A. 1978.

15 Q. Thank you.

16 And again to your recollection,  
17 approximately how large is it?

18 A. Well, 3.9 acres, 25 million gallons.

19 Q. Okay. And when it was constructed in  
20 1978, what was it constructed with?

21 A. Poz-O-Pac liner.

22 Q. And then it was relined, right?

23 A. It was relined in 2008. 2008 it was  
24 relined.

1           **Q.    And to your recollection what was it lined**  
2 **with?**

3           A.    Well, it was a multilayer liner, and it  
4 included a rubber liner.  It included a rubber  
5 liner.

6           **Q.    And then once it was relined, it was**  
7 **placed back into service right?**

8           A.    Correct.

9           **Q.    And collecting bottom ash?**

10          A.    Yes.  Until 2015.

11          **Q.    Do you mean -- right, until 2015.**

12          A.    When we started the construction outage  
13 for gas conversion.

14          **Q.    Right.  And then it held bottom ash until**  
15 **when?**

16          A.    Well, we cleaned it out in 2019, 2019.

17          **Q.    And what does Midwest Generation plan to**  
18 **do with Pond 2?  What would it like to do?**

19          A.    Well, repurpose for rainwater or process  
20 water.

21          **Q.    Okay.  And generally process water, what**  
22 **does that mean?**

23          A.    Well, we have an RO system, a reverse  
24 osmosis system, and we backwash that every week,

1 maybe a thousand gallons a week. Yeah.

2 Q. And so it's emptied at the CCR. Where is  
3 Midwest Gen in the process of repurposing Pond 2?

4 A. I don't understand the question.

5 Q. What are we waiting on before we can move  
6 forward with repurposing of the pond?

7 A. Results of regulation and approval to do  
8 this.

9 Q. Great.

10 And then, generally speaking, how would it  
11 be cleaned and repurposed?

12 A. Since we propose to intend to use the  
13 liner, it'll be done -- it'll start -- the sides  
14 will be washed down. The material will be removed.  
15 However, we'll go past the warning layer and go all  
16 the way to the liner. And there's a lot of  
17 precautions when you do that. You have to have a  
18 rubber-lined heavy machinery, things of that  
19 nature, so the liner is preserved.

20 Q. Thank you.

21 Now I switch over to the groundwater  
22 monitoring that we've been doing. You're aware  
23 that Midwest Generation monitors the groundwater  
24 around Pond 2?

1 A. Yes, I am.

2 Q. And to your recollection when did the  
3 groundwater sampling begin?

4 A. 2010, 2010.

5 Q. And then in 2013, Midwest Generation  
6 entered into a compliance agreement --

7 A. Correct.

8 Q. -- with the Agency?

9 A. Yes, to continue.

10 Q. Right. It required the Agency to continue  
11 groundwater monitoring?

12 A. Yes.

13 Q. Thank you.

14 And then in 2015 because Pond 2 is a  
15 federal unit, what happened?

16 A. Well, the ground monitoring continued to  
17 occur. However, it was done in a different method.  
18 Instead of just filtering the water and testing the  
19 water, it was all SOP. It was the water and all  
20 solids.

21 Q. Let's end here, Mr. Naglosky.

22 To confirm, what are Midwest Generation's  
23 intentions as it relates to the Illinois CCR rule?

24 A. Our intention is always to comply.

1 MS. GALE: Great. I have nothing further.

2 HEARING OFFICER HALLORAN: Thank you. Before  
3 we move on, Mr. Rao and Miss Brown may interject  
4 questions, if they see fit. They'll just try to  
5 let me know, and Miss Horton, if you need to ask a  
6 question. Thank you.

7 Miss Diers?

8 MS. DIERS: Thank you.

9 CROSS-EXAMINATION

10 BY MS. DIERS:

11 Q. Has Midwest Gen used standard earth moving  
12 equipment inside of Pond 2 to remove CCR?

13 A. Yes.

14 Q. Do you know approximately how many times  
15 the existing synthetic liner may have had earth  
16 moving equipment driven on top of it?

17 A. No. It's done on a -- it's done  
18 occasionally, but, no, I don't know.

19 Q. So when you say occasionally, would that  
20 be like --

21 A. Once a decade.

22 Q. -- weekly? Monthly? Yearly?

23 A. A decade.

24 Q. A decade ago --

1 A. Maybe.

2 Q. -- it has?

3 A. You know, something in that range. Five  
4 or eight years certainly at least.

5 Q. Since the last time it's had equipment on  
6 it?

7 A. We know that 2019 it was cleaned.

8 MS. DIERS: Okay. No further questions.

9 HEARING OFFICER HALLORAN: Thank you.

10 Miss Gale, any redirect?

11 MS. GALE: Nothing for me, no.

12 HEARING OFFICER HALLORAN: Thank you.

13 Panel, any questions?

14 You may step down. Thank you so much.

15 (Witness excused.)

16 HEARING OFFICER HALLORAN: You may call your  
17 next witness when ready.

18 MS. GALE: We call Patrick Allenstein.

19 (WHEREUPON, the witness was  
20 duly sworn.)

21 HEARING OFFICER HALLORAN: You may proceed.

22 MS. GALE: Thank you.

23

24



1 PATRICK ALLENSTEIN,  
2 called as a witness herein, having been first duly  
3 sworn, was examined and testified as follows:

4 DIRECT EXAMINATION

5 BY MS. GALE:

6 Q. Mr. Allenstein, for the court reporter can  
7 you please say and spell your name?

8 A. Patrick Allenstein, P-a-t-r-i-c-k,  
9 A-l-l-e-n-s-t-e-i-n.

10 Q. Mr. Allenstein, who do you work for?

11 A. I work for KPRG and Associates.

12 Q. And what do you do for them?

13 A. I'm a geologist.

14 Q. And as a geologist what do you do?

15 A. Right now I'm more in the field more or  
16 more in the office than I have been in the field,  
17 so I'm report writing, proposal writing.

18 Q. When you were in the field what did you  
19 do?

20 A. Collected a whole lot of soil and  
21 groundwater samples.

22 Q. How long have you worked for KPRG?

23 A. 19 years.

24 Q. And what professional licenses do you

1 **hold?**

2 A. I hold PG in the state of Wisconsin and  
3 the state of Kentucky, professional geologist.

4 **Q. Mr. Allenstein, can you tell me a little**  
5 **about your soil boring and soil logging experience?**

6 A. I've had probably hundreds of feet of soil  
7 boring through several different methods of  
8 drilling, logged and sampled.

9 **Q. And so how are soil borings collected for**  
10 **a geotechnical analysis?**

11 A. A few different ways depending on what the  
12 analysis is. One way is a Geoprobe which uses a  
13 direct push method that is kind of like a  
14 jackhammer. In a jackhammer is a tube, and they  
15 bring that up and open up the tube, and you can  
16 look at it that way.

17 They can also do an undisturbed sample  
18 which is using a hollow stem auger and a split  
19 spoon method with a weight that has a predetermined  
20 weight and height that it's dropped from.

21 **Q. And how is it determined which way you do?**  
22 **Is that --**

23 A. The client.

24 **Q. Mr. Allenstein, are you familiar with the**

1 **Munsell color chart?**

2 A. I am.

3 **Q. What is it?**

4 A. It's a color chart that has every color in  
5 the rainbow that uses a numerical method to  
6 identify a specific color.

7 **Q. So when is it used?**

8 A. Again when a client wants, suggests.

9 **Q. And would you describe it as a way to**  
10 **standardize color --**

11 A. It is a standardizing color method, yes.

12 **Q. Thank you.**

13 **Do you have to use the Munsell color**  
14 **chart --**

15 A. No.

16 **Q. -- when doing soil boring?**

17 A. No.

18 **Q. Mr. Allenstein, are you familiar with the**  
19 **term, coal combustion residual?**

20 A. Yes.

21 **Q. What is your understanding of it?**

22 A. It's -- well, it's from the -- it's from  
23 the burning of coal, and it generally consists of  
24 slag and bottom ash.

1           **Q.    Okay.  Fly ash, too?**

2           A.    Fly ash as well, yes.

3           **Q.    When you're looking at a soil for boring**  
4 **logs, for logging soil borings, are you able to**  
5 **identify CCR?**

6           A.    Yes.

7           **Q.    How do you do that?  What do you look for?**

8           A.    Experience, but other than that it's how  
9 it's laid in the tube.  For example, the borings  
10 that we generally use uses a Geoprobe boring, a  
11 Geoprobe to advance the boring.  And it come up in  
12 a acetate tube, and they cut that open, and we're  
13 able to see that whole core, if you will, of soil.  
14 And then within that we're able to tell where CCR  
15 and slag is pretty readily available or pretty  
16 readily identifiable being black and glassy like  
17 shards of glass.  And then bottom ash is easy to  
18 identify as a kind of a sandy layer, generally  
19 brown.

20           **Q.    And when you're logging a soil boring,**  
21 **what do you log if you see CCR such as bottom ash**  
22 **or slag?**

23           A.    I would log what it looks like as far as  
24 the USCS goes and then note whether it is CCR

1 material, generally bottom ash or slag or -- I  
2 haven't -- or fly ash.

3 **Q. Yeah.**

4 **You mentioned the U-S --**

5 **A. C-S.**

6 **Q. What is that?**

7 **A. That is Unified Soil Classification**  
8 **System. It's pretty much the standard for**  
9 **classifying soil in our industry.**

10 **Q. And so that's the standard that you use**  
11 **when you log soil borings?**

12 **A. Yes.**

13 **Q. Okay. Mr. Allenstein, can you just turn**  
14 **to Tab 1 in your binder? What is that?**

15 **A. That is my affidavit.**

16 **Q. Great.**

17 **I want to go through a few things that you**  
18 **discuss in the affidavit, but let's pull out --**  
19 **flip to Tab 2. And for the record it is Exhibit E**  
20 **of the Illinois EPA's recommendations?**

21 **What is this?**

22 **A. This is the geotech report we did on the**  
23 **stations.**

24 **Q. Okay. So you said geotech report you did**

1 on the stations. What did you do at the stations?

2 A. I was the one out -- the field person for  
3 collecting soil samples and logging those.

4 Q. And collecting geotechnical data, right?  
5 Is that what you mean by soil samples?

6 A. Yes.

7 Q. And when did this occur?

8 A. 2005.

9 Q. And one of the stations was Joliet 29,  
10 correct?

11 A. Correct.

12 Q. So let's turn to the soil borings for  
13 Joliet 29, excuse me, with the Figure 4-1. It's  
14 Attachment 4.

15 A. Got it.

16 Q. Okay. What does this map show?

17 A. This map shows the location of the borings  
18 that we advanced at the station.

19 Q. And you can see Pond 2 in the middle,  
20 right?

21 A. Correct.

22 Q. What are the borings around Pond 2?

23 A. 2 and 3.

24 Q. Okay. So you earlier described how you

1 collected soil borings. Is that what you did here?

2 A. Yes.

3 Q. And it was with a Geoprobe, right?

4 A. Correct.

5 Q. When logging these boring logs in 2005,  
6 did you use the Munsell color chart?

7 A. No.

8 Q. All right. So let's look at the soil  
9 boring logs for G2, if you flip two pages, and  
10 looking at the top it states, logged by

11 P. Allenstein. That's you?

12 A. That's correct.

13 Q. Okay. So the log of boring -- I'll just  
14 read the title of it. Log of boring GS29-GT-2.

15 What -- what does this show us? Tell us  
16 what this shows.

17 A. This is my description of the soils that  
18 were brought up as part of this boring.

19 Q. Okay. And looking at the top first layer,  
20 how did you describe the soil?

21 A. Sand and silt, fine to medium, dark brown,  
22 some slag, dry.

23 Q. Okay. Now, looking at the -- down further  
24 in the column, did you observe any CCR further down

1 in the column of GT-2?

2 A. I did not.

3 Q. Same thing looking at log -- top of the  
4 page, the next page, log of boring GS29-GT-3.  
5 Again, logged by P. Allenstein, that's you,  
6 correct?

7 A. Yes.

8 Q. And similarly again, what does this show?

9 A. This is the my description of the soils  
10 that were brought up as part as -- as part of this  
11 soil boring.

12 Q. Okay. And in the top foot what did you  
13 see?

14 A. Bottom ash, dark brown, clay, little  
15 gravel, dry.

16 Q. And further down in GT-3, did you observe  
17 any CCR in the soil column?

18 A. I did not.

19 Q. In either GT-2 or GT-3, if you had seen  
20 CCR depths below the surface, would you identify it  
21 in the log as bottom ash, fly ash or slag?

22 A. Yes.

23 Q. Okay. I just want for the sake of  
24 comparison to look at the Will County boring logs



1 which are, if you flip back forward in,  
2 Attachment 3. And I want you to look at log --  
3 boring log WC-GT-3.

4 A. Okay.

5 Q. Okay. So for comparison, what did you log  
6 at 8 to 9 and a half feet?

7 A. Slag, black, fine to medium, sand with  
8 fine gravel, moist. And then at the bottom of that  
9 was a clay weather bedrock that was gray.

10 Q. And that was the end of your --

11 A. That was the end of the boring, yes.

12 MS. GALE: Okay. I have nothing further.

13 HEARING OFFICER HALLORAN: Thank you,  
14 Miss Gale.

15 Miss Terranova.

16 CROSS-EXAMINATION

17 BY MS. TERRANOVA:

18 Q. To your knowledge has the Poz-O-Pac or  
19 black silty gravel at Joliet 29 Pond 2 been  
20 analyzed for soil, total metals or leachable  
21 metals?

22 A. Not to my knowledge, no.

23 Q. Thank you.

24 Does the USCS soil classification have any

1 **method to determine the presence of fly ash or fly**  
2 **ash through analytical methods?**

3 A. The USCS doesn't use analytical methods.  
4 It's just a classification system for soils.

5 MS. TERRANOVA: Thank you.

6 HEARING OFFICER HALLORAN: Thank you.

7 Miss Gale, anything further?

8 MS. GALE: Nothing further. Thank you.

9 HEARING OFFICER HALLORAN: Okay. You may step  
10 down. Thank you, sir.

11 THE WITNESS: You're welcome.

12 (Witness excused.)

13 HEARING OFFICER HALLORAN: You may call your  
14 next witness.

15 MS. GALE: All right. We call Steve Kroll.

16 (WHEREUPON, the witness was  
17 duly sworn.)

18 STEVEN KROLL,  
19 called as a witness herein, having been first duly  
20 sworn, was examined and testified as follows:

21 DIRECT EXAMINATION

22 BY MS. GALE:

23 **Q. Good morning. For the record can you**  
24 **please say and spell your name?**

1 A. Steven Kroll, S-t-e-v-e-n, K-r-o-l-l.

2 Q. Mr. Kroll, who do you work for?

3 A. Patrick Engineering.

4 Q. What do you do for them?

5 A. I am a project manager in our geotechnical  
6 and environmental division.

7 Q. And, generally speaking, what do you do?

8 A. I shepherd projects from start to finish  
9 and ensure their completion, assign staff to  
10 various tasks, report writing, sometimes field  
11 collection of data, and all the fun accounting and  
12 billing things after that.

13 Q. Did you say also you train staff?

14 A. Yes, I do.

15 Q. And what do you train staff to do?

16 A. Generally I train them depending on their  
17 level of experience starting with fieldwork is  
18 generally the place most of them start out at. I  
19 train them on the USCS, how to identify soil,  
20 obviously safety, groundwater sampling, all the  
21 tasks that they need to be able to do.

22 Q. And how long have you been with Patrick  
23 Engineering?

24 A. 17 years.

1           **Q.    And what professional licenses do you**  
2 **have?**

3           A.    I'm a licensed professional geologist in  
4 Illinois, Wisconsin and Indiana.

5           **Q.    If you flip to your first tab in the**  
6 **binder in front of you, and this is the affidavit**  
7 **you signed in this matter?**

8           A.    Yes, it is.

9           **Q.    Okay.  Patrick Engineering, what -- you**  
10 **know, you generally described what you did for**  
11 **Patrick -- or Midwest Gen in this affidavit.  Tell**  
12 **us here what you did for Patrick -- Midwest Gen.**

13          A.    What we did -- we were -- for this part of  
14 the project we were retained to perform a  
15 hydrogeologic evaluation at a number of Midwest Gen  
16 sites, including Joliet 29, in order to determine  
17 if there was any impact to the groundwater in the  
18 area of the ash ponds.

19          **Q.    Let's turn to the second tab, and this is**  
20 **that hydrogeologic evaluation you were discussing?**

21          A.    Yes, it is.

22          **Q.    When did this occur?**

23          A.    This report was issued in February of  
24 2011.  The work began in 2010.

1           **Q.    And so what did -- generally speaking,**  
2 **what did Patrick Engineering do for this work?**

3           A.    For this work we installed monitoring  
4 wells around all the active ash ponds at Joliet 29.  
5 We developed the wells, collected groundwater  
6 samplings from the wells. We also surveyed the  
7 elevations of both the surface and the groundwater  
8 surface to determine direction of groundwater flow,  
9 and from taking all that data together we formed  
10 our assessment.

11           **Q.    And when you installed the monitoring**  
12 **wells, what did you do with the soil borings?**

13           A.    To install the monitoring wells we install  
14 soil borings, and we log the soil borings in a  
15 similar method to the previous witness.

16           **Q.    Okay. So looking at the map in front of**  
17 **you, Pond 2, what do we see here? What are those?**

18           A.    Those are the four monitoring wells that  
19 are around the perimeter of Pond Number 2.

20           **Q.    And when they installed the monitoring**  
21 **wells, who -- and you said they log the soil**  
22 **borings. Who logged the soil borings?**

23           A.    A person by the name of Andrew Gagnon.

24           **Q.    Can you spell his last name, please?**

1 A. G-a-g-n-o-n.

2 Q. Thank you.

3 And he was an employee of Patrick  
4 Engineering?

5 A. Yes.

6 Q. Is he still an employee of Patrick  
7 Engineering?

8 A. No, he is not.

9 Q. When he was an employee, did you train  
10 him?

11 A. Yes, I did.

12 Q. And what did you train him to do?

13 A. I trained him to identify soil using the  
14 USCS, Unified Soil Classification System. I also  
15 trained him to identify anything that fell outside  
16 of the USCS, things that were not soil.

17 Q. Does that include ash?

18 A. Yes, it does.

19 Q. Okay. Are you familiar with the Munsell  
20 color ash -- excuse me.

21 Are you familiar with the Munsell color  
22 chart?

23 A. I am.

24 Q. And we just had Mr. Allenstein describe

1 **it, but what is your understanding of the Munsell**  
2 **color chart?**

3 A. It is either a book or a collection of  
4 chips of various color very similar to paint  
5 samples you'd find in a hardware store, pretty much  
6 does cover every color that you would generally  
7 see. And it's a way of quantitatively describing  
8 the color. So each color has a alphanumeric code  
9 to it that is the same across the chart.

10 **Q. So before you came here did you review the**  
11 **soil borings that Mr. Gagnon took?**

12 A. I did.

13 **Q. Did he use the Munsell color chart?**

14 A. No, he did not.

15 **Q. Was he required to?**

16 A. No.

17 **Q. You said earlier that part of your**  
18 **evaluation of soil borings you look at soil, what**  
19 **may not be soil, such as coal ash. So you're**  
20 **familiar with the term, coal combustion residual?**

21 A. Yes.

22 **Q. And that is bottom ash, fly ash and slag?**

23 A. Correct.

24 **Q. Okay. When you look at the soil to record**

1 boring logs -- oh, we already did that. Never  
2 mind.

3 When you look at soil borings and you see  
4 CCR, what does it look like?

5 A. It obviously depends on if it was fly ash  
6 or bottom ash. It's a dark color anywhere from  
7 black to brown. It has a glassy appearance,  
8 various grain sizes. It definitely doesn't look  
9 like soil.

10 Q. Okay. So let's take a look at those soil  
11 borings for 3, 4 and 5, and I'll read them into the  
12 record.

13 Soil borings are B-MW3, B-MW4, B-MW5 and  
14 then ultimately B-MW10. These are the soil borings  
15 that you reviewed?

16 A. Yes.

17 Q. And upon your review did each boring log  
18 appear to have been prepared in accordance with  
19 Patrick Engineering and your training and generally  
20 accepted practices?

21 A. Yes.

22 Q. Within these Joliet 29 soil borings, 3, 4,  
23 5 and 10, was any CCR material identified within  
24 the soil?



1 A. No.

2 Q. Mr. Kroll, had Mr. Gagnon had seen CCR  
3 within the soil of these wells, would he have  
4 recorded it in the boring logs?

5 A. Yes.

6 MS. GALE: Thank you. I have nothing further.

7 HEARING OFFICER HALLORAN: Thank you,  
8 Miss Gale.

9 Agency?

10 CROSS-EXAMINATION

11 BY MS. DIERS:

12 Q. Hi, just one question, please. To your  
13 knowledge has the Poz-O-Pac or black silty gravel  
14 at Joliet 29 Pond 2 been analyzed for total, I'm  
15 sorry, for soil, total metals or leachable metals?

16 A. Not to my knowledge.

17 MS. DIERS: Thank you. Nothing further.

18 MS. GALE: Nothing further.

19 HEARING OFFICER HALLORAN: Thank you.

20 Yes, Mr. Rao?

21 MR. RAO: You identified the monitoring wells  
22 around Ash Pond 2. Can you identify which ones are  
23 downgradient and which ones are upgradient?

24 THE WITNESS: Not at this time. I know back

1 in -- when we did this report, I believe MW10 is  
2 the upgradient well. 3, 4 and 5 are the  
3 downgradient wells.

4 MR. RAO: Thank you.

5 MS. GALE: We can have somebody else answer  
6 that question as well.

7 MR. RAO: Thank you.

8 HEARING OFFICER HALLORAN: You may step down.  
9 Thank you, sir.

10 (Witness excused.)

11 HEARING OFFICER HALLORAN: You may call your  
12 next witness.

13 MS. GALE: Yes. We call Mr. Wilson.

14 Mr. Halloran, before we continue on, my --  
15 well, introducing exhibits --

16 HEARING OFFICER HALLORAN: We can go off the  
17 record.

18 (WHEREUPON, a discussion was had  
19 off the record.)

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

22 (WHEREUPON, the witness was  
23 duly sworn.)  
24

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24

MARK WILSON,

called as a witness herein, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MS. GALE:

**Q. Mr. Wilson, for the court reporter can you please say and spell your name?**

A. Mark, M-a-r-k, Wilson, W-i-l-s-o-n.

**Q. Who do you work for?**

A. KPRG and Associates.

**Q. And what do you do for them?**

A. A variety of things. I'm a project engineer. I do a lot of fieldwork, groundwater sampling, soil sampling. I do Phase 2 work, Phase 3 and environmental radiation.

HEARING OFFICER HALLORAN: Could you speak up a little, sir? I don't know if the mic is on.

THE WITNESS: Okay.

HEARING OFFICER HALLORAN: Just speak up. Thanks, sir.

THE WITNESS: Will do.

BY MS. GALE:

**Q. How long have you worked for KPRG?**

A. Ten years.

1 Q. Okay. And have you done work at the  
2 Midwest Generation stations?

3 A. Yes.

4 Q. What have you done at those stations?

5 A. I've done groundwater monitoring,  
6 installed some gauges in some of the ponds there.

7 Q. Okay. And in this case you sample the  
8 groundwater at Joliet 29, right?

9 A. Yes.

10 Q. Can you turn to Tab 1 of your report?

11 What is this?

12 A. It's my affidavit.

13 Q. Okay. And here you're discussing  
14 collecting the groundwater sampling on August 30,  
15 2021, correct?

16 A. Correct.

17 Q. Okay. And just look at the map in front  
18 of you, Pond 2, is that where you sampled the  
19 groundwater wells?

20 A. Yes.

21 Q. So what samples did you collect from each  
22 of these wells?

23 A. There was two sets of samples, one for the  
24 CCA program, one set for the CCR program. Each of

1 those has a variety of parameters.

2 Q. Okay. All right. So tell us how when you  
3 got to Pond 2 -- or got, excuse me, got to  
4 Joliet 29, tell us your process of collecting  
5 groundwater samples. What do you do?

6 A. Well, we set up the equipment, and we  
7 purge the well using a low flow technique, taking  
8 field parameters with a water quality instrument.  
9 We go until stabilization, and then the well is  
10 ready for sample collection. And I'll turn the  
11 equipment off there. I'll get the bottles and  
12 label them with the sample time, date and my  
13 initials.

14 So during this process, the labeling  
15 process, the bottles are separated into two groups,  
16 one being for filtered parameters, one being for  
17 nonfiltered parameters. So those are separated out  
18 during labeling and put into separate plastic bags.  
19 Then an inline 0.45 micron filter goes into the bag  
20 with the bottles that are to be filtered. Those  
21 are taken to the well. The samples that are  
22 nonfiltered are generally taken first, and then the  
23 inline filter will be connected to the sample  
24 discharge line. And then we'll collect the bottles

1 for dissolve parameters. Then they're taken and  
2 put on ice in the cooler and couriered to the lab  
3 or picked up by the lab after that.

4 Q. Okay. And I just want to ask about these  
5 bottles. So is there a bottle for each metal or is  
6 it one bottle for sampling of all the metals?

7 A. There's one bottle for total metals.

8 Q. Okay.

9 A. And if there's dissolved metals, there  
10 would be a separate bottle for that. But the one  
11 bottle generally has enough volume for the lab to  
12 get any metals they want out of that bottle.

13 Q. Great.

14 I want you to turn to Tab 2 in your  
15 binder, please. And for the record this is  
16 Exhibit O of the Illinois EPA's recommendation, and  
17 then attached to that is the analytical data. And  
18 I want you to flip to Page 17 and 18 of the first  
19 sample reports.

20 A. Okay.

21 Q. What are on Pages 17 and 18? What is  
22 that?

23 A. Chain of custody.

24 Q. What is a chain of custody?

1           A.    That's the document that is filled out in  
2 order to accompany the samples to the laboratory.  
3 It shows the custody of who collected the samples  
4 and anybody that took custody between them and the  
5 laboratory, and it identifies the parameters that  
6 the laboratory's going to analyze them for.

7           **Q.    And where does this sheet typically come**  
8 **from?**

9           A.    From the laboratory with the bottles.

10          **Q.    So I want to look at this one on Page 17.**  
11 **That's your handwriting, correct?**

12          A.    That's correct.

13          **Q.    Page 18, that doesn't look like your**  
14 **handwriting, does it?**

15          A.    No.

16          **Q.    So what happened here? Tell us what**  
17 **happened.**

18          A.    On this one, those samples were collected  
19 on August 30. They stayed in my possession  
20 overnight in to August 31 when I came back to the  
21 office, our Westmont office. There were CCA in the  
22 CCR -- or actually the laboratory did not have --  
23 did not send with the CCR samples a chain of  
24 custody for me to fill out. There was a CCA one I

1 did fill out.

2 So noticing this on the morning there, I  
3 requested a chain of custody from the laboratory  
4 for the CCR program. They sent that via email.  
5 Then I had all the samples in the office there  
6 packed on ice. I had to go off to another project  
7 that morning. I requested that our administrator  
8 be copied with that chain of custody from the  
9 laboratory and gave her instructions to fill that  
10 out. And she did sign my name and initial it, and  
11 that's what she did, Kelly Spadoni, our  
12 administrator.

13 So that's not my handwriting, but that's  
14 the correct information for the samples I collected  
15 as I directed Kelly to fill it out, sign my name  
16 and initialed on there.

17 **Q. Great.**

18 **Okay. So let's look at this chain of**  
19 **custody, and we're on Page 18 of 21, the one that**  
20 **Kelly filled out at your direction?**

21 **A. Yeah.**

22 **Q. And you describe what it includes. I want**  
23 **to look at the column after where it says, water.**  
24 **Where it says, field-filtered samples, yes or no,**



1 **do you see that there?**

2 A. Yeah.

3 **Q. So this shows that you checked yes, right?**

4 A. Yes.

5 **Q. Why did you check yes here?**

6 A. That yes would indicate that there was  
7 field-filtering performed in the field for the  
8 total dissolved solids bottle.

9 **Q. Did you field-filter the total metals**  
10 **bottle?**

11 A. No.

12 MS. GALE: Okay. I have nothing further.

13 HEARING OFFICER HALLORAN: Thank you.

14 Agency?

15 CROSS-EXAMINATION

16 BY MS. TERRANOVA:

17 **Q. Just one, to your knowledge has the**  
18 **Poz-O-Pac or black silty gravel at Joliet 29 Pond 2**  
19 **been analyzed for soil total metals or leachable**  
20 **metals?**

21 A. Not to my knowledge.

22 MS. TERRANOVA: Thank you. No further  
23 questions.

24 HEARING OFFICER HALLORAN: Miss Gale, any

1 redirect? Okay.

2           You may step down, Mr. Wilson. Thank you  
3 so much.

4                           (Witness excused.)

5           MS. GALE: Mr. Hearing Officer, can we go off  
6 the record for a second?

7           HEARING OFFICER HALLORAN: Yes we may.

8                           (WHEREUPON, a discussion was had  
9 off the record.)

10           HEARING OFFICER HALLORAN: We're back on the  
11 record. Miss Gale, your next witness.

12           MS. GALE: We call Mr. Richard Gnat.

13           HEARING OFFICER HALLORAN: Thank you.

14                           (WHEREUPON, the witness was  
15 duly sworn.)

16                           RICHARD GNAT,  
17 called as a witness herein, having been first duly  
18 sworn, was examined and testified as follows:

19                           EXAMINATION

20 BY MS. GALE:

21           **Q. Mr. Gnat, can you please say and spell**  
22 **your name for the court reporter?**

23           A. Richard, R-i-c-h-a-r-d, Gnat, G-n-a-t.

24           **Q. Mr. Gnat, you work for KPRG and**

1 **Associates, right?**

2 A. Correct.

3 **Q. What is your position?**

4 A. I'm a hydrogeologist by trade, and I'm a  
5 part owner of the company.

6 **Q. How long have you been part owner of the**  
7 **company?**

8 A. 22 -- 21 years started in January of 2000.  
9 I'm sorry, 2002, 20 years.

10 **Q. And what does KPRG do?**

11 A. We're an environmental consulting firm,  
12 and we specialize primarily in soil and groundwater  
13 subsurface work, take everything from initial  
14 phases of assessment through site investigations  
15 and remedial design and construction.

16 **Q. And what professional licenses do you**  
17 **have?**

18 A. I have a PG, a professional geologist  
19 certificate, in Wisconsin and Illinois.

20 **Q. Mr. Gnat, generally what type of work does**  
21 **KPRG do -- excuse me.**

22 **What type of work does KPRG do for Midwest**  
23 **Generation?**

24 A. We do a variety of work, and probably in

1 the last several years most of our work's been  
2 focused on various CCR issues.

3 Q. Can you turn to the first tab of your  
4 binder, please? What is this?

5 A. This is my affidavit.

6 Q. Okay. Great.

7 And then looking at our handy dandy map,  
8 these are the monitoring wells around Pond 2,  
9 right?

10 A. Correct.

11 Q. And KPRG collects the groundwater samples  
12 from these monitoring wells?

13 A. Correct. We started groundwater sampling  
14 I want to say in 2013 time frame.

15 Q. And your understanding is that Illinois  
16 EPA approved this groundwater monitoring network  
17 when it was installed, right?

18 A. Correct.

19 Q. And when you were sampling in 2013, the  
20 sampling was conducted pursuant to a compliance  
21 commitment agreement?

22 A. Correct.

23 Q. And that's what the CCA sampling that  
24 Mr. Wilson was discussing before, right?

1 A. Yes, it is.

2 Q. **And that continues today, correct?**

3 A. Yes, it does.

4 Q. **So for the CCA sampling, what is analyzed?**

5 A. There's a list of various parameters,  
6 inorganic parameters, and they actually included  
7 some, I believe, BTEX and so on, benzyltoluene,  
8 ethylene, xylene parameters. But it's primarily  
9 relative to the metals. And it's dissolved metals  
10 samples, so they're field-filtered in the field  
11 prior to preservation.

12 Q. **And then in about 2015, KPRG also started**  
13 **collecting samples pursuant to the federal CCR**  
14 **rule, right?**

15 A. Correct.

16 Q. **And what type of metal sampling is**  
17 **required under the federal rule?**

18 A. Under the federal CCR rule, it's total  
19 metal requirement, so those samples are not  
20 field-filtered prior to preservation.

21 Q. **And now we also have the Illinois CCR**  
22 **rule, right?**

23 A. Correct.

24 Q. **And are the metals sampling requirements**

1 the same under the federal rule and the Illinois  
2 CCR rule?

3 A. Yes, they are.

4 Q. We just heard from your colleague,  
5 Mr. Wilson, and how the samples are collected at  
6 Joliet 29. Does that sound about accurate to you?

7 A. Yes.

8 Q. And did Mr. Wilson properly collect the  
9 groundwater samples pursuant to the CCA and the  
10 federal and Illinois CCR rules?

11 A. Yes, he did.

12 Q. Okay. Let's turn to Tab 2 of your binder.  
13 So this is the second quarter of the 2021 Illinois  
14 CCR sampling data, isn't it?

15 A. Yes, it is.

16 Q. And it includes the analysis package from  
17 the lab?

18 A. Yes, it does. For the state CCR sampling,  
19 yes.

20 Q. And who prepared this document?

21 A. Along with myself, I had a geologist doing  
22 the table and so on, but under my direction.

23 Q. And once KPRG finalizes the document,  
24 where does it go?

1           A.    The document gets submitted to Midwest  
2           Generation which then also posts it onto their  
3           website, and now we're also submitting a hard copy  
4           to the Illinois EPA.

5           **Q.    And does this look like a true and**  
6           **accurate copy of the second quarter 2021 sampling**  
7           **data?   CCR sample data, excuse me.**

8           A.    Yes, it does.

9           **Q.    And were -- let's turn to the next Tab 3**  
10          **which is Exhibit O of the Illinois EPA**  
11          **recommendation.  This is the third quarter 2021**  
12          **CCR groundwater data, isn't it?**

13          A.    That is correct, yes.

14          **Q.    Okay.  And I want to finally -- we'll get**  
15          **to the point, but I want to get -- we'll get to the**  
16          **why.  I want you to turn to Tab 4, and this is the**  
17          **third quarter 2021 CCA sampling?**

18          A.    Correct, the compliance commitment  
19          agreement sampling, CCA.

20          **Q.    For Joliet 29?**

21          A.    Yes, it is.

22          **Q.    Who prepared this document?**

23          A.    KPRG does that at my direction.

24          **Q.    And then once KPRG is finished with the**

1 **document, where does it go?**

2 A. Well, it gets sent for signature by  
3 Mr. Naglosky. Then we run copies of it and  
4 distribute it to Midwest Generation, as well as  
5 four copies to Illinois EPA. I'm sorry, two  
6 copies.

7 **Q. And does this look like a true and**  
8 **accurate copy of the third quarter 2021**  
9 **CCA sampling for Joliet 29?**

10 A. Yes, it does.

11 **Q. So, generally speaking, what is the**  
12 **difference in results between field-filtered**  
13 **samples and total metal samples?**

14 A. In the ideal world the filtered samples,  
15 those are samples where any type of suspended  
16 sediment is filtered out to a 4.5 micron size, and  
17 then that water is poured into a laboratory  
18 prepared container which has acid as a  
19 preservative.

20 For total metals you do not filter. You  
21 do not take that filter step. So if there is any  
22 suspended sediment in that sample, it also gets  
23 acidified once it's preserved in the sample. So if  
24 there's any additional metals that are perhaps



1 attached to the sediment samples, those become part  
2 of the liquid. Basically the acid extracts it off  
3 that sediment.

4 So what does that mean? If you have a  
5 more sediment latent sample, the total metals  
6 analysis tend to be higher, and the field-filtered  
7 samples should be lower. If it's relatively little  
8 sediment or no sediment at all, pretty much the  
9 same.

10 Q. Okay. Great.

11 I want you to turn back to Tab 2 of your  
12 report, and I want you to turn to the chain of  
13 custody which is on Page 21 of 24?

14 A. Okay.

15 Q. We just heard Mr. Wilson describe what  
16 this chain of custody shows. Do you have any  
17 dispute with his description?

18 A. Yeah. This one in Tab 2, correct?

19 Q. Yes.

20 A. This first one is a chain of custody  
21 completed by Erin Bulson for her sampling when she  
22 was out doing sampling in May of 2000. In May,  
23 correct.

24 Q. And if you look in the column under

1 analysis requested, the first long column where it  
2 says field-filtered, that's blank, right?

3 A. Correct.

4 Q. What does that mean?

5 A. That she did not filter any samples in the  
6 field.

7 Q. Okay. All right. And let's turn to the  
8 next tab which is Exhibit O of the Agency's  
9 recommendation, and I want you to turn to Page 17  
10 of 18 which is also the chain of custody that we  
11 just discussed with the Mr. Wilson.

12 A. Got it.

13 Q. If you look at the first column under  
14 analysis requested, it says, field-filtered sample,  
15 and it says Y. Can you explain the discrepancy  
16 between the second quarter 2021 groundwater results  
17 chain of custody and the third quarter 2021  
18 results?

19 A. Sure. This particular round Mark Wilson  
20 was collecting the samples, and Mark does a lot of  
21 our groundwater sampling. In fact, he manages the  
22 waste management sampling. He was -- well, he  
23 field-filtered the total dissolved solids sample.  
24 When I saw that Y when I was reviewing these

1 things, I called him and asked him about that  
2 because we do not field-filter for total metals  
3 for CCR.

4           And he explained that the Y is in there to  
5 indicate that he did sample for the total dissolved  
6 solids, but that's a totally different jar and  
7 bottle than for the metals analysis. And these  
8 particular chains of custody, we determined, you  
9 know, it's pretty ambiguous. You put a Y, and  
10 somebody can assume everything's been filtered.  
11 That's just flagging to the lab that there's a  
12 sample in here that's got a dissolved parameter,  
13 total dissolved solids, and that he filtered it in  
14 the field.

15           In that we notice that there is data  
16 ambiguity and to not to have this issue again, we  
17 did have an internal meeting with all of our  
18 samplers, and we also talked with the lab. And now  
19 the lab is instructed that for all of our CCR  
20 sampling total dissolved solids, it's filtered in  
21 the lab, and they have it cued like that when they  
22 receive our CCR samples. And that precludes  
23 anybody being confused should a TDS sample be  
24 filtered in the field or not filtered in the field.

1 All of our metals samples were not filtered in the  
2 field.

3 Q. Great.

4 And so in looking at this chain of custody  
5 and looking at the results in Exhibit O of the  
6 recommendation, were the total metals  
7 field-filtered?

8 A. No, they were not.

9 Q. And didn't you also do another analysis to  
10 confirm that result?

11 A. That's correct. I took a look at the  
12 metals for the sampling in question, and I looked  
13 at the CCA data.

14 Q. Which is Tab 4?

15 A. Tab 4, and that's for dissolved metals.  
16 And I compared that against the total metals. And  
17 for all parameters except for cobalt, the total  
18 metals were either the same or slightly higher than  
19 the dissolved metals as one would expect. Cobalt,  
20 just the opposite, was at a very low level.  
21 However, the cobalt which was also from the same  
22 jar as the other metal samples was slightly higher  
23 in the totals, I'm sorry, in the dissolved analysis  
24 than in the totals.

1           You know, however, I guess, you know, when  
2 you look at this, you have to step back and look at  
3 the whole data set. If you look at all the other  
4 metals coming out of the same jar, they all follow  
5 that ideal trend. In fact, if you look at arsenic,  
6 which also comes from the same bottle, in the  
7 dissolved analysis for CCA arsenic was nondetect in  
8 all the samples, MW-4, MW-10, 3, 4 and 5. And yet  
9 it was detected in the total samples because the  
10 total samples were not filtered. So that arsenic  
11 was a good barometer for us that, you know, yep,  
12 these are not filtered samples.

13           **Q. And just to confirm, the arsenic results**  
14 **are from the same sample container as the cobalt**  
15 **results, correct?**

16           A. Correct.

17           **Q. So how do you explain this slight**  
18 **disparity in the total versus result cobalt for**  
19 **well MW-4?**

20           A. Right. We are at a fairly low levels. We  
21 are talking about low level parts per billion  
22 numbers. And, you know, it's -- the larger your  
23 environmental data sets become, the more likely  
24 you're gonna have an anomalous value here and

1 there. A little bit of a head scratcher, but you  
2 can't lose the forest for the trees. Sometimes  
3 you've got to step back and take a look at what  
4 that data is telling you.

5 And even though in this particular case  
6 for cobalt the total appears to be slightly lower  
7 than the dissolved, if you look at the range of  
8 detections for all of the total samples that we've  
9 done over time and then all the dissolved samples  
10 that we've done over time, both of them fell within  
11 the range. And, in general, you didn't have this  
12 issue, but in this particular sample you had that  
13 little statistical anomaly.

14 **Q. And you reviewed the data. Are the cobalt**  
15 **concentrations, both dissolved and total,**  
16 **consistent with historical data, excuse me,**  
17 **historical data from that location?**

18 A. Correct. Yes.

19 **Q. I want to turn to Board question -- well,**  
20 **Board question to the Agency Number 5 because I**  
21 **think you'd actually be better suited to answer**  
22 **this question. So I'll read the question, and then**  
23 **we can answer it. The Agency states that the**  
24 **cobalt analytical results exceed the groundwater**

1 protection standards of 0.006 mg/L under  
2 Section 845.600 at MW-4 as recently as October 22,  
3 2020, citation to the recommendation at Page 24.

4 HEARING OFFICER HALLORAN: Miss Gale, can you  
5 slow down. The court reporter's trying to --

6 MS. GALE: I'm sorry. I apologize.

7 The Agency states the cobalt analytical  
8 results exceed the groundwater protection standards  
9 of 0.006 milligrams per liter under Section 845.600  
10 at MW-04 as recently as October 22, 2020, citing to  
11 the Agency February 4, 2022, recommendation at  
12 Page 24. However, in Table 2 of Exhibit 11 and  
13 Table 1 of Exhibit 0, the cobalt measurement for  
14 October 22, 2022 -- October 22, 2020, excuse me,  
15 does not appear to be in agreement. Table 2 of  
16 Exhibit 11 has cobalt measured as 0.0041 milligrams  
17 per liter, and Table 1 has the measurement for  
18 cobalt as 0.0082 milligrams per liter.

19 And, Mr. Gnat, I'll represent to you that  
20 Exhibit 11 is the annual CCA report for Joliet 29,  
21 and you can find the data in this October 15 under  
22 Tab 4 for that as it is a CCA report. So to answer  
23 the Board's question, please elaborate on the  
24 discrepancy in the data between the two tables.

1 A. So --

2 Q. If you look to MW-4?

3 A. MW-4 on the --

4 Q. October 22, 2020.

5 A. October 22, 2020, cobalt, the dissolved  
6 value for cobalt was -- at MW-4 was 0.0041.

7 Q. And if you go to O which is your Tab 3 --

8 A. Right. The dates on this table are cut  
9 off.

10 Q. Oh, are they? If you need a better --  
11 it's in Mark Wilson's as well under Tab 2,  
12 Exhibit O of the recommendation.

13 A. For the October -- October 20? I'm sorry,  
14 October 20?

15 Q. October 20, 2020 -- October 22, 2020,  
16 excuse me.

17 A. Was 0.0037.

18 Q. 0.0082?

19 A. I'm sorry, but that's not on this table  
20 unless I'm looking at MW-4.

21 Q. You're looking at fluoride.

22 A. Oh, one over.

23 Q. You know what, we'll have somebody else  
24 answer that question.



1           **Mr. Gnat, I want to move on to talk about**  
2 **another project you conducted for Midwest**  
3 **Generation, and I want you to turn to the fifth tab**  
4 **in front of you, turn to Figure 1.**

5           A.     Okay.

6           **Q.     What does Figure 1 depict?**

7           A.     Figure 1 in this report is a copy of a  
8 Poz-O-Pac core, 3-inch core that we collected from  
9 the Will County Generating Station for Midwest  
10 Generation.

11          **Q.     And you said we. Who collected it?**

12          A.     KPRG did.

13          **Q.     And how did you collect it from the Will**  
14 **County Station?**

15          A.     There was a concrete coring machine, was  
16 lowered into the ash and so on, was moved aside in  
17 this particular area so that the Poz-O-Pac liner  
18 was exposed. And then the backhoe was used to  
19 lower a concrete coring machine, and a core was  
20 obtained that way.

21          **Q.     And this was -- there was no HDPE liner in**  
22 **there, correct?**

23          A.     Correct.

24          **Q.     When did this occur about?**

1 A. Circa 2011.

2 **Q. Did you handle the core?**

3 A. After it was collected, yes.

4 **Q. What did it feel like?**

5 A. Core of concrete.

6 **Q. I have it here just to use it as an**  
7 **example. Is that similar to what you collected?**

8 A. Yes, it is.

9 MS. GALE: Okay. Thank you. I have nothing  
10 further.

11 HEARING OFFICER HALLORAN: Thank you,  
12 Miss Gale.

13 MS. DIERS: Just one question, please.

14 HEARING OFFICER HALLORAN: Thank you.

15 CROSS-EXAMINATION

16 BY MS. DIERS:

17 **Q. To your knowledge has the Poz-O-Pac or**  
18 **black silty gravel at Joliet 29 Pond 2 been**  
19 **analyzed for soil, total metals or leachable**  
20 **metals?**

21 A. Not to my knowledge.

22 MS. DIERS: Nothing further. Thank you.

23 HEARING OFFICER HALLORAN: Miss Gale, any  
24 redirect?

1 MS. GALE: Mr. Hearing Officer, we'd like to  
2 label this as Exhibit 29. Is there any objection  
3 from the Agency?

4 MS. DIERS: No objection.

5 HEARING OFFICER HALLORAN: Thank you. It will  
6 be so admitted, Exhibit 29.

7 (WHEREUPON, Exhibit No. 29 was  
8 admitted into evidence.)

9 MS. GALE: Nothing further, thank you.

10 HEARING OFFICER HALLORAN: Panel?

11 You may step down.

12 (Witness excused.)

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

15 (WHEREUPON, a discussion was had  
16 off the record.)

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

19 (WHEREUPON, the witness was  
20 duly sworn.)

21 HEARING OFFICER HALLORAN: I noticed up this  
22 Webex with this witness approximately between  
23 1:00 and 3:00 today, but we're calling him --  
24 Midwest is calling him a tad early, but he will be

1 available at 1:00 to see if anybody wants to ask  
2 him any questions or just look at his face. So,  
3 anyway, I'm done.

4 Miss Gale, it's all yours.

5 MATEUSZ RADLINSKI,  
6 called as a witness herein, having been first duly  
7 sworn, was examined and testified as follows:

8 DIRECT EXAMINATION

9 BY MS. GALE:

10 Q. Just to explain to you, Dr. Radlinski, the  
11 idea is that at 1:00 p.m. we will log on and you  
12 will log on for about 10 to 15 minutes to see if  
13 anybody logs on, and then we are done.

14 A. And just to be clear, 1:00 p.m. Central,  
15 right?

16 Q. Yes, sorry, 1:00 p.m. Central time. Thank  
17 you.

18 A. Okay. Thank you.

19 Q. Dr. Radlinski, can you please say and  
20 spell your name?

21 A. Sure. My first name is Mateusz,  
22 M-a-t-e-u-s-z, last name Radlinski,  
23 R-a-d-l-i-n-s-k-i.

24 Q. And, Dr. Radlinski, where are you

1 **employed?**

2 A. I'm employed by Exponent, Incorporated.

3 **Q. And what do you do for Exponent?**

4 A. I primarily specialize in evaluating,  
5 broadly speaking, concrete cementitious materials,  
6 cementitious materials, mainly conducting forensic  
7 investigations, sometimes condition assessments,  
8 just variety of things related to -- I'll say  
9 anything cement related in a variety of  
10 applications.

11 **Q. Okay. Dr. Radlinski, what educational**  
12 **degrees do you have?**

13 A. So my education is in civil engineering.  
14 I hold both Master's of Science and Ph.D. in civil  
15 engineering. My Master's of Science Degree was  
16 from University in Poland, and the focus of that  
17 program in my case was structural engineering. For  
18 my Ph.D. and onward as you just heard, I switched  
19 areas from structural engineering to concrete  
20 technology and concrete materials. And my Ph.D. is  
21 from Purdue University.

22 **Q. So you said you had a Ph.D., and your**  
23 **focus was on concrete materials. Can you expand**  
24 **upon that? Explain that, please.**

1           A.     Sure.   So as part of my Ph.D. graduate  
2 program at Purdue, I worked -- I had the  
3 opportunity to work on a number of concrete,  
4 broadly speaking, concrete and cementitious  
5 projects.  There were a number of projects going on  
6 at the time I was involved in.

7                     The primary -- well, the primary topic of  
8 my Ph.D. dissertation related to development  
9 optimization and application of so-called high  
10 performance concrete mixes in bridge applications  
11 in Indiana.  It was an in-depth Indiana DOT  
12 sponsored project.  And in my case, just to explain  
13 a little bit what high performance concrete is, the  
14 goal of that is to increase durability of the  
15 concrete mixtures to extend the surface life of  
16 bridge decks.

17                     In my case I studied concrete mixes  
18 called, it's maybe a little bit confusing term, but  
19 it's a term called ternary, t-e-r-n-a-r-y, and what  
20 that meant or what it means is concrete mixes  
21 containing three different cementitious materials.  
22 In my case it could be anything, but in my case it  
23 was portland cement, fly ash and silica fume.  I'm  
24 sure we'll talk about fly ash, but just to explain

1 a little bit, silica fume is another byproduct of  
2 silicone -- elemental silicone.

3 **Q. And you're also a licensed professional**  
4 **engineer, correct?**

5 A. Yes, I am.

6 **Q. Where are you licensed?**

7 A. I'm licensed in California which is where  
8 I practice primarily.

9 **Q. And in looking at your CV, it says you are**  
10 **a senior managing engineer, but is that still the**  
11 **case?**

12 A. No. I think that the version of my CV  
13 you're likely looking at was attached to my report  
14 in this case. It was I think dated sometime early  
15 March. Oh, actually late March. But, in any case,  
16 I actually got promoted to principal engineer  
17 probably within a week after I issued the report,  
18 so I'm currently principal engineer. That's about  
19 the only real change in my -- in terms of my CV.

20 **Q. Congratulations.**

21 A. Thank you.

22 **Q. How long have you been with Exponent?**

23 A. Since January of 2009. Basically as soon  
24 as I finished my Ph.D. in December of 2008, I got

1 employed by Exponent.

2 Q. All right. Dr. Radlinski, I'd like you to  
3 turn to your expert report which is Exhibit 25 of  
4 Midwest Generation's response. Let me know when  
5 you have it available.

6 A. I have it in front of me.

7 Q. Dr. Radlinski, what was the scope of your  
8 engagement here for this report?

9 A. I was engaged to primarily evaluate and  
10 address the Illinois EPA's statement contained  
11 within their recommendation dated February 4, 2022,  
12 that Poz-O-Pac is CCR or Poz-O-Pac CCR material.

13 Q. What were your conclusions?

14 A. My -- broadly speaking my conclusion is --  
15 this statement is technically incorrect for the to  
16 simple reason that -- being that Poz-O-Pac doesn't  
17 meet the Agency's own definition of CCR.

18 Q. And what is that definition?

19 A. Let me refer to my report again. The  
20 Agency defines CCR, coal combustion residual, as  
21 fly ash, bottom ash, boiler slag, and flue gas,  
22 desulfurization materials generated from burning  
23 coal for the purpose of generating electricity.

24 Q. And I think you said earlier that in your



1 **studies for your Ph.D., you used fly ash.**

2 **Have you handled fly ash before?**

3 A. Oh, yes. Spent, you know, about four and  
4 a half years in total working on my Ph.D. I would  
5 say probably about three and a half years out of  
6 those four and a half years total period I spent in  
7 a lab day in and out making concrete mixes, making  
8 paste mixes, evaluating the materials and mixes on  
9 a much more fundamental level from a chemical  
10 composition and chemical reaction standpoint, and  
11 then eventually of course into actual concrete  
12 mixes and their properties and looking at a variety  
13 of properties, a lot of which related to their  
14 abilities.

