

IN THE MATTER OF:)
)
 WATER QUALITY STANDARDS AND)
 EFFLUENT LIMITATIONS FOR THE)
 CHICAGO AREA WATERWAY SYSTEM)
 AND THE LOWER DES PLAINES RIVER;) No. 08-9
 PROPOSED AMENDMENTS TO 35 ILL.)
 ADM. CODE PARTS 301, 302, 303)
 AND 304.)

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Pollution Control Board

TRANSCRIPT OF PROCEEDINGS held in the
 above-entitled cause before Hearing Officer
 Marie Tipsord, taken before Sharon L. Berkery,
 CSR, at 160 North LaSalle Street, Room 9-031,
 Chicago, Illinois, on the 14th day of August, A.D.,
 2009 commencing at 1:40 p.m.

1 APPEARANCES:

2

3 ILLINOIS POLLUTION CONTROL BOARD

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6 Mr. Shundar Lin, Board Member

7 Ms. Alisa Liu, Environmental Scientist

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21 appeared on behalf of ELPC, Prairie Rivers

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11 Chicago.

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23 REPORTED BY: SHARON BERKERY, C.S.R.

24 CERTIFICATE NO. 84-4327.

1 MR. ETTINGER: For those of us who
2 want to try and set a new record for number
3 of exhibits, you'll be thrilled to hear that
4 I have here a compilation of what I think is
5 the natural history data that Dr. Thomas
6 referred to earlier.

7 MS. TIPSORD: Okay.

8 MR. ETTINGER: And I just want to show
9 you that and ask you what this is.

10 DR. THOMAS: Yeah, this is -- I think
11 I mentioned in my testimony this morning, the
12 Natural History Survey has been doing
13 long-term monitoring of the Illinois waterway
14 using electrofishing gear since 1957. And
15 these -- they have a couple stations in the
16 Starved Rock Pool the Marseilles Pool and
17 Dresden Island Pool.

18 And this is a compilation of the
19 species and some of the numbers that they've
20 collected over these years from the three
21 pools. So, because I referenced this in
22 terms of the data on the Dresden Pool versus
23 a couple of these others, I thought it might
24 be good to enter this into the record.

1 So this is from the Illinois
2 Natural History Survey Long-Term
3 Electrofishing Monitoring Program. It's gone
4 from 1957 to 2007.

5 MR. ETTINGER: And this mixes all of
6 the numbers together for all of those years?

7 DR. THOMAS: It's sort of a sum total,
8 so...

9 (WHEREUPON, the document was
10 tendered.)

11 MS. TIPSORD: If there's no objection,
12 I will enter this chart, that has across the
13 top Starved Rock Marseilles and Dresden and
14 then species name, as Exhibit 329.

15 Seeing no objection, It's Exhibit
16 No. 329.

17 (WHEREUPON, a certain document was
18 marked Exhibit No. 329 for
19 identification, as of 8/14/09.)

20 MS. TIPSORD: And with that, then, I
21 think we're ready to start with Mr. Andes.

22 DR. DAVID L. THOMAS,
23 called as a witness herein, having been
24 previously duly sworn and having testified,

1 was examined and testified further as
2 follows:

3 EXAMINATION (Resumed)

4 BY MR. ANDES:

5 Q. Good afternoon, Dr. Thomas.

6 A. Good afternoon.

7 Q. Let's start with the first question.

8 Have you conducted any habitat
9 studies in the CAWS?

10 A. Other than -- none, other than what I
11 explained this morning, in terms of a boat trip that
12 I had taken in the early 1990s, looking at the
13 potential for improving habitat in a portion of the
14 CAWS.

15 Q. And to clarify, in terms of that
16 particular event, as I understand it, it simply
17 constituted one boat trip up a segment of the CAWS,
18 from Stickney North, you said --

19 A. Correct.

20 Q. -- in which you pointed out some
21 habitat improvement options?

22 A. Correct.

23 Q. And there wasn't any report generated
24 as a result of that trip?

1 A. That's correct.

2 Q. Okay.

3 Question No. 2.

4 MR. ETTINGER: I'm sorry. If that's
5 his study, maybe the trip -- the more recent
6 trip is also a study. Do you want to...

7 THE WITNESS: Yeah, I mean, I --

8 BY MR. ANDES:

9 Q. You didn't study, but --

10 MR. ETTINGER: I don't either. That's
11 why I was just saying, if you're looking for
12 formal studies, I think you've got your
13 answer.

14 MR. ANDES: Okay. I just wanted to
15 clarify --

16 THE COURT REPORTER: Please don't talk
17 on top of each other.

18 MR. ANDES: We've been doing that for
19 15 years.

20 Okay. I think we understand this
21 trip, we understand that there have not been
22 any studies.

23 MR. ETTINGER: Fine.

24 MR. ANDES: Thank you.

1 BY MR. ANDES:

2 Q. Can you explain the similarities for
3 common features for the large rivers in which you've
4 worked, including the Kaskaskia and the Lower
5 Delaware, have with the CAWS?

6 A. Yes, there are large stretches of the
7 Kaskaskia River, particularly from the middle
8 stretches on down, and also on the Lower Delaware
9 River that are deep water. The Lower Delaware River
10 is for major navigation, so there are huge ships
11 that utilize that area.

12 The bottom is a silt and clay
13 bottom, very low, and macroinvertebrates number in
14 density. The Chesapeake and Delaware Canal that I
15 worked in was an artificial waterway designed for
16 barge and boat traffic between Upper Delaware Bay
17 and the Delaware River Upper Delaware Bay. So those
18 are some of the similarities probably.

19 Q. Number 3. In Section 2 of the
20 testimony, you state that "I've evaluated fish
21 habitat using many of the parameters of the QHEI and
22 have reviewed how QHEI has been used in Ohio. I
23 believe it is a sound methodology for assessing
24 physical habitat."

1 First question, where have you
2 evaluated fish habitat?

3 A. As I mentioned, the Kaskaskia River,
4 the Lower Delaware River and its tributaries, the
5 Maluka River in Great Bay in New Jersey. I
6 mentioned the Chesapeake and Delaware Canal, the
7 Lower Susquehanna River, Hudson River, Raritan River
8 and Bay, Schoharie Creek in New York State and an
9 associated pump storage reservoir. And some smaller
10 streams in New England for a small hydro project.
11 So those are some varieties.

12 Q. Now, in which -- and in those fish
13 habitat evaluation projects, on which ones did you
14 use the QHEI as a tool?

15 A. We did not use QHEI in any of those.
16 We were looking at the fish species that were
17 utilizing those areas, and what -- and how their
18 habitat requirements were being met. But we did not
19 use this methodology for assessing habitat.

20 Q. Any particular reason why not?

21 A. Well, the QHEI is really sort of a --
22 it's sort of a rapid assessment tool, and it's
23 really not needed if you're doing more detailed
24 studies of a waterway. But it gives you a good

1 overview, and it's a nice way to compare between
2 stations, because you have at least a number you can
3 use.

4 Q. So it's more of a rapid assessment
5 tool?

6 A. Correct.

7 Q. So when you say it's a sound
8 methodology for assessing physical habitat, do you
9 mean in the sense of being a rapid assessment tool?

10 A. Yeah, and also it gives you a number.
11 At least you can relate to something and you can
12 compare sites, you know. If I did it as a verbal
13 description, it would be hard to compare two
14 different sites or two different rivers.

15 So this gives you some index to
16 make those kinds of comparison. It would be hard
17 without coming up with a numerical index.

18 But the studies I did were never
19 designed to sort of see how they might compare
20 between two systems or...

21 Q. Would you use a QHEI as the basis for
22 establishing designated use categories?

23 A. My impression was it was used more for
24 that, which I was never involved in doing, like a

1 regulatory study, where you're trying to assign
2 water quality. I mean, I was more interested from
3 the fish perspective and what habitats they're using
4 and from their life history requirement, so -- which
5 would have been one of the reasons I wouldn't have
6 been involved in using this methodology.

7 Q. So you're saying that -- correct me if
8 I'm wrong -- that it's a rapid assessment tool, and
9 yet, what we're discussing here is using it to
10 establish use categories which will ultimately be
11 used to establish water quality stands and
12 enforceable requirements.

13 Is it appropriate to use a rapid
14 assessment tool to establish enforceable
15 requirements?

16 A. Well, there's other data being used in
17 conjunction with a QHEI. But in terms of
18 characterizing the area, I think it is a good tool
19 to use as a way to do that.

20 As a verbal description, it would
21 be much more -- much longer and much more complex.
22 But to be used strictly alone, I would say, you
23 know, you'd want to have these other kinds of data.

24 And the other data that really

1 goes with it is actually assessment of the
2 macroinvertebrate and the fish populations that are
3 using these systems. So you're using those two in
4 conjunction with each other, as well as water
5 quality data that you have.

6 Q. And then you had wanted to define
7 pretty carefully, am I right, the nature of those
8 communities and how they would be improved by
9 changes that are required? When you talk about
10 information on fish and macroinvertebrate
11 communities, you're talking about defining the
12 community and how it would change if certain things
13 were done; am I right?

14 A. Well, I'm not sure. Most studies are
15 designed to look at the response that might be done
16 to the changes. I think, when you get involved in
17 habitat restoration projects or mitigation projects,
18 you are specific -- excuse me -- specifically
19 looking, in those cases, at improving the habitat
20 for certain species. So I am involved in some
21 projects along the Illinois River and improving
22 floodplain pool habitat. And those are designed to
23 improve the habitat for certain species.

