

BEFORE THE 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)

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STATE OF ILLINOIS
Pollution Control Board
R08-
(Rulemaking - Water)
Subdocket C

REPORT OF PROCEEDINGS of the above-entitled
cause held at 100 West Randolph Street, Suite 02-025,
Chicago, Illinois, before HEARING OFFICER MARIE TIPSORD,
at 9:00 o'clock a.m. on Wednesday, March 9, 2011.

L.A. COURT REPORTERS, LLC.
8 W. Monroe Street, Suite 2007
Chicago, Illinois 60603
(312)419-9292 (312)419-9294 (fax)
David Demski, CSR 084-004386

1 A P P E A R A N C E S:

2 MS. MARIE TIPSORD, Hearing Officer
MS. ALISA LIU, Environmental Scientist
3 MR. ANAND RAO, Senior Environmental Scientist
MR. G. TANNER GIRARD, Acting Chairman
4 MR. THOMAS E. JOHNSON
MR. GARY BLANKENSHIP
5 MS. CARRIE ZALEWSKI

6 ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
1021 North Grand Avenue East
7 P.O. Box 19276
Springfield, Illinois 62794-9276
8 (217)782-5544

BY: MS. DEBORAH WILLIAMS
9 MS. STEPHANIE DIERS

10 SNR DENTON US, LLP
BY: MR. ARIEL J. TESHER
11 MR. JEFFERY FORT

233 South Wacker Drive
12 Suite 7800
Chicago, Illinois 60606-6306
13 (312)876-2813
(312)876-7934 (fax)
14 E-mail: ariel.tesher@snrdenton.com

15 NIJMAN FRANZETTI, LLP
BY: MS. SUSAN M. FRANZETTI
16 10 South LaSalle Street - Suite 3600
Chicago, Illinois 60603
17 (312)251-5590
(312)251-4610 (fax)
18 E-mail: sf@nijmanfranzetti.com

19 ENVIRONMENTAL LAW AND POLICY CENTER
ILLINOIS CHAPTER SIERRA CLUB

20 BY: MR. ALBERT ETTINGER
35 East Wacker Drive - Suite 1300
21 Chicago, Illinois 60601

22 MATTHEW C. READ
GARY M. AULT

23 RAY E. HENRY
JAMES E. HUFF

24 ROBERT ELVERT

1 MS. TIPSORD: I have 9:00 o'clock. Are we
2 ready? Good morning.

3 My name is Marie Tipsord and I've been
4 appointed by the Board to serve as Hearing Officer in
5 this preceding entitled Water Quality Standards and
6 Affluent Limitations For the Chicago Area Waterway
7 Systems and Lower Des Plaines River, Proposed Amendment
8 to 35 Ill Admin Code 301, 302, 303, and 304. This is
9 docket number R08-9 Subdocket C today.

10 With me today to my immediate left is acting
11 Chairman G. Tanner Girard, Board Members Carrie Zalewski
12 and Tom Johnson will be joining us momentarily, and
13 Board Member Gary Blankenship to my far left. To my
14 immediate right is Anand Rao and to his right Alisa Liu
15 from our technical staff. In addition today, we have
16 two of our interns, Nick Garmisch and Kristin Carl back
17 in the back and Daniel Robertson who is Gary
18 Blankenship's assistant.

19 This is the third day of hearings in
20 Subdocket C, but it is the 47th overall day of hearings
21 for those of you still keeping track. A prehearing
22 conference was held on March 7th, 2011 and a schedule
23 was decided upon. I did not do a Hearing Officer order
24 so I will set forth the schedule today. We will first

1 hear from Mr. James Huff on behalf of CITGO and he will
2 be questioned first by the IEPA and then Three Rivers
3 and the Sierra Club, and finally by the District. After
4 Mr. Huff, we will turn to Mr. Ray Henry on behalf of
5 Midwest Generation. He will be questioned by the IEPA,
6 then Prairie Rivers and the Sierra Club. Tomorrow we
7 will begin with Mr. Scott Bell on behalf of the
8 Metropolitan Water Reclamation District of Greater
9 Chicago. He will be questioned first by the IEPA, then
10 Prairie Rivers and the Sierra Club, and finally by
11 Midwest Generation. After Mr. Bell, Mr. Scudder Mackey
12 will testify and he will be questioned first by the
13 IEPA, then Prairie Rivers and Sierra Club, then
14 Openlands, Midwest Generation, and finally by CITGO.
15 We do not anticipate completing Mr. Bell's testimony
16 tomorrow so additional hearings will be scheduled
17 tomorrow. The testimony in this hearing will be marked
18 as an exhibit and entered as if read, anyone may ask a
19 follow-up question, you need not wait until your turn to
20 ask questions. I do ask that you raise your hand, wait
21 for me to acknowledge you. After I have acknowledged
22 you, please state your name and whom you represent
23 before you begin your question. Please speak one at a
24 time. If you're speaking over each other the court

1 reporter will not be able to get your questions on the
2 record. Please note any questions asked by a Board
3 Member or staff are intended to help build a complete
4 record for the Board's decision and not to express any
5 preconceived notion or bias.

6 Dr. Girard.

7 MR. GIRARD: Good morning. Welcome to
8 day 47 of the hearings in this rulemaking. Sometimes
9 I do lose track. Obviously, with 47 days of hearing,
10 we've had a tremendous investment of time and energy and
11 even resources into all the preparation for both the
12 testimony, the questioning, over several years now. So,
13 the Board is very appreciative of all the time and
14 effort that's been put into this rulemaking and it is
15 becoming a very special event. We may have to have a
16 yearly reunion because it's sort of like old home week,
17 to see all the friendly faces every year, so thank you
18 all. We look forward to the testimony and questions
19 today, let's get on with it.

20 MS. TIPSORD: All right. With that, can we
21 have Mr. Huff sworn in.

22 JAMES E. HUFF
23 having been first duly sworn by the court reporter,
24 was examined and testified on his oath as follows:

1 MS. TIPSORD: Do we have a copy of
2 Mr. Huff's testimony?

3 MR. TESHER: We do.

4 MS. TIPSORD: Thank you very much.

5 If there's no objection, we will enter the
6 testimony of Mr. James E Huff as Exhibit 437.

7 Seeing no objection, it's Exhibit 437, and
8 with that we will begin the questioning.

9 MR. TESHER: Madame Hearing Officer, if I
10 may just introduce the Witness briefly?

11 MS. TIPSORD: Sure.

12 MR. TESHER: Good morning. My name is
13 Ariel Teshler. I'm here with Jeff Fort representing the
14 Lamont Refinery.

15 We're going to hear from Jim Huff this
16 morning about the uniqueness of a stretch of the Lower
17 Ship Canal and proposed Use C designation for that
18 stretch. This testimony was initially scheduled for the
19 prior hearings that we had regarding the electric fish
20 barrier, but it was pushed forward to this time. Jim
21 will be talking this morning about the Ship Canal
22 generally, but he will be also discussing that barrier.
23 As a result of the unique characteristics of this
24 stretch, the proposing regulatory language for Use C,

1 that would encompass the electric fish barrier which is
2 not currently envisioned by the regulatory language.
3 The map of that area was included as Exhibit A to
4 Mr. Huff's pre-filed testimony and the regulatory
5 language was included as Exhibit B to that same
6 testimony.

7 Our proposed Use C language was crafted to
8 fit within the existing proposal before by the agency,
9 although it certainly would fit within any framework
10 such as that proposed by the district. In order to
11 increase compatibility with the agency's proposal, we
12 took the Use B standard that they had and the Use B
13 explanation and modified it only where necessary to fit
14 this particular area. The main difference that Use C
15 recognizes is the very unique conditions that apply to
16 this stretch of the Ship Canal. The most obvious is the
17 electric fish barrier, but there are others as Jim has
18 noted in his pre-filed testimony.

19 With that I'd like to present Mr. Huff to
20 testify. You have his testimony. If anyone needs extra
21 copies I have them here, including all the exhibits.

22 MS. TIPSORD: Thank you very much.

23 Ms. Diers.

24 EXAMINATION

1 BY MS. DIERS:

2 Q. Good morning, Mr. Huff. My name is
3 Stephanie Diers and I represent the Illinois EPA today
4 and I will be asking you pre-filed questions. I'll
5 begin with question number one.

6 In their current altered state, what is the
7 difference between the natural waterways and the
8 artificial stream?

9 A. Natural streams existed in one form or another
10 before anthropogenic alterations changed them to the
11 present form. Artificial streams constructed for
12 commence rarely incorporate features which incur
13 biodiversity.

14 Q. And 1(a), does the natural stream have a gently
15 sloping riparian area and well developed littoral zone?

16 A. Natural streams may have gently sloping riparian
17 areas, well-developed littoral areas, and in many cases
18 canopy cover that also provide woody debris habitat,
19 especially in the littoral zones.

20 MS. TIPSORD: Mr. Huff, could you slow down
21 just a little bit?

22 THE WITNESS: Okay.

23 BY MS. DIERS:

24 Q. One (b), do you believe that since the Chicago

1 Sanitary and Ship Canal is not a natural waterway, that
2 it cannot support tolerant types of aquatic life
3 populations?

4 A. Past fish collections by the MWRDDC have taken
5 two to nine species at Lockport on the Ship Canal and
6 those collections have been dominated by the gizzard
7 shad and carp, and occasionally there's a few game fish
8 that have been collected.

9 Q. Is that yes? I'm sorry.

10 A. I think that the stream is dominated by
11 non-tolerant fish species.

12 Q. Do you know what type of fish were found during
13 the application of rotenone?

14 A. Only from the article that was published in the
15 Chicago Sun-Times where the IDNR reported the results of
16 the public.

17 Q. One (d), are channel catfish tolerant in respect
18 to dissolved oxygen?

19 A. I think this question would be better directed to
20 a fishery biologist. My suspicion is that channel
21 catfish are more tolerant to lower dissolved oxygen than
22 other game fish because of the bottom-feeding
23 tendencies, and temperature has some factor in this as
24 well. DE Moss and DC Scott in October 1961 in

1 transactions of the American Fishery Society published
2 an article entitled "Dissolved Oxygen Requirements of
3 Three Species of Fish." The channel catfish was one of
4 the three species. At 35 degree C, the channel catfish
5 was more tolerant of low-dissolved oxygen than the
6 bluegill or largemouth bass, but at the lower
7 temperature studies the bluegill were more tolerant of
8 lower-dissolved oxygen levels. In addition, the Catfish
9 Farming Handbook published by Springer notes that
10 channel catfish can tolerate 0.5 milligram per liter
11 dissolved oxygen for several hours and below 2.0
12 milligram per liter for several days.

13 MR. RAO: Mr. Huff, do you have a citation
14 for the book from Springer?

15 THE WITNESS: Just -- published by Springer,
16 but I can get that though.

17 MR. ETTINGER: Excuse me. This is Albert
18 Ettinger. I represent Prairie Rivers Network and Sierra
19 Club.

20 You said 0.5 milligrams per liter dissolved
21 oxygen for how long?

22 THE WITNESS: Several hours.

23 MR. ETTINGER: Several hours. Do they have
24 any figure as to how long they can handle that? Several

1 hours beyond that they die or what happens?

2 THE WITNESS: Yes.

3 BY MS. DIERS:

4 Q. Pre-filed question number two. Will discharges
5 under your proposed Use C designation need to meet water
6 quality standards downstream?

7 A. I would think this question is really a
8 permitting question. That is not what we are
9 considering in this area. However, I don't think this
10 is any different than the transaction from the secondary
11 contact waterways currently to the primary contact that
12 occurs at the I55 bridge on the Des Plaines River.

13 Q. Is that a yes?

14 A. I think I answered the question as best I could.
15 I don't think yes-no; it's a permitting question.

16 Q. Question three, the electric barrier is expected
17 to block fish while moving through the barrier. Will
18 macro invertebrates be impacted from the barrier?

