

ILLINOIS POLLUTION CONTROL BOARD
JANUARY 13, 2010

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STATE OF ILLINOIS
Pollution Control Board

IN THE MATTER OF:)
)
WATER QUALITY STANDARDS AND)
EFFLUENT LIMITATIONS FOR THE)
CHICAGO AREA WATERWAY SYSTEM AND)
THE LOWER DES PLAINES RIVER:)
PROPOSED AMENDMENTS TO 35 Ill.)
Adm. Code Parts 301, 302, 303)
and 304)

R08-9
(Rulemaking -
Water)

REPORT OF PROCEEDINGS at the hearing of the
above-entitled cause before Hearing Officer Marie
Tipsord, taken before Rebecca A. Graziano, Certified
Shorthand Reporter within and for the County of Cook
and State of Illinois, at the Thompson Center, Room
9-040, Chicago, Illinois, commencing at the hour of
1:15 p.m. on the 13th day of January, A.D., 2010.

A P P E A R A N C E S

ILLINOIS POLLUTION CONTROL BOARD:

Ms. Marie Tipsord, Hearing Officer
Mr. Anand Rao, Senior Environmental Scientist
Mr. G. Tanner Girard, Acting Chairman
Ms. Carrie Zalewski
Mr. Thomas Johnson
Ms. Andrea Moore
Mr. Gary Blankenship

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY:

Ms. Stefanie Diers
Ms. Deborah Williams

FRANZETTI LAW FIRM P.C.
10 South LaSalle Street
Suite 3600
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(312) 251-5590
BY: MS. SUSAN FRANZETTI

Appeared on behalf of the Midwest Generation,
L.L.C.,

ENVIRONMENTAL LAW AND POLICY CENTER,
33 East Wacker Drive
Suite 1300
Chicago, Illinois 60601
(312) 795-3707
BY: MR. ALBERT ETTINGER
MS. JESSICA DEXTER

Appeared on behalf of ELPC, Prairie Rivers
Network, and Sierra Club.

1 MS. WILLIAMS: Good afternoon,
2 Dr. Burton. I think we left off at Question 29.
3 On Page 3, Paragraph 1 of your pre-filed testimony,
4 you state, quote, "In 2004, Illinois EPA identified
5 more than 800 causes and sources of impairments.
6 The most common sources of impairment are municipal
7 point source discharges, CSOs, urban runoff/storm
8 sewers, contaminated sediments, channelization, flow
9 regulation, hydro modification, and habitat
10 alteration."

11 Question A asked, "How did you
12 reach the figure of 800 causes and sources? Aren't
13 there only 65 possible causes and 55 possible
14 sources of impairment?"

15 DR. BURTON: I was looking at the
16 total number of individual causes and sources of
17 impairment that were listed for the Des Plaines
18 River, so I counted and added together the number of
19 causes and sources of impairment that are listed in
20 the 2004 305-B for each segment in this waterway.
21 Because the upstream --

22 MR. ETTINGER: I don't want to take
23 over Marie's job, but I can't hear you.

24 DR. BURTON: Oh, I'm sorry.

1 MS. TIPSORD: Are you sure?

2 DR. BURTON: Because the upstream
3 reaches can contribute to downstream water quality,
4 I thought this was one of the appropriate ways to
5 generally assess total impacts within the UIW
6 system.

7 MS. WILLIAMS: I think we've covered
8 some of these parts in the earlier questions.

9 MR. ETTINGER: I'm sorry. 800 causes
10 and sources -- a cause and a source are two
11 different things, as they define it in these rules,
12 aren't they?

13 DR. BURTON: I simply added up all the
14 ones that were listed in the 305-B report for each
15 segment. That's how I got to the 800.

16 MR. ETTINGER: But a source could
17 be -- have more than one cause, or it could give
18 rise to more than one cause. So for example, a
19 sewage treatment plant that put out ammonia and
20 phosphorus would be contributing towards two causes
21 with one source, right?

22 DR. BURTON: Right.

23 MR. ETTINGER: Okay. Now I understand
24 what you meant.

1 MS. FRANZETTI: And Albert, I'll just
2 say for the record, so it's a little clearer,
3 perhaps, on Exhibit 374, which is just certain
4 excerpted pages, I think this answer was based on
5 even more segments that are included in here.

6 But he took -- he was adding
7 what's listed in the causes -- there's a column
8 entitled "Causes," and there's a column entitled
9 "Sources," and that's what he was referring to in
10 terms of counting up what's listed under those two
11 columns for every segment that's in the UIW,
12 including the Des Plaines River.

13 MS. WILLIAMS: And if a particular
14 source was identified in more than one segment -- so
15 an individual plant can be counted more than once
16 the way you've done this?

17 DR. BURTON: I added for each segment,
18 so yes.

19 MS. WILLIAMS: Okay. What areas are
20 you referring to specifically? Does this go back to
21 the 18 segments on the Des Plaines River, or does it
22 include the entire Watershed?

23 DR. BURTON: For this particular
24 tabulation of 800 it was a whole Des Plaines

1 Watershed. The whole watershed.

2 MS. WILLIAMS: Did you look at whether
3 the Illinois River Watershed or any other watershed
4 in Illinois have comparable numbers to these if you
5 looked at the watershed as a whole?

6 DR. BURTON: Well, I think the earlier
7 document we talked about from U.S. EPA 303-D number
8 375 does that for us and lists the causes of
9 impairment and ranks the Des Plaines as the worst on
10 the list with 18 waters.

11 MS. WILLIAMS: Well, that's a totally
12 different analysis though, right? That's the number
13 of segments, and we don't even know --

14 DR. BURTON: Well, it's going to have
15 a direct correlation though, isn't it, the number of
16 segments?

17 MS. WILLIAMS: It might not. No, it
18 might not.

19 DR. BURTON: So it might be 500
20 instead of 800?

21 MS. WILLIAMS: Because there might be
22 one cause and one --

23 MS. FRANZETTI: Counsel, can I just
24 object? I think you're arguing with the witness

1 now. You may do the analysis differently. He's
2 telling you how he did it.

3 MS. TIPSORD: I'd have to agree. You
4 can ask him questions more about how he did the
5 analysis. You can ask him did he not consider this,
6 but you're making a statement.

7 MS. WILLIAMS: So you think that
8 because -- what do you base your conclusion on that
9 because -- let me strike that.

10 Do you know one way or another
11 whether there's another watershed in Illinois that
12 would have a higher number?

13 DR. BURTON: Of what?

14 MS. WILLIAMS: Of sources and
15 causes -- potential sources and potential causes of
16 impairment, yes or no?

17 MS. FRANZETTI: I'm just going to
18 object to the use of the word potential, because I
19 don't think that's what the Agency uses when it
20 lists the causes and sources.

21 MS. WILLIAMS: Do you know if they're
22 listed as potential causes and potential sources?

23 DR. BURTON: Do I what?

24 MS. WILLIAMS: Are they listed as

1 definitive, or are they listed as potential?

2 DR. BURTON: I see a column that says
3 "Causes," and one that says "Sources."

4 MS. WILLIAMS: Did you review the
5 narrative to determine whether they're considered
6 potential causes and potential sources?

7 DR. BURTON: No. IEPA identified them
8 and I did not.

9 MS. WILLIAMS: Okay.

10 MR. ETTINGER: Well, let's look at it
11 this way: Let's look at the lowest segment in the
12 Illinois River, the one down in Pike County. If I
13 used your methodology and added up all the potential
14 sources and potential causes in the entire Illinois
15 Watershed, wouldn't I come up with a much larger
16 number than the number you have for the Lower Des
17 Plaines?

18 DR. BURTON: Yes, you would.

19 MR. ETTINGER: Thank you.

20 MS. WILLIAMS: Moving on, Question 30,
21 "What conclusions about the sediments were reached
22 based on the work you did for Commonwealth Edison in
23 the mid '90s?"

24 DR. BURTON: Generally, the

1 conclusions reached about the sediments were the
2 same as the conclusions reached in the EA survey and
3 the study by Maylor (phonetic) et al., 2010, in the
4 USGS 2004 study. The sediments are highly
5 contaminated and likely to have adverse impacts to
6 benthic biota.

7 MS. WILLIAMS: Question 32 asked,
8 "Have you conducted or participated in any sediment
9 data generation or study not contained in the record
10 involving CAWS, Brandon Pool, or Upper Dresden
11 Island Pool or any of the tributaries?

12 DR. BURTON: Before I answer, I should
13 note, based on the review of the record, I don't
14 think Illinois EPA introduced any sediment study
15 reports into the record. The sediment data is
16 referenced in the Lower Des UAA reports from
17 sources, such as the Com Ed UIW study, which
18 includes my work, the MWRD sediment sampling work,
19 and that of the U.S. EPA. But none of the data
20 generation or studies were introduced into this
21 record by the Agency.

22 With that qualification, and
23 excluding the EA sediment report that's attached to
24 my testimony, I did participate in a sediment data

1 generation for the north branch of the Chicago River
2 for MWRD, and those sediments were found to be
3 highly toxic.

4 MS. WILLIAMS: Are you on 32?

5 MS. FRANZETTI: Yes.

6 MS. WILLIAMS: Okay. Because I was
7 expecting you to tell me that you've identified
8 studies in the -- I was expecting this answer to,
9 kind of, already be covered by your submission here
10 of studies. Is that accurate for some of the
11 studies now in the record that were not before?

12 MS. FRANZETTI: Are you asking him
13 whether, on the CDs, they include any of the studies
14 he was just referring to, for example, the Com Ed
15 UIW study? Because, Counsel, I'll just point out,
16 just to move it along, CD number one is a one and
17 two volume final report aquatic ecological study of
18 the Upper Illinois Waterway, Commonwealth Edison,
19 1996, that has at least a summary of the work he's
20 referring to.

21 That study -- and I actually have
22 a couple of hard copies here if you wish -- is so
23 big that just the summary makes up two volumes. If
24 we can take -- let me just take a moment. This is

1 the summary of the UIW studies. So it's -- the
2 stuff is so voluminous. It's from the mid '90s.
3 Nobody's got it electronically. So if where we're
4 going is you'd like all of that stuff, I'd have to
5 say that it's going to be really difficult.

6 MS. WILLIAMS: That's not where we're
7 going.

8 DR. BURTON: Well --

9 MS. WILLIAMS: We gave a list of
10 studies -- we were told at the beginning that the
11 list of studies that were given are in response to
12 questions that you were asked. So I just was
13 expecting a simple, kind of, cross reference. In
14 response to this question, I submitted this index
15 which has -- if that's not the case, then that's
16 fine. We can move on.

17 DR. BURTON: It is the case.

18 MS. FRANZETTI: He'll point out to
19 you.

20 DR. BURTON: I was on a different
21 question than you were, and I've listed all the
22 things I just said.

23 But in addition, I reviewed the
24 national state -- natural history -- the Illinois

1 State and Natural History Survey studies, the one by
2 the USGS --

3 MS. TIPSORD: Excuse me, Dr. Burton.
4 For the record, let me try and clear up something,
5 because I am really confused right here. Question
6 number 32, and what you asked him, was had he
7 conducted or participated in any sediment data for
8 other studies that are in the record -- that are not
9 contained in the record.

10 MS. WILLIAMS: That are not contained
11 in the record. So I assumed that when she said,
12 "Here are things that were addressed," but I guess
13 that could be wrong.

14 MS. TIPSORD: Okay. I thought he
15 answered that question, and I thought you were
16 looking for an answer to 31, which is what I thought
17 you were now beginning to answer.

18 MS. FRANZETTI: And that's what I was
19 about to say.

20 MR. GOODFELLOW: Well, he actually
21 started 31 and then went to 32.

22 MS. WILLIAMS: I was planning to skip
23 31. I'm sorry if I confused everyone.

24 MS. FRANZETTI: Then he did answer 32,

1 right?

2 MS. WILLIAMS: Okay.

3 MS. FRANZETTI: Yeah, you answered 32.

4 Now you're starting to go back to 31, but I think --

5 DR. BURTON: Those studies have been
6 submitted.

7 MS. WILLIAMS: Let's go to 33, please.

8 Can you compare the likelihood of impacts from
9 sediment contamination in a small stream compared to
10 a large river?

11 DR. BURTON: Well, I'm not certain
12 what you're referring to when you talk about the
13 likelihood of impacts from sediment contamination or
14 any reference making them potentially more resilient
15 in small streams.

16 But assuming you were asking
17 whether the likelihood of adverse impacts from
18 sediment contaminants are greater in a small stream
19 as compared to a large stream, my answer would be
20 that you cannot make such a broad or absolute
21 generalization. It depends on many other factors,
22 such as the available refugium, the degree of
23 bioavailability, flow rates, et cetera.

24 MS. WILLIAMS: For example, does the

1 presence of some hot spot areas of contaminated
2 sediment in large rivers automatically mean that
3 fish that have the ability to avoid such areas will
4 experience toxic affects?

5 MS. FRANZETTI: Counsel, I'm sorry.
6 We lost you.

7 MS. WILLIAMS: It's not a -- it's a
8 follow-up question.

9 MS. FRANZETTI: Oh, I'm sorry.

10 DR. BURTON: Could you repeat that
11 question?

12 MS. WILLIAMS: Does the presence of
13 some hot spot areas of contaminated sediment in
14 large rivers automatically mean that fish that have
15 the ability to avoid such areas are going to
16 experience toxic affects?

17 DR. BURTON: No. It's too little
18 information.

19 MS. WILLIAMS: Okay. How much of the
20 bottom of the large river would need to be
21 contaminated by sediments to prevent the river from
22 being able to attain the Clean Water Act goal?

23 DR. BURTON: No one knows the answer
24 to that question.

1 MS. WILLIAMS: About how high would
2 the sediment contaminant concentrations have to be
3 to prevent a large river from attaining the Clean
4 Water Act aquatic life goal?

5 MS. FRANZETTI: Excuse me just a
6 second.

7 MS. TIPSORD: Ms. Williams, remember
8 to keep your voice up too.

9 DR. BURTON: The sediment quality
10 guidelines were developed to help make those
11 decisions. So if they're exceeded, you expect
12 adverse impacts.

13 MS. WILLIAMS: Okay. Let me ask that
14 question again. The sediment quality guidelines
15 were developed to make the decision about whether
16 the Clean Water Act aquatic life goal can be
17 attained. Is that what you just testified?

18 MS. FRANZETTI: No, that's not.

19 DR. BURTON: No, that's not what I
20 said.

21 MS. WILLIAMS: Okay. Well, the
22 question was: How contaminated do sediments have to
23 be to prevent attainment of the Clean Water Act
24 aquatic life use goal?

1 MS. FRANZETTI: And that's the
2 question he was answering, Counsel.

3 MS. WILLIAMS: I'll let you finish.

4 DR. BURTON: So the sediment quality
5 guidelines, if they're exceeded, you're going to
6 suspect you're going to be adverse effects to your
7 aquatic life.

8 MS. WILLIAMS: Is adverse effects the
9 same thing as failure to attain the Clean Water Act
10 goal? Would they be equivalent?

11 DR. BURTON: In my mind it is.

12 MS. WILLIAMS: I mean, I'm just trying
13 to understand your testimony.

14 DR. BURTON: I mean, that's the goal
15 of the Clean Water Act is not to have adverse
16 effects.

17 MS. WILLIAMS: Okay.

18 DR. BURTON: So I think your whole
19 context of the large river is -- I gather you're
20 meaning there's refugium, there's places they can
21 hide, and what I'd like to -- if we look at this, I
22 would like Dr. Bill Goodfellow to review this study
23 to show the pervasive nature of the contaminated
24 sediments.

1 MS. FRANZETTI: That was a slam on me.
2 I introduced him as Mr. Bill Goodfellow. He is a
3 doctor.

4 MR. GOODFELLOW: No, I'm mister. He
5 was right.

6 MS. FRANZETTI: You are mister. Okay.
7 I'm sorry.

8 DR. BURTON: He's been faking me out.

9 MS. TIPSORD: And for the record,
10 you're holding up Exhibit 378?

11 MR. GOODFELLOW: Yes, and this is the
12 Figure 2 from the EA report.

13 MS. FRANZETTI: You know, if he comes
14 over here, if you put it up here and stand to the
15 side, then I think all of you, and pretty much you,
16 and maybe even some of you can see it.

17 MR. GOODFELLOW: What this is is this
18 is the study that we did in concert with Dr. Burton.
19 Trying to mimic many of the sites -- I believe it
20 was 18 of the sites -- were repeated from his study,
21 and we threw in a couple other ones to make sure
22 that we didn't make a patchy graphical
23 interpretation. So we wanted to make sure that if
24 there was a large span of the river that really

1 wasn't sampled that we were pulling a sample from
2 there.

3 These samples were pulled from the
4 depositional zone sediments. So they were closer to
5 shore. They weren't in the main channels of the
6 river. Water flow comes from the upper right to the
7 lower left. This is Brandon Lock and Dam area here,
8 and you can see this is metal toxicity.

9 Of all the metals that we
10 evaluated, they're on, sort of, a clock type thing,
11 just to show graphically the entire data set of all
12 the metals that were evaluated the first time in the
13 1990 samples from Dr. Burton. Red is where it
14 exceeds the probable effect concentration. And in
15 the original report, they were yellow. When we blew
16 it up, it turned it more of, kind of, a chartreuse.
17 But it still shows, color-wise, the difference.

18 You can see that we have pockets
19 of red, red, and red down here. And then after
20 I-55, it starts just being a lot more yellow, or in
21 this case the chartreuse. That was for the metals.
22 The chartreuse is where it's at the threshold effect
23 level, which is the lowest concentration -- the
24 highest concentration that wouldn't cause an effect.