24 Q. But if we're talking in this

1 rulemaking about improving the fish community -- and
2 I think I've heard you say, and certainly, this is
3 in the Illinois EPA documents -- the supposition
4 that improving water quality here will lead to an
5 improvement in the fish community. Am I right?

6 A. Uh-huh.

7 Q. So let's put aside the habitat agent
8 for a minute. Don't you need to define that
9 community in order to then define what improvement
10 will occur if you change water quality?

11 A. Well, I think we have defined the
12 community. I mean, I think it's the result of all
13 the studies that have been done there, the fish
14 populations that are there.

15 Q. So can you tell me from the record in
16 this case -- and I assume you've read all the
17 testimony?

18 A. All of it.

19 Q. Can you define for me what the fish
20 communities are or look like in Use A and Use B
21 Waters and how they will change if these water
22 quality standards go into effect?

23 A. I'm trying to make sure I -- I'm not
24 positive I understand your question.

1 Q. Isn't that the purpose of changing the
2 water quality standards that changes in the
3 standards will lead to an improvement in the fish
4 community and the macroinvertebrate community?

5 A. That's correct.

6 MR. ETTINGER: I object, insofar as
7 you're asking a scientist the purpose of a
8 legal proceeding. So if that's what you're
9 doing, I have problems.

10 MS. TIPSORD: He's actually already
11 answered the question.

12 MR. ETTINGER: I understand. I just
13 don't want to go too far down that road.

14 MS. TIPSORD: I understand.

15 MR. ETTINGER: Because he's not an
16 expert on weighing relevance or what is
17 proper testimony in a UAA proceeding.

18 BY THE WITNESS:

19 A. But I can say that -- and one of the
20 things I relied on for the Chicago area waterway was
21 the -- I think it's Attachment M3, the study of
22 fisheries, resources, and water quality in the
23 Chicago Waterway System 1974 through 1996. So that
24 covers a pretty broad stretch of time.

1 And one of their conclusions in
2 that report was that, as water quality is improved,
3 they have seen an improvement in the fish
4 population. So I think the answer to your question
5 is, yes, there is an expectation that, in these
6 systems, as water quality has improved, that we are
7 seeing a response by the aquatic community to those
8 improvements.

9 BY MR. ANDES:

10 Q. Let me ask you then, if water quality
11 has improved, based on changes, such as the
12 District's implementation of TARP, would you
13 suspect -- put aside this rulemaking for a minute --
14 wouldn't you expect water quality to continue to
15 improve due to those actions, including further
16 actions that are going to take place in TARP, such
17 as --

18 A. I would think -- yeah, to the degree
19 that storm water runoff is further reduced. And the
20 record does document that some of the negative
21 effects from large runoff events, that, to the
22 degree that they're reduced, I would expect that
23 that would help the aquatic community.

24 Q. So the aquatic community would be

1 improving anyway, even if this rulemaking doesn't go
2 forward?

3 A. I can't draw that conclusion.

4 Q. I know that, but -- let's move on.

5 Going back to the QHEI for a
6 minute. Are you aware of to what extent it can or
7 it should be applied to low gradient artificial
8 channels?

9 A. Well, it has been applied in large
10 rivers, and Ohio moved to adopt it to large river
11 systems that are lower gradient. As I thought about
12 this, though, and how it's used, I -- my feeling
13 is -- and what I testified this morning was that I
14 think it may underestimate the available habitat,
15 particularly for fish as you go to a larger river
16 system.

17 Q. I didn't ask about large river
18 systems, I asked about whether it's appropriate to
19 apply to low gradient artificial channels. Not size
20 of the system.

21 I'm talking about low gradient
22 artificial channels. Are you aware of any
23 information showing that it's appropriate to apply
24 QHEI to that kind of water body?

1 A. I think you can and it has been. I'm
2 not sure I can say much more than that, so...

3 Q. Let me skip down a little farther in
4 Question 3, to 3M. And we'll go back to this issue
5 in a number of ways.

6 Can you explain to me what the
7 similarities and differences are in physical
8 characteristics between the upper Dresden Island
9 Pool and the CAWS in waterways north of Romeoville?

10 A. Well, the Upper Dresden Island Pool is
11 a wider system, and it has a little bit more natural
12 shoreline.

13 Q. A little bit more?

14 A. Well, it has more -- I shouldn't say
15 little bit. It probably has more natural habitat
16 for fish.

17 I think a lot of this has been
18 described in the record, and I would agree with
19 that. You know, it's a different system, it's
20 bigger, it has more water, it has probably greater
21 _ diversity of habitats, so in a certain area that we
22 - find in much of the CAWS.

23 Q. Okay. Let's move on to No. 4.

24 In Paragraph -- Section 2

1 Paragraph 2 of your testimony it states, "Fish do
2 not need a continuous stretch of good habitat to
3 restore life functions" -- go on from there. This
4 portion of your testimony concerns the Upper Dresden
5 Island Pool, however, you later assert you'd be
6 surprised if spawning were not also occurring in the
7 CAWS.

8 Have you performed any bottom
9 surveys of the CAWS?

10 A. I haven't personally performed any
11 bottom surveys, other than what's visible from boat
12 trips on the CAWS, that you can see in the shallow
13 areas.

14 Q. Are you aware of which portions of the
15 CAWS have adequate firm bottoms for spawning, if
16 any?

17 A. I've seen some areas that would be
18 adequate for spawning.

19 Q. Where?

20 A. Shoreline habitat, Cal-Sag in a number
21 of areas, even in Chicago's --

22 Q. So through a --

23 A. Sorry. Well, at Lockport Pool.

24 I mean, we have -- which is

1 probably the poorer -- some of the poorer habitat
2 quality, but the ecological analyst data still finds
3 some spawning in that pool. And it has a few
4 species that have been captured there.

5 So even there, in the Brandon
6 Pool, there is some spawning going on, although it's
7 much more limited than --

8 Q. I'm sorry, in the Cal-Sag, have you
9 seen any evidence in this record indicating
10 spawning?

11 A. Well, look at it this way, there's --

12 Q. Well, answer the question.

13 I mean, where is there any data of
14 spawning?

15 A. Well, I'm not aware of anybody trying
16 to find -- doing it -- you know, ichthyoplankton
17 sampling. I'd be surprised if someone hasn't, I
18 just haven't seen it in the records.

19 But every one of those fish that
20 are in there, where there's a population in there,
21 when breeding season comes, they're going to spawn.
22 Now, whether they're successful or how successful
23 they are, that's another matter.

24 But to say that they're not going

1 to spawn at all when the spawning season comes, is
2 just not right. They are going to spawn.

3 Q. The question is where they spawn.

4 Is this spawning habitat, here in
5 the CAWS then, and it sounds like you're saying
6 you're not aware of any evidence -- physical
7 evidence of spawning habitat in the CAWS.

8 A. All I'm saying is I have not seen
9 anybody present ichthyoplankton data -- well, other
10 than in Lockport Pool and Brandon Pool, EA collected
11 data there, and they found larvae. I haven't seen
12 the same data for the Cal-Sag or the Sanitary and
13 Ship Canal, or...

14 Q. And your only observations of bottom
15 have been from a boat; am I right?

16 A. That's correct.

17 Q. Let's move on to No. 5.

18 On Page 2 you state that the
19 habitat in the Upper Dresden Island Pool is
20 sufficient to minimally obtain the Clean Water Act.
21 You describe your review of fish habitat information
22 to the Pool and conclude that the Pool can support a
23 more balanced and diverse fish population.

24 Based on your later testimony, you

1 also draw some conclusions about the CAWS. Can you
2 first describe what you mean by sufficient to
3 minimally attain the Clean Water Act?

4 A. Well, there's already a fairly diverse
5 fish population in that pool, and the latest exhibit
6 we put in, 329, shows that there's a lot of the same
7 species that you find in general use waters,
8 downstream in Marseilles or Starved Rock Pool. I
9 think there's room for improvement in both water
10 quality and possibly in habitat in the pool, but I
11 think that's a system, based on all the data I have
12 seen. That should qualify it to have this
13 productive habitat as other impounded river water
14 bodies in the state, so...

15 Q. And so, that's your definition of
16 attaining the Clean Water Act, is similar status to
17 other impounded water bodies in the state?

18 A. Yeah. I mean, I think I referred to
19 the UAA and felt their description of minimally
20 attained, or however they exactly worded that, I
21 tended to agree with them. I thought it could be.

22 Q. Now, did you do a similar evaluation
23 for the CAWS as you did for the Pool?

24 A. Well, I mean, I evaluated the data

1 that's been collected for the CAWS, and I agreed
2 with the basic strategy of, you know, designating
3 segments of a water body.

4 Q. Do you think that the CAWS habitat is
5 also sufficient to minimally attain the Clean Water
6 Act?

7 A. I don't think I said that.

8 Q. No, I'm just wanted to get a sense of
9 whether you think it is or not.

10 A. Well, as I testified this morning, I'm
11 not always clear that -- what is meant by a balanced
12 indigenous population in a lot of these systems. So
13 I'm -- it would be interesting to hear someone
14 explain to me what they thought a balanced
15 indigenous population would be in these systems.

16 I think the populations have been
17 improving and can continue to improve. Whether --
18 how close that they get them to Clean Water Act
19 standards, I'm not prepared to say.

20 Q. So you were prepared to say that as to
21 the Pool, but you're not prepared to say that as to
22 the rest of the CAWS; am I right?

23 A. I think there's more opportunities in
24 the Upper Dresden Pool to get closer to -- once

1 condition have been met by the balanced indigenous
2 population and the Clean Water Act -- for the
3 reasons we talked about, in terms of its size,
4 greater diversity of habitat.