19 A. There are minimal data on electric barriers and
20 their effects on macroinvertebrates, but effects would
21 be expected. The electric current is applied at the
22 floor of the Ship Canal where the benthic organisms are
23 located. An Australian paper by Brown in 2000 suggest
24 that electric fields in a small stream can skew the

1 mayfly caddisfly ratios. My personal observations when
2 electro fishing is that the crawfish exit the area
3 rapidly and I expect that other macroinvertebrates would
4 decline in population due to the stress of the
5 continuous electric current.

6 Q. Question four, does your proposal protect the
7 macroinvertebrates?

8 A. First, I think you need to look at the current
9 macroinvertebrate quality on the Chicago Sanitary and
10 Ship Canal from the technical memorandum number one,
11 "Characterization of the Macroinvertebrate Community in
12 Chicago Area Waterway Systems," prepared for the MWRDGC
13 by LimnoTech in 2009. This report provides benthic data
14 from the closest sampling location to Romeoville at
15 AWQM Station 92, located downstream of the Lockport
16 controlling works. The collection was dominated by
17 90 percent oligochaeta worms and is not considered rich
18 for macroinvertebrates. The electric current is a large
19 stressor on the macroinvertebrates and will further
20 limit both quality and populations of macroinvertebrates
21 beyond what is already present along the Lower Chicago
22 Sanitary and Ship Canal, and the Lamont refinery's
23 proposal will have no impact on the quality or
24 population of macroinvertebrates in the proposed Use C

1 zone. It should be noted that the collection of biotic
2 data would be difficult in this region due to the
3 electric shock hazard.

4 Q. Question five, the black safety zone includes all
5 of the electric barriers. The Coast Guard has set up a
6 regulated navigation zone upstream and downstream of the
7 black safety zone. Do you know why they set up the
8 regulated navigation zone?

9 A. The Coast Guard set up the regulated navigation
10 zone based on the safety hazards associated with
11 electric current flowing through the waterway and the
12 health affects of higher voltage on people and vessels
13 that pass over and adjacent to the barriers, and
14 especially people that potentially could fall into the
15 water. As noted at the Federal Register at page 756 on
16 January 6, 2010, quote:

17 "The final report concluded that the
18 possible effects to a human body if immersed in the
19 water include paralysis of body muscles, inability to
20 breathe, and ventricular fibrillation."

21 MR. RAO: For the record, could you please
22 explain what black safety zone means?

23 THE WITNESS: If you look at Exhibit 1 to my
24 testimony --

1 MR. TESHER: Exhibit A.

2 THE WITNESS: A, there are two sections, the
3 black safety zone is where the electric barriers are and
4 then the regulated navigation zones are on both the
5 upstream and the downstream location of that area where
6 they prohibit any type of small vessels from entering
7 into those areas as well.

8 BY MS. DIERS:

9 Q. Question six, are fish expected in the regulated
10 navigation zone?

11 A. Fish are not expected in the regulated navigation
12 zone, they will avoid that area as well from the
13 current.

14 Q. Do you know how long the regulated navigation
15 zone is?

16 A. Again I'll refer you to Exhibit A of my
17 testimony. It goes from river mile 295.5 to 297.2, so
18 that would be 1.7 miles in length.

19 Q. Do you know how far the electric barrier will
20 drive the fish away?

21 A. I do not have data on that.

22 Q. Go to question seven, these are questions that
23 are based on Exhibit C that was attached to your
24 testimony. Do you know the cause of the non-winter high

1 chloride levels and I'll start with A), 580 milligram
2 per liter on July 7th, 2010?

3 A. Can I give you one answer for all of those?

4 Q. Sure.

5 A. Based on the historical chloride and water
6 quality data that's present in Exhibit C, that was
7 collected by the Lamont refinery on their water intake
8 from the Ship Canal. The only year that we see those
9 spikes is 2010. You don't see those summer-fall spikes
10 in the other years, so I believe those individual data
11 are outliers. I would discount those data.

12 MR. RAO: Did you do any analysis to figure
13 out whether they're outliers?

14 THE WITNESS: Well, again, you go back and
15 look in the wintertime when the chlorides spike, they
16 stay up for a period of time and every single one of
17 these that are referenced in the question, they went
18 from being spiked to the very next sample, they dropped
19 back down again and much too quick of a recovery if it
20 were a real chloride loading to the Ship Canal. And
21 again we didn't see those in the first three years, I
22 suspect that the analyst at the refinery changed and
23 there's a labeling issue on samples or something along
24 those lines.

1 MR. RAO: Yes. Because when you look at the
2 data it's -- like you said, it all happened in 2010.

3 THE WITNESS: Right. I included that data
4 so you can draw your own conclusions. I didn't want to
5 bias what I was submitting.

6 BY MS. DIERS:

7 Q. Question eight, in paragraph three of page two
8 of your pre-filed testimony you state: "A proper
9 consideration of the uniqueness of the artificially
10 created and physically constrained Lower Ship Canal is
11 lost by including it in this aquatic life Use B
12 grouping."

13 With respect to aquatic life, please
14 describe how the Lower Ship Canal differs from all other
15 waters the agency has included in its proposed aquatic
16 life Use B designation?

17 A. The electric barrier will result in essentially
18 creating a zone without fish and fish passage will not
19 occur. The use obtainability analysis completed by
20 Camp Dresser & McKee in 2007 in support of this rule
21 change indicated the goal of the Ship Canal was, quote,
22 "To maintain water quality to meet general use criteria
23 where attainable and to allow for navigation and fish
24 passage. This regulated navigation zone makes this

1 stretch totally unique from all other portions of the
2 Chicago area waterway system. This is also a stretch of
3 the Chicago area waterway system where rotenone had been
4 applied and also receives all of the pollutant loadings
5 from the various sources throughout the Chicago area
6 waterway systems."

7 MS. TIPSORD: For the record, the Camp
8 Dresser is attachment B to the proposal.

9 BY MS. DIERS:

10 Q. Question nine, on page six of your pre-filed
11 testimony you state:

12 "These electric barriers will not only
13 prevent the aquatic invasive species from migrating, but
14 they will also prevent all other fish from migrating up
15 or down the Lower Ship Canal at Lockport, effectively
16 terminating the water body at this point from a
17 biological perspective."

18 A), what do you mean by terminate the water
19 body from a biological perspective?

20 A. It stops. Fish will not be able to successfully
21 pass through this regulated navigation zone due to the
22 electric current.

23 Q. B), do fish have access to the Lower Chicago
24 Sanitary and Ship Canal above and up to the electrical

1 barrier from locations further upstream?

2 A. Yes.

3 Q. C), do fish have access to the Lower Chicago
4 Sanitary and Ship Canal below and up to the electric
5 barrier from locations further downstream?

6 A. Yes.

7 Q. Ten, how many discharges are there to the
8 proposed Use C waters?

9 A. One.

10 Q. What do you mean by discharge, is that Lamont?

11 A. That would be the CITGO Lamont refinery.

12 Q. Question 11, why can't CITGO achieve 500
13 milligrams per liter chloride in its effluent?

14 A. The Lamont refinery's water intake is from the
15 Chicago Sanitary and Ship Canal above its discharge.
16 When the Ship Canal above the Lamont refinery exceeds
17 500 milligrams per liter chloride due to highway deicing
18 practices, the refinery effluent discharge backs into
19 the Ship Canal exceeds 500 milligrams per liter. To
20 meet this limit would require the refinery to install
21 multi-effective evaporators on its effluent to remove
22 the sodium chlorides which the Illinois Pollution
23 Control Board and the Illinois EPA have consistently
24 determined is not an economically reasonable and every

1 adjusted standard case brought before the Board
2 historically for totally dissolved solvents, including
3 the Lamont refinery and PCB 08-33, chlorides cannot be
4 removed by precipitation technology and if reverse
5 osmosis is utilized a 30-percent concentrate needs to be
6 disposed of somewhere, either back into the Ship Canal
7 or deep-well injection. The Illinois EPA has already
8 determined that at the Lamont refinery this would
9 require a class-one underground injection control permit
10 which requires a cap rock above the zone where injection
11 will occur. There is no cap rock present in the Lamont
12 Romeoville area and this area has been determined not
13 suitable for class-one disposal wells by the Illinois
14 State Geological Survey. The Lamont refinery
15 investigated this with the agency when the wet gas
16 scrubber was installed previously, in addition to
17 evaluating the multi-effective evaporators.

18 Q. What concentration of chloride does Lamont
19 contribute to the effluent?

20 A. I don't know the answer to that. They
21 certainly -- there's three factors. You have the water
22 intake that comes in. They have extensive cooling
23 through the use of cooling towers, so they then
24 concentrate those chlorides further in their wastewater

1 that's being discharged. So on a mass basis they're not
2 adding from the cooling tower, but from a concentration
3 point of view that is a very significant effect. And
4 then crude oil, itself, that's chlorides in there and
5 the first process in a refinery is to basically wash out
6 the chlorides and other impurities through a unit called
7 a desalter, and so they do contribute chlorides through
8 that. I've not done any mass balance on how much that
9 accounts for.

10 MS. DIERS: I have no other questions.

11 MS. TIPSORD: With that, let's move to
12 Prairie Rivers.

13 MR. TESHER: I have a quick follow-up.

14 EXAMINATION

15 BY MR. TESHER:

16 Q. Mr. Huff, are you aware of exceedances beyond 500
17 milligrams per liter that occurred when the background
18 level in the effluent was not exceeding 500 milligrams
19 per liter?

20 A. I am not. I don't think that the contribution
21 from the desalter is efficient to cause a water quality
22 violation when the upstream achieves 500 milligrams per
23 liter.

24 MR. ETTINGER: May I ask some questions,

1 some of which are in the nature of interpretation of the
2 regulations? I'm not asking you to do these necessarily
3 as an expert on interpreting the regulations, but I
4 believe it's necessary for us to understand your
5 interpretation to the regulations, to understand some of
6 the regulatory consequences that you draw from the
7 current situation. I'll still probably draw a bunch of
8 objections anyway, but I'm going to try.

9 EXAMINATION

10 BY MR. ETTINGER:

11 Q. What is the basis for your statement on page
12 three of your pre-filed testimony that no net increase
13 in sulfates is allowed when the receiving stream exceeds
14 500 milligram per liter chlorides?

15 A. The current sulfate water quality standard for
16 general use streams is based on a formula that includes
17 chloride concentrations. However, the chloride
18 concentration is limited to a maximum of 500 milligrams
19 per liter of chloride. Above 500 milligrams per liter
20 of chloride the sulfate water quality standard cannot be
21 calculated. So in deriving NPDS permit limits based on
22 water quality standards, it is impossible to derive in
23 effluent limits that is appropriate during periods when
24 the chlorides in the receiving stream exceed 500

1 milligrams per liter.

2 Q. So you believe that whenever the receiving water
3 has 500 milligrams per liter or more, that there can be
4 no mixing zone for chlorides?

5 A. Could you read that question back? You were
6 mixing sulfate and chlorides, I got confused. I'm
7 sorry.

8 Q. I could well have done that. You believe that
9 when the receiving water exceeds 500 milligrams per
10 liter of chloride, that there can be no mixing zone for
11 chloride?

12 A. That's correct.

13 Q. Thank you. Also on page three you refer to the
14 agency proposed upgraded use of the Lower Ship Canal.
15 How is the agency proposing an upgrade?

16 A. Well, they're going to take the standards from
17 the secondary contact standards up to the proposed Use B
18 standard.

19 Q. As to what parameters? They're not doing that as
20 to all parameters, are they?

21 A. Pretty close to all of the parameters.

22 Q. What parameters aren't they doing it?

23 A. Well, let's turn that around. The ones that I'm
24 interested in today are the sulfates, the chlorides

1 temperature.