15 So in short to answer your question,  
16 probably hundreds I handled and used personally  
17 hundreds of thousands of fly ash usage.

18 **Q. Can you tell us a little bit what it looks**  
19 **like, generally speaking, high level, color,**  
20 **texture?**

21 A. Yeah. It's a -- fly ash is a very, very  
22 fine powder. I don't know if you've -- anybody can  
23 besides me relate to cement. Cement is extremely  
24 fine. Fly ash is even finer. The particle size is

1 medium particle size probably I think in order less  
2 of that than cement. The particles are spherical,  
3 so if you -- you can stir it in your hands. It's  
4 very easy. It's kind of a rewarding feeling in a  
5 way because the spherical nature of the particles  
6 that -- there's a bit of ball bearing effect in  
7 that.

8 Colorwise, it really depends on the type,  
9 whether it's Class A or Class C, and of course  
10 which plant it was generated by. It can range  
11 from, in my experience, from tan, brownish to more  
12 gray shades more like cement.

13 **Q. Okay. And boiler slag, have you ever**  
14 **handled boiler slag?**

15 A. Not for as part of my research, but the  
16 one exposure I recall having to boiler slag,  
17 growing up in Europe, in Poland specifically, it  
18 was used, you know, being a byproduct of or another  
19 byproduct of burning coal in power plants, it was  
20 used pretty commonly as a road surfacing material  
21 much like you'd see here, you know, gravel roads or  
22 crushed rock roads; so I've seen it, handled it,  
23 played with it I guess as a kid.

24 **Q. Dr. Radlinski, are you familiar with the**

1 **term, Poz-O-Pac?**

2 A. Yes, I am.

3 **Q. What is Poz-O-Pac?**

4 A. Well, the term Poz-O-Pac refers to a trade  
5 name for a patented product that was developed I  
6 believe in the 1950s. It was a construction  
7 material primarily developed for road based  
8 applications, and it consisted of a mixture of a  
9 black or blend of hydrated lime, fly ash and some  
10 sort of hydrated -- of course water.

11 **Q. All right. And in this case when we're**  
12 **talking, where was the Poz-O-Pac installed?**

13 A. Broadly speaking, it was used extensively  
14 throughout the United States in, well, I guess a  
15 wide range of applications and primarily in early  
16 roadway -- road based applications and later on in  
17 things even like pavements, highway shoulders.

18 **Q. But here -- here it was used to install in**  
19 **Pond 2?**

20 A. Yes. Here in this case it was at  
21 Joliet 29. It was installed as a liner at Pond 2,  
22 correct.

23 **Q. And what were the ingredients of the**  
24 **Poz-O-Pac in Pond 2?**

1           A.     According -- based on my review of the  
2 original construction drawings, the Poz-O-Pac in  
3 this case consisted of, nominally speaking,  
4 consisted of 3 percent hydrated lime, 20 percent  
5 fly ash, and the remainder of solvents being about  
6 77 percent boiler slag and of course water again.

7           **Q.     So earlier you said you disagreed with the**  
8 **Agency's conclusions that the Poz-O-Pac falls**  
9 **within the definition of CCR. Can you explain why?**

10          A.     Yes, certainly. In simple terms calling  
11 Poz-O-Pac a CCR, a coal combustion residual, would  
12 be like calling Poz-O-Pac fly ash. That's what CCR  
13 is, right. So it's like Poz-O-Pac, but calling  
14 Poz-O-Pac slag, of course either one of those  
15 statements would be true or technically correct  
16 because, as I explained, fly ash is a really fine  
17 powder. Slag is aggregate size particles, and  
18 Poz-O-Pac is a composite construction material  
19 consisting of a cementitious paste that glues in  
20 this case boiler slag with other particles. We're  
21 talking about completely different things.

22                 So maybe make a little different analogy,  
23 it would be like calling concrete cement only  
24 because cement is used to make concrete or make

1 another analogy be like calling cake flour because  
2 flour is used to make cake. Obviously, again,  
3 those statements would not be true because you  
4 can't really move cement out of concrete once it's  
5 there much like I don't think you can remove flour  
6 from the baking out of a cake. So for same reasons  
7 you cannot remove fly ash out of Poz-O-Pac.

8 **Q. So, Dr. Radlinski, what is the reaction**  
9 **that occurs when you mix fly ash with lime and**  
10 **water?**

11 A. Yes. It's -- I think -- I believe you are  
12 asking about the term pozzolanic reaction.

13 **Q. I am.**

14 A. And that refers to a chemical reaction.  
15 It's a rather unique feature of so-called  
16 pozzolanic materials like fly ash, like silicate,  
17 numerous other materials. Could be volcanic ash in  
18 the case of 2000 how years ago. That's how they  
19 made concrete. And it's, fundamentally, first a  
20 chemical reaction between a silicious or voluminous  
21 pozzolanic material. In this case we're talking  
22 about fly ash and lime and water, and the result of  
23 which is a brand new totally different chemical  
24 compound called calcium silicate hydrate.

1           In this case calcium or calcium oxide  
2 specifically comes from the lime, the silicate or  
3 silica outside comes from fly ash, and of course  
4 water comes from water. So we -- the hydrate part  
5 comes from water. So that acts as the new  
6 compound. The brand new compound is calcium  
7 silicate hydrate.

8           **Q. Okay. And, Dr. Radlinski, in your report**  
9 **on Page 3 you talk about how fly ash is commonly**  
10 **used in ordinary Portland cement.**

11           **Can you please explain that, please?**

12           A. Yes. Fly ash has been used in concrete as  
13 a supplementary -- the formal term is supplementary  
14 cementitious materials or SCM. Some refer to it as  
15 mineral mixture. And fly ash is used in concrete  
16 and has been used for decades as either a  
17 supplement or a replacement of cement. It was  
18 originally I believe in the 1950s, maybe even  
19 slightly earlier, used as a essentially cheap  
20 replacement for cement which at the time it was  
21 much more expensive.

22           So now people over the decades, years of  
23 decades and research and studying these materials  
24 and studying different mixes and proportions and

1 components of fly ash, including myself, have  
2 discovered huge benefits of using fly ash in  
3 concrete applications, primarily increasing  
4 durability of the concrete as a result of reduction  
5 in permeability, broadly speaking, and also  
6 increasing the variety of properties related to  
7 resistance to chemical attack.

8 **Q. So you say that fly ash is used as part of**  
9 **making concrete, and you said used in roadways. I**  
10 **mean, where is fly ash used as part of making**  
11 **concrete in the United States, generally speaking?**

12 A. In a really broad range of applications.  
13 I mean, I work on numerous projects related to  
14 concrete evaluations, and I would say my  
15 experience -- I don't have the exact count, but  
16 over the years I would say roughly half of the  
17 country mixes I look at contain fly ash. It's just  
18 extremely common to use fly ash these days and has  
19 been for a long time. It could be anything from  
20 pavements to concrete chimneys and power plants in  
21 fact, could be industrial floor slabs, could be  
22 building components, just really -- there's really  
23 no limit to the extent fly ash is used in concrete.

24 **Q. So we talk about fly ash and how it is**

1 converted into calcium -- I forgot the word.

2 Calcium --

3 A. Silicate.

4 Q. -- hydrate, which you've described as a  
5 hardened paste.

6 And there's a third ingredient or I guess  
7 a fourth ingredient on top of the water which is an  
8 aggregate. What happens to the aggregate when  
9 you're mixing the fly ash?

10 A. In the case of Poz-O-Pac, and we're  
11 talking at Joliet 29, the aggregate is the boiler  
12 slag, boiler slag particles. In fly ash -- so  
13 unlike fly ash which is chemically reacted as I  
14 explained a minute ago through the pozzolanic  
15 reaction with lime and water and forms  
16 cementitious -- hardened cementitious paste, it's a  
17 little bit different in the case of boiler slag.  
18 We're talking about half-inch, quarter-inch size  
19 particles, and those are not -- technically not  
20 reactive.

21 What happens to those is, again, analogous  
22 to the regular concrete where you have obviously a  
23 mixture of aggregate -- various size aggregate  
24 particles, the boiler slag simply gets physically



1 encapsulated by the hardened cementitious paste, in  
2 this case fly ash and lime and water, that glues  
3 those particles and surrounds it.

4 Q. Great. Thank you.

5 I want to turn to Board Question Number 8,  
6 which I'll read into the record, and then you can  
7 answer.

8 A. Okay.

9 Q. On Page 19 of Midwest Generation's  
10 response to the Agency's recommendation,  
11 Dr. Radlinski states, "Poz-O-Pac is formed by a  
12 chemical reaction (i.e., the pozzolanic reaction)  
13 between the lime and fly ash which forms a hardened  
14 cementitious paste. The pozzolanic reaction of  
15 lime and fly ash fundamentally alters the chemical  
16 composition of the mixture to form cementitious,  
17 excuse me, to form a cementitious matrix that binds  
18 and holds the aggregate particles together.

19 Question 8A, does the pozzolanic reaction  
20 render the CCR used inert or just binds it?

21 A. And my answer -- I think I'll break down  
22 my answer into two parts because the answer will  
23 vary a little bit between depending which CCR we  
24 are talking about. So let me start with the boiler

1 slag. The answer there as I explained just  
2 literally a minute ago, boiler slag is chemically  
3 nonreactive or inert essentially. So from the  
4 get-go and before it's used, it acts as inert  
5 material. You can think of it as a filler much  
6 like concrete. So what happens to the slag  
7 aggregate, it gets -- it remains inert and a  
8 hardened material and, you know, still not  
9 reactive.

10 Fly ash, I think the way I would  
11 characterize fly ash or answer this question  
12 relative to fly ash is fly ash is, again, as I  
13 explained, reacts chemically with lime through the  
14 pozzolanic reaction of lime and water to form a new  
15 chemical compound. So once fly ash is reacted,  
16 there's really no fly ash anymore in the mixture.  
17 It forms a different chemical compound. You will  
18 not find fly ash in the mix, in the hardened  
19 Poz-O-Pac material.

20 So the answer I guess is it's really  
21 neither inert. It's -- I guess it's bound through  
22 the new -- chemically bound through the new or  
23 within the new chemical compound I guess is the way  
24 I will answer.

1 MS. GALE: So we have a follow-up question from  
2 one of the Board members.

3 MR. RAO: Dr. Radlinski, can you hear me?

4 THE WITNESS: I can't see, but I can hear you.

5 MR. RAO: This is Anand Rao from the Pollution  
6 Control Board. You just mentioned how with fly ash  
7 with the pozzolanic reaction, the chemical itself  
8 is changed. How would you compare the chemical  
9 composition of fly ash and Poz-O-Pac, you know,  
10 once its undergone the reaction? What are the  
11 elemental composition?

12 THE WITNESS: Okay. So you're asking about the  
13 elemental composition. I would say elemental  
14 composition would be, you know, be comparable  
15 because, you know, there's no -- there's no  
16 addition or reduction to the elements.

17 I'm not sure if that answers your  
18 question, but if you're talking about the elements,  
19 well, the elements as I explained, the primary  
20 elements that come to -- come into play here is the  
21 lime in the Poz-O-Pac and the silicate outside from  
22 fly ash and then of course water. So the primary  
23 chemical compound still is going to contain  
24 calcium, silica and, you know, hydrogen and oxygen

1 and whatever else fly ash contains. If it contains  
2 other elements, well, they will be chemically bound  
3 within the cementitious matrix. I'm not sure if  
4 that answers your question.

5 MR. RAO: It kind of answers my question, but  
6 my follow-up would be elementally they may be same,  
7 but how is the Poz-O-Pac different in terms of once  
8 it's undergone the reaction and becomes Poz-O-Pac,  
9 is it a substance or a compound that's nonleachable  
10 or what's the difference?

11 THE WITNESS: Excellent question, yes, a very  
12 important point. The calcium silicate hydrate  
13 which is the product of the pozzolanic reaction is  
14 a non -- is a water insoluble material. And, in  
15 fact, it's the exact same chemical compound that  
16 forms from the hydration or reaction of Portland  
17 cement and regular concrete. If you mix, you know,  
18 if you get a bucket and put it -- buy the cement,  
19 Portland cement from Home Depot, dump it in the  
20 bucket, put some water and rock and sand, mix it up  
21 and give it a few hours. And, you know, next day  
22 if you were to look at -- try to determine the  
23 chemical composition of the -- of course not the  
24 aggregate, but the grade, the paste, the hard

1 cement paste, it will be primarily calcium silicate  
2 hydrate as well, which obviously is insoluble, and,  
3 you know, as demonstrated by the fact that we have,  
4 you know, concrete structures going back centuries  
5 that work well and when exposed to water and even  
6 when immersed in water.

7 MR. RAO: Are you aware of any studies over the  
8 last maybe 15, 20 years, where they've done  
9 leachate studies to show that once, you know, fly  
10 ash is used in the pozzolanic reaction and becomes  
11 Poz-O-Pac, that it won't leach the chemical that it  
12 used to have?

13 THE WITNESS: Specific -- not as it relates to  
14 Poz-O-Pac, in fact not even as it relates to fly  
15 ash concrete or concrete containing fly ash. You  
16 know, it's not something that I've ever heard of  
17 anybody being concerned about. In fact, the USEPA,  
18 there's an article or report on their website where  
19 they recognize the beneficial encapsulated use of  
20 CCR, specifically fly ash, in concrete materials or  
21 products. And based on my understanding of that  
22 article, there in the encapsulated form, as would  
23 be the case in Poz-O-Pac, there's really no minimum  
24 requirement for any monitoring or testing of

1 release, environmental release into water,  
2 groundwater soil or air from those materials  
3 containing fly ash.

4 Quite frankly, you know, there are  
5 literally thousands of miles of concrete pavements  
6 in the United States and worldwide, concrete  
7 with -- you know, pavements with -- made with  
8 concrete fly ash, and it's just not a -- they get a  
9 lot of rain and otherwise precipitation, a lot of  
10 exposure and potential for leaching, and to my  
11 knowledge it's just not a concern.

12 MR. RAO: Thank you.

13 BY MS. GALE:

14 Q. I might -- just for the record I might  
15 have Matt answer the other two questions that were  
16 under there. There was a second question, 8B,  
17 which I'll read.

18 If the Poz-O-Pac liner is cracked or  
19 damaged, is it possible for that material to leach  
20 into the groundwater?

21 A. Yes. And I guess it's -- my answer was a  
22 good segue into this question, but I'll -- I guess  
23 I will explain, elaborate a little more. The short  
24 answer is that in my expert opinion it's highly

1 unlikely. In the case of the Pond 2 Poz-O-Pac,  
2 first of all, a lot of things would have needed to  
3 happen first. In this case, we had the  
4 multicomponent waterproofing system incorporating  
5 essentially impermeable high density polyethylene,  
6 HDPE, liner. So for any water to reach Poz-O-Pac,  
7 some water would need to get through that system.  
8 That's number one.

9           Number two, it sounds like the inherent  
10 assumption in this hypothetical question is that  
11 there could be cracks in the Poz-O-Pac. I haven't  
12 seen any evidence of that.

13           So, number three, of course for water if  
14 it was to somehow make its way through the  
15 HDPE liner and down into the Poz-O-Pac and the  
16 crack in it, I think the tubes have to be fairly  
17 close to each other. So the chances of that  
18 happening would be fairly small to any sort of  
19 hypothetical breach in the membrane.

20           And couple more things to add to it, as I  
21 explained, from a chemical standpoint we're talking  
22 about a compound in the Poz-O-Pac that is insoluble  
23 in the -- under normal environmental conditions,  
24 meaning temperature and pressure. So the calcium

1 silicate hydrate is just not a soluble material.  
2 And, as I said, the concern for this particular  
3 question wouldn't be any -- or concerns with this  
4 question wouldn't be any different if this liner,  
5 this Pond 2 liner, was made out of concrete and fly  
6 ash. There's still CCR incorporated in the  
7 material in the liner mix, but because it's bound  
8 chemically to form calcium silicate hydrate, you  
9 know, the concern would be the same. And simply in  
10 my mind it isn't a concern.

11 **Q. Okay. Great.**

12 **Question -- Board Question Number 8C, does**  
13 **the Poz-O-Pac liner contain heavy metals?**

14 A. Yes. I think one of the very first  
15 question that was asked a few minutes ago, I think  
16 we just talked about more or less the same thing.  
17 My answer would be if there are materials contained  
18 heavy metals, then the answer would be yes. They  
19 are still within the Poz-O-Pac. They are  
20 chemically bound and physically encapsulated by the  
21 hardening --

22 **Q. Could you repeat the end of your sentence**  
23 **of what you said?**

24 A. So I was saying that if the heavy metals



1 were present in the -- in the raw ingredients of  
2 the Poz-O-Pac, then they be still present in the  
3 Poz-O-Pac liner, but they would be chemically bound  
4 and physically encapsulated in the hardened  
5 cementitious matrix of the Poz-O-Pac material.

6 **Q. We're done with the Board questions.**

7 **Thank you.**

8 A. Thank you.

9 **Q. Dr. Radlinski, is the Poz-O-Pac a**  
10 **cementitious product?**

11 A. Yes, it is.

12 **Q. Dr. Radlinski, I'd like you to turn and**  
13 **everyone here to turn to Figure 1 of your report.**  
14 **And I have -- I don't know if you can see it in the**  
15 **thing, I have it here. What am I holding and what**  
16 **do you show in Figure 1?**

17 A. Well, I can't see precisely from here, but  
18 I suspect what you're holding is what's contained  
19 within Figure 1 which is a core sample extracted  
20 from an ash pond liner at a Will County power plant  
21 which is I believe 10 miles from Joliet 29 Plant.  
22 As a matter of fact, I think it was -- as a matter  
23 of fact, it was constructed around the same time,  
24 1978, '79. And much like in the case of Pond 2

1 liner, the liner of that particular ash pond is  
2 also made out of Poz-O-Pac. So short answer is  
3 this is a Poz-O-Pac sample.

4 **Q. And I have it here, but did you handle**  
5 **this?**

6 A. Yes, I did. You or someone from your  
7 office sent it to me, and I just sent it back to  
8 you.

9 **Q. Can you -- when you handled it, can you**  
10 **generally describe what you handled?**

11 A. Yes. I handled a material that looks and  
12 feels very much like concrete. In fact, in my  
13 opinion as a concrete expert, it's virtually  
14 visually indistinguishable from concrete. If you  
15 look at a cross section of that little disk you're  
16 holding there, you'd see essentially the same  
17 composition, same gray color cementitious matrix as  
18 you would see in concrete -- in the case of  
19 concrete, and it surrounds or glues together  
20 aggregate particles.

21 **Q. Dr. Radlinski, so in looking at the**  
22 **definition of CCR which we discussed earlier, in**  
23 **your expert opinion does the Poz-O-Pac at Joliet 29**  
24 **fall when the definition of CCR?**



1 provide the definition.

2 Q. No. Your answer is fine. Thank you.

3 Okay. Within the last five years have  
4 there been any or has there been any core sampling  
5 or chemical analysis of the Poz-O-Pac at Joliet 29  
6 Pond 2?

7 A. No, not to my knowledge.

8 Q. Okay. Since the relining in 2008, has  
9 there been any core sampling or chemical analysis  
10 of the Poz-O-Pac at Joliet 29 Pond 2?

11 A. Same answer, not to my knowledge.

12 Q. Okay. Prior to the relining, was there  
13 any core sampling and chemical analysis of the  
14 Poz-O-Pac in Joliet 29 Pond 2?

15 A. Same answer, not to my knowledge.

16 Q. Okay. In your expert opinion, would you  
17 expect to see impacts to a liner that has been in  
18 place for over 44 years and has been exposed to  
19 various stressors such as burden and heavy  
20 machinery?

21 A. I guess are you ask -- I'm assuming you're  
22 asking, just want to confirm, specifically in  
23 relation to that Poz-O-Pac liner at Pond 2, right?  
24 You're not asking just -- are you asking a general

1 question?

2 Q. In general. Well, can you speak in  
3 general and then how about specifically to Pond 2?

4 A. Okay. Sure. And can you repeat the  
5 beginning of your question? Would I expect what?

6 Q. Sure. To see a liner that has been in  
7 place over 44 years and has been exposed to various  
8 stressors such as burden and machinery, what kind  
9 of impacts would you expect?

10 A. It depends -- well, I'm not sure I can  
11 give you a precise answer. It depends of course on  
12 what sort of as you call them stressors that you  
13 would see on the liner and, you know, frequency.  
14 I'm not -- yeah. I'm not even sure what -- your  
15 hypothetical question even includes in terms of  
16 these external forces as I understand.

17 But I think broadly speaking I would say  
18 the Poz-O-Pac is a concrete like material. It's a  
19 composite concrete like material. There's really  
20 no way to answer your question one way or the other  
21 because even if this was concrete, its performance  
22 would depend somewhat on what it was exposed to.

23 As I understand in this case, Pond 2, the  
24 Pond 2 liner was really, you know, was really used

1 to -- well, was -- the primary load I guess applied  
2 to the Poz-O-Pac prior to the lining and then I  
3 guess between 2008 which is when the liner was --  
4 the HDPE liner was installed and 2019 would be  
5 storage of -- storage of fly ash or broadly  
6 speaking, you know, CCRs within the pond.

7 As I understand, the pond was exposed or  
8 parts of the ponds were potentially exposed to  
9 periodic loads from things like, you know, the  
10 trucks or something like that to remove the  
11 material. And that happened every several years  
12 only because that was the frequency based on the  
13 operation of the plant. So not very often, not  
14 very much. Yeah.

15 **Q. Okay. I just have one more question. To**  
16 **your knowledge, has the Poz-O-Pac or black silty**  
17 **gravel at Joliet 29 Pond 2 been analyzed for soil**  
18 **total metals or leachable materials or no, excuse**  
19 **me, leachable metals?**

20 A. I'm sorry. Your question included  
21 Poz-O-Pac and?

22 **Q. Or the black silty gravel at Joliet 29**  
23 **Pond 2, have they been analyzed for soil total**  
24 **metals or leachable metals?**

1           A.    I don't know, not to my knowledge at  
2    least.  I haven't seen the results which doesn't  
3    mean it wasn't done, but I haven't seen it.

4           **Q.    So you just haven't seen them, but you**  
5    **don't know if they've been done?**

6           A.    Yeah.  Correct.

7           MS. TERRANOVA:  Okay.  That's it.  Thank you  
8    very much.

9           THE WITNESS:  Thank you.

10          HEARING OFFICER HALLORAN:  Thank you,  
11    Miss Terranova.

12                    Miss Gale, redirect?

13          MS. GALE:  I'm simply coming up to tell you  
14    very much, you're finished, just so you can see and  
15    hear me.  Dr. Radlinski, I think what we'll do is  
16    at 1:00 p.m. Central time we'll log back in for  
17    about ten minutes, see if anybody comings in.  I  
18    truly appreciate you being available earlier.  That  
19    makes our day go quickly.  Thank you so much for  
20    being so accommodating.  I understand there was a  
21    scramble on your end, so thank you.

22          THE WITNESS:  Thank you.  I'll come back in.

23          HEARING OFFICER HALLORAN:  Thank you,  
24    Miss Gale.  It's about what?  11:40.  Do you want

1 to take a lunch now?

2 MS. GALE: Yeah.

3 HEARING OFFICER HALLORAN: For 60 minutes?

4 MS. GALE: Perfect.

5 MS. DIERS: Yes. We're fine.

6 HEARING OFFICER HALLORAN: All right. Thank  
7 you. We're off the record. See you in an hour.

8 (WHEREUPON, a short recess was  
9 taken.)

10 HEARING OFFICER HALLORAN: We're back on the  
11 record. Miss Gale?

12 MS. GALE: Yes. We call Mr. Michael Maxwell.

13 (WHEREUPON, the witness was  
14 duly sworn.)

15 MICHAEL MAXWELL,  
16 called as a witness herein, having been first duly  
17 sworn, was examined and testified as follows:

18 EXAMINATION

19 BY MS. GALE:

20 **Q. Mr. Maxwell, can you please state and**  
21 **spell your name?**

22 A. It's Michael, M-i-c-h-a-e-l, Maxwell,  
23 M-a-x-w-e-l-l.

24 **Q. Thank you.**



1           **Mr. Maxwell, can you turn to the first tab**  
2 **of your binder?**

3           A.     Okay.

4           **Q.     What is this?**

5           A.     This is my resume.

6           **Q.     Okay. And first question, what is your**  
7 **educational background?**

8           A.     So I've got a Bachelor's Degree in  
9 geological sciences from State University of New  
10 York College at Geneseo, a Master's in geology from  
11 the University of Iowa.

12          **Q.     Okay. And what professional licenses do**  
13 **you have?**

14          A.     I'm licensed as a professional geologist  
15 in Illinois, Indiana, and also Wisconsin.

16          **Q.     Mr. Maxwell, can you tell me what it takes**  
17 **to become a professional geologist?**

18          A.     So there's a baseline educational  
19 requirement, and there's a baseline professional  
20 requirement. You've got to work for a certain  
21 number of years under another licensed professional  
22 geologist. Most importantly, though, you've got to  
23 pass a day-long test that's comprised of a  
24 fundamentals of geology exam and then a practicals

1 of geology exam. The fundamentals you learn in  
2 school, and the practical you're supposed to learn  
3 on the job.

4 **Q. And then once you are a professional**  
5 **geologist, what are your duties or standards you**  
6 **must maintain?**

7 A. Well, obviously there's technical  
8 standards one must live up to in terms of your  
9 technical work. You need to -- being licensed  
10 demonstrates that you've got a certain baseline  
11 competency in science, but along with that you're  
12 also obligated to follow certain ethical and  
13 honesty standards as well.

14 And anyone could make an allegation  
15 against me and my license, and of course if that  
16 were ultimately proven, I could be seriously  
17 reprimanded or worse. I could lose my license, and  
18 it obviously could have an adverse effect on my  
19 professional career.

20 **Q. Mr. Maxwell, I see here you're also a**  
21 **certified hazardous materials manager. What is**  
22 **that?**

23 A. So that's CHMM. That's another  
24 certification that I've attained through taking a

1 test. That one isn't quite as rigorous as the  
2 licensed professional geologist test, but that --  
3 the subject matter of that test, there's a handbook  
4 that's a -- that covers the criteria for the CHMM.  
5 It's basically environmental rules and regulations,  
6 environment law is RCRA, DOT laws, Clean Air Act,  
7 Clean Water Act, and also basic science as well,  
8 so . . .

9 **Q. And what is that certification for? What**  
10 **do you do with it? Excuse me.**

11 **What do you use it for?**

12 A. The CHMM or the LPG?

13 **Q. I'm sorry, the CHMM.**

14 A. The CHMM, it's -- I mean, it's a  
15 credential. I honestly don't use the CHMM as much  
16 as I use the LPG.

17 **Q. Very good.**

18 **And it says here you work for Weaver**  
19 **Consultants Group, correct?**

20 A. Correct.

21 **Q. How long have you worked for Weaver?**

22 A. I've been with Weaver for 26 years.

23 **Q. What is your current position?**

24 A. I am the operations manager for our

1 environmental practice group that's based in  
2 Chicago.

3 **Q. And, generally speaking, can you briefly**  
4 **describe to us what you do for Weaver?**

5 A. So I manage a team of geologists,  
6 scientists and engineers, biologists. And we do  
7 environmental investigation, soil and groundwater,  
8 surface water investigations, assessments,  
9 remediation. We've also got a group that deals  
10 with air compliance and also an environmental  
11 audits as well.

12 **Q. So in those investigations, you designed a**  
13 **water, excuse me, groundwater monitoring program?**

14 A. We -- I myself have been involved in  
15 designing and ultimately implementing various  
16 groundwater monitoring programs at solid waste,  
17 hazardous waste landfills, CCR disposal facilities,  
18 CCR surface impoundments as well.

19 **Q. And that includes logging soil borings,**  
20 **correct?**

21 A. Yes. I have actually done it early in my  
22 career, got my hands dirty so to speak looking at  
23 the soils. In subsequent years I'm managing the  
24 process from the office.

1           **Q. I think you said you've worked at CCR**  
2 **units and CCR landfills. What are those?**

3           A. Coal combustion residuals. Surface  
4 impoundments are liquid engineered features  
5 designed to retain liquids, and landfills are  
6 designed for the disposal of solid CCR.

7           **Q. Okay. What units have you worked at?**

8           A. So the one that I've worked at the longest  
9 is a site in Northwest Indiana called the Yard 520.  
10 That's a landfill. It's actually comprised of two  
11 different units, and CCR was the primary waste  
12 material that was disposed at Yard 520.

13           **Q. You said a long time. How long?**

14           A. 26 years. I started working on Yard 520  
15 the year I started working at Weaver.

16           **Q. So -- and at this site -- well, I guess**  
17 **I'll ask this first.**

18                   **Is Yard 520 the only CCR yard site you've**  
19 **worked at?**

20           A. No, there are others.

21           **Q. What others?**

22           A. Of course Joliet 29, the subject matter.  
23 There's a couple that I've worked on CCR surface  
24 impoundments in Indiana, a couple in New Jersey as

1 well.

2 **Q. So Yard 520, what's going on there? What**  
3 **are you evaluating and what are you doing?**

4 A. So Yard 520, it's a closed landfill, and  
5 so we're implementing the postclosure program which  
6 involves maintaining the cap, performing  
7 inspections, and also conducting the postclosure  
8 groundwater monitoring. Actually at Yard 520,  
9 there's been documented instances of groundwater  
10 impact as a result of the materials that were  
11 disposed at the facility, so we're -- we conduct  
12 semiannual groundwater monitoring at that -- at  
13 both units at Yard 520 twice per year.

14 **Q. So in your 25 years experience of working**  
15 **at CCR sites including Yard 520, what is the most**  
16 **common constituent found at those sites in**  
17 **groundwater?**

18 A. In the groundwater at sites where  
19 documented CCR impacts have occurred by far and  
20 away it is boron.

21 **Q. I mean, other than -- any others than**  
22 **boron that you commonly see?**

23 A. There are others that are common,  
24 molybdenum is one that I've seen a fair amount.

1 Boron and molybdenum are probably the two most  
2 common that stand out.

3 Q. Okay. Great.

4 So you prepared two expert reports related  
5 to this petition, correct?

6 A. Correct.

7 Q. Okay. Let's turn to your first report  
8 which is Attachment 5 to Exhibit G to the second  
9 large tab in the folder that you have. And I'll  
10 say for the record, in comparison to the first  
11 binder, to avoid confusion we've labeled the major  
12 tabs as the exhibit number of that document. So  
13 instead of having Tab 1, Tab 2, Tab 3, because the  
14 record's rather complicated, it'll be the tab that  
15 says Attachment 5 to Exhibit G, and that's the  
16 location of this document in the record.

17 HEARING OFFICER HALLORAN: The transcript will  
18 bear that out. Thank you, Miss Gale.

19 BY MS. GALE:

20 Q. Mr. Maxwell, what were you asked to do in  
21 this report?

22 A. We were engaged by your firm, Nijman and  
23 Franzetti, in order to support the work that Tom  
24 Dehlin's folks performed relative to the materials

1 that were comprised of the embankments of the  
2 Pond 2 surface impoundment.

3 **Q. And, Mr. Maxwell, what generally speaking**  
4 **what were your conclusions?**

5 A. We looked at the groundwater data that  
6 goes back to the fourth quarter of 2010, and we  
7 looked at the trends and the concentrations in the  
8 groundwater. And what we ultimately concluded was  
9 the fact that -- that neither the -- the  
10 groundwater data was not indicative of any type of  
11 CCR release either from CCR that would have been  
12 contained in the Pond 2 surface impoundment or the  
13 embankment outside the surface impoundment.

14 **Q. And that data I think you said is**  
15 **quarterly data, right?**

16 A. Correct. Quarterly data, yeah.

17 **Q. And as part of your analysis did you**  
18 **review the groundwater network in the array of**  
19 **wells where they were located?**

20 A. Yes.

21 **Q. And that's what we see here on this**  
22 **diagram?**

23 A. Yes.

24 **Q. What is your opinion of the array of**



1 **wells? What do you think of them?**

2 A. Well, there's a total of four wells.  
3 MW-10 is on the north side, and there are three,  
4 MW-3, 4 and 5, on the south side. The historical  
5 groundwater elevation data indicates that MW-10 is  
6 on the upgradient side, and MW-4 -- 3, 4 and 5 are  
7 on the downgradient side. And just in terms of the  
8 adequacy of the network in my -- in my experience,  
9 the spacing of the wells, the location of the  
10 wells, it's consistent with the federal CCR rules,  
11 number one.

12 The Illinois CCR rules are still being  
13 implemented, so there's not necessarily a lot of  
14 agency action yet on the -- on reviewing the  
15 groundwater monitoring networks for CCR surface  
16 impoundments. But I can say that based on my  
17 experience with solid waste landfills in Illinois,  
18 that the spacing is generally consistent at least  
19 with solid waste landfills that I've been involved  
20 with over the last 25 years or so, you know, in my  
21 work.

22 **Q. Okay. So you said groundwater samples in**  
23 **2010 on a quarterly basis. In your review of data,**  
24 **has boron been detected in the groundwater above**

1 **the groundwater protection standards at Pond 2?**

2 A. No, it has not.

3 **Q. Chlorides are also detected at above the**  
4 **groundwater protection standards in the wells in**  
5 **Pond 2, right?**

6 A. Chloride, yes. Chloride's present at both  
7 the upgradient location and various down locations  
8 as well -- downgradient locations.

9 **Q. In your opinion what's the source of the**  
10 **chloride?**

11 A. I think that the chloride is tied to the  
12 use of road salts on the highway that immediately  
13 borders the facility to the north of MW-10.

14 **Q. And you in your report, December 6, 2021,**  
15 **report, you also conducted a trend analysis of the**  
16 **groundwater data, correct?**

17 A. Correct, the Mann-Kendall trend analysis.

18 **Q. Yes. How does the Mann-Kendall trend**  
19 **analysis support your opinion?**

20 A. So the results of the trend analysis  
21 indicated that the majority of the trends were  
22 either level or downward which suggests a stable  
23 condition. So the trends support the idea that  
24 there's nothing unusual going on with the

1 groundwater in terms of an impact.

2 **Q. Not on this map, but in your December 2021**  
3 **report you also reviewed soil borings and**  
4 **groundwater monitoring data in an area adjacent to**  
5 **Monitoring Well 9, correct?**

6 A. Yes. We also looked at the area around  
7 MW-9 which as you mentioned isn't necessarily part  
8 of the Pond 2 monitoring well network.

9 **Q. Can you kind of generally describe to us**  
10 **where Monitoring Well 9 is in this?**

11 A. It's a few hundred feet to the east of  
12 Pond 2.

13 **Q. So it's off this picture, right?**

14 A. It's not -- I don't believe -- I think  
15 it's just off of that picture, correct.

16 **Q. Yeah.**

17 **Okay. And what did that data near**  
18 **Monitoring Well 9 tell you?**

19 A. So actually there's TDS concentrations and  
20 sulfate concentrations that historically have been  
21 detected.

22 **Q. And what does TDS stand for?**

23 A. Total dissolved solids.

24 **Q. Thank you. Go on.**

1           A.     That have been detected at that well at  
2 statistically significant concentrations.

3           **Q.     Okay. And in your boring logs, to your**  
4 **recollection -- excuse me.**

5                     **So you found TDS and you found sulfate.**  
6 **I'll go back. Was that from CCR in your opinion?**

7           A.     We don't think that was due to CCR, no.

8           **Q.     Why not?**

9           A.     So the PH at that particular well is  
10 actually unusually low. It's -- the low PH  
11 indicates more acidic conditions. And so what  
12 we've attributed those acidic conditions to is a  
13 oxidation reaction of sulfide minerals that are in  
14 the soils as a result of the inclusions and the  
15 underlying dolomite bedrock that have become part  
16 of the soil.

17                     And when those minerals are exposed to  
18 oxygen, they're gonna go through a process called  
19 oxidation which is gonna create this -- the  
20 sulfuric acid which is gonna lower the PH which has  
21 a tendency to also leach certain things from the  
22 soil including TDS and potentially sulfate as well.

23           **Q.     Great.**

24                     **And you said there were also soil boring**

1 **logs near Monitoring Well 9, right?**

2 A. Yeah. That was part of the investigation  
3 as well. I believe there were 10 or 12 boring logs  
4 that were advanced.

5 HEARING OFFICER HALLORAN: Miss Gale, I hate to  
6 interrupt you, but are we still on Webex?

7 UNIDENTIFIED SPEAKER: No, I ended it. You  
8 said 15 minutes.

9 HEARING OFFICER HALLORAN: Who ended it?

10 UNIDENTIFIED SPEAKER: I did. You said 15  
11 minutes.

12 HEARING OFFICER HALLORAN: We started it at  
13 1:04. Next time interrupt and ask me. As a host,  
14 did anybody sign on?

15 UNIDENTIFIED SPEAKER: Nobody signed on.

16 HEARING OFFICER HALLORAN: All right. You cut  
17 off a minute or two early, so next time please ask  
18 your counsel or me.

19 UNIDENTIFIED SPEAKER: I will. I apologize.

20 HEARING OFFICER HALLORAN: Thank you.

21 You may proceed, Miss Gale.

22 MS. GALE: Thank you, sir.

23 BY MS. GALE:

24 **Q. So we were talking about the soil boring**

1 logs, about 10 or 12 near Monitoring Well 9. Those  
2 boring logs, to your recollection was coal ash  
3 found?

4 A. Coal ash wasn't logged in the boring logs,  
5 no.

6 Q. Okay. I want to turn to the Board  
7 questions for a couple questions and turn to Board  
8 Question Number 13?

9 A. Okay.

10 Q. I'll read it into the record.

11 Please clarify whether Midwest Generation  
12 still intends to continue monitoring the  
13 groundwater surrounding Pond 2 after converting it  
14 into a process water basin.

15 A. Okay.

16 Q. Is that -- can you answer that question?

17 A. Yeah. The CCR rules, the 845 CCR rules  
18 indicate that after closure is complete, that three  
19 years of additional monitoring is required. It's  
20 either three years from completion of closure or  
21 three years from the last event where there's no  
22 concentrations above the groundwater protection  
23 standard.

24 Q. And so we heard earlier Mr. Naglosky say

1     **that Midwest Generation intends to comply with the**  
2     **law. So how does that inform your answer here?**

3           A.     Well, that would be consistent with the  
4     40 -- with the 845 regs, CCR -- the Illinois CCR  
5     rules.

6           **Q.     Great.**

7                   **And I want to turn next to Board Question**  
8     **Number 15?**

9           MR. RAO:   May I ask a follow-up?

10          MS. GALE:   Yes, of course.

11          MR. RAO:   You mentioned not Mr. Maxwell, but  
12     one of your witnesses talked about groundwater  
13     being monitored under two programs, the CCA and the  
14     CCR regulations?

15          MS. GALE:   Yeah.

16          MR. RAO:   So will monitoring be also, you know,  
17     will it be continued under CCA? What are the  
18     requirements under the CCA?

19          MS. GALE:   So you're asking if CCA monitoring  
20     will continue?

21          MR. RAO:   Yeah, and if that affects Pond 2.

22          MS. GALE:   So the CCA monitoring is pursuant  
23     to -- I guess I will answer that.

24                   CCR monitoring is pursuant to the

1 compliance commitment agreement which we've been  
2 doing since 2013. We will continue to do it until  
3 the Illinois EPA basically tells us not to. If I  
4 were -- ideally, we would like to convert to just  
5 the CCR sampling and not do the duplicate of  
6 samplings. The CCR is total metals. So as we've  
7 heard from Mr. Gnat and Mr. Maxwell today, as well,  
8 total metals is a higher value.

9 MR. RAO: Okay. So Midwest Generation would  
10 like to -- when you say follow the CCR rules, that  
11 would be what Mr. Maxwell just mentioned, maybe at  
12 three years or if that complies with all the  
13 standards, then be terminated at that point.

14 MS. GALE: Yeah. According to the rules,  
15 federal rules -- excuse me. Illinois CCR rules, if  
16 it's closed by removal, then it's three years no  
17 matter what. And if there's nothing -- if there's  
18 no exceedances to groundwater protection standards,  
19 then you may cease. I don't know off the top of my  
20 head, sir, whether I have to get Illinois EPA  
21 approval for that.

22 MR. RAO: So the EPA -- the Illinois EPA has to  
23 approve any change in the monitoring of the  
24 groundwater in the CCA.



1 MS. GALE: We've been treating it that way is  
2 the answer to that question.

3 MR. RAO: Okay. Thank you.

4 MS. GALE: I was just reminded, it's an  
5 agreement, and so to change it we would have to get  
6 both parties to agree.

7 BY MS. GALE:

8 Q. Board Question Number 15 I want to turn  
9 to.

10 A. Okay.

11 Q. In Exhibit 18, Table 4, semiannual  
12 detection monitoring statistical comparison. There  
13 appears to be a potentially statistically  
14 significant increase in sulfate in Monitoring  
15 Well 3, and boron in Monitoring Well 4, on May 7,  
16 2019, that did not occur in Monitoring Well 10  
17 which is used to determine background.

18 And, Mr. Maxwell, in your binder I have  
19 Exhibit 18 which you can flip to.

20 A. Okay.

21 Q. And just for the record, this is the CCR  
22 Compliance Annual Groundwater Monitoring and  
23 Corrective Action Report for 2020, correct?

24 A. Yes.

1           **Q.    So maybe we should flip to Table 4 before**  
2 **we ask the question.**

3           A.    Okay.

4           **Q.    Okay.  So Question A, please comment on**  
5 **whether these increases are attributable to Pond 2.**

6                   **And again just to remind you, we're**  
7 **looking at Monitoring Well 3 and 4 on May 7, 2019,**  
8 **and it's sulfate in Monitoring Well 3.**

9           A.    Okay.  So the sulfate concentration is  
10 140 milligrams per liter.

11          **Q.    Yeah.**

12          A.    And that was again on May 7, 2019.  And  
13 subsequent to that, on July 3, 2019, there was a  
14 resample that was collected, and that concentration  
15 was reported at 65 milligrams per liter which is  
16 below the prediction limit of 130 milligrams per  
17 liter.

18          **Q.    So there's an R next to the July 3, 2019,**  
19 **sample?**

20          A.    Yes.  There's an R in the table indicating  
21 resample.

22          **Q.    So in your understanding of the rule, what**  
23 **is that resample?**

24          A.    You're allowed an opportunity under the

1 Illinois CCR rules and the federal CCR rules if  
2 you've got what we call a preliminary trigger, a  
3 concentration above the background prediction limit  
4 in this case, that you've got an opportunity to  
5 sample it again to make sure that it's real.

6 **Q. Okay. And so before we go on, can you**  
7 **look at Monitoring Well 4, the boron, on the same**  
8 **date?**

9 A. Yeah. Was it --

10 **Q. May 7, 2019.**

11 A. Okay.

12 **Q. Monitoring Well 4, boron.**

13 A. Okay. So, again, the concentration that  
14 was originally reported in May was resampled on  
15 July 3, and the subsequent concentration in the  
16 resample was less than the prediction limit of --  
17 for boron which is 0.057 milligrams per liter.

18 **Q. So I'll repeat the Question 15A based upon**  
19 **that description of what's going on.**

20 **Please comment on whether these increases**  
21 **are attributable to Pond 2.**

22 A. So based on the inconsistent  
23 concentrations, those concentrations is what we  
24 would term a false positive. And if the Pond 2

1 were the source, you would expect a more consistent  
2 concentration to be more -- to show up during  
3 multiple sampling events. So for those reasons the  
4 concentration, the preliminary false positive, I do  
5 not believe is related to Pond 2.

6 Q. So I'll skip B cause it's not. So C, and  
7 I think you already answered this, but I'll repeat  
8 if for the record.

9 If not, comment on the reasons for the  
10 observed increases.

11 A. Yeah. I would attribute it to -- I  
12 suppose it's nature being nature. The  
13 concentrations in nature are gonna go up and down.  
14 And as long as it's temporary, that wouldn't  
15 indicate any type of a release from the pond  
16 because a release would exhibit a more consistent  
17 type of a situation.

18 Q. Okay. Thank you.

19 Mr. Maxwell, I want you to turn to the  
20 next tab which is Exhibit 22 in your report?

21 A. Okay.

22 Q. And this is your march 21, 2022, report,  
23 correct?

24 A. Yes.

1           **Q.    What was the purpose of this opinion?**

2           A.    This opinion was compiled in order to  
3 respond to the Agency's recommendation which I  
4 think was from February 4.

5           **Q.    Okay.  And we are gonna -- in this report**  
6 **we're gonna start first talking about cobalt which**  
7 **is on Page 7 of your report.**

8           A.    Thank you.

9           **Q.    Mr. Maxwell, cobalt was detected in the**  
10 **groundwater above the groundwater protection**  
11 **standards around Pond 2, correct?**

12          A.    Yes.

13          **Q.    I just want to step back.**

14                **To your recollection, what is the class**  
15 **one drinking water standard for cobalt?**

16          A.    It is 1.0 milligram per liter.

17          **Q.    And what is the standard in Part 845 for**  
18 **cobalt?**

19          A.    The Groundwater Protection Standard  
20 Part 845 is 0.006 milligrams per liter,  
21 substantially less.

22          **Q.    Yeah.**

23                **And then at Joliet 29, where is the cobalt**  
24 **found above 0.006 milligrams per liter?**

1           A.    We've seen it at MW-4.

2           **Q.    Anywhere else?**

3           A.    I don't believe we've seen it anywhere  
4 else at concentrations exceeding the groundwater  
5 protection standard, no.

6           **Q.    In any of the groundwater monitoring wells  
7 at Pond 2, so talking about Wells 3, 4 and 5, has  
8 other common CCR parameters like boron been  
9 detected above the Part 845 standard?**

10          A.    Boron hasn't been detected to date, no.  
11 Molybdenum hasn't been detected at concentrations  
12 that exceed the 845 groundwater protection  
13 standard.

14          **Q.    In your expert opinion what does the  
15 absence of those constituents in the groundwater  
16 mean?**

17          A.    Because those are the most common  
18 indicators of a release, that the absence of the  
19 most common means that there's not likely a  
20 release.

21          **Q.    Okay.  And didn't you also look at other  
22 less common constituents that indicate CCR?**

23          A.    We also looked at those as well.

24          **Q.    What are those?**

1           A.    Arsenic is a constituent that is  
2           historically associated with CCR, chromium, lead.  
3           Those are probably the three most common that come  
4           to mind.

5           **Q.    And to your recollection, have those**  
6           **constituents been detected above the groundwater**  
7           **protection standards around Pond 2?**

8           A.    No, no.  Those have not been detected  
9           above the groundwater protection standards around  
10          Pond 2.

11          **Q.    I think you heard earlier.  You were here**  
12          **for Mr. Naglosky's testimony where he testified**  
13          **that most of the CCR at Joliet 29 went to Lincoln**  
14          **Stone Quarry.  Do you remember that?**

15          A.    Yes.

16          **Q.    So did you consider that in your opinion?**

17          A.    Yeah.  We actually looked at the  
18          groundwater and the leachate from the Lincoln Stone  
19          Quarry as an indicator of -- if there were a  
20          release at Pond 2, what would that signature look  
21          like.

22          **Q.    How did you -- how did you get that data?**  
23          **Where did you go looking for it?**

24          A.    I obtained it.  There was a couple

1 different reports that I utilized. One was a  
2 groundwater monitoring report, annual groundwater  
3 monitoring report. Another was a permit  
4 application. I got one from the Midwest Gen  
5 Illinois CCR site, and I got one from the Midwest  
6 Gen federal CCR site.

7 **Q. By site you mean website?**

8 A. Publicly available website.

9 **Q. Thank you.**

10 **When you looked at the Lincoln Stone**  
11 **Quarry groundwater data, what did you find?**

12 A. What we saw in the groundwater was -- in  
13 the groundwater monitoring wells, we actually saw  
14 boron present at statistically significant  
15 concentrations at nine of the ten monitoring wells  
16 in the originally groundwater monitoring network.  
17 And then an additional eight monitoring wells were  
18 subsequently added as a result of assessment  
19 monitoring that's occurring there. And seven of  
20 the eight monitoring wells in the expanded  
21 assessment network indicated that boron was present  
22 at statistically significant concentrations as  
23 well.

24 **Q. So based upon that finding, what can you**



1 **conclude?**

2 A. So based on that, the boron is a key  
3 indicator of whether or not CCR impacts are present  
4 in groundwater. And the lack of boron at ash  
5 Pond 2 is strong evidence that ash Pond 2 is not  
6 exhibiting CCR impact.

7 **Q. Do you gather other data from the Lincoln**  
8 **Stone Quarry?**

9 A. Yes. We looked at leachate data as well.

10 **Q. Where did -- leachate data, where did you**  
11 **get that leachate data from?**

12 A. So there's a piezometer, P105, that --  
13 that's located at the Lincoln Stone Quarry that was  
14 monitored on a quarterly basis in 2012. And what  
15 we found was that the analytical results from the  
16 leachate piezometer indicated boron concentrations  
17 present at concentrations ranging from 10 to  
18 12 milligrams per liter. We also saw that  
19 molybdenum was present in the leachate also at  
20 similar concentrations of roughly 10 to 12  
21 milligrams per liter. In addition, the leachate  
22 indicated that arsenic was detected at three of the  
23 four quarterly samples, and also barium was  
24 detected in four of the four samples.

1 Q. So this leachate data in a piezometer, for  
2 those of us who don't quite understand what --  
3 where that is, can you describe where that  
4 piezometer is located and how that works?

5 A. Yeah. So piezometer in this instance, I  
6 interpret it to mean that it's a monitoring point,  
7 a groundwater monitoring point that's located  
8 inside the waste boundary as opposed to the ground  
9 monitoring wells that are generally located outside  
10 the landfill boundary itself.

11 Q. So when they're sampling the groundwater  
12 monitoring well inside the waste boundary, the  
13 water sampling is what?

14 A. Leachate would be the term that I would  
15 use. It's water that's directly filtered through  
16 the waste material.

17 Q. Got it.

18 And so you described what leachate for the  
19 Lincoln Stone Quarry shows. What does the presence  
20 of the boron, arsenic and barium in the Lincoln  
21 Stone Quarry leachate tell you when you consider  
22 the groundwater at Joliet 29 around Pond 2?

23 A. Yeah. It gives you an idea of what a CCR  
24 impact, what that signature would be. And it's

1 comprised of these constituents that we just  
2 mentioned, boron, molybdenum, arsenic, barium.  
3 These are the overall signature that if CCR is  
4 going to impact the groundwater, you're going to  
5 identify at least one of those at a statistically  
6 significant concentration and/or a concentration  
7 above the groundwater protection standard because  
8 it's the most common.

9 **Q. So, Mr. Maxwell, we just said we have**  
10 **cobalt in the groundwater.**

11 **Can you just tell us, what is cobalt?**

12 A. Cobalt is actually a naturally occurring,  
13 sorry, naturally occurring element in the earth's  
14 crust. It's found in various minerals, and it's  
15 actually also found in -- quite common in Illinois  
16 soils as well.

17 **Q. Oh, so how do you know it's found in**  
18 **Illinois soils?**

19 A. There was a couple of studies that we  
20 looked at as part of our expert report. There was  
21 a study by Richard Cahill that we refer to in my  
22 report as the Illinois soils composition, and then  
23 that was sort of a compendium of various different  
24 historical investigations of soil borings and

1 laboratory analysis throughout the state,  
2 specifically from locations that were deemed to be  
3 background away from sites that would have been  
4 industrial, you know, impacted by industry.

5 **Q. Isn't cobalt also in TACO, the tiered**  
6 **approach to corrective --**

7 A. Cobalt is a metal that is mentioned in  
8 tiered approach corrective action objectives.

9 **Q. Thank you.**

10 A. And it's present -- there's a table in the  
11 appendices of TACO that lists the background  
12 concentrations of soils in Illinois, and cobalt is  
13 of course listed in that table.