5 Q. I'll move to Question No. 7.

6 You state that, "One must consider
7 the range of scores shown for an area, the
8 predominant habitat characteristics, as well as the
9 presence of various microhabitats. The fact is it
10 might be influencing QHEI scores and one's knowledge
11 of the species in the system."

12 Are you aware of any studies that
13 have been done to identify the predominant habitat
14 characteristics for various microhabitats in the
15 CAWS?

16 A. Mackey actually presents some data on
17 that.

18 Q. Okay.

19 And, are you -- you don't have any
20 reason to question the assessment that he's done to
21 date as presented in testimony?

22 A. Well, I -- I think I had issue with
23 some of his conclusions. But -- I mean, he has
24 correct me -- was his data showing some of the sonar

1 data for underwater structures and that? Because I
2 get mixed up on who presented what.

3 Q. I believe so.

4 A. Yeah. I mean, like he'd show -- I
5 think one of his show the Sunken Barge, and -- well,
6 that could serve as fish habitat.

7 He showed, you know, blocks of
8 rock and stuff that were in the canal. And all of
9 those could, and would, serve as habitat for
10 micro-organisms and macro-organisms and fish, so...

11 Q. Does the QHEI process adequately look
12 at microhabitats?

13 A. As I testified this morning, I think,
14 actually, in some of these systems, it
15 underestimates the available habitat for fish in
16 these larger systems.

17 Q. How would you -- and the concept of
18 microhabitat is one that you're talking about here,
19 but it's sort of your concept; am I correct?

20 A. Well, I think others use that concept,
21 but maybe use a different terminology. But it's --

22 Q. I'm wondering who else uses it, and
23 can we get a citation to the references?

24 A. I don't -- I'm not sure.

1 Q. How would you assess, given the
2 limitations of the CAWS, confined channels, managed
3 flows, uniformly-shaped channels, how do those
4 factor into your assessment of microhabitats?

5 A. Well, I don't think it's as uniform as
6 people made it out to be. I was actually --
7 because I was just on a recent boat trip up the
8 Cal-Sag, which I didn't get to -- when I had done my
9 earlier boat tour in the early '90s -- but I was
10 amazed by the variety of habitat that is there.

11 And there's some emergent
12 vegetation coming in now in the area. I might call
13 that a microhabitat.

14 In other words, a small area with
15 maybe gravel and sand that has some emergent
16 vegetation. That provides some very specific
17 habitat that some fish might use -- fish would use
18 for feeding, some might use for spawning.

19 It's not in that macro, or larger
20 scale habitat. But it's small, and it still may be
21 used by some species of the habitat.

22 Q. These are isolated areas you observed
23 from the boat on the Cal-Sag?

24 A. Yes. Well, actually, there was more

1 vegetation than I had expected to see. A lot of it
2 was broken off and floating in the water.

3 But I haven't seen that really
4 described in the things I read. So I was actually
5 surprised it was as much as it was.

6 Q. Broken off and floating pieces from
7 trees?

8 A. No, this is aquatic plants.

9 Q. Okay.

10 A. A filamentous plant. Which I probably
11 should know the name of, but I don't know.

12 And then, we saw other plants that
13 were emergents, growing on the bottom of the water
14 and emerging from the surface.

15 Q. Along the shoreline areas?

16 A. Near the shoreline areas, yeah.

17 Q. In Question No. 8, in Section 2,
18 Paragraph 3 of the testimony states, "That
19 temperatures present in the Upper Dresden Island
20 Pool, times during the summer, are sufficient to
21 cause avoidance and limit the carrying capacity of
22 the system."

23 Can you cite references for that
24 statement?

1 A. Well, as I think I've mentioned this
2 morning, I think it's the EA 2003 report,
3 Appropriate Thermal Water Quality -- I can't read my
4 own writing. Is it standards or something.

5 Anyway, I think it was -- I don't
6 know what the number is of that report, but I think
7 they talked about there was avoidance of areas at
8 times during the summer by some of the fish, so...

9 Q. So that particular EA report is your
10 reference?

11 A. Well, that and temperature data. I
12 mean, if you see temperature data that exceeds the
13 avoidance temperature that has been reported for
14 fish, you can assume that those species that are
15 in -- if those species are there, they probably do
16 avoid those areas during that time.

17 Q. So you're basing that, then, on
18 reviewing temperature data and avoidance
19 temperatures in the literature?

20 A. Yeah.

21 Q. Do we know if the highest number
22 temp -- if the highest number temperatures in the
23 Pool are due to thermal loading, such as power
24 production or exposure to the Pool to direct solar

1 radiation?

2 A. Well, both work in combination. I
3 mean, you have a Delta T above ambient, so that the
4 ambient goes up, the thermal discharge is going to
5 go up, unless you begin adding on cooling units and
6 so forth.

7 Q. Do temperatures in other pools and
8 lakes also increase in the summer? And if so, are
9 the temperature increases in the pool significantly
10 different than the temperature increases in other
11 pools and lakes?

12 A. Well, all water bodies will warm
13 during the summer, usually. The incident of
14 radiation and...

15 Q. You mention avoidance in your
16 testimony. Don't fish avoid unfavorable conditions
17 in natural systems?

18 A. There are times when they are
19 presented with a gradient that they will avoid in
20 natural systems.

21 Q. And if those conditions are
22 unfavorable, don't fish return when the conditions
23 are more favorable?

24 A. Yes, they should. Assuming it's not

1 in the whole lake.

2 We have had -- which I didn't
3 think of this morning in sort of response to that
4 question -- but there have been some thermal fish
5 kills, high temperature fish kills in Illinois. But
6 those have been some of the cooling ponds or lakes
7 where there's been some higher temperatures and
8 lower DO.

9 They're usually at high ambient
10 temperatures that they have occurred. And so there
11 have been fish kills associated with that in
12 Illinois.

13 But it's usually where the fish
14 don't have an escape to avoid those thermal plumes.

15 Q. When do the fish generally spawn and
16 when are the larvae young of the year present?

17 A. Well, I mean, very generally, it
18 depends on the species. Of course, some species
19 will spawn all summer and early fall, like the
20 dessert shad.

21 But, probably, May through end of
22 August is the primary spawning season for most of
23 our fish. Some are a little bit earlier and some
24 may go a little bit later.

1 Q. So how does that timing compare to
2 when summer thermal and DO events occur?

3 A. Well, there's spawning during the --
4 most of them are spawning during the warmer time of
5 the year. It's interesting when you look at the
6 data for preferred temperature in upper avoidance
7 and lethal, you find that a lot of fish carry out a
8 lot of their life history not that far -- at
9 temperatures not that far below lethal temperatures.

10 So usually it's three or four
11 degrees, between the avoidance temperature or a
12 preferred temperature and a lethal temperature. But
13 it's not as much as one might expect.

14 They carry out a lot of their life
15 history duties at fairly high temperatures, so...

16 Q. In natural systems, does the fish
17 community structure remain constant for the entire
18 year, or are there seasonal changes in the fish
19 community structure?

20 A. Well, in these systems, I mean, you
21 basically have the same assemblage of fish
22 throughout the year. You get bigger numbers in late-
23 summer and fall.

24 Because, at that time, a lot of

1 the larval fish are entering the catch, if you will,
2 if you're out there shocking or collecting in some
3 way. So you tend to get higher numbers in the fall,
4 probably lower numbers in the spring, because you
5 have some natural mortality in that first six months
6 of life.

7 So you don't get as big of numbers
8 there. But the mix of species is still about the
9 same.

10 Although, in your catch data -- if
11 you're doing electrofishing, for example, you -- if
12 fish move to deeper water, you're going to get fewer
13 of those fish. Because electrofishing gear is not
14 that efficient once you get below about four feet of
15 depth.

16 So if fish in the wintertime, for
17 instance, and they've moved to deep pools, you're
18 probably not going to get many of them sampling with
19 electrofishing gear.

20 Q. Those seasonal changes in a community
21 structure, how do those compare between the Pool and
22 other pools and lakes? Is that similar concept?

23 A. Yeah, it's a similar concept. Fish
24 tend to move -- or many fish, anyway, move to deeper

1 water during the wintertime.

2 And, actually, that's because the
3 bottom water in the winter is actually warmer than
4 the surface water, because your heaviest water is at
5 4 degrees centigrade or 39 Farenheit. So they tend
6 to move down to that deeper water.

7 Q. Let's move on to the next question,
8 No. 9. In your testimony you state, "I have not
9 seen data that demonstrates the sediment toxicity is
10 a major factor limiting the aquatic life potential
11 of this system."

12 What sediment toxicity or sediment
13 chemistry data have you reviewed from the system?

14 A. Well, I -- Burton provided a lot of
15 the sediment data and some of the toxicity data. So
16 a lot of the reports I looked at were from him.

17 Whereas, looking at the CAWS, I've
18 been involved with the Calumet area since '85, so
19 I've been very involved with the sediment and
20 toxicity data from that part, that small part of the
21 system.

22 Q. The Burton data was just as to Upper
23 Dresden Island Pool; am I correct?

24 A. Excuse me?

1 Q. This statement -- was this statement,
2 particularly as to the Upper Dresden Island Pool?
3 I think you mentioned the Burton data, which would
4 have been for the Pool; am I right?

5 A. Well, I thought he'd had some data up
6 in Lockport -- at least the Lockport Pool and
7 Brandon.

8 Q. I'm just trying to figure out the
9 scope of this statement.

10 Are you saying this is the -- this
11 statement is applicable to the entire CAWS, the
12 entire system, or are you saying it particularly as
13 to the Pool?