2 MS. TIPSORD: Just to clarify. Those are
3 the ones they're taking --

4 THE WITNESS: That will be more restrictive
5 under the agency's original proposal.

6 MS. TIPSORD: Thank you.

7 BY MR. ETTINGER:

8 Q. On page four you state that the Lower Ship Canal
9 is typically 200 to 300 feet wide. Why does that
10 matter?

11 A. The width, depth, and straight sided nature of
12 the Lower Ship Canal were cited to demonstrated that the
13 habitat quality is limited for such a large water body.
14 Canopy cover is of course more difficult the wider the
15 stream. From a geomorphological perspective, the wetted
16 perimeter of the channel which incorporates both the
17 depth and the width was one of the variables found by
18 LimnoTech in its habitat evaluation report of 2010 as
19 correlating with fish metrics.

20 Q. That's interesting, but the Mississippi River is
21 more than 200 to 300 feet wide much of its distance.
22 Would you suggest that we declare the Mississippi River
23 should have a lower classification because it's too
24 wide?

1 A. No, sir.

2 Q. Why is that?

3 A. Because it follows more of a natural pattern to
4 it, it's got a lot more habitat area for fish spawning
5 and things like that.

6 Q. So it's not really the width, it's the habitat
7 area and other factors rather than the width?

8 A. I think if you look at the correlation work that
9 was done by LimnoTech, that there was a correlation
10 between the wetted perimeter which incorporates both the
11 depth plus the width.

12 Q. There's mention that the Lower Ship Canal has
13 depths greater than 27 feet, is it all over 27 feet
14 deep?

15 A. The Chicago Sanitary and Ship Canal deepens as it
16 flows downstream. By Damen and Cicero Avenue the depths
17 are typically 18 to 21 feet and then the depths
18 gradually increase to 27 feet at the downstream and near
19 Lockport and that's taken directly from the LimnoTech
20 report habitat evaluation report at page 73. The water
21 depth is maintained at depths required for commercial
22 navigation. Water depth between 18 and 27 feet will
23 limit light penetration, thus limiting macrophyte beds
24 which can be used by fish as habitat.

1 MS. TIPSORD: For the record, the LimnoTech
2 report is public comment 284.

3 BY MR. ETTINGER:

4 Q. What do you mean on page five of your pre-filed
5 testimony that overall stream use is designated as
6 non-spored?

7 A. Three stream sections on the segments on that
8 Chicago and Sanitary and Ship Canal has been designated
9 in the Illinois EPA's 303(d) list in 2010 as not
10 supporting aquatic life use.

11 Q. Does the Lower Ship Canal violate existing
12 standards for PCBs, iron, oil and grease, dissolved
13 oxygen, total nitrogen and total phosphorus?

14 A. The Lamont refinery would not be contributing to
15 PCB water quality violations. Given the significant
16 evaporation of water in the refinery cooling operations,
17 I would expect on an annual basis that the Lamont
18 refinery is discharging less iron, total nitrogen and
19 phosphorus than it removes from the Ship Canal in its
20 water intake. Huff & Huff using the MWRDGC's dissolved
21 oxygen model modeled the Lamont refinery's ammonia
22 impact on dissolved oxygen on not only the Ship Canal
23 but also on the downstream Des Plaines and Illinois
24 River. The modeling effort determined that any impact

1 from the Lamont refinery was so small that it could not
2 be measured. With respect to oil and grease, the
3 effluent from the Lamont refinery consistently achieves
4 the water quality limit so they would not be
5 contributing to oil and grease violations.

6 Q. I think we missed each other on our scripts here.
7 Did you just answer is the CITGO refinery contributing
8 to any of these violations through its operations?

9 A. I believe I just answered that.

10 Q. That's right, that's right. That's not the
11 question I asked, but that is the question you answered
12 so we'll let the record reflect that and go from there.

13 On page five you mentioned rotenone
14 applications. What information do you have about future
15 applications of rotenone?

16 A. The Asian Carp Regional Coordinating Committee
17 released the 2011 Asian Carp control spread, the
18 framework document in December of 2010 that includes
19 rotenone as one of the tools for potentially controlling
20 silver and bighead carp in the future.

21 Q. Do you have any idea how often they're going to
22 be able to do that in the future or will want to do that
23 in the future?

24 A. I think it's a question with respect to where the

1 electric barriers are and how often they have to be
2 taken down for maintenance and how effective those are,
3 and so every time that they want to test to see based on
4 the EDNA, that there may be Asian Carp present, rotenone
5 may be used under those cases to investigate it.

6 Q. Regarding the electric barrier, are you aware of
7 any information regarding the conductivity level and its
8 affect on the operations of the electric barrier?

9 MR. TESHER: Excuse me. Is this a follow-up
10 question?

11 MR. ETTINGER: No. We're just talking about
12 electric barrier, we're just talking electric barriers
13 now.

14 BY MR. ETTINGER:

15 Q. Are you aware of any impact of conductivity or
16 increased conductivity on the efficiency of the electric
17 barrier?

18 A. Not specifically.

19 Q. Have you heard any discussion of the affect of
20 conductivity on the efficiency of the electric barrier?

21 A. Again not specifically, no. With respect to as
22 the conductivity of the water goes up through the
23 presence of dissolved solids it becomes more conductive,
24 so that's going to have an affect on the electric

1 barriers I would expect.

2 Q. Page six in your testimony you mention fish
3 migrating up and down the system. Have you studied fish
4 migration in the system?

5 A. Have I? No.

6 Q. Do fish currently migrate into the Lower Ship
7 Canal?

8 A. Fish can certainly migrate both up and downstream
9 of the Lower Sanitary and Ship Canal, from downstream
10 they pass through the Lockport locks. If this was not
11 occurring, there would be no need for the electric
12 barriers. From upstream, migration from both the Upper
13 Ship Canal and the Cal-Sag Channel into the Lower Ship
14 Canal occur. The electric barrier has created an
15 impediment to fish migration through that regulated
16 navigation zone.

17 Q. Fish actually can migrate down, can't they?

18 A. Migrate down?

19 Q. Downstream? Maybe migrate's not the right word.
20 Limp downstream, can't they?

21 A. Not sure I understand the question. Where are
22 they starting?

23 Q. Upstream of the electric barrier. Have you seen
24 the data on what fish they found below the electric

1 barrier?

2 A. With respect to when they rotenone?

3 Q. Yes, after they rotenone?

4 A. Again only what was published in the Sun-Times.

5 Q. Does that include coho salmon?

6 A. Not to my knowledge, no.

7 Q. I'm going to skip eight. Nine, have you
8 determined how many violations there would be in the
9 Sanitary and Ship Canal if Illinois adopted the federal
10 criteria for chloride or the recently EPA approved Iowa
11 criteria?

12 A. I have a handout that will answer that question.

13 MS. TIPSORD: Point of clarification. When
14 you say recently EPA approved, U.S. EPA approved?

15 MR. ETTINGER: Yes. I'm sorry.

16 MR. TESHER: If I may introduce the two
17 exhibits. The first exhibit compares the water intake
18 to the U.S. EPA criteria, the second compares the same
19 water intake to the Iowa criteria.

20 MS. TIPSORD: I need a couple more copies up
21 here, please, and I'll wait until he looks -- gets these
22 passed around.

23 If there's no objection, we'll take the
24 comparison to the chloride levels at Lamont intake

1 compared to U.S. EPA criteria as Exhibit 438 and
2 compared to the Iowa criteria as Exhibit 439, if there's
3 no objection, and I'll give you all a chance to look at
4 that.

5 Is there any objection? Seeing none, the
6 comparison to the U.S. EPA criteria as Exhibit 438 and
7 comparison to Iowa criteria as Exhibit 439.

8 THE WITNESS: So if I could respond to your
9 question now? You have the data in front of you.

10 BY MR. ETTINGER:

11 Q. Yes, I'd like some explanation as to what
12 underlying means and bolding, and all that stuff.

13 MR. TESHER: The only item that has any of
14 the bolding would be the comparison to the U.S. EPA and
15 that would be data that exceeds the acute criteria.
16 Otherwise, any of the underlying "ital" will be
17 exceeding the chronic criteria for either of them and
18 there's no violation of the acute in the Iowa.

19 BY MR. ETTINGER:

20 Q. There's no violation of the Iowa acute. And we
21 think there's a violation of the chronics, but we don't
22 really have chronic figures here, do we, or --

23 A. Could I read my answer first and maybe you can
24 follow up with your question which might clarify?

1 Q. That's a good idea.

2 A. The attached table compares the Lamont refinery
3 water intake chloride levels to the federal criteria
4 which are acute 860 milligrams per liter and chronic
5 230 milligrams per liter from 2007 to 2010, four years
6 of weekly data, the acute federal criteria of 860
7 milligrams per liter was exceeded three times over that
8 period. The federal chronic criteria of 230 milligrams
9 per liter of chloride is basically exceeded for
10 prolonged periods each winter-spring. In the case of
11 the winter 2007-2008, it lasts from December 7th, 2007
12 through April 28th, 2008. For the recently EPA approved
13 Iowa criteria and using the critical hardness for the
14 Ship Canal of 192 milligrams per liter, the calculated
15 acute chloride criteria is 1051 milligrams per liter and
16 the chronic criterion is 340 milligrams per liter. The
17 Iowa acute criterion has been achieved for the entire
18 four years presented in the attached table. However,
19 the Ship Canal remains above the Iowa chronic criterion
20 for extended periods during the winter-spring months,
21 but not for as long as compared to the federal
22 criterion. What is missing in Illinois, Iowa, and the
23 federal criteria is the temperature component for
24 chlorides similar to that that's used for ammonia.

1 There are limited studies on the effective temperatures
2 on the toxicity of chlorides, however the limited data
3 suggests that at lower temperatures the chlorides are
4 less toxic and additional research in this area would be
5 prudent before adopting revised standards.

6 Q. That's interesting. So you're saying as the
7 temperature goes up chloride becomes more toxic, or as
8 stated, there's some studies that suggest that as
9 temperature rises chloride becomes more toxic?

10 A. That's correct.

11 Q. Are those studies cited somewhere?

12 A. Yes.

13 THE WITNESS: Do you have that one Silver
14 study?

15 MR. TESHHER: I don't have it right know, but
16 you can read it to him.

17 THE WITNESS: PS Silver and M Rupprecht,
18 R-u-p-r-e-c-h-t, and MS Stouffer published an article
19 entitled Temperature Dependent Effects of Road Deicing
20 Salt on Carana Mid Larvae, and it was in Wetlands Volume
21 29, page 942 to 951 in 2009.

22 MS. WILLIAMS: Can we request that?

23 MR. TESHHER: We can file that article with
24 the record and have it --

1 BY MR. ETTINGER:

2 Q. On page 10 --

3 MR. GIRARD: Albert, can I just clarify
4 that? That study sounds like it was not on fish, is
5 that correct?

6 THE WITNESS: That one was on benthic
7 organisms, that's correct.

8 MR. GIRARD: Do you have some other studies
9 that were done on fish, in terms of chloride levels and
10 temperature?

11 THE WITNESS: I do not. I think that that
12 would be a wonderful area for additional research, much
13 like the Illinois EPA led that effort with the sulfate
14 toxicity several years ago and Iowa's now done some
15 additional work with chloride. That's again one more
16 variable that the state water survey should undertake,
17 because I think it would really help in our proceedings
18 here on addressing chlorides and making sure it's
19 protective to the environment as well.

20 MR. GIRARD: Thank you.

21 I'm sorry, Albert. Go ahead.

22 MR. ETTINGER: No, that's all right. Every
23 once in a while we learn something here.

24 BY MR. ETTINGER:

1 Q. Question No. 10, on page eight you state that on
2 an affluent dominated stream chlorinating incoming water
3 is important to prevent biological growth on the heat
4 exchangers. Why is this?

5 A. Microscopic biota become established on the
6 inside of the heat exchangers as well as the piping and
7 the biological coating becomes established quicker on
8 effluent dominated streams just because of the other
9 organic food sources that are there. Without
10 chlorinating the water intake and or the cooling towers
11 to retard and remove this growth, the biological
12 coatings become so thick as to reduce the heat transfer
13 efficiency, reducing the capacity of the process.