1 This is the PAHs and PCDs --

2 MS. TIPSORD: Which is Exhibit 377?

3 MR. GOODFELLOW: Yes, thank you.

4 MS. FRANZETTI: No, actually I had --

5 MR. GOODFELLOW: I think it's
6 flip-flopped. I think three had the lower number of
7 exhibits.

8 MS. TIPSORD: Yeah, Exhibit 3 is
9 377 -- Figure 3 is 377, Figure 2 is 378.

10 MR. GOODFELLOW: Because the
11 difference between the 1990 and 2008 was that we've
12 now analyzed PCBs differently. We did it as total
13 PCBs, just to give us -- handle them as likes
14 instead of confusing the issue.

15 But you can see the same
16 orientation. PAHs are the top half of the circle,
17 the bottom half of the circle is PCBs, and you can
18 again see that we have heavy contamination above the
19 probable effect level, all the way down until a
20 little past the I-55, and they actually just
21 exceeded for PAHs below I-55 until you get much
22 lower.

23 MS. FRANZETTI: Thank you.

24 MS. WILLIAMS: Unfortunately, I think

1 because of this answer we probably need to delve in,
2 for the Board, on what these terms mean.

3 MS. FRANZETTI: PEC and TEC?

4 MS. WILLIAMS: PEC and TEC, yes. So
5 is Dr. Burton or Mr. Goodfellow the proper witness
6 to explain this terminology?

7 MS. FRANZETTI: I think actually they
8 both can. If you just help us, Ms. Williams, if you
9 want to jump to another part of your questions, they
10 can -- give us where you're going. Or if all you
11 want is for them to give you what does --

12 MS. WILLIAMS: Yeah, I'd like to start
13 there.

14 MS. FRANZETTI: You just want to know
15 what PEC is and TEC is?

16 MS. WILLIAMS: For now, yeah.

17 MS. FRANZETTI: Oh, okay. That's
18 fine.

19 DR. BURTON: These are consensus-based
20 guidelines that were developed that looked at about
21 8,000 data points across the nation, and looked at
22 the distribution of the benthic data that was there
23 versus the chemical concentrations that were there
24 where the benthos was living.

1 So these were field samples
2 collected primarily. They was some lab tox testing,
3 but most of the database is from field sample that's
4 equating a benthic response with a chemical
5 concentration in the sediment.

6 And with that distribution, they
7 found that if it was 80 percent or higher of the
8 distribution, you had probable adverse effects to
9 the benthic community. And I forget the cutoff, but
10 somewhere down in the 30 or 40 percent range of that
11 distribution, you had threshold effect
12 concentrations, meaning between the TEL and the PEL
13 you might have adverse effects.

14 So a large data set came up with
15 that. Now, this data set has been used a lot
16 throughout the country and Canada and Europe, and
17 found to be accurate, if you just use a number and
18 go to a field and see does that number really equate
19 to an impacted benthic community about 75 percent of
20 the time.

21 MS. WILLIAMS: So they're found to be
22 accurate about 75 percent of the time. Is that
23 across all chemicals, or are some chemicals found to
24 be more accurate than others?

1 DR. BURTON: I think they do -- yes,
2 you're right. Some are not as good. I believe
3 mercury is one they do not predict well.

4 MR. GOODFELLOW: Lead is another.
5 Some of the metals that are most affected by other
6 water chemistry, they aren't as readily biologically
7 available or most impacted. But where -- they start
8 falling in and being very predictive when there are
9 multiple contaminants that exceed thresholds or the
10 probable cause and effect levels.

11 Then it all comes down to, as Dr.
12 Burton talked about, the weight of evidence. If
13 there's -- when it's one compound, the changes of it
14 are probably, you know, not being as predictive or
15 higher than if there's three or four, then they're
16 much more predictive to the point where when there's
17 a lot of compounds then they're very predictable.

18 MS. FRANZETTI: Can you keep going in
19 terms of now bringing it to here? What's the case
20 here for the 2008 sediment sampling data?

21 MR. GOODFELLOW: Well, that's an
22 excellent question. That's part of the reason we
23 wanted to show all the metals in one graphic
24 interpretation, to give that -- you can see that

1 many of these circles here are almost completely
2 filled in with red, and if they're not completely
3 filled in with red they're between red and yellow,
4 which is now chartreuse. Same as for the
5 organics --

6 MS. FRANZETTI: Okay. Wait a second.
7 What's the significance of the fact that most of the
8 metal circles are almost all red?

9 MS. WILLIAMS: Are we looking at 378?
10 When you mean most, you mean more than half?

11 DR. BURTON: It looks that way.

12 MS. TIPSORD: Actually, no. That's
13 377.

14 MR. GOODFELLOW: 377.

15 MS. TIPSORD: Figure 3 is 377,
16 Figure 2 is 378.

17 MS. WILLIAMS: Metals is 378, right?

18 MS. TIPSORD: No. 377 you have right
19 there is metals.

20 MS. WILLIAMS: Right, but Figure 2 is
21 the one that says, "Concentration of Metals Use."

22 MS. FRANZETTI: Right, and that's 378.
23 I did them backwards. I did Figure 3 first and
24 Figure 2 --

1 MS. WILLIAMS: Well, which one is he
2 holding up?

3 MR. GOODFELLOW: Figure 2.

4 MS. FRANZETTI: Figure 2 is the
5 metals.

6 MS. TIPSORD: Okay. Sorry.

7 MR. GOODFELLOW: From my perspective,
8 virtually all the sampling points have either yellow
9 or red in them.

10 MS. WILLIAMS: Most of them don't have
11 red -- is what I was hearing -- you don't mean to
12 say most of them have red?

13 MR. GOODFELLOW: Most of them have
14 either red or yellow, but you can see that a large
15 portion of them have many -- are filled in almost
16 completely with red.

17 MS. WILLIAMS: And when it's filled in
18 completely with red, that means --

19 MR. GOODFELLOW: It exceeded the
20 probable effect concentration for more than one
21 metal, in fact, the eight metals.

22 MS. WILLIAMS: For as many as you
23 have?

24 MR. GOODFELLOW: Right.

1 MS. FRANZETTI: So then the circle is
2 divided like a pie?

3 MR. GOODFELLOW: It is, yes.

4 MS. FRANZETTI: And so each slice of
5 the pie --

6 MR. GOODFELLOW: Is one metal.

7 MS. FRANZETTI: So when you've got
8 about six of the slices of the pie red, that means
9 six metals were above --

10 MR. GOODFELLOW: It's heavily
11 contaminated with metals in those samples.

12 MS. WILLIAMS: Can we tell from this
13 chart whether those metal samples are ones that are
14 reliable or ones that are found to be unreliable,
15 the PECs for those metals? You have just testified
16 that some of the PECs from metals --

17 MR. GOODFELLOW: Are more reliable.

18 MS. WILLIAMS: -- are found to
19 be -- okay. Less reliable. Do we know by looking
20 at this whether any of those pie pieces represent
21 the less reliable PEC exceedances?

22 MR. GOODFELLOW: Well, primarily --
23 well, lead -- if you look at it as a clock, lead is
24 at 7:00 o'clock, and 9:00 o'clock is mercury. Those

1 have been the compounds that are most problematic
2 with sediment quality guidelines. Compounds like
3 zinc, nickel, cadmium, copper, chromium, are very
4 good indicators for that.

5 So at the most, you're only
6 talking two of the eight compounds. So you can see
7 that many of these compounds -- or many of the
8 sampling spots are completely covered with either
9 yellow or red. So I would argue that these are
10 heavily contaminated for metals, as related to the
11 sediment quality guidelines.

12 MS. FRANZETTI: Bill, I think it may
13 be pretty obvious, but can you just -- for purposes
14 of the Upper Dresden Pool, can you just note what
15 you're talking about? The sediment samples that
16 go -- I-55 crosses the Des Plaines right here. So
17 just for the Board's benefit, the sediment samples
18 that were within what's been called the UDIP in the
19 proposed rules is all the sediment samples from I-55
20 bridge --

21 MR. GOODFELLOW: And I-55 is right
22 there. So it's right this way. Actually, for the
23 metals, virtually everything that has red in it is
24 in that area.

1 MS. WILLIAMS: And some of the -- at
2 the top where we see a lot of red, are those --

3 MS. FRANZETTI: Still on the metals?

4 MS. WILLIAMS: Yeah. Those are
5 within -- some of those are within the Brandon Pool,
6 correct?

7 MR. GOODFELLOW: Yes, the top four
8 are. These are -- Brandon reaches right there.

9 MS. TIPSORD: For the record, could
10 you tell us what -- give us the numbers on the four
11 you're talking about?

12 MR. GOODFELLOW: It's BR 0801, 02, 03,
13 and 04.

14 MS. TIPSORD: Thank you.

15 MS. FRANZETTI: We used BR to signify
16 it was in the Brandon Pool.

17 Actually, while they're -- I have
18 one follow-up question. Can either Dr. Burton or
19 you, Mr. Goodfellow, explain why were there a few
20 samples included for the Brandon Pool? Why is that
21 relevant?

22 DR. BURTON: Well, because we had
23 sampled there before because it's immediately
24 upstream of the lock and dam, so the sediments there

1 are most likely to be the sediments that travel
2 downstream.

3 MS. FRANZETTI: Into the Upper Dresden
4 Island Pool?

5 DR. BURTON: Right, and the MWRD has a
6 lot of sampling sites in that area too.

7 MS. WILLIAMS: So let's talk about the
8 yellow dots though. The yellow pie pieces are
9 samples where there was a violation of one of the
10 TECs, correct?

11 DR. BURTON: Right.

12 MR. GOODFELLOW: Correct.

13 MS. WILLIAMS: Now, that -- but there
14 was a violation of a TEC, but not so high as to
15 reach the PEC, correct?

16 DR. BURTON: Right.

17 MS. WILLIAMS: Okay.

18 MS. FRANZETTI: And we might want to
19 say exceedance instead of violation.

20 MS. WILLIAMS: Okay. That's fine.

21 MS. FRANZETTI: I think that's clearer
22 assurance of what we're talking about.

23 MS. WILLIAMS: Sure. Would you agree
24 that within the yellow, it's unknown what effect the

1 sediments are going to have on aquatic life?

2 DR. BURTON: No. That would be below
3 the TEC.

4 MR. GOODFELLOW: It would be white.

5 DR. BURTON: In the area between the
6 TEC and the PEC, its adverse effects have been
7 noted, but you've got more in certainty around it.

8 MS. WILLIAMS: So there's no area
9 that's unknown, because below the TEC we're saying
10 there's no effect, right?

11 DR. BURTON: There's no data to show
12 any effects at those concentrations.

13 MS. WILLIAMS: But you wouldn't agree
14 that between the TEC and the PEC it's unknown if
15 there's an adverse effect?

16 DR. BURTON: There's a greater
17 uncertainty, I guess would be the best way to answer
18 that.

19 MR. ETTINGER: Can I just clarify a
20 few things? Probable means more likely than not in
21 effect?

22 DR. BURTON: Right.

23 MR. ETTINGER: And what kind of
24 effects?

1 DR. BURTON: Oh, adverse effects with
2 the benthic communities for these data sets were
3 comprised of lots of different endpoints. The ones
4 that were laboratory would be mortality, the ones
5 that were in the field could be increased dominance
6 of tolerate species, depressed diversity, richness.
7 So something to show that it's a depressed response.

8 MR. ETTINGER: Okay. But we don't
9 know what -- reproduction rate might be lower, or
10 what kind of effects --

11 DR. BURTON: These aren't chronic
12 effects. The benthic indices that were used are
13 pretty much the standard aquatic biologists use,
14 like richness and abundance.

15 MR. ETTINGER: So it had a lower IBI
16 score?

17 DR. BURTON: Right, a lower IBI,
18 exactly.

19 MS. WILLIAMS: Wait, did you say -- I
20 thought you said you used benthic -- IBI is fish
21 index, right?

22 DR. BURTON: That can be used for
23 benthic.

24 MR. ETTINGER: IBI is invertebrates.

1 MS. WILLIAMS: Right, invertebrates
2 versus macro invertebrate.

3 DR. BURTON: There's lots of versions
4 of IBIs.

5 MS. WILLIAMS: Okay. I'm sorry if I
6 missed part of your questioning from Albert, so
7 maybe I'm misunderstanding, but are you saying they
8 did use IBIs to judge the toxic effects in
9 developing these guidelines?

10 DR. BURTON: There's over 8,000 data
11 points. There were all kinds of typical adverse
12 benthic responses that went into that database.

13 MS. WILLIAMS: And if any of those
14 responses were found -- did it only take one
15 response to trigger a finding of a toxic effect?

16 DR. BURTON: I don't know, but it's
17 8,000 data points looking at the distribution of the
18 data. So you're not going to have, like, one
19 response, one data point dictating the adverse
20 effect. It's going to be lots of data points that
21 dictate that concentration is the probable effect or
22 the threshold effect level.

23 MR. GOODFELLOW: But they were all
24 ecological evaluation endpoints that were used in

1 combination with the sediment samples, regardless of
2 the varying degrees of metrics that tend to be on a
3 regional basis.

4 MS. WILLIAMS: Can you explain that a
5 little more for us?

6 MR. GOODFELLOW: Well, ecological
7 endpoints would be endpoints that are dealing with
8 population, species richness, dominant species.
9 Different river systems geographically have
10 different ecological endpoints that are more
11 beneficial within those regions, so that -- to use
12 these all inclusive guidelines they, you know, are
13 forced to make some compromises.

14 The other thing, the 80 percent
15 and the 40 percentiles, when it was 80 percent or
16 greater, the developers of the sediment quality
17 guidelines believed that they were very certain to
18 call it probable effect concentration, that there
19 was a high degree of likelihood that every one of
20 them that was part of the sediment quality
21 guidelines initiation group would say, "Yes, we all
22 believe that that's the number." And, you know,
23 that's -- there's going to absolutely be an effect
24 there.

1 The 40 percentile, or at least the
2 concentration for the threshold one, there was
3 evidence that there was ecological harm, but it was
4 not as strong of a signal compared to the
5 80 percent. So it's almost like a two-tier criteria
6 of saying, "We feel absolutely comfortable that the
7 probable effect concentration is going to be an
8 absolute effect."

9 And when it was -- when you've
10 exceeded the threshold effect concentration, that's
11 when they said, "We believe that there's going to be
12 some harm, but we're not 100 percent certain," and
13 that's where the weight of evidence comes in.

14 So if you have three or four
15 compounds that exceed the threshold or higher, then
16 there's a much stronger likelihood that there would
17 be harm.

18 MS. WILLIAMS: I think you've answered
19 part of 35 about how the sites -- what sites were
20 sampled in the Dresden Island Pool. How was it
21 determined that these sites adequately represented
22 the sediment concentrations encountered by aquatic
23 life?

24 DR. BURTON: Well, the initial survey

1 that I did in the mid '90s was basically trying to
2 sample all the areas we could over the 55-mile
3 stretch, and we quickly learned that if you drop a
4 Ponar into the middle of the Chicago Ship Canal,
5 you're often going to hit bedrock. So you obviously
6 can't sample the sediments there.

7 So the sampling, by necessity, to
8 collect a sample had to move to the depositional
9 areas, which are outside of the main channel. So we
10 tried to get all the habitats, as you can see from
11 this map, pretty equally spaced all the way
12 downstream, and we focused a few more samples where
13 there was more concern about habitats, such as the
14 tail waters.

15 MS. WILLIAMS: Can you explain why we
16 find bedrock at the bottom of the Sanitary and Ship
17 Canal in the main channel?

18 DR. BURTON: High flow. It was
19 dredged out to bedrock. I mean, when it was
20 constructed it went down to bedrock.

21 MS. FRANZETTI: Counsel, do you mean
22 why we don't find as much sediment --

23 MS. WILLIAMS: Right.

24 MS. FRANZETTI: -- and we find

1 bedrock?

2 DR. BURTON: It's the flow and the
3 barge traffic, of course, that keeps a lot of that
4 sediment resuspended.

5 MS. WILLIAMS: And where is it going?

6 DR. BURTON: Downstream to the nearest
7 depositional zone.

8 MS. WILLIAMS: Does it stay in the
9 nearest depositional zone do you think?

10 DR. BURTON: Sometimes, sometimes not.
11 If it gets resuspended it will go further
12 downstream.

13 MS. WILLIAMS: Question 36, you've
14 answered part of this. The last piece, "Do you know
15 of rivers with elevated levels of sediment
16 contamination that maintain good aquatic
17 assemblages?" That's the very last part of 36.

18 DR. BURTON: I know of no streams
19 where good benthic communities exist in contaminated
20 sediments. If fish are present, then the data seems
21 to indicate a higher correlation with exceedances of
22 fish tissue advisories.

23 MS. WILLIAMS: And by fish tissue
24 advisories, we mean it's not safe for the humans to

1 eat the fish, right? Not necessarily that the fish
2 themselves --

3 DR. BURTON: Well, that's --

4 MS. WILLIAMS: I mean, that's the
5 purpose of this, right?

6 DR. BURTON: That's the purpose, but
7 it's not safe for any anything, whether it be
8 wildlife or humans.

9 MS. WILLIAMS: Question 37 asks, "Are
10 you suggesting that the fine sediment areas where
11 contamination is high below the Brandon Lock and Dam
12 are the same areas where fish would be spawning?"

13 DR. BURTON: Yes.

14 MS. WILLIAMS: Were the sediment
15 samples from the Brandon Lock and Dam taken from the
16 riffle/flowing areas or in the depositional areas
17 next to the bank?

18 DR. BURTON: Well, if you look at one
19 of the satellite photographs of this -- and it's not
20 very visible from this -- it's easy to see that the
21 waters in the tail waters are all flowing. There's
22 no real area where the waters are quiescent there.