14 A. Well, I think it would be true to say
15 that I haven't seen direct data on some of the
16 sediment contaminants in the CAWS actually limiting
17 the productivity there. Although, it may very well
18 be true in some places.

19 Q. I'm trying to get a sense -- have you
20 looked at sediment data, for example, for the
21 Cal-Sag?

22 A. I don't believe so.

23 Q. For the Sanitary and Ship Canal?

24 A. I may have -- do we know if that was

1 in the -- was that in the Wasnik testimony that she
2 presented, some sediment data?

3 Q. There was data with the Wasnik
4 testimony for -- throughout the system.

5 A. I think I did look at some of her
6 data.

7 Q. But that wasn't reviewed before you
8 prepared this testimony; am I right?

9 A. That's correct.

10 Q. I'm trying to get a sense of what data
11 you reviewed to make this --

12 A. It was probably the Burton data, which
13 was primarily the data that I relied on in terms of
14 data that I've seen.

15 Q. So if there were areas that weren't
16 covered by the Burton data, your statement wouldn't
17 apply to those?

18 A. Well --

19 MR. ETTINGER: He had not seen
20 statements. It would apply, but...

21 MR. ANDES: He hasn't seen any data?

22 MR. ETTINGER: Right.

23 BY MR. ANDES:

24 Q. I can skip a couple of my questions.

1 Well, let me ask, as to the data you have seen, do
2 you believe that the metals concentrations are below
3 the threshold where direct toxicity is a problem?

4 A. Well, let me put it this way, I've
5 seen a lot of contaminated systems with metals,
6 including probably the closest to this area, Lake
7 Calumet and Waukegan Harbor. And Waukegan Harbor
8 actually doesn't have that much in terms of metals.

9 But most metals seemed to get
10 bound up in the sediment, and so, even areas where
11 there's fairly high levels in the sediment, they
12 don't seem to prevent a toxicity problem, at least
13 to fish and probably to most macroinvertebrates.

14 The PAHs, and some of the others,
15 seem to get implicated more in terms of toxicity
16 effects when people do laboratory studies to try to
17 tease out what chemicals are having toxic effects on
18 some animals, so...

19 Q. We need you to talk to the people of
20 the Superfund Program.

21 So you don't think metal issues in
22 the sediment generally are a problem in terms of
23 aquatic toxicity? Even if they're above the
24 Ingersoll and McDonald's levels or other indicia?

1 A. I'm not sure about that. Copper in
2 the water can be quite toxic to plants, so that's
3 why you use copper sulfate if you want to treat your
4 farm pond for aquatic weeds.

5 And sulphur from some discharges
6 when it's in the water can have an effect. Mercury
7 in its more soluble form has been sometimes
8 associated with aquatic problems.

9 But I'm just saying, at least for
10 the lot of the systems that I've looked at where you
11 have metal contaminants in the bottom sediments, we
12 often have not found them in like fish samples or
13 found them accumulating. So they do tend to get
14 bound up.

15 That's not saying there aren't
16 cases where they become problematic, but...

17 Q. I'm aware that metal toxicity to
18 aquatic life -- correct me if I'm wrong -- is a
19 separate issue than bioaccumulation. I'm not asking
20 whether they get bioaccumulating the fish. Because
21 that's something we would deal with more for
22 mercury, PCBs, dioxin.

23 I'm asking in terms of direct
24 aquatic toxicity to the fish, would certainly be

1 more of an issue for metals than for the PCBs.

2 A. Well, the report I referenced this
3 morning by the researchers from Southern Illinois
4 University did not -- they specifically looked at
5 whether -- and this was for the Dresden Pool -- they
6 got up as far as to the Stickney plant. So it does
7 include some of the CAWS.

8 They did not find metals to be
9 contributing to the toxicity in the studies -- in
10 their studies, which is similar to a lot of other
11 studies that I've seen. They have higher metal
12 levels, but they were not contributing to the
13 toxicity.

14 And the nice thing about this TIE
15 studies that do is that you can separate out -- so
16 are metals are having an effect, you can bind up the
17 metals and see if that changes the toxicity. If
18 not, then you can look at PAHs or some other
19 factors.

20 So, anyway, from the part of the
21 system they looked at -- and I think their results
22 were somewhat similar to Burton's also, if I
23 remember.

24 Q. Well, I'll --

1 MR. ANDES: For the record, I'll
2 reserve the same right Ms. Franzetti did,
3 since we haven't reviewed that study yet.
4 Actually, it's on initial information I'm
5 receiving, I have a lot of questions about
6 those conclusions.

7 So we'll reserve the right to call
8 Dr. Thomas back and talk about that further?

9 MR. ETTINGER: I'll note, as I should
10 have noted with Susan, you could reserve the
11 right, but I don't know whether your
12 reservation will be respected, and,
13 ultimately, the hearing examiner would have
14 to decide that.

15 MR. ANDES: I thought I -- understood.

16 MR. ETTINGER: Okay.

17 BY MR. ANDES:

18 Q. Going on to Question No. 10.

19 You state, "That the white sucker,
20 which is a temperature species, was collected in the
21 Dresden Pool every year since 1994. The logperch,
22 also a temperature species, was collected fairly
23 regularly in the Pool."

24 If these temperature-sensitive

1 species are already present in the Pool, can you
2 explain to me why additional thermal limitations are
3 needed?

4 A. Well, there's a big difference between
5 presence and the species thriving.

6 Q. Can you define that for me?

7 A. Yeah, you can have a species present,
8 but it may be present in lower numbers than should
9 be in the system, if that particular stress was
10 removed, so...

11 Q. Do you have a bases for concluding,
12 say, as to the logperch, which were collected fairly
13 regularly, to what extent there would be many more
14 of them if the temperature were --

15 A. No, I'm just saying there's a big
16 difference between presence and the species
17 thriving. The question seemed to imply that they
18 are present. So, obviously, thermal regulations
19 aren't needed, or something to that effect.

20 And I'm just saying there's a big
21 difference between something being present and
22 something actually doing well and thriving. And the
23 species is present, but may not be necessarily
24 thriving in the system.

1 Q. Do you have any information to
2 conclude that the logperch is not thriving? It's
3 collected fairly regularly to clearly not avoid any
4 area, they are present, they are alive.

5 What information do you have
6 indicating that they are a sickly community?

7 A. Well, I didn't use that term, but...

8 Q. I know.

9 A. They were sickly. But I don't have
10 data to the contrary that they couldn't have a
11 bigger population.

12 The other thing, as I said this
13 morning, what's missing, for me anyway, is I haven't
14 seen the detailed thermal data for the Upper Dresden
15 Pool. And so, because this -- the logperch and the
16 white sucker, both bottom species, we have
17 temperature data on the plume coming out of the
18 plant, and we know from the record anyway, there's
19 cooler water underneath.

20 But I don't know what that looks
21 like. I haven't seen the detailed profile data to
22 say, yeah, there's cool pockets here and it's hotter
23 here, and this is where it's all mixed to the
24 bottom, and -- and so, I would need -- if I was

1 asked to really elaborate more on this, I need to
2 see some of those detailed plume data to get a
3 better feeling for what's going on.

4 Q. So to really make definite
5 conclusions, you would need that data?

6 A. Well, that would be one piece of the
7 data, yes. And then I probably have to sit down and
8 analyze the collection data. Where were they
9 collected, where weren't they collected, how does
10 that much up with the plume. That's a level of
11 analysis that I didn't have the time to do, and I
12 didn't have all the data that would have been
13 necessary to do that.

14 But, you know, if you really
15 wanted to get into that kind of issue, that's the
16 kind of analysis you really need to do.

17 Q. Okay.

18 No. 11. The testimony states, "I
19 believe these waterways can support tolerant or
20 intermediately tolerant species, including early
21 life stages of the species, based on my review of
22 the habitat data and the use of the IEPA and my
23 personal knowledge of the CAWS."

24 I think you've described what your

1 personal knowledge is. So we'll skip that one.

2 Have you reviewed water quality
3 data for the CAWS and considered it in formulating
4 this statement?

5 A. Yes.

6 Q. What data did you look at?

7 A. Well, one of the things that I
8 probably should have added right back in my
9 testimony was I relied a lot on the fisheries data
10 collected by the District over that long period of
11 time. And they also had some water quality data
12 they reported on, so...

13 Q. So how did you use water quality data
14 in coming to that conclusion?

15 A. Well, I was relying -- it wasn't so
16 much me using it as me interpreting, and sometimes I
17 think they actually made the statement that water
18 quality is improving and fish populations have
19 improved. So I was using the results of their
20 studies, including some of the direct statements
21 about water quality improvements and the positive
22 effects on the fish population to come up with that
23 statement.

24 Q. So you based it on the statement by

1 the District that water quality has been improving.
2 Is that what you're saying?

3 A. Well, that, plus the fisheries data
4 that shows the improvement over time.

5 Q. But --

6 A. And also -- I mean, we keep talking
7 about the CAWS, but, you know, we have to keep --
8 and I'm reminded of this sometimes myself. I mean,
9 there's a huge diversity of habitats within the
10 CAWS, and there's a wide range of water quality
11 also.

12 So we have to realize when we're
13 talking about this that we're talking within this
14 range of habitats and water quality.

15 Q. But if your general statement as to
16 the CAWS is support for tolerance or an
17 intermediately tolerant species, including the early
18 life stages, are you saying, well, maybe it could in
19 some segments and not other segments?