14 **Q. I think I heard you say the Zhang and**  
15 **Frost study. Didn't you also look at the**  
16 **Illinois -- the United States geological survey?**

17 A. Yes. That's -- Zhang and Frost was a  
18 survey that was referenced in the Illinois soils  
19 composition document. That one looked at 90 soil  
20 samples and actually detected cobalt in 90 of 90  
21 soil samples throughout the state.

22 **Q. And weren't samples also taken in**  
23 **Will County?**

24 A. There were samples that were taken

1 specifically in Will County, yes.

2 **Q. And what did those samples finds?**

3 A. The concentrations of cobalt in  
4 Will County in the upper 6 inches to a depth of  
5 1 foot ranged from 6.9 to 10.9 milligrams per  
6 kilogram, which is also PPM or parts per million.

7 **Q. Thank you.**

8 **And the highest concentration of cobalt**  
9 **found in the groundwater, do you recall, is**  
10 **0.0106 milligrams per liter, right?**

11 A. Correct.

12 **Q. So tell me, Mr. Maxwell, how do those two**  
13 **numbers correlate?**

14 A. Well, one is significantly smaller than  
15 the other. The 0.016 is actually a couple orders  
16 of magnitude smaller than the 6.9 to 10.9 number.  
17 So there's a much higher concentration in the soil  
18 than as -- than the maximum concentration that's  
19 ever been detected in the groundwater.

20 **Q. Okay. So where do you think the cobalt in**  
21 **the groundwater is coming from?**

22 A. So looking at all of the data that we had  
23 at our disposal, knowing what was there in terms of  
24 CCR signatures and the lack of CCR signatures,

1 looking at the proximity to the highway and knowing  
2 that the chlorides had previously been attributed  
3 to road salts being utilized along the highway, it  
4 didn't make sense that it was coming from the  
5 Pond 2, either the CCR in Pond 2 or the embankments  
6 of Pond 2. So the natural place to look was given  
7 the Illinois -- the concentrations of background in  
8 Illinois soils, the natural place to look was to  
9 the soils that are part of background.

10 **Q. Okay. And what did you conclude?**

11 A. We concluded that the road salts -- the  
12 application of the road salt is actually creating a  
13 situation where through -- the primary mechanism is  
14 through what's called ion exchange. The higher  
15 concentrations of sodium chloride, calcium,  
16 magnesium, once that's added to the soil, the  
17 binding affinities of those cations are different  
18 than cobalt or arsenic or the heavier metals that  
19 are part of background concentrations in soils.

20 And through the process of ion exchange  
21 these positive cations get attached to the  
22 negatively charged soil particles and actually  
23 release the trace metals, cobalt in this case. And  
24 once the cobalt is released, it's free in the

1 environment, and it's able to become mobilized and  
2 ultimately end up in the groundwater where it can  
3 be detected.

4 **Q. And this study is what you cite to in your**  
5 **report, right?**

6 A. Correct. There's -- we refer to it as the  
7 Schuller study.

8 **Q. Since you've written this report, have you**  
9 **found any additional information to support that**  
10 **conclusion?**

11 A. Actually, a colleague of mine, another  
12 geologist from --

13 **Q. So we have here a copy of it.**

14 A. Yeah. That would be helpful. Thank you.

15 MS. GALE: We can just call this Exhibit 30.

16 (WHEREUPON, Exhibit No. 30 was  
17 marked for identification.)

18 BY MS. GALE:

19 **Q. I'm ready.**

20 A. Okay. A colleague of mine attended a  
21 poster session at St. Louis University just on  
22 Thursday and came across this poster that is  
23 titled, Road Salt Retention and Transport in Soils  
24 and Subsequent Release of Toxic Trace Elements to

1 Pore Waters. That's the title of the poster, and  
2 he shared it with me because I had shared with him  
3 what I was going to be testifying to here today.  
4 And so he sent this to me, and I found it  
5 particularly useful.

6 There's various plates here that indicate  
7 the process of cation exchange, and it sort of  
8 simplifies it there in the upper left-hand corner.  
9 So they looked at arsenic here, rubidium, and I  
10 can't read what that other heavy metal is. But  
11 they looked at a few different heavy metals and  
12 concluded similar to the Schuller study that the  
13 application of road salt at this particular site  
14 primarily through cation exchange processes is  
15 resulting in concentrations of these trace metals  
16 ending up in the soil pore water.

17 **Q. So, Mr. Maxwell, in your expert opinion**  
18 **based upon review of the groundwater data, is what**  
19 **you're seeing here in this sheet, Exhibit 30 and in**  
20 **Exhibit 22, occurring around Pond 2?**

21 A. I believe that the mechanisms described in  
22 those two technical resources, those two technical  
23 studies, are the reason why we've got cobalt at  
24 MW-4, Pond 2, yes.



1           **Q.    Thank you.**

2                    I want to turn to our discussion about  
3 **black silty gravel, so if you could turn to Page 3**  
4 **of your report?**

5            A.    Okay.

6           **Q.    Okay.  First, we've heard a few people**  
7 **talk about the Munsell color system.  And, you**  
8 **know, Mr. Maxwell just tell me what you think the**  
9 **Munsell color system is.**

10          A.    It's a standardized system for essentially  
11 taking the objectivity out of identification of  
12 soils.  It's a standard system that allows you to  
13 be more sure that your color characterization is  
14 accurate.  One person's dark brown might be another  
15 person's black, so it helps to standardize the  
16 identification of color.

17          **Q.    And generally when you're logging soil**  
18 **borings do you use the Munsell color system?**

19          A.    We use it as a tool.  It depends on the  
20 regulations.  It depends on the state that we're  
21 working in.  It depends on the client that we're  
22 working for.  So it's certainly a tool that we use  
23 depending on the project.

24          **Q.    And you reviewed the soil borings we've**

1 discussed here, right?

2 A. I have.

3 Q. And did they use the Munsell color system?

4 A. It wasn't indicated on the borings, no,  
5 the boring logs.

6 Q. Okay. I want you to pull out from your  
7 binder Exhibit A which is Exhibit A to the Illinois  
8 EPA's recommendation and Lauren Hunt's affidavit.  
9 I want you to turn to Paragraph 17.

10 A. Okay.

11 Q. So I'm just gonna read the first four  
12 lines.

13 The engineering properties summarized --  
14 this is what Miss Hunt says at Paragraph 17 of  
15 Exhibit A. The engineering properties summarized  
16 in Joliet 29's History of Construction show  
17 Pond 2's foundation is comprised of sand slash  
18 gravel with a unit weight of 125 pounds per cubic  
19 foot. And she cites to Exhibit D, Attachment 3,  
20 Tables 2 and 3, 2, Table 2. The embankment  
21 properties are brown clay with a unit weight of  
22 115 PCF and black silty gravel with a unit of  
23 weight of 125 PCF, Exhibit D, Attachment 3.

24 And then she states, according to the

1 FHWA, dark gray to black soils represent organic  
2 material. Do you see that there?

3 A. Yes.

4 Q. What is the -- to your recollection, what  
5 is the FHWA?

6 A. That is the Federal Highway  
7 Administration, I believe.

8 Q. Okay. Can you turn to the next tab which  
9 is an excerpt of Agency Exhibit F?

10 A. Okay.

11 Q. Can you turn to Page 10 which is the page  
12 she cites in her Paragraph 17?

13 A. Okay.

14 Q. And can you tell us what FHWA states of  
15 highly organic soils?

16 A. This says, colloidal and amorphous organic  
17 materials finer than Number 200 sieve  
18 0.075 millimeters are identified and classified in  
19 accordance with their drop in plasticity,  
20 ASTM D2487. Further identification markers are  
21 dark gray and black and sometimes dark brown  
22 colors. Although, not all dark chloride soils are  
23 organic.

24 Q. Okay. What is your interpretation of what

1 **the FHWA meant for its conclusion about black or**  
2 **dark gray soils?**

3 A. So based on this, they're indicating that  
4 not all dark colored soils are necessarily organic.  
5 You could have dark colored soils that wouldn't  
6 fall into that category.

7 **Q. Okay. And don't you have experience with**  
8 **that?**

9 A. Yeah. I've seen -- I've seen dark colored  
10 soils that are -- that aren't organic, yes.

11 **Q. Not organic, correct?**

12 A. That are not organic, correct.

13 **Q. Okay. And have you seen it near Joliet?**

14 A. We worked on a Phase 2 ESA in Joliet, if I  
15 may just turn to my report. So, yeah, we looked at  
16 a Phase 2 ESA, an environmental site investigation,  
17 at a site about a mile and a half from the  
18 Joliet 29 site where we encountered some darker  
19 colored fill soils that we ultimately logged as a  
20 mixture of dark silts and clays that also included  
21 sand and gravel.

22 **Q. Did you log them as CCR?**

23 A. No, we didn't log those materials at CCR.

24 **Q. If they were CCR, would you have logged**

1     **them as CCR?**

2           A.     Yeah, we would have. We would have noted  
3     that, yes.

4           Q.     **Actually, I want you to actually pull out**  
5     **her affidavit because we're going to be flipping to**  
6     **it a lot.**

7           A.     Pull it out of the binder?

8           Q.     **Yeah, pull it out of the binder. So**  
9     **turning back to her affidavit, Paragraph 17, but on**  
10    **the next page, Page 5, where she states, therefore,**  
11    **the black silty gravel is likely fly ash mixed with**  
12    **some crushed Poz-O-Pac or locally sourced limestone**  
13    **or dolomite gravel or some combination of the two.**

14                    **Do you see that there?**

15           A.     Yes.

16           Q.     **Do you agree with that conclusion?**

17           A.     No. I don't think that the -- that  
18    material would be fly ash, no.

19           Q.     **Why not?**

20           A.     Well, it's certainly possible based on the  
21    Phase 2 ESA that we had done in the area that those  
22    concentrate -- or the darker soils would be present  
23    and would not necessarily be logged as fly ash.

24           Q.     **Okay. Great.**

1                   **So why weren't they logged as fly ash?**

2           A.    In our boring logs?

3           **Q.    Yes.**

4           A.    Because, well, multiple reasons.  We  
5 looked at the visual boring logs to log what we  
6 had, and then the visual boring logs and  
7 descriptions in the boring logs were actually  
8 backed up in this particular instance by the soil  
9 and groundwater data that we collected as part of  
10 the Phase 2 ESA.  The soil and groundwater data  
11 ended up being compliant with TACO, and so that was  
12 indicative of materials that were not CCR.  So  
13 everything sort of fit together in this particular  
14 Phase 2.

15           **Q.    Can you turn to Paragraph 20 of**  
16 **Miss Hunt's affidavit on Page 5?**

17           A.    Okay.

18           **Q.    So in Paragraph 20, Exhibit A, upon**  
19 **information and belief, Poz-O-Pac and black silty**  
20 **gravel material are CCR or CCR combined with other**  
21 **materials and are therefore a potential source of**  
22 **contamination in the groundwater.**

23                   **Do you see that there?**

24           A.    Yes.

1 Q. So I'm gonna break that down.

2 Mr. Maxwell, to your recollection, when  
3 was Pond 2 built?

4 A. It was originally built, I believe, in the  
5 early '70s, but then the Poz-O-Pac was added in  
6 1978, the liner.

7 Q. Yeah.

8 And that was -- the Poz-O-Pac in the  
9 embankments of the pond were built in '78?

10 A. Yes.

11 Q. Then it was relined in 2008?

12 A. Yes.

13 Q. And that included to your recollection  
14 exposing and modifying the embankment?

15 A. There was some grading work that needed to  
16 be done in order to prep the embankments for  
17 placing the of HDPE liner, yes.

18 Q. Right. And then groundwater monitoring  
19 began in 2010?

20 A. The first groundwater monitoring was in  
21 2010, yes.

22 Q. So when groundwater monitoring began in  
23 2010, the Poz-O-Pac had been in the ground for how  
24 long?

1 A. Since 1978.

2 Q. 32 years?

3 A. Yeah.

4 Q. And the embankments had been in place for  
5 the same amount of time, correct?

6 A. Correct.

7 Q. And then in '08, Midwest Generation  
8 relined the pond, modifying the embankments and  
9 leaving the Poz-O-Pac in place, right?

10 A. That's my understanding, yes.

11 Q. And so now -- and then from 2010, Midwest  
12 Generation has quarterly monitored the groundwater,  
13 groundwater monitoring, excuse me, has quarterly  
14 monitored the groundwater from 2010 to present,  
15 right?

16 A. Correct.

17 Q. And so now we've had -- the Poz-O-Pac has  
18 been in the ground for 44 years?

19 A. Yes, since 1978 to present.

20 Q. And the embankments the same amount of  
21 time?

22 A. Yes. And the groundwater has not  
23 exhibited concentrations that would be indicative  
24 of a CCR impact over those 44 years.



1           **Q.    So, Mr. Maxwell, in your expert opinion**  
2 **would you reasonably expect after 44 years of the**  
3 **Poz-O-Pac in the ground, the embankments in the**  
4 **ground, and 12 years of groundwater sampling,**  
5 **evidence of leaching to the Poz-O-Pac or the**  
6 **embankments?**

7           A.    Yeah.  44 years of exposure to the  
8 elements and subject to rainwater and percolation  
9 and groundwater flow, all of the natural mechanisms  
10 that occur in the vicinity of the pond underground,  
11 that's more than adequate amount of time if any  
12 type of an impact was going to occur, that it would  
13 have been identified in the downgradient wells,  
14 yes.

15           **Q.    So what does the absence of those CCR**  
16 **constituents in groundwater tell you?**

17           A.    It tells me the same thing, that -- those  
18 mechanisms are occurring.  Percolation is  
19 occurring.  Groundwater transport is occurring.  
20 There's nothing that's percolating out and is  
21 ending up in the groundwater that can then be  
22 sampled in the wells and reported by the  
23 laboratory.

24           **Q.    Okay.  Great.**

1           **So, therefore, do you -- in your expert**  
2 **opinion is the Poz-O-Pac in the ground and the**  
3 **gravel material in the embankments a potential**  
4 **source of contamination to the groundwater?**

5           A.    If it were a potential source, we would  
6 have seen an impact by now, so I don't think it's a  
7 potential source.

8           **Q.    Thank you.**

9           I actually want to turn now to Board  
10 **Question Number 10. I'll read it into the record.**  
11 **On Page 3 of Midwest Generation's response to the**  
12 **Agency's recommendation states, because the**  
13 **groundwater monitoring results around Pond 2 does**  
14 **not detect any of the CCR primary constituents**  
15 **(boron, barium and arsenic) that CCR is not present**  
16 **in Pond 2. Please comment on whether the absence**  
17 **of detections are sufficient to show the absence of**  
18 **CCR in Pond 2.**

19           **Mr. Maxwell, can you please answer that**  
20 **question?**

21           A.    So I think the absence of detections are  
22 part of the story. The absence of detections for  
23 the most common constituents is a big part of the  
24 story; but you combine that with the lack of

1 detections of the other secondary constituents that  
2 are associated with fly ash, and the whole picture  
3 together demonstrate -- is useful. All the  
4 information is useful whether you've got something  
5 detected or whether you've got something not  
6 detected. You put it all together. The total  
7 picture suggests that neither the pond itself, nor  
8 the embankments are leaching CCR related  
9 constituents.

10 **Q. Great. Thank you.**

11 **I want you to turn back to Miss Hunt's**  
12 **affidavit. I want you to read to yourself her**  
13 **Paragraph 26. Tell me when you're finished.**

14 **A. Okay.**

15 **Q. In the opinion you just discussed about**  
16 **the potential contamination, does that equally**  
17 **apply in response to Paragraph 26?**

18 **A. The word potential source of contamination**  
19 **is repeated there in that paragraph, so, yeah, the**  
20 **same rationale would apply.**

21 **Q. Can you also turn to her Paragraph 33**  
22 **which is on Page 8?**

23 **A. Okay.**

24 **Q. Read it to yourself and then . . .**

1           A.     Okay.

2           **Q.     Same question, is your analysis earlier of**  
3 **the groundwater and the embankments, did that apply**  
4 **to your analysis and written response apply to her**  
5 **written Paragraph 33?**

6           A.     Yes, I think it does. The first part of  
7 that, stormwater infiltrates Pond 2 embankments,  
8 that's true. Stormwater does infiltrate, but the  
9 second part of that -- again, the data that we've  
10 collected from the monitoring wells since 2010  
11 isn't indicative of a release of CCR materials.

12          **Q.     Great. One last paragraph, can you turn**  
13 **to Paragraph 38, please, on Page 9?**

14          A.     Okay.

15          **Q.     So based upon earlier analysis of**  
16 **groundwater and your review of the boring logs, do**  
17 **you agree with her conclusions in Paragraph 38?**

18          A.     No. I don't believe that the pond  
19 embankment material, nor the material formerly in  
20 the pond itself is ultimately ending up in the  
21 grown as evidenced by the data.

22          **Q.     And -- yeah.**

23                 **All right. Mr. Maxwell, I want to turn to**  
24 **your discussion about chlorides which is on Page 4**

1 of your report. At the same time can you turn to  
2 Paragraph 34 of Miss Hunt's affidavit?

3 A. Okay.

4 Q. So you see Miss Hunt states five lines  
5 down, Illinois EPA and Midwest Gen agreed in 2012  
6 that the exceedances of Section 620.410 Groundwater  
7 Quality Standards were likely due to road salts.

8 Do you see that there?

9 A. Yes.

10 Q. And you already testified that the  
11 chloride is from the road, correct?

12 A. Yes.

13 Q. Okay. But let's look at her last  
14 sentence. However, these exceedances signify the  
15 stormwater infiltration and recharge is occurring  
16 through the immediate vicinity of Pond 2 through  
17 the embankments. Is that accurate?

18 A. Well, if you take that very last sentence  
19 there --

20 Q. Right.

21 A. Okay. There is recharge occurring through  
22 those embankments. There's another part of the  
23 opinion, though, where the source of the stormwater  
24 is what I disagree with.

1           **Q.    Great.**

2           A.    Okay.

3           **Q.    You're talking about the exceedances**  
4 **signify.  That's what you disagree with?**

5           A.    I guess I'm not sure what the reference is  
6 there to exceedances.  Oh, we're talking about  
7 chloride there, right?

8           **Q.    Yeah.**

9           A.    Yeah.  So, yeah, I don't think that the  
10 chloride exceedances are necessarily part of the  
11 story.

12          **Q.    Great.**

13          A.    Okay.

14          **Q.    Let's talk about that.  So, well, we're**  
15 **gonna get into that.  I'm gonna switch over a board**  
16 **here.**

17                   **So, Mr. Maxwell, what are we looking at**  
18 **here?**

19          A.    So that is a profile of the ground  
20 surface -- can I get up?

21          **Q.    Please do, but make sure you project so**  
22 **the court reporter can hear you.**

23          A.    So this is -- the heavier dark line is a  
24 profile of the ground surface that we generated

1 from Google Earth, and so it goes from the north  
2 side of Pond 2, Highway 6, across Pond 2, and then  
3 ultimately ending at the intake channel for the  
4 Des Plaines River.

5 **Q. Okay. And can you turn to Exhibit B of**  
6 **your report?**

7 A. Okay.

8 **Q. Looking at it?**

9 A. Yep.

10 **Q. So tell me how Exhibit B compares with**  
11 **what you're seeing here and where it came from?**

12 A. So the source of the information is the  
13 same. The drawing that's posted here in the room  
14 today is just made to look a little bit more  
15 professional. The scale has been changed. So  
16 we've put it in autoCAD so we can make it a little  
17 more presentable for presentations purposes, but  
18 the source of the information and the basis for the  
19 profile is the same.

20 **Q. Okay. Great.**

21 **So, Mr. Maxwell, why did you do this?**  
22 **What is the purpose of this?**

23 A. So --

24 **Q. I'm sorry.**

1           **Why did you do this evaluation on the --**  
2           **in Exhibit B and of the elevations?**

3           A.     So the -- if I understand the argument  
4           that the Agency has made in terms of linking the  
5           chloride to the groundwater, there's a reference  
6           that's made to chloride stormwater infiltrating the  
7           topsoil in the immediate vicinity of the pond. And  
8           the only way that I'm aware of that the top -- that  
9           the topsoil in the immediate vicinity of the pond  
10          could be impacted as a result of stormwater flow  
11          from the highway would be for direct infiltrate --  
12          or for direct stormwater to flow from the highway  
13          and ultimately end up in the embankments of the  
14          pond because the allegation is that the chlorides  
15          are present in the topsoil.

16                 So if you look at the profile, this is --  
17          this is the highway, and then there's a ditch  
18          immediately adjacent to the highway that is going  
19          to collect stormwater and then ultimately funnel it  
20          in and out of the page, okay. But then some  
21          stormwater is actually gonna infiltrate as well and  
22          go vertical, and it's gonna go vertical until it  
23          hits the aquifer at which point it's gonna flow and  
24          follow the flow of the aquifer.



1           So with this profile, it just -- I don't  
2 know of a way for stormwater from the highway to  
3 ultimately end up on the embankment of the pond  
4 given the barrier of the ditch. Water would have  
5 to come up and over the ditch in order to get onto  
6 the embankment of the pond and subsequently impact  
7 the topsoils of the pond.

8           **Q. Thank you. You can step down.**

9           A. Thanks.

10          **Q. So in your analysis of this chloride**  
11 **seepage, you -- first, you just told us that the**  
12 **chloride impacted water from the stormwater can't**  
13 **flow off the embankment of the pond. Didn't you**  
14 **also look at the seepage rates in the groundwater?**

15          A. [Nodding.]

16          **Q. What did that tell you?**

17          A. So once -- let me just flip to my report  
18 because -- so what we looked at was the average  
19 seepage velocity that's been reported in the -- in  
20 the historical groundwater monitoring reports and  
21 the historical geological investigations, and we  
22 saw that the average seepage velocity is 0.87 feet  
23 per day. And so if you were to use that average  
24 seepage velocity, it's gonna take roughly 30 days

1 for the stormwater that mixes with the groundwater  
2 beneath the ditch to ultimately end up at the  
3 upgradient well, MW-10.

4 And then the downgradient wells are even  
5 further away from the ditch, so it's going to take  
6 at least 300 days for the groundwater to flow from  
7 the highway ditch to the downgradient wells.

8 **Q. And by seepage, what is the seepage**  
9 **velocity?**

10 A. So the seepage velocity is the rate that  
11 groundwater actually flows in the subsurface. It  
12 needs to flow around the various grains in the  
13 aquifer. So it's the rate that it flows in the  
14 aquifer.

15 **Q. And do constituents like chloride move**  
16 **with the seepage velocity?**

17 A. Yes. The dissolved constituents --  
18 chloride is dissolved in the groundwater. The  
19 migration rate is going to be largely dependent on  
20 the seepage velocity. The faster the seepage  
21 velocity, the faster the chloride will migrate.

22 **Q. Okay. Let's turn back to Miss Hunt's**  
23 **affidavit, Paragraph 36. After you've read it,**  
24 **I'll ask you a question.**

1           A.     Okay.

2           **Q.     So, Mr. Maxwell, what analysis in your**  
3 **understanding is Miss Hunt doing in Paragraph 36 of**  
4 **Exhibit A?**

5           A.     I believe that the idea is to indicate  
6 that rapid or excess precipitation in the  
7 springtime is ultimately finding its way onto  
8 Midwest Gen's monitoring wells and into the  
9 groundwater quickly, and it's causing the  
10 concentrations of chloride to spike quickly,  
11 immediately.

12          **Q.     And what is your opinion of this analysis?**

13          A.     So I don't think the timing is right for  
14 the reasons that are indicated here on the board.  
15 In order for that timing to actually play out, you  
16 got to have the overload flow. The water's gonna  
17 flow faster over the ground surface than it's gonna  
18 actually flow within the subsurface in the aquifer.  
19 So for that reason I don't think that the time  
20 makes sense.

21                 And then one other point to make would be  
22 that there's only a couple of different events that  
23 were evaluated here as part of Paragraph 36.  
24 There's -- there was multiple other years in which

1 we were performing groundwater monitoring in which  
2 to look. So two out of ten years were assessed, so  
3 I was left to wonder what the other eight or so  
4 years might indicate.

5 **Q. She also looked at rain events, right, to**  
6 **support her conclusions?**

7 A. Yeah.

8 **Q. What do you think about using rain events**  
9 **in this instance to support her conclusions? How**  
10 **would you -- do you think that's a scientific way**  
11 **to consider rain events?**

12 A. I don't think the rain events support the  
13 conclusion.

14 **Q. Why is that?**

15 A. The timing doesn't work out.

16 **Q. Okay.**

17 A. The -- again, in order for it to -- in  
18 order for the stormwater with chloride to -- as  
19 quickly as is indicated by the Agency's affidavit  
20 to get to the monitoring wells, it's got to go over  
21 the land, and it's gonna go slower once it gets  
22 into the subsurface. So the timing doesn't add up.

23 **Q. Great.**

24 **So, Mr. Maxwell, in your opinion based**

1 upon this analysis here, do the chloride results in  
2 the groundwater provide any evidence of high -- of  
3 any conductivity in the surrounding soil in Pond 2?

4 A. No. I don't think the chloride data  
5 supports that -- a conclusion about the hydraulic  
6 conductivity of the embankments.

7 Q. Right. So we're gonna get to Board  
8 Question Number 2. So I'll read into the record.

9 The Agency suggests due to the topography  
10 of Pond 2's embankments Highway 6's associated  
11 storm drainage, "chloride is moving from the road  
12 salts into the topsoil of the Pond 2 embankment and  
13 the US Highway 6 stormwater drainage ditch during  
14 the winter months and then infiltrating to the  
15 groundwater beneath and to the north of Pond 2  
16 during the springtime thaw of ice and snow and  
17 subsequent rain events." Citing Agency at 20 --  
18 Pages 24 to 25.

19 Please clarify whether Midwest Generation  
20 has done testing of the soils in Pond 2's  
21 embankment to determine their composition and  
22 permeability. If not, is it possible to do so?  
23 How would it take -- how long would it take to  
24 conduct the analysis?

1           So I guess starting with the question,  
2 **Mr. Maxwell, to your knowledge has Midwest**  
3 **Generation done testing of the soils in Pond 2's**  
4 **embankment to determine their composition and**  
5 **permeability?**

6           A.    The composition of the soils has been  
7 documented in the various boring logs that have  
8 been investigate -- generated as a result of  
9 various different geotech investigations. So that  
10 would be the composition. I think the USDA  
11 textural classification system was utilized. So  
12 there's -- the full description is in the boring  
13 logs that were provided to describe composition.

14           As it relates to permeability, my  
15 understanding is that 2005 there was a geotech  
16 investigation that was performed that assessed  
17 permeability of the bottom portion of the  
18 embankment. And if I remember correctly, those  
19 hydraulic conductivity results from the  
20 permeability tests indicated a 10 to the minus 2 to  
21 10 to the minus 4 centimeters per second range of  
22 materials.

23           **Q.    And I think the 2005 geotechnical report**  
24 **you're discussing is Exhibit E to the Agency's**

1 **recommendation, and that would be in the other book**  
2 **there.**

3 A. Okay.

4 Q. Okay. So second question -- I guess the  
5 second question I'll just say both, so you can  
6 answer both.

7 If not, is it possible to do so, and how  
8 long would it take to conduct the analysis?

9 A. So I think the first part, if not, is it  
10 possible to do so, we do have the data, so that's  
11 not applicable. And I don't think the second part  
12 is applicable either because we do have data and  
13 composition permeability.

14 Q. Let me ask you this follow-up to that  
15 Board question.

16 Would the permeability tell you anything  
17 about whether it's CCR in the embankments or not?

18 A. It could tell you -- it could tell you --  
19 if you have other evidence to suggest that CCR were  
20 there, it could give you information on the type of  
21 CCR. Bottom ash is courser grained. Courser  
22 grained is going to be more permeable. But there's  
23 no other information to indicate that there's CCR  
24 there, so by itself, no.

1 Q. Because the permeability only tells you  
2 how quickly water goes through it, right?

3 A. Correct.

4 Q. That's what I mean if I tell you, if you  
5 think it's CCR, what it is?

6 A. Permeability, you could -- it could be  
7 impermeable or very permeable, and that doesn't  
8 have any relation at all to whether it's CCR or  
9 not. Permeability is primarily related to  
10 compaction, grain size, things like that.

11 MR. RAO: Can I ask a follow-up?

12 MS. GALE: Please.

13 MR. RAO: Mr. Maxwell, just in responding to  
14 Miss Gale's question, you said permeability by  
15 itself is not being proven in terms of whether CCR  
16 is in the embankment or not. When we ask the  
17 question about the composition, we are also  
18 wondering if any chemical analysis was done on the  
19 soils to see if CCR is present. Is that  
20 information available of whether testing has been  
21 done?

22 THE WITNESS: On the soils themselves, I'm not  
23 aware of information on the soils themselves. We  
24 do have information on the groundwater downgradient



1 of the soils, 12 years worth of data, downgradient.

2 But on the soils themselves, I'm not aware of any.

3 MR. RAO: Okay. Thank you.

4 MS. GALE: Okay. Good? Okay.

5 BY MS. GALE:

6 Q. Mr. Maxwell, I just want to turn next to  
7 your discussion about the alleged data quality  
8 issues, that's on Page 12 of your report.

9 A. Okay.

10 Q. Okay. So you heard the testimony this  
11 morning. Generally speaking, total dissolved  
12 metals results are higher than dissolved metals  
13 results, right?

14 A. Generally speaking, yes.

15 Q. Yeah.

16 And we heard Mr. Gnat say that, but I'll  
17 ask you to repeat it. Why is that, generally  
18 speaking?

19 A. The total are an unfiltered aliquot. The  
20 dissolved are filtered. So the process of  
21 filtering potentially could eliminate solids that  
22 are suspended in the sample that would then be part  
23 of the reported concentration.

24 Q. And you heard how Mr. Wilson and Mr. Gnat

1 **discussed how they collected the groundwater data,**  
2 **right?**

3 A. Yes.

4 **Q. And their collection of methods are**  
5 **similar to the methods you're familiar with of**  
6 **collecting from the groundwater with a filter or**  
7 **without a filter?**

8 A. Yes. That's standard practice with a  
9 0.45 micron filter.

10 **Q. Great.**

11 **And is it standard practice to perform it**  
12 **in two separate containers collected consecutively?**

13 A. That's generally the way most sampling  
14 analysis plans specify how it be done.

15 **Q. But -- I'm sorry?**

16 A. And that -- that in and of itself could  
17 potentially create variation because groundwater  
18 flows. And so because it flows, the concentrations  
19 are changing with time. The sample containers are  
20 collected one after another, but the one is  
21 technically different groundwater than the other.  
22 And so it is possible to have small variations  
23 simply because you're not necessarily sampling the  
24 exact same groundwater.

1 Q. That was my next question, so thank you.

2 A. Okay.

3 Q. So now we have, as you say, two samples  
4 with groundwater from the same groundwater unit,  
5 but as you said not the exact same water. And it's  
6 sent to the lab for analysis, right?

7 A. Yes.

8 Q. And then at the lab what happens?

9 A. So they follow a standard USEPA procedure.  
10 Most of them are SW 846 methodology. As part of  
11 that methodology when they're running their samples  
12 through the instruments and doing their  
13 calibration, there's specific QA/QC procedures in  
14 terms of the accuracy and precision of the data  
15 that are arranged. And it can be plus or minus  
16 10 or 20 percent, for example, high or low. And  
17 that can still be -- if you've got that type of  
18 variation, that can still be deemed acceptable when  
19 they report the results. So that's just another  
20 level of variation that occurs when they're running  
21 the lab analysis.

22 The -- basically the methodology is only  
23 so tight. They run it per the methods, but the  
24 technology is only -- and the method is only so

1 accurate and only so precise. And so by following  
2 the method, reporting per the method, basically the  
3 method allows a little bit of leeway in the  
4 results. So there's a certain high and a certain  
5 low range of the concentration that could also  
6 account for, you know, concentrations that may not  
7 necessarily follow the general rule.

8 **Q. Right. So with the variation in the water**  
9 **and the variation of the calibration and standards**  
10 **at the lab and your decades of experience, are**  
11 **total dissolved metal results always higher than**  
12 **dissolved metal results?**

13 A. In my field, we don't like to use the word  
14 always, except there's always variation.

15 **Q. Okay.**

16 A. We'll use it then, so no, never a hundred  
17 percent in time.

18 **Q. Great.**

19 **Can you please turn to Miss Hunt's**  
20 **affidavit Paragraph 40? Please read it, and then**  
21 **I'll ask you a couple questions.**

22 A. Okay.

23 **Q. So her last sentence she states, dissolved**  
24 **metal results presented to the Agency were higher**

1 in value for some of the detections than the total  
2 metal results, suggesting that the sample bottles  
3 were switched in the field, all samples were  
4 field-filtered, and some other sampling error  
5 occurred.

6 Do you agree with her conclusion that some  
7 of the metals detected in the dissolved metals were  
8 higher than the total metals indicate a switching  
9 in the field or all metal samples were  
10 field-filtered?

11 A. No, I don't agree with that, the testimony  
12 this morning, the data that I looked at. The  
13 majority of the total metals concentrations that I  
14 viewed -- reviewed from those two sampling events  
15 did have totals, total metal concentrations higher  
16 than the dissolved. So I didn't see anything that  
17 would indicate that there were QA/QC issues as  
18 referenced in this paragraph.

19 Q. Okay. So turning to her Paragraph 41, I'm  
20 gonna read through that. Actually, before you do  
21 that, I'll stop you there.

22 Didn't you also do a line-by-line, a  
23 side-by-side comparison of the results?

24 A. I did.

1           **Q.    What did you conclude or what did you**  
2 **find?**

3           A.    Again, the majority of the total metals  
4 concentrations were higher than the dissolved  
5 metals concentrations.  In those two sampling  
6 events I believe there were only 3 or 4 instances  
7 out of 20 or so that -- where the opposite were  
8 true, so not enough to suggest that a large scale  
9 mixup had occurred.

10          **Q.    And to your recollection do you remember**  
11 **the concentrations of those differences?**

12          A.    The concentrations were close in terms of  
13 what one was reported versus another.  One was  
14 0.069 I believe, and one was 0.070.  You know, so  
15 very minimal difference between the two which could  
16 certainly be accounted for by either the field  
17 variation that was mentioned or the analysis at the  
18 lab, the variation that could occur from that.

19          **Q.    And these are small concentrations we're**  
20 **talking about, right?**

21          A.    Yeah, yeah.

22          **Q.    Does that -- how does that inform your**  
23 **conclusions?**

24          A.    Well, it -- I mean, it -- the small

1 concentrations, it only takes a little bit of a  
2 difference to tip one higher than the other. You  
3 know, so the fact that they're small concentrations  
4 is an important part of it because, like I said, it  
5 only takes a little bit to kick one higher or lower  
6 than the other.

7 Q. Can you turn to Paragraph -- Miss Hunt's  
8 Paragraph 41 in Exhibit A?

9 A. Okay.

10 Q. Here she states in her second sentence  
11 that because the 2021 Q3 data summary seems to  
12 include field-filtered sample collection, as  
13 explained in Paragraph 40, the detections and  
14 potentially some of the nondetects could have been  
15 greater -- she's indicating in Monitoring Well 3  
16 and 5 for cobalt -- if the total metals sample  
17 collections had been followed.

18 Do you see that there?

19 A. Yes.

20 Q. Based on your comparison of the total and  
21 dissolved data, is Miss Hunt's suggestion that  
22 there were field-filtered sample collections  
23 correct?

24 A. No. The cobalt is -- as was discussed, is

1 from the same sample bottles, so there's no reason  
2 to suspect that are the QA/QC issues with cobalt  
3 are present when there's no QA/QC issues with the  
4 other metals.

5 **Q. So in your expert opinion could the**  
6 **results in Monitoring Wells 3 and 5 been higher?**

7 A. I don't believe so, no.

8 **Q. Mr. Maxwell, we've gone through the**  
9 **groundwater monitoring results which you state show**  
10 **the absence of boron and other common CCR**  
11 **constituents. Cobalt in the groundwater is due to**  
12 **the road salts. Black silty sand -- excuse me.**  
13 **Black silty gravel is not CCR.**

14 **Based upon all that, in your expert**  
15 **opinion is the groundwater contaminated by CCR?**

16 A. I don't believe it is.

17 **Q. And in your expert opinion is there a**  
18 **future potential for contamination from CCR?**

19 A. Again, given that we've got 44 years worth  
20 of data -- or I'm sorry. Given that the embankment  
21 material has been in place for 44 years and we've  
22 got a dozen years or so of groundwater monitoring  
23 data, if something was going to leach from the  
24 embankment and/or from the pond, we'd have seen it



1 by now in the groundwater downgradient of Pond 2,  
2 and we just haven't.

3 **Q. Okay. So in your expert opinion, is**  
4 **additional sampling analysis of the embankments**  
5 **around Pond 2 to analyze whether the soil is**  
6 **leaching metals required?**

7 A. I don't think it's required. There would  
8 be potential issues with the representativeness if  
9 you were to do that testing. I believe the shake  
10 test or the neutral leach test has been suggested.  
11 You know, taking a lab test and trying to translate  
12 that to a field condition is risky. It's not as --  
13 there are questions attached with trying to  
14 translate a lab test to actual field data, and  
15 we've got field data from an array of groundwater  
16 wells downgradient that -- from 12 years that is  
17 showing no, no -- the absence of common  
18 constituents and then the absence of the uncommon  
19 constituents is showing that the groundwater isn't  
20 impacted.

21 **Q. Similarly, in your expert opinion does the**  
22 **Poz-O-Pac need to be sampled to analyze whether**  
23 **it's leaching metals?**

24 A. Yeah. The Poz-O-Pac, because that is

1 underneath the HDPE liner, you would have to  
2 compromise the HDPE liner to get at the Poz-O-Pac.  
3 And assuming the liner ultimately is going to stay,  
4 that doesn't make a lot of sense because you're  
5 creating a conduit for contamination to go vertical  
6 if you were to attain that sample.

7 **Q. So is your analysis earlier about the**  
8 **absence of constituent groundwater equal applicable**  
9 **to the consideration of sampling the Poz-O-Pac?**

10 A. Yeah. Yes. The -- there's -- the  
11 groundwater data indicates that the Poz-O-Pac isn't  
12 serving as a source either.

13 MS. GALE: Nothing further for now. Thank you.

14 HEARING OFFICER HALLORAN: Miss Diers, do you  
15 need a moment or do you need a short break?

16 MS. DIERS: Just a short break, thank you.

17 HEARING OFFICER HALLORAN: Seven, eight minutes  
18 we'll be back. We're off the record.

19 (WHEREUPON, a short recess was  
20 taken.)

21 HEARING OFFICER HALLORAN: We're back on the  
22 record. Mr. Maxwell is still under oath.

23 Miss Diers, would you like cross?

24 MS. DIERS: Yes, just a few questions.

CROSS-EXAMINATION

1  
2 BY MS. DIERS:

3 Q. With respect to Exhibit B attached to your  
4 affidavit, does infiltration also have lateral flow  
5 components?

6 A. Can you be more specific?

7 Q. I'm referring to Exhibit B attached to  
8 your affidavit.

9 A. The --

10 Q. Yes.

11 A. There's two reports.

12 Q. Sorry.

13 A. Okay. Now that I see what you're  
14 referring to, would you mind repeating the  
15 question?

16 Q. With respect to Exhibit B attached to your  
17 affidavit, does infiltration also have lateral flow  
18 components?

19 MS. GALE: Objection, only to the extent he  
20 doesn't have an affidavit. It's Exhibit B to  
21 Exhibit 22.

22 MS. DIERS: That's what I'm referring to, yes.

23 THE WITNESS: Once the infiltration reaches the  
24 groundwater, reaches the aquifer, yes, the flow at

1 that point would be lateral.

2 BY MS. DIERS:

3 **Q. With respect to Exhibit B attached to**  
4 **Exhibit 22 depicting groundwater flow towards the**  
5 **Des Plaines River, is it possible that the lateral**  
6 **flow component of infiltration intersected with**  
7 **Pond 2 subgrade and foundation materials?**

8 A. No. The groundwater surface is a minimum  
9 of 5 feet beneath the base of the liner, and so as  
10 a result the groundwater flow is beneath the liner.

11 **Q. Next question, was the groundwater metals**  
12 **data evaluated in 2010 until the enactment of the**  
13 **federal rule as total recoverable metals or**  
14 **dissolved metals?**

15 A. My understanding is that we collected  
16 both, total metals and dissolved metals, depending  
17 upon the applicable regulation or the CCA. There  
18 was monitoring that was done in compliance with  
19 compliance commitment agreement, the CCA, which was  
20 comprised primarily of dissolved metals. And then  
21 once the federal rules were enacted, the federal  
22 CCR rules in 2015, and later the Illinois CCR rules  
23 last year, those require total metals. So both  
24 have been monitored at various points throughout

1 the monitoring program.

2 **Q. Is it the practice of Weaver Consultants**  
3 **Group to evaluate human health risks and/or**  
4 **compliance with class one groundwater protection**  
5 **standards using dissolved metals data?**

6 A. We will follow the applicable regulations.  
7 In some instances dissolved metals are required to  
8 comply with various permits. For example, in other  
9 instances we will collect total. I would say that  
10 on a general basis just our standard operating  
11 procedure, if we're doing -- if we're investigating  
12 groundwater for a site that's in the site  
13 remediation program, let's say, we'll do both. We  
14 will do both total and dissolved because to have  
15 both informs as to what's going on, how much  
16 concentrations are in the sediments suspended and  
17 then how much concentrations are dissolved in the  
18 groundwater.

19 **Q. In your testimony I believe you state that**  
20 **the geotechnical permeability testing showed that**  
21 **hydraulic conductivity was 10 to the negative and**  
22 **10 to the negative 4, I'm sorry, 10 to the negative**  
23 **2 and 10 to the negative 4.**

24 **Are those consistent hydraulic**

1 **conductivities for clay?**

2 A. No. That would not -- unless the clay is  
3 awfully sandy, the permeability of clay is going to  
4 be lower than that particular range. Typically  
5 clays would be in terms of centimeters per second  
6 in the 10 to the minus 5 or 10 to the minus 6 or  
7 lower permeability. So, no, that wouldn't be  
8 characteristic of clays.

9 **Q. Has cobalt been detected in MW-10?**  
10 **Monitoring Well 10?**

11 A. I don't recall it being collect or  
12 being -- was it collected or detected?

13 **Q. I'm sorry, detected.**

14 A. Was it detected. I don't believe it's  
15 been detected in MW-10.

16 **Q. Do you know, is MW-10 downgradient of**  
17 **Route 6?**

18 A. Yes.

19 **Q. Then I have one more question. I believe**  
20 **Mr. Rao asked this. I just wanted to make sure it**  
21 **was on the record.**

22 **Did you do a chemical analysis at**  
23 **Joliet 29 Pond 2?**

24 MS. GALE: Objection, vague. Chemical analysis

1 of what at Joliet Pond 2?

2 BY MS. DIERS:

3 **Q. Of the soil, I'm sorry.**

4 A. I'm not aware of any analytical data on  
5 the soil. I've discussed the groundwater data  
6 downgradient of the soil, but the soil itself, I'm  
7 not aware of any analytical testing data done on  
8 the soil of the embankment.

9 MS. DIERS: Okay. No further questions. Thank  
10 you?

11 HEARING OFFICER HALLORAN: Thank you,  
12 Miss Diers.

13 Miss Gale, any redirect?

14 MS. GALE: Nothing from us. Thank you.

15 HEARING OFFICER HALLORAN: Thank you.

16 (Witness excused.)

17 MS. GALE: Can we go briefly off the record?

18 HEARING OFFICER HALLORAN: Sure.

19 (WHEREUPON, a discussion was had  
20 off the record.)

21 HEARING OFFICER HALLORAN: Back on the record.  
22 Everybody looks ready.

23 (WHEREUPON, the witness was  
24 duly sworn.)

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24

THOMAS DEHLIN,

called as a witness herein, having been first duly sworn, was examined and testified as follows:

EXAMINATION

BY MS. GALE:

**Q. Mr. Dehlin, for the record can you please say and spell your name?**

A. Of course. Thomas, T-h-o-m-a-s, Dehlin, D-e-h-l-i-n.

**Q. Mr. Dehlin, I want you to turn to the first tab in Volume 1 of the binders you have in front of you.**

A. Okay.

**Q. What is this?**

A. This is my CV.

**Q. Okay. Mr. Dehlin, what is your educational background?**

A. I have a Bachelor's Degree and Master's Degree both from the University of Illinois at Urbana-Champaign in civil and environmental engineering.

**Q. And what professional licensing do you have?**

A. I'm a professional engineer licensed in



1 the state of Illinois, state of Wyoming and  
2 recently became licensed in the state of Kentucky.

3 **Q. How do you become a professional engineer?**

4 A. Similar to becoming a professional  
5 geologist as Mr. Maxwell indicated, there are  
6 baseline educational requirements and professional  
7 practice requirements. So from the educational  
8 side, it's four years at an ABET accredited  
9 university in engineering, and then also three to  
10 four years of practice under a licensed  
11 professional engineer. The three years being if  
12 you have a master's degree, they count it as a year  
13 of professional practice.

14 **Q. And then did you take a test?**

15 A. Yes. You take two exams. One is called  
16 the fundamentals in engineering exam or FE. As the  
17 name suggested, test you on the fundamentals for  
18 engineering principles. And then you take after  
19 that to get your actual PE license what's known as  
20 the PE exam where you test your proficiency in the  
21 area of engineering that you work to practice. For  
22 example, I took the civil engineering version of  
23 the PE exam.

24 **Q. And now that you're a professional**

1 **engineer, what are your duties and**  
2 **responsibilities?**

3 A. So as a licensed civil engineer, my  
4 primary duties are to understand the behavior of  
5 materials in terms of how they can be used to  
6 construct various things. So that can be  
7 understanding steel for design and steel  
8 structures, concrete for designing concrete  
9 foundations, soil for embankments or as in the case  
10 of Pond 2 here, understanding the HDPE for use as a  
11 liner for waste containment.

12 **Q. As a professional engineer isn't there**  
13 **also an ethical duty?**

14 A. There's an ethical duty. And also one of  
15 our first and foremost responsibilities is to  
16 protect the public.

17 **Q. Mr. Dehlin, who do you work for?**

18 A. I work for Sargent and Lundy. They're an  
19 engineering firm based out of Chicago.

20 **Q. And how long have you worked for Sargent**  
21 **and Lundy?**

22 A. I've worked for Sargent and Lundy since  
23 February of 2014, so just over eight years.

24 **Q. And can you please briefly and generally**

1 **describe what you do at Sargent and Lundy?**

2 A. Sure. So my primary responsibilities  
3 going back to August of 2015 have been various  
4 applications related to federal CCR rule or various  
5 state CCR rules. So I've done everything from  
6 designing new CCR surface impoundments or  
7 retrofitting existing ones, closing CCR surface  
8 impoundments, preparing or overseeing various  
9 compliance demonstrations for compliance with the  
10 various CCR regulations.

11 **Q. I guess I'll ask.**

12 **So for Midwest Generation Joliet 29**  
13 **station, generally speaking, what are you doing?**

14 A. For Joliet 29, I am looking at the ability  
15 to reuse the existing HDPE membrane liner installed  
16 in 2008 so that the Pond 2 which was or I guess is  
17 a CCR surface impoundment can be repurposed for low  
18 volume waste water.

19 **Q. And isn't that part of the closure**  
20 **process?**

21 A. Yes, that is part of the closure process.  
22 So the first part would be obtaining a construction  
23 permit to close Pond 2 which would be removing  
24 above the existing geomembrane liner. There exists

1 two layers that help protect the liner when the  
2 facility used to remove ash from it periodically as  
3 part of regular maintenance practices.

4 It's a 6-inch gravel what they term a  
5 warning layer that warns the excavators as their  
6 removing CCR to proceed no further so they don't  
7 damage the geomembrane. And then there's a 12-inch  
8 thick sand cushion layer that provides additional  
9 protection to the geomembrane. There's a  
10 geotextile between there as well that provides  
11 additional protection. So all of that has to come  
12 out, and then the existing HDPE geomembrane would  
13 be decontaminated.

14 **Q. All right. You want to turn to the first**  
15 **exhibit in your binder which is Exhibit G of the**  
16 **Illinois EPA's recommendation.**

17 A. Okay.

18 **Q. This is your January 18, 2022 report,**  
19 **right?**

20 A. Yes.

21 **Q. And -- I'm sorry.**

22 **In this report what did -- generally**  
23 **speaking, high level, what did you do?**

24 A. The purpose of this report was to document

1 the construction history of Pond 2 at Joliet 29  
2 going back to when it was first constructed in 1978  
3 through the relining process in 2008.

4 **Q. So let's first start talking about the**  
5 **embankments, your first conclusion. Do you see**  
6 **there on Page 2 --**

7 A. Yes.

8 **Q. -- your first conclusion there?**

9 A. So my first conclusion after reviewing the  
10 various construction documentation attached to this  
11 report was that Pond 2's embankments and subgrade  
12 consist of natural earthen materials obtained from  
13 on-site and/or off-site borrow sources.

14 **Q. So turning to Page 2 of 3 of your report,**  
15 **let's talk about that. What documents did you**  
16 **start with in coming to that conclusion?**

17 A. So the original construction of Pond 2 in  
18 1978 is documented in a document referred to as the  
19 History of Construction that was prepared in 2016  
20 by Geosyntec as part federal CCR rule compliance.

21 **Q. Okay. And if you want to turn to that,**  
22 **that's actually Exhibit -- Attachment 1 of your**  
23 **report, right?**

24 A. Correct.

1           **Q.    Specifically, I believe you looked at**  
2 **Sheets 2 and 3?**

3           A.    Of which appendix?

4           **Q.    Appendix --**

5           A.    Are you referring to Sheet 2 as I have  
6 called out in the first line on Page 3 of my  
7 January 18 --

8           **Q.    I am.**

9           A.    -- report?

10          **Q.    Thank you.**

11          A.    So that sheet -- in Attachment 1, that  
12 Sheet 2 is in Appendix A-2 of Attachment 1.

13          **Q.    Yeah.**

14                   **So I thought I had larger copies of it in**  
15 **here because these are rather hard to read, but --**

16          A.    I did bring larger copies of these with  
17 me. Granted it's just the one set, but I can use  
18 that to facilitate the discussion.

19          **Q.    Would that be easier for you to read them?**

20          A.    Yes.

21          MS. GALE: If we can grab those copies. Can we  
22 go off record for a second?

23                   Mr. Halloran, can we go off the record  
24 real quick?

1 HEARING OFFICER HALLORAN: Yes.

2 (WHEREUPON, a short recess was  
3 taken.)

4 MS. GALE: So I'd like to mark this new page as  
5 Exhibit 31 that we can mark that you can take with  
6 you.

7 HEARING OFFICER HALLORAN: Very good.

8 (WHEREUPON, Exhibit No. 31 was  
9 marked for identification.)

10 BY MS. GALE:

11 **Q. Okay. So, Mr. Dehlin, just can you tell**  
12 **us what you're looking at first?**

13 A. Sure. This is a typical cross section  
14 through Pond 2 at Joliet 29 when it was first  
15 constructed in 1978. Typical means that if you  
16 were to look at this cross section anywhere along  
17 the length of the pond, this would be  
18 representative of how the contractor was instructed  
19 to shape the impoundment for the storage of ash.

20 **Q. So based upon this drawing, can you just**  
21 **explain to us the original construction of Pond 2,**  
22 **the Pond 2 embankment specifically?**

23 A. Yes. So based on this drawing, the  
24 contractor was instructed to excavate existing

1 ground which is shown by a dashed line across the  
2 section.

3 Q. Now, are you looking at Section S,  
4 Sheet 2?

5 A. Yes. Thank you. Section S, typical  
6 section through Ash Pond Number 2. So they were  
7 instructed to excavate below existing ground to a  
8 bottom elevation of 516 feet that was to be  
9 approximately 168 feet long. And then the side  
10 slopes for the embankments were to be at a  
11 3-to-1 slope from that elevation 516 up to  
12 elevation 535.

13 Q. Okay. So Sections S and U for pond --  
14 well, what does that -- I guess I'll ask this.

15 What does that tell you about how it was  
16 constructed? What does 3 by 1 you said?

17 A. A 3-to-1 slope refers to a slope that is  
18 3 -- for every 3 feet you go horizontally, you drop  
19 in elevation by 1 foot.