14 Q. What is it in the effluent dominated streams that
15 causes there to be more need for chlorination than there
16 is otherwise?

17 A. Two-part answer. One would be the higher
18 concentration of just microbes in general and there's
19 also more food there, the organic matter that's there.

20 Q. What kind of microbes are in the effluent
21 dominated streams that you wouldn't expect in a less
22 effluent dominated stream?

23 A. Well, just because you've got a higher food
24 source there, you have a higher equilibrium population

1 of microbial growth.

2 Q. What's in the food -- what's in the food source?

3 A. Biochemical oxygen demand, BOD, total organic
4 carbon, it's going to be discharged from the wastewater
5 treatment plants also be present -- overflow.

6 Q. That's even if the plants are meeting secondary
7 treatment levels?

8 A. Yes, sir.

9 Q. Because even meeting secondary treatment levels,
10 you'll be higher than you would be in a typical
11 natural -- more natural water?

12 A. That's correct.

13 Q. Here on number 11, I really didn't follow your
14 math here. You state on page eight that a 50-percent
15 reduction of salt used during the heaviest storm events
16 would be required to achieve a 500-milligram per liter
17 chloride standard. How did you calculate that?

18 A. If you go back and look at Exhibit A of my
19 testimony, the background levels in the summer, the Ship
20 Canal gets down to about 100 milligrams per liter, plus
21 or minus. If you look at the peaks each year, they're
22 on the order of 900 and I believe the highest was 998
23 milligrams per liter, and so if you're trying to get the
24 500 and you're at 900 now, and background's a hundred,

1 there's an 800 milligram per liter spread and you have
2 to basically get half of that down to get the 500
3 milligrams per liter and then the worst year it's over
4 60 percent.

5 Q. I guess my problem was it's not a direct
6 relationship between salt used and how much salt gets in
7 the water or is there?

8 A. Sure there is. They would be incredibly well
9 correlated.

10 Q. Well, there's nothing we could do to keep the
11 salt out of the water once we've used it?

12 A. I believe that's substantially correct. You
13 better reduce what you're applying as opposed to trying
14 to remove that somehow through -- what you can do,
15 Albert, is through retention you can retard the rate of
16 runoff. So instead of the salt being laid in the storm
17 sewer over one or two days, it may emerge from a
18 retention basin with a slower release over a couple
19 weeks. So you could retard the rate which would
20 certainly reduce the peaks.

21 Q. Question 12 of the pre-filed questions, in
22 footnote one of page eight of your testimony you state
23 that the agency seeks to impose more restrictive water
24 quality temperatures on secondary contact waters and

1 general use waters with regard to temperature and
2 arsenic. Please explain why you believe this as to
3 temperatures?

4 A. I was comparing the primary contact temperature
5 limits in 302.211(e) to the proposed temperature limits
6 that were in the agency's proposal for the Chicago area
7 waterway.

8 Q. Did you take into account 35 Illinois
9 Administrative Code 302.211(c) or (d), which provide for
10 the 5 degree Delta T limitation and the requirement that
11 temperature variations over a day be natural?

12 A. Not specifically, no.

13 MR. ETTINGER: I'm dropping number 13. We
14 can talk about that later.

15 MR. TESHER: I have a quick follow-up for
16 Jim, then, regarding the chloride question and the
17 application of salt. Are there other methods besides
18 retention ponds, any BMPs or anything else like that
19 that can be done to reduce the impact of chloride?

20 THE WITNESS: Well, most of the BMPs are
21 directed at reducing the amount of sodium chloride that
22 is actually applied, whether it's parking lots or
23 highways through such things as the beet juice or
24 pre-wetting a surface so you have a more efficient

1 application that goes on.

2 MR. RAO: I'd like to ask Albert's
3 thirteenth -- you know, the thirteenth question because
4 may have to deal with this proposed language and you
5 have a fairly detailed explanation in the rule language
6 which we usually don't include in the rule languages.
7 So if you want to take a look at it now or later, it's
8 fine but -- then you take a look at that in context of
9 what the agency has proposed and, you know, proposed
10 consistent language?

11 THE WITNESS: I think that with our exact
12 attempt, was we modeled that after the justification of
13 the agency's proposal for Use B.

14 MS. TIPSORD: Is there anything further for
15 Mr. Huff?

16 MR. TESHER: Jim, would the explanation
17 necessarily need to be part of the regulation or was it
18 there only to match the agency's proposal?

19 THE WITNESS: I think more to match the
20 agency proposal than incorporation in the regulation,
21 is how I envisioned it.

22 MR. RAO: All right. That helps, Thanks.

23 MR. ETTINGER: That was my question. There
24 was some statements in there that are either arguably

1 debatable or could become debatable in the future and I
2 don't think it's appropriate normally to make statements
3 like that in the regulatory language itself, but we can
4 discuss that later.

5 MS. TIPSORD: Anything else? Then we move
6 to the district and Mr. Andes, please identify yourself
7 for the record.

8 MR. ANDES: Fred Andes. I'm counsel for the
9 Metropolitan Water Reclamation District of Greater
10 Chicago. Excuse the hoarse voice, colds are going
11 around.

12 EXAMINATION

13 BY MR. ANDES:

14 Q. Good morning, Mr. Huff.

15 A. Good morning.

16 Q. Let's start with question one. Why is snow-melt
17 runoff more of a beneficial use for the Lower Ship Canal
18 than it is for the Upper Ship Canal or for any other
19 portion of the cause?

20 A. The Lower Ship Canal receives the snow-melt
21 runoff from essentially all of the Chicago area
22 waterways, and that was the point I was making. The
23 chloride-laden water has to go somewhere and the
24 drainage through the Chicago area waterways is a key use

1 of the Lower Chicago Sanitary and Ship Canal.

2 Q. Are you saying the drainage from, say, the area
3 of the north shore channel of snow melt goes to the
4 Lower Ship Canal?

5 A. Yes.

6 Q. All of the storm water runoff from the entire
7 system goes directly to the Lower Ship Canal?

8 A. It passes through the Lower Ship Canal.

9 Q. Does it pass through any other areas of the
10 system?

11 A. Well, certainly, it has to pass through the North
12 Shore Channel or the Upper Sanitary Ship Canal or the
13 Cal-Sag Channel.

14 Q. It passes through those areas and then goes
15 through the Lower Ship Canal?

16 A. Correct.

17 Q. So it's the last point in the system that gets
18 all the runoff, is that your point?

19 A. Yes, that and they're all going to go down
20 through that area, yes.

21 Q. But they all receive some degree of snow melt?

22 A. Absolutely, yes.

23 Q. You state that some of the waterways covered by
24 the UAA are natural streams and I think -- I had assumed

1 the question before, but it was a little hard to hear,
2 in the back. How do you define natural streams?

3 A. The streams that existed in one form or another
4 before anthropogenic influences modified them.

5 Q. You include channelized straightened waterways as
6 natural?

7 A. Yes.

8 Q. Are the altered waterways in the cause sometimes
9 as artificial and lacking in physical habitat as the
10 manmade channels?

11 A. Yes. Referring to the LimnoTech report habitat
12 evaluation report in 2010, pages 138 and 139, they rated
13 the habitat quality of the entire Chicago Sanitary and
14 Ship Canal as the poorest in the Chicago area waterway,
15 tied with the south branch of the Chicago River which is
16 a heavily modified natural stream.

17 Q. You identified the Lower Ship Canal as effluent
18 dominated. Isn't the whole system effluent dominated?

19 A. Similar to my response on the first question, my
20 point was just that all of the effluence ultimately goes
21 through the Lower Sanitary and Ship Canal.

22 Q. You talked about segments of the cause and the
23 natural waterways on page two. Is the Upper Ship Canal
24 a natural waterway?

1 A. No.

2 Q. Let's move to question five. You discuss depth,
3 width, vertical walls, and steep embankments. How do
4 those characteristics for the Lower Ship Canal differ
5 from those in the Upper Ship Canal?

6 A. The Lower Chicago Sanitary and Ship Canal is
7 dominated by vertical walls and in part by a steep rock
8 filled embankments, while the Upper Sanitary and Ship
9 Canal is more trapezoidal shape with areas of vertical
10 back walls and that's from the MWRDGC report description
11 of the Chicago area waterway systems May 2002. The
12 Lower Ship Canal receives more effluent from the
13 watershed than the upper canal does, the lower canal
14 contains the electric barrier as well.

15 Q. I think you've answered 5B, so let me -- by your
16 answer just then, so let me move on.

17 On page four you stated, "With the potential
18 exception of the Cal-Sag Channel as described later in
19 my testimony," however, you didn't mention it again in
20 your testimony. What was the point that you wanted to
21 make, is the Cal-Sag similar to the Lower Ship Canal?

22 A. Yes, sir, it is. Except that it doesn't have the
23 thermal loading that the Sanitary Ship Canal has.

24 MR. ANDES: Thank you.

1 MR. TESHHER: A quick follow-up. Does it
2 have an electric barrier?

3 THE WITNESS: The Cal-Sag Channel?

4 MR. TESHHER: Yes.

5 THE WITNESS: No.

6 BY MR. ANDES:

7 Q. That goes to my next question which I'll
8 rephrase. Are you saying the main factor that makes the
9 Lower Ship Canal unique is the fact that it is
10 specifically associated with efforts to control the
11 spread of evasive species?

12 A. If you had to pick one factor, that would be the
13 most important factor, yes.

14 Q. On page five you listed a number of water quality
15 impairments. Are you aware that in the draft 2010
16 303(d) lists total nitrogen and VO are not listed
17 impairments in the Ship Canal?

18 A. As this is still a draft document, I did not
19 believe it was appropriate to cite. However, the draft
20 version that's posted on the Illinois EPA website, I
21 checked on March 4th, continues to show dissolved oxygen
22 as a cause of impairments in all three segments of the
23 Chicago Sanitary and Ship Canals. I believe the
24 Illinois EPA discontinued total nitrogen as a cause of

1 impairment while maintaining nitrates where the water is
2 used for public water supply. I'm not aware of any
3 conditions on the ship canals that would change the
4 dissolved oxygen levels or the total nitrogen levels
5 compared to the levels utilized in the 2008 303(d) list.
6 So, perhaps, your question should be directed to the
7 Illinois EPA as to why total nitrogen was dropped and
8 whether dissolved oxygen is a cause of impairment and --

9 Q. Are the listed impairments for the Lower Ship
10 Canal similar to those listed for the Upper Ship Canal,
11 the north branch of the Chicago River, the Little Cal,
12 Cal-Sag, and the Grand Calumet River?

13 A. Yes, sir.

14 MR. AMES: Thank you. I'm done.

15 MS. TIPSORD: Anything else for Mr. Huff?

16 MR. TESHER: No.

17 MS. TIPSORD: Okay, anything else?

18 Thank you very much.

19 Let's take a 10-minute break and we'll come
20 back and go with Mr. Henry.

21 (Recess.)

22 MS. TIPSORD: Let's go back on the record.

23 Next we're ready with the testimony of Ray
24 E. Henry, on behalf of Midwest Generation. Can we have

1 the witness sworn in, please?

2 RAY E. HENRY

3 having been first duly sworn by MS. TIPSORD reporter,
4 was examined and testified on is oath as follows:

5 MS. TIPSORD: Do we have a copy of his
6 testimony?

7 MS. FRANZETTI: Yes, we do, Madam Hearing
8 Officer. This is a copy of his pre-filed testimony with
9 Exhibit A his resume, and this is Exhibit B, the
10 Sargent & Lundy cooling tower study report.