20 A. Yes, I would say that would be true.
21 There's some segments that -- and I think those have
22 already been identified.

23 I mean, those segments as

24 B Waters, I think there's a recognition there's only

1 going to be so much improvement in those because of
2 their present usage in the habitat, so...

3 Q. So you're not saying all the waterways
4 could support these species. Basically, what you're
5 saying -- what you meant was what the IEPA said?

6 A. Yeah, pretty much.

7 Q. And can you -- well, again, I'm trying
8 to understand. If you've looked at water quality
9 data, and you've looked at fisheries data, how --
10 looking at the data, including improvements that
11 have happened over time, how does that lead you to
12 conclude that these water bodies, or some of these
13 water bodies, it sounds like, would support early
14 life stages?

15 A. I think they already are supporting
16 early life stages. And I think they could support
17 even more under further improvements in the water
18 quality.

19 Q. And what's your basis for that
20 statement? What's your biological basis for those
21 statement?

22 A. Because these species in there are
23 going to spawn. And from what I saw, like in the
24 Cal-Sag, I was actually surprised how relatively

1 good the water quality looked. And I think there's
2 successful spawning in it.

3 Q. So if that's happening, let me go back
4 to my earlier point.

5 A. Uh-huh.

6 Q. If that's happened in the current
7 conditions, what's to say that's not going to keep
8 improving? Why is it necessary, then, to tighten
9 down all the water quality standards?

10 A. Well, this has been sort of a long
11 process from the late '60s and early '70s to --
12 there's been sort of an incremental improvement in
13 water quality with some of the regs and some of
14 the -- like in the CAWS, many of the things that the
15 city has done has been successful. I mean, you
16 know, when you stop chlorination, the early use of
17 the TARP, these have shown up as positive results in
18 the system.

19 So things being done are working.
20 We're not there yet, and, you know, people will
21 argue about how far can you really go. But I think
22 that there is still room for some improvement and --

23 Q. What I'm asking you --

24 A. -- we need to work towards that point.

1 Q. -- how are you -- if you're saying
2 that yes, it's improving --

3 A. Uh-huh.

4 Q. -- but we can make it improve even
5 more, what's your basis for that statement that
6 changing these parameters is going to lead to more
7 of an improvement than would happen otherwise?

8 A. Well, I look at the fisheries data for
9 the CEPA stations. I mean, they're -- basically,
10 they add some flow, just by their nature. But
11 they're improving oxygen in the local areas and
12 there has been a response by the fish population.

13 There are small mouth bass and
14 channel catfish that are showing up in those. So, I
15 mean, that's partly what they were designed for, to
16 help improve dissolved oxygen, and there seems to be
17 a positive response by the biotic community to that,
18 so...

19 Q. So you don't believe there's any limit
20 to that in terms of --

21 A. Well, I'm sure there's a limit
22 financially for how many CEPA stations you're going
23 to build, and I certainly understand that. But --
24 no, I'm just saying that I think you were asking the

1 basis, and I think that we've done things to help
2 improve the water quality, we have seen a positive
3 response to it.

4 Q. You're saying that because they find a
5 lot of fish gravitating toward the aeration
6 stations?

7 A. Well, I'd have to go back and look at
8 the fisheries data, but I think they're finding
9 species that were maybe uncommon in a relatively low
10 abundance in the Cal-Sag that were showing up at
11 these CEPA stations in greater abundance.

12 Q. Can you show me one?

13 A. I think Page 18 in here.

14 MS. TIPSORD: You know, could we have
15 exactly what you're looking at again?

16 THE WITNESS: Okay. I'm sorry.

17 MS. TIPSORD: Including, if you can,
18 give it to me by exhibit number.

19 BY THE WITNESS:

20 A. This is Attachment M3. That's all I
21 have on it. It's a study of the fisheries resources
22 of water quality in the Chicago Waterway System,
23 1974 through 1996. I'm not sure whether it was
24 Attachment 2, but I guess --

1 MS. TIPSORD: We really need to know
2 that. Because I thought at first it was an
3 exhibit, it's obviously not. It was attached
4 to the testimony --

5 MS. DEXTER: It's from the record.

6 MS. TIPSORD: Right. But, I mean it
7 was attached to the testimony of one of the
8 distant witnesses.

9 MR. ANDES: I think so.

10 MS. TIPSORD: And I looked back
11 through the Agency's stuff and I'm not seeing
12 it there either.

13 MR. ETTINGER: You can always mark it
14 again.

15 MS. TIPSORD: Can you give me the
16 title again?

17 THE WITNESS: It's called the Study of
18 the Fisheries Resource and Water Quality in
19 the Chicago Waterway System 1974 through
20 1996.

21 MS. WILLIAMS: Does it have an MWRD
22 number?

23 THE WITNESS: It's Report No. 98-10.

24 MS. DEXTER: It's either Melching or

1 Mackey.

2 MS. TIPSORD: All right. Melching's
3 testimony was admitted as Exhibit 169 and
4 Mackey's was entered as Exhibit 179. And I
5 will check when the transcript comes in and
6 make sure that that is in the record.

7 MS. DEXTER: I can look it up when we
8 go back to the office.

9 THE WITNESS: But in answer to your
10 question, may I read just a portion from
11 this?

12 MS. TIPSORD: Yes.

13 THE WITNESS: Page 18, the second
14 paragraph.

15 It says, "The CEPA stations have
16 also shown an immediate benefit for the
17 quality of the fish populations in the
18 Calumet River system. Twenty-five fish
19 species have been collected from the
20 waterways of the five CEPA stations --
21 station locations during 1995 and 1996.
22 Small mouth bass and channel catfish were
23 collected at the CEPA stations on the Cal-Sag
24 Channel.

1 "This was the first occurrence of
2 these desirable game fish species in the
3 Cal-Sag Channel collections."

4 MS. TIPSORD: And Ms. Williams has
5 found it.

6 MS. WILLIAMS: I just want to point
7 out for the record that MWRD 98-10 was
8 attached to Mr. Mackey's testimony.

9 THE WITNESS: Okay.

10 MS. TIPSORD: That was Exhibit 179.
11 So it is attachment M3 to Exhibit 179.

12 MR. ETTINGER: Do we have another
13 question on the floor or...

14 MS. TIPSORD: No, we were taking care
15 of housekeeping. I just nodded to Mr. Andes.

16 BY MR. ANDES:

17 Q. Now, have you looked at, in making
18 this conclusion -- well, let's go back to the
19 conclusion.

20 You were saying that certain
21 segments of the CAWS could support tolerant or
22 intermediate species. And, as to sediment character
23 and contamination, did you look at that data and
24 factor it into that analysis?

1 A. I'm sorry.

2 Q. You looked at sediment information,
3 both character of the sediment -- composition of the
4 sediment, as well as contamination, and factored
5 that into your analysis?

6 A. Not really for the CAWS. I was really
7 more focused on just some of the general water
8 quality and the fish populations and
9 macroinvertebrates.

10 Q. Wouldn't the sediment composition --
11 as Dr. Mackey says in his testimony, wouldn't the
12 sediment composition be relevant in terms of the
13 substrates?

14 A. Well, this is an interesting point.
15 And I thought maybe we were going to get to it later
16 on macroinvertebrates, but I could bring that up
17 here.

18 The production of
19 macroinvertebrates in large river systems, and this
20 includes these waterways, is not in the bottom
21 sediments of the main part of the channel and that.
22 It tends to be on hard substrates.

23 And these hard substrates tend to
24 be along the surface -- or along the shoreline.

1 Some of them, though, could be a sunken ship or some
2 of them could be, you know, even pilings or whatever
3 that were in the water. And that's where a lot of
4 production is.

5 I -- over the summer, I went
6 back -- because I worked with a grad student at the
7 University of Illinois that was doing a study of
8 logs in the Kaskaskia River. And one of the reasons
9 was, when we did all those Ponar samples in the
10 Kaskaskia River, we were finding a very low
11 abundance of macroinvertebrates.

12 And yet, when we take a drift
13 sample, and these are nets that are put in the water
14 to get drifting invertebrates, we find pretty good
15 numbers of drifting invertebrates. So the question
16 was where do they come from?

17 And what we were finding was they
18 were coming from hard substrates, Kaskaskia primary
19 logs, which there are a lot of in the water. And he
20 did a study of putting in a whole array of
21 artificial logs, where he could, every week, scrape
22 off the logs and see what had settled on them and
23 what the populations were. And he documented the
24 increase in populations on those logs.

1 What we have in the record here
2 that's similar to that is the hestrodendes
3 (phonetic) samples. They're an artificial substrate
4 that is put in the water and we can measure what
5 settles on those.

6 So I think -- I don't expect when
7 someone shows Ponar samples from these systems that
8 you are going to find much in the bottom sediments.
9 But there are a lot of hard substrates in this
10 system in the water, and that's where I would expect
11 a lot of the production of macroinvertebrates to be.
12 And that's going to serve as a food source for a lot
13 of the fish that are using the system.

14 Q. So you think in the Cal-Sag Channel
15 there's habitat?

16 A. Absolutely.

17 Q. On the side walls?

18 A. In fact, we were going through the
19 O'Brien Lock and Dam on our boat trip just a few
20 weeks ago, and I was pointing out to Jessica that if
21 you looked on the side of the pilings there, and
22 this is just sheet metal, but you could see all the
23 algae growing off of the pilings and you could see
24 some zebra muscles on there, and there's going to be

1 aquatic inverts crawling about in that. So even on
2 just a sheet of -- a plain sheet of sheet piling,
3 there are a number of plants and algae and that that
4 are going to grow and micro-organisms and also
5 macro-organisms that are going to use that
6 substrate.