23 So we've got the inputs coming
24 over the lock and dam, and then we've got Hickory

1 Creek feeding in right to the top of the tail
2 waters. So within the cobble and gravel that exists
3 throughout that area, you have little pockets of
4 depositional sediment that are filling in the cracks
5 and crevices. So it's always flowing, and the
6 depositional sediment is, kind of, mixed in there.

7 MS. FRANZETTI: Counsel, if I may,
8 just so we go right to the source, Mr. Vondruska,
9 would you mind adding to that? You were out in the
10 field, weren't you, and responsible, in part, as one
11 of the people who collected these samples, am I
12 right?

13 MR. VONDRUSKA: Yes.

14 MS. FRANZETTI: All right.

15 MS. TIPSORD: And may I remind you you
16 were previously sworn in, so you're still under
17 oath.

18 MS. FRANZETTI: You're still under
19 oath.

20 MR. VONDRUSKA: Joe Vondruska with EA
21 engineering.

22 MS. FRANZETTI: Would you describe
23 these as riffle, or flowing areas, or depositional
24 areas? And if you would like -- would you like the

1 aerial?

2 MS. WILLIAMS: What are these items?

3 MS. FRANZETTI: The sample locations.

4 I'm trying to make it real clear what the nature of
5 the sampling locations were for purposes of the
6 question. And let's just have one of of the people
7 who is out there doing it weigh in.

8 MR. VONDRUSKA: Okay. We sampled four
9 locations in the Brandon tail water. The two upper
10 ones, which were right off the Brandon Road -- I
11 believe it's 30 -- and 31 one was in the mouth of
12 Sugar Run, which is a flowing tributary on the
13 elevation of the tail water sample depositional area
14 there, and then we sampled, I believe it was --

15 MS. FRANZETTI: You can use your
16 version of the map.

17 MR. VONDRUSKA: DR 0830, which is near
18 the mouth of Sugar Run, which is just adjacent to
19 the fast water in the cobblely areas of the Brandon
20 Road tail waters.

21 MS. WILLIAMS: I think we're getting
22 confused. Is Sugar Run a creek or is it within the
23 Brandon Tail Waters? What is Sugar Run?

24 MR. VONDRUSKA: Sugar Run essentially

1 is a tributary to the Brandon tail water just
2 downstream of Hickory Creek.

3 MS. WILLIAMS: Okay. I think we're
4 trying to understand -- is this sampling point
5 within the Des Plaines River or is it within Sugar
6 Creek?

7 MR. VONDRUSKA: That's what I'm
8 explaining.

9 MS. WILLIAMS: Oh, okay. Go ahead and
10 finish then.

11 MR. VONDRUSKA: I was talking of our
12 four locations we sampled in the Brandon Road tail
13 water. One was in Sugar Run, which is a tributary
14 that comes in right upstream of Brandon Road
15 downstream of the dam. We sampled one just outside
16 of that mouth, which was kind of the only
17 depositional area within the stretch from Brandon
18 Road upstream to Brandon Road Lock and Dam.

19 MS. FRANZETTI: And that number is
20 what sampling location number on the map?

21 MR. VONDRUSKA: DR 0831 was in Sugar
22 Run. DR 08-30 was just outside of the mouth.

23 MS. FRANZETTI: Outside of the mouth
24 of Sugar Run?

1 MR. VONDRUSKA: Yes.

2 MS. FRANZETTI: In the Brandon tail
3 water?

4 MR. VONDRUSKA: In the Brandon tail
5 water. We sampled two other areas within the
6 Brandon Road tail water and both of these locations
7 downstream of Brandon Road. DR 0829 is a small,
8 triangular shaped, kind of, back water area, which
9 again, it's just off from the flowing water. And
10 then basically at the bottom of the tail water,
11 right before it empties out into the main channel,
12 which is DR 0828, was another depositional area,
13 kind of, outside from the flowing area of the tail
14 water. So those were the four locations we sampled
15 there.

16 MS. FRANZETTI: And before you move
17 on, Mr. Vondruska, was it correct that one of the
18 reasons that EA and Dr. Burton, as they worked
19 together to select the sampling locations, why you
20 had several in the Brandon tail water was because
21 you were trying to see whether or not there were not
22 just siltation, but also contaminated sediments in
23 areas of the Brandon tail water that, in this
24 proceeding, have -- some have suggested might

1 otherwise provide good habitat?

2 MR. VONDRUSKA: Yes.

3 MS. FRANZETTI: Thank you.

4 MR. VONDRUSKA: Can I elaborate just a
5 little bit?

6 MS. FRANZETTI: Absolutely.

7 MR. VONDRUSKA: So these depositional
8 areas we sampled are areas where we noted
9 contamination, but are areas where the larval fish,
10 when they're spawning in the tail waters, they're
11 going to fall out in the drift in these areas and be
12 exposed to those. So that's why it, kind of, was
13 important to sample them, because it is a habitat
14 where those young larval fish are going to fall out
15 and try to develop.

16 MS. WILLIAMS: Okay. I'm going to ask
17 this -- it's going to sound very unscientific, I
18 know. But from listening to the testimony of
19 Mr. Seegert, I was under the impression that the
20 riffle areas are good habitat for many types of
21 fish -- not all of them, but many -- and that would
22 not be precisely the same areas as the depositional
23 areas where you would find the contaminated
24 sediment, would it? I know they're all within the

1 same Brandon tail waters, but it seems like I'm --

2 MS. FRANZETTI: Are you done with your
3 question? What gets tough is you keep talking and
4 it's really hard to tell what the question is. Let
5 me -- can I -- maybe I can help. Are you asking
6 whether none of these sampling locations were in
7 what Mr. Seegert was referring to as riffle areas?
8 Is that what you want to know?

9 MS. WILLIAMS: That would help. Let's
10 ask that. I'm not sure that will cover it, but we
11 can ask that.

12 MS. FRANZETTI: Okay. Well,
13 Mr. Vondruska, do you need Mr. Seegert to tell you
14 what he was referring to as riffle areas in his
15 testimony, or can you answer this question?

16 MR. VONDRUSKA: No, I can -- sorry, we
17 were having a conversation. Can you repeat the
18 question?

19 MS. WILLIAMS: It was Susan's
20 question.

21 MR. VONDRUSKA: I'm sorry.

22 MS. FRANZETTI: And I'm going to
23 change it slightly to hopefully make it even
24 clearer.

1 Were any of these sediment
2 sampling locations, riffle areas as described by
3 Mr. Seegert in his testimony, as areas that fish
4 prefer to live in?

5 MR. VONDRUSKA: Well, no. They
6 were -- deposition doesn't occur on riffles, so no.

7 MS. TIPSORD: Could we --

8 MR. VONDRUSKA: We could not sample --

9 MS. TIPSORD: I'm sorry. Go ahead.

10 MR. VONDRUSKA: We cannot sample
11 riffle areas because they are just rocks. There's
12 no sediment deposition.

13 MS. TIPSORD: That may be part of the
14 confusion, because the original question was were
15 any of those four sampling points -- were any of the
16 four sampling points you were just talking about,
17 the Brandon tail waters, were any of those taken in
18 riffle flowing areas or were they all in
19 depositional areas?

20 MR. VONDRUSKA: All in depositional
21 areas.

22 MS. TIPSORD: Thank you.

23 MS. WILLIAMS: Thank you.

24 MS. TIPSORD: I was with you on this

1 one, Deb. I was lost.

2 MS. WILLIAMS: Well, I didn't know. I
3 wasn't with myself. I appreciate that.

4 MS. FRANZETTI: Hang on just a second,
5 Ms. Williams.

6 DR. BURTON: Well, I guess I feel like
7 I need to add a little bit here.

8 MS. TIPSORD: Go ahead, Dr. Burton.

9 MS. WILLIAMS: I'm fine. Go ahead.

10 DR. BURTON: As I said, the deposition
11 sediments fall in the riffled area, and they get
12 between all the cracks, where your eggs and larvae
13 and benthic invertebrates are. He can't sample
14 there because he's using a ponar dredge, and there's
15 too much gravel and cobble mixed in with that.

16 So we do have contaminated -- we
17 have to have contaminated sediments because the
18 nearest place he can sample downstream is
19 contaminated. So within the riffle area, I would
20 argue there is contaminated sediments between the
21 larger particles. And the larvae, once they are
22 hatched, they can't stay there. They drift
23 downstream, as Joe noted, to the areas where he
24 sampled. They can't avoid this exposure.

1 MS. FRANZETTI: I'm sorry.

2 Mr. Seegert would also like to supplement, instead
3 of having to pass notes to other people.

4 MS. TIPSORD: And I remind you,
5 Mr. Seegert, you are still under oath.

6 MR. SEEGERT: Does that last forever,
7 by the way?

8 MS. TIPSORD: At least for the length
9 of this proceeding, which could be forever.

10 MR. SEEGERT: I'm sorry. Dr. Burton
11 just explained that couldn't physically take the
12 samples within the riffle. But nonetheless, even
13 larvae then might have been -- the point I was
14 making during my testimony was the area within the
15 gravelly cobblely areas tend to be the best areas
16 for spawning.

17 But once the larvae have hatched,
18 they react almost like particles. I mean, you're
19 talking about a thing that might be five to
20 ten millimeters long. It doesn't have much swimming
21 ability, so it acts almost like a particle. And so
22 it ends up getting swirled around, and they settle
23 out, in the same way inert particles would, in the
24 depositional areas.

1 So even though they might have
2 been spawned in an area that have less sediment,
3 they end up getting into areas where they encounter,
4 because that's where the larvae settle out. And
5 they're going to spend the early part of their life
6 stage in that area where they don't have to fight
7 the current. As they get larger, then they'll move
8 back into the riffles as sub-adults and adults.

9 MS. FRANZETTI: Thank you,
10 Mr. Seegert.

11 MS. WILLIAMS: And were the PEC levels
12 developed with probable effects of fish and fish
13 spawning?

14 DR. BURTON: No. They were developed
15 for benthic invertebrates, which the fish eat.

16 MS. WILLIAMS: Question B, "Your
17 report on the sediment study suggests there's a
18 great spacial heterogony and results between
19 samples. How certain can you be about trends or
20 lack of them between the two time periods of the
21 results?"

22 DR. BURTON: You cannot be sure about
23 trends, but there's a preponderance of data showing
24 excessive contamination in most sediments throughout

1 the Upper Dresden Island Pool, Lower Brandon Pool,
2 and the Ship Canal from all the data collected in
3 the past two years. I do not know of a more
4 extensively sediment contaminated area, with the
5 exception of three superfund sites, the Hudson
6 River, Fox River, and Cordelane River (phonetic).

7 As noted above, the USGS study
8 also found UIW to be one of the most contaminated
9 areas in the nation, as did the USEPA national
10 sediment inventory.

11 MS. WILLIAMS: So let me make sure I
12 heard that. You said there's only three superfund
13 cites that you think have more sediment
14 contamination?

15 DR. BURTON: Extensively spatial --

16 MS. WILLIAMS: Spatially? Do you
17 think this should be a superfund site?

18 DR. BURTON: I'm not going to go
19 there. I'm sorry. That's -- the designation for
20 superfund site revolves -- it's very complicated.

21 MS. WILLIAMS: Question 38, what
22 studies are you referring to on Page 9 that showed
23 that, quote, "Turbidity is a major stressor in both
24 the Chicago Sanitary and Ship Canal and the Upper

1 Dresden Island Pool?"

2 DR. BURTON: I'm referring to the
3 literature review that I submitted, and also a
4 wealth of literature that's provided in my other
5 submissions, such as Wood and Armitage number 46,
6 '97, which is an extensive lit review.

7 MS. FRANZETTI: He is referring to
8 Exhibit 371, the index to CD number two.

9 DR. BURTON: And the USEPA's draft
10 criteria for extended embedded sediments, number 42,
11 which has an extensive review within it by Barry
12 (phonetic) et al., the adverse effects.

13 MS. WILLIAMS: Okay. So those are
14 not -- those are not site-specific, correct? So
15 you're using those studies to analyze the system?

16 DR. BURTON: They were not collected
17 in this system, but they drew relationships between
18 the levels of total suspended solids and adverse
19 biological effects.

20 In addition, I've done a number of
21 studies for the city of Dayton on the Great Miami
22 Watershed that also found suspended solids were the
23 primary stressor in issuing nutrients during storm
24 water.

1 MS. WILLIAMS: Did you look at any
2 data on turbidity in this system?

3 DR. BURTON: Yes, I did.

4 MS. WILLIAMS: Where did that data
5 come from?

6 DR. BURTON: MWRD.

7 MS. WILLIAMS: And what did you find?

8 DR. BURTON: The MWRD data from 2005
9 and 2008 for the Dresden Pool showed TSS levels that
10 range from below three to 69, and below ten to 94,
11 which those levels can cause adverse effects in some
12 aquatic life.

13 And in addition, it should be
14 noted that the MWRD data does not sample the plumes
15 of the barges that are going up the river. I think
16 about 12,000 per year go up the river, and we have
17 one photograph that shows the plume of turbidity
18 that's amid every time one of these barges goes
19 through.

20 MS. WILLIAMS: Explain why --

21 MS. FRANZETTI: Counsel, since he
22 referenced it, can I --

23 MS. WILLIAMS: Don't we have lots of
24 pictures of barges in the record?

1 MS. FRANZETTI: I apologize, but I'll
2 enter as the next Exhibit. I'll just use one
3 photograph of an example of barges and turbidity --

4 MS. TIPSORD: I've been handed a barge
5 picture.

6 MS. FRANZETTI: -- so people know what
7 he's referring to.

8 MS. TIPSORD: That's all I can
9 describe it as, is a barge, which we will mark as
10 Exhibit 379, coming up on a bend with tanks, which
11 we will mark as Exhibit 379, if there's no
12 objection. Seeing none, it's Exhibit 379.

13 MS. FRANZETTI: Marie, we can further
14 verify this, but we dropped off the description. I
15 believe this is in the Cal Sag area. I'll try and
16 get more specific information and supply that to the
17 record.

18 MS. TIPSORD: You're just trying to
19 make me crazy, right?

20 MS. FRANZETTI: I know. Sorry.

21 MS. WILLIAMS: Can you explain,
22 Dr. Burton, why you stated that MWRD's sampling data
23 does not sample the plumes from the barges? What
24 about their sampling methodology does not capture

1 that?

2 DR. BURTON: Well, I guess that was a
3 little naive on my part. I would not expect them to
4 go out behind the barges and sample. I imagine they
5 have fixed stations on the bank. They sample -- I'm
6 not sure how often they sample. I was just assuming
7 that.

8 MS. WILLIAMS: Okay. Did you make any
9 analysis when you looked at turbidity -- I mean, I
10 guess in this question I've provided a quote where
11 you say turbidity is a major stressor. Are we
12 talking both about resuspension of sediment from
13 barges and other -- what are the other sources of
14 turbidity that you include within that definition?
15 Are we talking just about wet weather events, or
16 would it be turbidity during dry weather and wet
17 weather both?

18 DR. BURTON: Both.

19 MS. WILLIAMS: So what are the sources
20 of turbidity other than dry weather, that you know
21 of?

22 DR. BURTON: Turbidity is -- well,
23 total suspended solids are coming out of wastewater
24 treatment plants coming from conditional bank

1 erosion. So anywhere there's flow over clay, silty
2 sediments, you may get resuspension.

3 MS. WILLIAMS: Do you think you're
4 going to have levels of turbidity greater than ten
5 coming out of the treatment plant?

6 DR. BURTON: I have no idea. I just
7 know that's a source that's been identified by
8 Mr. Lanyon, L-a-n-y-o-n.

9 MS. WILLIAMS: Question D asked, "Do
10 turbidity and solids exist in streams achieving
11 clean Water Act goals, and what level of turbidity
12 needs to be present for Clean Water Act aquatic life
13 use goals to be unattainable?"

14 DR. BURTON: So you're asking if
15 turbidity and suspended solids exist in streams that
16 are achieving goals? They exist in all streams.

17 MS. WILLIAMS: Okay.

18 DR. BURTON: Of course all streams
19 have turbidity. EPA is, as I submitted here, trying
20 to establish criteria for suspended sediments and
21 bedded sediments unrelated to chemical
22 contamination -- just the physical presence of the
23 sediments -- to determine when this causes a
24 beneficial use impairment in the absence of chemical

1 contamination.

2 MS. WILLIAMS: And they don't have a
3 final guideline on what that is yet, do they?

4 DR. BURTON: They present all kinds of
5 different ways for states to determine that. It's
6 going to vary with the region of the country and the
7 watershed.

8 MS. WILLIAMS: Do you know if --

9 MS. FRANZETTI: Counsel, just to
10 clarify, can you please, Dr. Burton, explain what
11 you were referring to by the USEPA guidelines on
12 this topic?

13 DR. BURTON: I was referring to
14 Attachment 42. It's the draft document that USEPA
15 has produced.

16 MS. WILLIAMS: But is it a draft?

17 DR. BURTON: Yes.

18 MS. WILLIAMS: Okay. What was what I
19 was trying to get at --

20 MS. FRANZETTI: That's what I wanted
21 to make clear in the record, too, Counsel. We're
22 not trying to contend that it's final criteria.

23 MS. WILLIAMS: I'm going to move on to
24 Question 39. On Page 4 of your pre-filed testimony,

1 you state that, quote, "Despite reductions of
2 untreated discharges of sewage from the Metropolitan
3 Water Reclamation District of Greater Chicago's
4 tunnel and reservoir plant, significant loading of
5 raw sewage with associated solids, nutrients, and
6 chemical contaminants will continue into the
7 foreseeable future."