11 MS. TIPSORD: If there's no objection, we
12 will mark the pre-filed testimony and exhibits as
13 Exhibit 440.

14 Received as Exhibit 440.

15 With that, are we ready to go to questions?

16 MS. FRANZETTI: Yes.

17 EXAMINATION

18 BY MS. WILLIAMS:

19 Q. Good morning, Mr. Henry. My name is Deborah
20 Williams and I'm going to be asking questions on behalf
21 of Illinois EPA today. Welcome; nice to meet you.

22 A. Good morning.

23 Q. Why don't we start with question one. Which of
24 the five Midwest Generation facilities on the Chicago

1 area waterway system and Lower Des Plaines River were
2 designed by Sargent & Lundy?

3 A. The unit and the commercial operating date of
4 the units designed by Sargent & Lundy are as follows:
5 Joliet Unit 6, 1959; Crawford Unit 7, 1958; Crawford
6 Unit 8, 1961; Will County Unit 4, 1963; Joliet Unit 7,
7 1965, and Joliet Unit 8, 1966.

8 Q. You went through those pretty quickly. Does that
9 cover all the facilities?

10 A. No, it does not. There were two units that were
11 not designed by Sargent & Lundy and those are Fisk Unit
12 19 and Will County Unit 3.

13 Q. Do you know how old those two facility are?

14 A. No, I don't. I don't know the commercial
15 operating date of those two units.

16 Q. Do you know if they predated the ones you named
17 or you just don't know at all?

18 A. I don't know at all.

19 Q. I don't want to insult you with Question A, but
20 did you work personally on any of these facilities?

21 A. No, I did not.

22 Q. They predate you, is that --

23 A. Yes, that is correct.

24 Q. What is the expected life of the five Midwest

1 Generation facilities?

2 A. Well, the end of life of coal-fired units is
3 really an economical rather than a technical issue.
4 With proper maintenance, coal-fired plants can operate
5 for a very long time. And really it's a matter of what
6 does it cost or capital improvements and operating and
7 maintenance costs versus the potential revenue, so it's
8 an economic decision and not a technical issue.

9 Q. Was there a useful life for these facilities when
10 they were originally designed?

11 A. I don't know.

12 Q. Did you design the existing -- this is Question
13 D. Did you design the existing cooling towers at the
14 Joliet 9 facility?

15 A. I think you mean the Joliet 29 facility?

16 Q. I'm sorry, yes. I misread the question, Joliet
17 29?

18 A. No, we did not.

19 Q. Do you know when they were built?

20 A. I understand that the construction was started in
21 1999 and completed in 2000.

22 Q. Do you know why they were built?

23 A. No -- well, I guess I'd say that they were built
24 to meet the temperature, the current temperature limits

1 which are at the I-55 bridge.

2 Q. Can you explain what you mean by meet the limits?

3 A. Well, by using those cooling towers they can
4 minimize their D ratings. With the current limits, one
5 way to meet the limit would be to de-rate the units.
6 With the cooling tower they are able to cool the water
7 and minimize the amount of de-rates that they are
8 required on the units.

9 Q. So it enabled them to generate more power and
10 still comply with the existing standards, is that
11 correct?

12 A. That is correct.

13 Q. Do you know for the facilities at least that
14 Sargent & Lundy designed, can you tell us what the rate
15 its generating capacity was for each facility at the
16 time it was built?

17 A. That's in our report and it's also in my
18 testimony, but I don't remember the number, off the top
19 of my head.

20 Q. You think it was, like, the background in your
21 report or, like, which part of your report would we want
22 to refer to to find that information?

23 A. I don't know. I do know it's -- I can tell you
24 in my testimony I listed the capacity of each of the

1 stations.

2 Q. I guess maybe that helps answer my question. I
3 think the question I'm trying to ask is when the
4 facilities were built was that the capacity they were
5 built at, what's listed in your testimony?

6 A. I believe so.

7 MS. TIPSORD: That's table two of your
8 testimony.

9 THE WITNESS: That's correct.

10 MS. TIPSORD: Table two on page 14, just for
11 the record.

12 BY MS. WILLIAMS:

13 Q. So these numbers, can you just explain what
14 station total growth, gross megawatt, means for those of
15 us who are not familiar?

16 A. That would be the maximum output at the
17 generators. By gross that means the gross output is
18 generated by the plant and then the plant uses some of
19 that power for axillary. So, what the plant actually
20 sells or exports is less than that number.

21 Q. Thank you. I have to strike question two from
22 the pre-filed questions. It was a mistake on my part, I
23 apologize.

24 Question three, why were the Will County

1 units one and two retired effective December 31st, 2010?

2 A. I don't know.

3 Q. Are there any other Midwest Generation facilities
4 or units that will be retired in the future?

5 A. I don't know of any plans to retire any of the
6 other Midwest Generation facilities.

7 Q. When you say you don't know of any plans, do you
8 mean that there aren't any or you're just not aware, one
9 way or the other?

10 MS. FRANZETTI: I think that he doesn't
11 know.

12 THE WITNESS: I don't know.

13 BY MS. WILLIAMS:

14 Q. Do you know who would know?

15 A. I don't know.

16 Q. Question four, your report states that on page
17 1-1 that, quote, "None of the Midwest Gen operating
18 stations are capable of achieving and consistently
19 maintaining compliance with the proposed thermal
20 standards at existing operating levels."

21 The question is, is it possible to maintain
22 compliance by de-rating the facility?

23 A. I reviewed the inlet water temperatures to each
24 of the five stations for 2007 through 2010 and there are

1 a number of instances at some of these stations, as many
2 as 100 days per year, when the inlet river temperature
3 is higher than the proposed thermal standards, which
4 means that more than 100 days per year those units, if
5 they don't have cooling facilities, would have to
6 completely shut down, and there are other days when the
7 proposed limits are close to the measured river
8 temperatures where you could potentially meet those by
9 de-rating. And I don't know of any coal plant in the
10 world that operates where they shut down 100 days per
11 year, I don't think that's practical to run units like
12 that. These units take several hours to safely shut
13 down and probably eight or ten hours to start up. So,
14 shutting these down and starting them up based on river
15 temperatures which can change quickly is not a
16 practical --

17 Q. Now, let's talk about this just a little more.
18 These inlet temperatures that you look at as violating
19 the standard, are you talking about the maximum numbers
20 or the average numbers?

21 A. Maximum or average over what period?

22 Q. Maybe you should --

23 MS. FRANZETTI: I'm sorry. You're referring
24 to the period average numerical standards and the daily

1 max standard contained in the proposed --

2 MS. WILLIAMS: Right. I'd like to
3 understand what he compared the inlet temperature to.

4 THE WITNESS: We looked at both.

5 BY MS. WILLIAMS:

6 Q. When you say you found 100 days, that 100 days
7 could include a violation of a period average that
8 wouldn't truly be a violation because you didn't
9 look -- you couldn't look at a day as an average, right?

10 MS. FRANZETTI: Objection to form. If you
11 can answer.

12 THE WITNESS: I don't understand the
13 question.

14 MR. ETTINGER: Excuse me. May I ask a
15 question? If you're referring to a chart or something
16 which is on your testimony, that would be helpful.

17 THE WITNESS: No.

18 MS. FRANZETTI: No.

19 MR. ETTINGER: Oh, you're not. Okay, sorry.

20 MS. FRANZETTI: He just looked at the intake
21 data.

22 BY MS. WILLIAMS:

23 Q. Let me ask it a different way. Can you split
24 that number up, how many days violated the maximum

1 versus how many days violated a period or are you
2 lumping them together?

3 A. I'm lumping them together. I didn't look at that
4 in that regard.

5 Q. Can you give us a rough idea of percentage, how
6 many days violated the maximum?

7 A. No.

8 Q. Is it true that Midwest Generation continuously
9 monitors its temperature and its effluent --

10 A. Effluent I don't --

11 Q. Midwest Generation, do they rely on continuous
12 temperature monitoring? I mean, they don't take one
13 sample a month of temperature, do they?

14 A. I don't know.

15 Q. Is it your understanding that if the inlet
16 temperature was violating a period average, the plant
17 would have to de-rate that day?

18 A. Not necessarily. But since I can't predict -- if
19 it's early in the month, you can't predict what's going
20 to happen the rest of the month, it's hard to say, and
21 some of the periods are only 14 days, so that would be
22 even shorter.

23 MS. FRANZETTI: Ms. Williams --

24 THE WITNESS: It wasn't rare when they were

1 exceeding the daily maps and sometimes the exceedance
2 was as much as 10 degrees.

3 BY MS. WILLIAMS:

4 Q. Did you look at all the plants?

5 A. Yes.

6 Q. What did you find for the most upstream facility?

7 MS. FRANZETTI: Do you want to name that, so
8 the record's clear?

9 MS. WILLIAMS: I hope it's Fisk.

10 MS. FRANZETTI: You're not sure? Fisk? Can
11 I help you?

12 MS. WILLIAMS: Okay. I was going to guess
13 Fisk.

14 THE WITNESS: I don't remember -- I don't
15 think Fisk was the worst. But I do remember that Fisk,
16 there was one year where the inlet temperature exceeded
17 the proposed limit by more than 50 days.

18 BY MS. WILLIAMS:

19 Q. But you don't recall whether any of those
20 violated the maximum?

21 A. I don't recall.

22 Q. Let's move on to question five. On page 3-1 of
23 your report you state that, quote:

24 "When this study was originally prepared in

1 2005, the design considerations were based on General
2 Use Thermal standards. Under the General Use thermal
3 water quality standards, the probability of being able
4 to operate in open cycle mode during parts of year is
5 greater than under the stricter proposed UAA rules."

6 Question A, explain how you reached this
7 conclusion?

8 A. I reached that conclusion by looking at the
9 numerical temperature. For example, the general use
10 standards for April are a daily maximum temperature
11 limit of 90 degrees Farenheit and the proposed thermal
12 standard for April 1st to 15th is a period average of
13 60.8 degrees Farenheit. So, under the general use
14 standards for the first 15 days in April, you can
15 operate with a discharge temperature of 90 degrees.
16 Whereas under in the proposed standards, you would have
17 to average a discharge temperature of 60, so that's 29.2
18 degrees less so I consider that to be stricter.

19 Q. Did you do the same analysis with the general use
20 standard that you just described for us with the
21 proposed water quality standard, as far as looking at
22 how many days the intake temperatures would violate the
23 general use standards?

24 A. No.

1 Q. Did you consider the requirement in the general
2 use standard not to allow the temperature to go -- we
3 call it five Delta T requirement, do you understand what
4 I mean when I say that?

5 A. Yes.

6 Q. Do you consider that aspect of the general use
7 standard when you made that statement?

8 A. My understanding of the general use regulation is
9 that's 5 degrees above the normal temperature and since
10 these waterways are manmade and altered and affluent
11 dominated, I haven't seen any real definition of what is
12 a normal temperature in these waterways.

13 Q. But would you agree that that makes the agency
14 proposal less stringent in one aspect, in that one
15 aspect in the general use standards?

16 MS. FRANZETTI: Objection to form, but if
17 you can answer.

18 THE WITNESS: It may be less stringent and
19 that 5-degree temperature rise is not defined.

20 BY MS. WILLIAMS:

21 Q. Do you know what I mean when I say excursion
22 hours?

23 A. Yes.

24 Q. Did you consider that aspect as well, the amount

1 of hours that the affluent can exceed the standard?

2 MS. FRANZETTI: Object to form, counselor.

3 What do you mean, did he compare the number of excursion
4 hours allowed under general use versus that allowed
5 under the proposed standards?

6 MS. WILLIAMS: Correct.

7 THE WITNESS: No, because in our analysis we
8 look at it and we don't really design to make use of
9 excursion hours. We basically want to design the plant
10 so it meets the requirements all the time, and excursion
11 hours is kind of an extra margin you would have for
12 upsets in the plant for extreme conditions. We don't
13 really factor that in as part of the design
14 consideration.

15 BY MS. WILLIAMS:

16 Q. Interesting. Is it your understanding that
17 that's how Midwest Generation operates, not relying on
18 excursion hours as part of the planned operation, but
19 for extreme situations?