7 Q. How about for the fish?

8 A. Well, the fish -- obviously, you're
9 going to have to be a little more -- if you're going
10 to use that. But they'll feed off of invertebrates
11 on those structures, so...

12 Q. But that doesn't provide habitat for
13 them?

14 A. It provides areas that they can feed
15 in, so, in that sense, it's some habitat that they
16 can use. In terms of spawning, most of the fish
17 that we're talking about would not be able to use
18 that to spawn, they'd need other kinds of habitat.

19 Q. Intermediately tolerant species, can
20 you tell me what those are intended to cover?

21 A. I would say white sucker and channel
22 catfish, small mouth bass, probably fresh
23 water prawn -- yellow bass, those might all be
24 considered -- they wouldn't be considered fully

1 tolerant, they would be considered more immediate,
2 whatever term we want to use for that.

3 Q. And when you talk about supporting
4 tolerant or intermediately tolerant species, do you
5 have a sense of what proportions of those species
6 you would envision in the community?

7 A. I assume you ought to have -- you'd
8 still have in these systems a higher percentage of
9 tolerant species, which is also true of a lot of our
10 other large river systems in the state. The real
11 intolerant species in some of these river systems
12 were lost by the middle of the last century.

13 In the Kaskaskia, by the 1930s,
14 the real sense of the species were already gone. So
15 we have already eliminated the most sensitive
16 species in a good part of our state.

17 Q. And those aren't coming back?

18 A. In a lot of these systems, no, unless
19 somebody reintroduces them. Which we're actually
20 doing on the Illinois, by the way, in some of the
21 backwater areas. We are reintroducing some species
22 that have been lost over time.

23 Q. Of course in this system, in the CAWS,
24 in the artificial system --

1 A. Right.

2 Q. -- those would never get --

3 A. That's correct.

4 The only reason I stopped you is
5 we did have some waterways going into the rivers, I
6 had to think way, way, way back.

7 Q. Over a hundred years ago?

8 A. Yeah.

9 MR. ETTINGER: Never is a long time.

10 BY MR. ANDES:

11 Q. Let's skip down to Question N --
12 Subquestion N.

13 Have you reviewed the continuous
14 DO data from the District to determine whether
15 current conditions are suitable for the early life
16 stages of fish that you expect could thrive in the
17 CAWS?

18 A. Well, I never said early life stages
19 were going to thrive in the CAWS. But I said I
20 would be very surprised if there weren't early life
21 stages in the CAWS.

22 Q. I think we just talked about the
23 difference between present and thriving, and you
24 said they could thrive. The stage you thought they

1 could get to was thriving; remember?

2 I said, "Well, aren't they
3 present?" And you said, "There's a difference
4 between present and thriving."

5 A. I thought we were talking about
6 Dresden Pool then. Were we talking about the CAWS?

7 Q. You said that they probably won't
8 thrive in the CAWS. They may thrive in the Pool but
9 not the CAWS?

10 A. I think some species would probably.
11 I don't know what -- thrive is sort of a little bit
12 of a nebulas word. But I think there are some
13 species that would do fairly well there.

14 Remember, in some sections of the
15 CAWS there was reasonable populations of, like white
16 sucker. And so -- like the north channel. I assume
17 the north shore channel, there's probably some
18 spawning that's occurring there.

19 So there are sections of the
20 waterway now in which some of these species are
21 maintaining populations.

22 Q. So to go back to the question. If you
23 looked to the DO data, looked at the current
24 conditions and determine if those conditions are

1 suitable for the early life stages.

2 A. Well, the reason I have to hesitate on
3 that is, again, it's one thing to have these
4 monitoring stations where you look at DO, you know,
5 once a week or whenever, but that still doesn't tell
6 you the range of DO that might be available to
7 species. It doesn't tell me necessarily along the
8 shoreline where there is some vegetation that DO in
9 those areas might stay a little bit higher.

10 So it's a little hard to answer
11 that as a very general question. I know there's DO
12 problems in the system, but how extensive, does it
13 affect all the habitats that these fish might use,
14 how much might the improvement be, I -- those are
15 questions I can't really answer.

16 Q. So you haven't reviewed the DO data;
17 am I right?

18 A. I've seen some of the DO data, but I
19 haven't reviewed it in detail.

20 Q. And so, what you said just now is you
21 cannot determine the relationship between DO levels
22 and fish thriving or fish survival? Have you looked
23 at the impact of the DO conditions, including --
24 particularly during wet weather, and how that

1 affects the fish population?

2 A. Well, I know there's a depression of
3 DO, and if it lasts long enough and there are no
4 refugia, it's going to have an adverse effect on the
5 fish population. The fact that with DO improvement
6 from the CEPA stations, the fish population has
7 apparently improved based on the District report
8 that indicates there has been a problem of DO
9 holding down some of these populations.

10 And that if we can improve the DO,
11 we can potentially see a positive response of the
12 fish population to that, so...

13 Q. So what leads you to say -- so if they
14 have a certain number of -- and I will specify they
15 have nine aeration stations right now. And if they
16 see improvement, you would expect that improvement
17 to continue?

18 A. You mean if they did nothing else?

19 Q. Right.

20 A. Just left those in there?

21 Q. Right.

22 A. I don't know at what point the system
23 is going to continue to improve on its own and
24 whether we've seen that improvement already or

1 whether there could be continuing improvement. What
2 that question sort of asks under line is, what is
3 the -- sort of the curve, if you will, of
4 improvement and at what point are you going to
5 reach -- where it levels off and you're not going to
6 get any further improvement? I don't know the
7 answer to that question.

8 But it's been relatively recent
9 for a number of these stations, so I would assume
10 there's still some lag. You might expect that there
11 might be some continued improvement for a few years.

12 Q. Okay.

13 A. But I'm speculating.

14 Q. So you really need more information to
15 be able to determine what change is going to result
16 and how much more is possible; am I right?

17 MR. ETTINGER: Possible from what?

18 BY MR. ANDES:

19 Q. From continued changes in the system.

20 A. Well, part of that may relate to --
21 again, this would go back to something that I
22 haven't analyzed and what are all the causal factors
23 causing the DO problems. Well, one of them is in
24 the record that I have seen that the flood events

1 and storm water flow in the river does depress DO
2 levels.

3 So once the TARP system is fully
4 operational, I assume some of those events will go
5 down. What impact that has on water quality over
6 the year, I don't know.

7 I mean, that's another analysis
8 that I'm not prepared to do. But it's a reasonable
9 question for someone to ask.

10 But as we improve these -- as we
11 identify what is the source of the DO problems, and
12 as we can improve each of those, and as the system
13 responds to that by a little bit higher DO levels,
14 then yes, I would expect that we're going to see
15 continued improvements by the aquatic organisms.

16 Q. So you would expect significant -- so
17 if I can state, and correct me if I am wrong, you
18 would expect a completion of TARP, which -- would it
19 mean completion of the three reservoirs, which will
20 happen in about 15 to 20 years? You would expect
21 that could lead to improvement with DO and from your
22 analysis, therefore, in the fish population?

23 A. It should help.

24 Q. You don't have a sense of how much

1 that would help?

2 A. I couldn't really answer that.

3 Q. You don't have a sense of how much, in
4 the interim, putting in more aeration stations would
5 help?

6 A. No, because I haven't -- I know
7 there's higher oxygen around the stations, but I
8 haven't seen the data. They may be in the record, I
9 have not gone into the -- you know, every piece of
10 thing in the record, but -- in detail.

11 But I don't know what the
12 system-wide impact has been of those stations,
13 whether average DO has gone up a half a part per
14 million or a part per million. So if we're
15 seeing -- or if there's some point in which you're
16 seeing a rise in the general DO levels in the whole
17 system, then yeah, you're going to see a more
18 system-wide response to that.

19 Q. Now, let me shift to another aspect.
20 One of our areas that you've discussed before has
21 been habitat improvement.

22 A. Uh-huh.

23 Q. Is that something else that should be
24 considered, I assume long-term, is identifying where

1 there are areas where habitat could be improved and
2 that that could also be something that could improve
3 the situation? Am I right?

4 A. Uh-huh.

5 Q. So do you have a sense --

6 MR. ANDES: I don't know what the hand
7 gestures are.

8 MR. ETTINGER: I'm just telling him
9 "uh-huh" isn't very good for the court
10 reporter, and he should say yes.

11 BY THE WITNESS:

12 A. Yes.

13 BY MR. ANDES:

14 Q. Do you have any sense of the relative
15 roles of habitat improvements, which could be
16 conducted sequentially over a period of time versus
17 changes in dissolved oxygen, for example, or
18 temperature?

19 A. No. That's a very complex issue.

20 And how you would tease out the
21 contribution from each of those to the overall
22 system? It's just -- I mean, it's been raised and
23 it's -- you know, there's a barge effect right now,
24 especially in some of the system where you have the

1 wave action.

2 And so, there are habitat things
3 you could do to attenuate that some degree, provide
4 a little more sheltered habitat, and that's going
5 to, you know, show some habitat improvements again
6 in those areas.

7 Q. So that was something you'd recommend
8 assessing --

9 A. Yes.

10 Q. -- as part of this whole --

11 A. Right.

12 Q. So the habitat improvements could
13 familiarize the situation?

14 A. Correct.

15 Q. You're probably aware that Dr. Mackey
16 and other folks are conducting a further habitat
17 study for the District?