8 Will you quantify significant
9 loadings and explain what levels constitute
10 significance?

11 DR. BURTON: In the testimony offered
12 by MWRD's witness, Richard Lanyon, he noted that
13 between 2002 and 2006 the District was averaging
14 43 days a year of CSO discharges. These events
15 resulted in thousands of gallons of discharge into
16 the effluent dominated system.

17 Given that even non-CSO urban
18 waterways frequently have degraded life, these
19 additional inputs certainly are significant from an
20 ecosystem quality perspective. And as I noted
21 earlier, the downstream section of our study area
22 will not be affected by TARP.

23 MR. ETTINGER: Wait a minute --

24 MS. WILLIAMS: When did you note that

1 earlier?

2 DR. BURTON: It will not be captured
3 by TARP.

4 MS. WILLIAMS: I'm sorry. Could you
5 repeat that?

6 DR. BURTON: It will not be captured
7 by TARP. The runoff in the lower end of this system
8 is outside of TARP.

9 MS. WILLIAMS: Okay. I think the
10 simplest way I can think of to address the rest of
11 these points here is -- are you assuming that the
12 current situation, as you just testified to from
13 Mr. Lanyon's testimony, will continue into the
14 foreseeable future? When you look into the
15 foreseeable future in this quote, you're talking
16 about as it is today? You're talking about the
17 level of overflows we're receiving today?

18 DR. BURTON: Yes.

19 MS. FRANZETTI: And just for the
20 record, I wanted to point out that Dr. Burton
21 included a PowerPoint map of TARP as reference
22 number 33 on CD number two that's been submitted
23 into evidence. That's the basis on which he is
24 referring to the area that TARP captures.

1 MS. WILLIAMS: So you're not assuming
2 that TARP won't reduce the loadings, are you? I
3 mean, you're assuming it will, but that it's too far
4 in the future to take it into account. Does that
5 accurately summarize what you're trying to say?

6 DR. BURTON: Not exactly. It will
7 reduce the loading certainly, and I believe I heard
8 from Mr. Lanyon, 2024 is when it will be completed.

9 What I'm saying is in addition to
10 that, because of all of the impervious area that
11 exist outside of TARP -- and that's where the
12 greatest urbanization is occurring -- we're going to
13 continue to have urban runoff issues, even after
14 2024.

15 MS. WILLIAMS: Give me a second to see
16 if we've already addressed 40. I know we've talked
17 a lot about this.

18 DR. BURTON: I should also note that
19 Mr. Dennison's testimony for the MWRD said that TARP
20 is not going to eliminate all the CSO discharge.
21 It's not going to eliminate 100 percent of the
22 gravity CSOs, and it's not going to eliminate the
23 CSOs from the pump stations.

24 MS. WILLIAMS: Do you know how many

1 overflows Mr. Dennison said that would be?

2 DR. BURTON: No, I don't.

3 MS. FRANZETTI: I don't think he did
4 give a number actually looking at the -- I've got
5 the transcript. I think he just said a huge volume.

6 MS. WILLIAMS: I just wondered if he
7 did.

8 MS. FRANZETTI: Well, I didn't think
9 it was a test of --

10 MS. WILLIAMS: I don't think that we
11 need to ask anything else in 40. Let me see about
12 41. I think we've already talked about 41 A. 41 B,
13 let me read the quote and then I'll go on to 41 B.

14 You state on Page 5 of your
15 pre-filed testimony that, quote, "The sheer
16 magnitude of urbanization and agriculture in the UIW
17 and lack of affected non-point source controls mean
18 that non-point source related degradation would be
19 the dominant source of impairment for the
20 foreseeable future."

21 Does the predominance of combined
22 sewers versus separate sewers in this area impact
23 your conclusion?

24 DR. BURTON: Yes and no, because they

1 are going to continue to be a factor for the
2 foreseeable future. And even after 2024, according
3 to Mr. Dennison, they will be a factor after that.

4 MS. WILLIAMS: C is definitely
5 covered. I guess what I was trying to ask in this
6 question is: Did you look at the differences
7 between urban runoff in areas that have combined
8 sewers versus areas that have separate sewers at
9 all, or did you just, sort of, take urbanization
10 impacts as being urbanization impacts generally?

11 DR. BURTON: Well, as I mentioned
12 earlier, the literature shows that even urban
13 systems that don't have CSOs have degraded aquatic
14 life commonly. And in this system we've got both
15 scenarios going on.

16 So no, I didn't attempt to
17 separate them. Once you get above ten percent
18 impervious area, you start to see aquatic life
19 degradations. I believe this area ranges from 25 to
20 40 percent impervious area.

21 MS. WILLIAMS: Do you know if those
22 studies looked at whether there was a difference
23 between impervious areas with separated sewers or
24 impervious areas with combined sewers?

1 DR. BURTON: They included both.

2 MS. WILLIAMS: They didn't try to
3 compare and contrast?

4 DR. BURTON: Some did, but I'm talking
5 about the 100 studies I submitted.

6 MS. WILLIAMS: Question D, on Page 9
7 of your testimony, you call suspended solids and
8 turbidity, quote, "This dominant stressor of the UIW
9 aggravated by barge and navigation traffic."

10 Is this the same stressor you are
11 referring to above as, quote, "NPS related
12 degradation?" If so, please explain. If not, which
13 is more dominant in your opinion?

14 DR. BURTON: Well, suspended solids
15 and turbidity both are part of a non-point source
16 degradation. The debris and materials that are
17 carried into the waterway in non-point source runoff
18 contribute to the degradation.

19 There's been a number of studies
20 that have shown this. TSS has strongly correlated
21 with contaminant concentrations in human dominated
22 systems. High TSS flows and rivers contribute to
23 water quality impairment, habitat loss, excessive
24 turbidity, resulting in impairments of

1 recreational --

2 MS TIPSORD: I'm sorry, Dr. Burton.

3 We have a train going by and I lost you.

4 DR. BURTON: High TSS lows in rivers
5 contribute to water quality impairments, habitat
6 loss, excessive turbidity relating to impairments to
7 recreational fish and wildlife, water supply
8 designated uses, the results suggesting that
9 controlling TSS specific lane uses may result in
10 reducing other particle bound constituents.

11 Navigation impacts from fresh water fish
12 assemblages, the ecological relevance of swimming
13 performance, have also been noted.

14 Specifically, turbidity is
15 comprised of more than total suspended solids. It
16 can be algae, plankton, it can be organic matter, it
17 can even be human substances, natural coloration.
18 But typically, TSS is a more specific stressor than
19 turbidity. Sometimes I use them interchangeably.

20 MS. WILLIAMS: Subpart E, later on
21 Page 9 of your testimony you also state that, quote,
22 "When nitrogen is elevated, another stressor of
23 particular concern is ammonia, which can be
24 particularly toxic to certain aquatic species," end

1 quote.

2 Studies have found ammonia to be a
3 primary sediment stressor in the UIW and Brandon
4 Pool area. What studies have found ammonia to be a
5 primary sediment stressor in this area?

6 DR. BURTON: The commonwealth study I
7 conducted in the mid '90s, the studies by Rick
8 Sparks of the Illinois Natural History Survey, the
9 USGS, and MWRD studies have all shown high levels of
10 ammonia in some parts of this system, either in the
11 overlying water, or associated with the bulk
12 sediments, particularly in the area from Dresden
13 Lock and Dam upstream.

14 It ranks high. The ammonia is
15 high in sediments in the depositional sites, and
16 likely is a benthic stressor. And as I mentioned
17 before, the USGS found ammonia to be at some of the
18 highest levels of any water shed in the U.S. This
19 is on top of the proposed draft USEPA ammonia
20 criteria being lower.

21 MS. WILLIAMS: So are you saying USGS
22 found the water column ammonia to be among the
23 highest?

24 DR. BURTON: Yes, but that was -- I

1 believe their sampling was further upstream.

2 MR. ETTINGER: It's complying -- is it
3 your understanding that this water is now complying
4 with the current Illinois ammonia standard?

5 DR. BURTON: That's my understanding.

6 MR. ETTINGER: But it's still higher
7 than almost every other water in the United States,
8 according to USGS?

9 DR. BURTON: The upstream river -- the
10 area where the USGS sampled upstream, that's what
11 they found.

12 MR. ETTINGER: And where exactly did
13 they sample?

14 DR. BURTON: I don't know exactly
15 where it was. I just remember it was upstream a
16 little bit. Their study actually encompassed the
17 whole Illinois water system.

18 MR. ETTINGER: And this is in the
19 water column?

20 DR. BURTON: Yes, this is water. But
21 we've got very high levels in the sediment, and we
22 don't have standards for that.

23 MR. ETTINGER: Right. And the
24 proposed USEPA ammonia criteria is for water column?

1 DR. BURTON: Yes.

2 MR. ETTINGER: And it's specifically
3 designed to protect muscles. Is that correct?

4 DR. BURTON: Yes. It's a two-faced
5 approach, with and without muscles.

6 MR. ETTINGER: Right. But if it's an
7 area without muscles, you have essentially the same
8 standard as you have now. Is that correct?

9 MS. FRANZETTI: Emphasis on
10 essentially, right, Albert?

11 MR. ETTINGER: Well, I'll ask the
12 question, rather than try and -- what's your
13 understanding if it's an area that they call muscles
14 not present -- and that's not too well spelled out
15 in the draft, but assuming we've got an area where
16 muscles are not present, does the new proposed
17 criteria vary from the existing criteria, and if so,
18 how?

19 MR. GOODFELLOW: I'd like to answer
20 that, because I was one of the independent peer
21 reviewers prior to the EPA submitting it as a draft
22 criteria.

23 MR. ETTINGER: Wonderful. I might
24 want to hire you.

1 MS. FRANZETTI: Nope, he's mine.

2 MR. GOODFELLOW: The acute provision
3 of the -- without muscles is slightly lower, because
4 there's no species -- or actually more included in
5 the criteria. On a chronic basis, it's a little
6 less stringent for chronic. And then with muscles,
7 it's considerably lower for both, acute and chronic.

8 MR. ETTINGER: Okay. Do you know
9 whether the Lower Des Plaines that we're talking
10 about here is an area in which we would consider
11 muscles present?

12 DR. BURTON: I believe Rick Sparks
13 suggested that when he did his studies, and
14 unfortunately the EPA criteria doesn't tell the
15 states how to determine that. Should they be here
16 or should they not be here is a big question that's
17 going to be difficult.

18 MR. ETTINGER: Just as a biologist --

19 MS. FRANZETTI: Well, that's what I
20 was actually going to switch over to, but I don't
21 know I'm catching Mr. Seegert off guard.

22 MR. SEEGERT: Well, I would expect
23 there should be some muscles present. Because of
24 all of the other stressors that we've talked about

1 and the habitat limitations, I wouldn't expect there
2 to be a diverse population. I guess that also, kind
3 of, just as a scientist, I would wonder about if you
4 have one species of highly tolerant muscle, does
5 that count? I don't know, but there should be some
6 muscles present in a water body of this size and
7 given its overall habitat.

8 MR. ETTINGER: To our knowledge, are
9 there muscles present?

10 MR. SEEGERT: Joe, have we
11 encountered -- I think -- I should say I don't know.

12 MS. FRANZETTI: I don't know.

13 MR. SEEGERT: I haven't investigated
14 that.

15 MR. VONDRUSKA: I'm not aware of any.

16 DR. BURTON: There's a lot of zebra
17 muscles there.

18 MR. VONDRUSKA: Corbicula.

19 DR. BURTON: You know, if you go back
20 to the 1800s, there were muscles in most of the
21 streams east of the Mississippi. So again, how do
22 you define --

23 MS. FRANZETTI: Muscles present.

24 DR. BURTON: Right.

1 MR. ETTINGER: That will be fun for
2 the next proceeding.

3 MS. FRANZETTI: I was going to say,
4 Albert, can we not go into that here? We have
5 enough issues here.

6 MR. ETTINGER: Well, never mind.
7 We'll see where we go.

8 MS. WILLIAMS: I think you've
9 mentioned a couple of times the Illinois Natural
10 History Survey studies by Mr. Sparks or Dr. Sparks.
11 Was that on your index provided in 371, Exhibit 371,
12 do you know?

13 DR. BURTON: Those are -- they're not.
14 They are actually cited in the paper I submitted,
15 number 27, who looked closely. They were doing a
16 TIE on all the sediments of this river, and they
17 specifically cited the works of Rick Sparks and some
18 previous work by the Duluth USEPA lab.

19 MS. WILLIAMS: For the record, can you
20 explain what TIE stands for?

21 DR. BURTON: Well, I mentioned that
22 earlier. It's the toxicity identification
23 evaluation approach that USEPA came up with to
24 separate out which chemicals are causing the most

1 toxicity.

2 MS. WILLIAMS: Finishing up with
3 ammonia, in question E, it asks, "How does this
4 stressor -- " and by "this" I'm assuming that we
5 mean --

6 MS. FRANZETTI: I'm sorry, Counsel.
7 We lost you. Give us the question reference again.

8 MS. WILLIAMS: It says this stressor,
9 and we've been talking about ammonia as a primary
10 sediment stressor. So how does ammonia as a primary
11 sediment stressor rank in dominance compared to
12 non-point source related degradation and turbidity,
13 subpart E?

14 DR. BURTON: What number are you on?

15 MS. WILLIAMS: I'm sorry. 41, subpart
16 E.

17 DR. BURTON: Well, I thought I already
18 answered that.

19 MS. WILLIAMS: We asked about what
20 studies and then you went into the studies. I know
21 you did that, but I don't know if you answered the
22 relative dominance of this stressor compared to the
23 other stressors. I did not hear an answer to that.

24 DR. BURTON: Well --

1 MS. WILLIAMS: Is ammonia worse than
2 turbidity?

3 DR. BURTON: I guess I need to
4 reemphasize something, because it keeps coming up as
5 we talk about each stressor. The organisms are
6 seeing all of these stressors. Cumulative stress is
7 the issue here.

8 And so to separate out one is
9 okay, but in reality they're seeing everything. So
10 one might not be acutely lethal to them, but if
11 there are several other stressors it could be
12 because it's pushing them over the edge.

13 So I would rank -- if I had to
14 give a one to ten ranking of stressors, I would put
15 ammonia in the top ten. I would -- the habitat
16 issues I talked about earlier, the flow issues, the
17 contaminated sediments, probably are greater issues
18 in the system, the high nutrients. Even though
19 we're not violating water criteria, we have loaded
20 up the sediments and that's changing the ecosystem.

21 MR. ETTINGER: Are you done with
22 ammonia?

23 MS. WILLIAMS: I am done with 41.

24 MR. ETTINGER: Okay. I'm not quite

1 sure I understand the chemistry or whatever it is of
2 this dependant clause at the beginning of the
3 beginning quoting sentence here. It says, "When
4 nitrogen is elevated, another stressor of particular
5 concern is ammonia." What do you mean by that?

6 DR. BURTON: Well, it's a night vision
7 cycle. If you've got high nitrates around, you're
8 going to probably end up having high ammonia
9 concentrations.

10 MR. ETTINGER: Let's say I'm
11 discharging nitrate, rather than ammonia, or there's
12 nitrate in the system. Are there circumstances in
13 which the nitrate will go to ammonia in this system?

14 DR. BURTON: Yes, it can go to
15 ammonia.

16 MR. ETTINGER: When would that happen?

17 DR. BURTON: If you have the right
18 conditions, the nitrifying bacteria that are there
19 and the denitrifying bacteria. So it just has to be
20 the right conditions. And most of that activity in
21 this system is probably happening in surficial
22 sediments. That's why we're seeing higher
23 concentration notice the poor water. We have higher
24 concentrations of ammonia in the sediments.

1 MR. ETTINGER: That's what I'm trying
2 to understand as a matter of chemistry. And you
3 don't have to get too precise, but let's imagine we
4 have a sewage treatment plant, which is
5 denitrifying, so it's putting out nitrate, rather
6 than ammonia. The nitrate goes into the water. Are
7 there conditions in the sediment that nitrate then
8 will be turned into ammonia?

9 MR. GOODFELLOW: I can answer that I
10 think.

11 MR. ETTINGER: Please do.

12 MR. GOODFELLOW: Nitrates are very
13 water soluble. So the chances of them getting into
14 the sediment are -- I mean, there will be -- some
15 amounts will get into the sediment, but not a large
16 concentration of it. In comparison of 100 percent
17 nitrate, you'll have a very small percentage that
18 will actually go into the sediment, because it wants
19 to say dissolved in the water column.

20 Probably a larger source of
21 nitrogenous material would be just degradation of
22 organic material, leaves, any other vegetative
23 material. They're also going to be pumping a lot of
24 ammonia out of the sediment into the water column.

1 So additional to any discharge
2 from a point source, that's a large portion of
3 ammonia in a natural system that's coming from -- in
4 an aquatic system is coming from that route also.

5 MR. ETTINGER: The route being just --

6 MR. GOODFELLOW: Natural degradation
7 of vegetative material -- of protein, proteinaceous
8 material.

9 MS. WILLIAMS: I think -- let's do
10 Question 79. Would that throw you off too much to
11 jump ahead? Because I think Albert was trying to
12 answer the rest of the ammonia questions, and that
13 might help.

14 MS. TIPSORD: Can we skip the ones in
15 between?

16 MS. WILLIAMS: I reserve the right to
17 go back.

18 MR. ETTINGER: Can I just follow up
19 with one thing? Are you aware of studies of nitrate
20 toxicity?

21 DR. BURTON: To aquatic life?

22 MR. ETTINGER: To aquatic life.

23 DR. BURTON: No. Usually the stressor
24 comes in from changing the ecosystem up. You get

1 nitrification occurring. Did you say nitrate or
2 nitrite?