20 Q. Okay. So the original conclusion was that  
21 the embankments were made with natural materials.  
22 How does that inform that conclusion? How does --  
23 excuse me.

24 How does Exhibit 31 inform your



1 **conclusion?**

2 A. So based on what I'm seeing here, material  
3 was removed from the existing ground that was there  
4 at Ash Pond 2, and then it was sloped up to the new  
5 top of the embankment. And you can also see on  
6 Section S here that fill material was placed where  
7 either they had to go up to this design elevation  
8 of 535 or they had to remove unsuitable material.

9 **Q. Okay. So you said fill material, and you**  
10 **started with the original drawings. What other**  
11 **documents did you review for your conclusion that**  
12 **the embankments were not made of CCR material?**

13 A. I looked at soil borings that were drilled  
14 through the embankments dating back to KPRG's  
15 investigation in 2005, Patrick Engineering's  
16 investigation in 2010, 2011 time frame, as well as  
17 Geosyntec's borings that they drilled to prepare  
18 the History of Construction and various other CCR  
19 rule documents.

20 **Q. So I'm gonna pause right there and pull**  
21 **out another diagram. I'll try to make it -- bring**  
22 **it closer.**

23 **Mr. Dehlin, what is this? What is the**  
24 **diagram we're looking at depicting?**

1           A.    This diagram is a plan view of all of the  
2 borings that Geosyntec used to prepare their  
3 History of Construction and various other CCR rule  
4 compliance documents that show the locations of  
5 borings that were drilled as part of the  
6 aforementioned KPRG investigation, Patrick  
7 Engineering investigation and Geosyntec's own  
8 investigation.

9           **Q.    Mr. Dehlin, can you turn to Attachment 2**  
10 **of your Exhibit G? What is --**

11           A.    Okay.

12           **Q.    What is it?**

13           A.    It is the same figure as shown here on the  
14 larger board.

15           **Q.    All right. I want to ask you Board**  
16 **Question Number 11. That should be in front of**  
17 **you?**

18           A.    Yes. Okay.

19           **Q.    Footnote Number 6 of Midwest Generation's**  
20 **response to the Agency's recommendation states that**  
21 **Geosyntec collected the boring samples from 2015,**  
22 **but were not available. Please clarify whether the**  
23 **boring logs have been located since the filing of**  
24 **Midwest Gen's response. If so, submit the logs**

1 **into the record.**

2 **Mr. Dehlin, can you clarify?**

3 A. Yes. The logs are in the record, so I'll  
4 start with the logs first.

5 **Q. Okay.**

6 A. Those are in an attachment to the next few  
7 pages after the boring location plan. The first  
8 boring is labeled JB1 and then the next is JB2.

9 **Q. To clarify, the Geosyntec map that's in**  
10 **Attachment 2 and on this board, that locates each**  
11 **of the boring logs taken on the embankments,**  
12 **correct?**

13 A. Yes, that's correct. JP1 -- I'm sorry.  
14 JB1 is located in that eastern corner, and then JB2  
15 is located in the southern southwestern embankment.

16 **Q. And as part of your opinion you reviewed**  
17 **each of those boring logs?**

18 A. Yes.

19 **Q. And, generally speaking, to your**  
20 **recollection what did the boring logs show?**

21 A. The boring logs identified various fill  
22 materials as well as the native soils that the  
23 embankments are founded on. In general, the  
24 Geosyntec borings as provided in Attachment 2 here

1 show primarily clay fill, silty gravel with sand  
2 fill, and then gravel with silt and sand as the  
3 uppermost native soil there.

4 **Q. To your recollection, in reviewing those**  
5 **boring logs, was any ash identified in the logs?**

6 A. No ash was identified in the boring logs.

7 **Q. Are you sure not the top foot in 2005?**

8 A. For the -- I'm sorry. I was referring to  
9 the Geosyntec borings.

10 **Q. Oh, I'm sorry, collectively, the 2005**  
11 **boring logs you looked at, the 2011 boring logs you**  
12 **looked at, and the 2015 boring logs you looked at.**

13 A. Of all the borings that are shown on this  
14 map, the only locations where CCR was identified  
15 was in the upper foot of two borings drilled by  
16 KPRG, not in the primary fill material of the  
17 embankments. The material was identified in the  
18 aggregate roadway, so that the upper foot.

19 **Q. So what do you mean by aggregate roadway?**

20 A. Aggregate is constructed primarily with  
21 crushed rock. I believe it's referred to as  
22 Illinois Department of Transportation Gradation CA6  
23 which is a specific gradation type for a course  
24 aggregate material. So it's not CCR aggregate.

1 It's just like rock material.

2 **Q. So in your opinion what is -- what is the**  
3 **bottom ash that was the top foot in those KPRG**  
4 **borings?**

5 A. If I had to speculate in my opinion, it's  
6 likely just ash material that came off onto the  
7 roadway during handling perhaps during excavation  
8 of the CCR. I don't think it was intentionally  
9 placed there.

10 **Q. So the roadway, where -- that you're**  
11 **talking about, where is it?**

12 A. The roadway is around the perimeter of  
13 Pond 2. So looking at this plan of the borings  
14 here, the roadway would be just north of Ash Pond 2  
15 on the crest of the embankment. That elevation 535  
16 that I referenced, that's where it would be, and it  
17 goes around the perimeter of Pond 2.

18 **Q. Thank you.**

19 **Mr. Dehlin, if ash were used as fill**  
20 **material in construction of Pond 2, in your expert**  
21 **opinion what would you have expected to see?**

22 A. I would have expected to see it identified  
23 on the boring logs.

24 **Q. You also reviewed the expert opinion of**

1 **Mr. Mike Maxwell, correct?**

2 A. I did.

3 **Q. And we just heard Mr. Maxwell's opinion**  
4 **that the groundwater data does not indicate the**  
5 **presence of CCR in the proximity of Pond 2?**

6 A. Correct.

7 **Q. And his opinion is actually attached as**  
8 **Attachment 5 of your report, right?**

9 A. Correct.

10 **Q. How does Mr. Maxwell's conclusions inform**  
11 **your opinion here?**

12 A. Given Mr. Maxwell's conclusion that the  
13 groundwater at the site doesn't indicate the  
14 presence of CCR fill material in the embankments,  
15 that further supports my conclusion that it is  
16 highly unlikely that CCR fill material was used to  
17 construct the embankments for Pond 2.

18 **Q. Great. Thank you.**

19 **I want to turn to discussing the**  
20 **Poz-O-Pac.**

21 A. Okay.

22 **Q. Which will be on Page 2 of your report.**

23 A. Okay.

24 **Q. So we were here, and we heard**

1 **Dr. Radlinski talk about Poz-O-Pac. What is your**  
2 **understanding of Poz-O-Pac?**

3 A. Poz-O-Pac, the way I understand it, it's  
4 similar to concrete. You have -- it ends up -- you  
5 have an aggregate filler material, and then you  
6 have the lime that's similar to cement that's used  
7 in making concrete that causes a reaction and  
8 causes it to bind to create this concrete-like  
9 substance.

10 **Q. And I think you have it detailed here on**  
11 **Page 5 of your report. What was the -- Pond 2,**  
12 **what was the Poz-O-Pac composed of?**

13 A. The Poz-O-Pac mixture consisted of 3  
14 percent hydrated lime, so water mixing with lime,  
15 20 percent fly ash, and 77 percent boiler slag  
16 aggregate.

17 **Q. In your third bullet you say, has a**  
18 **minimum of seven days curing time. What does**  
19 **curing time mean?**

20 A. Curing with respect to cementitious  
21 materials like this or like concrete, it allows the  
22 material to harden, to gain strength, to form into  
23 that -- I forget where the sample went, but that  
24 material that you brought with today, to end up

1 becoming that form.

2 Q. And -- well, I'll just ask it. I think  
3 you answered it already.

4 Why is curing time important?

5 A. Curing time is important because you need  
6 to gain strength, and you have to gain that final  
7 solid form.

8 Q. So once the curing time is finished, what  
9 happens to the boiler slag in the Poz-O-Pac?

10 A. It becomes encapsulated within that  
11 Poz-O-Pac matrix. It's held together by that  
12 cementitious reaction between the fly ash and the  
13 hydrated lime. Or pozzolanic reaction, I  
14 apologize.

15 Q. And you rely here on Page 5, you mention  
16 the Federal Highway Administration, excuse me,  
17 Federal Highway Administration's User Guidelines.

18 A. Yes.

19 Q. Why were those important to you?

20 A. These were important to me because my  
21 understanding is the primary use of Poz-O-Pac or a  
22 similar type of substance was as a base material  
23 for roadways, and so this would be of interest for  
24 the Federal Highway Administration to document its



1 use across the United States and what typical  
2 standards were.

3 So what I did is I reviewed the user  
4 guidelines to see how the Poz-O-Pac mixture that  
5 was used as Pond 2 here for the liner would compare  
6 to what they refer to as PSB mixtures or pozzolan  
7 stabilized base mixtures just to make sure that the  
8 proportion of components was within what the FHWA  
9 has documented in their guidelines.

10 **Q. What did you conclude based on that?**

11 A. I concluded that the Poz-O-Pac liner that  
12 was installed at Pond 2, its compositions were in  
13 line with FHWA guidelines.

14 **Q. All right. Moving on, in 2007, for**  
15 **Midwest Generation, what did Midwest Generation**  
16 **initiate?**

17 A. They initiated a systematic relining  
18 program at its four power plants, so including  
19 Joliet 29. They looked at their CCR surface  
20 impoundments at Powerton in Pekin, the Waukegan  
21 generating station in Waukegan, and then the nearby  
22 Will County Generating Station in Romeoville.

23 **Q. And they engaged an engineer to do this?**

24 A. Correct.

1           **Q.    What did the engineer for the project**  
2 **initially think about the Pond 2 Poz-O-Pac liner?**

3           A.    My understanding is that the engineer  
4 tasked with this designing this relining program,  
5 implementing this relining program, assumed that  
6 the Poz-O-Pac liner would not have been in good  
7 condition, it would have been in bad condition, and  
8 therefore would have had to have been replaced  
9 prior to relining, for example, the Pond 2 at  
10 Joliet 29, relining it with an HDPE geomembrane  
11 liner.

12           **Q.    The original plan was to remove the**  
13 **Poz-O-Pac, right?**

14           A.    Correct.

15           **Q.    But what happened when Midwest Gen**  
16 **dewatered Pond 2 and removed the ash?**

17           A.    They found the Poz-O-Pac liner to be in  
18 better than anticipated condition so far as to say  
19 good condition.

20           **Q.    How do you know this?**

21           A.    Based on photographic records that I've  
22 attached to my January report and my March report,  
23 as well as changes that were made in the design  
24 drawing process. We were fortunate enough to have

1 draft drawings likely submitted to Midwest  
2 Generation for comment as part of the design  
3 process, and at some point in the design process,  
4 the drawings changed a note that had previously  
5 instructed the contractor to remove the --

6 **Q. Let me stop you there.**

7 A. Yes.

8 **Q. So we can go to Attachment 6 of your**  
9 **report --**

10 A. Okay.

11 **Q. -- which has those drawings.**

12 A. Okay.

13 **Q. So let's start again.**

14 **You compared -- what is this Attachment 6?**

15 A. So this Attachment 6 is a draft drawing  
16 that was prepared by the engineer that was tasked  
17 with the systematic relining program for the  
18 Midwest Generation CCR surface impoundments,  
19 Natural Resource Technology. This specific drawing  
20 is titled, Sheet Number C020, liner subgrade  
21 preparation ash impoundment liner design, and it  
22 covers both Pond 2 and Pond 1.

23 **Q. And the date is May 4, 2007, right?**

24 A. The -- yes. The draft date would have

1 been May 4, 2007.

2 **Q. Okay. What did you look on this drawing**  
3 **to in your opinion?**

4 A. So on this drawing where it says  
5 Ash Impoundment 2 in the middle of the pond, there  
6 are various triangles with numbers in them. Those  
7 triangles represent contractor notes, and those  
8 notes are listed below Ash Impoundment 2 just above  
9 where the drawings says, not for construction.

10 The note of interest here is Note 5 which  
11 states, contractors shall remove existing liner  
12 from impoundments and dispose at an approved  
13 landfill. And existing liner here would have  
14 referred to the Poz-O-Pac liner that was installed  
15 in 1978.

16 **Q. Okay. Can you turn to Attachment 7?**

17 A. Okay.

18 **Q. Attachment 7 is the technical**  
19 **specifications for Ash Pond 2, right?**

20 A. Yes, this is correct. I did note in my  
21 report that these technical specifications are  
22 labeled as Draft 4, Midwest Generation review.  
23 However, based on my comparison of as-built  
24 drawings and the construction records that were

1 submitted by the contractor to Midwest Generation,  
2 I do not believe any significant updates were made  
3 to these technical specifications insofar as to say  
4 I believe these to be representative of how the  
5 contractor was to construct the impoundment.

6 **Q. Okay. Attached to it are drawings, and**  
7 **hopefully in yours there are some that are in large**  
8 **form with a paper clip?**

9 A. They are.

10 **Q. So what is this?**

11 A. Is there a drawing --

12 **Q. I'm sorry, the large ones. So I'm looking**  
13 **at --**

14 A. The --

15 **Q. -- Ash Pond 2 Liner Replacement**  
16 **Sheet C020?**

17 A. Okay. So this drawing, Sheet C020, is a  
18 updated, revised version of the drawing that we  
19 just looked at that was labeled draft and would  
20 have been issued to Midwest Generation for review.  
21 The date on this drawing appears to be August 2 of  
22 2007, and the revision note suggests that it was  
23 issued for bid. So this would have been the  
24 drawing that would have been submitted to the

1 contractors bidding on the relining work.

2 **Q. And what does this tell you about what was**  
3 **done with the Poz-O-Pac?**

4 A. So when I reviewed the contractor notes on  
5 this revised version of Sheet Number C020, I noted  
6 that the previous Note 5 which instructed the  
7 contractor to remove the Poz-O-Pac liner was  
8 replaced by a different note that had nothing to do  
9 with removing the existing Poz-O-Pac liner. And  
10 upon reviewing the nine contractor notes that were  
11 submitted on this bid version of the document, I  
12 did not see an indication that the Poz-O-Pac liner  
13 was to be removed.

14 **Q. I want you to turn to Attachment 8 of your**  
15 **report.**

16 A. Okay.

17 **Q. What is this?**

18 A. Attachment 8 is two field change requests,  
19 also commonly referred to in the industry as change  
20 orders that contractors will submit when they  
21 encounter conditions that weren't specified on the  
22 design drawings, technical specifications or that  
23 they would otherwise have thought to be aware of.

24 **Q. Okay. And what is Attachment 8? What do**

1 **the field change requests tell us?**

2 A. So field change request Number 1 was  
3 submitted by the contractor, Brieser Construction.  
4 Brieser is B-r-i-e-s-e-r. This first one was with  
5 respect to nine marker posts that were to be  
6 installed at the bottom of the pond. These marker  
7 posts serve as warning posts and also level  
8 indicators to indicate how far above the liner the  
9 ash and water was stored. Brieser noted here on  
10 field change request Number 1 that the nine parker  
11 post required drilling into bedrock in lieu of  
12 soil. Drilling into rock requires specialized  
13 equipment and more time. We will hire a  
14 subcontractor for this work.

15 Based on my review of the boring logs that  
16 are shown here on the board, bedrock is not  
17 encountered at the elevation that the marker posts  
18 were to be installed. The marker posts were to be  
19 installed at the base of the pond. So I interpret  
20 this bedrock to be the Poz-O-Pac liner that they  
21 encountered.

22 And, furthermore, the fact that they  
23 are -- they're calling it bedrock is telling me  
24 that it was still in good condition, intact, and

1 they required special equipment to have to drill  
2 into it to install these nine marker posts for the  
3 reliner work at Pond 2.

4 Q. Yeah.

5 I'm gonna turn to Board Question Number 1.

6 A. Okay.

7 Q. I'll read it into the record. Please  
8 elaborate on why Midwest Generation decided to  
9 retain the Poz-O-Pac liner in Pond 2 during the  
10 installation the HDPE liner in 2008. Comment on  
11 the remaining estimated life span of the current  
12 Poz-O-Pac liner. If the Poz-O-Pac liner is  
13 required to be removed, would that also require the  
14 disposal of the HDPE liner?

15 A. So to answer the first part of the  
16 question, my understanding is that Midwest  
17 Generation decided to retain the Poz-O-Pac liner  
18 because they found it to be in good condition.  
19 Regarding the remaining estimated life span of the  
20 current Poz-O-Pac liner, I'm not sure of an exact  
21 estimate. I would say that given the Poz-O-Pac  
22 liner was found to be in good condition in 2008  
23 when it was re -- when it was covered with the new  
24 HDPE geomembrane liner, the design conditions



1 haven't changed at the pond since other than the  
2 purpose of this project is to no longer use it for  
3 CCR, just use it for low volume waste water, and  
4 the fact that's been covered with the HDPE  
5 geomembrane liner, in my opinion I don't think the  
6 Poz-O-Pac has added a significant risk of  
7 deterioration. I would expect it I guess to be in  
8 similar condition now, 14 years later, as it was  
9 when they installed the HDPE liner in 2008 after it  
10 had been in place for 30 years.

11 **Q. And last question, if the Poz-O-Pac liner**  
12 **is required to be removed, would that also require**  
13 **disposal of the HDPE liner?**

14 A. Yes. The HDPE liner is installed over the  
15 Poz-O-Pac liner. So to get to the Poz-O-Pac liner,  
16 you would have to remove that liner. You would  
17 also have to remove the HDPE geomembrane liner.

18 **Q. Great.**

19 **Now I want to turn to Board Question**  
20 **Number 7.**

21 A. Okay.

22 **Q. I'll read it into the record.**

23 **The Agency states the Poz-O-Pac liner**  
24 **material is known to crack substantially over time,**

1 so it is likely the Poz-O-Pac liner damaged -- it  
2 is likely the Poz-O-Pac is damaged because the use  
3 conditions, the nature of the liner, and should be  
4 removed, citing the Agency recommendation at  
5 Page 10 through 11.

6 First of all, do you have a response to  
7 that conclusion by the Agency?

8 A. So based on what I had just said based on  
9 the photographs that I've reviewed of the subgrade  
10 when it was relined, the fact that the Poz-O-Pac is  
11 no longer exposed to the elements, it's covered  
12 with an HDPE geomembrane liner, it's found to be in  
13 good condition, that's why it was left in place, I  
14 disagree with this statement that the Poz-O-Pac  
15 liner was damaged because of the conditions and the  
16 nature of the liner.

17 Q. So Question 7A from the Board, is it  
18 possible to determine the integrity of the  
19 Poz-O-Pac liner without removing the HDPE liner?

20 A. If you wanted to perform some sort of  
21 integrity testing today, you would have to damage  
22 the HDPE liner.

23 Q. Okay. Question 7B, if not, comment on how  
24 Midwest Generation can ensure integrity of the

1 **Poz-O-Pac liner other than relying on groundwater**  
2 **monitoring.**

3 A. I think the construction history and in  
4 photograph evidence that I submitted with my  
5 reports supports that the Poz-O-Pac liner was in  
6 good condition when it was -- prior to the HDPE  
7 liner being installed. And then since it's been  
8 covered with this HDPE liner, it's not exposed to  
9 the elements, and it's that similar operating  
10 conditions as had been in place for 30 years prior  
11 to being relined.

12 **Q. I want to turn to Board Question 14.**

13 A. Okay.

14 **Q. On Pages 8 through 9, the Federal Highway**  
15 **Association's report, Exhibit C I believe of the**  
16 **Agency's recommendation, states that crack control**  
17 **has been a prime concern for many state agencies**  
18 **when using PSB mixtures.**

19 **Question 14A, please comment on whether**  
20 **Midwest Generation has similar concerns about the**  
21 **use of Poz-O-Pac liners.**

22 A. I think given the successful history that  
23 Midwest Generation has had with Poz-O-Pac liners,  
24 particularly here at Pond 2, I would say we do not

1 have similar concerns with the use of Poz-O-Pac  
2 liners.

3 **Q. Question 14B, how has Midwest Generation**  
4 **ensured that Poz-O-Pac liners have not been damaged**  
5 **or started cracking?**

6 A. So couple things here, again, going back  
7 to the construction history that I referred to a  
8 few times here, Poz-O-Pac was found to be in good  
9 condition in 2008 prior to the liner being  
10 installed. The HDPE liner has since been installed  
11 covering the Poz-O-Pac liner, so it's not subject  
12 to the elements.

13 If the Poz-O-Pac liner was significantly  
14 damaged or started cracking to the point that it  
15 might compromise the HDPE geomembrane liner, then I  
16 think that's something we would have also seen in  
17 the groundwater monitoring results if there was an  
18 issue with the performance of the liner system at  
19 Pond 2 since 2008.

20 **Q. I think we touched on this, but there's an**  
21 **important detail I want to ask. So you said if the**  
22 **original plan was to -- you know, we said that they**  
23 **changed the plan to not remove the liner, and**  
24 **that's because in your opinion it was in good**

1 **condition.**

2 **They were gonna lay over an HDPE liner**  
3 **over this, right?**

4 A. Correct.

5 **Q. So how does the plan of putting an HDPE**  
6 **liner inform your opinion of the Poz-O-Pac?**

7 A. I would expect the Poz-O-Pac to be in good  
8 condition just based on them deciding to leave it  
9 in place, to place an HDPE liner over it, because  
10 you can't place HDPE liner over subgrade that isn't  
11 relatively smooth. Yes, you're gonna have some  
12 small particles, but they can't be especially  
13 large. They can't be sharp. Significant  
14 deviations in subgrade could lead to situations  
15 where the liner could get punctured, and that would  
16 compromise the integrity of the liner.

17 So when you're installing it and during  
18 that installation process, there's subgrade  
19 specification criteria, and that was specified in  
20 the technical specifications that we can revisit  
21 that are meant to ensure that the liner isn't  
22 damaged during the installation process.

23 **Q. We will revisit those in just a second.**

24 A. Okay.

1           **Q.    Mr. Dehlin, are you familiar with the**  
2 **construction of Ponds 1 and 3 at Joliet 29?**

3           A.    Yes.

4           **Q.    And what is -- generally speaking, what is**  
5 **their construction?**

6           A.    It's similar to Pond 2, earthen  
7 embankments around the area used to store ash, and  
8 then they were initially lined with Poz-O-Pac  
9 liners 12 inches thick, same as Pond 2.

10          **Q.    In your expert opinion would your opinion**  
11 **of the Poz-O-Pac in Pond 2 apply also to Ponds 1**  
12 **and 3?**

13          A.    Given that they were installed around the  
14 same time, despite having not seen the same like  
15 photographic evidence that I've looked at for  
16 Pond 2, it would lead me to believe that they would  
17 have been in similar condition.  In especially  
18 Ponds 1 and 2, they're very similar in size, they  
19 were operated the same, so yes.

20          **Q.    Now I do want to talk about the subgrade.**

21          A.    Okay.

22          **Q.    So let's go to Page 7 of your report.**

23          A.    Okay.

24          **Q.    So here, Mr. Dehlin, you're talking about**

1 **the preparation of the subgrade for Pond 2, right?**

2 A. Correct.

3 **Q. What is the purpose of your examination**  
4 **here?**

5 A. The purpose of the examination is to  
6 confirm what I alluded to that the subgrade was  
7 appropriately prepared before the HDPE geomembrane  
8 liner was installed so far as to say that there  
9 weren't conditions that would have been present  
10 that could have caused the liner to be punctured,  
11 for example, or otherwise damaged during  
12 installation, but with respect to placing it onto  
13 the subgrade.

14 **Q. So that's the subbase.**

15 **Didn't they also have to do some work on**  
16 **the embankments?**

17 A. Yes, per the specifications, specifically  
18 Section 02300, Article 305.

19 **Q. Do you want to go to it?**

20 A. Yes. Yeah.

21 **Q. What -- we're going to Attachment 7,**  
22 **right?**

23 A. Yes, that's correct.

24 **Q. So we're looking at Attachment 7, and I**

1 believe here on -- well, fortunately we have a  
2 Bates Number here.

3 A. Yes.

4 Q. So we have Midwest Gen 13-15 underscore,  
5 what number you at?

6 A. 18696.

7 Q. Thank you.

8 Okay. So can you tell us what you see  
9 here and how it forms your opinion?

10 A. Sure. So Article 305 is titled, Liner  
11 Subgrade. Paragraph A states, liner subgrade  
12 surface shall be graded to 3 horizontal to  
13 1 vertical, that's the 3H to 1V or 3-to-1 I  
14 referenced earlier, along side slopes or as  
15 approved by the owner and/or engineer. The base of  
16 the impoundment subgrade surface shall not exceed a  
17 1 percent slope to be relatively flat.

18 So pausing here, what I had noted  
19 comparing these specifications for relining the  
20 embankments to the original construction of the  
21 embankments, going back to -- I forget what exhibit  
22 Number this was.

23 Q. 31.

24 A. 31, thank you.



1           Section S on Exhibit 31 calls for 3-to-1  
2 or 3 horizontal to 1 vertical side slopes for the  
3 original embankment construction. So the way I  
4 read these technical specifications is that minor  
5 regrading work was anticipated by the engineer to  
6 reline the pond. Essentially what they would have  
7 to do is smooth out the existing embankment  
8 material prior to installing the liner.

9           **Q. And did any of that material include CCR?**

10          A. No, it did not.

11          **Q. Okay. I want you to turn back to**  
12 **Attachment 8.**

13          A. Okay.

14          **Q. So you just said it didn't include CCR.**  
15 **What does that Attachment 8 tell us?**

16          A. So Attachment 8, specifically field change  
17 request Number 2, so that's the field change  
18 request after the first one that we just discussed  
19 submitted by Brieser Construction April 17, 2008.  
20 That date is important. The description of the  
21 field change request is written as follows.

22                 Bottom of Ash Pond Number 2 has unsuitable  
23 material that has been deposited in the pond. The  
24 material will not dry out. It needs to be removed.

1 We have estimated that 1200 cubic yards of material  
2 may have to be removed.

3 And based on my calculations of the pond  
4 bottom, I calculate that would be approximately  
5 6 inches of material.

6 **Q. Okay. So you said material will not dry**  
7 **out and needs to be removed. I think you said**  
8 **it -- my brain is losing focus. What does that**  
9 **mean to you?**

10 A. This means that material that was on the  
11 bottom of Pond 2 when the HDPE liner was to be  
12 placed would not have served as suitable subgrade  
13 material for the liner to be installed on. Based  
14 on what's being stated here, it's material that was  
15 very wet and can dry out. You would not install --  
16 it's not recommended to install an HDPE liner on  
17 wet material that will not dry out.

18 **Q. Why don't you turn to Attachment 9? I**  
19 **think this will help me here wherever I want to go.**

20 A. Okay.

21 **Q. What is that?**

22 A. These are job invoices that were submitted  
23 by Brieser Construction to Midwest Generation  
24 for -- throughout the project. Specifically these

1 are related to the material that was addressed in  
2 field change request Number 2.

3 **Q. And the third one actually is the earliest**  
4 **one dated April 17, '08?**

5 A. Correct.

6 **Q. What's the description of the work?**

7 A. So the description of the work shown in  
8 the left column here, it says, push coal residue  
9 into piles. So the unsuitable material that is  
10 referenced in field change request Number 2, also  
11 dated April 17, 2008, referring to unsuitable  
12 material, and then looking at these job invoices  
13 tells me that that was CCR material that was above  
14 the Poz-O-Pac liner that was deemed unsuitable to  
15 be used as subgrade to support the HDPE liner and  
16 therefore had to be removed.

17 This first job invoice that we are  
18 discussing, Job Invoice 35549, is that first step  
19 of pushing the CCR material on the bottom of the  
20 pond into piles.

21 **Q. Okay. So actually I have Exhibit 11 as a**  
22 **picture, a large picture here. Let me put it up on**  
23 **the easel. This isn't exactly Exhibit 11. It's**  
24 **close.**

1           **So in your report you reference**  
2 **Exhibit 11. This is similar to it. We're looking**  
3 **at a large picture which is actually Exhibit 1 of**  
4 **your March 2022 report, but this is the same**  
5 **picture as Exhibit 11, right? With your notations?**

6           A. Yes, that's correct.

7           **Q. Okay. And what does Exhibit 11 tell you?**

8           A. Exhibit 11 shows the installation of the  
9 new geomembrane liner on the existing Poz-O-Pac and  
10 the embankments for Pond 2. So if I could actually  
11 step up.

12           **Q. Please do. Please, for the record, please**  
13 **describe what you're pointing out.**

14           A. Yes, absolutely. So this board photograph  
15 is looking northeast, so this would be the  
16 southernmost embankment that this photograph is  
17 showing. So we're looking northeast on the  
18 southern embankment. This shows kinds of a  
19 step-by-step construction procedure of how the  
20 geomembrane line was installed at Pond 2.

21           So the background shows the white  
22 geomembrane liner being installed over this black  
23 fabric. This black fabric is a nonwoven geotextile  
24 which serves as a cushion material, additional

1 insurance to protect against damage to the  
2 geomembrane liner when it's installed. This black  
3 fabric or geotextile as you can see on the  
4 foreground of the photograph here is being  
5 installed directly over the pond subgrade. And  
6 pond subgrade based on my review of this photograph  
7 is a dark brown sand and gravel material.

8           And then just to comment on the condition  
9 of the Poz-O-Pac liner, you can see on the left  
10 side of this photograph the Poz-O-Pac here on the  
11 pond floor; and based on my review of this  
12 photograph, I'm not seeing any significant cracking  
13 or damage or ruts or something that would be  
14 inappropriate to install an HDPE geomembrane liner  
15 on.

16           **Q. Okay. Great. Thank you.**

17           **Okay. We are done with Volume 1. We can**  
18 **move on to Volume 2.**

19           A. Okay.

20           **Q. Okay. First off, Volume 2 is Exhibit 28**  
21 **of Midwest Generation's response?**

22           A. Okay.

23           **Q. And this is your March 24, 2022 report,**  
24 **right?**

1           A.     Correct.

2           **Q.     Generally speaking, what was the purpose**  
3 **of this report?**

4           A.     The purpose of this report was to respond  
5 to two items in the Agency's recommendation that  
6 the Illinois Pollution Control Board not allow  
7 Midwest Generation to use the existing HDPE  
8 geomembrane liner in Pond 2.  Specifically those  
9 two items, and I'll read them here from Page 1 of  
10 my report, is the Agency's claim that Midwest  
11 Generation knowingly used CCR material, including  
12 coal ash or black silty gravel, as structural fill  
13 or foundational backfill in the 2008 construction  
14 of Pond 2's current HDPE liner system without  
15 meeting the Agency's coal combustion byproduct or  
16 CCB for beneficial reuse.

17                     The second claim that I investigated here  
18 and responded to was the implication that Pond 2's  
19 existing HDPE geomembrane liner has suffered  
20 degradation due to its exposure to the elements.

21           **Q.     Okay.  We'll get to that.**

22                     **So for this part in your -- oh, there it**  
23 **is.  After your report is Exhibit A which is Lauren**  
24 **Hunt's affidavit.  Can you just go ahead and pull**

1 that out of your affidavit? We'll be referencing  
2 both at the same time.

3 A. Yes. Okay.

4 Q. Can you please turn to Paragraph 19 of her  
5 affidavit?

6 A. Okay.

7 Q. So please read it to yourself, and then  
8 I'll ask you some questions?

9 A. Okay.

10 Q. All right. So I guess this is the second  
11 sentence where she states the black silty gravel,  
12 I'm sorry, second sentence --

13 (Reporter clarification.)

14 BY MS. GALE:

15 Q. The side slope of the impoundment subgrade  
16 is compacted black to dark brown silty gravel.

17 Do you see that there?

18 A. I do.

19 Q. And then she continues and says,  
20 potentially the aforementioned black silty gravel  
21 or unconsolidated Poz-O-Pac?

22 A. Yes, I see that.

23 Q. Okay. And then I want -- I'm saying this  
24 because I want to break this down eventually. And

1 then later on she states at the end, the black  
2 silty gravel described in the History of  
3 Construction and shown in the picture of the  
4 construction of Pond 2's HDPE liner, likely  
5 contains fly ash and/or bottom ash to which Midwest  
6 Gen has not provided evidence to the contrary.

7 A. Yes, I see that.

8 Q. So first question, she says to which  
9 Midwest Gen has not provided evidence to the  
10 contrary. Do you agree with that statement?

11 A. I disagree with that statement.

12 Q. Yeah, why is that?

13 A. Just the boring logs that have been  
14 submitted in the record alone do not indicate that  
15 the presence of CCR material as primary fill other  
16 than the two instances that were noted by KPRG in  
17 2005 where it was found in the upper foot in the  
18 road base material.

19 Q. Okay. Great.

20 And then the sentence I said earlier about  
21 the side slope of the impoundment subgrade is  
22 compacted black to dark brown silty gravel, she  
23 cites to Exhibit G, Attachment 11. That's your  
24 photo that we just discussed, right?



1 A. Yes.

2 Q. Yeah.

3 What do you think of her interpretation of  
4 your picture, Attachment 11, in your Exhibit G?

5 A. I disagree with that interpretation. I  
6 interpret it to be a dark brown material, gravel  
7 and sand material. And I, in fact, what I did find  
8 was another photograph that I submitted in my March  
9 report.

10 Q. We can get those out. They're right  
11 behind there.

12 A. So I do just want to call everyone's  
13 attention to the bottom of this marker post. Here  
14 the photograph -- this is labeled Photograph P1.  
15 The photograph that I'm gonna show is a zoomed in  
16 version focused on the bottom of the marker post  
17 here and then along the base just south of the  
18 geotextile fabric.

19 So this shows some better lighting  
20 admittedly because it's a closer picture. From  
21 looking at this, I'm seeing, as I had mentioned,  
22 dark brown sand and gravel material. I'm not  
23 seeing black CCR or material that I would presume  
24 to be CCR. Admittedly, it is darker here at the

1 bottom, but based on my analysis of this  
2 photograph, that appears to be related to moisture.

3 And there's a third photograph I can bring  
4 up that shows the condition of the subgrade two  
5 days, I believe, yes, two days below -- before this  
6 photo was taken. So this is the condition of the  
7 subgrade on April 28, 2008. The other two photos  
8 we looked at were taken April 30, 2008. And this  
9 is the picture -- the subgrade after rainfall. So  
10 presumably that material that we looked at that was  
11 darker near the marker post is just moisture in the  
12 material as a result of the rainfall, hence the  
13 darker color.

14 **Q. So just to clarify, these photos, these**  
15 **blow-up photos, are Attachment 1 to your March 22**  
16 **report?**

17 A. I know I attached them on my March 22  
18 report. Let me verify that that's --

19 **Q. Go ahead.**

20 A. -- the correct attachment.

21 Yes, it is Attachment 1.

22 **Q. Great.**

23 **Okay. So I want to go back to looking at**  
24 **Paragraph 19 where she's talks about the History of**

1 Construction -- the black silty gravel in the  
2 History of Construction. Do you see that last  
3 line -- last sentence of her Paragraph 19?

4 A. Yes, I do.

5 Q. And the History of Construction was  
6 actually attached to your first report, right?

7 A. Correct.

8 Q. That's what we just looked at. So you  
9 might want to -- yeah. So she's looking at Page 5  
10 of the History of Construction.

11 A. In Volume 1?

12 Q. Volume 1.

13 A. Okay.

14 Q. What section is this page -- do you see  
15 where it says black silty gravel on Page 5?

16 A. Yes, I do.

17 Q. What section is this -- is that black  
18 silty gravel within?

19 A. This is within Section 2.6.1 of the  
20 History of Construction which is titled,  
21 Engineering Properties.

22 Q. What is the engineering properties section  
23 about?

24 A. Engineering properties are properties of

1 interest to determine how these materials would  
2 behave when, for example, Pond 2, specifically when  
3 used as construction materials for the embankments.  
4 So when Geosyntec in 2016 prepared the factor of  
5 safety assessment as required by the federal CCR  
6 rule, to do that evaluation they would have had to  
7 known the properties of the materials that were  
8 used to construct the embankments.

9 So this section summarizes what material  
10 properties they used, what fill materials they used  
11 to the embankments to model how the embankments  
12 would perform in various operational cases.

13 **Q. But it's not the soil description section,**  
14 **is it?**

15 A. No, it is not.

16 **Q. That's in Section 2.5, correct?**

17 A. Yes.

18 **Q. And in Section 2.5, what does it state**  
19 **about the soil, the description of the soil around**  
20 **Pond 2?**

21 A. Foundation materials in the vicinity of  
22 Ash Pond 2 vary from clay to sand and gravel with  
23 Silurian dolomite as a bedrock layer at  
24 approximately 40 feet below the embankment crests.

1           **Q.    Okay.  And can you please turn to**  
2           **Section 3 of the History of Construction which is**  
3           **the references section?**

4           A.    Yes.

5           **Q.    Related to the soil in this report, what**  
6           **did they rely upon?**

7           A.    So looking through these references, they  
8           would have relied upon their own investigation in  
9           2016, soil properties calculations, their, I  
10          apologize, KPRG's 2005 investigation which was  
11          discussed earlier today, and then Patrick  
12          Engineering's 2011 soil investigation which was  
13          also discussed earlier today.

14          **Q.    So the same three boring logs we've**  
15          **discussed already, correct?**

16          A.    Correct.

17          **Q.    And in your recollection what was found in**  
18          **those three boring logs, not three, but same three**  
19          **reports of boring logs?**

20          A.    A variety of embankment fill materials,  
21          gravel, sands, clays, natural earthen materials.  
22          No ash was identified as primary fill materials in  
23          those borings.

24          **Q.    Great.  Thank you.**

1           Continuing with Miss Hunt's affidavit, I  
2 want you to look at Paragraph 21?

3           A.    Okay.

4           Q.    So read that through, and then we'll talk  
5 about it.

6           A.    Okay.

7           Q.    So here she states, Midwest Gen removed  
8 between 1 to 3 feet of black silty gravel and/or  
9 Poz-O-Pac along the internal side slopes and then  
10 reused that black silty gravel to rebuild the side  
11 slopes. Is that accurate?

12          A.    That is not accurate.

13          Q.    Before we get into that, can you just turn  
14 to Paragraph 22 and 23?

15          A.    Okay.

16          Q.    And read through those?

17          A.    Okay.

18          Q.    And then I want to go to -- here her  
19 conclusions are about removing the topographic  
20 contours from Pond 2 embankments, and she relies on  
21 Appendix A-3 of the History of Construction. Same  
22 thing with Paragraph 23, she looks at the History  
23 of Construction where she states Midwest Gen had  
24 knowledge of the nature of the CCR material being

1 reused prior to construction and knowingly  
2 reutilized the CCR materials for geotechnical  
3 applications.

4 Do you agree with those conclusions?

5 A. I do not agree with those conclusions.

6 Q. So let's start talking about why. I want  
7 you to turn back to the History of Construction.

8 A. Okay.

9 Q. And the reason I want you -- what -- I  
10 guess I'll say this.

11 When she makes those conclusions, she's  
12 looking at Exhibit D, Attachment 3. That's the  
13 History of Construction, right?

14 A. Yes.

15 Q. Okay. So let's turn back to that. I  
16 swore it was attached to this. So you there?

17 A. Yes.

18 Q. Actually, I want you to go to Attachment 3  
19 of the History of Construction.

20 A. Appendix A-3 or --

21 Q. I'm sorry, Appendix A-3.

22 A. Yes, I am there.

23 Q. What does Appendix A-3 show?

24 A. Appendix A-3 shows -- it's titled, Liner

1 Replacement Construction Drawings. These look like  
2 versions of the design drawings that NRT, Natural  
3 Resource Technology, the engineer for the project,  
4 prepared for the relining work. They appear to be  
5 the bid drawings looking at the revision histories  
6 and the various drawings in this appendix.

7 **Q. Okay. So it's the bid drawings. As a**  
8 **professional engineer, what map -- I guess I'll ask**  
9 **this.**

10 **As the bid drawings, when were those**  
11 **drawn, before or after construction?**

12 A. Before construction.

13 **Q. Okay. As a professional engineer, what**  
14 **maps should you use to evaluate construction of a**  
15 **surface impoundment?**

16 A. When looking at a project like this, the  
17 first thing that I would use to see what was  
18 actually constructed is what's referred to as an  
19 as-built plan. What that is and as its name  
20 implies, it's how the impoundment was actually  
21 constructed. So when that will -- when that plan  
22 is prepared is after construction. A surveyor will  
23 come in after all the elements of the project have  
24 been completed. So that would be the HDPE geomembrane



1 liner is installed, and the sand cushion and gravel  
2 warning layers are then placed over that. Surveyor  
3 come in, survey the pond area, and that represents  
4 the as-built condition of the pond.

5 **Q. And was an as-built map available in the**  
6 **History of Construction?**

7 A. Yes, it was.

8 **Q. Where is it?**

9 A. Appendix A-4, the next appendix after  
10 these design drawings that we were just looking at  
11 in Appendix A-3.

12 **Q. All right. So let's turn to Page 3 of**  
13 **your report where we can talk about the as-built.**

14 A. The March report?

15 **Q. March, I'm sorry. You're right. Page 3**  
16 **of Exhibit 28, your March 28 report -- March 24**  
17 **report.**

18 A. Okay.

19 **Q. So in response to Miss Hunt's conclusion**  
20 **that CCR material was reused prior to construction,**  
21 **what did you look at?**

22 A. I compared the as-built survey that was  
23 prepared for Pond 2 construction to the existing  
24 conditions that were surveyed prior to

1 construction. And based on what I found there is  
2 that there was -- most of the significant regrading  
3 work occurred in the -- what I term the eastern  
4 corner of the pond.

5 Q. So I think we have it blown up as well?

6 A. Yes.

7 Q. So let's get that so everyone can see it.

8 For the record, I'll be showing you Attachment 5 of  
9 Exhibit 28 which is an as-built drawing.

10 So a preliminary question, though, when we  
11 looked -- I guess maybe we didn't. But the  
12 as-built that I looked at before in the History of  
13 Construction under Appendix A-4, it looks different  
14 than what I'm looking at here, right?

15 A. Yes, that's correct.

16 Q. Why?

17 A. So the relining project to Joliet 29 was  
18 done in two phases. The first phase was to reline  
19 Pond 2. After they reline Pond 2, they went and  
20 relined Pond 1. The survey that's shown in the  
21 History of Construction is the first version of  
22 this survey which is the as-built for just Pond 2  
23 cause Pond 1 had not been relined yet.

24 This version of that as-built survey shows

1 Pond 1 included in it with the Pond 2 as-built.  
2 However, the survey information shown on here for  
3 Pond 2 is the same as the survey information that  
4 was shown on the as-built plan in Appendix A-4 of  
5 the History of Construction for Pond 2.

6 Q. Great.

7 So -- and I invite you to stand up for my  
8 next question.

9 A. Okay.

10 Q. So looking at the as-built of Pond 2, what  
11 did the subcontractor -- what did you conclude the  
12 subcontractor had to do to the subgrade?

13 A. So when I compared this final as-built  
14 condition to the existing conditions that were  
15 present, I noted that there appears to have been  
16 what I refer to as this cut area as that material  
17 had to be removed from the eastern, northeastern  
18 portion of this embankment to smooth it out to  
19 relatively 3-to-1, 3 horizontal to 1 vertical side  
20 slopes.

21 On the northwestern or western embankment  
22 here, I also noted that the upper several feet had  
23 similar work done that they had to cut away  
24 material to smooth it out that it was relatively

1 steep.

2 Q. And you said, again, you said 3-to-1. Can  
3 you just tell us what that means?

4 A. Yes.

5 Q. Where was it originally and where did it  
6 have to go to?

7 A. So originally, particularly in this  
8 eastern area of interest where I noted the existing  
9 conditions prior to the lining were relatively  
10 steep, these were -- I forget exactly if it was  
11 1-to-1, but it was pretty steep. For example, a  
12 1-to-1 is, you know, 1 horizontal by 1 vertical, a  
13 45-degree angle.

14 So what they would have had to do to make  
15 that material shallower is they would have come in  
16 and cut along the top to make that a shallower  
17 angle, so a 3-to-1, so 3 horizontal to 1 vertical.  
18 So every 3 feet you go horizontally, you change in  
19 elevation by 1 foot vertically.

20 Q. You said it was 1-to-1 at first, a  
21 45-degree angle. What does that tell you about the  
22 soil that had -- that maintained that slope?

23 A. So soils of that kind of slope tend to  
24 have cohesive properties, so clays, in other words,

1 in order to retain that kind of natural -- it's not  
2 a natural angle of repose, but in order to maintain  
3 that and be stable, you have to have some sort of  
4 cohesiveness in the material. So that told me the  
5 material of the embankment was clay.

6 **Q. Could CCR maintain that slope?**

7 A. In my opinion, no, based on discussions  
8 that we've had here today about the nature of CCR  
9 tends to be bottom ash, for example, sandier. The  
10 natural angle of repose for sandier materials like  
11 that is in the range of 30 degrees, certainly not  
12 45 degrees.

13 **Q. So you said that you had to cut off the**  
14 **top of the slope to make it a -- what's it? Less**  
15 **steep?**

16 A. Shallower.

17 **Q. Shallower, thank you.**

18 **And what did the contractor -- I believe**  
19 **you said -- what did the contractor do with the**  
20 **clay cut from the top?**

21 A. So I don't know for sure what the  
22 contractor did with the clay material from the top.  
23 I didn't see that in the construction records.  
24 Typically what gets done in these situations is

1 that material will get used elsewhere. If it's not  
2 used elsewhere in the project, it would be  
3 stockpiled for later use.

4 Based on the photographs that I've seen  
5 and some of the cut material that's being shown  
6 here on the comparison of the as-built construction  
7 to the existing conditions prior to relining, it's  
8 my opinion that that material would have been cut  
9 down into the base of the pond and then just  
10 smoothed over on top of the Poz-O-Pac because you  
11 don't want to -- well, one, you don't want to have  
12 sharp changes in grade, and, two, the  
13 specifications at the pond bottom had to be  
14 relatively flat.

15 So in my opinion the contractor would have  
16 taken that cut material and smoothed it over the  
17 top of the Poz-O-Pac liner to get that relatively  
18 flat subgrade.

19 **Q. Okay. I believe in here we have the**  
20 **technical specifications about that. Let's turn to**  
21 **the Attachment 6 of Exhibit 28.**

22 A. Okay.

23 **Q. And these are the same technical**  
24 **specifications we discussed early every, right?**

1 A. Yes.

2 Q. Yeah. So can you turn to Bates

3 Number MWG 13-1518697?

4 A. Okay.

5 Q. At the top of that page, Section 3.05,  
6 which is liner subgrade, B, what does that tell  
7 you?

8 A. Paragraph B states, contractor shall  
9 prepare the liner subgrade by clearing and grubbing  
10 vegetation and removing rocks and other debris  
11 greater than 3 inches in diameter alongside slopes  
12 and base of the impoundment and excavating at least  
13 18 inches of existing ramp surface material.

14 That first part with respect to what we  
15 just discussed tells me that material that would  
16 have posed risk to the HDPE geomembrane liner's  
17 integrity when it was installed was removed from  
18 the embankment, was removed from the floor at  
19 present, and certainly would not have been placed  
20 along the floor if -- to avoid puncturing the liner  
21 when it was installed.

22 Q. Can you please also look to Paragraph F on  
23 that same page?

24 A. Yes. Paragraph F states, the surface of

1 the subgrade shall be to the satisfaction of the  
2 owner and/or engineer and geomembrane installer,  
3 graded so it is free of irregularities,  
4 protrusions, loose soil and abrupt changes in  
5 grade. Rocks with sharp intrusions and rocks or  
6 other debris greater than 3 inches in any dimension  
7 shall be removed.

8 So that further builds off of Paragraph B  
9 where that the subgrade would have been relatively  
10 smooth when the liner was placed on it.

11 **Q. And just to clarify, the geotextile went**  
12 **first, right?**

13 A. Yes. I apologize. There was a 16-ounce  
14 per square yard nonwoven geotextile that was  
15 installed over the subgrade prior to the HDPE  
16 geomembrane liner being installed.

17 **Q. But not to belabor the point, even with**  
18 **that geotextile they had to make sure that subgrade**  
19 **was free of sharp -- what was the word? Sharp**  
20 **protrusions and rocks, right?**

21 A. Yes. Correct, because you could have a  
22 situation where that would damage the geotextile or  
23 could damage the geotextile. So damaged  
24 geotextile, it's not going to perform its function



1 for the geomembrane, so yes.

2 Q. So, Mr. Dehlin, in your opinion reviewing  
3 the photos in Attachment 1 and the as-built drawing  
4 which is in Attachment 5 and also within the  
5 History of Construction as Appendix A-4 and the  
6 invoices, the technical specifications, was CCR  
7 used as fill in Pond 1?

8 A. No. I think it is highly unlikely that  
9 CCR was used as fill in Pond 2, I think is what you  
10 meant to ask.

11 Q. I'm sorry. I said Pond 1. I meant  
12 Pond 2. Thank you for answering correctly.

13 I'm gonna go to Board Question Number 3.

14 A. Okay.

15 Q. I'll read it into the record. Please  
16 comment on whether Midwest Gen can provide evidence  
17 that shows any use of CCR in construction of the  
18 existing liner system in Pond 2 was done under  
19 beneficial use requirements of the act and that it  
20 does not pose a risk to groundwater quality now or  
21 in the future if left in place.

22 A. I believe based on what we just  
23 demonstrated, that CCR was not used in the  
24 construction of the embankments for Pond 2 or for

1 the liner system.

2 Q. And since CCR wasn't used, were there any  
3 requirements for beneficial use under the act?

4 A. No.

5 Q. Okay. Mr. Dehlin, in your opinion, is any  
6 additional testing required of the embankments of  
7 the soil of in the embankments such as a shake  
8 test?

9 A. No. In my opinion based on the materials  
10 that have been identified in the boring logs, that  
11 would not be necessary.

12 Q. And why?

13 A. The boring logs indicate the primary fill  
14 materials for the embankments in Pond 2 to be  
15 gravels, sands, clays, natural earthen materials,  
16 not CCR.

17 Q. Great.

18 Mr. Dehlin, I also want to ask you about  
19 how to sample the Poz-O-Pac which as the Agency  
20 suggests. Agency suggests collecting three  
21 separate samples. How would that work?

22 A. I think it would follow a similar  
23 procedure as was done to extract the sample that  
24 was brought here today that Mr. -- I believe

1 Mr. Gnat testified to that was extracted from  
2 Will County. You would bring in a vehicle, the  
3 backhoe with a core -- concrete core mounted to it.  
4 You would go down the access ramp at Pond 2 into  
5 the pond floor and you would start coring.

6 You'd have to go through the 6-inch gravel  
7 warning layer, 12-inch sand layer. You would then  
8 puncture the geotextile above the HDPE geomembrane  
9 liner, the HDPE geomembrane liner itself, the  
10 geotextile under the liner, and then get into the  
11 actual Poz-O-Pac material.

12 **Q. Okay. So you drill through all those**  
13 **layers. Now you have a hole in the HDPE liner,**  
14 **right?**

15 A. Correct.

16 **Q. What's your opinion about that?**

17 A. I think based on what we've demonstrated  
18 here today, that is an unnecessary action to  
19 intentionally damage the liner to test the  
20 Poz-O-Pac that we have demonstrated is in good  
21 condition. Therefore, if we don't think the  
22 integrity test is needed, I don't see a need to  
23 intentionally damage the liner to get to that.  
24 Cause then once you damage the liner, you have to

1 remove all that material that you just cored  
2 through and then patch the liner in those three  
3 spots. I just don't think that that's necessary  
4 based on the evidence that we have.

5 MS. GALE: Mr. Halloran, can we go off the  
6 record for a second?

7 HEARING OFFICER HALLORAN: Yes, Miss Gale, you  
8 may we're off the record.

9 (WHEREUPON, a discussion was had  
10 off the record.)