18 A. Yes, I've seen that mentioned in the
19 record.

20 Q. Okay.

21 A. It was supposed to be done this
22 summer, if I remember rightly, so...

23 Q. I believe that was what was stated.
24 It's pretty close. All right.

1 So that would be something you'd
2 believe would be relevant to look at, to assess role
3 habitat versus some of these other factors; am I
4 right?

5 A. Well, I'm not sure I would phrase is
6 as versus, but I think it would be an important
7 component, yes.

8 Q. Various factors, including habitat and
9 improving the fish population?

10 A. Yes.

11 Q. Okay. Thank you.

12 Let's move to Subquestion R.

13 Do you know what effect the
14 electric field barrier north of the confluence of
15 the Des Plaines and the Illinois Waterway has on
16 fish migration?

17 A. Yeah. Hopefully on this answer I can
18 correct something that's wrong in the record. But
19 it should keep adult fish from moving either
20 upstream or downstream through that barrier.

21 Downstream, still could happen,
22 you could still shock a fish, it could float through
23 and recover potentially. There was some statement,
24 I can't remember whether it was Mackey's testimony

1 or Melching.

2 THE WITNESS: Oh, in Huff's testimony?

3 I think it was.

4 BY THE WITNESS:

5 A. Anyway, something about with
6 electro -- this was related to electrofishing,
7 saying that it should be -- yeah, I think it was in
8 Mackey's -- saying that electrofishing should be
9 more effective on small fish than large. It's
10 actually just the opposite of that.

11 Electroshock is -- and there's a
12 ton of papers on that, which I now have, if anyone
13 is interested. But electric fields from
14 electroshocking, for instance, are more effective on
15 larger bodies, the bulkier fish rather than very
16 small fish.

17 And so, real small fish may be
18 able to pass through this field and move on
19 upstream. They'll pass through with the current.

20 But, basically, in terms of adult
21 fish, it should keep adult fish from either moving
22 downstream or moving upstream. It should form a
23 barrier to adult fish.

24 Q. Now, that fact assumes then, to some

1 extent -- I mean, after all, we're talking about
2 improving the fish population. Part of that would
3 be fish coming from other places, who then would
4 like this community, this area; right?

5 Would the barrier serve some sense
6 of limit to migration of those fish, such that they
7 wouldn't be able to pass easily back and forth?

8 A. Well, there's not a large fish
9 population in the Brandon Pool anyway, and so -- and
10 I don't think there's any species in that pool that
11 aren't already in the -- at least some portion of
12 the Chicago area waterway. So I don't see any
13 particular species being prevented, and, of course,
14 that connection is an artificial one. I mean, it
15 used to be.

16 So it's not like we have a
17 migratory salmon or shad or something population
18 that's being cut off. The negative effect from
19 getting invasive silver and big head carp is much
20 greater than any impact that might be from causing
21 some of these adult fish not to be able to move
22 from, say, Brandon Pool or Lower Lockport Pool up to
23 other areas of the CAWS.

24 Q. So you're not looking for major new

1 populations of other fish becoming anyway?

2 A. In terms of the CAWS?

3 Q. Right.

4 A. No, I think most of the fish we've
5 expected there -- are probably there to some degree.
6 In some portion of the CAWS anyway. So I'm sure
7 there's some exceptions to that, but generally.

8 Q. Are you aware that the Corp of
9 Engineers is doubling the voltage of the electric
10 barrier?

11 A. I've sort of kept up with it, but I
12 don't know that I've heard that particular
13 announcement. So -- yeah, if they have high enough
14 voltage, they may take care of small fish going
15 through, too.

16 Q. Let's move on.

17 Let's move to Subquestion W. And,
18 actually, X. They are sort of the same question.

19 We're talking in the studies to
20 form the basis for the UAA of 23 sampling points
21 over the 78 miles of the system in terms of habitat.
22 How many would you recommend?

23 Do you think 23 sampling points
24 was enough to form conclusions about the habitat

1 here? Do you think something else would be
2 required?

3 A. Well, I guess I have a couple of
4 answers to that. Obviously, if that was all the
5 data being relied on, I'd have to say no.

6 However, there are -- is a lot of
7 other information that has been relied on. My
8 feelings, especially after traveling on the
9 Cal-Sag -- I think there were only two stations, if
10 I remember correctly, in the Cal-Sag. And I don't
11 think two stations were adequate to describe the
12 available habitat.

13 My view, we -- they underestimated
14 the available habitat that was there. So I would
15 say they served maybe as a base, but I would say
16 it's on the low end, not on the high end. But they
17 underestimate the available habitat.

18 Q. And you're saying because you --
19 that's your concern with QHEI?

20 A. Well, it's my concern, but two
21 stations trying to characterize the whole Cal-Sag.

22 Q. What if those two are really good,
23 then they wouldn't be over -- they wouldn't be
24 underestimating the quality, you would be over

1 estimating the quality; right?

2 A. Well, we discussed this some this
3 morning, and I said one of the issues I had with
4 QHEI and the large body of water is these fish tend
5 to move over much wider areas. And if you're doing
6 your measurement of the QHEI in a 500 meter stretch
7 and that really isn't picking up, necessarily, all
8 the habitat, any fish in -- even collected in that
9 area, may be using -- to carry out their life
10 history.

11 So again, I think, if anything, it
12 may underestimate the available habitat of the fish
13 because of their ability to move longer distances.

14 Q. If the points you happen to sample
15 have good habitat but they move around a lot and
16 most of the area they're going in doesn't have good
17 habitat, then you've overestimated the quality;
18 right?

19 A. You could do that. I mean, to try to
20 characterize Dresden Pool by, obviously, the tail
21 water areas of Brandon Lock and Damn, you would
22 mischaracterize the whole pool.

23 Q. Have you looked, for example, at the
24 points that were used on the Cal-Sag, and do you

1 have any reason to believe that those were
2 particularly good or bad relative to the rest of the
3 channel?

4 A. No. I didn't go back and actually try
5 to pinpoint where those were when we were doing the
6 trip.

7 But I think a lot of the habitats
8 that we saw that I thought were -- would be
9 reasonably good for fish populations we saw
10 reoccurring a number of times as we went down that
11 canal. And what I mean by that is emergent
12 vegetation or logs in the water or overhanging
13 vegetation or maybe shallower shoreline with gravel
14 or -- so...

15 Q. Let's move down to Question 12.

16 MR. TIPSORD: You know what, let's
17 take a ten-minute break.

18 (WHEREUPON, a recess was had.)

19 MS. TIPSORD: All right. I think
20 we're ready doing to go back on the record.

21 Mr. Andes, your Question No. 12.

22 MR. ANDES: Yes.

23 BY MR. ANDES:

24 Q. We covered some of these issues

1 already. Let's move to Subquestion E.

2 The UAA states that good quality
3 aquatic habitat in the CAWS is limited and the
4 waterways would need to undergo major habitat
5 creation and/or restoration to improve the fish
6 macroinvertebrate assemblages.

7 Do you agree with that statement?

8 A. Partially. I agree there is a
9 limitation of good quality habitat, but I'm not sure
10 that the creation or restoration would have to be
11 major to improve the fish population.

12 Q. So it could be minor?

13 A. Well, I'm not sure what was meant
14 by -- major to me implies that it is going to have
15 to be these massively overly expensive endeavors.
16 And I think there's a lot of things that could be
17 done to improve the fish habitat in the system that
18 won't have to be that major.

19 I realize these are very
20 qualitative terms we are talking about, but...

21 Q. Let's move on.

22 And also in the UAA document it
23 says, "Improvements to water quality through various
24 technologies, like re-aeration, may not improve the

1 fish communities due to lack of suitable habitat to
2 support the fish populations. Unless habitat
3 improvements are made in areas, like the Chicago
4 Sanitary and Ship Canal, additional aeration may not
5 result in the attainment of higher aquatic life
6 use."

7 Do you agree with that statement?

8 A. Well, I agree it may not. I guess I
9 would say, pretty much, I do agree with it.

10 Q. Let's move on to -- in our Question 13
11 you talk about the representative aquatic species
12 secondary contact lists used by IEPA to represent
13 the CAWS-A Waterways.

14 I guess the first question is to
15 clarify secondary contact as that to a recreational
16 standards term. So I wasn't clear on its use in
17 that context.

18 A. I think that was used in Table 1 of
19 the CABB/MDI Lower Des Plaines temperature criteria
20 options, maybe used in the Yoda report.

21 Q. Okay.

22 A. So I think I just referenced it.

23 Q. So that was their confusion?

24 MS. DEXTER: Which is Exhibit 15.

1 MS. TIPSORD: Thank you.

2 BY MR. ANDES:

3 Q. Were those representative aquatic
4 species -- that list, was that used to develop the
5 dissolved oxygen criteria?

6 MS. WILLIAMS: Which question?

7 MS. TIPSORD: C.

8 MS. WILLIAMS: Because that question
9 says were these RAS 8 species. Is that the
10 question you're asking about the specific...

11 MR. ANDES: Yeah, I just played with
12 the wording a little. But I'm talking about
13 that list.

14 BY MR. ANDES:

15 Q. The question really, Dr. Thomas, was
16 you're talking here about the representative aquatic
17 species. And what I'm trying to clarify is, correct
18 me if I'm wrong, that species list was used to
19 develop temperature standards that -- those were not
20 used to develop the DO criteria.

21 A. I can't address that for the Agency.
22 I found the representative species they used. I
23 thought it was a good list of species. I mean, I
24 thought it was...

1 Q. Are you aware of how the DO criteria
2 was developed?

3 A. No.

4 Q. I'm just checking the rest of the
5 questions to determine what else we would need to
6 discuss. I think we're done.