3 MR. ETTINGER: Nitrate.

4 DR. BURTON: Nitrate, no. But you can
5 obviously cause degradation to the ecosystem by
6 producing more algae.

7 MR. ETTINGER: Okay. But the nitrate
8 itself, to your knowledge, is not a problem of
9 toxicity in the system, although it might be
10 facilitating an algal bloom or something which would
11 be a stressor?

12 DR. BURTON: Right, exactly. There
13 were some questions in that line, which I don't know
14 if we've skipped or not.

15 MR. ETTINGER: Okay.

16 MS. WILLIAMS: Now you're really
17 getting me confused.

18 MR. ETTINGER: I'm sorry. I'll be
19 quiet for a while. I just, sort of, woke up a
20 little bit this afternoon.

21 MS. TIPSORD: Albert, no more coffee
22 for you at lunch.

23 MS. FRANZETTI: Ms. Williams, you're
24 going to Question 79?

1 MS. WILLIAMS: Yes, in an attempt to
2 finish out the ammonia questions, but there are
3 other nutrient questions and I won't say I haven't
4 got to those.

5 You state on Page 14 of attachment
6 one that, quote, "It is not until the Low Dresden
7 Pool that levels drop significantly for nitrogen,
8 ammonia, phosphorus, and fecal coliforms," end
9 quote. Where precisely do these levels drop, and
10 what levels do they drop to?

11 DR. BURTON: The MWRD reports are
12 showing a substantial drop that occurs right at
13 Dresden Lock and Dam. The summary observations from
14 water quality for 2007 and 2008 by MWRD, the
15 Lockport station was always more degraded for total
16 ammonia, total nitrogen, and total phosphorus in
17 regards to the other stations, but the Brandon Road
18 Pool stations and Dresden Island Pool stations were
19 similar to Lockport, and the proceeding downstream
20 stations were considerably lower in regards to these
21 parameters.

22 It should be noted that the
23 Brandon Road Pool and the Dresden Island pools were
24 roughly a PH unit lower, versus the lower downstream

1 stations which had a higher PH, which would make the
2 unionized ammonia concentrations lower.

3 With regards to nutrients, the
4 Lockport Pool, Brandon Road Pool, and Dresden Island
5 Pool are carrying the highest nutrient loads.

6 MR. ETTINGER: I'm not sure whether I
7 heard you right or whether you misspoke. The higher
8 the PH, the higher the amount of unionized ammonia?

9 DR. BURTON: Yes.

10 MR. ETTINGER: I think that's what you
11 meant to say. I'm not sure that's what you said.

12 DR. BURTON: Yes, that's what I meant
13 to say. So you have the upstream having the lower
14 PH, so downstream the ammonia is going to be more of
15 a concern because it has a higher PH.

16 MS. FRANZETTI: Can you just give an
17 example of what figure you're looking at here?

18 DR. BURTON: A lot of this is coming
19 from example 5 and 6 from the 2008 report, 09-46.

20 MS. FRANZETTI: Issued by the
21 metropolitan Water Reclamation District of Greater
22 Chicago. I think it may already be an exhibit or it
23 was referenced, but we did not include it on the
24 CDs. It's available on their website.

1 MS. WILLIAMS: Okay. Let's try --
2 hopefully these will go quickly, because I think
3 I've gotten into some of them already. I think
4 they're just, sort of, yes or no.

5 Question A, "Do you have evidence
6 that the upper Dresden Island Pool is not in
7 compliance with the general use water standard for
8 ammonia?"

9 DR. BURTON: It's not exceeding the
10 current ammonia standards. But as I noted, in the
11 future, it may. Those draft criteria are adopted
12 from USEPA.

13 MS. WILLIAMS: Is it your testimony
14 that Illinois's ammonia water quality standard does
15 not protect Clean Water Act goal aquatic life uses?

16 MS. TIPSORD: That's B?

17 DR. BURTON: No.

18 MS. WILLIAMS: C, I'm sorry. And what
19 is the evidence that ammonia is present in toxic
20 amounts to support ammonia as a stressor to aquatic
21 life in the Brandon Pool and the upper Dresden
22 Island?

23 DR. BURTON: Well, the previous
24 studies I cited and the studies I conducted on the

1 Brandon Road Lock and Dam were the sediments from
2 there that showed in the TIE I did there shows
3 ammonia as a toxicant.

4 MS. WILLIAMS: And by that, do you
5 mean ammonia in the sediment or in the water column?

6 DR. BURTON: In the sediment.

7 MS. WILLIAMS: This is moving on to
8 80, and then we'll jump back. You answered the
9 first part of 80 A, and the second part of 80 A
10 asked, "What is the relationship between ammonia in
11 the sediment in the water column?" I think
12 maybe -- do we think Mr. Goodfellow already answered
13 that? Do you want to add anything to that?

14 DR. BURTON: Well, obviously a lot of
15 the ammonia, if it's a gradient distribution, if you
16 have a high concentration of something like ammonia
17 that's water soluble in the sediment, it's going to
18 migrate out of the sediment to the overlying water.

19 So the concern are really the
20 organisms that live at that interface of sediment
21 and water having toxicity there. Certainly, as soon
22 as that ammonia gets into the overlying water, it's
23 diluted out, and it's not going to be a problem for
24 the organisms in the water column.

1 MS. FRANZETTI: I'm sorry, Counsel.
2 Just for the record, you also have used the phrase
3 "poor water." Is that the water you were just
4 referring to that is in contact with the sediment?

5 DR. BURTON: Right. The poor water is
6 the water between the sediment particles, so that
7 would go all the way up to the sediment water
8 interface.

9 MS. WILLIAMS: The last piece of that
10 asks, "Has ammonia been detected in both sediment
11 tests?"

12 DR. BURTON: Yes. The study I did
13 showed TIE, bulk sediments, and the poor water that
14 comes from those sediments.

15 MS. WILLIAMS: And was there a
16 particular methodology used in your TIE tests?
17 That's part of B that you haven't answered yet.

18 DR. BURTON: Yeah. That was explained
19 in my reports that were submitted. The TIE followed
20 a modified draft USEPA protocol for poor water TIEs.
21 That would be number six of the exhibits that I
22 submitted.

23 MS. FRANZETTI: Reference number six
24 on Exhibit 371.

1 DR. BURTON: The other part of that
2 TIE test, which is relevant here, it showed a PH
3 used to be a principal toxicant. We separate --
4 basically, in those exposures you separate out the
5 different kinds of chemicals and then expose the
6 organisms to the poor water again. And when we
7 remove the PAHs, the survival greatly increased in
8 the poor water, suggesting the PHs are the source of
9 toxicity. Those are the same results that Maylor
10 just published this month.

11 MS. WILLIAMS: And these were done in
12 '95, correct?

13 DR. BURTON: Yes. His were done last
14 year.

15 MS. WILLIAMS: And where were the
16 samples subject to TIE testing collected?

17 DR. BURTON: Mine were collected from
18 the Brandon Road Lock and Dam area.

19 MS. WILLIAMS: How were they selected?
20 How were the sample locations selected?

21 DR. BURTON: I wanted a depositional
22 sediment, and something that was close to the Joliet
23 station where we were doing most of our work.

24 MS. WILLIAMS: The last piece of

1 that --

2 MS. FRANZETTI: Counsel, can I
3 just, for a moment, to put it in context, his work?
4 Was your work included ultimately in the proceeding
5 that's been referred to in this rulemaking as
6 AS 96-10, the Board proceeding? The work that you
7 did in the mid '90s, '95, '96, that was for Com Ed.
8 Com Ed relied on that work in the AS 96-10 adjusted
9 standard proceeding, correct?

10 DR. BURTON: Yes. I have not heard
11 that number before, but yes.

12 MS. FRANZETTI: I'm sorry. And that
13 was part of the reason why you were staying close to
14 the Joliet station --

15 DR. BURTON: Right.

16 MS. FRANZETTI: -- for your sampling
17 locations because it was related to seeking an
18 adjusted standard for the Joliet station, correct?

19 DR. BURTON: Correct.

20 MS. WILLIAMS: Were you upstream or
21 downstream of the Brandon Road Dam?

22 DR. BURTON: Upstream.

23 MS. WILLIAMS: The last piece asked,
24 "Were the sample locations intended to be

1 representative or more conservative worse case
2 scenario samples?"

3 DR. BURTON: Worst case, because I was
4 trying to look also at temperature effects.

5 MS. WILLIAMS: Okay.

6 MR. ETTINGER: I don't promise to
7 leave nitrogen alone in the future, but just as to
8 ammonia, what are the critters that we believe are
9 being affected by any ammonia in the sediment?

10 DR. BURTON: Obviously there is a wide
11 range of responses from organisms. We have a lot of
12 pollution tolerant organisms in this system that
13 don't really care whether ammonia is around or not.
14 But the desirable species, like hilolazteca
15 (phonetic), which is, again, a USEPA indicator
16 species that's supposed to be relatively sensitive
17 and protective of other species, seize toxicity in
18 the presence of the ammonia concentrations we were
19 talking about.

20 And, as you know, cold water fish
21 are much more sensitive to ammonia than warm water
22 fish, and then you have a whole range of responses
23 there.

24 MR. ETTINGER: Now, as I recall -- and

1 I haven't looked at the ammonia criteria in general
2 for a whole -- the most sensitive critters were
3 salmonids?

4 DR. BURTON: Yes.

5 MR. ETTINGER: And that was what was
6 driving the standard outside of Illinois in many
7 places. But in Illinois, we throw out the salmonid
8 data because we don't have salmonids?

9 DR. BURTON: Right.

10 MR. ETTINGER: So what are the next
11 most sensitive critters that might be affected
12 there?

13 MS. FRANZETTI: By ammonia?

14 MR. ETTINGER: By ammonias. This is
15 all about ammonia.

16 DR. BURTON: Well, it would be muscles
17 for sure.

18 MR. ETTINGER: Well, muscles, as you
19 know, were not taken into account in this standard
20 either. So other than muscles -- muscles and salmon
21 are out of here -- are not in this criteria. What
22 then would be the critter that might be in this?

23 DR. BURTON: What would be nice is to
24 have, as I was mentioning to Bill, a species

1 sensitivity distribution. Those data are out there.
2 I don't know what the answer is. I'm guessing what
3 I've just mentioned, the anthropoids, is down near
4 the more sensitive area. But I really haven't
5 looked at the data that make up those criteria.

6 MR. GOODFELLOW: Formally, the old one
7 was a darter. It was one of the species. I cannot
8 remember the invertebrate. There was an
9 invertebrate -- I think it was a snail. I'm not
10 100 percent sure on that one. But there
11 were -- only one species changed, and the newer data
12 made the numbers go -- that's why they go down
13 slightly in the absence of salmonids for the newer
14 criteria.

15 MR. ETTINGER: Okay. So just to be
16 clear then, I guess -- leaving aside -- well,
17 there's a number of concepts here, but what we're
18 saying here is that because the ammonia is there,
19 we're possibly not seeing some benthic critters that
20 would obviously be there. We're seeing more
21 ammonia-tolerant benthic critters?

22 DR. BURTON: Correct. But again, I
23 want to point out that we don't have to be killing
24 something from ammonia for it to be a worry. It's

1 an additional stressor in the midst of a lot of
2 other stressors.

3 So I hesitate to say, "Well we're
4 not above this level, so it's not a problem." If
5 it's an early life stage of an organism and it's
6 inducing stress --

7 MR. ETTINGER: So the fact that the
8 ammonia levels are higher than natural conditions,
9 shall we say, would be an additional -- would be a
10 stressor, and might make the critter more
11 susceptible to problems from other stressors than it
12 would be otherwise?

13 DR. BURTON: Correct.

14 MR. ETTINGER: Thank you.

15 MS. TIPSORD: Let's take a ten-minute
16 break.

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

20 MS. WILLIAMS: I'm going to start on
21 Question 43. I think only Subpart D do I want to
22 ask at this point. I'll start with the
23 introduction.

24 At the top of Page 5 of your

1 testimony, you state, quote, "As I have studied and
2 documented in prior studies, as well as documented
3 elsewhere, urban and agricultural storm waters are
4 often acutely toxic to fish and other aquatic
5 species."

6 So Question D says, "Does this
7 statement mean that aquatic life are routinely
8 killed off in water bodies of urban and agriculture
9 storm water?" Is what what you mean by acutely
10 toxic?

11 DR. BURTON: You meant 43?

12 MS. FRANZETTI: We had trouble with D
13 and B.

14 MS. WILLIAMS: 43-D, as in debit.

15 DR. BURTON: I'm not saying that
16 species are killed off, but rather that the system
17 is not hospitable to higher quality organisms,
18 because you've already downgraded the neighborhood,
19 so to speak. Therefore, if they were there, they
20 had moved out. Because of the conditions they can't
21 move in to that area.

22 MS. WILLIAMS: Question 45 -- I'm
23 going to skip 44 and move on to 45.

24 On Page 5, Paragraph 2 of your

1 testimony, you state, quote, "Depositional sediment
2 in the UIW, including those in the Upper Dresden
3 Pool, are severely contaminated." And subpart C
4 asks, "How do you classify sediments as severely
5 contaminated?"

6 DR. BURTON: That was based on the
7 previous discussion we had with using the probable
8 effect and guidelines.

9 MS. WILLIAMS: So the exceedance of
10 the PEC would be the same as the definition of
11 severe in this case?

12 DR. BURTON: That's what I'm using as
13 a commonly recognized indicator of quality, yes.

14 MS. WILLIAMS: Do toxic sediments have
15 to be available to aquatic life before one can
16 classify the sediments as severely contaminated?
17 This is D.

18 DR. BURTON: Well, that's what the
19 guidelines are doing. They're based on biological
20 effects. That's means they have to be bioavailable
21 to have an effect. So toxicity was determined
22 by -- this was mentioned by some of these laboratory
23 mortality-based bio-essays. Some were field-based
24 benthic indices.

1 Studies were conducted throughout
2 the nation by many academic and government
3 institutions, and actually there are a number of
4 different SQGs we haven't even talked about today,
5 but they all are similar in some regard. They're
6 doing pretty much the same thing.

7 The empirical guidelines that EA
8 used were based on the relationship between benthic
9 indices and concentrations. I think we've already
10 discussed most of that. There's some other chemical
11 tool -- other tools available to look at
12 bioavailability, such as acid sulfides, and
13 simultaneously extracted metals, organic carbon, the
14 PH of water. All of those things have some effect
15 of controlling bioavailability.

16 Severely contaminated sediments
17 that are high in chemical concentration that is
18 exceeding the guidelines have potential
19 under-ecological conditions to cause adverse effects
20 to organisms by a variety of mechanisms.

21 MS. WILLIAMS: I'm going to ask E. I
22 was trying to decide to ask E. I'm not sure it's
23 clear, so I may have to flush it out with some
24 follow-up.

1 Have you demonstrated that
2 sediment in the Lower Des Plaines River is severely
3 contaminated and that toxic in these sediments are
4 available to and accumulated in aquatic life?

5 DR. BURTON: Clearly and
6 unequivocally, by multiple investigations, as I've
7 cited previously. In the case of the sediments
8 contaminated by petroleum and combustion products,
9 advanced chemical analyses really don't need to be
10 done to ascertain whether they're grossly
11 contaminated or toxic.

12 A real simple visual and smell
13 test will do that for you. So to demonstrate this,
14 we went out in late December and collected from six
15 of the sites that we've collected from before, and
16 two of these were from the Brandon tail water area.

17 These sediments smell of
18 petroleum. They release oily sheens into the
19 overlying water, and due to the very small size the
20 particle size, they're unsuitable for habitat for
21 any desirable species. We could get some worms to
22 live in there, but little else would.

23 So Joe is going to open these up
24 briefly for anyone that would like --

1 MS. FRANZETTI: I don't even know if
2 we're going to -- unless you want, we are not going
3 to open all of them up, but --

4 MS. TIPSORD: I would certainly prefer
5 the ones that you're going to enter as exhibits do
6 not get opened.

7 MS. FRANZETTI: Well, you need to tell
8 me whether you want these introduced as exhibits or
9 not. We don't want to burden you. There has been a
10 lot of testimony about these sediments.

11 MR. RAO: Our fridge is full.

12 MS. FRANZETTI: Right. And so we
13 don't really need to, but we just thought that the
14 Board members might like to actually see, when they
15 talk about the contaminated sediments out there, see
16 and actually smell what they're talking about.

17 DR. BURTON: So my point --

18 MS. FRANZETTI: I always think a
19 picture is worth 1,000 words. This is a little bit
20 better than a picture.

21 DR. BURTON: And my point to the Board
22 is I've been doing this since the late 1980s, and
23 really for most sites that are like this, I don't
24 need to do a bunch of toxicity tests and spend a lot

1 of money. I can just look at the sediment.

2 MS. WILLIAMS: Can I smell?

3 MS. FRANZETTI: You can take a bottle.

4 Here you go. Just for you.

5 MS. TIPSORD: Ladies and gentlemen,
6 we're still on the record, so let's make clear that
7 we have some -- these sediment jars are being shown
8 to people. If there's no objection -- I am not
9 going to enter these into the record unless someone
10 really feels strongly that we should. Seeing no
11 objection, we won't enter them into the record. We
12 will -- I will try to describe what I'm looking at.
13 This is from the Dresden Reach 09-18. Is that
14 correct?