20 MS. FRANZETTI: Objection to form, counsel.
21 That's not what he said. He's talking about how he
22 designed a system --

23 MS. WILLIAMS: Absolutely.

24 MS. FRANZETTI: Now you're asking a totally

1 separate question.

2 MS. WILLIAMS: Right.

3 MS. FRANZETTI: Not based on how one designs
4 a system, correct?

5 MS. WILLIAMS: Correct.

6 MS. FRANZETTI: Okay.

7 THE WITNESS: The difference is when we
8 design, we don't design where we're going to use those
9 excursions because that's a margin that gives the
10 operation some flexibility. If we design up to the
11 absolute limit using the excursion, they have no
12 operating flexibility.

13 BY MS. WILLIAMS:

14 Q. I understand and I think that's useful
15 information, I didn't realize that. Do you know if
16 that's how the facilities are operated or do you -- or
17 are the facilities operated to maximize the excursion
18 hours as part of the operation?

19 A. I don't really know the details of the operation.

20 MR. ETTINGER: Just a follow-up on that
21 briefly. Did you look at any of the studies that were
22 done in the late '80s and early '90s to enable the
23 Joliet plant to avoid violating the I-55 bridge
24 regulations?

1 THE WITNESS: No.

2 MR. ETTINGER: So you're not aware of the
3 testimony that was before the Board at that time, in
4 which then Commonwealth Edison put plans in as to how
5 they would operate the plant so as to avoid violating
6 the variance that they were seeking for the I-55 bridge
7 standards?

8 THE WITNESS: I am not aware of any have
9 those studies.

10 BY MS. WILLIAMS:

11 Q. Let's move on to question six -- actually, before
12 I have move to question six.

13 MS. WILLIAMS: Would Midwest Generation be
14 willing to provide the analysis that Mr. Henry described
15 regarding the 100 days of intake temperature exceeding
16 the agency's proposal? I think that's information that
17 we would like to see, to be able to --

18 MS. FRANZETTI: Counsel, it's not really an
19 analysis. He looked at the intake temperature data and
20 had standards, the proposed standards next to him and
21 was just looking to answer your question, looking at
22 approximately -- you know, were there times and were
23 they frequent when the intake temperatures were
24 exceeding the daily max and/or the period average. So

1 there's really not an analysis that I can produce to
2 you.

3 BY MS. WILLIAMS:

4 Q. Maybe I should have asked it this way. You
5 looked at the intake data, correct?

6 A. That's correct.

7 Q. Is that data in the record, the intake data? I
8 don't believe it is, so I guess we would like to have
9 that data, then, so we can make our own comparison?

10 MS. FRANZETTI: We'll consider it. It's a
11 lot of data, 2007 through 2010 for every plant and I
12 think it may be more relevant in Subdocket D, but we'll
13 take a look.

14 MS. TIPSORD: Don't we already have some
15 exhibits with some of that data?

16 MS. FRANZETTI: Well, that's why I'm
17 hesitating. I just don't know --

18 MS. TIPSORD: From the hearing back in
19 Joliet, I think we may already have it.

20 MR. ETTINGER: I think I put some in too,
21 some that we got from the FOIA and we put in some intake
22 data.

23 MS. FRANZETTI: I don't remember how old
24 yours is, though. He did look at more recent.

1 MR. ETTINGER: I don't know that I looked
2 at -- I don't remember what I put in.

3 MS. FRANZETTI: Right.

4 MS. TIPSORD: Certainly we haven't had any
5 2011 data in.

6 MS. FRANZETTI: No, that's true.

7 MS. TIPSORD: But I do think there are some
8 2007 intake -- I mean, we have some.

9 MS. WILLIAMS: Most of the data that's been
10 entered, Marie, is from the stream. That's why I'm
11 asking, I mean this is unusual. We don't require
12 Midwest Gen to provide us with that kind of --

13 MS. TIPSORD: Right, but I --

14 MS. FRANZETTI: I would ask counsel, would
15 you --

16 MS. WILLIAMS: If we've got it, then we
17 don't need it.

18 MS. FRANZETTI: We'll see about whether it
19 can fairly and readily be put on a CD and we'll get it
20 to you. It's not anything that isn't, quite frankly,
21 out there.

22 MR. ETTINGER: I will note, actually, that
23 the Illinois Environmental Protection Agency may have
24 the data, even if you don't, because that's where I got

1 it.

2 MS. FRANZETTI: That's kind of what I'm
3 hinting at without coming right out and saying, but, you
4 know, we can gather it. It's publicly available
5 information.

6 MS. WILLIAMS: Thank you.

7 BY MS. WILLIAMS:

8 Q. Question six, explain any differences in the
9 design basis between the 2005 study performed for
10 Midwest Generation and the current study which began in
11 2008?

12 A. There's not a lot of differences in the design
13 basis between the two studies. One difference is that
14 for the later study we had more water quality data that
15 we got from MWRD on total suspended solids in the
16 waterways and we took a close look at those and we were
17 able to determine that we could use a less expensive
18 type of fill in the cooling towers, which we reduced the
19 cost and that's the only real change in the design basis
20 that I'm aware of.

21 Q. Question A, have the recommended compliance
22 alternatives changed?

23 A. No. In both cases we still believe that the most
24 practical solution to meet either regulations is to go

1 to a closed cycle cooling with mechanical draft cooling
2 towers.

3 Q. That was the recommendation that you made to
4 Midwest Generation in 2005?

5 A. Yes, that's what our report included.

6 Q. Can you explain -- question B asks what factors
7 resulted in the increase capital costs and operating
8 maintenance costs between the two studies?

9 A. The primary cost at increase were material and
10 labor.

11 Q. So generally increasing costs over time from
12 inflation, what have you?

13 A. Yes.

14 MS. FRANZETTI: Well, objection, counsel. I
15 don't know that the cost of materials and construction
16 labor is inflation.

17 MS. WILLIAMS: He can explain then.

18 MS. FRANZETTI: No, he did. I'm objecting
19 to you characterizing that as simply inflation.

20 BY MS. WILLIAMS:

21 Q. I guess your counsel is implying that -- do you
22 believe the cost has gone up more than inflation I
23 guess? Is there something else that's the basis for
24 those costs going up?

1 A. I don't recall exactly how much they went up and
2 I didn't compare it to inflation.

3 Q. Question C, why did you use the 75-percent
4 capacity factor in evaluating operating and maintenance
5 costs?

6 A. I guess first I'd like to explain what is meant
7 by a capacity factor and basically how that's defined is
8 it's the actual energy generated over a period, usually
9 a year, versus a theoretical maximum. So, for example,
10 if a plant operated at 100-percent load 75 percent of
11 the time during the year, would have a 75-percent
12 capacity, or if it operated at 75 percent load for 100
13 percent of the time, that would be a 75-percent capacity
14 factor, so it's really the energy generated versus the
15 maximum potential. And the 75-percent capacity factor
16 was an input from Midwest Gen based on their recent
17 operation of the units and their projections for the
18 future.

19 Q. So --

20 A. I think -- yeah, 75 is the actual from the past.
21 I'm just kind of extrapolating that that's following in
22 the future.

23 Q. Do you know whether -- you gave two examples?

24 A. Yes.

1 Q. That it could be operating at 75 percent 100
2 percent of the time, 100 percent of the year, or could
3 also be operating at 100 percent 75 percent of the days
4 of the year?

5 A. Or --

6 Q. Or anywhere in between?

7 A. In between. And typically they'd operate 100
8 percent load some days, maybe 60 percent other days, and
9 when you take basically the weighted average it comes
10 out to be 75 percent. If you take the average load
11 times the operating time, you get 75 percent.

12 Q. Do you know over what historical period that
13 figure was derived?

14 A. No.

15 Q. Do you know if the figure is the same at each
16 station or was it just average across all five stations?

17 A. I don't know.

18 Q. So you didn't ask for a capacity for Fisk, one
19 for Crawford?

20 A. No. We did not request separate capacity factors
21 for each station.

22 Q. Question D, did the 2005 study also include the
23 following assumption from your 2008 analysis that,
24 quote:

1 "As part of the design basis, the proposed
2 cool systems were designed with the goal of allowing the
3 stations to run at full capacity under the most
4 demanding conditions".

5 A. Yes. The same design basis was used for 2005.

6 Q. When you say, though, in this statement full
7 capacity, can we just explain now that we've explained
8 what capacity factor is, by full capacity do you mean
9 75 percent or 100 percent?

10 A. A hundred percent.

11 Q. I'll move onto E -- well, I just want to
12 understand, I'm just curious. I'm not an engineer so
13 this is a struggle for me. When you say -- I think this
14 is a pretty simple distinction, but when you say you're
15 looking at operating maintenance at 75-percent capacity,
16 but you designed for 100 percent, can you just sort of
17 explain for the layperson --

18 MS. FRANZETTI: Why is that reasonable?

19 MS. WILLIAMS: Yes.

20 THE WITNESS: Okay. The 100 percent means
21 we basically designed the system so that almost on any
22 day you could run the unit at 100-percent load. But
23 when we calculate operating and maintenance costs,
24 operating and maintenance costs are going to be a

1 function of how many megawatt hours per year you operate
2 the unit. Because we know you're not going to operate
3 the unit 100 percent load every day of the year. But
4 our design basis is that on any day of the year they can
5 operate -- almost any of the days of the year they can
6 operate at 100-percent load. But when we calculate the
7 operating and maintenance costs, we realize that there's
8 going to be times when the units are not going to be
9 operating, you have outages or reduced load, and so you
10 would be overestimating the operating and maintenance
11 cost if you were to assume that the plant's going to
12 operate 100 percent load 365 days of the year.

13 MS. FRANZETTI: Counsel, can I just ask a
14 couple of questions?

15 MS. WILLIAMS: Can I say this particular --
16 just to make sure I understand.

17 BY MS. WILLIAMS:

18 Q. Just to be clear. Obviously it would be
19 unreasonable to assume 100 percent when you're doing the
20 cost estimate, but if you did that would lower the cost,
21 correct?

22 MS. FRANZETTI: Counsel, I just ask you to
23 be clear because we have different types of costs,
24 capital versus O and M. I believe your question is

1 asking him about O and M costs.

2 BY MS. WILLIAMS:

3 Q. The capital costs would remain the same, but O
4 and M would go down, is that correct?

5 A. No. The O and M cost would go up, because if you
6 operate the plant 100-percent load -- on a day you're
7 operating, if you're operating one day, you're going to
8 have an operating and maintenance cost for the cooling
9 tower. If you're not operating, that cost goes down.
10 So by using a --

11 MS. WILLIAMS: We'll get into this more in
12 detail probably later --

13 MS. FRANZETTI: I just wanted a couple of
14 questions. By using the 75-percent capacity factor to
15 estimate the O and M cost, if these closed cycle systems
16 were built at the Midwest Gen plant, do you believe that
17 that was a reasonable assumption based on what Midwest
18 Gen said had been the actual observed capacity factor
19 for these plants?

20 THE WITNESS: Yes.

21 MS. FRANZETTI: And if you had used instead
22 100-percent capacity factor in establishing O and M
23 costs, do you believe that would have been arguably
24 overstating the amount of the annual O and M costs for

1 these plants if they were to be converted to closed
2 cycle systems?

3 THE WITNESS: Yes.

4 BY MS. WILLIAMS:

5 Q. Let's move on to E. I think it was helpful when
6 you explained --

7 MR. ETTINGER: Can I just ask one quick --

8 MS. WILLIAMS: Yes.

9 MR. ETTINGER: Did you use the same capacity
10 factors on all of the plants that you considered?

11 THE WITNESS: Yes.

12 BY MS. WILLIAMS:

13 Q. Explain the term approach temperature?

14 A. On a wet cooling tower that we based our estimate
15 on, the approach temperature is the difference between
16 the cold-water temperature coming out of the cooling
17 tower and the wet bulb temperature. The wet bulb
18 temperature is the driving factor that's cooling the
19 water and so the approach temperature is the difference
20 between that cold-water temperature and the wet bulb
21 temperature is a measure of the cooling tower
22 performance.