7 MS. TIPSORD: Thank you very much. I
8 believe IEPA has a few questions.

9 MR. ETTINGER: I just want to clarify
10 one thing. He said --

11 MS. TIPSORD: I can't hear you,
12 Albert.

13 MR. ETTINGER: We did not make a
14 connection here. Dr. Thomas, did actually
15 testify, I believe, in the dissolved oxygen
16 proceeding. There was a separate proceeding
17 from that, and that did relate to the
18 dissolved oxygen criteria here.

19 MR. ANDES: The question really was in
20 his testimony here, he -- in discussing the
21 CAWS waters, he focuses on that list of the
22 representative aquatic species. My point was
23 simply the issue the District has been
24 focusing on, the DO, that species list was

1 not used.

2 MR. ETTINGER: All I was trying to say
3 was your question was did he have anything to
4 do with developing the dissolved oxygen
5 standard, and I didn't want it --

6 MR. ANDES: Oh, that wasn't it. The
7 question was did he know how these DO
8 standards were developed.

9 MR. ETTINGER: For the CAWS?

10 MR. ANDES: Yes, for the CAWS.

11 MR. ETTINGER: That's all we were
12 clarifying. Because he did testify in the
13 statewide dissolved oxygen.

14 MR. ANDES: We know the CAWS is
15 utterly unique and different from the --

16 MR. ETTINGER: Yeah. I just wanted
17 the record to be clear on that.

18 MR. ANDES: Let the record be clear.

19 MR. ETTINGER: Let the record be
20 clear.

21 THE WITNESS: And that's the way I was
22 answering it, for the CAWS.

23 MR. ANDES: Right. Thank you.

24 MS. TIPSORD: Let's go to the IEPA.

EXAMINATION

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BY MS. DIERS:

Q. I'm Stefanie Diers for Illinois EPA.

I have a few questions to ask.

I want to ask Prefiled Question
No. 1. In your opinion --

A. Can you hold on just a second?

Okay. I'm sorry. Go ahead.

Q. In you opinion, why do you believe it
is sensible to determine the highest attainable
aquatic use of a waterway by studying the physical
characteristics?

A. Well, I feel the physical and chemical
environment of aquatic systems do basically provide
the basic support system for the biota -- for the
biological community.

Q. I just have a couple follow-ups
because all our other prefiled questions have been
asked.

Dr. Thomas, what weight would you
put on aquatic life data versus habitat data if the
aquatic life data came from collections taken in the
waterway that is subject to chemical or thermal
stressors?

1 A. Are you referring to a specific
2 question here?

3 MS. TIPSORD: No, it's a follow-up.

4 THE WITNESS: Oh.

5 BY MS. DIERS:

6 Q. This is just a follow-up based on some
7 of the things we talked about.

8 A. Okay. I'm sorry. Could you repeat
9 it?

10 Q. What weight would you put on aquatic
11 life data versus habitat data if the aquatic life
12 data came from collections taken in the waterway
13 that is subject to chemical or thermal stressors?

14 A. Well, I have to think about that a
15 second. I mean, I think the two go together,
16 obviously, and maybe a broader answer for your first
17 question is the habitat analysis starts to give
18 you -- and along with chemistry -- starts to give
19 you a view of what the potential for the system is
20 to carry aquatic biota.

21 So I think you'd have to consider
22 the two together. If you have a system that has
23 really good habitat and yet has a low population,
24 you know something is not right, and probably it's

1 water quality.

2 I think from sampling I've done in
3 acid mine drainage streams that had beautiful
4 habitat and nothing -- no fish at all in them.
5 So -- I mean that's an extreme example, to say,
6 "Wow, there's pretty good habitat here, but this has
7 some real problems."

8 So that would be an extreme case.
9 But the habitat tells you at least what the
10 potential is if that had good water quality.

11 Q. Are you aware of an -- I know we
12 talked by the RIS and the RA lists recently and this
13 morning. Are you aware of the RIS or an RA list
14 being used to determine attainability of biological
15 condition?

16 A. Attainability of biological -- of any
17 biological -- of clean water? I'm not exactly sure.

18 Q. I think the RIS and RA has been used
19 to look at water quality. We were wondering could
20 you use that to determine attainability?

21 MS. DEXTER: Stefanie, do you mean
22 defining attainable use without the RAS? Is
23 that the question, whether or not he knows of
24 other situations where -- or, I'm sorry, not

1 other situations, but any situations where
2 the attainable use is defined using the RAS?

3 MS. DIERS: Yes.

4 MS. DEXTER: Is that your question?

5 MS. DIERS: Yes.

6 BY THE WITNESS:

7 A. I'm not sure if I know another case,
8 because I haven't been so involved on the regulatory
9 end of looking at that. I know -- I have been
10 involved in doing some environmental impact
11 statements for power plants.

12 And if you're going to present
13 data, you do try to include a range of species, such
14 as was done here with the RIS, that have a range of
15 sensitivity. Obviously, if you can prove the most
16 sensitive of your species are not going to be
17 affected, the assumption usually goes that you're
18 not going to affect the more tolerant ones.

19 So I think, when you're trying to
20 do a demonstration, you do tend to find more
21 sensitive species in which you have data. As I_
22 mentioned earlier, the hard part is there hasn't
23 been a lot of work done on sensitive species in many
24 cases, because they're hard to work on.

1 So I think the concept is a good
2 one, though. And you can't look at everything,
3 there's just too much information.

4 So you try to pick on a suite of
5 species that represent the range of conditions that
6 the community of organisms might respond to. And,
7 hopefully, you've included some of the more
8 sensitive ones so you don't lose those out of the
9 system.

10 MS. DIERS: No further questions.

11 Thank you.

12 MS. DEXTER: Can I ask one follow-up
13 question?

14 MS. TIPSORD: Absolutely.

15 BY MS. DEXTER:

16 Q. We've talked a lot today about fish
17 data and a little bit about electrofishing sampling.
18 Is there anything we should take into consideration
19 when we look at electrofishing samples that would,
20 sort of, include how we interpret the data?

21 A. Yeah. And I think I discussed this a
22 little bit in my testimony, but not directly.

23 The -- and this relates to the IBI.

24 We've had in the record -- and we

1 didn't really talk about it, I don't think, in the
2 cross-examination questions today -- but how the
3 index of biotic integrity, how those scores compare,
4 like in Dresden Pool or elsewhere in the CAWS with
5 other water bodies. Both the electrofishing data
6 for the CAWS, as well as for Dresden Pool, were
7 using alternating current called AC electrofishing.

8 And there is a study that's just
9 coming out from some of the natural history survey
10 staff that shows a comparison of what you might
11 catch with alternating current data versus direct
12 current, which tends to be used more often. And it
13 is interesting in some of the buffalo, like small
14 mouth buffalo, large mouth buffalo, that are in this
15 system, possibly some of the red horses are causing
16 much greater abundance with direct current, DC
17 electrofishing than with AC.

18 If that's the case, our index of
19 biotic integrity might be much higher, or at least
20 significantly higher, than the values that we have
21 for this case. And I just had sent to me this last
22 week probably six or seven publications that talk
23 about the difference between AC and DC, and there's
24 a lot of variations.

1 But I think it is important when
2 considering these data. I'm not sure, but it seems
3 like Ohio criteria may have used the DC
4 electrofishing as part of how they sampled over the
5 500 meters or whatever they're sampling. So that's
6 one thing to consider.

7 The other, which we talked about
8 today, is that electrofishing is somewhat limited.
9 In turbid waters you miss a lot of fish. You tend
10 not to get fish in the deeper waters, particularly
11 with the AC electrofishing.

12 The DC is a little more effective,
13 in fact, and may be the reason you get more buffalo
14 fish and some of these other near bottom fish. So
15 it's another one of those confounding variables, but
16 it's one I think that has to be considered for the
17 record.

18 BY MR. ANDES:

19 Q. And then I have a couple of follow-up
20 questions to that. I guess one would be if there
21 are references indicating that difference, we'd
22 certainly like to see those for the record.

23 I guess the other question is, so
24 are you saying that if they used a different kind of

1 electrofishing, it could turn out that these waters
2 are far healthier than we thought?

3 A. It might have a higher index of biotic
4 integrity.

5 Q. Which means they are healthier? Fish
6 communities are really healthier than we thought?

7 A. That's a possibility.

8 MR. ANDES: Thank you.

9 MS. TIPSORD: Anything else for
10 Dr. Thomas?

11 Thank you so much for joining us.

12 Everyone have a great weekend.

13 I'll see you October 5th for Laura Barghusen,
14 Cheryl Adelman, and Victor Crivello.

15 Thank you, all. We are adjourned.

16 (WHICH WERE ALL THE MATTERS
17 HEARD IN THE ABOVE-ENTITLED
18 CAUSE THIS DATE.)

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1 STATE OF ILLINOIS)

2) SS:

3 COUNTY OF COOK)

4 I, SHARON BERKERY, a Certified Shorthand
5 Reporter of the State of Illinois, do hereby certify
6 that I reported in shorthand the proceedings had at
7 the hearing aforesaid, and that the foregoing is a
8 true, complete and correct transcript of the
9 proceedings of said hearing as appears from my
10 stenographic notes so taken and transcribed under my
11 personal direction.

12 IN WITNESS WHEREOF, I do hereunto set my
13 hand at Chicago, Illinois, this 25th day of
14 August, 2009.

15

16

17


Certified Shorthand Reporter

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19 C.S.R. Certificate No. 84-4327.

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