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

13 We decided that we're going to adjourn for  
14 today and continue this matter until tomorrow,  
15 June 29, 2022, at 9:00 a.m.

16 Safe travels thank you.

17 (WHEREUPON, proceedings were  
18 continued to June 29, 2022, at  
19 9:00 a.m.)

20

21

22

23

24

1 STATE OF ILLINOIS )  
2 ) SS:  
3 COUNTY OF C O O K )  
4

5 RAELENE STAMM being first duly sworn, on  
6 oath says that she is a court reporter doing  
7 business in the City of Chicago; and that she  
8 reported in shorthand the proceedings of said  
9 hearing, and that the foregoing is a true and  
10 correct transcript of her shorthand notes so taken  
11 as aforesaid, and contains the proceedings given at  
12 said hearing.

13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24

---

Certified Shorthand Reporter

<p style="text-align: center;"><b>A</b></p> <p><b>A-2</b> 174:12</p> <p><b>A-3</b> 214:21 215:20 215:21,23,24 217:11</p> <p><b>A-4</b> 217:9 218:13 219:4 225:5</p> <p><b>A-l-l-e-n-s-t-e-i-n</b> 25:9</p> <p><b>a.m</b> 1:19 228:15 228:19</p> <p><b>ABET</b> 169:8</p> <p><b>abilities</b> 73:14</p> <p><b>ability</b> 171:14</p> <p><b>able</b> 28:4,13,14 35:21 91:24 127:1</p> <p><b>above-entitled</b> 1:13</p> <p><b>abrupt</b> 224:4</p> <p><b>absence</b> 10:4 118:15,18 137:15 138:16 138:17,21,22 160:10 161:17 161:18 162:8</p> <p><b>absolutely</b> 204:14</p> <p><b>acceptable</b> 155:18</p> <p><b>accepted</b> 40:20</p> <p><b>access</b> 227:4</p> <p><b>accommodating</b> 95:20</p> <p><b>accompany</b> 47:2</p> <p><b>account</b> 156:6</p> <p><b>accounted</b> 158:16</p> <p><b>accounting</b> 35:11</p> <p><b>accredited</b> 169:8</p> <p><b>accuracy</b> 155:14</p> <p><b>accurate</b> 54:6 55:6 56:8 129:14 141:17 156:1 214:11,12</p> <p><b>acetate</b> 28:12</p> <p><b>acid</b> 56:18 57:2 108:20</p>	<p><b>acidic</b> 108:11,12</p> <p><b>acidified</b> 56:23</p> <p><b>acquired</b> 14:15</p> <p><b>acres</b> 19:18</p> <p><b>act</b> 5:22 99:6,7 225:19 226:3</p> <p><b>action</b> 105:14 113:23 124:8 227:18</p> <p><b>active</b> 8:24 37:4</p> <p><b>acts</b> 78:5 82:4</p> <p><b>actual</b> 73:11 161:14 169:19 227:11</p> <p><b>add</b> 87:20 148:22</p> <p><b>added</b> 120:18 126:16 135:5 193:6</p> <p><b>addition</b> 83:16 121:21</p> <p><b>additional</b> 9:20 56:24 110:19 120:17 127:9 161:4 172:8,11 204:24 226:6</p> <p><b>address</b> 72:10</p> <p><b>addressed</b> 5:15 203:1</p> <p><b>adequacy</b> 105:8</p> <p><b>adequate</b> 137:11</p> <p><b>adjacent</b> 107:4 144:18</p> <p><b>adjourn</b> 228:13</p> <p><b>adjusted</b> 1:6 5:7 5:20 7:6</p> <p><b>ADM</b> 1:7,9</p> <p><b>Administration</b> 131:7 184:16,24</p> <p><b>Administration's</b> 184:17</p> <p><b>administrator</b> 48:7,12</p> <p><b>admitted</b> 4:18 5:17 67:6,8</p> <p><b>admittedly</b> 209:20</p>	<p>209:24</p> <p><b>advance</b> 28:11</p> <p><b>advanced</b> 30:18 109:4</p> <p><b>adverse</b> 98:18</p> <p><b>aerial</b> 19:8</p> <p><b>affidavit</b> 15:6 29:15,18 36:6,11 44:12 52:5 130:8 133:5,9 134:16 139:12 141:2 146:23 148:19 156:20 163:4,8,17,20 206:24 207:1,5 214:1</p> <p><b>affinities</b> 126:17</p> <p><b>aforementioned</b> 178:6 207:20</p> <p><b>aforsaid</b> 229:11</p> <p><b>agencies</b> 195:17</p> <p><b>agency</b> 2:16 5:13 22:8,10 41:9 49:14 62:20,23 63:7,11 67:3 72:20 105:14 131:9 144:4 149:9,17 156:24 193:23 194:4,7 226:19,20</p> <p><b>Agency's</b> 11:22 18:21 58:8 72:17 76:8 81:10 117:3 138:12 148:19 150:24 178:20 195:16 206:5,10 206:15</p> <p><b>aggregate</b> 8:17 76:17 80:8,8,11 80:23,23 81:18 82:7 84:24 90:20 180:18,19 180:20,24,24 183:5,16</p>	<p><b>ago</b> 17:16 23:24 77:18 80:14 82:2 88:15</p> <p><b>agree</b> 113:6 133:16 140:17 157:6,11 208:10 215:4,5</p> <p><b>agreed</b> 7:14 9:17 141:5</p> <p><b>agreement</b> 22:6 52:21 55:19 63:15 112:1 113:5 164:19</p> <p><b>ahead</b> 206:24 210:19</p> <p><b>air</b> 86:2 99:6 100:10</p> <p><b>aliquot</b> 153:19</p> <p><b>allegation</b> 98:14 144:14</p> <p><b>alleged</b> 153:7</p> <p><b>Allenstein</b> 3:7 9:7 24:18 25:1,6,8 25:10 26:4,24 27:18 29:13 31:11 32:5 38:24</p> <p><b>allow</b> 206:6</p> <p><b>allowed</b> 114:24</p> <p><b>allows</b> 129:12 156:3 183:21</p> <p><b>alluded</b> 199:6</p> <p><b>alongside</b> 223:11</p> <p><b>alphanumeric</b> 39:8</p> <p><b>alters</b> 81:15</p> <p><b>ambiguity</b> 59:16</p> <p><b>ambiguous</b> 59:9</p> <p><b>amorphous</b> 131:16</p> <p><b>amount</b> 102:24 136:5,20 137:11</p> <p><b>analogous</b> 80:21</p> <p><b>analogy</b> 76:22 77:1</p>	<p><b>analysis</b> 26:10,12 54:16 57:6 58:1 58:14 59:7 60:9 60:23 61:7 92:5 92:9,13 104:17 106:15,17,19,20 124:1 140:2,4,15 145:10 147:2,12 149:1,24 151:8 152:18 154:14 155:6,21 158:17 161:4 162:7 166:22,24 210:1</p> <p><b>analytical</b> 34:2,3 46:17 62:24 63:7 121:15 167:4,7</p> <p><b>analyze</b> 9:16 47:6 161:5,22</p> <p><b>analyzed</b> 10:6,8 10:11 33:20 41:14 49:19 53:4 66:19 94:17,23</p> <p><b>Anand</b> 2:4 6:3 83:5</p> <p><b>ancillary</b> 7:7</p> <p><b>and/or</b> 123:6 160:24 165:3 173:13 200:15 208:5 214:8 224:2</p> <p><b>Andrew</b> 37:23</p> <p><b>angle</b> 220:13,17 220:21 221:2,10</p> <p><b>annual</b> 63:20 113:22 120:2</p> <p><b>anomalous</b> 61:24</p> <p><b>anomaly</b> 62:13</p> <p><b>answer</b> 17:7,21 18:5 42:5 62:21 62:23 63:22 64:24 73:15 81:7,21,22,22 82:1,11,20,24</p>
--	---	--	---	--

86:15,21,24 88:17,18 90:2 91:24 92:2,11,15 93:11,20 110:16 111:2,23 113:2 138:19 151:6 192:15 <b>answered</b> 116:7 184:3 <b>answering</b> 225:12 <b>answers</b> 11:24 12:1 83:17 84:4 84:5 <b>anticipated</b> 186:18 201:5 <b>anybody</b> 47:4 59:23 68:1,13 73:22 85:17 95:17 109:14 <b>anymore</b> 82:16 <b>anyway</b> 68:3 <b>apologize</b> 63:6 109:19 184:14 213:10 224:13 <b>appear</b> 40:18 63:15 216:4 <b>appearance</b> 40:7 <b>APPEARANCES</b> 2:1 <b>appears</b> 62:6 113:13 189:21 210:2 219:15 <b>appendices</b> 124:11 <b>appendix</b> 174:3,4 174:12 214:21 215:20,21,23,24 216:6 217:9,9,11 218:13 219:4 225:5 <b>applicable</b> 151:11 151:12 162:8 164:17 165:6 <b>application</b> 70:9 120:4 126:12	128:13 <b>applications</b> 69:10 70:10 75:8,15,16 79:3 79:12 171:4 215:3 <b>applied</b> 11:4 94:1 <b>apply</b> 139:17,20 140:3,4 198:11 <b>appreciate</b> 6:4 95:18 <b>approach</b> 124:6,8 <b>appropriately</b> 5:24 199:7 <b>approval</b> 18:21 21:7 112:21 <b>approve</b> 112:23 <b>approved</b> 52:16 188:12 200:15 <b>approximate</b> 17:9 <b>approximately</b> 19:17 23:14 67:22 176:9 202:4 212:24 <b>April</b> 201:19 203:4,11 210:7,8 <b>aquifer</b> 144:23,24 146:13,14 147:18 163:24 <b>area</b> 36:18 65:17 107:4,6 133:21 169:21 198:7 217:3 219:16 220:8 <b>areas</b> 69:19 <b>argument</b> 144:3 <b>arranged</b> 155:15 <b>array</b> 104:18,24 161:15 <b>arsenic</b> 61:5,7,10 61:13 119:1 121:22 122:20 123:2 126:18 128:9 138:15 <b>article</b> 85:18,22	199:18 200:10 <b>as-built</b> 11:9 188:23 216:19 217:4,5,13,22 218:9,12,22,24 219:1,4,10,13 222:6 225:3 <b>ash</b> 7:21,24 8:6,15 8:20,21 9:10 16:1,3,5,6,16,16 16:17 18:18 20:9,14 27:24 28:1,2,17,21 29:1,2 32:14,21 32:21 34:1,2 36:18 37:4 38:17,20 39:19 39:22,22 40:5,6 41:22 65:16 70:23,24 72:21 72:21 73:1,2,17 73:21,24 75:9 76:5,12,16 77:7 77:9,16,17,22 78:3,9,12,15 79:1,2,8,10,17 79:18,23,24 80:9 80:12,13 81:2,13 81:15 82:10,11 82:12,12,15,16 82:18 83:6,9,22 84:1 85:10,15,15 85:20 86:3,8 88:6 89:20 90:1 91:5,18,19 94:5 110:2,4 121:4,5 133:11,18,23 134:1 139:2 151:21 172:2 175:19 176:6 177:4 180:5,6 181:3,6,14,19 183:15 184:12 186:16 187:21 188:5,8,19	189:15 191:9 198:7 201:22 206:12 208:5,5 212:22 213:22 221:9 <b>aside</b> 65:16 <b>asked</b> 9:15 18:23 59:1 88:15 103:20 166:20 <b>asking</b> 77:12 83:12 92:22,24 92:24 111:19 <b>assessed</b> 148:2 150:16 <b>assessment</b> 37:10 51:14 120:18,21 212:5 <b>assessments</b> 69:7 100:8 <b>assign</b> 35:9 <b>assigned</b> 5:5 <b>associated</b> 119:2 139:2 149:10 <b>Associates</b> 10:13 25:11 43:10 51:1 <b>Association's</b> 195:15 <b>assume</b> 59:10 <b>assumed</b> 186:5 <b>assuming</b> 92:21 162:3 <b>assumption</b> 87:10 <b>ASTM</b> 131:20 <b>attached</b> 46:17 57:1 71:13 126:21 161:13 163:3,7,16 164:3 173:10 182:7 186:22 189:6 210:17 211:6 215:16 <b>attachment</b> 30:14 33:2 103:8,15 130:19,23	173:22 174:11 174:12 178:9 179:6,10,24 182:8 187:8,14 187:15 188:16 188:18 190:14 190:18,24 199:21,24 201:12,15,16 202:18 208:23 209:4 210:15,20 210:21 215:12 215:18 218:8 222:21 225:3,4 <b>attack</b> 79:7 <b>attain</b> 162:6 <b>attained</b> 98:24 <b>attended</b> 127:20 <b>attention</b> 209:13 <b>attorney</b> 2:6 6:4 <b>attorneys</b> 5:10 6:17 <b>attributable</b> 114:5 115:21 <b>attribute</b> 116:11 <b>attributed</b> 108:12 126:2 <b>audits</b> 100:11 <b>auger</b> 26:18 <b>August</b> 44:14 47:19,20 171:3 189:21 <b>autoCAD</b> 143:16 <b>available</b> 28:15 68:1 72:5 95:18 120:8 152:20 178:22 217:5 <b>Avenue</b> 2:19 <b>average</b> 145:18,22 145:23 <b>avoid</b> 12:11 103:11 223:20 <b>aware</b> 21:22 85:7 144:8 152:23 153:2 167:4,7
--	---	--	--	---

190:23	<b>ball</b> 74:6	<b>bearing</b> 74:6	<b>bidding</b> 190:1	62:19,20 81:5
<b>awfully</b> 166:3	<b>barium</b> 121:23	<b>becoming</b> 169:4	<b>big</b> 138:23	83:2,6 88:12
	122:20 123:2	184:1	<b>Bill</b> 7:17 13:6	89:6 110:6,7
	138:15	<b>bedrock</b> 33:9	<b>billing</b> 35:12	111:7 113:8
<b>B</b>	<b>bark</b> 139:11	108:15 191:11	<b>billion</b> 61:21	138:9 142:15
<b>B</b> 4:17 116:6	<b>barometer</b> 61:11	191:16,20,23	<b>bind</b> 183:8	147:14 149:7
143:5,10 144:2	<b>barrier</b> 145:4	212:23	<b>binder</b> 12:5 15:5	151:15 178:14
163:3,7,16,20	<b>base</b> 164:9 184:22	<b>began</b> 9:3 36:24	29:14 36:6	178:15 179:10
164:3 223:6,8	185:7 191:19	135:19,22	46:15 52:4	191:16 192:5
224:8	200:15 208:18	<b>beginning</b> 93:5	54:12 97:2	193:19 194:17
<b>B-MW10</b> 40:14	209:17 222:9	<b>behalf</b> 2:14,22	103:11 113:18	195:12 204:14
<b>B-MW3</b> 40:13	223:12	6:18 91:12	130:7 133:7,8	206:6 225:13
<b>B-MW4</b> 40:13	<b>based</b> 75:7,16	<b>behave</b> 212:2	172:15	<b>Board's</b> 5:19,22
<b>B-MW5</b> 40:13	76:1 85:21	<b>behavior</b> 170:4	<b>binders</b> 12:3	12:1 18:3 63:23
<b>B-r-i-e-s-e-r</b> 191:4	94:12 100:1	<b>belabor</b> 224:17	168:11	<b>boiler</b> 8:17 72:21
<b>Bachelor's</b> 97:8	105:16 115:18	<b>belief</b> 134:19	<b>binding</b> 126:17	74:13,14,16 76:6
168:18	115:22 120:24	<b>believe</b> 13:4 18:5	<b>binds</b> 81:17,20	76:20 80:11,12
<b>back</b> 20:7 33:1	121:2 128:18	42:1 53:7 75:6	<b>biologists</b> 100:6	80:17,24 81:24
41:24 42:20	132:3 133:20	77:11 78:18	<b>bit</b> 62:1 70:13,18	82:2 91:5
47:20 50:10	140:15 148:24	89:21 107:14	71:1 73:18 74:6	183:15 184:9
57:11 61:2 62:3	159:20 160:14	109:3 116:5	80:17 81:23	<b>book</b> 39:3 151:1
67:17 85:4 90:7	170:19 175:20	118:3 128:21	143:14 156:3	<b>borders</b> 106:13
95:16,22 96:10	175:23 177:2	131:7 135:4	159:1,5	<b>boring</b> 11:13 26:5
104:6 108:6	185:10 186:21	140:18 147:5	<b>black</b> 28:16 33:7	26:7 27:16 28:3
117:13 133:9	188:23 191:15	158:6,14 160:7	33:19 40:7	28:10,11,20 31:5
146:22 162:18	194:8,8 197:8	160:16 161:9	41:13 49:18	31:9,13,14,18
162:21 167:21	202:3,13 205:6	165:19 166:14	66:18 75:9	32:4,11,24 33:3
171:3 173:2	205:11 210:1	166:19 174:1	94:16,22 129:3	33:11 40:1,17
177:14 196:6	218:1 221:7	180:21 189:2,4	129:15 130:22	41:4 108:3,24
200:21 201:11	222:4 225:22	195:15 198:16	131:1,21 132:1	109:3,24 110:2,4
210:23 215:7,15	226:9 227:17	200:1 210:5	133:11 134:19	130:5 134:2,5,6
228:11	228:4	221:18 222:19	160:12,13	134:7 140:16
<b>backed</b> 134:8	<b>baseline</b> 97:18,19	225:22 226:24	204:22,23 205:2	150:7,12 178:21
<b>backfill</b> 206:13	98:10 169:6	<b>beneath</b> 146:2	206:12 207:11	178:23 179:7,8
<b>background</b> 97:7	<b>basic</b> 99:7	149:15 164:9,10	207:16,20 208:1	179:11,17,20,21
113:17 115:3	<b>basically</b> 57:2	<b>beneficial</b> 85:19	208:22 209:23	180:5,6,11,11,12
124:3,11 126:7,9	71:23 99:5	206:16 225:19	211:1,15,17	181:23 191:15
126:19 168:17	112:3 155:22	226:3	214:8,10	208:13 213:14
204:21	156:2	<b>benefits</b> 79:2	<b>blank</b> 58:2	213:18,19
<b>backhoe</b> 65:18	<b>basin</b> 110:14	<b>benzyltoluene</b>	<b>blend</b> 75:9	226:10,13
227:3	<b>basis</b> 10:7 105:23	53:7	<b>blow-up</b> 210:15	<b>borings</b> 9:8,11,20
<b>backwash</b> 20:24	121:14 143:18	<b>better</b> 62:21 64:10	<b>blown</b> 218:5	9:22,24 10:2
<b>bad</b> 186:7	165:10	186:18 209:19	<b>board</b> 1:1,15 2:4,5	26:9 28:4,9
<b>bag</b> 45:19	<b>Bates</b> 200:2 223:2	<b>bid</b> 189:23 190:11	5:4 6:1,16 7:11	29:11 30:12,17
<b>bags</b> 45:18	<b>bear</b> 103:18	216:5,7,10	17:3,8,19,22	30:22 31:1
<b>baking</b> 77:6				



37:12,14,14,22	<b>Box</b> 2:20	<b>burned</b> 7:20	76:10,12,13,23	40:4,23 41:2
37:22 39:11,18	<b>Bradley</b> 1:14 2:3	<b>burning</b> 27:23	77:1 191:23	44:24 47:22,23
40:3,11,13,14,22	5:2	72:22 74:19	<b>calls</b> 201:1	48:4 52:2 53:13
100:19 107:3	<b>brain</b> 202:8	<b>burns</b> 7:17	<b>cap</b> 102:6	53:18,21 54:2,10
123:24 129:18	<b>brand</b> 77:23 78:6	<b>business</b> 229:7	<b>career</b> 98:19	54:14,18 55:7,12
129:24 130:4	<b>breach</b> 87:19	<b>buy</b> 84:18	100:22	59:3,19,22 72:12
177:13,17 178:2	<b>break</b> 81:21 135:1	<b>byproduct</b> 71:1	<b>case</b> 8:17 44:7	72:12,17,20 76:9
178:5 179:24	162:15,16	74:18,19 206:15	62:5 69:17	76:11,12 81:20
180:9,13,15	207:24		70:12,17,22,22	81:23 85:20
181:4,13 213:23	<b>bridge</b> 70:10,16	<b>C</b>	71:11,14,15	88:6 90:22,24
<b>boron</b> 102:20,22	<b>briefly</b> 100:3	<b>C</b> 74:9 116:6	75:11,20 76:3,20	91:4 100:17,18
103:1 105:24	167:17 170:24	195:15 229:3	77:18,21 78:1	101:1,2,6,11,18
113:15 115:7,12	<b>Brieser</b> 191:3,4,9	<b>C-S</b> 29:5	80:10,17 81:2	101:23 102:15
115:17 118:8,10	201:19 202:23	<b>C020</b> 187:20	85:23 87:1,3	102:19 104:11
120:14,21 121:2	<b>bring</b> 26:15	189:16,17 190:5	89:24 90:18	104:11 105:10
121:4,16 122:20	174:16 177:21	<b>CA6</b> 180:22	91:4 93:23	105:12,15 108:6
123:2 138:15	210:3 227:2	<b>Cahill</b> 123:21	115:4 126:23	108:7 110:17,17
160:10	<b>broad</b> 79:12	<b>cake</b> 77:1,2,6	170:9	111:4,4,14,24
<b>borrow</b> 173:13	<b>broadly</b> 69:5 70:4	<b>calcium</b> 77:24	<b>cases</b> 212:12	112:5,6,10,15
<b>bottle</b> 46:5,6,7,10	72:14 75:13	78:1,1,6 80:1,2	<b>category</b> 132:6	113:21 115:1,1
46:11,12 49:8,10	79:5 93:17 94:5	83:24 84:12	<b>cation</b> 128:7,14	118:8,22 119:2
59:7 61:6	<b>brought</b> 31:18	85:1 87:24 88:8	<b>cations</b> 126:17,21	119:13 120:5,6
<b>bottles</b> 45:11,15	32:10 183:24	126:15	<b>cause</b> 1:13 116:6	121:3,6 122:23
45:20,24 46:5	226:24	<b>calculate</b> 202:4	218:23 227:24	123:3 125:24,24
47:9 157:2	<b>brown</b> 2:5 6:3	<b>calculations</b> 202:3	<b>caused</b> 11:3	126:5 132:22,23
160:1	23:3 28:19	213:9	199:10	132:24 133:1
<b>bottom</b> 8:20 16:3	31:21 32:14	<b>calibration</b>	<b>causes</b> 183:7,8	134:12,20,20
16:5,6 18:19	40:7 129:14	155:13 156:9	<b>causing</b> 147:9	136:24 137:15
20:9,14 27:24	130:21 131:21	<b>California</b> 71:7	<b>CCA</b> 44:24 47:21	138:14,15,18
28:17,21 29:1	205:7 207:16	<b>call</b> 13:3,6 24:16	47:24 52:23	139:8 140:11
32:14,21 33:8	208:22 209:6,22	24:18 34:13,15	53:4 54:9 55:17	151:17,19,21,23
39:22 40:6	<b>brownish</b> 74:11	42:11,13 50:12	55:19 56:9	152:5,8,15,19
72:21 91:19	<b>BTEX</b> 53:7	93:12 96:12	60:13 61:7	160:10,13,15,18
150:17 151:21	<b>bucket</b> 84:18,20	115:2 127:15	63:20,22 111:13	164:22,22 171:4
176:8 181:3	<b>build</b> 12:20	209:12	111:17,18,19,22	171:5,6,7,10,17
191:6 201:22	<b>building</b> 1:17	<b>called</b> 1:14 8:4	112:24 164:17	172:6 173:20
202:4,11 203:19	79:22	13:14 18:12	164:19	177:12,18 178:3
208:5 209:13,16	<b>builds</b> 224:8	25:2 34:19 43:2	<b>CCB</b> 206:16	180:14,24 181:8
210:1 221:9	<b>built</b> 8:8 11:7	50:17 59:1 68:6	<b>CCR</b> 7:11 8:7,24	182:5,14,16
222:13	135:3,4,9	70:18,19 77:24	9:23 10:4,10,24	185:19 187:18
<b>bound</b> 8:18 82:21	<b>bullet</b> 183:17	96:16 101:9	11:14 12:18,19	193:3 201:9,14
82:22 84:2 88:7	<b>Bulson</b> 57:21	108:18 126:14	12:20 18:3 21:2	203:13,19
88:20 89:3	<b>burden</b> 92:19	168:2 169:15	22:23 23:12	206:11 208:15
<b>boundary</b> 122:8	93:8	174:6	28:5,14,21,24	209:23,24 212:5
122:10,12	<b>burn</b> 15:19	<b>calling</b> 67:23,24	31:24 32:17,20	214:24 215:2

217:20 221:6,8 225:6,9,17,23 226:2,16 <b>CCRs</b> 94:6 <b>cease</b> 112:19 <b>cement</b> 69:9 70:23 73:23,23 74:2,12 76:23,24 77:4 78:10,17,20 84:17,18,19 85:1 183:6 <b>cementitious</b> 69:5 69:6 70:4,21 76:19 78:14 80:16,16 81:1,14 81:16,17 84:3 89:5,10 90:17 91:4 183:20 184:12 <b>centimeters</b> 150:21 166:5 <b>Central</b> 68:14,16 95:16 <b>centuries</b> 85:4 <b>certain</b> 97:20 98:10,12 108:21 156:4,4 <b>certainly</b> 24:4 76:10 129:22 133:20 158:16 221:11 223:19 <b>certificate</b> 51:19 <b>certification</b> 98:24 99:9 <b>certified</b> 98:21 229:15 <b>chain</b> 46:23,24 47:23 48:3,8,18 57:12,16,20 58:10,17 60:4 <b>chains</b> 59:8 <b>chances</b> 87:17 <b>change</b> 11:11 71:19 112:23 113:5 190:18,19	191:1,2,10 201:16,17,21 203:2,10 220:18 <b>changed</b> 83:8 91:16 143:15 187:4 193:1 196:23 <b>changes</b> 8:15,20 11:11 91:16 186:23 222:12 224:4 <b>changing</b> 154:19 <b>Channahon</b> 11:4 <b>channel</b> 143:3 <b>characteristic</b> 166:8 <b>characterization</b> 129:13 <b>characterize</b> 82:11 <b>charged</b> 126:22 <b>chart</b> 27:1,4,14 31:6 38:22 39:2 39:9,13 <b>cheap</b> 78:19 <b>check</b> 49:5 <b>checked</b> 49:3 <b>chemical</b> 8:19 73:9,10 77:14,20 77:23 79:7 81:12,15 82:15 82:17,23 83:7,8 83:23 84:15,23 85:11 87:21 91:16 92:5,9,13 152:18 166:22 166:24 <b>chemically</b> 8:15 80:13 82:2,13,22 84:2 88:8,20 89:3 <b>Chicago</b> 1:17 2:13 100:2 170:19 229:7 <b>chimneys</b> 79:20	<b>chips</b> 39:4 <b>chloride</b> 106:6,10 106:11 126:15 131:22 141:11 142:7,10 144:5,6 145:10,12 146:15,18,21 147:10 148:18 149:1,4,11 <b>Chloride's</b> 106:6 <b>chlorides</b> 106:3 126:2 140:24 144:14 <b>CHMM</b> 98:23 99:4,12,13,14,15 <b>chromium</b> 119:2 <b>Circa</b> 66:1 <b>citation</b> 63:3 <b>cite</b> 127:4 <b>cites</b> 130:19 131:12 208:23 <b>citing</b> 17:10 63:10 149:17 194:4 <b>City</b> 229:7 <b>civil</b> 69:13,14 168:20 169:22 170:3 <b>claim</b> 206:10,17 <b>clarification</b> 207:13 <b>clarify</b> 17:8,12 18:1 110:11 149:19 178:22 179:2,9 210:14 224:11 <b>class</b> 74:9,9 117:14 165:4 <b>classification</b> 29:7 33:24 34:4 38:14 150:11 <b>classified</b> 131:18 <b>classifying</b> 29:9 <b>clay</b> 32:14 33:9 130:21 166:1,2,3 180:1 212:22	221:5,20,22 <b>clays</b> 132:20 166:5 166:8 213:21 220:24 226:15 <b>clean</b> 18:16 99:6,7 <b>cleaned</b> 16:22,24 20:16 21:11 24:7 <b>clear</b> 68:14 <b>clearing</b> 223:9 <b>client</b> 26:23 27:8 129:21 <b>clip</b> 189:8 <b>close</b> 8:6 87:17 158:12 171:23 203:24 <b>closed</b> 102:4 112:16 <b>closer</b> 177:22 209:20 <b>closing</b> 171:7 <b>closure</b> 7:9 110:18 110:20 171:19 171:21 <b>co-counsel</b> 6:7,22 <b>coal</b> 7:20,21,24 8:6,22 9:10 15:19,23,24 16:1 27:19,23 39:19 39:20 72:20,23 74:19 76:11 101:3 110:2,4 203:8 206:12,15 <b>cobalt</b> 11:2 60:17 60:19,21 61:14 61:18 62:6,14,24 63:7,13,16,18 64:5,6 117:6,9 117:15,18,23 123:10,11,12 124:5,7,12,20 125:3,8,20 126:18,23,24 128:23 159:16 159:24 160:2,11	166:9 <b>code</b> 1:7,9 39:8 <b>cohesive</b> 220:24 <b>cohesiveness</b> 221:4 <b>colleague</b> 54:4 127:11,20 <b>collect</b> 44:21 45:24 54:8 65:13 144:19 165:9 166:11 <b>collected</b> 10:1,16 25:20 26:9 31:1 37:5 47:3,18 48:14 54:5 65:8 65:11 66:3,7 114:14 134:9 140:10 154:1,12 154:20 164:15 166:12 178:21 <b>collecting</b> 20:9 30:3,4 44:14 45:4 53:13 58:20 154:6 226:20 <b>collection</b> 35:11 39:3 45:10 154:4 159:12 <b>collections</b> 159:17 159:22 <b>collectively</b> 180:10 <b>collects</b> 52:11 <b>College</b> 97:10 <b>colloidal</b> 131:16 <b>color</b> 27:1,4,4,6 27:10,11,13 31:6 38:20,21 39:2,4 39:6,8,8,13 40:6 73:19 90:17 129:7,9,13,16,18 130:3 210:13 <b>colored</b> 132:4,5,9 132:19 <b>colors</b> 131:22
---	---	---	--	---

<b>Colorwise</b> 74:8 <b>column</b> 31:24 32:1,17 48:23 57:24 58:1,13 203:8 <b>combination</b> 133:13 <b>combine</b> 138:24 <b>combined</b> 17:11 134:20 <b>combustion</b> 8:22 27:19 39:20 72:20 76:11 101:3 206:15 <b>come</b> 28:11 47:7 83:20,20 95:22 119:3 145:5 172:11 216:23 217:3 220:15 <b>comes</b> 61:6 78:2,3 78:4,5 <b>coming</b> 61:4 95:13 125:21 126:4 173:16 <b>comings</b> 95:17 <b>commencing</b> 1:19 <b>comment</b> 114:4 115:20 116:9 138:16 187:2 192:10 194:23 195:19 205:8 225:16 <b>commitment</b> 52:21 55:18 112:1 164:19 <b>common</b> 79:18 102:16,23 103:2 118:8,17,19,22 119:3 123:8,15 138:23 160:10 161:17 <b>commonly</b> 8:4 74:20 78:9 102:22 190:19 <b>compact</b> 207:16	208:22 <b>compaction</b> 152:10 <b>company</b> 51:5,7 <b>company-wide</b> 9:4 <b>comparable</b> 83:14 <b>compare</b> 83:8 185:5 <b>compared</b> 11:8 60:16 187:14 217:22 219:13 <b>compares</b> 143:10 <b>comparing</b> 200:19 <b>comparison</b> 32:24 33:5 103:10 113:12 157:23 159:20 188:23 222:6 <b>compendium</b> 123:23 <b>competency</b> 98:11 <b>competent</b> 12:17 <b>compiled</b> 117:2 <b>complete</b> 110:18 <b>completed</b> 57:21 216:24 <b>completely</b> 76:21 <b>completion</b> 35:9 110:20 <b>compliance</b> 14:11 22:6 52:20 55:18 100:10 112:1 113:22 164:18,19 165:4 171:9,9 173:20 178:4 <b>compliant</b> 134:11 <b>complicated</b> 103:14 <b>complies</b> 112:12 <b>comply</b> 22:24 111:1 165:8 <b>component</b> 164:6 <b>components</b> 79:1	79:22 163:5,18 185:8 <b>composed</b> 10:3 183:12 <b>composite</b> 76:18 91:3 93:19 <b>composition</b> 73:10 81:16 83:9,11,13,14 84:23 90:17 123:22 124:19 149:21 150:4,6 150:10,13 151:13 152:17 <b>compositions</b> 185:12 <b>compound</b> 77:24 78:6,6 82:15,17 82:23 83:23 84:9,15 87:22 <b>comprised</b> 91:19 97:23 101:10 104:1 123:1 130:17 164:20 <b>compromise</b> 162:2 196:15 197:16 <b>concentrate</b> 133:22 <b>concentration</b> 114:9,14 115:3 115:13,15 116:2 116:4 123:6,6 125:8,17,18 153:23 156:5 <b>concentrations</b> 62:15 104:7 107:19,20 108:2 110:22 115:23 115:23 116:13 118:4,11 120:15 120:22 121:16 121:17,20 124:12 125:3 126:7,15,19	128:15 136:23 147:10 154:18 156:6 157:13,15 158:4,5,11,12,19 159:1,3 165:16 165:17 <b>concern</b> 86:11 88:2,9,10 195:17 <b>concerned</b> 85:17 <b>concerns</b> 88:3 195:20 196:1 <b>conclude</b> 11:13 121:1 126:10 158:1 185:10 219:11 <b>concluded</b> 10:24 104:8 126:11 128:12 185:11 <b>concludes</b> 10:22 <b>conclusion</b> 72:14 127:10 132:1 133:16 148:13 149:5 157:6 173:5,8,9,16 176:20,22 177:1 177:11 182:12 182:15 194:7 217:19 <b>conclusions</b> 72:13 76:8 104:4 140:17 148:6,9 158:23 182:10 214:19 215:4,5 215:11 <b>concrete</b> 8:10 65:15,19 66:5 69:5,19,20,23 70:3,4,10,13,15 70:17,20 73:7,11 76:23,24 77:4,19 78:12,15 79:3,4 79:9,11,14,20,23 80:22 82:6 84:17 85:4,15,15 85:20 86:5,6,8	88:5 90:12,13,14 90:18,19 91:2 93:18,19,21 170:8,8 183:4,7 183:21 227:3 <b>concrete-like</b> 183:8 <b>condition</b> 12:15 69:7 106:23 161:12 186:7,7 186:18,19 191:24 192:18 192:22 193:8 194:13 195:6 196:9 197:1,8 198:17 205:8 210:4,6 217:4 219:14 227:21 <b>conditions</b> 87:23 108:11,12 190:21 192:24 194:3,15 195:10 199:9 217:24 219:14 220:9 222:7 <b>conduct</b> 102:11 149:24 151:8 <b>conducted</b> 10:13 52:20 65:2 106:15 <b>conducting</b> 69:6 102:7 <b>conductivities</b> 166:1 <b>conductivity</b> 149:3,6 150:19 165:21 <b>conduit</b> 162:5 <b>confirm</b> 15:9 22:22 60:10 61:13 92:22 199:6 <b>confused</b> 59:23 <b>confusing</b> 70:18 <b>confusion</b> 103:11
--	--	---	---	--

<b>Congratulations</b> 71:20	195:3 196:7 198:2,5 200:20	<b>continues</b> 53:2 207:19	51:2 52:10,13,18 52:22 53:2,15,23	91:13 101:23,24 110:7 119:24
<b>connected</b> 45:23	201:3,19 202:23	<b>Continuing</b> 214:1	55:13,18 57:18	123:19 125:15
<b>consecutively</b> 154:12	204:19 206:13	<b>contours</b> 214:20	57:23 58:3	147:22 156:21
<b>consider</b> 119:16	208:3,4 211:1,2	<b>contractor</b> 175:18	60:11 61:15,16	196:6
122:21 148:11	211:5,10,20	175:24 187:5	62:18 65:22,23	<b>couriered</b> 46:2
<b>consideration</b> 162:9	212:3 213:2	188:7 189:1,5	71:4 75:22	<b>course</b> 73:11 74:9
<b>consist</b> 173:12	214:21,23 215:1	190:4,7,10 191:3	76:15 95:6	75:10 76:6,14
<b>consisted</b> 75:8	215:7,13,19	221:18,19,22	99:19,20 100:20	78:3 83:22
76:3,4 183:13	216:1,11,12,14	222:15 223:8	103:5,6 104:16	84:23 87:13
<b>consistent</b> 62:16	216:22 217:6,20	<b>contractors</b>	106:16,17 107:5	93:11 98:15
91:20 105:10,18	217:23 218:1,13	188:11 190:1,20	107:15 113:23	101:22 111:10
111:3 116:1,16	218:21 219:5	<b>contrary</b> 208:6,10	116:23 117:11	124:13 168:8
165:24	221:23 222:6	<b>control</b> 1:1,15 5:4	125:11 127:6	180:23
<b>consisting</b> 76:19	225:5,17,24	83:6 195:16	132:11,12 136:5	<b>courser</b> 151:21,21
<b>consists</b> 27:23	<b>Consultants</b> 99:19	206:6	136:6,16 141:11	<b>court</b> 13:5,9,19
<b>constituent</b> 102:16 119:1	165:2	<b>controlled</b> 91:19	152:3 159:23	25:6 43:6 50:22
162:8	<b>consulting</b> 51:11	<b>conversion</b> 15:21	173:24 179:12	63:5 142:22
<b>constituents</b> 118:15,22 119:6	<b>contain</b> 79:17	20:13	179:13 182:1,6,9	229:6
123:1 137:16	83:23 88:13	<b>convert</b> 112:4	185:24 186:14	<b>cover</b> 12:8 39:6
138:14,23 139:1	<b>contained</b> 72:10	<b>converted</b> 80:1	188:20 197:4	<b>covered</b> 192:23
139:9 146:15,17	88:17 89:18	<b>converting</b> 110:13	199:2,23 203:5	193:4 194:11
160:11 161:18	104:12	<b>cooler</b> 46:2	204:6 206:1	195:8
161:19	<b>container</b> 56:18	<b>copied</b> 48:8	210:20 211:7	<b>covering</b> 196:11
<b>construct</b> 170:6	61:14	<b>copies</b> 56:3,5,6	212:16 213:15	<b>covers</b> 99:4
182:17 189:5	<b>containers</b> 154:12	174:14,16,21	213:16 218:15	187:22
212:8	154:19	<b>copy</b> 17:3 55:3,6	224:21 227:15	<b>crack</b> 87:16
<b>constructed</b> 19:13	<b>containing</b> 70:21	56:8 65:7	229:10	193:24 195:16
19:19,20 89:23	85:15 86:3	127:13	<b>corrective</b> 113:23	<b>cracked</b> 86:18
173:2 175:15	<b>containment</b>	<b>core</b> 28:13 65:8,8	124:6,8	<b>cracking</b> 196:5,14
176:16 180:20	170:11	65:19 66:2,5	<b>correctly</b> 150:18	205:12
216:18,21	<b>contains</b> 84:1,1	89:19 92:4,9,13	225:12	<b>cracks</b> 87:11
<b>construction</b> 11:12,15,23	208:5 229:11	227:3,3	<b>correlate</b> 125:13	<b>Crawford</b> 15:1
20:12 51:15	<b>contaminated</b>	<b>cored</b> 228:1	<b>costs</b> 17:9	<b>create</b> 108:19
75:6 76:2,18	12:18 160:15	<b>coring</b> 65:15,19	<b>counsel</b> 6:24	154:17 183:8
130:16 171:22	<b>contamination</b>	227:5	109:18	<b>creating</b> 126:12
173:1,10,17,19	12:19 134:22	<b>corner</b> 128:8	<b>count</b> 79:15	162:5
175:21 177:18	138:4 139:16,18	179:14 218:4	169:12	<b>credential</b> 99:15
178:3 181:20	160:18 162:5	<b>corporation</b> 15:2	<b>country</b> 79:17	<b>crest</b> 181:15
188:9,24 191:3	<b>continue</b> 12:12	<b>correct</b> 15:7 16:2	<b>County</b> 1:16	<b>crests</b> 212:24
	22:9,10 42:14	16:4,13 20:8	32:24 65:9,14	<b>criteria</b> 99:4
	110:12 111:20	22:7 30:10,11,21	89:20 124:23	197:19
	112:2 228:14	31:4,12 32:6	125:1,4 185:22	<b>cross</b> 90:15
	<b>continued</b> 22:16	39:23 44:15,16	227:2 229:3	162:23 175:13
	111:17 228:18	47:11,12 48:14	<b>couple</b> 87:20	175:16

<b>CROSS-EXAM...</b>	<b>damaged</b> 86:19	203:4,11	18:24 168:1,6,8	<b>described</b> 30:24
23:9 33:16	194:1,2,15 196:4	<b>dates</b> 64:8	168:10,16	36:10 80:4
41:10 49:15	196:14 197:22	<b>dating</b> 177:14	170:17 175:11	122:18 128:21
66:15 91:9	199:11 224:23	<b>day</b> 1:18 73:7	177:23 178:9	208:2
163:1	<b>dandy</b> 52:7	84:21 95:19	179:2 181:19	<b>describing</b> 39:7
<b>crushed</b> 74:22	<b>dark</b> 31:21 32:14	145:23	198:1,24 225:2	<b>description</b> 31:17
133:12 180:21	40:6 129:14	<b>day-long</b> 97:23	226:5,18	32:9 57:17
<b>crust</b> 123:14	131:1,21,21,22	<b>days</b> 79:18 145:24	<b>Dehlin's</b> 103:24	115:19 150:12
<b>CSR</b> 1:16,23	132:2,4,5,9,20	146:6 183:18	<b>demonstrate</b>	201:20 203:6,7
<b>cubic</b> 130:18	142:23 205:7	210:5,5	139:3	212:13,19
202:1	207:16 208:22	<b>deals</b> 100:9	<b>demonstrated</b>	<b>descriptions</b>
<b>cued</b> 59:21	209:6,22	<b>debris</b> 223:10	85:3 225:23	134:7
<b>curing</b> 183:18,19	<b>darker</b> 132:18	224:6	227:17,20	<b>design</b> 11:10
183:20 184:4,5,8	133:22 209:24	<b>decade</b> 23:21,23	<b>demonstrates</b>	51:15 170:7
<b>current</b> 99:23	210:11,13	23:24	98:10	177:7 186:23
192:11,20	<b>dashed</b> 176:1	<b>decades</b> 78:16,22	<b>demonstrations</b>	187:2,3,21
206:14	<b>data</b> 10:20,21,22	78:23 156:10	171:9	190:22 192:24
<b>currently</b> 71:18	30:4 35:11 37:9	<b>December</b> 71:24	<b>density</b> 87:5	216:2 217:10
<b>cushion</b> 172:8	46:17 54:14	106:14 107:2	<b>Department</b>	<b>designed</b> 100:12
204:24 217:1	55:7,7,12 59:15	<b>decided</b> 192:8,17	180:22	101:5,6
<b>custody</b> 46:23,24	60:13 61:3,23	228:13	<b>depend</b> 93:22	<b>designing</b> 11:18
47:3,4,24 48:3,8	62:4,14,16,17	<b>deciding</b> 197:8	<b>dependent</b> 146:19	100:15 170:8
48:19 57:13,16	63:21,24 104:5	<b>decks</b> 70:16	<b>depending</b> 26:11	171:6 186:4
57:20 58:10,17	104:10,14,15,16	<b>decontaminate</b>	35:16 81:23	<b>despite</b> 198:14
59:8 60:4	105:5,23 106:16	18:8	129:23 164:16	<b>destroy</b> 12:16
<b>cut</b> 28:12 64:8	107:4,17 119:22	<b>decontaminated</b>	<b>depends</b> 40:5 74:8	<b>desulfurization</b>
109:16 219:16	120:11 121:7,9	172:13	93:10,11 129:19	72:22
219:23 220:16	121:10,11 122:1	<b>deemed</b> 124:2	129:20,21	<b>detail</b> 196:21
221:13,20 222:5	125:22 128:18	155:18 203:14	<b>depict</b> 65:6	<b>detailed</b> 11:11
222:8,16	134:9,10 140:9	<b>defines</b> 72:20	<b>depicted</b> 19:6	183:10
<b>CV</b> 71:9,12,19	140:21 149:4	<b>definitely</b> 40:8	<b>depicting</b> 164:4	<b>detect</b> 138:14
168:15	151:10,12 153:1	<b>definition</b> 8:22	177:24	<b>detected</b> 61:9
<b>CX</b> 3:2 4:2	153:7 154:1	72:17,18 76:9	<b>deposited</b> 201:23	105:24 106:3
	155:14 157:12	90:22,24 91:2,22	<b>Depot</b> 84:19	107:21 108:1
	159:11,21	92:1	<b>depth</b> 125:4	117:9 118:9,10
<b>D</b>	160:20,23	<b>degradation</b>	<b>depths</b> 32:20	118:11 119:6,8
<b>D</b> 3:1 4:1 5:19	161:14,15	206:20	<b>Des</b> 143:4 164:5	121:22,24
130:19,23	162:11 164:12	<b>degree</b> 69:15 97:8	<b>describe</b> 8:14 9:9	124:20 125:19
215:12	165:5 167:4,5,7	168:18,19	11:6,8 27:9	127:3 139:5,6
<b>D-e-h-l-i-n</b> 168:9	182:4	169:12	31:20 38:24	157:7 166:9,12
<b>D-i-e-r-s</b> 6:22	<b>date</b> 45:12 115:8	<b>degreed</b> 14:23	48:22 57:15	166:13,14,15
<b>D2487</b> 131:20	118:10 187:23	<b>degrees</b> 69:12	90:10 100:4	<b>detection</b> 113:12
<b>damage</b> 172:7	187:24 189:21	221:11,12	107:9 122:3	<b>detections</b> 62:8
194:21 205:1,13	201:20	<b>Dehlin</b> 4:11 10:1	150:13 171:1	138:17,21,22
224:22,23	<b>dated</b> 71:14 72:11	10:19 11:5,17,21	204:13	139:1 157:1
227:19,23,24				

159:13 <b>deterioration</b> 193:7 <b>determine</b> 11:10 34:1 36:16 37:8 84:22 113:17 149:21 150:4 194:18 212:1 <b>determined</b> 26:21 59:8 <b>developed</b> 37:5 75:5,7 <b>development</b> 70:8 <b>deviations</b> 197:14 <b>dewatered</b> 186:16 <b>diagram</b> 104:22 177:21,24 178:1 <b>diameter</b> 223:11 <b>Diers</b> 2:17 3:5,9 3:13,21 4:9 6:21 6:21,22 12:23,24 23:7,8,10 24:8 41:11,17 66:13 66:16,22 67:4 96:5 162:14,16 162:23,24 163:2 163:22 164:2 167:2,9,12 <b>difference</b> 56:12 84:10 158:15 159:2 <b>differences</b> 158:11 <b>different</b> 22:17 26:7,11 59:6 70:21 76:21,22 77:23 78:24 80:17 82:17 84:7 88:4 101:11 120:1 123:23 126:17 128:11 147:22 150:9 154:21 190:8 218:13 <b>dimension</b> 224:6 <b>direct</b> 13:16 25:4	26:13 34:21 43:4 68:8 144:11,12 <b>directed</b> 48:15 <b>direction</b> 37:8 48:20 54:22 55:23 <b>directly</b> 122:15 205:5 <b>director</b> 15:1 <b>dirty</b> 8:12 100:22 <b>disagree</b> 141:24 142:4 194:14 208:11 209:5 <b>disagreed</b> 76:7 <b>discharge</b> 45:24 <b>discovered</b> 79:2 <b>discrepancy</b> 58:15 63:24 <b>discuss</b> 10:2 29:18 <b>discussed</b> 18:10 58:11 90:22 130:1 139:15 154:1 159:24 167:5 201:18 208:24 213:11 213:13,15 222:24 223:15 <b>discussing</b> 16:19 36:20 44:13 52:24 150:24 182:19 203:18 <b>discussion</b> 42:18 50:8 67:15 129:2 140:24 153:7 167:19 174:18 228:9 <b>discussions</b> 221:7 <b>disk</b> 90:15 <b>disparity</b> 61:18 <b>disposal</b> 100:17 101:6 125:23 192:14 193:13 <b>dispose</b> 188:12 <b>disposed</b> 101:12	102:11 <b>dispute</b> 57:17 <b>dissertation</b> 70:8 <b>dissolve</b> 46:1 <b>dissolved</b> 10:8,9 10:12,15 46:9 49:8 53:9 58:23 59:5,12,13,20 60:15,19,23 61:7 62:7,9,15 64:5 107:23 146:17 146:18 153:11 153:12,20 156:11,12,23 157:7,16 158:4 159:21 164:14 164:16,20 165:5 165:7,14,17 <b>distribute</b> 56:4 <b>distribution</b> 15:15 <b>ditch</b> 144:17 145:4,5 146:2,5 146:7 149:13 <b>division</b> 35:6 <b>docket</b> 5:8,12 <b>document</b> 47:1 54:20,23 55:1,22 56:1 103:12,16 124:19 172:24 173:18 184:24 190:11 <b>documentation</b> 173:10 <b>documented</b> 102:9,19 150:7 173:18 185:9 <b>documents</b> 173:15 177:11,19 178:4 <b>doing</b> 21:22 27:16 54:21 57:22 102:3 112:2 147:3 155:12 165:11 171:13 229:6 <b>dolomite</b> 108:15	133:13 212:23 <b>DOT</b> 70:11 99:6 <b>downgradient</b> 41:23 42:3 105:7 106:8 137:13 146:4,7 152:24 153:1 161:1,16 166:16 167:6 <b>downward</b> 106:22 <b>dozen</b> 160:22 <b>Dr</b> 8:10 68:10,19 68:24 69:11 72:2,7 74:24 77:8 78:8 81:11 83:3 89:9,12 90:21 95:15 183:1 <b>draft</b> 187:1,15,24 188:22 189:19 <b>drainage</b> 149:11 149:13 <b>drawing</b> 143:13 175:20,23 186:24 187:15 187:19 188:2,4 189:11,17,18,21 189:24 218:9 225:3 <b>drawings</b> 11:9,9 76:2 177:10 187:1,4,11 188:9 188:24 189:6 190:22 216:1,2,5 216:6,7,10 217:10 <b>drawn</b> 216:11 <b>drill</b> 192:1 227:12 <b>drilled</b> 177:13,17 178:5 180:15 <b>drilling</b> 26:8 191:11,12 <b>drinking</b> 117:15 <b>driven</b> 23:16 <b>drop</b> 131:19	176:18 <b>dropped</b> 26:20 <b>dry</b> 31:22 32:15 201:24 202:6,15 202:17 <b>due</b> 11:3 108:7 141:7 149:9 160:11 206:20 <b>duly</b> 13:11,14 24:20 25:2 34:17,19 42:23 43:2 50:15,17 67:20 68:6 96:14,16 167:24 168:2 229:5 <b>dump</b> 84:19 <b>duplicate</b> 112:5 <b>durability</b> 70:14 79:4 <b>duties</b> 98:5 170:1 170:4 <b>duty</b> 170:13,14 <b>DX</b> 3:2 4:2
<b>E</b>				
<b>E</b> 3:1 4:1,17 29:19 150:24 <b>earlier</b> 30:24 39:17 72:24 76:7 78:19 90:22 95:18 110:24 119:11 140:2,15 162:7 200:14 208:20 213:11,13 <b>earliest</b> 203:3 <b>early</b> 67:24 71:14 75:15 100:21 109:17 135:5 222:24 <b>earth</b> 23:11,15 143:1 <b>earth's</b> 123:13 <b>earthen</b> 173:12 198:6 213:21				