15 MR. VONDRUSKA: 09 for the year, and
16 18 refers to the same location that we sampled in
17 2008.

18 MS. TIPSORD: And this is murky, to
19 say the least. Oh, yeah, it smells like gasoline.
20 I'm not tasting it.

21 MS. WILLIAMS: Wait, mine doesn't
22 smell like gasoline.

23 MS. TIPSORD: Oh, mine does.

24 MS. WILLIAMS: I want to smell yours.

1 MS. TIPSORD: Mine definitely smells
2 like gasoline.

3 MS. WILLIAMS: See, yours smells worse
4 than mine. Smell mine.

5 MS. FRANZETTI: Does anyone else want
6 want to actually come up and look at these or smell
7 them?

8 MR. ETTINGER: 09-18?

9 MS. FRANZETTI: Yes.

10 MS. TIPSORD: 09-22 is actually
11 clearer and does not have the same strong scent.

12 MR. VONDRUSKA: What's really
13 interesting to note is the sample from DR-22, which
14 you notice doesn't have as a distinct odor as some
15 of these others, actually had the highest
16 concentrations of total PHs.

17 MS. FRANZETTI: We're not introducing
18 them.

19 MS. TIPSORD: Off the record for just
20 a second.

21 (Whereupon, a discussion was had
22 off the record.)

23 MS. TIPSORD: Dr. Burton, did you have
24 anything further to add to that?

1 DR. BURTON: No, ma'am.

2 MS. FRANZETTI: Hand sanitizer?

3 MS TIPSORD: Well, maybe just to be on
4 the safe side.

5 Ms. Williams, I think we're ready
6 for your next question.

7 MS. WILLIAMS: Okay. Number 46 -- are
8 you ready, Dr. Burton?

9 DR. BURTON: Yes.

10 MS. WILLIAMS: Paragraph 2 on Page 5
11 of your testimony, you mention transport mechanisms
12 and processes, such as resuspension, convection,
13 bioturbation, and diffusion. And all of these
14 processes exist on the Lower Des Planes today,
15 correct?

16 DR. BURTON: Yes.

17 MS. WILLIAMS: Do these processes
18 exist in most waterways?

19 DR. BURTON: Yes, they do.

20 MS. WILLIAMS: What impact does
21 resuspension have on sediment or water quality
22 toxicity?

23 DR. BURTON: Well, like a lot of
24 things in this field, it depends on many factors,

1 biological, chemical, and physical, the magnitude
2 and frequency and duration of when those
3 resuspension events happen.

4 So there's really no simple
5 answer. It also depends on if the organisms living
6 in that system are pollution tolerant and can stand
7 that resuspension or turbidity.

8 MS. WILLIAMS: What data demonstrates
9 that resuspension is resulting in deleterious
10 effects on aquatic life in the Upper Dresden Island
11 Pool, and what data demonstrates these effects are
12 significant enough to prevent the Upper Dresden
13 Island Pool from attaining the Clean Water Act
14 aquatic life goals?

15 DR. BURTON: Well, as I discussed
16 previously, I did some suspended solid studies that
17 showed some effects on daphnia. I don't think the
18 phenomenon really needs to be documented in every
19 waterway to prove this phenomenon exists.

20 Because of all the publications
21 that I've already discussed and submitted, we know
22 that resuspension occurs a lot in this system. And
23 so if we have high TSS, then we're going to have
24 potential stress to the organisms that live there.

1 Otherwise, USEPA wouldn't be developing suspended
2 sediment criteria.

3 MS. WILLIAMS: Would you agree that if
4 we knew precisely what all these impacts are in
5 aquatic life that we'd have final criteria that the
6 states could use?

7 DR. BURTON: Are you talking about the
8 suspended solids criteria? There's already a lot of
9 criteria.

10 MS. WILLIAMS: When referring to the
11 criteria, you said that's why USEPA is working on
12 developing criteria for -- maybe you should finish.

13 DR. BURTON: As I mentioned, they are
14 trying to make it flexible, because right now the
15 states use a wide range of criteria to determine
16 standards.

17 MS. WILLIAMS: For suspended solids or
18 for everything?

19 DR. BURTON: I'm talking about
20 suspended solids.

21 MS. WILLIAMS: Question D asks, "What
22 effect does advection have on sediment or water
23 quality toxicity? And maybe you should first
24 explain what advection is.

1 DR. BURTON: That would be the
2 movement of groundwater up through sediments, the
3 movement of water through sediments, which then can
4 go out into the overlying waters. And it's a common
5 phenomena in waters and streams and rivers. So it's
6 a very site-specific process.

7 If you've got sediment
8 contamination and if you've got advection in those
9 sediments it's going to move the contaminants out of
10 the sediment into the water where more organisms can
11 see it.

12 MS. WILLIAMS: You have to have ground
13 water come in for that to occur?

14 DR. BURTON: It can be ground water.
15 It can be water from just upstream that's going
16 through the sediments. So most streams are
17 recharged from the bank, and that's where you tend
18 to get this advection coming into the stream.

19 MS. WILLIAMS: Do you have data that
20 demonstrates advection as resulting in deleterious
21 effects on aquatic life in the Upper Dresden Island
22 Pool that prevent attainment of the Clean Water Act
23 aquatic life uses?

24 DR. BURTON: No, I do not, but it's a

1 common process, so I don't know why it wouldn't
2 exist there.

3 MS. WILLIAMS: What effect does
4 bioturbation have on sediment or water quality
5 toxicity? And again, maybe you should explain
6 bioturbation.

7 DR. BURTON: That's any resuspension
8 of the sediment. That's the turbation due to biota.
9 So although it could be fish, like carp, it's
10 usually referred to the benthic invertebrates and
11 the worms that are moving through the sediments.
12 They're resuspending some of those sediments,
13 they're causing chemicals in the sediment to go into
14 the overlying water.

15 So again, it's a very
16 site-specific phenomenon. It tends to be greater in
17 areas and sediments that have a lot of organic
18 matter, like a lot of these depositional settings.

19 MS. WILLIAMS: What data demonstrates
20 that bioturbation is resulting in deleterious
21 effects on aquatic life in the Upper Dresden Island
22 Pool that is significant enough to prevent
23 attainment of Clean Water Act aquatic life goal
24 uses?

1 DR. BURTON: Well, as in my previous
2 answer, there's no specific data. It happens in all
3 aquatic systems, and one would expect it's happening
4 in this one, and would be contributing to moving
5 contaminants out of sediments.

6 MS. WILLIAMS: Explain what diffusion
7 is and what effect does diffusion have on toxicity.

8 DR. BURTON: As the previous two
9 questions, this is a very common process that occurs
10 in all waterways. When you have a higher
11 concentration in sediment than you have in the
12 overlying water, the chemicals are going to slowly
13 diffuse to the area of lower concentration.

14 So it's more common in lake
15 systems as being important. In the river systems,
16 usually advection and bioturbation would be more
17 important than diffusion.

18 MS. WILLIAMS: Question 47, you
19 mention on Page 5 Paragraph 2 of your pre-filed
20 testimony the contaminant sediment concentrations
21 can steadily increase in depositional sediments.

22 Question A, "Are sediment
23 contaminant concentrations actually increasing in
24 this system, and what evidence do you base your

1 answer on?"

2 DR. BURTON: Well, they appear to be
3 very similar, despite the suggestive reductions that
4 are occurring in overlying water in the statements
5 that were made in the UAA Chapter 3. That's based
6 on the reports we've submitted here of my studies
7 and EA studies, USGS, Maylor et al., and the MWRD
8 studies.

9 Metals detected in the EA study
10 were higher or within a factor of two or less,
11 indicating that overall the sediment quality has
12 essentially stayed the same, or even has degraded in
13 some areas. That's table eight of the EA report.
14 Sediment samples in --

15 MS. FRANZETTI: That's table 11.

16 DR. BURTON: Excuse me, table 11 of
17 the 2008 EA report.

18 Sediment samples in most river
19 systems have a very high degree of spacial
20 heterogeneity, which makes it hard to make
21 determinations of improvements or trends over time.

22 MS. WILLIAMS: So do you agree or
23 disagree that the levels of contaminated sediments
24 in this system will decrease over time, and why or

1 why not? This is C.

2 DR. BURTON: No, because they do not
3 appear to have. The loadings of contaminants are
4 going to continue to be high with or without TARP.
5 And it's a depositional system, much of it. So
6 there's no evidence to me that sediment
7 contamination will go down in the foreseeable
8 future.

9 When I look at Figure 3.6 and 3.7
10 and Figure 3.8 that the UAA report Chapter 3 had
11 that was citing that sediments were becoming cleaner
12 because of MWRD's data on metals, from 1991 forward
13 to 2000, there is absolutely no trend whatsoever.
14 So I don't really know how they establish that.

15 Zinc concentrations went down in
16 the late '80s. But at the same time, most zinc
17 measurements were faulty during that period of time
18 because of contamination from the overlying -- the
19 hoods they were using to digest sediments.

20 So there's no evidence from any of
21 this wealth of data that shows declines are
22 occurring.

23 MS. WILLIAMS: Question D asks, "Is it
24 your testimony that natural attenuation processes

1 will not occur at this site?"

2 DR. BURTON: Well, given the fact that
3 the contaminant levels in the sediments and the more
4 recent data are not significantly different, this is
5 an indication that natural attenuation alone, even
6 assuming that that was occurring, is not going to be
7 adequate to break down or move the contaminants out
8 of the system.

9 MS. WILLIAMS: What was the
10 highest -- farthest upstream that sampling was done
11 over the period of time that you looked at? How far
12 upstream did you go?

13 DR. BURTON: Are you referring to my
14 mid '90s studies? Those went, as I mentioned, all
15 the way up into South Branch turning basin here in
16 downtown.

17 MS. WILLIAMS: And then the more
18 recent data was collected --

19 DR. BURTON: Up to Brandon Road Lock
20 and Dam.

21 MS. FRANZETTI: Again, just so it's
22 clear, that is the data collected by EA, not MWRD,
23 that Dr. Burton is referring to.

24 MS. WILLIAMS: What I'd like to

1 know -- and it's very basic and probably not too
2 scientific -- did you look at any data that would
3 help you to have an opinion on whether or not legacy
4 sediments may actually be moving out of, say, the
5 South Branch of the Chicago River and the Sanitary
6 and Ship Canal and finding their way into the
7 Dresden Island Pool?

8 DR. BURTON: So when you say legacy,
9 you're talking, what, deeper sediments?

10 MS. WILLIAMS: Older.

11 DR. BURTON: Older sediments. I
12 collected two cores from that upper end, and the
13 findings were, kind of, unequivocal. One had lower
14 in the higher sediments and one didn't.

15 Really in a system like this -- in
16 a system like this, core data is relatively
17 worthless, because the sediments are so -- can be so
18 dynamic. So, for example, you'll never see dating
19 of sediments done in rivers. You can do that in
20 lakes.

21 MS. WILLIAMS: Because of the process
22 of storms and other flow?

23 DR. BURTON: Too much mixing and the
24 advection stuff I was talking about. All that is

1 going on. So you're best off, I think, just looking
2 at surficial sediments over time, because that's
3 what you really care about. That's where the
4 benthic invertebrates are, not the deeper sediments.
5 So our surficial sediments here are still highly
6 contaminated.

7 MS. WILLIAMS: But there's no way of
8 knowing if the upper sediments in the Dresden Island
9 Pool were possibly originally deposited in the
10 Sanitary and Ship Canal and then flushed downstream
11 at this point? There's no timing -- no way to tell
12 that?

13 DR. BURTON: There's no tracer
14 studies. Since we know sediments move -- and I
15 think that was the premise of another earlier IEPA
16 testimony, that they're going to flush out in time
17 and be better. But in reality, that's happening,
18 but they're still contaminated. So that must mean
19 they're becoming contaminated from ongoing sources.

20 Because we've got such a high
21 impervious area, we're going to keep getting PHs,
22 washing off of every street, every parking, lot into
23 every storm drain, and that's going to continue to
24 be an issue.

1 MR. ETTINGER: Let me just ask
2 something in general. These metals obviously don't
3 break down. Do some of the compounds -- the
4 ammonia, as it's stirred up, doesn't some of that
5 cease to be ammonia and go to nitrate or other
6 chemicals?

7 DR. BURTON: Right, ammonia is
8 extremely labile. So it's not persistent. Metals
9 do not degrade?

10 MR. ETTINGER: Exactly.

11 DR. BURTON: The PAHs, it depends.
12 PCBs, as you know, not very well.

13 MR. ETTINGER: Okay. But the PAHs, is
14 there a half life on them, so to speak?

15 DR. BURTON: They vary too much. And
16 we have small ones that break down quickly and
17 volatilize, and then we have big ones that don't and
18 they hang around. Like creosote, you know, is made
19 up of a lot of PAHs. You know, that stuff hangs
20 around a long time.

21 MR. ETTINGER: So if you quit adding
22 anything through the system, you'd expect -- if you
23 put a cap on a bottle and added nothing else to the
24 system expect to shake it a little bit every once in

1 awhile, you'd expect in time the ammonia to go away
2 relatively quickly, the PAHs would vary, PCBs will
3 be there a long time, and, of course, the metals
4 will be there forever because they're not going
5 anywhere. Is that right?

6 DR. BURTON: That's right, and we'd
7 want to move the river away from Chicago.

8 MR. ETTINGER: There's been
9 suggestions of that.

10 DR. BURTON: Well, this is a case
11 where the PAHs -- we're not going to find PAHs in
12 agricultural runoff. So if we can divert more ag
13 runoff into the system, the sediments would probably
14 clean up a little bit faster.

15 MR. ETTINGER: Then we'd have
16 different problems.

17 MS. WILLIAMS: I'm going to move on to
18 question 50. In footnote one of your testimony, you
19 state that SQGs are commonly accepted benchmarks and
20 have been widely used in the U.S. for many years to
21 establish cleanup levels for federal and state
22 remediation activities and to determine which
23 sediments are toxic and represent a threat to
24 aquatic life.

1 Why is it called a sediment
2 quality guideline, and what do you mean by a
3 commonly accepted benchmark?

4 DR. BURTON: There's a lot of history
5 behind why it's called a guideline. It took about
6 five years of arguing with the U.S. Corps of
7 Engineers and USEPA. The USEPA wanted to call them
8 criteria, and the U.S. Corps of Engineers won at the
9 end of the day. That's why it's called a guideline.

10 It's obviously a non-enforceable
11 number, but they have been used, as I mentioned,
12 to -- particularly for superfund and hazardous waste
13 cleanups as a cleanup goal. And, of course, the
14 most common one is for PCBs, because most of our
15 cleanups are being spurred by PCBs.

16 And so a lot of these cleanups
17 will say let's get the sediments down to five parts
18 per million PCBs or ten or one, depending on what
19 was negotiated in the record of decision.

20 MS. WILLIAMS: How would an SQG be
21 used to determine if sediments represent a threat to
22 aquatic biota, and would no -- and I'm going to
23 change to exceedance -- of an SQG mean that no
24 impairment to aquatic life would be expected?

1 DR. BURTON: Well, I think we
2 explained how the SQG would be used if sediments are
3 toxic. If they're exceeded, particularly the PEC,
4 we assume they're toxic. Based upon all of the
5 rationalities I gave before, if it's exceeded, it's
6 likely a threat. It is just one line of evidence.

7 So if one wanted to be
8 certain -- let's say we have a lead problem and the
9 SQGs aren't particularly good with lead. Then we
10 would want to do more biological testing and look at
11 the benthic community that lives there or do
12 toxicity testing.

13 MS. WILLIAMS: Would bulk sediment
14 chemistry benchmark SQGs be used in establishing
15 clean up levels? This is D.

16 DR. BURTON: Yeah, that's what I just
17 mentioned in the previous two answers ago. They're
18 used for a lot of cleanup sites.

19 MS. WILLIAMS: Question F, "Are these
20 SQGs based on effects to humans from drinking water
21 or fish consumption, impacts to fish, or impacts to
22 macro invertebrates?"

23 DR. BURTON: The SQGs we've been
24 talking about are only for benthic invertebrates.

1 MS. WILLIAMS: Does the presence of
2 sediments that exceed SQGs mean that fish will not
3 be able to reproduce within the habitat?

4 DR. BURTON: Perhaps, but it's
5 certainly a site-specific issue. Because if the
6 benthic invertebrates are contaminated with PAHs and
7 metals and PCBs and the fish are eating them, that's
8 their food source, then one might expect they're
9 going to have difficulty reproducing.

10 Again, we have to come back to the
11 issue that it depends on the pollution tolerance of
12 the fish. Some fish can handle a lot of PCBs, like
13 carp.

14 MS. WILLIAMS: Question I, "If you
15 believe that the violations of SQGs listed in your
16 testimony would make Clean Water Act aquatic life
17 goal uses unattainable, what aquatic life use would
18 be attainable?"

19 DR. BURTON: I'm sorry?

20 MS. FRANZETTI: Can you repeat the
21 question?

22 MS. WILLIAMS: It's question I. Do
23 you want me to read it again?

24 MS. FRANZETTI: Would you mind?

1 MS. WILLIAMS: "If you believe
2 exceedances of SQGs listed in your testimony would
3 make Clean Water Act aquatic life use goals
4 unattainable -- which I think you have already
5 suggested, correct?

6 DR. BURTON: Mm-hmm.

7 MS. WILLIAMS: What aquatic life use
8 would be attainable under these conditions?

9 DR. BURTON: I didn't look at that.

10 MR. ETTINGER: Maybe we ought to ask
11 what do you mean by attaining the Clean Water Act
12 aquatic life goal?

13 DR. BURTON: Well, we talked about
14 this this morning.

15 MS. FRANZETTI: I actually thought --
16 go ahead. You can repeat it. It's not that big of
17 a deal. I think he did describe it this morning.

18 DR. BURTON: I'm looking at any
19 impairment to aquatic life. It's got to be
20 affecting the goals of the Clean Water Act, doesn't
21 it?