23 Q. Based on your previous answers, both studies
24 relied on 7 degrees Fahrenheit approach, 2005 and 2008,

1 is that correct?

2 A. Yes, that is correct.

3 Q. Can you explain why you selected that figure?

4 A. The reason we selected that figure was that one
5 of the concerns that we have is the cooling towers have
6 a blow down because you're making up water to the tower,
7 a lot of the water evaporates and the water that
8 evaporates is pure so you're concentrating the dissolved
9 solids in the water that's remaining. So you need to
10 blow down some of that water in order to maintain the
11 dissolved solids to a certain level in the cooling
12 tower. And although we're blowing down that water from
13 the coldest point in the cycle, it's still going to be
14 high and I believe in many cases it's going to exceed
15 the proposed limits. But by using a 7-degree approach
16 temperature, we were able to get the lowest practical
17 blow down.

18 Q. One question that I had, it might come up later
19 but I'll ask now since you brought it up. Is the
20 blow down continuous or is it periodic?

21 A. Continuous.

22 Q. What would be the blow down temperature with the
23 7-degree approach?

24 A. Well, in our report we have a table where we list

1 the blow down temperatures, but the maximum blow down
2 temperature, or based on our design, would be 85
3 degrees. That would cover -- you know, there's a
4 1-percent time when it could be higher than that 1
5 percent during the summer months, but for most practical
6 purposes the maximum temperature would be 85.

7 Q. Can you explain for us, Mr. Henry, your report
8 mentions that you rejected using a 12-degree Fahrenheit
9 approach temperature. Can you just explain why you made
10 that decision and what difference it makes in the blow
11 down temperature?

12 A. We looked at different approach temperatures
13 because that affects the cost of the cooling tower. A
14 12-degree approach cooling tower would be less expensive
15 than a 7-degree approach, but there are two impacts.
16 One is the 12-degree approach is going to result in a
17 higher temperature, it would be 90 degrees Fahrenheit.
18 So we would have a warmer temperature going to the plant
19 which would reduce the plant output and plant deficiency
20 and the blow down temperature would be higher. So we
21 selected the 7-degree approach as giving us the lowest
22 practical blow down temperature.

23 Q. I believe you stated in your report, but tell me
24 if this is correct, that had you been -- had you

1 selected the 12-degree approach temperature, that would
2 have decreased the capital cost by 20 percent, is that
3 correct?

4 A. I believe we say in the report is that it would
5 decrease the capital cost to the cooling tower by 20
6 percent. A lot of other costs -- and the cooling tower
7 I think is 25 to 30 percent of the total cost. A lot of
8 other costs would be fixed, all the pumping, the piping
9 and the structures and everything would pretty much be
10 fixed.

11 Q. Question F, explain what is meant when you state
12 that, quote, "All of the stations were designed for an
13 80 degree Farenheit cold water temperature"?

14 A. Well, as I explained the --

15 Q. They say I said 80 instead of 85, I apologize.
16 It says 85 in my pre-filed questions.

17 A. Okay. Well, the design summer wet bulb
18 temperature is 78 degrees and the cooling towers were
19 designed for a 7-degree approach, so that gives you an
20 85-degree cold-water temperature. So that would be the
21 water temperature that would only be exceeded 1 percent
22 of the time in the summer months.

23 MR. ETTINGER: Let me ask, does the cold
24 bulb temperature, is that the same as the discharge

1 temperature?

2 MS. FRANZETTI: Mr. Ettinger, I think you
3 mean wet bulb, not cold bulb.

4 MR. ETTINGER: Whatever the bulb is, your
5 bulb temperature, is that the same as the discharge
6 temperature?

7 THE WITNESS: No. The wet bulb temperature
8 is the wet bulb temperature in the air, you know, what
9 the normal temperature that's mentioned in air. Like
10 if it's 80 degrees in here, that's the dry bulb
11 temperature. The wet bulb temperature is the function
12 of the relative humidity and the wet bulb temperature is
13 always equal to or lower than the dry bulb. It's the
14 wet bulb temperature that affects the cooling tower
15 performance so that's the important design.

16 BY MS. WILLIAMS:

17 Q. When you say you added the 7-degree approach
18 temperature to the 78 degree wet bulb to get 85, is
19 that -- so I understand from your previous answer,
20 that's the temperature that the blow down will be, is
21 that correct?

22 A. Yes. That is the coldest water temperature in
23 the cycle. That's coming -- the water coming out of the
24 tower which would go to the condensers and the blow down

1 is taken at that point, so you have the lowest possible
2 blow down temperature from the cycle.

3 Q. Will the effluent temperature be lower than the
4 blow down temperature at all times or -- does that make
5 sense?

6 A. What do you mean by effluent? What I'm referring
7 to here is a closed cycle cooling where the water would
8 go from the condenser to the cooling tower back to the
9 condenser and then in order to maintain the water
10 chemistry a small amount would be discharged to the
11 river. That's what I am talking blow down, and the blow
12 down would be, essentially, the only effluent from the
13 system.

14 Q. Do you know what the volume of blow down effluent
15 would be?

16 A. No, I don't. We'd have to calculate that, but
17 I would expect it would be in the range of maybe 1 or 2
18 percent of what the total water flow is. It depends on
19 the water chemistry.

20 MS. FRANZETTI: Counsel, just so the record
21 is clear. This is Mr. Gary Ault who was project manager
22 of the report preparation at Sargent & Lundy. Mr. Ault,
23 can we swear him in?

24 GARY M. AULT

1 having been first duly sworn by MS. TIPSORD reporter,
2 was examined and testified on his oath as follows:

3 MS. FRANZETTI: Counsel, for that question
4 I'm going to have Mr. Ault -- why don't you just
5 generally state that the information is in the report.

6 MR. AULT: The quantity of blow down
7 required is, in part, determined by the quality of the
8 incoming water, and these towers were designed for what
9 we call five cycles of concentration, meaning we run the
10 water in a circle until the total dissolved solids or
11 whatever reaches five times the incoming level and then
12 if you limit that from a materials design standpoint,
13 that varies depending on the incoming water quality,
14 which varies throughout the year. So the blow down flow
15 rate required is going to vary as a function of
16 river water quality and that data is in one of the
17 tables in the report.

18 MS. FRANZETTI: So the plant would be able
19 to do more than five cycles if the CVS values are low,
20 diluted, at a certain time of year, is that what you're
21 saying or am I missing --

22 MR. AULT: I suppose theoretically it could,
23 but --

24 MS. FRANZETTI: But it's not designed to do

1 that?

2 MR. AULT: I don't think it planned to do
3 that. But, yeah, you're right. What you're trying to
4 achieve is a level of chemical concentration in the
5 cooling water that doesn't exceed a certain value so you
6 don't core with the condenser and so forth.

7 BY MS. WILLIAMS:

8 Q. We've gotten into G a little bit, but I will ask
9 it for the record's clarity. Did you use the 78 degree
10 wet bulb temperature in the design of the cooling towers
11 in the 2005 study?

12 A. Yes.

13 Q. Does that temperature represent the 99 percentile
14 wet bulk temperature in the summer months in the Chicago
15 area?

16 A. Yes.

17 Q. Can you just explain a little bit how you decided
18 to use the 99 percentile?

19 A. That's a standard practice for cooling towers for
20 power use.

21 Q. It makes sense to me, Mr. Henry, that you're
22 saying this is a standard design parameter. Did you
23 consider, however, using, say, 97 percentile given the
24 excursion hours and the standard or something like that?

1 A. Well, for the cool-cycle cooling the excursion
2 hours really don't apply.

3 Q. Well, you're designing for the blow down so the
4 excursion hours would apply to the blow down at
5 discharge, correct, or no? I mean -- I guess I just
6 want to know if you considered it. So you didn't think
7 it was applicable, is that your answer?

8 A. No.

9 MS. FRANZETTI: While Counsel's looking for
10 her next question. Mr. Henry, is it correct that it is
11 not standard practice in the industry to design closed
12 cycle cooling tower systems such that they exhaust the
13 potentially allowed excursion hours under the applicable
14 regulations?

15 THE WITNESS: I don't understand the
16 question.

17 MS. FRANZETTI: Okay, let me try it again.
18 You said it's standard practice for the design of
19 cooling towers for power plants to use the 99 percentile
20 wet bulb temperature, correct?

21 THE WITNESS: That's correct.

22 MS. FRANZETTI: Counsel wants to know
23 whether or not why -- why wouldn't you design a cooling
24 tower for a power plant to use up all of the allowed per

1 year excursion hours over the thermal standard?

2 THE WITNESS: Well, in the particular case
3 we're looking at, we're looking at a cold cycle tower.
4 So if we were designing it for 1 percent wet bulb, so
5 1 percent of the time during the summer months the
6 water temperature is going to be higher than what we're
7 designing for, which is going to be a further
8 restriction on the plant. If we size the towers for the
9 97 percentile, then 3 percent of the time the plant
10 would be restricted. Now, if we designed it for 97
11 percent, the blow down temperature would be higher, but
12 if you look at our blow down temperatures in our report,
13 the blow down temperature will be exceeding the proposed
14 limit much more than the allowable excursion for
15 anything we design, it's going to be exceeding it much
16 more than what's allowed.

17 BY MS. WILLIAMS:

18 Q. Question seven, are you aware of other existing
19 facilities that have installed closed cycle cooling
20 retrofits?

21 A. Yes.

22 Q. Have you or your company worked on any of them?

23 A. Yes.

24 Q. What were the dates and locations of those

1 retrofit projects?

2 A. It was the Noblesville plant in Noblesville,
3 Indiana, and that was in 2003.

4 Q. Is that the only one?

5 A. That's the only one that we worked on.

6 Q. Are you aware of some others that you didn't work
7 on?

8 A. I'm aware of one other plant that is in the
9 process of doing that.

10 Q. Is that mentioned in your testimony?

11 A. No.

12 Q. What plant are you referring to?

13 A. I understand the Brayton Point plant in
14 Massachusetts is retrofitting closed cycle cooling.

15 Q. Do you have any cost information either for
16 Noblesville or the other plant, the Brayton Plant?

17 A. Well, Noblesville was for a regulated utility
18 and they were allowed -- at the same time they did the
19 closed cycle conversion they were doing a lot of other
20 major plant modifications, and so for the overall
21 project it's a matter of public record that they were
22 allowed to put \$210 million into the rate base, but we
23 don't know how much of that was for cooling tower versus
24 how much of it was for other projects.

1 Q. Have you worked on retrofits to existing plants
2 for open-cycle cooling?

3 MS. FRANZETTI: To go from closed to open?

4 MS. WILLIAMS: No. I'm sorry.

5 BY MS. WILLIAMS:

6 Q. To add like -- helper cooling towers might be the
7 proper term?

8 MS. FRANZETTI: Like we have at one of the
9 Joliet stations?

10 THE WITNESS: Yes, we have done that.

11 BY MS. WILLIAMS:

12 Q. Generally can you speak to the cost differences
13 between converting to closed cycle cooling versus
14 install upper cooling towers in open cycle operations?

15 A. No, I don't remember the costs on anything I've
16 done and any costs would be very site specific.

17 Q. So you wouldn't say generally whether it's
18 cheaper to do open cycle than closed cycle cooling?

19 A. If people put in open cycle versus closed cycle,
20 I would assume that they did that because it was
21 cheaper, but it wouldn't necessarily be in every case.

22 Q. Number eight, why didn't your analysis factor in
23 mixing with the receiving stream?

24 A. That goes back to the inlet temperatures. If the

1 inlet temperature which as I mentioned earlier exceeds
2 the proposed limit as much as 100 days per year for some
3 stations, the problem we have is if the inlet
4 temperature is already exceeding and the river
5 temperature is exceeding the proposed standard, by
6 mixing our outlet water with the river temperatures that
7 always exceeds the limit, we cannot achieve the limit by
8 mixing. For example, if the limit is 60 degrees and the
9 river is already at 65 and we're heating the water up to
10 75 degrees, we cannot achieve 60 degrees by mixing
11 75-degree water with 65-degree water.