226:15 <b>easel</b> 19:4 203:23 <b>easier</b> 174:19 <b>east</b> 2:19 107:11 <b>eastern</b> 179:14 218:3 219:17 220:8 <b>easy</b> 28:17 74:4 <b>education</b> 69:13 <b>educational</b> 69:11 97:7,18 168:17 169:6,7 <b>effect</b> 74:6 98:18 <b>eight</b> 24:4 120:17 120:20 148:3 162:17 170:23 <b>either</b> 32:19 39:3 60:18 76:14 78:16 104:11 106:22 110:20 126:5 151:12 158:16 162:12 177:7 <b>elaborate</b> 63:23 86:23 192:8 <b>electrical</b> 14:23 <b>electricity</b> 15:13 15:17 16:1 72:23 <b>element</b> 123:13 <b>elemental</b> 71:2 83:11,13,13 <b>elementally</b> 84:6 <b>elements</b> 83:16,18 83:19,20 84:2 127:24 137:8 194:11 195:9 196:12 206:20 216:23 <b>elevation</b> 105:5 176:8,11,12,19 177:7 181:15 191:17 220:19 <b>elevations</b> 37:7 144:2	<b>eliminate</b> 153:21 <b>email</b> 48:4 <b>embankment</b> 9:7 9:23 104:13 130:20 135:14 140:19 145:3,6 145:13 149:12 149:21 150:4,18 152:16 160:20 160:24 167:8 175:22 177:5 179:15 181:15 201:3,7 204:16 204:18 212:24 213:20 219:18 219:21 221:5 223:18 <b>embankments</b> 10:3 104:1 126:5 135:9,16 136:4,8,20 137:3 137:6 138:3 139:8 140:3,7 141:17,22 144:13 149:6,10 151:17 161:4 170:9 173:5,11 176:10,21 177:12,14 179:11,23 180:17 182:14 182:17 198:7 199:16 200:20 200:21 204:10 212:3,8,11,11 214:20 225:24 226:6,7,14 <b>employed</b> 69:1,2 72:1 <b>employee</b> 38:3,6,9 <b>emptied</b> 8:5 21:2 <b>enacted</b> 164:21 <b>enactment</b> 164:12 <b>encapsulated</b> 81:1 85:22 88:20	89:4 184:10 <b>encounter</b> 190:21 <b>encountered</b> 132:18 191:17 191:21 <b>ended</b> 109:7,9 134:11 <b>ends</b> 183:4 <b>energy</b> 12:16 <b>engaged</b> 9:18 72:9 103:22 185:23 <b>engagement</b> 72:8 <b>engineer</b> 10:19 14:23 43:13 71:4,10,16,18 168:24 169:3,11 170:1,3,12 185:23 186:1,3 187:16 200:15 201:5 216:3,8,13 224:2 <b>engineered</b> 101:4 <b>engineering</b> 9:18 9:22 14:11 15:2 35:3,23 36:9 37:2 38:4,7 40:19 69:13,15 69:17,19 130:13 130:15 168:21 169:9,16,18,21 169:22 170:19 178:7 211:21,22 211:24 <b>Engineering's</b> 177:15 213:12 <b>engineers</b> 100:6 <b>ensure</b> 9:1 35:9 194:24 197:21 <b>ensured</b> 196:4 <b>entered</b> 22:6 <b>entitled</b> 5:5 <b>environment</b> 99:6 127:1 <b>environmental</b> 2:16 5:22 14:12	35:6 43:15 51:11 61:23 86:1 87:23 91:20,22 99:5 100:1,7,10 132:16 168:20 <b>environmentally</b> 91:18 <b>EPA</b> 6:24 7:13 9:15 52:16 55:4 55:10 56:5 91:6 91:12 112:3,20 112:22,22 141:5 <b>EPA's</b> 29:20 46:16 72:10 130:8 172:16 <b>equal</b> 162:8 <b>equally</b> 139:16 <b>equipment</b> 7:8 23:12,16 24:5 45:6,11 191:13 192:1 <b>Erin</b> 57:21 <b>error</b> 157:4 <b>ESA</b> 132:14,16 133:21 134:10 <b>escalated</b> 17:16 <b>especially</b> 197:12 198:17 <b>Essence</b> 2:5 6:3 <b>essentially</b> 78:19 82:3 87:5 90:16 129:10 201:6 <b>estimate</b> 192:21 <b>estimated</b> 17:10 192:11,19 202:1 <b>ethical</b> 98:12 170:13,14 <b>ethylene</b> 53:8 <b>Europe</b> 74:17 <b>evaluate</b> 72:9 165:3 216:14 <b>evaluated</b> 10:20 147:23 164:12 <b>evaluating</b> 69:4	73:8 102:3 <b>evaluation</b> 9:4 36:15,20 39:18 144:1 212:6 <b>evaluations</b> 79:14 <b>event</b> 110:21 <b>events</b> 116:3 147:22 148:5,8 148:11,12 149:17 157:14 158:6 <b>eventually</b> 73:11 207:24 <b>Everybody</b> 167:22 <b>everyone's</b> 209:12 <b>everything's</b> 59:10 <b>evidence</b> 12:17,18 12:20 67:8 87:12 121:5 137:5 149:2 151:19 195:4 198:15 208:6,9 225:16 228:4 <b>evidenced</b> 140:21 <b>exact</b> 79:15 84:15 154:24 155:5 192:20 <b>exactly</b> 203:23 220:10 <b>exam</b> 97:24 98:1 169:16,20,23 <b>examination</b> 13:16 25:4 34:21 43:4 50:19 68:8 96:18 168:4 199:3,5 <b>examined</b> 13:15 25:3 34:20 43:3 50:18 68:7 96:17 168:3 <b>example</b> 28:9 66:7 155:16 165:8
--	---	---	--	---

169:22 186:9 199:11 212:2 220:11 221:9 <b>exams</b> 169:15 <b>excavate</b> 175:24 176:7 <b>excavating</b> 223:12 <b>excavation</b> 181:7 <b>excavators</b> 172:5 <b>exceed</b> 62:24 63:8 118:12 200:16 <b>exceedances</b> 112:18 141:6,14 142:3,6,10 <b>exceeding</b> 118:4 <b>Excellent</b> 84:11 <b>excerpt</b> 131:9 <b>excess</b> 147:6 <b>exchange</b> 126:14 126:20 128:7,14 <b>excuse</b> 5:21 9:13 10:9 11:22,24 15:23 30:13 38:20 45:3 51:21 55:7 62:16 63:14 64:16 81:17 94:18 99:10 100:13 108:4 112:15 136:13 160:12 176:23 184:16 <b>excused</b> 24:15 34:12 42:10 50:4 67:12 167:16 <b>exhibit</b> 4:19 12:8 29:19 46:16 55:10 58:8 60:5 63:12,13,16,20 64:12 67:2,6,7 72:3 103:8,12,15 113:11,19 116:16,20 127:15,16	128:19,20 130:7 130:7,15,19,23 131:9 134:18 143:5,10 144:2 147:4 150:24 159:8 163:3,7,16 163:20,21 164:3 164:4 172:15,15 173:22 175:5,8 176:24 178:10 195:15 200:21 201:1 203:21,23 204:2,3,5,7,8 205:20 206:23 208:23 209:4 215:12 217:16 218:9 222:21 <b>exhibited</b> 136:23 <b>exhibiting</b> 121:6 <b>exhibits</b> 12:5 42:15 <b>existing</b> 17:24,24 23:15 171:7,15 171:24 172:12 175:24 176:7 177:3 188:11,13 190:9 201:7 204:9 206:7,19 217:23 219:14 220:8 222:7 223:13 225:18 <b>exists</b> 171:24 <b>expand</b> 69:23 <b>expanded</b> 120:20 <b>expect</b> 60:19 92:17 93:5,9 116:1 137:2 193:7 197:7 <b>expected</b> 181:21 181:22 <b>expensive</b> 78:21 <b>experience</b> 11:17 26:5 28:8 35:17 74:11 79:15 102:14 105:8,17	132:7 156:10 <b>expert</b> 8:10 72:3 86:24 90:13,23 92:16 103:4 118:14 123:20 128:17 137:1 138:1 160:5,14 160:17 161:3,21 181:20,24 198:10 <b>experts</b> 10:17 <b>explain</b> 8:19 58:15 61:17 68:10 69:24 70:12,24 76:9 78:11 86:23 175:21 <b>explained</b> 59:4 76:16 80:14 82:1,13 83:19 87:21 159:13 <b>Exponent</b> 69:2,3 71:22 72:1 <b>exposed</b> 65:18 85:5 92:18 93:7 93:22 94:7,8 108:17 194:11 195:8 <b>exposing</b> 135:14 <b>exposure</b> 74:16 86:10 137:7 206:20 <b>extend</b> 70:15 <b>extensively</b> 75:13 <b>extent</b> 79:23 163:19 <b>external</b> 93:16 <b>extract</b> 226:23 <b>extracted</b> 89:19 227:1 <b>extracts</b> 57:2 <b>extremely</b> 73:23 79:18 <hr/> <b>F</b> <b>F</b> 5:24 131:9	223:22,24 <b>fabric</b> 204:23,23 205:3 209:18 <b>face</b> 68:2 <b>facilitate</b> 174:18 <b>facilities</b> 100:17 <b>facility</b> 102:11 106:13 172:2 <b>fact</b> 58:21 61:5 79:21 84:15 85:3,14,17 89:22 89:23 90:12 104:9 159:3 191:22 193:4 194:10 209:7 <b>factor</b> 212:4 <b>fair</b> 102:24 <b>fairly</b> 61:20 87:16 87:18 <b>fall</b> 8:21 90:24 132:6 <b>falls</b> 76:8 <b>false</b> 115:24 116:4 <b>familiar</b> 26:24 27:18 38:19,21 39:20 74:24 154:5 198:1 <b>far</b> 28:23 102:19 186:18 191:8 199:8 <b>faster</b> 146:20,21 147:17 <b>FE</b> 169:16 <b>feature</b> 77:15 <b>features</b> 101:4 <b>February</b> 5:13 36:23 63:11 72:11 117:4 170:23 <b>federal</b> 10:10 18:3 22:15 53:13,17 53:18 54:1,10 105:10 112:15 115:1 120:6 131:6 164:13,21	164:21 171:4 173:20 184:16 184:17,24 195:14 212:5 <b>feel</b> 66:4 <b>feeling</b> 74:4 <b>feels</b> 90:12 <b>feet</b> 26:6 33:6 107:11 145:22 164:9 176:8,9,18 212:24 214:8 219:22 220:18 <b>fell</b> 38:15 62:10 <b>FHWA</b> 131:1,5,14 132:1 185:8,13 <b>field</b> 11:12 25:15 25:16,18 30:2 35:10 45:8 49:7 53:10 58:6 59:14,24,24 60:2 156:13 157:3,9 158:16 161:12 161:14,15 190:18 191:1,2 191:10 201:16 201:17,21 203:2 203:10 <b>field-filter</b> 49:9 59:2 <b>field-filtered</b> 48:24 53:10,20 56:12 57:6 58:2 58:14,23 60:7 157:4,10 159:12 159:22 <b>field-filtering</b> 49:7 <b>fieldwork</b> 35:17 43:13 <b>fifth</b> 65:3 <b>figure</b> 30:13 65:4 65:6,7 89:13,16 89:19 178:13 <b>filed</b> 5:13 <b>filing</b> 178:23 <b>fill</b> 47:24 48:1,9
--	--	--	---	--



48:15 132:19 177:6,9 179:21 180:1,2,16 181:19 182:14 182:16 206:12 208:15 212:10 213:20,22 225:7 225:9 226:13 <b>filled</b> 47:1 48:20 <b>filler</b> 82:5 183:5 <b>filter</b> 45:19,23 56:20,21 58:5 154:6,7,9 <b>filtered</b> 45:16,20 56:14,16 59:10 59:13,20,24,24 60:1 61:10,12 122:15 153:20 <b>filtering</b> 22:18 153:21 <b>final</b> 11:9,10 184:6 219:13 <b>finalizes</b> 54:23 <b>finally</b> 55:14 <b>find</b> 7:11 9:23 39:5 63:21 82:18 120:11 158:2 209:7 <b>finding</b> 1:8 120:24 147:7 <b>findings</b> 9:9 <b>finds</b> 125:2 <b>fine</b> 31:21 33:7,8 73:22,24 76:16 92:2 96:5 <b>finer</b> 73:24 131:17 <b>finish</b> 35:8 <b>finished</b> 55:24 71:24 95:14 139:13 184:8 <b>fire</b> 18:15,17 <b>firm</b> 51:11 103:22 170:19 <b>first</b> 8:8 9:5 10:7 12:5,6 13:3,14	15:4,5 25:2 31:19 34:19 36:5 43:2 45:22 46:18 50:17 52:3 57:20 58:1 58:13 68:6,21 77:19 87:2,3 88:14 91:14 96:16 97:1,6 101:17 103:7,10 117:6 129:6 130:11 135:20 140:6 145:11 151:9 168:2,11 170:15 171:22 172:14 173:2,4,5 173:8,9 174:6 175:12,14 179:4 179:7 191:4 192:15 194:6 201:18 203:17 203:18 205:20 208:8 211:6 216:17 218:18 218:21 220:20 223:14 224:12 229:5 <b>Fisk</b> 14:24 <b>fit</b> 23:4 134:13 <b>five</b> 24:3 92:3 141:4 <b>flagging</b> 59:11 <b>flat</b> 200:17 222:14 222:18 <b>flip</b> 29:19 31:9 33:1 36:5 46:18 113:19 114:1 145:17 <b>flipping</b> 133:5 <b>floor</b> 1:17 79:21 205:11 223:18 223:20 227:5 <b>flour</b> 77:1,2,5 <b>flow</b> 37:8 45:7 137:9 144:10,12	144:23,24 145:13 146:6,12 147:16,17,18 163:4,17,24 164:4,6,10 <b>flows</b> 146:11,13 154:18,18 <b>flue</b> 72:21 <b>fluoride</b> 64:21 <b>fly</b> 8:15,20 28:1,2 29:2 32:21 34:1 34:1 39:22 40:5 70:23,24 72:21 73:1,2,17,21,24 75:9 76:5,12,16 77:7,9,16,22 78:3,9,12,15 79:1,2,8,10,17 79:18,23,24 80:9 80:12,13 81:2,13 81:15 82:10,11 82:12,12,15,16 82:18 83:6,9,22 84:1 85:9,14,15 85:20 86:3,8 88:5 91:5,18 94:5 133:11,18 133:23 134:1 139:2 183:15 184:12 208:5 <b>focus</b> 7:15 69:16 69:23 202:8 <b>focused</b> 52:2 209:16 <b>folder</b> 103:9 <b>folks</b> 103:24 <b>follow</b> 61:4 98:12 112:10 144:24 155:9 156:7 165:6 226:22 <b>follow-up</b> 83:1 84:6 111:9 151:14 152:11 <b>followed</b> 159:17 <b>following</b> 10:9	11:5 156:1 <b>follows</b> 13:15 25:3 34:20 43:3 50:18 68:7 96:17 168:3 201:21 <b>foot</b> 32:12 125:5 130:19 176:19 180:7,15,18 181:3 208:17 220:19 <b>Footnote</b> 178:19 <b>forces</b> 93:16 <b>foregoing</b> 229:9 <b>foreground</b> 205:4 <b>foremost</b> 170:15 <b>forensic</b> 69:6 <b>forest</b> 62:2 <b>forget</b> 183:23 200:21 220:10 <b>forgot</b> 80:1 <b>form</b> 81:16,17 82:14 85:22 88:8 183:22 184:1,7 189:8 <b>formal</b> 78:13 <b>formed</b> 8:18 37:9 81:11 <b>formerly</b> 140:19 <b>forms</b> 80:15 81:13 82:17 84:16 200:9 <b>fortunate</b> 186:24 <b>fortunately</b> 200:1 <b>forward</b> 21:6 33:1 <b>found</b> 102:16 108:5,5 110:3 117:24 121:15 123:14,15,17 125:9 127:9 128:4 186:17 192:18,22 194:12 196:8 208:17 213:17 218:1	<b>foundation</b> 130:17 164:7 212:21 <b>foundational</b> 206:13 <b>foundations</b> 170:9 <b>founded</b> 179:23 <b>four</b> 37:18 56:5 73:3,6 105:2 121:23,24,24 130:11 169:8,10 185:18 <b>fourth</b> 80:7 104:6 <b>frame</b> 52:14 177:16 <b>frankly</b> 86:4 <b>Franzetti</b> 2:8,10 6:17,18 103:23 <b>free</b> 126:24 224:3 224:19 <b>frequency</b> 93:13 94:12 <b>front</b> 15:5 17:4 36:6 37:16 44:17 65:4 72:6 168:12 178:16 <b>Frost</b> 124:15,17 <b>full</b> 16:15 150:12 <b>fume</b> 70:23 71:1 <b>fun</b> 35:11 <b>function</b> 224:24 <b>fundamental</b> 73:9 <b>fundamentally</b> 77:19 81:15 <b>fundamentals</b> 97:24 98:1 169:16,17 <b>funnel</b> 144:19 <b>further</b> 9:13 23:1 24:8 31:23,24 32:16 33:12 34:7,8 41:6,17 41:18 49:12,22 66:10,22 67:9 131:20 146:5
--	---	---	--	--

162:13 167:9 172:6 182:15 224:8 <b>furtherance</b> 9:13 <b>furthermore</b> 191:22 <b>future</b> 160:18 225:21	166:24 167:13 167:14,17 168:5 174:21 175:4,10 207:14 228:5,7 <b>Gale's</b> 91:14 152:14 <b>gallons</b> 19:18 21:1 <b>gas</b> 7:17 15:18 20:13 72:21 <b>gather</b> 121:7 <b>gauges</b> 44:6 <b>Gen</b> 5:6 9:3,17 14:15,22 21:3 23:11 36:11,12 36:15 120:4,6 141:5 186:15 200:4 208:6,9 214:7,23 225:16 <b>Gen's</b> 147:8 178:24 <b>Generation</b> 4:19 <b>general</b> 62:11 92:24 93:2,3 156:7 165:10 179:23 <b>generally</b> 14:7,18 19:12 20:21 21:10 27:23 28:10,18 29:1 35:7,16,18 36:10 37:1 39:6 40:19 45:22 46:11 51:20 56:11 73:19 79:11 90:10 100:3 104:3 105:18 107:9 122:9 129:17 153:11 153:14,17 154:13 170:24 171:13 172:22 179:19 198:4 206:2 <b>generate</b> 15:24 <b>generated</b> 16:1,5	72:22 74:10 142:24 150:8 <b>generating</b> 7:16 15:11 65:9 72:23 185:21,22 <b>Generation</b> 1:5 2:14 6:19 8:3,5 8:23 9:16 10:6 10:11 12:4 13:24 14:14 18:8 20:17 21:23 22:5 44:2 51:23 55:2 56:4 65:3,10 110:11 111:1 112:9 136:7,12 149:19 150:3 171:12 185:15,15 187:2 187:18 188:22 189:1,20 192:8 192:17 194:24 195:20,23 196:3 202:23 206:7,11 <b>Generation's</b> 7:5 7:9,10 22:22 72:4 81:9 138:11 178:19 205:21 <b>Geneseo</b> 97:10 <b>geological</b> 97:9 124:16 145:21 <b>geologist</b> 10:18 25:13,14 26:3 36:3 51:18 54:21 97:14,17 97:22 98:5 99:2 127:12 169:5 <b>geologists</b> 100:5 <b>geology</b> 97:10,24 98:1 <b>geomembrane</b> 171:24 172:7,9 172:12 186:10 192:24 193:5,17 194:12 196:15	199:7 204:9,20 204:22 205:2,14 206:8,19 216:24 223:16 224:2,16 225:1 227:8,9 <b>Geoprobe</b> 26:12 28:10,11 31:3 <b>Geosyntec</b> 10:1 173:20 178:2,21 179:9,24 180:9 212:4 <b>Geosyntec's</b> 177:17 178:7 <b>geotech</b> 29:22,24 150:9,15 <b>geotechnical</b> 9:6 26:10 30:4 35:5 150:23 165:20 215:2 <b>geotextile</b> 172:10 204:23 205:3 209:18 224:11 224:14,18,22,23 224:24 227:8,10 <b>get-go</b> 82:4 <b>give</b> 7:2 17:7 84:21 93:11 151:20 <b>given</b> 126:6 145:4 160:19,20 182:12 192:21 195:22 198:13 229:11 <b>gives</b> 122:23 <b>glass</b> 28:17 <b>glassy</b> 28:16 40:7 <b>glues</b> 76:19 81:2 90:19 <b>Gnat</b> 3:19 10:14 50:12,16,21,23 50:24 51:20 63:19 65:1 112:7 153:16,24 227:1 <b>go</b> 16:6,10,10,16	21:15,15 29:17 42:16 45:9 48:6 50:5 54:24 56:1 64:7 67:13 95:19 107:24 108:6,18 115:6 116:13 119:23 144:22,22 148:20,21 162:5 167:17 174:22 174:23 176:18 177:7 187:8 198:22 199:19 202:19 206:24 210:19,23 214:18 215:18 220:6,18 225:13 227:4,6 228:5 <b>goal</b> 70:14 <b>goes</b> 28:24 45:19 104:6 143:1 152:2 181:17 <b>going</b> 8:19 47:6 70:5 83:23 85:4 102:2 106:24 115:19 123:4,4 128:3 133:5 137:12 144:18 146:5,19 151:22 160:23 162:3 165:15 166:3 171:3 173:2 196:6 199:21 200:21 224:24 228:13 <b>gonna</b> 8:9,14 61:24 108:18,19 108:20 116:13 117:5,6 130:11 135:1 142:15,15 144:21,22,23 145:24 147:16 147:17 148:21 149:7 157:20 177:20 192:5
--	---	---	--	---

197:2,11 209:15 225:13 <b>good</b> 5:2 6:9,15 12:15 17:2 34:23 61:11 86:22 91:11 99:17 153:4 175:7 186:6,19 191:24 192:18 192:22 194:13 195:6 196:8,24 197:7 227:20 <b>Google</b> 143:1 <b>governed</b> 5:21 <b>government</b> 9:2 <b>grab</b> 174:21 <b>gradation</b> 180:22 180:23 <b>grade</b> 84:24 222:12 224:5 <b>graded</b> 200:12 224:3 <b>grading</b> 135:15 <b>graduate</b> 70:1 <b>grain</b> 40:8 152:10 <b>grained</b> 151:21,22 <b>grains</b> 146:12 <b>Grand</b> 2:19 <b>Granted</b> 174:17 <b>gravel</b> 32:15 33:8 33:19 41:13 49:18 66:18 74:21 94:17,22 129:3 130:18,22 132:21 133:11 133:13 134:20 138:3 160:13 172:4 180:1,2 205:7 206:12 207:11,16,20 208:2,22 209:6 209:22 211:1,15 211:18 212:22 213:21 214:8,10 217:1 227:6	<b>gravels</b> 226:15 <b>gray</b> 33:9 74:12 90:17 131:1,21 132:2 <b>Great</b> 13:6 15:3 17:1 21:9 23:1 29:16 46:13 48:17 52:6 57:10 60:3 81:4 88:11 103:3 108:23 111:6 133:24 137:24 139:10 140:12 142:1,12 143:20 148:23 154:10 156:18 182:18 193:18 205:16 208:19 210:22 213:24 219:6 226:17 <b>greater</b> 159:15 223:11 224:6 <b>ground</b> 22:16 122:8 135:23 136:18 137:3,4 138:2 142:19,24 147:17 176:1,7 177:3 <b>groundwater</b> 9:16 9:19 10:7,8,11 10:12,20,21,23 11:1,2 12:19 21:21,23 22:3,11 25:21 35:20 36:17 37:5,7,8 43:13 44:5,8,14 44:19 45:5 51:12 52:11,13 52:16 54:9 55:12 58:16,21 62:24 63:8 86:2 86:20 100:7,13 100:16 102:8,9 102:12,17,18 104:5,8,10,18	105:5,15,22,24 106:1,4,16 107:1 107:4 110:13,22 111:12 112:18 112:24 113:22 117:10,10,19 118:4,6,12,15 119:6,9,18 120:2 120:2,11,12,13 120:16 121:4 122:7,11,22 123:4,7,10 125:9 125:19,21 127:2 128:18 134:9,10 134:22 135:18 135:20,22 136:12,13,14,22 137:4,9,16,19,21 138:4,13 140:3 140:16 141:6 144:5 145:14,20 146:1,6,11,18 147:9 148:1 149:2,15 152:24 154:1,6,17,21,24 155:4,4 160:9,11 160:15,22 161:1 161:15,19 162:8 162:11 163:24 164:4,8,10,11 165:4,12,18 167:5 182:4,13 195:1 196:17 225:20 <b>group</b> 99:19 100:1 100:9 165:3 <b>groups</b> 45:15 <b>growing</b> 74:17 <b>grown</b> 140:21 <b>grubbing</b> 223:9 <b>GS29-GT-2</b> 31:14 <b>GS29-GT-3</b> 32:4 <b>GT-2</b> 32:1,19 <b>GT-3</b> 32:16,19 <b>guess</b> 13:4 61:1	74:23 75:14 80:6 82:20,21,23 86:21,22 91:21 92:21 94:1,3 101:16 111:23 142:5 150:1 151:4 171:11,16 176:14 193:7 207:10 215:10 216:8 218:11 <b>guidelines</b> 184:17 185:4,9,13 <hr/> <b>H</b> <hr/> <b>H</b> 4:17 <b>half</b> 33:6 73:4,5,6 79:16 132:17 <b>half-inch</b> 80:18 <b>Halloran</b> 1:14 2:3 5:1,3 6:11,13,20 7:1 12:21 13:2,8 13:12 23:2 24:9 24:12,16,21 33:13 34:6,9,13 41:7,19 42:8,11 42:14,16,20 43:16,19 49:13 49:24 50:7,10,13 63:4 66:11,14,23 67:5,10,13,17,21 95:10,23 96:3,6 96:10 103:17 109:5,9,12,16,20 162:14,17,21 167:11,15,18,21 174:23 175:1,7 228:5,7,11 <b>handbook</b> 99:3 <b>handle</b> 66:2 90:4 <b>handled</b> 73:2,16 74:14,22 90:9,10 90:11 <b>handling</b> 181:7 <b>hands</b> 74:3 100:22 <b>handwriting</b>	47:11,14 48:13 <b>handy</b> 52:7 <b>happen</b> 15:21 87:3 <b>happened</b> 16:20 22:15 47:16,17 94:11 186:15 <b>happening</b> 87:18 <b>happens</b> 80:8,21 82:6 155:8 184:9 <b>hard</b> 55:3 84:24 174:15 <b>harden</b> 183:22 <b>hardened</b> 80:5,16 81:1,13 82:8,18 89:4 91:3 <b>hardening</b> 88:21 <b>hardware</b> 39:5 <b>hate</b> 109:5 <b>hazardous</b> 98:21 100:17 <b>HDPE</b> 8:5 11:18 11:19,20 12:14 12:18 65:21 87:6,15 94:4 135:17 162:1,2 170:10 171:15 172:12 186:10 192:10,14,24 193:4,9,13,14,17 194:12,19,22 195:6,8 196:10 196:15 197:2,5,9 197:10 199:7 202:11,16 203:15 205:14 206:7,14,19 208:4 216:24 223:16 224:15 227:8,9,13 <b>head</b> 62:1 112:20 <b>health</b> 165:3 <b>hear</b> 8:9 9:21 10:14 12:4 83:3
---	---	---	--	---

83:4 95:15 142:22 <b>heard</b> 54:4 57:15 69:18 85:16 110:24 112:7 119:11 124:14 129:6 153:10,16 153:24 182:3,24 <b>hearing</b> 1:13 2:3 5:1,3,18 6:11,13 6:15,20 7:1,14 12:21 13:2,8,12 23:2 24:9,12,16 24:21 33:13 34:6,9,13 41:7 41:19 42:8,11,16 42:20 43:16,19 49:13,24 50:5,7 50:10,13 63:4 66:11,14,23 67:1 67:5,10,13,17,21 95:10,23 96:3,6 96:10 103:17 109:5,9,12,16,20 162:14,17,21 167:11,15,18,21 175:1,7 228:7,11 229:9,12 <b>hearings</b> 17:18 <b>heavier</b> 126:18 142:23 <b>heavy</b> 18:18 21:18 88:13,18,24 92:19 128:10,11 <b>height</b> 26:20 <b>held</b> 1:12 5:18 20:14 184:11 <b>help</b> 172:1 202:19 <b>helpful</b> 127:14 <b>helps</b> 129:15 <b>Hi</b> 41:12 <b>high</b> 70:9,13 73:19 87:5 149:2 155:16 156:4 172:23	<b>high-density</b> 8:4 <b>higher</b> 57:6 60:18 60:22 112:8 125:17 126:14 153:12 156:11 156:24 157:8,15 158:4 159:2,5 160:6 <b>highest</b> 125:8 <b>highly</b> 86:24 131:15 182:16 225:8 <b>highway</b> 75:17 106:12 126:1,3 131:6 143:2 144:11,12,17,18 145:2 146:7 149:10,13 184:16,17,24 195:14 <b>hire</b> 191:13 <b>historical</b> 62:16 62:17 105:4 123:24 145:20 145:21 <b>historically</b> 107:20 119:2 <b>histories</b> 216:5 <b>history</b> 7:19 130:16 173:1,19 177:18 178:3 195:3,22 196:7 208:2 210:24 211:2,5,10,20 213:2 214:21,22 215:7,13,19 217:6 218:12,21 219:5 225:5 <b>hits</b> 144:23 <b>hold</b> 26:1,2 69:14 <b>holding</b> 89:15,18 90:16 <b>holds</b> 81:18 <b>hole</b> 227:13 <b>hollow</b> 26:18	<b>Home</b> 84:19 <b>honestly</b> 99:15 <b>honesty</b> 98:13 <b>hopefully</b> 189:7 <b>horizontal</b> 200:12 201:2 219:19 220:12,17 <b>horizontally</b> 176:18 220:18 <b>Horton</b> 2:6 6:4 23:5 <b>hose</b> 18:15,17 <b>host</b> 109:13 <b>hour</b> 1:19 96:7 <b>hours</b> 84:21 <b>huge</b> 79:2 <b>human</b> 165:3 <b>hundred</b> 107:11 156:16 <b>hundreds</b> 26:6 73:16,17 <b>Hunt</b> 130:14 141:4 147:3 <b>Hunt's</b> 130:8 134:16 139:11 141:2 146:22 156:19 159:7,21 206:24 214:1 217:19 <b>hydrate</b> 77:24 78:4,7 80:4 84:12 85:2 88:1 88:8 <b>hydrated</b> 75:9,10 76:4 183:14 184:13 <b>hydration</b> 84:16 <b>hydraulic</b> 149:5 150:19 165:21 165:24 <b>hydrogen</b> 83:24 <b>hydrogeologic</b> 36:15,20 <b>hydrogeologist</b> 51:4	<b>hypothetical</b> 87:10,19 93:15 <hr/> <b>I</b> <hr/> <b>i.e</b> 81:12 <b>ice</b> 46:2 48:6 149:16 <b>idea</b> 68:11 106:23 122:23 147:5 <b>ideal</b> 56:14 61:5 <b>ideally</b> 112:4 <b>identifiable</b> 28:16 <b>identification</b> 127:17 129:11 129:16 131:20 175:9 <b>identified</b> 40:23 41:21 131:18 137:13 179:21 180:5,6,14,17 181:22 213:22 226:10 <b>identifies</b> 12:8 47:5 <b>identify</b> 27:6 28:5 28:18 32:20 35:19 38:13,15 41:22 123:5 <b>IEPA</b> 2:22 6:20 <b>ILL</b> 1:7,9 <b>Illinois</b> 1:1,14,16 1:18 2:13,16,21 5:3,22 6:24 7:13 8:7 9:15 15:13 22:23 29:20 36:4 46:16 51:19 52:15 53:21 54:1,10,13 55:4,10 56:5 72:10 91:6,12 97:15 105:12,17 111:4 112:3,15 112:20,22 115:1 120:5 123:15,18 123:22 124:12	124:16,18 126:7 126:8 130:7 141:5 164:22 168:19 169:1 172:16 180:22 206:6 229:1 <b>immediate</b> 141:16 144:7,9 <b>immediately</b> 106:12 144:18 147:11 <b>immersed</b> 85:6 <b>impact</b> 36:17 102:10 107:1 121:6 122:24 123:4 136:24 137:12 138:6 145:6 <b>impacted</b> 10:23 124:4 144:10 145:12 161:20 <b>impacts</b> 92:17 93:9 102:19 121:3 <b>impermeable</b> 87:5 152:7 <b>implemented</b> 105:13 <b>implementing</b> 100:15 102:5 186:5 <b>implication</b> 206:18 <b>implies</b> 216:20 <b>important</b> 84:12 159:4 184:4,5,19 184:20 196:21 201:20 <b>importantly</b> 97:22 <b>impoundment</b> 8:1 9:17 18:1 104:2 104:12,13 171:17 175:19 187:21 188:5,8 189:5 200:16
---	--	---	---	--

207:15 208:21 216:15,20 223:12 <b>impoundments</b> 7:12 9:1,5 11:18 100:18 101:4,24 105:16 171:6,8 185:20 187:18 188:12 <b>in-depth</b> 70:11 <b>INAPPLICABL...</b> 1:8 <b>inappropriate</b> 205:14 <b>incapsulated</b> 85:19 <b>inches</b> 9:12 125:4 198:9 202:5 223:11,13 224:6 <b>include</b> 38:17 159:12 201:9,14 <b>included</b> 17:17 20:4,4 53:6 94:20 132:20 135:13 219:1 <b>includes</b> 12:14 48:22 54:16 93:15 100:19 <b>including</b> 8:1 9:10 16:3 36:16 79:1 102:15 108:22 185:18 206:11 <b>inclusions</b> 108:14 <b>inconsistent</b> 115:22 <b>incorporated</b> 69:2 88:6 <b>incorporating</b> 87:4 <b>incorrect</b> 72:15 <b>increase</b> 70:14 113:14 <b>increases</b> 114:5 115:20 116:10 <b>increasing</b> 79:3,6	<b>Indiana</b> 36:4 70:11,11 97:15 101:9,24 <b>indicate</b> 49:6 59:5 91:15 110:18 116:15 118:22 128:6 147:5 148:4 151:23 157:8,17 182:4 182:13 191:8 208:14 226:13 <b>indicated</b> 106:21 120:21 121:16 121:22 130:4 147:14 148:19 150:20 169:5 <b>indicates</b> 105:5 108:11 162:11 <b>indicating</b> 114:20 132:3 159:15 <b>indication</b> 190:12 <b>indicative</b> 104:10 134:12 136:23 140:11 <b>indicator</b> 119:19 121:3 <b>indicators</b> 118:18 191:8 <b>indistinguishable</b> 90:14 <b>industrial</b> 79:21 124:4 <b>industry</b> 29:9 124:4 190:19 <b>inert</b> 81:20 82:3,4 82:7,21 <b>infiltrate</b> 140:8 144:11,21 <b>infiltrates</b> 140:7 <b>infiltrating</b> 144:6 149:14 <b>infiltration</b> 141:15 163:4,17 163:23 164:6 <b>inform</b> 111:2	158:22 176:22 176:24 182:10 197:6 <b>information</b> 48:14 127:9 134:19 139:4 143:12,18 151:20,23 152:20,23,24 219:2,3 <b>informs</b> 165:15 <b>ingredient</b> 80:6,7 <b>ingredients</b> 8:16 75:23 89:1 <b>inherent</b> 87:9 <b>initial</b> 48:10 51:13 <b>initialed</b> 48:16 <b>initially</b> 186:2 198:8 <b>initials</b> 45:13 <b>initiate</b> 185:16 <b>initiated</b> 185:17 <b>inline</b> 45:19,23 <b>inorganic</b> 53:6 <b>insert</b> 11:24 12:1 <b>inside</b> 23:12 122:8 122:12 <b>insofar</b> 189:3 <b>insoluble</b> 84:14 85:2 87:22 <b>inspections</b> 102:7 <b>install</b> 9:18 37:13 37:13 75:18 192:2 202:15,16 205:14 <b>installation</b> 9:20 10:5 192:10 197:18,22 199:12 204:8 <b>installed</b> 37:3,11 37:20 44:6 52:17 75:12,21 94:4 171:15 185:12 188:14 191:6,18,19 193:9,14 195:7	196:10,10 198:13 199:8 202:13 204:20 204:22 205:2,5 217:1 223:17,21 224:15,16 <b>installer</b> 224:2 <b>installing</b> 197:17 201:8 <b>instance</b> 122:5 134:8 148:9 <b>instances</b> 102:9 158:6 165:7,9 208:16 <b>instructed</b> 59:19 175:18,24 176:7 187:5 190:6 <b>instructions</b> 48:9 <b>instrument</b> 45:8 <b>instruments</b> 155:12 <b>insurance</b> 205:1 <b>intact</b> 191:24 <b>intake</b> 143:3 <b>integrity</b> 194:18 194:21,24 197:16 223:17 227:22 <b>intend</b> 21:12 <b>intends</b> 110:12 111:1 <b>intention</b> 22:24 <b>intentionally</b> 181:8 227:19,23 <b>intentions</b> 22:23 <b>interest</b> 8:24 9:14 184:23 188:10 212:1 220:8 <b>interject</b> 23:3 <b>internal</b> 59:17 214:9 <b>interpret</b> 122:6 191:19 209:6 <b>interpretation</b> 131:24 209:3,5	<b>interrupt</b> 109:6 109:13 <b>intersected</b> 164:6 <b>introduce</b> 6:7,13 <b>introducing</b> 42:15 <b>intrusions</b> 224:5 <b>investigate</b> 150:8 <b>investigated</b> 206:17 <b>investigating</b> 165:11 <b>investigation</b> 9:6 9:9 100:7 109:2 132:16 150:16 177:15,16 178:6 178:7,8 213:8,10 213:12 <b>investigations</b> 51:14 69:7 100:8,12 123:24 145:21 150:9 <b>invite</b> 219:7 <b>invoice</b> 203:17,18 <b>invoices</b> 11:11 202:22 203:12 225:6 <b>involved</b> 70:6 100:14 105:19 <b>involves</b> 102:6 <b>ion</b> 126:14,20 <b>Iowa</b> 97:11 <b>irregularities</b> 224:3 <b>issue</b> 59:16 62:12 196:18 <b>issued</b> 36:23 71:17 189:20,23 <b>issues</b> 52:2 153:8 157:17 160:2,3 161:8 <b>it'll</b> 21:13,13 103:14 <b>items</b> 206:5,9
--	--	---	---	---

---

**J**


---

<b>jackhammer</b> 26:14,14	169:2	25:11,22 43:10	203:22 204:3	203:8 205:9
<b>January</b> 51:8	<b>key</b> 121:2	43:23 50:24	<b>largely</b> 146:19	225:21
71:23 172:18	<b>kick</b> 159:5	51:10,21,22	<b>larger</b> 61:22	<b>left-hand</b> 128:8
174:7 186:22	<b>kid</b> 74:23	52:11 53:12	174:14,16	<b>length</b> 175:17
<b>jar</b> 59:6 60:22	<b>kilogram</b> 125:6	54:23 55:23,24	178:14	<b>let's</b> 22:21 29:18
61:4	<b>kind</b> 8:12 26:13	65:12 178:6	<b>LaSalle</b> 2:11	30:12 31:8
<b>JB1</b> 179:8,14	28:18 74:4 84:5	180:16 181:3	<b>late</b> 71:15	36:19 40:10
<b>JB2</b> 179:8,14	93:8 107:9	208:16	<b>latent</b> 57:5	48:18 54:12
<b>Jersey</b> 101:24	220:23 221:1	<b>KPRG's</b> 177:14	<b>lateral</b> 163:4,17	55:9 58:7 67:13
<b>job</b> 98:3 202:22	<b>kinds</b> 204:18	213:10	164:1,5	103:7 141:13
203:12,17,18	<b>know</b> 19:2 23:5,14	<b>Kristin</b> 2:9 6:16	<b>LAUGHRIDGE</b>	142:14 146:22
<b>Joliet</b> 1:18 5:7 7:8	23:18 24:3,7	<b>Kroll</b> 3:11 9:22	2:9	165:13 173:4,15
7:16 9:11 12:11	36:10 41:24	34:15,18 35:1,2	<b>Lauren</b> 130:8	187:13 198:22
14:2,4,21 15:10	43:17 59:9 61:1	41:2	206:23	215:6,15 217:12
17:23 30:9,13	61:1,11,22 64:23		<b>law</b> 99:6 111:2	218:7 222:20
33:19 36:16	72:4 73:3,22	<b>L</b>	<b>laws</b> 99:6	<b>level</b> 35:17 60:20
37:4 40:22	74:18,21 82:8	<b>lab</b> 46:2,3,11	<b>lay</b> 197:2	61:21 73:9,19
41:14 44:8 45:4	83:9,14,15,24	54:17 59:11,18	<b>layer</b> 18:11,12,19	106:22 155:20
49:18 54:6	84:17,21 85:3,4	59:19,21 73:7	21:15 28:18	172:23 191:7
55:20 56:9	85:9,16 86:4,7	155:6,8,21	31:19 172:5,8	<b>levels</b> 61:20
63:20 66:18	88:9 89:14	156:10 158:18	212:23 227:7,7	<b>license</b> 1:24 98:15
75:21 80:11	93:13,24 94:6,9	161:11,14	<b>layers</b> 172:1 217:2	98:17 169:19
89:21 90:23	95:1,5 105:20	<b>label</b> 45:12 67:2	227:13	<b>licensed</b> 36:3 71:3
92:5,10,14 94:17	111:16 112:19	<b>labeled</b> 103:11	<b>leach</b> 85:11 86:19	71:6,7 97:14,21
94:22 101:22	123:17 124:4	179:8 188:22	108:21 160:23	98:9 99:2
117:23 119:13	129:8 145:2	189:19 209:14	161:10	168:24 169:2,10
122:22 130:16	156:6 158:14	<b>labeling</b> 45:14,18	<b>leachable</b> 33:20	170:3
132:13,14,18	159:3 161:11	<b>laboratory</b> 47:2,5	41:15 49:19	<b>licenses</b> 25:24
166:23 167:1	166:16 186:20	47:9,22 48:3,9	66:19 94:18,19	36:1 51:16
171:12,14 173:1	196:22 210:17	56:17 124:1	94:24	97:12
175:14 185:19	220:12 221:21	137:23	<b>leachate</b> 10:21	<b>licensing</b> 168:22
186:10 198:2	<b>knowing</b> 125:23	<b>laboratory's</b> 47:6	85:9 119:18	<b>lieu</b> 191:11
218:17	126:1	<b>lack</b> 121:4 125:24	121:9,10,11,16	<b>life</b> 70:15 192:11
<b>JP1</b> 179:13	<b>knowingly</b> 206:11	138:24	121:19,21 122:1	192:19
<b>July</b> 114:13,18	215:1	<b>laid</b> 28:9	122:14,18,21	<b>lighting</b> 209:19
115:15	<b>knowledge</b> 33:18	<b>land</b> 148:21	<b>leaching</b> 86:10	<b>lime</b> 8:15 75:9
<b>June</b> 1:18 5:4	33:22 41:13,16	<b>landfill</b> 12:16	137:5 139:8	76:4 77:9,22
228:15,18	49:17,21 66:17	101:10 102:4	161:6,23	78:2 80:15 81:2
	66:21 86:11	122:10 188:13	<b>lead</b> 119:2 197:14	81:13,15 82:13
<b>K</b>	92:7,11,15 94:16	<b>landfills</b> 100:17	198:16	82:14 83:21
<b>K</b> 229:3	95:1 150:2	101:2,5 105:17	<b>learn</b> 98:1,2	183:6,14,14
<b>K-r-o-l-l</b> 35:1	214:24	105:19	<b>leave</b> 197:8	184:13
<b>Kelly</b> 48:11,15,20	<b>known</b> 169:19	<b>large</b> 12:7 19:17	<b>leaving</b> 136:9	<b>limestone</b> 133:12
<b>Kentucky</b> 26:3	193:24 212:7	103:9 158:8	<b>leeway</b> 156:3	<b>limit</b> 79:23 114:16
	<b>KPRG</b> 10:13	189:7,12 197:13	<b>left</b> 148:3 194:13	115:3,16

<b>Lincoln</b> 7:22 10:22 16:8,12,18 119:13,18 120:10 121:7,13 122:19,20 <b>line</b> 45:24 142:23 174:6 176:1 185:13 204:20 211:3 <b>line-by-line</b> 157:22 <b>lined</b> 20:1 198:8 <b>liner</b> 7:7 8:4,9 11:20 12:14,17 17:24 18:9,13 19:21 20:3,4,5 21:13,16,19 23:15 65:17,21 75:21 86:18 87:6,15 88:4,5,7 88:13 89:3,20 90:1,1 92:17,23 93:6,13,24 94:3 94:4 135:6,17 162:1,2,3 164:9 164:10 170:11 171:15,24 172:1 185:5,11 186:2,6 186:11,17 187:20,21 188:11,13,14 189:15 190:7,9 190:12 191:8,20 192:9,10,12,12 192:14,17,20,22 192:24 193:5,9 193:11,13,14,15 193:15,16,17,23 194:1,3,12,15,16 194:19,19,22 195:1,5,7,8 196:9,10,11,13 196:15,18,23 197:2,6,9,10,15 197:16,21 199:8	199:10 200:10 200:11 201:8 202:11,13,16 203:14,15 204:9 204:22 205:2,9 205:14 206:8,14 206:19 208:4 215:24 217:1 222:17 223:6,9 223:20 224:10 224:16 225:18 226:1 227:9,9,10 227:13,19,23,24 228:2 <b>liner's</b> 223:16 <b>liners</b> 11:18,20 195:21,23 196:2 196:4 198:9 <b>lines</b> 130:12 141:4 <b>lining</b> 94:2 220:9 <b>linking</b> 144:4 <b>liquid</b> 57:2 101:4 <b>liquids</b> 101:5 <b>list</b> 53:5 <b>listed</b> 124:13 188:8 <b>lists</b> 124:11 <b>liter</b> 63:9,17,18 114:10,15,17 115:17 117:16 117:20,24 121:18,21 125:10 <b>literally</b> 82:2 86:5 <b>little</b> 7:18 26:4 32:14 43:17 57:7 62:1,13 70:13,18 71:1 73:18 76:22 80:17 81:23 86:23 90:15 143:14,16 156:3 159:1,5 <b>live</b> 98:8 <b>LLC</b> 1:5 2:14 5:6	6:19 <b>LLP</b> 2:8 <b>load</b> 15:14 94:1 <b>loads</b> 94:9 <b>locally</b> 133:12 <b>located</b> 104:19 121:13 122:4,7,9 178:23 179:14 179:15 <b>locates</b> 179:10 <b>location</b> 12:9 30:17 62:17 103:16 105:9 106:7 179:7 <b>locations</b> 106:7,8 124:2 178:4 180:14 <b>log</b> 9:10 28:21,23 29:11 31:13,14 32:3,4,21 33:2,3 33:5 37:14,21 40:17 68:11,12 95:16 132:22,23 134:5 <b>logged</b> 9:8 26:8 31:10 32:5 37:22 110:4 132:19,24 133:23 134:1 <b>logging</b> 26:5 28:4 28:20 30:3 31:5 100:19 129:17 <b>logs</b> 11:13 28:4 31:5,9 32:24 40:1 41:4 68:13 108:3 109:1,3 110:1,2,4 130:5 134:2,5,6,7 140:16 150:7,13 178:23,24 179:3 179:4,11,17,20 179:21 180:5,5,6 180:11,11,12 181:23 191:15 208:13 213:14	213:18,19 226:10,13 <b>long</b> 7:3 9:2 14:4 14:13 25:22 35:22 43:23 51:6 58:1 71:22 79:19 99:21 101:13,13 116:14 135:24 149:23 151:8 170:20 176:9 <b>longer</b> 193:2 194:11 <b>longest</b> 101:8 <b>look</b> 26:16 28:7 31:8 32:24 33:2 39:18,24 40:3,4 40:8,10 44:17 47:10,13 48:18 48:23 55:5 56:7 57:24 58:13 60:11 61:2,2,3,5 62:3,7 64:2 68:2 79:17 84:22 90:15 115:7 118:21 119:20 124:15 126:6,8 141:13 143:14 144:16 145:14 148:2 175:16 188:2 214:2 216:1 217:21 223:22 <b>looked</b> 60:12 104:5,7 107:6 118:23 119:17 120:10 121:9 123:20 124:19 128:9,11 132:15 134:5 145:18 148:5 157:12 174:1 177:13 180:11,12,12 185:19 189:19 198:15 210:8,10	211:8 218:11,12 <b>looking</b> 28:3 31:10,19,23 32:3 37:16 52:7 60:4 60:5 64:20,21 71:9,13 73:12 90:21 100:22 114:7 119:23 125:22 126:1 142:17 143:8 171:14 175:12 176:3 177:24 181:13 189:12 199:24 203:12 204:2,15,17 209:21 210:23 211:9 213:7 215:12 216:5,16 217:10 218:14 219:10 <b>looks</b> 28:23 73:18 90:11 167:22 214:22 218:13 <b>loose</b> 224:4 <b>lose</b> 62:2 98:17 <b>losing</b> 202:8 <b>lot</b> 21:16 25:20 43:13 58:20 73:13 86:9,9 87:2 105:13 133:6 162:4 <b>Louis</b> 127:21 <b>low</b> 12:13 45:7 60:20 61:20,21 108:10,10 155:16 156:5 171:17 193:3 <b>lower</b> 57:7 62:6 65:19 108:20 159:5 166:4,7 <b>lowered</b> 65:16 <b>LPG</b> 99:12,16 <b>lunch</b> 96:1 <b>Lundy</b> 170:18,21 170:22 171:1
--	--	---	---	--