22 MR. ETTINGER: Well, let's say
23 hypothetically there was a chemical in the water
24 that knocked out one critter, but everything else

1 was just happy there. Would you say that the water
2 was meeting Clean Water Act aquatic life goals or
3 not?

4 DR. BURTON: Well, no. But that's not
5 a situation that I have ever heard of happening.

6 MR. ETTINGER: Well, I'm trying to get
7 a gauge, you know. What is your view of how many
8 species would have to be affected, or when do we
9 fall short of the goal?

10 MS. FRANZETTI: I'm just going to say,
11 for the record, I think that's a regulatory answer
12 if you satisfy one or more of the UAA factors. I
13 mean, is that what you're getting at?

14 MS. WILLIAMS: No.

15 MR. ETTINGER: No, I'm not. And I
16 agree with you, it's a regulatory factor. It's just
17 we're using this term in the testimony now, so we
18 need to understand, you know, how good do I have to
19 be before you say I've met the goal? Do I have to
20 have 100 percent of the species that we would want
21 there to meet the goal, 95 percent of the species?
22 What, in general, do we mean by meeting the goal?

23 MS. FRANZETTI: Well, I'm just going
24 to state on the record that I don't think you can

1 answer that question without reference to the six
2 UAA factors because of the presumption under the
3 Clean Water Act that a water body can attain the
4 goal, unless you show that one or more of the six
5 factors apply. So I just wanted to state that from
6 a legal perspective.

7 MS. WILLIAMS: But I think he's
8 already testified that any adverse effect on aquatic
9 life means you haven't met the Clean Water Act goal,
10 correct?

11 MS. FRANZETTI: No.

12 MS. WILLIAMS: That's what I thought
13 he testified to.

14 MS. FRANZETTI: Is that what you
15 testified to?

16 MS. WILLIAMS: Do you want to correct
17 that at this point?

18 DR. BURTON: I think that's being a
19 little extreme, because you're thinking of the Clean
20 Water Act goals in a regulatory sense and I'm not.
21 I'm thinking at it purely from an ecological impact,
22 and I'm not drawing bright lines on what's
23 acceptable and what else not. I'm talking about an
24 impacted community in an impacted watershed that's

1 impacted by multiple stressors and which of those
2 stressors are probably dominating.

3 Now, if we were in Ohio, Ohio has
4 biological criteria, and I think it would actually
5 be easier to answer your question, because you can
6 tie it into the IBI. If you're at a certain level,
7 you're good. If you're at another level, you're
8 just fair.

9 And it's that percentage of the
10 community response I think you're looking for. But
11 in this system, I can't say. I mean, the EPA's
12 water quality criteria are based on the assumption
13 that they're predicting 95 percent of the
14 populations that are out there. That means five
15 percent are the species. Five percent are
16 expendable. I don't know where the ecology is in
17 that. I don't think there is any.

18 But, you know, just that one
19 method of evaluating Clean Water Act attainment,
20 water quality criteria, is allowing five percent of
21 the species to be lost. So I really can't answer
22 your question, I think, the way you would like me
23 to, because I'm just looking at a relationship
24 between exposure to stressors and responses.

1 MS. FRANZETTI: And in fairness to
2 Dr. Burton, he was asked here by Midwest Gen to
3 review the UAA factors, except for the last one, the
4 widespread economic impact. But the first
5 five -- he was asked to review the first five and
6 apply them to the information, the data that you've
7 seen and heard him present today and in his written
8 testimony, and form an opinion as to whether one or
9 more of the UAA factors were satisfied here with
10 respect to the South Branch of the Chicago River,
11 Ship Canal, Brandon Pool, Upper Dresden Island Pool.

12 So that's why I'm making the point
13 in terms of what we asked him to do and what
14 opinions we asked him to form were focused on the
15 UAA factors.

16 MR. ETTINGER: Well, I don't want to
17 belabor it anymore. All I want to know is if we use
18 a term that we understand, if people think they
19 understand the way we're using the term now, I guess
20 we've got an answer, and it's in the transcript or
21 it isn't. Thank you.

22 MS. WILLIAMS: Do you know,
23 Dr. Burton, if you find that a PEC has been
24 exceeded, would a wait of evidence approach require

1 further information to conclude with reliability
2 that an adverse effect has actually occurred? This
3 is a follow-up, if you're looking for the pre-filed
4 question.

5 MS. FRANZETTI: It's not a pre-filed
6 question.

7 DR. BURTON: I think I stated earlier
8 that it's one line of evidence, and a weight of
9 evidence study means you have more than one line of
10 evidence.

11 So my sediment chemistry would be
12 one. My sediment quality guidelines would be
13 another. It's linked to a biological effect, so
14 that's good. But benthic data from the site would
15 be even better.

16 MS. WILLIAMS: Okay. Question 51, on
17 Page 86, Attachment 1, you state that, quote, "SQGs
18 have been used in superfund RCRA, and state
19 investigations for many years, and are frequently
20 used to establish cleanup levels for remediation
21 activities," and you site Tiwinny (phonetic), et al.

22 And the question asks, "Doesn't
23 that document state that SQGs are intended for
24 screening purposes and should not be used to set

1 site-specific cleanup standards or remediation
2 goals?"

3 DR. BURTON: Yes, it does. That
4 conference workshop was convened because of that
5 controversial point, that people were putting too
6 much weight of their decision on just the SQGs.

7 And so the Chapter 5 that I helped
8 write in that book said you should use weight of
9 evidence. It was recognized that SQGs would be
10 small -- would be fine alone at small sites, not big
11 sites. You have to look at other forms of data.

12 But the stark reality is, as I
13 mentioned, they're used commonly for cleanup goals.
14 So, I mean, we thought that book was great, but it's
15 not getting really adhered to by the project
16 managers of these hazardous waste sites.

17 MS. WILLIAMS: 52, on Page 7 of
18 attachment one you state, with regard to sediment
19 sampling, quote, "All have shown typical high
20 degrees of rivering spacial heterogeneity, i.e.,
21 natural variations across the river and
22 longitudinally. This high degree of spatial
23 heterogeneity makes determinations of improvements
24 through time extremely difficult, end quote."

1 A, are the variations and sediment
2 samples in the CAWS and Lower Des typical or high?

3 DR. BURTON: I've seen more and less.

4 MS. WILLIAMS: Do you agree that there
5 is not enough data to determine whether sediment
6 levels are decreasing over time?

7 DR. BURTON: Well, as I said earlier,
8 I think there's more data on this system than most
9 any I've seen. But there's still enough noise in it
10 that you can't say a lot, except that it's not
11 significantly different.

12 It's going to be difficult to see
13 an improvement without multiple years of sampling at
14 all of these sites. The closest thing you've got is
15 the MWRD data, and it's really not showing an
16 improvement.

17 MS. WILLIAMS: Okay. Question E --
18 I'm going to move on. I think you've answered C and
19 D.

20 MS. FRANZETTI: If you can give us
21 just a moment. I'm sorry, Counsel. You can
22 proceed.

23 MS. WILLIAMS: Skipping on to Question
24 E, which is referencing the bottom of Page 9 of

1 Attachment 1, asks how do you conclude from these
2 studies that, quote, "It is likely that depositional
3 sediments are not being cleaned out, tabbed, or
4 significantly degraded?"

5 DR. BURTON: I state this because the
6 contaminant levels are roughly similar to what they
7 were 15 years ago.

8 I should also note -- have added
9 that another scenario that may be occurring in the
10 waterways is contaminated sediments are being
11 flushed out, and the areas are then being
12 recontaminated from continuing or new sources of
13 discharges into the system.

14 MS. WILLIAMS: Question F asks, "Isn't
15 it true that most samples were lower in 2008 than in
16 1994 through 1995?"

17 DR. BURTON: No, most of them were not
18 in the EA study.

19 MS. WILLIAMS: G, you state at the top
20 of Page 10 of Attachment 1 that, quote, "For the
21 detected metals, the sediment quality has remained
22 the same or degraded in several areas," end quote.

23 Did more samples degrade or
24 improve, and how do you define "remain the same" in

1 this context?

2 DR. BURTON: It's shown as Table 11 of
3 the EA 2008 report and summarized at Page 12 for the
4 detected metals. The majority of detected
5 concentrations are either higher or within a factor
6 of two or less, indicating that overall sediment
7 quality has essentially remained the same or has
8 degraded in several areas.

9 Also, as stated on Page 12 of the
10 report, when environmental samples are compared
11 using the weight of evidence approach, a factor of
12 two is generally a rule of thumb that is used to
13 determine if sample concentrations are similar when
14 doing a comparison. For sediment samples with
15 mental concentrations that exceeded the TEC or PEC
16 concentrations in 2008 are often less than a factor
17 of two compared to the '94 or '95.

18 So for these reasons, I do not
19 agree that it would be more accurate to say sediment
20 quality has improved or stayed the same.

21 MS. WILLIAMS: When you talk about
22 using factor two -- a factor of two, can you explain
23 that again a little better or a little more fully?

24 MS. FRANZETTI: Well, do you want to

1 or, do you want Mr. Goodfellow?

2 DR. BURTON: I would ask Bill.

3 MS. FRANZETTI: That's really the EA
4 part in the sediment report.

5 MR. GOODFELLOW: Because samples are
6 not homogeneous -- it's not a solution -- it's
7 difficult to drop a ponar sample in exactly the same
8 spot, and there's actually almost no expectation
9 that it will be exactly the same. Because it's a
10 mixture, there's a chance you're going to get a
11 couple particles that have a little higher
12 concentration or even a lower concentration of
13 contaminant in that same equal volume of sediment
14 that a ponar is pulling up. A ponar is a little
15 mini steam shovel that drops into the sediment and
16 pulls a bite out of the sediment and brings it up.

17 So a factor of two or less is a
18 general rule of thumb that says if you're within a
19 factor of two, then essentially those samples are
20 the same. And, in fact, if the concentrate is
21 higher, you could argue that it could be a little
22 higher because it's also within a factor of two of
23 what it was the first time.

24 At the same time, over the 13-year

1 period, analytical detection limits, analytical
2 precision for making sure we're not making false,
3 you know, type one errors, saying something is
4 concentration and it's different slightly, have
5 improved because our analytical protection limits
6 are much better over that 13-year period.

7 So that, on top of it, makes it
8 another reason why the factor of two of comparing
9 samples is a general rule of thumb that is used
10 within the analytical and toxicological community.

11 MS. WILLIAMS: Let me see if I
12 understand what's going on in this Table 11. If
13 it's white -- if the box is white, you're saying
14 that the sample went down, decreased?

15 MR. GOODFELLOW: Correct.

16 MS. WILLIAMS: And if the box is
17 yellow --

18 MR. GOODFELLOW: Can I add to that?
19 If the box is white, it means the sample is
20 in -- the 2008 sample was lower and it was lower
21 than -- it was lower than -- how do I say
22 it -- lower than a factor of two.

23 MS. WILLIAMS: So those are the white?

24 MR. GOODFELLOW: Those are the white.

1 MS. WILLIAMS: There was at least a
2 factor of two lower. If it's yellow or
3 orange -- I'm not sure how it came out to
4 everyone -- those are the samples that you're saying
5 stayed the same because they're within a factor of
6 two?

7 MR. GOODFELLOW: Factor of two,
8 correct.

9 MS. WILLIAMS: If a box is green,
10 you're saying the sample increased, correct?

11 MS. FRANZETTI: No, that it's higher.

12 MR. GOODFELLOW: That it's higher.
13 It's a higher concentration than it was in the 1990
14 study.

15 MS. WILLIAMS: Is it higher by a
16 factor or two, or just higher?

17 MR. GOODFELLOW: It's just higher.
18 All I was comparing -- the whole purpose of this
19 study was to evaluate the statement that the samples
20 are getting better.

21 MS. WILLIAMS: I understand. But what
22 I'm --

23 MS. FRANZETTI: Sediments, I think you
24 mean, not samples are getting better.

1 MR. GOODFELLOW: Yeah, the sediment
2 sample concentrations are becoming less
3 concentrated -- less contaminated.

4 MS. WILLIAMS: But what I want to get
5 at, Mr. Goodfellow, is I think your analysis is very
6 biased. Because if your sample was less than a
7 factor of two lower, you didn't consider it getting
8 better. But if it was higher, even by a teeny tiny
9 amount, you're identifying it as being higher.

10 Wouldn't you say that a lot of
11 these greens should actually be yellow in order to
12 make an unbiased presentation to say that they're
13 staying the same?

14 MS. FRANZETTI: That wasn't the
15 purpose --

16 MR. GOODFELLOW: Yeah, agreed. That
17 wasn't the purpose of the study. Your assessment is
18 moot, because we were -- whether it's beige or
19 green, if it was colored that meant it was virtually
20 the same or worse.

21 MS. WILLIAMS: Okay.

22 MR. GOODFELLOW: So it really doesn't
23 matter. I was just -- all I was trying to say is
24 these samples -- I wasn't even making a statement

1 that it was worse saying these samples in that
2 13-year period have not improved.

3 MS. WILLIAMS: Okay. Well, I don't
4 think that's how this visual presentation --

5 MR. GOODFELLOW: It's how it was
6 stated in the narrative. It stated that in the
7 narrative.

8 MS. WILLIAMS: So the question in
9 number -- well, that's fine. I understand. I just
10 want to make sure it was clear to the Board that
11 you're interpreting both colors in the same way, and
12 it just means it hasn't improved, correct?

13 MR. GOODFELLOW: Correct.

14 MS. WILLIAMS: That's fine.

15 MR. GOODFELLOW: A colored box meant
16 that samples indicated that there was -- minimally,
17 there was no improvement to it could have been
18 slightly worse, and a white box meant it was better.
19 And from the -- in the chart, it's primarily colored
20 with very little white.

21 MS. WILLIAMS: But your table does not
22 mean where it's green you've concluded the sediments
23 got worse?

24 MR. GOODFELLOW: I wasn't making a

1 statement that green was worse, other than refuting
2 the statement that it was improving.

3 MS. WILLIAMS: Question H asks --
4 Question H of 52, "Do sediment levels need to
5 improve in the Brandon Pool for the CAWS and Brandon
6 Pool aquatic life use B designations to be
7 attainable?"

8 DR. BURTON: I'm not sure I understand
9 the meaning of the proposed aquatic life use B
10 designation sufficiently to be able to form an
11 opinion in response to this question. I would need
12 a clear explanation of just what the proposed
13 designation means, in terms of what the waterway's
14 aquatic life support level is supposed to be.

15 However, if the proposed aquatic
16 life B designation is intended to reflect the
17 existing aquatic life community that is present in
18 the Brandon Pool, then I would conclude the sediment
19 levels do not need to improve to support the
20 existing community.

21 MS. WILLIAMS: Question 53, you state
22 on Page 7 of your testimony and Page 8 of Attachment
23 1 that, quote, "There are no known plans to remove
24 contaminated sediments in the UDP area."

1 The question asks, "What do you
2 consider the Upper Dresden Pool area " -- I hope
3 we've already addressed that -- but it asks, "Are
4 you aware of any plans to cap contaminated sediments
5 in the Chicago Sanitary and Ship Canal or the South
6 Fork of the South Branch of the Chicago River?"

7 MS. FRANZETTI: And I think you should
8 clarify a bit. Do you mean plans just has anyone
9 talked about it, or do you mean plans that are going
10 to be implemented?

11 MS. WILLIAMS: If he's heard of
12 either.

13 MS. FRANZETTI: Okay.

14 DR. BURTON: I'm aware of the
15 testimony of Ms. Wasik (phonetic) for MWRD seeing
16 some plans on the books to sediment cap parts of the
17 CAWS. Engineers have determined it's not possible
18 in the Bubbly Creek area, besides the mouth. The
19 District is involved in some wetland projects off
20 the Ship Canal with some capping. The CAWS itself
21 is a similar project that would impact flood control
22 function, so caps are not really feasible there.

23 I'm also aware of Dr. Melching's
24 (phonetic) testimony in the proceedings that the

1 CAWS areas, which includes the Ship Canal and South
2 Fork, capping would create problems in the
3 system -- other problems.

4 MS. WILLIAMS: So do any of the
5 testimony that you reviewed, if it was implemented,
6 would it change any of your conclusions if any of
7 those plans were implemented or ideas were
8 implemented?

9 MS. FRANZETTI: Well, just objection
10 in the sense of he's pointed out that several of
11 those plans have been found to be essentially not
12 feasible.

13 MS. WILLIAMS: Some of them. Not all
14 of them, though, right?

15 MS. FRANZETTI: Not all of them, but I
16 just want to clarify that his answer already said
17 it's not going to happen, so it's not going to
18 effect his opinion.

19 MS. WILLIAMS: If it did happen, would
20 it change your opinion?

21 DR. BURTON: So as to whether plans
22 would change any of the conclusions, we've
23 already -- reversibility of impacts to aquatic life
24 from contaminated sediments in the CAWS or Lower Des

1 Plaines, it would depend on a number of things, such
2 as how extensive the capping was going to be, would
3 it be sufficient to make a significant improvement
4 on the degree that sediments are a stressor, and how
5 well the plans, once they're implemented, are -- how
6 well those caps are actually stopping that exposure
7 to the contaminants, which is a tricky issue.

8 Because of the extensive sediment
9 contamination that we've talked about, the cost of a
10 capping system is very high, and I doubt there are
11 any so-called plans that would likely change my
12 opinion for capping because of these issues.

13 Capping technology in a system
14 like this would be very difficult. And as the
15 previous experts noted, it would actually change the
16 hydraulics. You can't just fill the system up with
17 sediment, because the hydraulics will wash it out.
18 So it would be very difficult to get caps in there
19 that can actually stay in place.

20 MS. WILLIAMS: I'm going to skip 54.
21 On Page 7, you state, "Further, the fact that the
22 2008 sediment survey reveals highly contaminated
23 sediments similar to what I observed in the mid '90s
24 strongly suggest that depositional sediments remain

1 significantly degraded and are not being reduced,
2 contrary to Illinois EPA's assumption that the
3 sediment quality in the Chicago Sanitary and Ship
4 Canal and Dresden Island Pool are improving."

5 What statistical -- this is not a
6 pre-filed question it's just follow up from -- I
7 think you've answered parts of the pre-filed
8 question already. What statistical quantitative
9 analysis was performed to reach this in-conclusion,
10 or was there any statistical quantitative analysis
11 performed?

12 DR. BURTON: There's really no
13 statistics that could be used in this data. You
14 don't have a measure of variance at every site.
15 There's just too much variability. The data are not
16 distributed homogeneously, so that's why we're using
17 crude things like a factor of two. If we could do
18 statistics that were meaningful, we would do them.

19 MS. WILLIAMS: Question D asks -- I'm
20 not sure if you've answered all of this -- "Did you
21 collect sediment samples in the sanitary and Ship
22 Canal?" I believe the answer is yes, correct?

23 DR. BURTON: I did. The EA study did
24 not.

1 MS. WILLIAMS: Did you conduct an
2 analysis that compared current and historic sediment
3 conditions in the Sanitary Ship Canal? So that part
4 is no?

5 DR. BURTON: No.

6 MS. WILLIAMS: Okay. You state on
7 Page 8, Paragraph 1, that, quote, "Based on my
8 experience, most depositional sediments that are
9 acutely toxic are located in areas as suitable as
10 fish habitat."

11 Which areas of sampling sites do
12 you refer to in this quote?

13 DR. BURTON: Of the EA 2003 habitat
14 evaluation of Dresden Pool, it was found
15 sedimentation was moderate to severe in about
16 70 percent of the areas where the QHEI scores from
17 calculated. Their 2008 study found a similar
18 percentage of locations were moderately to severely
19 impacted by sedimentation.

20 So sedimentation appears to have
21 gotten worse over the last five to ten years in some
22 areas, such as the DuPage Delta. In my '95 study,
23 it was found that toxicity varied among the pools
24 and habitat types in the river. Differences were

1 correlated with sedimentation patterns, so we got a
2 lot more toxicity associated with the clay type
3 sediments or depositional sediments. They tended to
4 be at the tributary mouth in the back water areas
5 the protected areas of the main channel, bordered
6 habitat, especially the Lockport and Brandon Pools.

7 Some of the highest levels of
8 toxicity were found in Brandon Road Lock and Dam in
9 the tail waters, which we've already talked about.
10 The contaminated sediment depositional area provided
11 one of the primary sources of potential habitat for
12 the fish community. As such, fish are likely to be
13 exposed to whatever contamination exists in these
14 areas.

15 In contrast, sediments collected
16 from the main channel habitat or the power plant
17 intakes and discharges generally have very little
18 sediment toxicity, and these areas are not a good
19 aquatic habitat.

20 MR. ETTINGER: Can I ask one question?
21 You mentioned the DuPage Delta. Is it relevant?

22 DR. BURTON: I mentioned it because
23 it's part of this system.

24 MR. ETTINGER: It's not actually

1 within the segment that we're looking at.

2 DR. BURTON: I understand, but the
3 fish don't know that, and they swim up and down past
4 I-55.

5 MR. ETTINGER: Thank you.

6 MS. WILLIAMS: I'd like to ask
7 Question D of 56. "Are you familiar with the data
8 collected by EA that found larval fish to be present
9 within and below this riffle area?" And by "this
10 riffle area," it's referring back to the previous
11 question, the Brandon tail waters, I believe.

12 DR. BURTON: I've not studied the EA
13 data regarding larval fish. It's my general
14 understanding that just because larval fish are
15 found, it doesn't mean that the subject area doesn't
16 have a sediment contamination problem. If you
17 remember the testimony earlier by Mr. Seegert, they
18 float down stream and tend to stop in the
19 depositional areas.

20 MS. WILLIAMS: I think we've answered
21 57. I'm going to move on to 58. Please provide the
22 documentation you are referring to on Page 6 of your
23 pre-filed testimony with respect to strong
24 correlations between fish tissue, consumption

1 advisories, and sediment contamination.

2 DR. BURTON: This, again, kind of like
3 urban runoff impacts, is one of those widely
4 accepted relationships that exist. 41 of the 42
5 areas of concern in the great lakes are because of
6 fish advisories, and they're directly related to the
7 contaminated sediments that exist there.

8 The USEPA's National Sediment
9 Inventory and other EPA guidance documents also note
10 the contaminated sediments are likely contributing
11 to not only fish tissue advisories, but DELTs, high
12 levels of fish deformities, erosions, lesions, and
13 tumors.

14 MS. WILLIAMS: Question 59 asks you to
15 explain photo-induced toxicity and whether you
16 measured photo-induced toxicity in either the upper
17 Dresden Island or Brandon pools.

18 DR. BURTON: When ultraviolet light,
19 which is in natural sunlight, strikes some of the
20 larger PAHs, such as fluoranthene, anthracene
21 phenanthrene, very, very common PAHs, that have
22 passed through the membranes of organisms.

23 So these things are lipophilic.
24 They pass through the outer membrane of the

1 organism, and then when sunlight hits that, they
2 form an oxygen radical, which is very, very
3 destructive cellular tissue.

4 So if I have a sediment sample
5 with PAHs in it, and I have fathead minnows swimming
6 around in a beaker, if I'm standing in here there
7 will be no problem, unless there's incredibly high
8 levels of PAHs. But if I was to walk outside, and I
9 wasn't in Chicago, when the sun was shining, within
10 seconds that fish would die and sink to the bottom
11 because this phenomenon occurs so quickly.

12 So it just takes a short exposure
13 to sunlight if they've been exposed to PHs. And
14 we've shown this phenomena and multiple people have
15 shown this phenomena to the part per trillion levels
16 of PAHs, which means virtually every urban waterway
17 will have PAH toxicity if sunlight is hitting
18 organisms when they've been exposed to PAHs.

19 MS. WILLIAMS: Did you say whether
20 you've measured photo-induced toxicity, or you're
21 saying it would incur everywhere?

22 DR. BURTON: Well, we demonstrated in
23 my report that I submitted as occurring in the
24 system.

1 MR. ETTINGER: I'm sorry. You
2 testified specifically with regard to fathead
3 minnows?

4 DR. BURTON: Yes. It occurs with
5 multiple species, though.

6 MR. ETTINGER: Fathead minnows are
7 relatively insensitive. You can pretty much hit
8 them with a sledgehammer, can't you?

9 DR. BURTON: Well I'm talking larval
10 fathead minnows, and that's part per trillion levels

11 MR. ETTINGER: Okay. So would this be
12 true with every species?

13 DR. BURTON: Most species I've seen
14 tested it's been true of. It's all the way to
15 lumbriculus worms, which can be quite happy in these
16 sediment samples we brought.

17 MR. ETTINGER: Okay. So there's no
18 limitation on the species that you would be expected
19 be affected by this phenomenon?

20 DR. BURTON: I don't think so.

21 MR. ETTINGER: And that wouldn't
22 differentiate between carp and rainbow trout?

23 DR. BURTON: I think it would probably
24 only be an issue at the larval stage with species

1 like that.

2 MR. ETTINGER: Thank you.

3 DR. BURTON: Which might not be a bad
4 thing.

5 MR. ETTINGER: Well, it depends on how
6 you feel about carp and rainbow trout.

7 MS. WILLIAMS: Roy is saying I should
8 ask you, don't most larvae just die anyway in
9 general in nature?

10 DR. BURTON: Well, I don't think I
11 need to refer to Mr. Seegert. We don't want to add
12 more stressors, do we? They're already dying
13 anyway.

14 MS. WILLIAMS: Is the water column
15 capable of attenuating photo-induced toxicity?

16 DR. BURTON: Certainly. And the good
17 thing about our system here is that it can be turbid
18 at times. And if there's turbidity, this phenomenon
19 does not exist. You have to have clear water.

20 MS. WILLIAMS: So we're not too
21 worried about that?

22 DR. BURTON: Well, I think the IEPA is
23 saying that turbidity and TSS is not a problem in
24 this system. So I think you would have to worry.

1 MS. WILLIAMS: Where did we say that?

2 MR. ETTINGER: The fact that they say
3 something doesn't make it true.

4 DR. BURTON: No, I think we all know
5 that there's clear water in this system at times.
6 And particularly when we get off the main channel
7 where there's less barge traffic, you can get clear
8 water. The Brandon tail waters is a perfect example
9 because it's so shallow.

10 MS. WILLIAMS: I'm not sure if we
11 answered question 60, I guess. I think you were
12 talking about lab studies. Have any in situ
13 toxicity studies been conducted to assess
14 photo-induced toxicity and whether it's actually
15 occurring in the Lower Des Plaines River?

16 DR. BURTON: I must admit right now
17 I'm forgetting whether I did some of these studies
18 in situ or in the lab. We did these studies, but
19 they may have been done in the lab with samples from
20 the system. The study by Maylor et al., 2010,
21 showed PAHs with a dominant stressor. So it raises
22 the concern for this phenomenon.

23 MS. WILLIAMS: I think 63 was the
24 question I was looking for earlier, so let me make

1 sure that I've already asked it. I wish I would
2 have asked it this way. There's a few new things in
3 here.

4 Question B, "Were sediment samples
5 taken from the same locations in all years?" I'm
6 not sure if Mr. Goodfellow already answered that or
7 not.

8 MS. FRANZETTI: In all years -- a
9 little clarity here. As between the 1994/95 survey
10 and the 2008 EA?

11 MS. WILLIAMS: Yes.

12 MS. FRANZETTI: Okay. And so you're
13 asking were all the same locations sampled in both
14 surveys?

15 MR. GOODFELLOW: No, but there
16 was -- 18 of the samples were duplicate from
17 stations, and that's what is in Table 11.

18 MS. WILLIAMS: The duplicates only are
19 in Table 11?

20 MR. GOODFELLOW: Yeah. It was only
21 when the same samples were evaluated in 94/95 and
22 the 2008 sampling period.

23 MS. TIPSORD: Excuse me. Is that
24 because the prior study was Dr. Burton's, which went

1 all the way to the South Branch, and EA only went to
2 the Brandon Pool -- Brandon Road?

3 DR. BURTON: Right.

4 MS. FRANZETTI: I mean, I will add it
5 was -- in part influenced by two things really. It
6 was -- we felt the MWRD's data was pretty well
7 covering north of Brandon Road Lock and Dam area.
8 And so to conserve our resources but get more
9 sampling locations in Dresden Pool area, we focused
10 more on that in the 2008 sediment survey work that
11 was done, where there was not -- really, since 94/95
12 there wasn't that much, other than the USEPA data.

13 MS. WILLIAMS: Question D, I'd like to
14 ask from that one. Does a chemical decline or
15 increase correlate to a decline or increase in the
16 bioavailability of that chemical?

17 DR. BURTON: Not necessarily.

18 MS. WILLIAMS: Question F asks about
19 other factors that effect the bioavailability of
20 metals. And you may have discussed this already,
21 but if you want to answer it --

22 DR. BURTON: Yeah, I think we did. As
23 acid volatile sulfides, organic carbon, iron and
24 manganese, oxides. All of those things are

1 important, but those are mainly important for
2 metals. The only one that is important for organics
3 would be organic carbon.

4 MS. WILLIAMS: And did you evaluate
5 acid volatile sulfides?

6 DR. BURTON: No, we did not, because
7 the 94/95 study was really done before AVS was an
8 accepted approach, and we wanted to compare back to
9 that.

10 MS. WILLIAMS: Question 64, you state
11 on Pages 12 to 13 of appendix C that, quote, "Based
12 on the results in Table 11, it is our opinion that
13 the differences are not improvements of the sediment
14 quality, but rather improvements in detection
15 limits."

16 I think this was mentioned
17 earlier, but I'm not sure you answered. How many
18 samples fall into this category, and for which
19 parameter does the change in methodology impact the
20 results?

21 DR. BURTON: Since that was done by
22 the EA report, I'll let Mr. Goodfellow answer that.

23 MS. WILLIAMS: Okay.

24 MR. GOODFELLOW: For most of the PAHs,

1 the samples fall into this category. If you look at
2 the report from 1994 to '95 results for PAHs, for
3 most of them the reported values are less than a
4 value that is stated in the thousands of milligrams
5 per kilogram.

6 If you look at the 2008 results,
7 the same parameters were detected in thousands of
8 milligrams, although below the higher 1994 and 1995
9 detection limits, and also were detected in hundreds
10 of milligrams per kilogram. So in affect, we could
11 see lower concentrations in the 2008 period.

12 MS. FRANZETTI: Bill, you might just
13 give an example of that using Table 11.

14 MR. GOODFELLOW: For example, for --

15 MS. FRANZETTI: Give the sample
16 location number.

17 MR. GOODFELLOW: Sure. For
18 acenaphthylene, for example, in the 1994 and 1995
19 sample in Brandon Lock and Dam, 08-03, the detection
20 limit was 45,000 milligrams per kilogram. In the
21 new round, it was 1,500 in the 2008.

22 So that's -- and those compounds
23 are, you know, not that much different, you know,
24 for all the samples. I just pulled the one that was

1 the last one on the chart.

2 MS. FRANZETTI: And so that means that
3 in the 94/95 sampling, all they could say was the
4 level at which -- can you say it?

5 DR. BURTON: Acenaphthylene.

6 MR. GOODFELLOW: Acenaphthylene.

7 MS. FRANZETTI: Thank you. The level
8 of it couldn't be detected above 45,000 milligrams
9 per liter? It might have been there --

10 MR. GOODFELLOW: It definitely doesn't
11 say that -- it could easily, in 94/95, been 1,500.

12 MS. FRANZETTI: Right.

13 MR. GOODFELLOW: But all we could say
14 is it was less than 45,000.

15 MS. FRANZETTI: And in 2008 you could
16 pinpoint it --

17 MR. GOODFELLOW: Correct.

18 MS. FRANZETTI: -- at 1,500 or above?

19 MR. GOODFELLOW: Correct.

20 MR. ETTINGER: Have you tried to look
21 at any of the data from site to site here and figure
22 out what might have happened at these particular
23 sites?

24 MR. GOODFELLOW: That's really why we

1 put it on a graphical basis on the aerials. Because
2 of the complexity of sediments moving a little bit
3 here and there down streams and such, we just wanted
4 to see the overall concentrations and how
5 they -- you know, the degree of contamination.

6 So what you see when we looked at
7 the exhibits -- and I cannot remember the exhibit
8 numbers --

9 MS. FRANZETTI: 377 and 378.

10 MR. GOODFELLOW: Right, which are the
11 blowups of that, is that there's -- when there is
12 contamination, it's clustered for when they are the
13 red or they exceed the probable effect
14 concentrations, and also that largely they, at
15 least, were above the threshold concentration --
16 effect concentration levels for most of the samples,
17 for metals as well as PAHs and PCBs.

18 MR. ETTINGER: But for some of these
19 sites, I mean, just looking at -- eyeballing it,
20 DR 8-30 and DR 8-05 seem like they've improved a
21 lot, and there's some other sites that
22 look -- well, DR 8-20, eyeballing it, it seems like
23 it got a lot crummier. And do we have any idea why
24 that is?

1 MR. GOODFELLOW: The hypothesis that
2 we were using was whether there was a change. We
3 weren't really trying to do a forensic
4 identification line, or at least I didn't. We would
5 have had to collect a lot more samples and a lot
6 more data for other compounds.

7 DR. BURTON: I think that's a key
8 statement. If we, in 94/95, at each site had
9 collected maybe at least five sediments from a small
10 area so that we knew what the spatial variation was
11 at that site, then in 2008 we had done the very same
12 thing, we might be able to statistically say
13 something about the difference. But right now, we
14 don't know the variance around every graph sample.

15 MR. ETTINGER: But really it would be
16 best to, sort of, interpret this chart as a whole --

17 DR. BURTON: Exactly. It's the only
18 way you can.

19 MR. ETTINGER: -- and not make
20 conclusions about particular sites.

21 DR. BURTON: Because maybe at Brandon
22 Road Lock and Dam you'll get a variance of ten fold
23 at the same area. We don't know that, so we really
24 have to look at the big picture.

1 MR. GOODFELLOW: And that largely was
2 the reason I went with the color interpretation, to
3 just give that immediate visual of the entire data
4 set, rather than just focusing on one station versus
5 another station.

6 MS. FRANZETTI: And once again, the
7 purpose was to rebut the statement that was made
8 earlier in this proceeding by the Agency, that it
9 believed the contamination in the sediments was
10 improving because there have been greater controls,
11 I believe was the cited reason on point source
12 discharges, and we doubted that that was the case
13 with regard to sediments.

14 So we went out here and did some
15 more sediment sampling in Upper Dresden Island Pool
16 to see whether or not it did generally support that
17 statement. And as they've said, they don't believe
18 it does, that they're about the same as they used to
19 be 15 years ago.

20 MR. ETTINGER: In the system as a
21 whole?

22 MS. FRANZETTI: In the system as a
23 whole.

24 MS. TIPSORD: This is probably a good

1 time to call it a day. It's about ten minutes to
2 5:00, and I think we're all growing weary. So let's
3 break up. We'll see you all at 9:00 o'clock
4 tomorrow morning.

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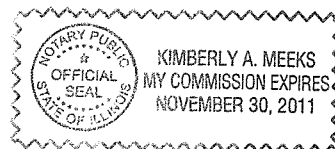
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9 the taking of said hearing, and that the foregoing
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11 notes so taken as aforesaid, and contains all the
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