<b>M</b>				
<b>M</b> 2:10	<b>manner</b> 91:20	201:23,24 202:1	<b>maximum</b> 125:18	<b>meet</b> 72:17 91:1
<b>M-a-r-k</b> 43:8	<b>map</b> 30:16,17	202:5,6,10,13,14	<b>Maxwell</b> 4:7	<b>meeting</b> 59:17
<b>M-a-t-e-u-s-z</b>	37:16 44:17	202:17 203:1,9	10:18,19,24	206:15
68:22	52:7 107:2	203:12,13,19	11:21 96:12,15	<b>megawatts</b> 15:12
<b>M-a-x-w-e-l-l</b>	179:9 180:14	204:24 205:7	96:20,22 97:1,16	<b>Member</b> 2:4,5
96:23	216:8 217:5	206:11 208:15	98:20 103:20	<b>members</b> 5:9 6:1
<b>M-i-c-h-a-e-l</b>	<b>maps</b> 216:14	208:18 209:6,7	104:3 111:11	6:2,16 83:2
96:22	<b>march</b> 71:15,15	209:22,23	112:7,11 113:18	<b>membrane</b> 87:19
<b>machine</b> 65:15,19	116:22 186:22	210:10,12 212:9	116:19 117:9	171:15
<b>machinery</b> 18:18	204:4 205:23	214:24 217:20	123:9 125:12	<b>mention</b> 184:15
21:18 92:20	209:8 210:15,17	219:16,24	128:17 129:8	<b>mentioned</b> 29:4
93:8	217:14,15,16,16	220:15 221:4,5	135:2 137:1	83:6 107:7
<b>magnesium</b>	<b>mark</b> 3:15 10:14	221:22 222:1,5,8	138:19 140:23	111:11 112:11
126:16	43:1,8 58:19,20	222:16 223:13	142:17 143:21	123:2 124:7
<b>magnitude</b> 125:16	64:11 175:4,5	223:15 227:11	147:2 148:24	158:17 209:21
<b>maintain</b> 98:6	<b>marked</b> 4:18	228:1	150:2 152:13	<b>metal</b> 10:15 11:1
221:2,6	127:17 175:9	<b>materials</b> 69:5,6	153:6 160:8	46:5 53:16,19
<b>maintained</b>	<b>marker</b> 191:5,6	69:20,23 70:21	162:22 169:5	56:13 60:22
220:22	191:17,18 192:2	72:22 73:8	182:1	124:7 128:10
<b>maintaining</b>	209:13,16	77:16,17 78:14	<b>Maxwell's</b> 182:3	156:11,12,24
102:6	210:11	78:23 85:20	182:10,12	157:2,9,15
<b>maintenance</b> 9:4	<b>markers</b> 131:20	86:2 88:17	<b>mean</b> 20:11,22	<b>metals</b> 10:9,9,12
9:14 14:10	<b>master's</b> 69:14,15	94:18 98:21	30:5 57:4 58:4	10:12 33:20,21
172:3	97:10 168:18	102:10 103:24	79:10,13 95:3	41:15,15 46:6,7
<b>major</b> 103:11	169:12	131:17 132:23	99:14 102:21	46:9,12 49:9,19
<b>majority</b> 7:21	<b>material</b> 18:11,13	134:12,21	118:16 120:7	49:20 53:9,9,24
16:7 106:21	21:14 29:1	140:11 150:22	122:6 152:4	56:20,24 57:5
157:13 158:3	40:23 72:12	164:7 170:5	158:24 180:19	59:2,7 60:1,6,12
<b>making</b> 73:7,7	74:20 75:7	173:12 176:21	183:19 202:9	60:15,16,18,19
79:9,10 183:7	76:18 77:21	179:22 183:21	<b>meaning</b> 87:24	61:4 66:19,20
<b>manage</b> 14:10	82:5,8,19 84:14	212:1,3,7,10,21	<b>means</b> 70:20	88:13,18,24
100:5	86:19 88:1,7	213:20,21,22	118:19 175:15	94:18,19,24,24
<b>managed</b> 14:4	89:5 90:11 91:3	215:2 221:10	202:10 220:3	112:6,8 126:18
<b>management</b>	93:18,19 94:11	226:9,14,15	<b>meant</b> 70:20	126:23 128:11
15:15 58:22	101:12 122:16	<b>Mateusz</b> 4:3 68:5	132:1 197:21	128:15 153:12
<b>manager</b> 7:18	131:2 133:18	68:21	225:10,11	153:12 157:7,7,8
14:2,9,17,20,24	134:20 138:3	<b>matrix</b> 8:18 81:17	<b>measured</b> 63:16	157:13 158:3,5
35:5 98:21	140:19,19	84:3 89:5 90:17	<b>measurement</b>	159:16 160:4
99:24	160:21 177:2,6,8	184:11	63:13,17	161:6,23 164:11
<b>manages</b> 58:21	177:9,12 180:16	<b>Matt</b> 8:10 86:15	<b>mechanism</b>	164:13,14,16,16
<b>managing</b> 71:10	180:17,24 181:1	<b>matter</b> 1:3 5:5,6	126:13	164:20,23 165:5
100:23	181:6,20 182:14	15:6 36:7 89:22	<b>mechanisms</b>	165:7
<b>Mann-Kendall</b>	182:16 183:5,22	89:22 99:3	128:21 137:9,18	<b>method</b> 22:17
106:17,18	183:24 184:22	101:22 112:17	<b>medium</b> 31:21	26:13,19 27:5,11
	193:24 201:8,9	228:14	33:7 74:1	34:1 37:15



155:24 156:2,2,3 <b>methodology</b> 18:9 155:10,11,22 <b>methods</b> 26:7 34:2,3 154:4,5 155:23 <b>mg/L</b> 63:1 <b>mic</b> 43:17 <b>Michael</b> 4:7 10:17 96:12,15,22 <b>micron</b> 45:19 56:16 154:9 <b>mid</b> 9:3 <b>middle</b> 30:19 188:5 <b>Midwest</b> 1:5 2:14 4:19 5:6 6:19 7:5,9,10 8:3,5 8:23 9:3,15,17 10:6,10 12:4 13:24 14:13,15 14:22 18:8 20:17 21:3,23 22:5,22 23:11 36:11,12,15 44:2 51:22 55:1 56:4 65:2,9 67:24 72:4 81:9 110:11 111:1 112:9 120:4,5 136:7,11 138:11 141:5 147:8 149:19 150:2 171:12 178:19 178:24 185:15 185:15 186:15 187:1,18 188:22 189:1,20 192:8 192:16 194:24 195:20,23 196:3 200:4 202:23 205:21 206:7,10 208:5,9 214:7,23 225:16 <b>migrate</b> 146:21	<b>migration</b> 146:19 <b>Mike</b> 182:1 <b>mile</b> 132:17 <b>miles</b> 86:5 89:21 <b>milligram</b> 117:16 <b>milligrams</b> 63:9 63:16,18 114:10 114:15,16 115:17 117:20 117:24 121:18 121:21 125:5,10 <b>millimeters</b> 131:18 <b>million</b> 19:18 125:6 <b>mind</b> 40:2 88:10 119:4 163:14 <b>mine</b> 127:11,20 <b>mineral</b> 78:15 <b>minerals</b> 108:13 108:17 123:14 <b>minimal</b> 158:15 <b>minimum</b> 85:23 164:8 183:18 <b>minor</b> 201:4 <b>minus</b> 150:20,21 155:15 166:6,6 <b>minute</b> 80:14 82:2 109:17 <b>minutes</b> 68:12 88:15 95:17 96:3 109:8,11 162:17 <b>missed</b> 19:9 <b>mix</b> 77:9 82:18 84:17,20 88:7 <b>mixed</b> 133:11 <b>mixes</b> 70:10,17,20 73:7,8,8,12 78:24 79:17 146:1 <b>mixing</b> 80:9 183:14 <b>mixture</b> 75:8 78:15 80:23	81:16 82:16 132:20 183:13 185:4 <b>mixtures</b> 70:15 185:6,7 195:18 <b>mixup</b> 158:9 <b>mobilized</b> 127:1 <b>model</b> 212:11 <b>modifying</b> 135:14 136:8 <b>moist</b> 33:8 <b>moisture</b> 210:2,11 <b>molybdenum</b> 102:24 103:1 118:11 121:19 123:2 <b>moment</b> 162:15 <b>monitored</b> 111:13 121:14 136:12 136:14 164:24 <b>monitoring</b> 9:19 21:22 22:11,16 37:3,11,13,18,20 41:21 44:5 52:8 52:12,16 85:24 100:13,16 102:8 102:12 105:15 107:4,5,8,10,18 109:1 110:1,12 110:19 111:16 111:19,22,24 112:23 113:12 113:14,15,16,22 114:7,8 115:7,12 118:6 120:2,3,13 120:15,16,17,19 120:20 122:6,7,9 122:12 135:18 135:20,22 136:13 138:13 140:10 145:20 147:8 148:1,20 159:15 160:6,9 160:22 164:18 165:1 166:10	195:2 196:17 <b>monitors</b> 21:23 <b>Monthly</b> 23:22 <b>months</b> 149:14 <b>morning</b> 5:2 6:15 34:23 48:2,7 91:11 153:11 157:12 <b>motion</b> 5:14 <b>mounted</b> 227:3 <b>move</b> 5:12 17:19 21:5 23:3 65:1 77:4 146:15 205:18 <b>moved</b> 65:16 <b>moving</b> 23:11,16 149:11 185:14 <b>multicomponent</b> 87:4 <b>multilayer</b> 20:3 <b>multiple</b> 116:3 134:4 147:24 <b>Munsell</b> 27:1,13 31:6 38:19,21 39:1,13 129:7,9 129:18 130:3 <b>MW-04</b> 63:10 <b>MW-10</b> 61:8 105:3,5 106:13 146:3 166:9,15 166:16 <b>MW-3</b> 105:4 <b>MW-4</b> 61:8,19 63:2 64:2,3,6,20 105:6 118:1 128:24 <b>MW-9</b> 107:7 <b>MW10</b> 42:1 <b>MWG</b> 223:3 <hr/> <b>N</b> <hr/> <b>N</b> 2:17 3:1 4:1 <b>N-a-g-l-o-s-k-y</b> 13:21 <b>Naglosky</b> 3:3 7:17	13:7,13,18,20,23 15:4,10 17:12 19:3 22:21 56:3 110:24 <b>Naglosky's</b> 119:12 <b>name</b> 5:2 13:19 25:7 34:24 37:23,24 43:7 48:10,15 50:22 68:20,21,22 75:5 91:11 96:21 168:7 169:17 216:19 <b>national</b> 11:3 <b>native</b> 179:22 180:3 <b>natural</b> 7:17 15:18 16:22 126:6,8 137:9 173:12 176:21 187:19 213:21 216:2 221:1,2,10 226:15 <b>naturally</b> 123:12 123:13 <b>nature</b> 21:19 74:5 116:12,12,13 194:3,16 214:24 221:8 <b>near</b> 107:17 109:1 110:1 132:13 210:11 <b>nearby</b> 185:21 <b>necessarily</b> 105:13 107:7 132:4 133:23 142:10 154:23 156:7 <b>necessary</b> 226:11 228:3 <b>need</b> 23:5 35:21 64:10 87:7 91:21 98:9 161:22 162:15 162:15 184:5 227:22
--	---	---	--	--

<b>needed</b> 87:2 135:15 227:22	204:17	<b>O</b>	90:7 100:24	94:15 95:7 97:3
<b>needs</b> 146:12 201:24 202:7	<b>northeastern</b> 219:17	<b>O</b> 46:16 55:10	<b>officer</b> 1:13 2:3	97:6,12 101:7
<b>negative</b> 165:21 165:22,22,23	<b>Northern</b> 15:13	58:8 60:5 63:13	5:1,3 6:11,13,15	103:3,7 105:22
<b>negatively</b> 126:22	<b>Northwest</b> 101:9	64:7,12 229:3,3	6:20 7:1 12:21	107:17 108:3
<b>neither</b> 18:5 82:21 104:9 139:7	<b>northwestern</b> 219:21	<b>oath</b> 162:22 229:6	13:2,8,12 23:2	110:6,9,15 112:9
<b>network</b> 52:16 104:18 105:8	<b>notations</b> 204:5	<b>object</b> 7:13	24:9,12,16,21	113:3,10,20
107:8 120:16,21	<b>note</b> 17:23 28:24	<b>objection</b> 5:15,16	33:13 34:6,9,13	114:3,4,9 115:6
<b>networks</b> 105:15	187:4 188:10,10	67:2,4 163:19	41:7,19 42:8,11	115:11,13
<b>neutral</b> 161:10	188:20 189:22	166:24	42:16,20 43:16	116:18,21 117:5
<b>never</b> 40:1 156:16	190:6,8	<b>objectives</b> 124:8	43:19 49:13,24	118:21 125:20
<b>new</b> 77:23 78:5,6	<b>noted</b> 133:2 190:5	<b>objectivity</b> 129:11	50:5,7,10,13	126:10 127:20
82:14,22,22,23	191:9 200:18	<b>obligated</b> 98:12	63:4 66:11,14,23	129:5,6 130:6,10
97:9 101:24	208:16 219:15	<b>observe</b> 31:24	67:1,5,10,13,17	131:8,10,13,24
171:6 175:4	219:22 220:8	32:16	67:21 95:10,23	132:7,13 133:24
177:4 192:23	<b>notes</b> 188:7,8	<b>observed</b> 116:10	96:3,6,10 103:17	134:17 137:24
204:9	190:4,10 229:10	<b>obtained</b> 65:20	109:5,9,12,16,20	139:14,23 140:1
<b>Nijman</b> 2:8 6:18	<b>notice</b> 5:12 59:15	119:24 173:12	162:14,17,21	140:14 141:3,13
103:22	<b>noticed</b> 5:24	<b>obtaining</b> 171:22	167:11,15,18,21	141:21 142:2,13
<b>nine</b> 120:15	67:21	<b>obviously</b> 35:20	175:1,7 228:7,11	143:5,7,20
190:10 191:5,10	<b>noticing</b> 48:2	40:5 77:2 80:22	<b>oh</b> 40:1 64:10,22	144:20 146:22
192:2	<b>NRT</b> 216:2	85:2 98:7,18	71:15 73:3	147:1 148:16
<b>nod</b> 11:14	<b>number</b> 4:18 17:3	<b>occasion</b> 7:23	123:17 142:6	151:3,4 153:3,4
<b>Nodding</b> 145:15	17:8,20,22 36:15	<b>occasionally</b> 23:18	180:10 206:22	153:4,9,10 155:2
<b>nominally</b> 76:3	37:19 62:20	23:19	<b>okay</b> 5:16 7:2 15:3	156:15,22
<b>non</b> 84:14	70:3,5 81:5 87:8	<b>occur</b> 22:17 30:7	15:9 16:15,19	157:19 159:9
<b>non-CCR</b> 18:1,2	87:9,13 88:12	36:22 65:24	17:1,5,22 18:7	161:3 163:13
<b>nondetect</b> 61:7	97:21 103:12	113:16 137:10	19:19 20:21	167:9 168:13,16
<b>nondetects</b> 159:14	105:11 110:8	137:12 158:18	24:8 28:1 29:13	172:17 173:21
<b>nonfiltered</b> 45:17	111:8 113:8	<b>occurred</b> 18:6	29:24 30:16,24	175:11 176:13
45:22	125:16 131:17	102:19 157:5	31:13,19,23	176:20 177:9
<b>nonleachable</b> 84:9	138:10 149:8	158:9 218:3	32:12,23 33:4,5	178:11,18 179:5
<b>nonreactive</b> 82:3	176:6 178:16,19	<b>occurring</b> 120:19	33:12 34:9 36:9	182:21,23
<b>nonwoven</b> 204:23	187:20 190:5	123:12,13	37:16 38:19	187:10,12 188:2
224:14	191:2,10 192:5	128:20 137:18	39:24 40:10	188:16,17 189:6
<b>normal</b> 87:23	193:20 200:2,5	137:19,19	43:18 44:1,7,13	189:17 190:16
<b>north</b> 1:17 2:19	200:22 201:17	141:15,21	44:17 45:2 46:4	190:24 192:6
105:3 106:13	201:22 203:2,10	<b>occurs</b> 77:9	46:8,20 48:18	193:21 194:23
143:1 149:15	223:3 225:13	155:20	49:12 50:1 52:6	195:13 197:24
181:14	<b>numbers</b> 61:22	<b>October</b> 63:2,10	54:12 55:14	198:21,23 200:8
<b>northeast</b> 204:15	125:13 188:6	63:14,14,21 64:4	57:10,14 58:7	201:11,13 202:6
	<b>numerical</b> 27:5	64:5,13,13,14,15	65:5 66:9 68:18	202:20 203:21
	<b>numerous</b> 77:17	64:15	69:11 74:13	204:7 205:16,17
	79:13	<b>off-site</b> 173:13	78:8 81:8 83:12	205:19,20,22
		<b>office</b> 1:16 25:16	88:11 92:3,8,12	206:21 207:3,6,9
		47:21,21 48:5	92:16 93:4	207:23 208:19

210:23 211:13	182:3,7,11 188:3	200:15 224:2	133:9 134:15,18	<b>particular</b> 58:19
213:1 214:3,6,15	193:5 196:24	<b>oxidation</b> 108:13	139:13,17,19,21	59:8 62:5,12
214:17 215:8,15	197:6 198:10,10	108:19	140:5,12,13,17	65:17 88:2 90:1
216:7,13 217:18	200:9 221:7	<b>oxide</b> 78:1	141:2 146:23	108:9 128:13
219:9 222:19,22	222:8,15 225:2	<b>oxygen</b> 83:24	147:3,23 156:20	134:8,13 166:4
223:4 225:14	226:5,9 227:16	108:18	157:18,19 159:7	<b>particularly</b> 128:5
226:5 227:12	<b>opportunity</b> 6:9		159:8,13 200:11	195:24 220:7
<b>on-site</b> 173:13	17:2 70:3	<b>P</b>	207:4 210:24	<b>parties</b> 5:11 7:14
<b>once</b> 20:6 23:21	114:24 115:4	<b>P</b> 1:14 2:3 31:11	211:3 214:2,14	113:6
54:23 55:24	<b>opposed</b> 122:8	32:5	214:22 223:8,22	<b>parts</b> 61:21 81:22
56:23 77:4	<b>opposite</b> 60:20	<b>P-a-t-r-i-c-k</b> 25:8	223:24 224:8	94:8 125:6
82:15 83:10	158:7	<b>p.m</b> 68:11,14,16	<b>parameter</b> 59:12	<b>pass</b> 8:12 97:23
84:7 85:9 98:4	<b>optimization</b> 70:9	95:16	<b>parameters</b> 45:1,8	<b>passage</b> 10:10
126:16,24	<b>order</b> 36:16 47:2	<b>P.O</b> 2:20	45:16,17 46:1	<b>paste</b> 73:8 76:19
145:17 148:21	74:1 103:23	<b>P1</b> 209:14	47:5 53:5,6,8	80:5,16 81:1,14
163:23 164:21	117:2 135:16	<b>P105</b> 121:12	60:17 118:8	84:24 85:1
184:8 227:24	145:5 147:15	<b>package</b> 54:16	<b>parker</b> 191:10	<b>patch</b> 228:2
<b>ones</b> 41:22,23	148:17,18 221:1	<b>packed</b> 48:6	<b>part</b> 7:9,12 8:16	<b>patented</b> 75:5
171:7 189:12	221:2	<b>page</b> 12:8 17:23	9:19 11:14	<b>Patrick</b> 3:7 9:7,18
<b>onward</b> 69:18	<b>orders</b> 11:11	32:4,4 46:18	15:14 31:18	9:22 24:18 25:1
<b>open</b> 26:15 28:12	125:15 190:20	47:10,13 48:19	32:10,10 36:13	25:8 35:3,22
<b>opening</b> 6:8,12	<b>ordinary</b> 78:10	57:13 58:9 63:3	39:17 51:5,6	36:9,11,12 37:2
7:3 12:24 91:14	<b>organic</b> 131:1,15	63:12 78:9 81:9	57:1 70:1 74:15	38:3,6 40:19
<b>operate</b> 12:12	131:16,23 132:4	117:7 129:3	78:4 79:8,10	177:15 178:6
<b>operated</b> 198:19	132:10,11,12	131:11,11	104:17 107:7	213:11
<b>operating</b> 9:2	<b>original</b> 11:9,14	133:10,10	108:15 109:2	<b>pause</b> 177:20
165:10 195:9	76:2 173:17	134:16 138:11	117:17,20 118:9	<b>pausing</b> 200:18
<b>operation</b> 9:14	175:21 176:20	139:22 140:13	123:20 126:9,19	<b>pavements</b> 75:17
94:13	177:10 186:12	140:24 144:20	134:9 138:22,23	79:20 86:5,7
<b>operational</b>	196:22 200:20	153:8 173:6,14	140:6,9 141:22	<b>PCF</b> 130:22,23
212:12	201:3	174:6 175:4	142:10 147:23	<b>PE</b> 169:19,20,23
<b>operations</b> 14:10	<b>originally</b> 11:6	182:22 183:11	151:9,11 153:22	<b>Pekin</b> 185:20
99:24	19:13 78:18	184:15 194:5	155:10 159:4	<b>people</b> 78:22
<b>opinion</b> 86:24	115:14 120:16	198:22 206:9	171:19,21,22	129:6
90:13,23 91:17	135:4 220:5,7	211:9,14,15	172:3 173:20	<b>percent</b> 76:4,4,6
92:16 104:24	<b>osmosis</b> 20:24	217:12,15 223:5	178:5 179:16	155:16 156:17
106:9,19 108:6	<b>outage</b> 20:12	223:23	187:2 192:15	183:14,15,15
117:1,2 118:14	<b>outside</b> 38:15 78:3	<b>pages</b> 31:9 46:21	206:22 223:14	200:17
119:16 128:17	83:21 104:13	149:18 179:7	<b>particle</b> 73:24	<b>percolating</b>
137:1 138:2	122:9	195:14	74:1	137:20
139:15 141:23	<b>overall</b> 123:3	<b>paint</b> 39:4	<b>particles</b> 74:2,5	<b>percolation</b> 137:8
147:12 148:24	<b>overload</b> 147:16	<b>Panel</b> 24:13 67:10	76:17,20 80:12	137:18
160:5,15,17	<b>overnight</b> 47:20	<b>paper</b> 189:8	80:19,24 81:3,18	<b>Perfect</b> 13:2 96:4
161:3,21 179:16	<b>overseeing</b> 171:8	<b>paragraph</b> 130:9	90:20 91:5	<b>perform</b> 36:14
181:2,5,21,24	<b>owner</b> 51:5,6	130:14 131:12	126:22 197:12	154:11 194:20

212:12 224:24 <b>performance</b> 70:10,13 93:21 196:18 <b>performed</b> 49:7 103:24 150:16 <b>performing</b> 102:6 148:1 <b>perimeter</b> 37:19 181:12,17 <b>period</b> 73:6 91:23 <b>periodic</b> 94:9 <b>periodically</b> 172:2 <b>permeability</b> 79:5 149:22 150:5,14 150:17,20 151:13,16 152:1 152:6,9,14 165:20 166:3,7 <b>permeable</b> 151:22 152:7 <b>permit</b> 120:3 171:23 <b>permits</b> 165:8 <b>permitting</b> 17:9 <b>person</b> 30:2 37:23 <b>person's</b> 129:14 129:15 <b>personally</b> 73:16 <b>petition</b> 1:5 5:6 7:6,10 12:7 17:10 103:5 <b>petitioner</b> 6:18 <b>PG</b> 26:2 51:18 <b>PH</b> 108:9,10,20 <b>Ph.D</b> 69:14,18,20 69:22 70:1,8 71:24 73:1,4 <b>phase</b> 43:14,15 132:14,16 133:21 134:10 134:14 218:18 <b>phases</b> 51:14 218:18 <b>phenomena</b> 11:3	<b>photo</b> 208:24 210:6 <b>photograph</b> 195:4 204:14,16 205:4 205:6,10,12 209:8,14,14,15 210:2,3 <b>photographic</b> 186:21 198:15 <b>photographs</b> 194:9 222:4 <b>photos</b> 210:7,14 210:15 225:3 <b>physical</b> 8:20 <b>physically</b> 8:18 16:17 80:24 88:20 89:4 <b>picked</b> 46:3 <b>picture</b> 19:7 107:13,15 139:2 139:7 203:22,22 204:3,5 208:3 209:4,20 210:9 <b>piezometer</b> 121:12,16 122:1 122:4,5 <b>piles</b> 203:9,20 <b>pipe</b> 7:21,24 <b>PJM</b> 15:14 <b>place</b> 35:18 92:18 93:7 126:6,8 136:4,9 160:21 193:10 194:13 195:10 197:9,9 197:10 225:21 <b>placed</b> 20:7 177:6 181:9 202:12 217:2 223:19 224:10 <b>placing</b> 135:17 199:12 <b>Plaines</b> 143:4 164:5 <b>plan</b> 20:17 178:1 179:7 181:13	186:12 196:22 196:23 197:5 216:19,21 219:4 <b>plans</b> 154:14 <b>plant</b> 74:10 89:20 89:21 94:13 <b>plants</b> 14:24 74:19 79:20 185:18 <b>plastic</b> 45:18 <b>plasticity</b> 131:19 <b>plates</b> 128:6 <b>play</b> 83:20 147:15 <b>played</b> 74:23 <b>please</b> 13:19 17:8 17:13 18:1 25:7 34:24 37:24 41:12 43:7 46:15 50:21 52:4 63:23 66:13 68:19 69:24 78:11,11 96:20 109:17 110:11 114:4 115:20 138:16 138:19 140:13 142:21 149:19 152:12 156:19 156:20 168:6 170:24 178:22 192:7 195:19 204:12,12,12 207:4,7 213:1 223:22 225:15 <b>plus</b> 155:15 <b>point</b> 55:15 84:12 112:13 122:6,7 144:23 147:21 164:1 187:3 196:14 224:17 <b>pointing</b> 204:13 <b>points</b> 164:24 <b>Poland</b> 69:16 74:17 <b>Pollution</b> 1:1,15	5:4 83:5 206:6 <b>polyethylene</b> 8:4 87:5 <b>pond</b> 7:8,9,15,19 8:1,3,5,8 9:7,11 9:15,20 10:21,23 11:1,6,10,15,16 11:23 12:13,13 12:15,20 16:10 16:19,20,21,23 16:23 17:11,23 18:2,8,16,21 19:8,10,13 20:18 21:3,6,24 22:14 23:12 30:19,22 33:19 37:17,19 41:14,22 44:18 45:3 49:18 52:8 66:18 75:19,21 75:24 87:1 88:5 89:20,24 90:1 91:17 92:6,10,14 92:23 93:3,23,24 94:6,7,17,23 104:2,12 106:1,5 107:8,12 110:13 111:21 114:5 115:21,24 116:5 116:15 117:11 118:7 119:7,10 119:20 121:5,5 122:22 126:5,5,6 128:20,24 130:17 135:3,9 136:8 137:10 138:13,16,18 139:7 140:7,18 140:20 141:16 143:2,2 144:7,9 144:14 145:3,6,7 145:13 149:3,10 149:12,15,20 150:3 160:24 161:1,5 164:7 166:23 167:1	170:10 171:16 171:23 173:1,11 173:17 175:14 175:17,21,22 176:6,13 177:4 181:13,14,17,20 182:5,17 183:11 185:5,12 186:2,9 186:16 187:22 187:22 188:5,19 189:15 191:6,19 192:3,9 193:1 195:24 196:19 198:6,9,11,16 199:1 201:6,22 201:23 202:3,11 203:20 204:10 204:20 205:5,6 205:11 206:8,14 206:18 208:4 212:2,20,22 214:20 217:3,4 217:23 218:4,19 218:19,20,22,23 219:1,1,3,5,10 222:9,13 225:7,9 225:11,12,18,24 226:14 227:4,5 <b>ponds</b> 7:11 16:11 16:15 17:10,11 17:15 36:18 37:4 44:6 94:8 198:2,11,18 <b>pore</b> 128:1,16 <b>portion</b> 150:17 219:18 <b>portland</b> 70:23 78:10 84:16,19 <b>pose</b> 225:20 <b>posed</b> 223:16 <b>position</b> 51:3 99:23 <b>positive</b> 115:24 116:4 126:21 <b>possession</b> 47:19
---	--	---	---	--

<p><b>possible</b> 86:19 133:20 149:22 151:7,10 154:22 164:5 194:18</p> <p><b>post</b> 191:11 209:13,16 210:11</p> <p><b>postclosure</b> 102:5 102:7</p> <p><b>posted</b> 143:13</p> <p><b>poster</b> 127:21,22 128:1</p> <p><b>posts</b> 55:2 191:5,7 191:7,17,18 192:2</p> <p><b>potential</b> 86:10 134:21 138:3,5,7 139:16,18 160:18 161:8</p> <p><b>potentially</b> 94:8 108:22 113:13 153:21 154:17 159:14 207:20</p> <p><b>pounds</b> 130:18</p> <p><b>poured</b> 56:17</p> <p><b>powder</b> 73:22 76:17 91:5</p> <p><b>power</b> 7:16 12:12 15:10 74:19 79:20 89:20 185:18</p> <p><b>Powerton</b> 185:20</p> <p><b>Poz-O-Pac</b> 8:9,11 8:21 19:21 33:18 41:13 49:18 65:8,17 66:17 72:12,12 72:16 75:1,3,4 75:12,24 76:2,8 76:11,12,13,14 76:18 77:7 80:10 81:11 82:19 83:9,21 84:7,8 85:11,14 85:23 86:18</p>	<p>87:1,6,11,15,22 88:13,19 89:2,3 89:5,9 90:2,3,23 91:2,15,17 92:5 92:10,14,23 93:18 94:2,16,21 133:12 134:19 135:5,8,23 136:9 136:17 137:3,5 138:2 161:22,24 162:2,9,11 182:20 183:1,2,3 183:12,13 184:9 184:11,21 185:4 185:11 186:2,6 186:13,17 188:14 190:3,7,9 190:12 191:20 192:9,12,12,17 192:20,21 193:6 193:11,15,15,23 194:1,2,10,14,19 195:1,5,21,23 196:1,4,8,11,13 197:6,7 198:8,11 203:14 204:9 205:9,10 207:21 214:9 222:10,17 226:19 227:11 227:20</p> <p><b>pozzolan</b> 185:6</p> <p><b>pozzolanic</b> 8:11 8:14 77:12,16,21 80:14 81:12,14 81:19 82:14 83:7 84:13 85:10 184:13</p> <p><b>PPM</b> 125:6</p> <p><b>practical</b> 98:2</p> <p><b>practicals</b> 97:24</p> <p><b>practice</b> 71:8 100:1 154:8,11 165:2 169:7,10 169:13,21</p> <p><b>practices</b> 40:20</p>	<p>172:3</p> <p><b>precautions</b> 21:17</p> <p><b>precipitation</b> 86:9 147:6</p> <p><b>precise</b> 93:11 156:1</p> <p><b>precisely</b> 89:17</p> <p><b>precision</b> 155:14</p> <p><b>precludes</b> 59:22</p> <p><b>predetermined</b> 26:19</p> <p><b>prediction</b> 114:16 115:3,16</p> <p><b>preliminary</b> 115:2 116:4 218:10</p> <p><b>prep</b> 135:16</p> <p><b>preparation</b> 187:21 199:1</p> <p><b>prepare</b> 177:17 178:2 223:9</p> <p><b>prepared</b> 40:18 54:20 55:22 56:18 103:4 173:19 187:16 199:7 212:4 216:4,22 217:23</p> <p><b>preparing</b> 171:8</p> <p><b>presence</b> 34:1 122:19 182:5,14 208:15</p> <p><b>present</b> 89:1,2 106:6 120:14,21 121:3,17,19 124:10 133:22 136:14,19 138:15 144:15 152:19 160:3 199:9 219:15 223:19</p> <p><b>presentable</b> 143:17</p> <p><b>presentations</b> 143:17</p> <p><b>presented</b> 156:24</p> <p><b>preservation</b></p>	<p>53:11,20</p> <p><b>preservative</b> 56:19</p> <p><b>preserved</b> 21:19 56:23</p> <p><b>pressure</b> 87:24</p> <p><b>presumably</b> 210:10</p> <p><b>presume</b> 209:23</p> <p><b>presumptions</b> 11:22</p> <p><b>pretty</b> 28:15,15 29:8 39:5 57:8 59:9 74:20 220:11</p> <p><b>previous</b> 37:15 190:6</p> <p><b>previously</b> 126:2 187:4</p> <p><b>prices</b> 17:16</p> <p><b>primarily</b> 51:12 53:8 69:4 71:8 72:9 75:7,15 79:3 85:1 128:14 152:9 164:20 180:1,20</p> <p><b>primary</b> 70:7,7 83:19,22 94:1 101:11 126:13 138:14 170:4 171:2 180:16 184:21 208:15 213:22 226:13</p> <p><b>prime</b> 195:17</p> <p><b>principal</b> 71:16,18</p> <p><b>principles</b> 169:18</p> <p><b>prior</b> 18:7 53:11 53:20 92:12 94:2 186:9 195:6,10 196:9 201:8 215:1 217:20,24 220:9 222:7 224:15</p> <p><b>probably</b> 26:6 51:24 71:17</p>	<p>73:5,16 74:1 103:1 119:3</p> <p><b>problem</b> 16:9</p> <p><b>procedural</b> 5:20 5:23</p> <p><b>procedure</b> 155:9 165:11 204:19 226:23</p> <p><b>procedures</b> 155:13</p> <p><b>proceed</b> 13:12 24:21 109:21 172:6</p> <p><b>proceeding</b> 18:10</p> <p><b>proceedings</b> 1:12 228:17 229:8,11</p> <p><b>process</b> 8:16,20 20:19,21 21:3 45:4,14,15 100:24 108:18 110:14 126:20 128:7 153:20 171:20,21 173:3 186:24 187:3,3 197:18,22</p> <p><b>processes</b> 128:14</p> <p><b>product</b> 75:5 84:13 89:10 91:3,4</p> <p><b>products</b> 85:21</p> <p><b>professional</b> 10:18 10:19 25:24 26:3 36:1,3 51:16,18 71:3 97:12,14,17,19 97:21 98:4,19 99:2 143:15 168:22,24 169:3 169:4,6,11,13,24 170:12 216:8,13</p> <p><b>proficiency</b> 169:20</p> <p><b>profile</b> 142:19,24 143:19 144:16 145:1</p>
--	--	--	---	--

<b>program</b> 9:4 44:24,24 48:4 69:17 70:2 100:13 102:5 165:1,13 185:18 186:4,5 187:17	179:24 208:6,9 <b>provides</b> 172:8,10 <b>proximity</b> 126:1 182:5 <b>PSB</b> 185:6 195:18 <b>public</b> 5:9 17:17 170:16 <b>Publicly</b> 120:8 <b>pull</b> 17:2 29:18 130:6 133:4,7,8 177:20 206:24 <b>puncture</b> 227:8 <b>punctured</b> 197:15 199:10 <b>puncturing</b> 223:20 <b>purchased</b> 8:23 <b>Purdue</b> 69:21 70:2 <b>purge</b> 45:7 <b>purpose</b> 16:23 72:23 117:1 143:22 172:24 193:2 199:3,5 206:2,4 <b>purposes</b> 143:17 <b>pursuant</b> 5:18 8:6 52:20 53:13 54:9 111:22,24 <b>push</b> 26:13 203:8 <b>pushing</b> 203:19 <b>put</b> 45:18 46:2 59:9 84:18,20 139:6 143:16 203:22 <b>putting</b> 197:5	<b>Quarry</b> 7:22 10:22 16:8,12,18 119:14,19 120:11 121:8,13 122:19,21 <b>quarter</b> 54:13 55:6,11,17 56:8 58:16,17 104:6 <b>quarter-inch</b> 80:18 <b>quarterly</b> 10:7 104:15,16 105:23 121:14 121:23 136:12 136:13 <b>question</b> 17:3,8 17:19,22 18:1,7 18:20,23 21:4 23:6 41:12 42:6 60:12 62:19,20 62:22,22 63:23 64:24 66:13 73:15 81:5,19 82:11 83:1,18 84:4,5,11 86:16 86:22 87:10 88:3,4,12,12,15 91:24 93:1,5,15 93:20 94:15,20 97:6 110:8,16 111:7 113:2,8 114:2,4 115:18 138:10,20 140:2 146:24 149:8 150:1 151:4,5,15 152:14,17 155:1 163:15 164:11 166:19 178:16 192:5,16 193:11 193:19 194:17 194:23 195:12 195:19 196:3 208:8 218:10 219:8 225:13 <b>questions</b> 12:1	23:4 24:8,13 49:23 68:2 86:15 89:6 91:7 91:13 110:7,7 156:21 161:13 162:24 167:9 207:8 <b>quick</b> 174:24 <b>quickly</b> 95:19 147:9,10 148:19 152:2 <b>quite</b> 86:4 99:1 122:2 123:15	<b>ranging</b> 121:17 <b>Rao</b> 2:4 6:3 23:3 41:20,21 42:4,7 83:3,5,5 84:5 85:7 86:12 111:9,11,16,21 112:9,22 113:3 152:11,13 153:3 166:20 <b>rapid</b> 147:6 <b>rare</b> 7:23 16:9 <b>rate</b> 146:10,13,19 <b>rates</b> 145:14 <b>rationale</b> 139:20 <b>raw</b> 89:1 <b>RCRA</b> 99:6 <b>RCX</b> 3:2 4:2 <b>RDX</b> 3:2 4:2 <b>reach</b> 87:6 <b>reaches</b> 163:23,24 <b>reacted</b> 80:13 82:15 <b>reaction</b> 8:14 73:10 77:8,12,14 77:20 80:15 81:12,12,14,19 82:14 83:7,10 84:8,13,16 85:10 108:13 183:7 184:12,13 <b>reactions</b> 8:11 <b>reactive</b> 80:20 82:9 <b>reacts</b> 82:13 <b>read</b> 17:6,20 31:14 40:11 62:22 81:6 86:17 110:10 128:10 130:11 138:10 139:12 139:24 146:23 149:8 156:20 157:20 174:15 174:19 192:7 193:22 201:4
<b>programs</b> 100:16 111:13 <b>project</b> 35:5 36:14 43:12 48:6 65:2 70:12 129:23 142:21 186:1 193:2 202:24 216:3,16,23 218:17 222:2 <b>projects</b> 9:5 35:8 70:5,5 79:13 <b>promoted</b> 71:16 <b>properly</b> 9:2 54:8 <b>properties</b> 11:19 73:12,13 79:6 130:13,15,21 211:21,22,24,24 212:7,10 213:9 220:24 <b>proportion</b> 185:8 <b>proportions</b> 78:24 <b>proposal</b> 25:17 <b>propose</b> 21:12 <b>protect</b> 170:16 172:1 205:1 <b>protection</b> 2:16 5:22 11:2 63:1,8 106:1,4 110:22 112:18 117:10 117:19 118:5,12 119:7,9 123:7 165:4 172:9,11 <b>protrusions</b> 224:4 224:20 <b>proven</b> 98:16 152:15 <b>provide</b> 92:1 149:2 225:16 <b>provided</b> 150:13	<hr/> <b>Q</b> <hr/> <b>Q3</b> 159:11 <b>QA/QC</b> 155:13 157:17 160:2,3 <b>quality</b> 45:8 141:7 153:7 225:20 <b>quantitatively</b> 39:7	<hr/> <b>R</b> <hr/> <b>R</b> 114:18,20 <b>R-a-d-l-i-n-s-k-i</b> 68:23 <b>R-i-c-h-a-r-d</b> 50:23 <b>radiation</b> 43:15 <b>Radlinski</b> 4:3 8:10 68:5,10,19,22,24 69:11 72:2,7 74:24 77:8 78:8 81:11 83:3 89:9 89:12 90:21 95:15 183:1 <b>Raelene</b> 1:15,23 229:5 <b>rain</b> 86:9 148:5,8 148:11,12 149:17 <b>rainbow</b> 27:5 <b>rainfall</b> 210:9,12 <b>rainwater</b> 16:23 20:19 137:8 <b>ramp</b> 223:13 227:4 <b>range</b> 24:3 62:7 62:11 74:10 75:15 79:12 150:21 156:5 166:4 221:11 <b>ranged</b> 125:5		

206:9 207:7 214:4,16 225:15 <b>readily</b> 28:15,16 <b>ready</b> 24:17 45:10 127:19 167:22 <b>real</b> 71:19 115:5 174:24 <b>really</b> 74:8 76:16 77:4 79:12,22,22 82:16,20 85:23 93:19,24,24 <b>reason</b> 72:16 128:23 147:19 160:1 215:9 <b>reasonably</b> 137:2 <b>reasons</b> 77:6 116:3,9 134:4 147:14 <b>rebuild</b> 214:10 <b>recall</b> 74:16 125:9 166:11 <b>receive</b> 59:22 <b>recess</b> 96:8 162:19 175:2 <b>recharge</b> 141:15 141:21 <b>recognize</b> 85:19 <b>recollection</b> 19:12 19:16 20:1 22:2 108:4 110:2 117:14 119:5 131:4 135:2,13 158:10 179:20 180:4 213:17 <b>recommendation</b> 5:14 46:16 55:11 58:9 60:6 63:3,11 64:12 72:11 81:10 117:3 130:8 138:12 151:1 172:16 178:20 194:4 195:16 206:5 <b>recommendations</b>	11:23 29:20 <b>recommended</b> 202:16 <b>record</b> 5:1 12:6,9 17:6,20 29:19 34:23 39:24 40:12 42:17,19 42:21 46:15 50:6,9,11 67:14 67:16,18 81:6 86:14 96:7,11 103:10,16 110:10 113:21 116:8 138:10 149:8 162:18,22 166:21 167:17 167:20,21 168:6 174:22,23 179:1 179:3 192:7 193:22 204:12 208:14 218:8 225:15 228:6,8 228:10,12 <b>record's</b> 103:14 <b>recorded</b> 41:4 <b>records</b> 186:21 188:24 221:23 <b>recoverable</b> 164:13 <b>redirect</b> 24:10 50:1 66:24 95:12 167:13 <b>reduction</b> 79:4 83:16 <b>refer</b> 72:19 78:14 123:21 127:6 185:6 219:16 <b>reference</b> 142:5 144:5 204:1 <b>referenced</b> 124:18 157:18 181:16 200:14 203:10 <b>references</b> 213:3,7 <b>referencing</b> 207:1 <b>referred</b> 173:18	180:21 188:14 190:19 196:7 216:18 <b>referring</b> 163:7,14 163:22 174:5 180:8 203:11 <b>refers</b> 75:4 77:14 176:17 <b>regarding</b> 5:20 192:19 <b>regarding</b> 201:5 218:2 <b>regs</b> 111:4 <b>regular</b> 80:22 84:17 172:3 <b>regulation</b> 9:3 16:24 21:7 164:17 <b>regulations</b> 16:21 18:3,4,6 99:5 111:14 129:20 165:6 171:10 <b>relate</b> 73:23 <b>related</b> 69:8,9 70:8 73:13 79:6 79:13 103:4 116:5 139:8 152:9 171:4 203:1 210:2 213:5 <b>relates</b> 22:23 85:13,14 150:14 <b>relation</b> 92:23 152:8 <b>relative</b> 53:9 82:12 103:24 <b>relatively</b> 57:7 197:11 200:17 219:19,24 220:9 222:14,17 224:9 <b>release</b> 86:1,1 104:11 116:15 116:16 118:18 118:20 119:20 126:23 127:24	140:11 <b>released</b> 126:24 <b>relied</b> 213:8 <b>relies</b> 214:20 <b>reline</b> 201:6 218:18,19 <b>relined</b> 8:3 11:7 19:22,23,24 20:6 135:11 136:8 194:10 195:11 218:20,23 <b>reliner</b> 192:3 <b>relining</b> 11:15 92:8,12 173:3 185:17 186:4,5,9 186:10 187:17 190:1 200:19 216:4 218:17 222:7 <b>rely</b> 184:15 213:6 <b>relying</b> 195:1 <b>remainder</b> 76:5 <b>remaining</b> 192:11 192:19 <b>remains</b> 82:7 <b>remedial</b> 51:15 <b>remediated</b> 91:18 <b>remediation</b> 91:20,22 100:9 165:13 <b>remember</b> 119:14 150:18 158:10 <b>remind</b> 114:6 <b>reminded</b> 113:4 <b>removal</b> 112:16 <b>remove</b> 7:7 18:11 18:13,18 23:12 77:5,7 94:10 172:2 177:8 186:12 187:5 188:11 190:7 193:16,17 196:23 228:1 <b>removed</b> 16:17 21:14 177:3	186:16 190:13 192:13 193:12 194:4 201:24 202:2,7 203:16 214:7 219:17 223:17,18 224:7 <b>removing</b> 171:23 172:6 190:9 194:19 214:19 223:10 <b>render</b> 81:20 <b>repeat</b> 88:22 93:4 115:18 116:7 153:17 <b>repeated</b> 139:19 <b>repeating</b> 163:14 <b>replaced</b> 186:8 190:8 <b>replacement</b> 78:17,20 189:15 216:1 <b>report</b> 1:12 25:17 29:22,24 35:10 36:23 42:1 44:10 57:12 63:20,22 65:7 71:13,17 72:3,8 72:19 78:8 85:18 89:13 103:7,21 106:14 106:15 107:3 113:23 116:20 116:22 117:5,7 120:2,3 123:20 123:22 127:5,8 129:4 132:15 141:1 143:6 145:17 150:23 153:8 155:19 172:18,22,24 173:11,14,23 174:9 182:8,22 183:11 186:22 186:22 187:9 188:21 190:15
---	---	--	---	---

195:15 198:22 204:1,4 205:23 206:3,4,10,23 209:9 210:16,18 211:6 213:5 217:13,14,16,17 <b>reported</b> 1:23 114:15 115:14 137:22 145:19 153:23 158:13 229:8 <b>reporter</b> 13:5,9,19 25:6 43:6 50:22 142:22 207:13 229:6,15 <b>reporter's</b> 63:5 <b>reporting</b> 156:2 <b>reports</b> 46:19 103:4 120:1 145:20 163:11 195:5 213:19 <b>repose</b> 221:2,10 <b>represent</b> 63:19 131:1 188:7 <b>representative</b> 175:18 189:4 <b>representativen...</b> 161:8 <b>representatives</b> 5:10 <b>represents</b> 217:3 <b>reprimanded</b> 98:17 <b>repurpose</b> 20:19 <b>repurposed</b> 17:24 18:2 21:11 171:17 <b>repurposing</b> 18:7 18:20 21:3,6 <b>request</b> 7:13 191:2,10 201:17 201:18,21 203:2 203:10 <b>requested</b> 48:3,7 58:1,14	<b>requests</b> 7:10 190:18 191:1 <b>require</b> 18:21 164:23 192:13 193:12 <b>required</b> 22:10 39:15 53:17 110:19 161:6,7 165:7 191:11 192:1,13 193:12 212:5 226:6 <b>requirement</b> 7:7 53:19 85:24 97:19,20 <b>requirements</b> 53:24 111:18 169:6,7 225:19 226:3 <b>requires</b> 191:12 <b>resample</b> 114:14 114:21,23 115:16 <b>resampled</b> 115:14 <b>research</b> 74:15 78:23 91:21,23 <b>residual</b> 8:22 27:19 39:20 72:20 76:11 <b>residuals</b> 101:3 <b>residue</b> 203:8 <b>resistance</b> 79:7 <b>Resource</b> 187:19 216:3 <b>resources</b> 128:22 <b>respect</b> 163:3,16 164:3 183:20 191:5 199:12 223:14 <b>respond</b> 11:21 117:3 206:4 <b>responded</b> 206:18 <b>responding</b> 152:13 <b>response</b> 11:22 72:4 81:10	138:11 139:17 140:4 178:20,24 194:6 205:21 217:19 <b>responsibilities</b> 14:8 170:2,15 171:2 <b>result</b> 60:10 61:18 77:22 79:4 102:10 108:14 120:18 144:10 150:8 164:10 210:12 <b>resulting</b> 128:15 <b>results</b> 21:7 56:12 58:16,18 60:5 61:13,15 62:24 63:8 95:2 106:20 121:15 138:13 149:1 150:19 153:12 153:13 155:19 156:4,11,12,24 157:2,23 160:6,9 196:17 <b>resume</b> 97:5 <b>retain</b> 101:5 192:9 192:17 221:1 <b>retained</b> 36:14 <b>Retention</b> 127:23 <b>retrofitting</b> 171:7 <b>reuse</b> 171:15 206:16 <b>reused</b> 11:20 214:10 215:1 217:20 <b>reutilized</b> 215:2 <b>reverse</b> 20:23 <b>review</b> 39:10 40:17 76:1 104:18 105:23 128:18 140:16 177:11 188:22 189:20 191:15 205:6,11	<b>reviewed</b> 11:8,13 40:15 62:14 107:3 129:24 157:14 179:16 181:24 185:3 190:4 194:9 <b>reviewing</b> 58:24 105:14 173:9 180:4 190:10 225:2 <b>revised</b> 189:18 190:5 <b>revision</b> 189:22 216:5 <b>revisit</b> 197:20,23 <b>rewarding</b> 74:4 <b>Rich</b> 10:14 <b>Richard</b> 3:19 50:12,16,23 123:21 <b>right</b> 6:6 15:19 16:1 17:7 19:2 19:22 20:7,11,14 22:10 25:15 30:4,20 31:3,8 34:15 44:8 45:2 49:3 51:1 52:9 52:17,24 53:14 53:22 58:2,7 61:20 64:8 68:15 72:2 75:11 76:13 92:23 96:6 104:15 106:5 107:13 109:1,16 125:10 127:5 130:1 135:18 136:9,15 140:23 141:20 142:7 147:13 148:5 149:7 152:2 153:13 154:2 155:6 156:8 158:20 172:14 172:19 173:23	177:20 178:15 182:8 185:14 186:13 187:23 188:19 197:3 199:1,22 204:5 205:24 207:10 208:24 209:10 211:6 215:13 217:12,15 218:14 222:24 224:12,20 227:14 <b>rigorous</b> 99:1 <b>risk</b> 193:6 223:16 225:20 <b>risks</b> 165:3 <b>risky</b> 161:12 <b>river</b> 7:22 16:13 143:4 164:5 <b>RO</b> 20:23 <b>road</b> 11:3,4 74:20 75:7,16 106:12 126:3,11,12 127:23 128:13 141:7,11 149:11 160:12 208:18 <b>roads</b> 74:21,22 <b>roadway</b> 75:16 180:18,19 181:7 181:10,12,14 <b>roadways</b> 79:9 184:23 <b>rock</b> 74:22 84:20 180:21 181:1 191:12 <b>rocks</b> 223:10 224:5,5,20 <b>Romeoville</b> 185:22 <b>room</b> 143:13 <b>roughly</b> 79:16 121:20 145:24 <b>round</b> 58:19 <b>Route</b> 166:17 <b>rubber</b> 20:4,4
---	--	---	---	--



<b>rubber-lined</b> 21:18	90:3 114:19	112:6	103:8 140:9	205:12 209:21
<b>rubidium</b> 128:9	115:5 153:22	<b>sand</b> 31:21 33:7	150:21 151:4,5	209:23
<b>rule</b> 8:7 10:10	154:19 157:2	84:20 130:17	151:11 159:10	<b>seen</b> 11:1 32:19
22:23 53:14,17	159:12,16,22	132:21 160:12	166:5 174:22	41:2 74:22
53:18,22 54:1,2	160:1 162:6	172:8 180:1,2	197:23 206:17	87:12 95:2,3,4
114:22 156:7	183:23 226:19	205:7 209:7,22	207:10,12 228:6	102:24 118:1,3
164:13 171:4	226:23	212:22 217:1	<b>secondary</b> 139:1	132:9,9,13 138:6
173:20 177:19	<b>sampled</b> 26:8	227:7	<b>section</b> 5:19,23	160:24 196:16
178:3 212:6	44:18 137:22	<b>sandier</b> 221:9,10	63:2,9 90:15	198:14 222:4
<b>rules</b> 5:20,23	161:22	<b>sands</b> 213:21	141:6 175:13,16	<b>seepage</b> 145:11,14
54:10 99:5	<b>samplers</b> 59:18	226:15	176:2,3,5,6	145:19,22,24
105:10,12	<b>samples</b> 10:16	<b>sandy</b> 28:18 166:3	177:6 199:18	146:8,8,10,16,20
110:17,17 111:5	25:21 30:3,5	<b>Sara</b> 2:18 6:22	201:1 211:14,17	146:20
112:10,14,15,15	39:5 44:21,23	91:11	211:19,22 212:9	<b>segue</b> 86:22
115:1,1 164:21	45:5,21 47:2,3	<b>Sargent</b> 170:18,20	212:13,16,18	<b>semiannual</b>
164:22,22 171:5	47:18,23 48:5,14	170:22 171:1	213:2,3 223:5	102:12 113:11
<b>run</b> 56:3 155:23	48:24 52:11	<b>satisfaction</b> 224:1	<b>Sections</b> 176:13	<b>send</b> 47:23
<b>running</b> 155:11	53:10,13,19 54:5	<b>saw</b> 58:24 120:12	<b>sediment</b> 56:16,22	<b>senior</b> 71:10
155:20	54:9 56:13,13,14	120:13 121:18	57:1,3,5,8,8	<b>sense</b> 126:4
<b>ruts</b> 205:13	56:15 57:1,7	145:22	<b>sediments</b> 165:16	147:20 162:4
	58:5,20 59:22	<b>saying</b> 88:24	<b>see</b> 5:15 7:5 19:2,5	<b>sent</b> 48:4 56:2
<b>S</b>	60:1,22 61:8,9	207:23	23:4 28:13,21	90:7,7 128:4
<b>S</b> 4:17 176:3,5,13	61:10,12 62:8,9	<b>says</b> 5:16 48:23,24	30:19 32:13	155:6
177:6 201:1	105:22 121:23	58:2,14,15 71:9	37:17 39:7 40:3	<b>sentence</b> 88:22
<b>S-a-r-a</b> 6:23	121:24 124:20	99:18 103:15	49:1 68:1,12	141:14,18
<b>S-t-e-f-a-n-i-e</b>	124:21,22,24	130:14 131:16	74:21 83:4	156:23 159:10
6:21	125:2 155:3,11	188:4,9 203:8	89:14,17 90:16	207:11,12
<b>S-t-e-v-e-n</b> 35:1	157:3,9 178:21	207:19 208:8	90:18 92:17	208:20 211:3
<b>Safe</b> 228:16	226:21	211:15 229:6	93:6,13 95:14,17	<b>separate</b> 45:18
<b>safety</b> 14:11 35:20	<b>sampling</b> 10:13	<b>scale</b> 143:15 158:8	96:7 98:20	46:10 154:12
212:5	22:3 35:20	<b>school</b> 98:2	102:22 104:21	226:21
<b>sake</b> 32:23	43:14,14 44:14	<b>Schuller</b> 127:7	131:2 133:14	<b>separated</b> 45:15
<b>salt</b> 11:4 126:12	46:6 52:13,19,20	128:12	134:23 141:4,8	45:17
127:23 128:13	52:23 53:4,16,24	<b>science</b> 69:14,15	152:19 157:16	<b>seriously</b> 98:16
<b>salts</b> 106:12 126:3	54:14,18 55:6,17	98:11 99:7	159:18 163:13	<b>serve</b> 191:7
126:11 141:7	55:19 56:9	<b>sciences</b> 97:9	173:5 177:5	<b>served</b> 202:12
149:12 160:12	57:21,22 58:21	<b>scientific</b> 148:10	181:21,22 185:4	<b>serves</b> 15:13
<b>sample</b> 8:12 26:17	58:22 59:20	<b>scientists</b> 100:6	190:12 200:8	204:24
44:7 45:10,12,23	60:12 92:4,9,13	<b>SCM</b> 78:14	205:3,9 207:17	<b>service</b> 20:7
46:19 55:7	112:5 116:3	<b>scope</b> 72:7	207:22 208:7	<b>servicing</b> 162:12
56:22,23 57:5	122:11,13 137:4	<b>scramble</b> 95:21	211:2,14 216:17	<b>session</b> 127:21
58:14,23 59:5,12	154:13,23 157:4	<b>scratcher</b> 62:1	218:7 221:23	<b>set</b> 9:24 17:17
59:23 61:14	157:14 158:5	<b>second</b> 36:19 50:6	227:22	44:24 45:6 61:3
62:12 89:19	161:4 162:9	54:13 55:6	<b>seeing</b> 128:19	174:17
	<b>samplings</b> 37:6	58:16 86:16	143:11 177:2	<b>sets</b> 44:23 61:23

<b>seven</b> 120:19 162:17 183:18	122:19 204:8,18 204:21 209:19	49:18 66:18 94:16,22 129:3	<b>size</b> 56:16 73:24 74:1 76:17	<b>so-called</b> 70:9 77:15
<b>shades</b> 74:12	210:4 215:24	130:22 133:11	80:18,23 152:10	<b>sodium</b> 126:15
<b>shake</b> 161:9 226:7	218:24 225:17	134:19 160:12	198:18	<b>soil</b> 9:8,20 25:20
<b>shallower</b> 220:15	<b>side</b> 105:3,4,6,7	160:13 180:1	<b>sizes</b> 40:8	26:5,5,6,9 27:16
220:16 221:16	143:2 169:8	206:12 207:11	<b>skip</b> 116:6	28:3,4,13,20
221:17	176:9 200:14	207:16,20 208:2	<b>slabs</b> 79:21	29:7,9,11 30:3,5
<b>shape</b> 175:19	201:2 205:10	208:22 211:1,15	<b>slag</b> 8:17 27:24	30:12 31:1,8,20
<b>shards</b> 28:17	207:15 208:21	211:18 214:8,10	28:15,22 29:1	32:11,17 33:20
<b>shared</b> 128:2,2	214:9,10 219:19	<b>Silurian</b> 212:23	31:22 32:21	33:24 35:19
<b>sharp</b> 197:13	<b>side-by-side</b>	<b>similar</b> 37:15 39:4	33:7 39:22	37:12,14,14,21
222:12 224:5,19	157:23	66:7 121:20	72:21 74:13,14	37:22 38:13,14
224:19	<b>sides</b> 18:15,17	128:12 154:5	74:16 76:6,14,17	38:16 39:11,18
<b>sheet</b> 5:13 47:7	21:13	169:4 183:4,6	76:20 80:12,12	39:18,19,24 40:3
128:19 174:5,11	<b>sieve</b> 131:17	184:22 193:8	80:17,24 82:1,2	40:9,10,13,14,22
174:12 176:4	<b>sign</b> 48:10,15	195:9,20 196:1	82:6 91:5	40:24 41:3,15
187:20 189:16	109:14	198:6,17,18	183:15 184:9	43:14 49:19
189:17 190:5	<b>signature</b> 56:2	204:2 219:23	<b>slash</b> 130:17	51:12 66:19
<b>Sheets</b> 174:2	119:20 122:24	226:22	<b>slight</b> 61:17	86:2 94:17,23
<b>shepherd</b> 35:8	123:3	<b>similarly</b> 32:8	<b>slightly</b> 60:18,22	100:7,19 107:3
<b>short</b> 7:2,4 73:15	<b>signatures</b> 125:24	161:21	62:6 78:19	108:16,22,24
86:23 90:2 96:8	125:24	<b>simple</b> 72:16	<b>slope</b> 176:11,17	109:24 123:24
162:15,16,19	<b>signed</b> 15:6 36:7	76:10	176:17 200:17	124:19,21
175:2	109:15	<b>simplifies</b> 128:8	207:15 208:21	125:17 126:16
<b>shorthand</b> 229:8	<b>significant</b> 11:17	<b>simply</b> 80:24 88:9	220:22,23 221:6	126:22 128:16
229:10,15	108:2 113:14	95:13 154:23	221:14	129:17,24 134:8
<b>shoulders</b> 75:17	120:14,22 123:6	<b>sir</b> 19:11 34:10	<b>sloped</b> 177:4	134:10 149:3
<b>show</b> 30:16 31:15	189:2 193:6	42:9 43:17,20	<b>slopes</b> 176:10	161:5 167:3,5,6
32:8 85:9 89:16	197:13 205:12	91:6 109:22	200:14 201:2	167:6,8 170:9
116:2 130:16	218:2	112:20	214:9,11 219:20	177:13 180:3
138:17 160:9	<b>significantly</b>	<b>sit</b> 13:4	223:11	191:12 212:13
178:4 179:20	125:14 196:13	<b>site</b> 51:14 101:9	<b>slow</b> 63:5	212:19,19 213:5
180:1 209:15	<b>signify</b> 141:14	101:16,18 120:5	<b>slower</b> 148:21	213:9,12 220:22
215:23	142:4	120:6,7 128:13	<b>sluiced</b> 7:21,24	224:4 226:7
<b>showed</b> 165:20	<b>silica</b> 70:23 71:1	132:16,17,18	<b>small</b> 87:18	<b>soils</b> 9:6 31:17
<b>showing</b> 161:17	78:3 83:24	165:12,12	154:22 158:19	32:9 34:4
161:19 204:17	<b>silicate</b> 77:16,24	182:13	158:24 159:3	100:23 108:14
218:8	78:2,7 80:3	<b>sites</b> 14:15 36:16	197:12	123:16,18,22
<b>shown</b> 176:1	83:21 84:12	102:15,16,18	<b>smaller</b> 125:14,16	124:12,18 126:8
178:13 180:13	85:1 88:1,8	124:3	<b>smooth</b> 197:11	126:9,19 127:23
191:16 203:7	<b>silicious</b> 77:20	<b>situation</b> 116:17	201:7 219:18,24	129:12 131:1,15
208:3 218:20	<b>silicone</b> 71:2,2	126:13 224:22	224:10	131:22 132:2,4,5
219:2,4 222:5	<b>silt</b> 31:21 180:2	<b>situations</b> 197:14	<b>smoothed</b> 222:10	132:10,19
<b>shows</b> 30:17 31:16	<b>silts</b> 132:20	221:24	222:16	133:22 149:20
47:3 49:3 57:16	<b>silty</b> 33:19 41:13	<b>six</b> 12:6	<b>snow</b> 149:16	150:3,6 152:19

152:22,23 153:1 153:2 179:22 220:23 <b>solid</b> 10:8 100:16 101:6 105:17,19 184:7 <b>solids</b> 22:20 49:8 58:23 59:6,13,20 107:23 153:21 <b>soluble</b> 88:1 <b>solvents</b> 76:5 <b>somebody</b> 42:5 59:10 64:23 <b>somewhat</b> 17:16 93:22 <b>soon</b> 71:23 <b>SOP</b> 22:19 <b>sorry</b> 6:11 19:9 41:15 51:9 56:5 60:23 63:6 64:13,19 68:16 94:20 99:13 123:13 143:24 154:15 160:20 163:12 165:22 166:13 167:3 172:21 179:13 180:8,10 189:12 207:12 215:21 217:15 225:11 <b>sort</b> 75:10 87:18 93:12 123:23 128:7 134:13 194:20 221:3 <b>sound</b> 54:6 <b>sounds</b> 87:9 <b>source</b> 106:9 116:1 134:21 138:4,5,7 139:18 141:23 143:12 143:18 162:12 <b>sourced</b> 133:12 <b>sources</b> 173:13 <b>south</b> 2:11 105:4 209:17	<b>southern</b> 179:15 204:18 <b>southernmost</b> 204:16 <b>southwestern</b> 179:15 <b>space</b> 12:16 <b>spacing</b> 105:9,18 <b>Spadoni</b> 48:11 <b>span</b> 192:11,19 <b>speak</b> 43:16,19 93:2 100:22 <b>SPEAKER</b> 109:7 109:10,15,19 <b>speaking</b> 14:7 21:10 35:7 37:1 56:11 69:5 70:4 72:14 73:19 75:13 76:3 79:5 79:11 93:17 94:6 100:3 104:3 153:11,14 153:18 171:13 172:23 179:19 198:4 206:2 <b>special</b> 192:1 <b>specialize</b> 51:12 69:4 <b>specialized</b> 191:12 <b>specific</b> 27:6 85:13 155:13 163:6 180:23 187:19 <b>specifically</b> 5:23 74:17 78:2 85:20 92:22 93:3 124:2 125:1 174:1 175:22 199:17 201:16 202:24 206:8 212:2 <b>specification</b> 197:19 <b>specifications</b> 188:19,21 189:3	190:22 197:20 199:17 200:19 201:4 222:13,20 222:24 225:6 <b>specified</b> 190:21 197:19 <b>specify</b> 154:14 <b>speculate</b> 181:5 <b>spell</b> 13:18 25:7 34:24 37:24 43:7 50:21 68:20 96:21 168:7 <b>spent</b> 73:3,6 <b>spherical</b> 74:2,5 <b>spike</b> 147:10 <b>split</b> 26:18 <b>sponsored</b> 70:12 <b>spoon</b> 26:19 <b>spots</b> 228:3 <b>Springfield</b> 2:21 <b>springtime</b> 147:7 149:16 <b>square</b> 224:14 <b>SS</b> 229:2 <b>St</b> 127:21 <b>stabilization</b> 45:9 <b>stabilized</b> 185:7 <b>stable</b> 106:22 221:3 <b>staff</b> 2:6 6:3 35:9 35:13,15 <b>Stamm</b> 1:15,23 229:5 <b>stand</b> 103:2 107:22 219:7 <b>standard</b> 1:6 5:7 7:6 11:2 23:11 29:8,10 110:23 117:15,17,19 118:5,9,13 123:7 129:12 154:8,11 155:9 165:10 <b>standardize</b> 27:10 129:15	<b>standardized</b> 129:10 <b>standardizing</b> 27:11 <b>standards</b> 5:20 63:1,8 98:5,8,13 106:1,4 112:13 112:18 117:11 119:7,9 141:7 156:9 165:5 185:2 <b>standpoint</b> 73:10 87:21 <b>start</b> 13:3 21:13 35:8,18 81:24 117:6 173:4,16 179:4 187:13 215:6 227:5 <b>started</b> 20:12 51:8 52:13 53:12 101:14,15 109:12 177:10 196:5,14 <b>starting</b> 35:17 150:1 <b>state</b> 1:16 26:2,3 54:18 96:20 97:9 124:1,21 129:20 160:9 165:19 169:1,1,2 171:5 195:17 212:18 229:1 <b>stated</b> 202:14 <b>statement</b> 6:9 13:1 72:10,15 194:14 208:10 208:11 <b>statements</b> 76:15 77:3 91:14 <b>states</b> 31:10 62:23 63:7 75:14 79:11 81:11 86:6 124:16 130:24 131:14 133:10 138:12	141:4 156:23 159:10 178:20 185:1 188:11 193:23 195:16 200:11 207:11 208:1 214:7,23 223:8,24 <b>station</b> 5:7 7:8,16 7:18,19,20 8:1 8:24 12:12,12 14:2,3,5,8,12,17 14:20,24 15:11 30:18 65:9,14 171:13 185:21 185:22 <b>stations</b> 29:23 30:1,1,9 44:2,4 <b>statistical</b> 62:13 113:12 <b>statistically</b> 108:2 113:13 120:14 120:22 123:5 <b>stay</b> 162:3 <b>stayed</b> 47:19 <b>steel</b> 170:7,7 <b>steep</b> 220:1,10,11 221:15 <b>Stefanie</b> 2:17 6:21 <b>stem</b> 26:18 <b>step</b> 24:14 34:9 42:8 50:2 56:21 61:2 62:3 67:11 91:7 117:13 145:8 203:18 204:11 <b>step-by-step</b> 204:19 <b>Steve</b> 9:21 34:15 <b>Steven</b> 3:11 34:18 35:1 <b>stir</b> 74:3 <b>stockpiled</b> 222:3 <b>Stone</b> 7:22 10:22 16:8,12,18 119:14,18
--	--	--	--	--

120:10 121:8,13 122:19,21 <b>stop</b> 157:21 187:6 <b>storage</b> 8:2 94:5,5 175:19 <b>store</b> 39:5 198:7 <b>stored</b> 191:9 <b>storm</b> 12:14 149:11 <b>stormwater</b> 140:7 140:8 141:15,23 144:6,10,12,19 144:21 145:2,12 146:1 148:18 149:13 <b>story</b> 138:22,24 142:11 <b>Street</b> 1:17 2:11 <b>strength</b> 183:22 184:6 <b>stressors</b> 92:19 93:8,12 <b>strong</b> 121:5 <b>structural</b> 69:17 69:19 206:12 <b>structures</b> 85:4 170:8 <b>studied</b> 70:17 <b>studies</b> 73:1 85:7 85:9 123:19 128:23 <b>study</b> 123:21 124:15 127:4,7 128:12 <b>studying</b> 78:23,24 <b>subbase</b> 199:14 <b>subcontractor</b> 191:14 219:11 219:12 <b>subgrade</b> 164:7 173:11 187:20 194:9 197:10,14 197:18 198:20 199:1,6,13 200:11,11,16	202:12 203:15 205:5,6 207:15 208:21 210:4,7,9 219:12 222:18 223:6,9 224:1,9 224:15,18 <b>subject</b> 7:12 99:3 101:22 137:8 196:11 <b>submit</b> 178:24 190:20 <b>submitted</b> 55:1 187:1 189:1,24 190:11 191:3 195:4 201:19 202:22 208:14 209:8 <b>submitting</b> 55:3 <b>Subpart</b> 5:19,24 <b>subsequent</b> 100:23 114:13 115:15 127:24 149:17 <b>subsequently</b> 120:18 145:6 <b>substance</b> 84:9 183:9 184:22 <b>substantially</b> 117:21 193:24 <b>subsurface</b> 51:13 146:11 147:18 148:22 <b>successful</b> 195:22 <b>suffered</b> 206:19 <b>sufficient</b> 138:17 <b>suggest</b> 151:19 158:8 <b>suggested</b> 161:10 169:17 <b>suggesting</b> 157:2 <b>suggestion</b> 159:21 <b>suggests</b> 27:8 106:22 139:7 149:9 189:22 226:20,20	<b>suitable</b> 202:12 <b>Suite</b> 2:12 <b>suites</b> 62:21 <b>sulfate</b> 107:20 108:5,22 113:14 114:8,9 <b>sulfide</b> 108:13 <b>sulfuric</b> 108:20 <b>summarized</b> 130:13,15 <b>summarizes</b> 212:9 <b>summary</b> 159:11 <b>summation</b> 12:10 <b>supplement</b> 5:14 78:17 <b>supplementary</b> 78:13,13 <b>support</b> 103:23 106:19,23 127:9 148:6,9,12 203:15 <b>supports</b> 149:5 182:15 195:5 <b>suppose</b> 116:12 <b>supposed</b> 98:2 <b>sure</b> 5:8,15 17:16 58:19 68:21 70:1,24 83:17 84:3 93:4,6,10 93:14 115:5 129:13 142:5,21 166:20 167:18 171:2 175:13 180:7 185:7 192:20 200:10 221:21 224:18 <b>surface</b> 7:11 9:1 32:20 37:7,8 70:15 100:8,18 101:3,23 104:2 104:12,13 105:15 142:20 142:24 147:17 164:8 171:6,7,17 185:19 187:18	200:12,16 216:15 223:13 223:24 <b>surfacing</b> 74:20 <b>surrounding</b> 110:13 149:3 <b>surrounds</b> 81:3 90:19 <b>survey</b> 124:16,18 217:3,22 218:20 218:22,24 219:2 219:3 <b>surveyed</b> 37:6 217:24 <b>surveyor</b> 216:22 217:2 <b>Susan</b> 2:10 6:17 <b>suspect</b> 89:18 160:2 <b>suspended</b> 56:15 56:22 153:22 165:16 <b>SW</b> 155:10 <b>swear</b> 13:9 <b>switch</b> 21:21 142:15 <b>switched</b> 69:18 157:3 <b>switching</b> 157:8 <b>swore</b> 215:16 <b>sworn</b> 13:11,15 24:20 25:3 34:17,20 42:23 43:3 50:15,18 67:20 68:7 96:14,17 167:24 168:3 229:5 <b>synthetic</b> 23:15 <b>system</b> 15:15 16:9 20:23,24 29:8 34:4 38:14 87:4 87:7 129:7,9,10 129:12,18 130:3 150:11 196:18 206:14 225:18	226:1 <b>systematic</b> 185:17 187:17 <hr/> <b>T</b> <hr/> <b>T</b> 4:17 <b>t-e-r-n-a-r-y</b> 70:19 <b>T-e-r-r-a-n-o-v-a</b> 6:23 <b>T-h-o-m-a-s</b> 168:8 <b>tab</b> 15:5 29:14,19 36:5,19 44:10 46:14 52:3 54:12 55:9,16 57:11,18 58:8 60:14,15 63:22 64:7,11 65:3 97:1 103:9,13,13 103:13,14 116:20 131:8 168:11 <b>table</b> 54:22 63:12 63:13,15,17 64:8 64:19 113:11 114:1,20 124:10 124:13 130:20 <b>tables</b> 63:24 130:20 <b>tabs</b> 103:12 <b>TACO</b> 124:5,11 134:11 <b>tad</b> 67:24 <b>take</b> 40:10 51:13 56:21 62:3 96:1 141:18 145:24 146:5 149:23,23 151:8 169:14,15 169:18 175:5 <b>taken</b> 1:15 9:8,21 45:21,22 46:1 96:9 124:22,24 162:20 175:3 179:11 210:6,8 222:16 229:10
--	--	--	---	--

<b>takes</b> 97:16 159:1 159:5	95:13 97:16 107:18 122:21	91:11 95:7,11	116:18 117:8 120:9 124:9	149:4 150:10,23 151:9,11 152:5
<b>talk</b> 65:1 70:24 78:9 79:24 129:7 142:14 173:15 183:1 198:20 214:4 217:13	123:11 125:12 129:8 131:14 137:16 139:13 143:10 145:16 151:16,18,18 152:4 175:11 176:15 190:2 191:1 200:8 201:15 204:7 220:3,21 223:6	<b>test</b> 97:23 99:1,2,3 161:10,10,11,14 169:14,17,20 226:8 227:19,22	125:7 127:14 129:1 138:8 139:10 145:8 153:3 155:1 162:13,16 167:9 167:11,14,15 174:10 176:5 181:18 182:18 200:7,24 205:16 213:24 221:17 225:12 228:16	161:7 181:8 183:10 184:2 186:2 193:5 195:3,22 196:16 196:20 202:7,19 209:3 218:5 225:8,9 226:22 227:17,21 228:3
<b>talked</b> 59:18 88:16 111:12	<b>telling</b> 62:4 191:23	<b>testified</b> 13:15 25:3 34:20 43:3 50:18 68:7 96:17 119:12 141:10 168:3 227:1	<b>Thanks</b> 43:20 145:9	<b>third</b> 55:11,17 56:8 58:17 80:6 183:17 203:3 210:3
<b>talking</b> 61:21 75:12 76:21 77:21 80:11,18 81:24 83:18 87:21 109:24 117:6 118:7 142:3,6 158:20 173:4 181:11 198:24 215:6	<b>tells</b> 112:3 137:17 152:1 203:13 223:15	<b>testifying</b> 128:3	<b>thaw</b> 149:16	<b>Thomas</b> 4:11 10:18 18:24 168:1,8
<b>talks</b> 210:24	<b>temperature</b> 87:24	<b>testimony</b> 8:13 10:2 12:2 18:24 91:15 119:12 153:10 157:11 165:19	<b>thick</b> 172:8 198:9	<b>thought</b> 174:14 190:23
<b>tan</b> 74:11	<b>temporary</b> 8:2 116:14	<b>testing</b> 22:18 85:24 149:20 150:3 152:20 161:9 165:20 167:7 194:21 226:6	<b>thing</b> 32:3 88:16 89:15 137:17 214:22 216:17	<b>thousand</b> 21:1
<b>tasked</b> 186:4 187:16	<b>ten</b> 43:24 95:17 120:15 148:2	<b>tests</b> 150:20	<b>things</b> 21:18 29:17 35:12 38:16 43:12 59:1 69:8 75:17 76:21 87:2,20 94:9 108:21 152:10 170:6 196:6	<b>thousands</b> 73:17 86:5
<b>tasks</b> 35:10,21	<b>tend</b> 57:6 220:23	<b>textural</b> 150:11	<b>think</b> 5:10 7:4 14:6 62:21 71:12,14 72:24 74:1 77:5,11 81:21 82:5,10 87:16 88:14,15 89:22 93:17 95:15 101:1 104:14 105:1 106:11 107:14 108:7 116:7 117:4 119:11 124:14 125:20 129:8 133:17 138:6,21 140:6 142:9 147:13,19 148:8,10,12	<b>three</b> 8:16 70:21 73:5 87:13 105:3 110:18,20 110:21 112:12 112:16 119:3 121:22 169:9,11 213:14,18,18,18 226:20 228:2
<b>TDS</b> 59:23 107:19 107:22 108:5,22	<b>tendency</b> 108:21	<b>texture</b> 73:20		<b>Thursday</b> 127:22
<b>team</b> 100:5	<b>tends</b> 221:9	<b>thank</b> 6:20 7:1 12:20,21 13:8,22 19:11,15 21:20 22:13 23:2,6,8 24:9,12,14,22 27:12 33:13,23 34:5,6,8,10 38:2 41:6,7,17,19 42:4,7,9 49:13 49:22 50:2,13 66:9,11,14,22 67:5,9 68:16,18 71:21 81:4 86:12 89:7,8 91:6,8 92:2 95:7 95:9,10,19,21,22 95:23 96:6,24 103:18 107:24 109:20,22 113:3		<b>tied</b> 106:11
<b>technical</b> 6:2 98:7 98:9 128:22,22 188:18,21 189:3 190:22 197:20 201:4 222:20,23 225:6	<b>term</b> 27:19 39:20 70:18,19 75:1,4 77:12 78:13 115:24 122:14 172:4 218:3			<b>tiered</b> 124:5,8
<b>technically</b> 72:15 76:15 80:19 154:21	<b>terminated</b> 112:13			<b>tight</b> 155:23
<b>technique</b> 45:7	<b>terms</b> 71:19 76:10 84:7 93:15 98:8 105:7 107:1 125:23 144:4 152:15 155:14 158:12 166:5 170:5			<b>time</b> 12:16 24:5 41:24 45:12 52:14 62:9,10 68:16 70:6 78:20 79:19 89:23 95:16 101:13 109:13 109:17 136:5,21 137:11 141:1 147:19 154:19 156:17 177:16
<b>technology</b> 69:20 155:24 187:19 216:3	<b>Terranova</b> 2:18 3:17 4:5 6:23 33:15,17 34:5 49:16,22 91:10			
<b>tell</b> 7:18,19 8:2 11:19 26:4 28:14 31:15 36:11 45:2,4 47:16 73:18				

183:18,19 184:4 184:5,8 191:13 193:24 198:14 207:2 <b>times</b> 23:14 196:8 <b>timing</b> 147:13,15 148:15,22 <b>tip</b> 159:2 <b>title</b> 31:14 128:1 <b>titled</b> 127:23 187:20 200:10 211:20 215:24 <b>today</b> 5:4,18 9:21 12:5 15:16 53:2 67:23 112:7 128:3 143:14 183:24 194:21 213:11,13 221:8 226:24 227:18 228:14 <b>today's</b> 7:14 <b>told</b> 145:11 221:4 <b>Tom</b> 103:23 <b>tomorrow</b> 228:14 <b>tool</b> 129:19,22 <b>top</b> 9:12 23:16 31:10,19 32:3,12 80:7 112:19 144:8 177:5 180:7 181:3 220:16 221:14 221:20,22 222:10,17 223:5 <b>topic</b> 70:7 <b>topographic</b> 214:19 <b>topography</b> 149:9 <b>topsoil</b> 144:7,9,15 149:12 <b>topsoils</b> 145:7 <b>total</b> 10:12,15 33:20 41:14,15 46:7 49:8,9,19 53:18 56:13,20 57:5 58:23 59:2	59:5,13,20 60:6 60:16,17 61:9,10 61:18 62:6,8,15 66:19 73:4,6 94:18,23 105:2 107:23 112:6,8 139:6 153:11,19 156:11 157:1,8 157:13,15 158:3 159:16,20 164:13,16,23 165:9,14 <b>totally</b> 59:6 77:23 <b>totals</b> 60:23,24 157:15 <b>touched</b> 196:20 <b>Toxic</b> 127:24 <b>trace</b> 126:23 127:24 128:15 <b>trade</b> 51:4 75:4 <b>traditional</b> 18:16 <b>train</b> 35:13,15,16 35:19 38:9,12 <b>trained</b> 38:13,15 <b>training</b> 40:19 <b>transcript</b> 103:17 229:10 <b>translate</b> 161:11 161:14 <b>transmission</b> 15:14 <b>transport</b> 16:9 127:23 137:19 <b>Transportation</b> 180:22 <b>transported</b> 16:18 <b>travels</b> 228:16 <b>treating</b> 113:1 <b>trees</b> 62:2 <b>trend</b> 61:5 106:15 106:17,18,20 <b>trends</b> 104:7 106:21,23 <b>triangles</b> 188:6,7 <b>trigger</b> 115:2	<b>trucks</b> 94:10 <b>true</b> 55:5 56:7 76:15 77:3 140:8 158:8 229:9 <b>truly</b> 95:18 <b>try</b> 23:4 84:22 177:21 <b>trying</b> 63:5 161:11,13 <b>tube</b> 26:14,15 28:9,12 <b>tubes</b> 87:16 <b>turn</b> 15:4 29:13 30:12 36:19 44:10 45:10 46:14 52:3 54:12 55:9,16 57:11,12 58:7,9 62:19 65:3,4 72:3 81:5 89:12 89:13 97:1 103:7 110:6,7 111:7 113:8 116:19 129:2,3 130:9 131:8,11 132:15 134:15 138:9 139:11,21 140:12,23 141:1 143:5 146:22 153:6 156:19 159:7 168:10 172:14 173:21 178:9 182:19 188:16 190:14 192:5 193:19 195:12 201:11 202:18 207:4 213:1 214:13 215:7,15 217:12 222:20 223:2 <b>turned</b> 16:22 <b>turning</b> 133:9 157:19 173:14 <b>twice</b> 102:13	<b>two</b> 6:2 10:17 31:9 44:23 45:15 56:5 63:24 81:22 86:15 87:9 101:10 103:1,4 109:17 111:13 125:12 128:22 128:22 133:13 148:2 154:12 155:3 157:14 158:5,15 163:11 169:15 172:1 180:15 190:18 206:5,9 208:16 210:4,5,7 218:18 222:12 <b>type</b> 51:20,22 53:16 56:15 74:8 104:10 116:15,17 137:12 151:20 155:17 180:23 184:22 <b>typical</b> 175:13,15 176:5 185:1 <b>typically</b> 47:7 166:4 221:24 <hr/> <b>U</b> <hr/> <b>U</b> 176:13 <b>U-S</b> 29:4 <b>ultimately</b> 40:14 98:16 100:15 104:8 127:2 132:19 140:20 143:3 144:13,19 145:3 146:2 147:7 162:3 <b>unavailable</b> 7:24 <b>uncommon</b> 161:18 <b>unconsolidated</b> 207:21 <b>undergone</b> 83:10	84:8 <b>underground</b> 137:10 <b>underlying</b> 108:15 <b>underneath</b> 162:1 <b>underscore</b> 200:4 <b>understand</b> 21:4 93:16,23 94:7 95:20 122:2 144:3 170:4 183:3 <b>understanding</b> 27:21 39:1 52:15 85:21 114:22 136:10 147:3 150:15 164:15 170:7,10 183:2 184:21 186:3 192:16 <b>undisturbed</b> 26:17 <b>unfiltered</b> 153:19 <b>UNIDENTIFIED</b> 109:7,10,15,19 <b>Unified</b> 29:7 38:14 <b>unique</b> 77:15 <b>unit</b> 6:2 22:15 130:18,21,22 155:4 <b>United</b> 75:14 79:11 86:6 124:16 185:1 <b>units</b> 101:2,7,11 102:13 <b>university</b> 69:16 69:21 97:9,11 127:21 168:19 169:9 <b>unnecessary</b> 227:18 <b>unsuitable</b> 177:8 201:22 203:9,11 203:14
--	--	--	---	---

<b>unusual</b> 106:24	<b>V</b>	220:12,17	202:19 207:23	87:4
<b>unusually</b> 108:10	<b>vague</b> 166:24	<b>vertically</b> 220:19	207:24 209:12	<b>Waters</b> 128:1
<b>updated</b> 189:18	<b>value</b> 61:24 64:6	<b>vicinity</b> 137:10	210:23 211:9	<b>Waukegan</b> 185:20
<b>updates</b> 189:2	112:8 157:1	141:16 144:7,9	214:2,18 215:6,9	185:21
<b>upgradient</b> 41:23	<b>Vanessa</b> 2:6 6:4	212:21	215:18 222:11	<b>way</b> 18:16 21:16
42:2 105:6	<b>variation</b> 154:17	<b>view</b> 19:8 178:1	222:11 226:18	26:12,16,21 27:9
106:7 146:3	155:18,20 156:8	<b>viewed</b> 157:14	<b>wanted</b> 15:9	39:7 65:20 74:5
<b>upper</b> 125:4 128:8	156:9,14 158:17	<b>virtually</b> 90:13	166:20 194:20	82:10,23 87:14
180:15,18	158:18	<b>visual</b> 134:5,6	<b>wants</b> 12:13 27:8	93:20,20 113:1
208:17 219:22	<b>variations</b> 154:22	<b>visually</b> 90:14	68:1	144:8 145:2
<b>uppermost</b> 180:3	<b>variety</b> 43:12 45:1	<b>volcanic</b> 77:17	<b>warning</b> 18:11,12	147:7 148:10
<b>Urbana-Champ...</b>	51:24 69:8,9	<b>volume</b> 12:13	18:19 21:15	154:13 183:3
168:20	73:12 79:6	46:11 168:11	172:5 191:7	201:3
<b>usage</b> 73:17	213:20	171:18 193:3	217:2 227:7	<b>ways</b> 26:11
<b>USCS</b> 28:24 33:24	<b>various</b> 35:10	205:17,18,20	<b>warns</b> 172:5	<b>WC-GT-3</b> 33:3
34:3 35:19	39:4 40:8 52:2	211:11,12	<b>wash</b> 18:15,16	<b>we'll</b> 17:19 19:4
38:14,16	53:5 80:23	<b>voluminous</b> 77:20	<b>washed</b> 21:14	21:15 45:24
<b>USDA</b> 150:10	92:19 93:7		<b>wasn't</b> 95:3 110:4	55:14,15 64:23
<b>use</b> 12:13 15:17	100:15 106:7	<b>W</b>	130:4 226:2	70:24 95:15,16
18:2,17 21:12	123:14,23 128:6	<b>W-i-l-l-i-a-m</b>	<b>waste</b> 12:11,13,15	156:16 162:18
27:13 28:10	146:12 150:7,9	13:20	58:22 100:16,17	165:13 206:21
29:10 31:6 34:3	164:24 165:8	<b>W-i-l-s-o-n</b> 43:8	101:11 105:17	207:1 214:4
39:13 66:6	170:6 171:3,4,8	<b>waiting</b> 21:5	105:19 122:8,12	<b>we're</b> 5:1 6:17,23
79:18 85:19	171:10 173:10	<b>want</b> 6:6 7:2	122:16 170:11	8:9 12:10 16:19
99:11,15,16	177:18 178:3	12:11 29:17	171:18 193:3	28:12,14 42:20
106:12 122:15	179:21 188:6	32:23 33:2 46:4	<b>water</b> 8:15 12:14	48:19 50:10
129:18,19,22	212:12 216:6	46:12,14,18	20:20,21 22:18	51:11 55:3
130:3 145:23	<b>vary</b> 81:23 212:22	47:10 48:22	22:19,19 45:8	67:17,23 75:11
156:13,16	<b>vast</b> 7:20	52:14 55:14,15	48:23 56:17	76:20 77:21
170:10 174:17	<b>vegetation</b> 223:10	55:16 57:11,12	75:10 76:6	80:10,18 87:21
184:21 185:1	<b>vehicle</b> 227:2	58:9 62:19 65:1	77:10,22 78:4,4	89:6 96:5,7,10
193:2,3 194:2	<b>velocity</b> 145:19,22	65:3 81:5 92:22	78:5 80:7,15	102:5,11 114:6
195:21 196:1	145:24 146:9,10	95:24 110:6	81:2 82:14	117:6 129:20,21
206:7 216:14,17	146:16,20,21	111:7 113:8	83:22 84:14,20	133:5 142:6,14
222:3 225:17,19	<b>verify</b> 210:18	116:19 117:13	85:5,6 86:1 87:6	149:7 158:19
226:3	<b>version</b> 71:12	129:2 130:6,9	87:7,13 99:7	162:18,21
<b>useful</b> 128:5 139:3	169:22 189:18	133:4 138:9	100:8,13 110:14	165:11,11
139:4	190:5,11 209:16	139:11,12	117:15 122:13	177:24 199:21
<b>USEPA</b> 85:17	218:21,24	140:23 153:6	122:15 128:16	199:24 204:2,17
155:9	<b>versions</b> 216:2	168:10 172:14	145:4,12 152:2	228:8,11,13
<b>user</b> 184:17 185:3	<b>versus</b> 61:18	173:21 178:15	155:5 156:8	<b>we've</b> 21:22 62:8
<b>uses</b> 11:19 26:12	158:13	182:19 190:14	171:18 183:14	62:10 100:9
27:5 28:10	<b>vertical</b> 144:22,22	193:19 195:12	191:9 193:3	103:11 108:12
<b>utilized</b> 120:1	162:5 200:13	196:21 198:20	<b>water's</b> 147:16	112:1,6 113:1
126:3 150:11	201:2 219:19	199:19 201:11	<b>waterproofing</b>	118:1,3 128:23

129:6,24 136:17 140:9 143:16 160:8,19,21 161:15 213:14 221:8 227:17 <b>weather</b> 33:9 <b>Weaver</b> 99:18,21 99:22 100:4 101:15 165:2 <b>Webex</b> 67:22 109:6 <b>website</b> 55:3 85:18 120:7,8 <b>week</b> 20:24 21:1 71:17 <b>weekly</b> 23:22 <b>weight</b> 26:19,20 130:18,21,23 <b>welcome</b> 34:11 <b>wells</b> 9:19 10:5 37:4,5,6,12,13 37:18,21 41:3,21 42:3 44:19,22 52:8,12 104:19 105:1,2,9,10 106:4 118:6,7 120:13,15,17,20 122:9 137:13,22 140:10 146:4,7 147:8 148:20 160:6 161:16 <b>went</b> 16:7 119:13 183:23 218:19 224:11 <b>weren't</b> 124:22 134:1 190:21 199:9 <b>western</b> 219:21 <b>Westmont</b> 47:21 <b>wet</b> 202:15,17 <b>white</b> 204:21 <b>wide</b> 75:15 <b>William</b> 3:3 13:13 13:20 <b>Wilson</b> 3:15 10:14	42:13 43:1,6,8 50:2 52:24 54:5 54:8 57:15 58:11,19 153:24 <b>Wilson's</b> 64:11 <b>winter</b> 149:14 <b>Wisconsin</b> 26:2 36:4 51:19 97:15 <b>witness</b> 3:2 4:2 12:3,7 13:3,4,10 13:14 15:5 24:15,17,19 25:2 34:11,12,14,16 34:19 37:15 41:24 42:10,12 42:22 43:2,18,21 50:4,11,14,17 67:12,19,22 68:6 83:4,12 84:11 85:13 91:8 95:9 95:22 96:13,16 152:22 163:23 167:16,23 168:2 <b>witnesses</b> 12:4,6 111:12 <b>wonder</b> 148:3 <b>wondering</b> 152:18 <b>word</b> 80:1 139:18 156:13 224:19 <b>words</b> 220:24 <b>work</b> 13:23,24 25:10,11 35:2 36:24 37:2,3 43:9,14 44:1 50:24 51:13,20 51:22,24 70:3 79:13 85:5 97:20 98:9 99:18 103:23 105:21 135:15 148:15 169:21 170:17,18 190:1 191:14 192:3 199:15 201:5	203:6,7 216:4 218:3 219:23 226:21 <b>work's</b> 52:1 <b>worked</b> 14:13 25:22 43:23 70:2 99:21 101:1,7,8,19,23 132:14 170:20 170:22 <b>working</b> 73:4 101:14,15 102:14 129:21 129:22 <b>works</b> 122:4 <b>world</b> 56:14 <b>worldwide</b> 86:6 <b>worse</b> 98:17 <b>worth</b> 153:1 160:19 <b>wouldn't</b> 88:3,4 116:14 132:5 166:7 <b>writing</b> 25:17,17 35:10 <b>written</b> 127:8 140:4,5 201:21 <b>Wyoming</b> 169:1 <hr/> <b>X</b> <hr/> <b>X</b> 3:1 4:1,17 <b>xylyne</b> 53:8 <hr/> <b>Y</b> <hr/> <b>Y</b> 58:15,24 59:4,9 <b>yard</b> 101:9,12,14 101:18,18 102:2 102:4,8,13,15 224:14 <b>yards</b> 202:1 <b>yeah</b> 6:8 21:1 29:3 48:21 49:2 57:18 73:21 93:14 94:14 95:6 96:2 104:16 107:16	109:2 110:17 111:15,21 112:14 114:11 115:9 116:11 117:22 119:17 122:5,23 127:14 132:9,15 133:2,8 135:7 136:3 137:7 139:19 140:22 142:8,9,9 148:7 153:15 158:21,21 161:24 162:10 174:13 192:4 199:20 208:12 209:2 211:9 223:2 <b>year</b> 17:15 101:15 102:13 164:23 169:12 <b>Yearly</b> 23:22 <b>years</b> 10:20 14:6 24:4 25:23 35:24 43:24 51:8,9 52:1 73:4 73:5,6 77:18 78:22 79:16 85:8 92:3,18 93:7 94:11 97:21 99:22 100:23 101:14 102:14 105:20 110:19,20,21 112:12,16 136:2 136:18,24 137:2 137:4,7 147:24 148:2,4 153:1 160:19,21,22 161:16 169:8,10 169:11 170:23 193:8,10 195:10 <b>yep</b> 61:11 143:9 <b>York</b> 97:10 <hr/> <b>Z</b> <hr/>	<b>Zhang</b> 124:14,17 <b>zoomed</b> 209:15 <hr/> <b>0</b> <hr/> <b>0.0037</b> 64:17 <b>0.0041</b> 63:16 64:6 <b>0.006</b> 63:1,9 117:20,24 <b>0.0082</b> 63:18 64:18 <b>0.0106</b> 125:10 <b>0.016</b> 125:15 <b>0.057</b> 115:17 <b>0.069</b> 158:14 <b>0.070</b> 158:14 <b>0.075</b> 131:18 <b>0.45</b> 45:19 154:9 <b>0.87</b> 145:22 <b>02300</b> 199:18 <b>08</b> 136:7 203:4 <b>084-004445</b> 1:24 <hr/> <b>1</b> <hr/> <b>1</b> 7:11 16:20,21 17:23 18:2,8,21 29:14 44:10 63:13,17 65:4,6 65:7 89:13,16,19 103:13 125:5 168:11 173:22 174:11,12 176:16,19 187:22 191:2,10 192:5 198:2,11 198:18 200:13 200:17 201:2 204:3 205:17 206:9 210:15,21 211:11,12 214:8 218:20,23 219:1 219:19 220:12 220:12,17,19 225:3,7,11 <b>1-to-1</b> 220:11,12 220:20 <b>1.0</b> 117:16
---	--	---	---	---



<p><b>1:00</b> 67:23 68:1 68:11,14,16 95:16 <b>1:04</b> 109:13 <b>10</b> 2:11 40:23 68:12 89:21 109:3 110:1 113:16 121:17 121:20 131:11 138:10 150:20 150:21 155:16 165:21,22,22,23 166:6,6,10 194:5 <b>10.9</b> 125:5,16 <b>101</b> 5:23 <b>1021</b> 2:19 <b>104.400</b> 5:19 <b>11</b> 14:6 63:12,16 63:20 178:16 194:5 203:21,23 204:2,5,7,8 208:23 209:4 <b>11:40</b> 95:24 <b>115</b> 130:22 <b>12</b> 10:20 109:3 110:1 121:18,20 137:4 153:1,8 161:16 198:9 <b>12-inch</b> 172:7 227:7 <b>1200</b> 202:1 <b>125</b> 130:18,23 <b>127</b> 4:21 <b>13</b> 3:4 110:8 <b>13-15</b> 200:4 <b>13-1518697</b> 223:3 <b>130</b> 114:16 <b>14</b> 193:8 195:12 <b>140</b> 114:10 <b>1400</b> 15:12 <b>14A</b> 195:19 <b>14B</b> 196:3 <b>15</b> 5:13 63:21 68:12 85:8 109:8,10 111:8</p>	<p>113:8 <b>15A</b> 115:18 <b>16-ounce</b> 224:13 <b>163</b> 4:9 <b>168</b> 4:12 176:9 <b>17</b> 35:24 46:18,21 47:10 58:9 130:9,14 131:12 133:9 201:19 203:4,11 <b>175</b> 4:22 <b>18</b> 17:11 46:18,21 47:13 48:19 58:10 113:11,19 172:18 174:7 223:13 <b>18696</b> 200:6 <b>19</b> 25:23 81:9 207:4 210:24 211:3 <b>19276</b> 2:20 <b>1950s</b> 75:6 78:18 <b>1978</b> 8:8 19:14,20 89:24 135:6 136:1,19 173:2 173:18 175:15 188:15 <b>1999</b> 14:16 <b>1V</b> 200:13</p> <hr/> <p style="text-align: center;"><b>2</b></p> <hr/> <p><b>2</b> 7:8,15 8:1,3,5,8 9:11,20 10:21,23 11:1,6,16,23 12:13,15 16:19 19:8,10,13 20:18 21:3,24 22:14 23:12 29:19 30:19,22,23 33:19 37:17,19 41:14,22 43:14 44:18 45:3 46:14 49:18 52:8 54:12 57:11,18 63:12</p>	<p>63:15 64:11 66:18 75:19,21 75:24 87:1 88:5 89:24 91:17 92:6,10,14,23 93:3,23,24 94:17 94:23 103:13 104:2,12 106:1,5 107:8,12 110:13 111:21 114:5 115:21,24 116:5 117:11 118:7 119:7,10,20 121:5,5 122:22 126:5,5,6 128:20 128:24 130:20 130:20,20 132:14,16 133:21 134:10 134:14 135:3 138:13,16,18 140:7 141:16 143:2,2 149:3,8 149:12,15 150:20 161:1,5 164:7 165:23 166:23 167:1 170:10 171:16 171:23 173:1,6 173:14,17 174:2 174:5,12 175:14 175:21,22 176:4 176:6 177:4 178:9 179:10,24 181:13,14,17,20 182:5,17,22 183:11 185:5,12 186:2,9,16 187:22 188:5,8 188:19 189:15 189:21 192:3,9 195:24 196:19 198:6,9,11,16,18 199:1 201:17,22 202:11 203:2,10</p>	<p>204:10,20 205:18,20 206:8 212:2,20,22 214:20 217:23 218:19,19,22 219:1,3,5,10 225:9,12,18,24 226:14 227:4 <b>2's</b> 130:17 149:10 149:20 150:3 173:11 206:14 206:18 208:4 <b>2.5</b> 212:16,18 <b>2.6.1</b> 211:19 <b>20</b> 17:20,22 51:9 64:13,14,15 76:4 85:8 134:15,18 149:17 155:16 158:7 183:15 <b>200</b> 131:17 <b>2000</b> 51:8 57:22 77:18 <b>2000s</b> 9:3 <b>2002</b> 51:9 <b>2005</b> 30:8 31:5 150:15,23 177:15 180:7,10 208:17 213:10 <b>2007</b> 185:14 187:23 188:1 189:22 <b>2008</b> 8:5 11:7 19:23,23 71:24 92:8 94:3 135:11 171:16 173:3 192:10,22 193:9 196:9,19 201:19 203:11 206:13 210:7,8 <b>2009</b> 71:23 <b>2010</b> 9:17 10:6 22:4,4 36:24 104:6 105:23 135:19,21,23 136:11,14</p>	<p>140:10 164:12 177:16 <b>2011</b> 36:24 66:1 177:16 180:11 213:12 <b>2012</b> 121:14 141:5 <b>2013</b> 22:5 52:14 52:19 112:2 <b>2014</b> 170:23 <b>2015</b> 10:10 16:21 20:10,11 22:14 53:12 164:22 171:3 178:21 180:12 <b>2016</b> 10:1 15:22 173:19 212:4 213:9 <b>2019</b> 8:6 20:16,16 24:7 94:4 113:16 114:7,12 114:13,18 115:10 <b>2020</b> 63:3,10,14 64:4,5,15,15 113:23 <b>2021</b> 44:15 54:13 55:6,11,17 56:8 58:16,17 106:14 107:2 159:11 <b>2021-1</b> 5:8 <b>2022</b> 1:18 5:4,13 63:11,14 72:11 116:22 172:18 204:4 205:23 228:15,18 <b>20B</b> 18:7 <b>20C</b> 18:20 <b>20D</b> 18:23 <b>21</b> 48:19 51:8 57:13 116:22 214:2 <b>21-1</b> 1:5 <b>22</b> 51:8 63:2,10,14 63:14 64:4,5,15 116:20 128:20</p>
--	--	---	--	--

163:21 164:4 210:15,17 214:14 <b>23</b> 3:5 214:14,22 <b>24</b> 57:13 63:3,12 149:18 205:23 217:16 <b>25</b> 3:8 19:18 72:3 102:14 105:20 149:18 <b>26</b> 99:22 101:14 139:13,17 <b>28</b> 5:4 205:20 210:7 217:16,16 218:9 222:21 <b>28th</b> 1:18 <b>29</b> 4:20 5:7 7:8,16 9:11 12:11 14:21 15:10 17:23 30:9,13 33:19 36:16 37:4 40:22 41:14 44:8 45:4 49:18 54:6 55:20 56:9 63:20 66:18 67:2,6,7 75:21 80:11 89:21 90:23 92:5,10,14 94:17,22 101:22 117:23 119:13 122:22 132:18 166:23 171:12 171:14 173:1 175:14 185:19 186:10 198:2 218:17 228:15 228:18 <b>29's</b> 130:16 <b>2nd</b> 1:17	61:8 64:7 76:4 78:9 103:13 105:6 113:15 114:7,8,13,18 115:15 118:7 129:3 130:19,20 130:23 138:11 158:6 159:15 160:6 173:14 174:2,6 176:16 176:18,18 183:13 198:2,12 200:12 201:2 213:2 214:8 215:12,18 217:12,15 219:19 220:17 220:18 223:11 224:6 225:13 <b>3-inch</b> 65:8 <b>3-to-1</b> 176:11,17 200:13 201:1 219:19 220:2,17 <b>3.05</b> 223:5 <b>3.9</b> 19:18 <b>3:00</b> 67:23 <b>30</b> 4:21 44:14 47:19 127:15,16 128:19 145:24 193:10 195:10 210:8 221:11 <b>300</b> 146:6 <b>302</b> 1:17 <b>305</b> 199:18 200:10 <b>31</b> 4:22 47:20 175:5,8 176:24 200:23,24 201:1 <b>32</b> 136:2 <b>33</b> 3:9 139:21 140:5 <b>34</b> 3:12 141:2 <b>35</b> 1:7,9 <b>35549</b> 203:18 <b>36</b> 146:23 147:3 147:23	<b>3600</b> 2:12 <b>38</b> 140:13,17 <b>3H</b> 200:13 <hr/> <b>4</b> <hr/> <b>4</b> 30:14 40:11,22 42:2 55:16 60:14,15 61:8 63:11,22 72:11 105:4,6 113:11 113:15 114:1,7 115:7,12 117:4 118:7 140:24 150:21 158:6 165:22,23 187:23 188:1,22 <b>4-1</b> 30:13 <b>4.5</b> 56:16 <b>40</b> 111:4 156:20 159:13 212:24 <b>41</b> 3:13 157:19 159:8 <b>43</b> 3:16 <b>44</b> 92:18 93:7 136:18,24 137:2 137:7 160:19,21 <b>45</b> 221:12 <b>45-degree</b> 220:13 220:21 <b>49</b> 3:17 <hr/> <b>5</b> <hr/> <b>5</b> 17:3,8 40:11,23 42:2 61:8 62:20 103:8,15 105:4,6 118:7 133:10 134:16 159:16 160:6 164:9 166:6 182:8 183:11 184:15 188:10 190:6 211:9,15 218:8 225:4 <b>50</b> 3:20 <b>516</b> 176:8,11 <b>520</b> 101:9,12,14	101:18 102:2,4,8 102:13,15 <b>535</b> 176:12 177:8 181:15 <hr/> <b>6</b> <hr/> <b>6</b> 17:23 106:14 125:4 143:2 149:13 166:6,17 178:19 187:8,14 187:15 202:5 222:21 <b>6's</b> 149:10 <b>6-inch</b> 172:4 227:6 <b>6.9</b> 125:5,16 <b>60</b> 96:3 <b>60603</b> 2:13 <b>620.410</b> 141:6 <b>62794</b> 2:21 <b>65</b> 114:15 <b>65,000</b> 17:9 <b>66</b> 3:21 <b>67</b> 4:20 <b>68</b> 4:4 <hr/> <b>7</b> <hr/> <b>7</b> 113:15 114:7,12 115:10 117:7 188:16,18 193:20 198:22 199:21,24 <b>70s</b> 135:5 <b>77</b> 76:6 183:15 <b>78</b> 135:9 <b>79</b> 89:24 <b>7A</b> 194:17 <b>7B</b> 194:23 <hr/> <b>8</b> <hr/> <b>8</b> 33:6 81:5 139:22 190:14,18,24 195:14 201:12 201:15,16 <b>845</b> 7:12 110:17 111:4 117:17,20	118:9,12 <b>845.600</b> 63:2,9 <b>846</b> 155:10 <b>854.740(a)</b> 1:7 <b>8A</b> 81:19 <b>8B</b> 86:16 <b>8C</b> 88:12 <hr/> <b>9</b> <hr/> <b>9</b> 33:6 107:5,10,18 109:1 110:1 140:13 195:14 202:18 <b>9:00</b> 1:19 228:15 228:19 <b>90</b> 124:19,20,20 <b>91</b> 4:5 <b>96</b> 4:8
---	--	--	--	---