12 Q. So your assumption wasn't - it was a technical
13 one, not a legal one I guess I should ask?

14 A. That's correct.

15 Q. It wasn't that you wouldn't be allowed to have
16 it, but you found that it would not be achievable?

17 A. Well, there were many times when a mixing zone is
18 really irrelevant if the river temperature is already
19 higher than what you have to achieve.

20 Q. Question nine asks would it have been less
21 expensive to add smaller cooling towers and rely on some
22 mixing in the receiving stream?

23 A. Well, as I explained in the -- when the river
24 temperature is already above the proposed limit, if we

1 were to operate once through with helper cooling towers,
2 we would have to not only dissipate all the heat from
3 the plant, we would actually have to cool the water from
4 the river below where it came into the plant. So the
5 cooling tower would actually have to be bigger than a
6 closed cycle tower.

7 MS. FRANZETTI: Does bigger mean more
8 expensive?

9 THE WITNESS: Yes. I guess -- maybe I can
10 explain by example. If we have a day where our limit
11 is 60 degrees, and the river temperature is 65 and the
12 plant heats it up to 75, we have to cool it from 75 all
13 the way down to 60 to meet the limit.

14 BY MS. WILLIAMS:

15 Q. Question ten asks are once-through cooling towers
16 currently being built?

17 A. I think you mean once-through cooling power
18 plants?

19 Q. Yes, and that's what I wrote, isn't it? Are
20 once-through cooling power plants currently being built?

21 MS. FRANZETTI: Just to show you, counsel,
22 we do read what you write.

23 THE WITNESS: Yes. One example that I'm
24 aware of is the Elm Road generating station which is

1 located in Oak Creek, Wisconsin. That's two coal-fired
2 units 677 megawatts each. That plant was completed
3 earlier this year and that uses once-through cooling
4 from Lake Michigan. Worldwide there are many examples
5 of plants that are under construction that use once
6 through cooling.

7 BY MS. WILLIAMS:

8 Q. Question 11, how much of the cost of electricity
9 increases with the installation of closed-cycle cooling?

10 A. I don't know.

11 Q. Question 12, what would the interest rate be if
12 Midwest Generation could get a loan for these proposed
13 upgrades?

14 A. In our cost estimate we did not include any
15 financing costs which would be over and above the cost
16 that we estimated, so we had no need for an interest
17 rate number.

18 Q. Question 13, on page 1-6 of your report you
19 discuss the construction timeline and conclude that at
20 least 72 months should be allocated. Are you
21 recommending that Midwest Generation begin construction
22 of cooling towers at the upstream facilities first and
23 then proceed downstream and if so, why?

24 A. We did not make any recommendation for the order

1 of construction. There are a number of site specific
2 conditions that would have to be taken into account in
3 determining the order of building the plant, because on
4 some of the plants transmission lines have to be moved
5 and so that would have to be factored into the overall
6 schedule.

7 Q. Question 14 --

8 MS. TIPSORD: Ms. Williams, just for a
9 second. I apologize, but I just noticed the second
10 student is recording the proceedings and I just have to
11 note for the record that they are recording, audio
12 recording. Is there anyone who objects to that?

13 Okay. Seeing no objection, go ahead.

14 MS. FRANZETTI: I'll restrain myself from
15 singing.

16 MS. TIPSORD: Off the record.

17 (Brief off-the-record discussion.)

18 MS. TIPSORD: Back on the record.

19 BY MS. WILLIAMS:

20 Q. Questioned 14, explain the following statement on
21 page 2-8 of your report, quote:

22 "Low-clog film fill was selected by SPX
23 Marley as suitable for the Midwest Gen application based
24 on the total suspended solids levels in the make-up

1 water."

2 A. First, SBX Marley is the cooling tower company
3 that we use to get budget quotes for the cooling towers.
4 And as I explained earlier, in the more recent report we
5 had more river data, we looked at total suspended solids
6 and we talked to the cooling tower supplier and they
7 said with the lower suspended solids we can go to this
8 low clog film fill which was cheaper and would lower the
9 cost.

10 Q. Question 15, were all the cooling towers equipped
11 with drip eliminators or just those that were projected
12 to exceed new source review threshold?

13 A. All of the cooling towers were specified with
14 drip eliminators, that has been our standard for a
15 number of years. The high-efficiency drift eliminators
16 are considered that and they are pretty much industry
17 standards for large cooling towers.

18 Q. How much would it save in the cost if they were
19 only installed at plants that were required?

20 A. I don't know because we've been specifying the
21 high-efficiency drip eliminator for a number of years.
22 As far as I know, we've never had a cooling tower
23 supplier object or take exception to providing that.
24 I've never seen a cost breakout and I believe most of

1 them will tell you that that's their standard design,
2 so I've never seen a cost for that. Since it's their
3 standard design, I think it would be small, but I don't
4 know.

5 Q. So regardless of whether new source review
6 thresholds were exceeded or not, that would have been
7 how you recommended they be designed anyway?

8 A. That is correct.

9 Q. Question 16, you mention at least two, quote,
10 "constructability issues" in your report, moving
11 high-voltage power lines and performance problems
12 related to locating cooling towers too close together.
13 Are there any others?

14 A. From my experience, on almost any large retrofit
15 project you run into problems once you start
16 construction. If you walk around the sites you'll see
17 that there's manholes and covers and evidence of
18 underground capable and pipe, and based on my experience
19 a lot of those underground abandoned facilities are not
20 shown in the drawing. And when you look at the Fisk
21 station, which is over a hundred years old, although
22 Fisk unit 19 is not 100 years old, the reason they call
23 it unit 19 is it's the nineteenth generating unit at the
24 station. Units one through 18 have been retired and

1 demolished so there's been a lot of construction, over
2 a hundred years in that plant, and once you start
3 digging to build a foundation for a cooling tower you're
4 going to run into a lot of pipes, tunnels, and who
5 knows, foundations and a lot of other things. So we
6 can't really specifically identify what those problems
7 are so we couldn't really put a cost on something that
8 we can't quantify. But we expect that as any large
9 project on an existing plant, that there's going to be
10 other problems you're going to run into.

11 Q. Do you feel comfortable that those problems will
12 be able to be overcome?

13 A. Yes. I'm confident they can be overcome, just a
14 matter of time and money.

15 Q. Question 17, on page three dash four of your
16 report you discuss your calculation of the, quote,
17 "megawatt output gain or loss." Explain how this was
18 calculated?

19 A. Earlier we talked about the ratings of these
20 units and the ratings of these units are based upon
21 specific conditions and one of the important parameters
22 for the output of a unit is the inlet water temperature.
23 And so if we convert from open cycle to closed cycle,
24 most of the time the water temperature going to the unit

1 is going to be higher and as a result the output, the
2 gross output generated by those units is going to be
3 lower so that's what we calculated here. Now, this is
4 different than the axillary power, because the higher
5 water temperature will mean that the generator output
6 will be lower. Over and above that, more of the plant's
7 gross power will be used to run the cooling towers and
8 pumps. So this output loss is basically an efficiency
9 loss, which means lower output and is an addition to any
10 axillary power used by the new cooling facilities.

11 Q. Can you explain how it was calculated and what
12 the results of the calculations were used to determine?

13 A. We calculated using design information that's
14 mostly from the steam turbine, the original steam
15 turbine design information, and we looked at each month,
16 looked at what the river temperature is, looked at what
17 the cooling tower temperature would be and calculated
18 what the difference would be. There's a few instances
19 where actually the cooling tower gives you a little bit
20 lower temperature in the gain, but in most of the months
21 there's a loss and overall there's a net loss.

22 Q. This is represented on table 5-3 of your report,
23 is that correct -- well, one example I should say. You
24 did it for each plant, correct?

1 A. Yes, we did it for each plant.

2 Q. One example would be table 5-3 for Fisk?

3 MR. AULT: It sounds right.

4 BY MS. WILLIAMS:

5 Q. I would like, Mr. Henry, for the record, if you
6 could take a look at that table and just sort of walk us
7 through what the different columns represent so that we
8 understand?

9 MS. FRANZETTI: Counsel, for the record,
10 table 5-3 is entitled Fisk 19 megawatt loss due to
11 closed versus open-cycle operation and it is on page 5-3
12 of Exhibit B to Mr. Henry's testimony.

13 THE WITNESS: In the first column we have
14 the periods, these are the period average for the
15 proposed thermal standards. The second column is closed
16 cycle megawatt loss and you can see we show a loss for
17 every month, and basically that loss is calculated from
18 the nominal design basis of the plant. And then we did
19 the same thing for the open cycle loss and I think in
20 almost all of the months you have a loss, in January and
21 February you have a gain. And, again, that gain or loss
22 is relative to the nominal rating of the unit which is
23 based on a fairly low cooling water temperature. So
24 then by taking the difference between the open cycle

1 loss or gain and the closed cycle loss or gain, we got
2 the net loss or gain which represents the loss or gain
3 of closed cycle versus open cycle.

4 BY MS. WILLIAMS:

5 Q. In some months -- can you explain why some months
6 are a positive number and some are a negative number?

7 A. Yes. Because in some months the -- let's see.
8 In some months the closed cycle would actually have a
9 little bit colder water temperature going through the
10 condenser than an open cycle.

11 Q. Those would be the summer months generally,
12 right, or am I getting it backwards?

13 A. Yes.

14 Q. Has the design of the plant -- I'm sorry. Has
15 the design of the closed cycle cooling retrofit allowed
16 for optional open cycle in the months where that would
17 be beneficial?

18 A. Yes, we did that. The way we laid these out, we
19 have moveable gates at the intake and discharge. So if
20 the river conditions are favorable that we could open
21 those gates and operate open cycle, which would reduce
22 the axillary power consumption and the operating and
23 maintenance on the cooling towers.

24 Q. Does your cost estimate assume closed cycle all

1 the time or does the cost estimate provide a range,
2 depending on whether it's an open or closed cycle?

3 MS. FRANZETTI: Counsel, again are you
4 talking -- are you switching to capital costs?

5 MS. WILLIAMS: No. He said axillary power
6 would go down and O and M would go down. I want to
7 understand if that's reflected in his testimony when he
8 says the range of costs or that would be outside.

9 BY MS. WILLIAMS:

10 Q. Is that something not reflected in your costs?

11 A. In the megawatt loss and gain -- let's see. Our
12 operating and maintenance costs were based on operating
13 in closed cycle all the time.

14 Q. So those could potentially go down if it was
15 determined that open cycle operation --

16 A. Yes. During the times that you could operate
17 open cycle, yes, those could potentially --

18 MS. FRANZETTI: Based on table 5-3, how much
19 of the year would you expect to be -- for the plants to
20 be able to operate in open cycle?

21 THE WITNESS: We didn't look at it on a
22 daily basis, we just looked at monthly data. It could
23 be done on more of a daily basis than --

24 MS. TIPSORD: You trailed off there, I'm

1 sorry. Excuse me, you trailed off when you were
2 speaking to Ms. Franzetti.

3 THE WITNESS: We looked at the open cycle
4 versus closed cycle using monthly averages, we didn't
5 look at it on a daily basis. And you would have to do
6 it on a daily basis to really calculate how many hours
7 per year, days per year, you can operate the open cycle.

8 MS. FRANZETTI: Mr. Henry, all I'm trying to
9 do is give the Board some sense of -- since the costs
10 weren't included, you know, try to pinpoint how many
11 days a year could you operate in open cycle versus
12 closed. But can you give the Board some sense as to
13 whether or not that was going to be -- you expect that
14 to be frequent, that they can operate in open cycle?

15 THE WITNESS: No. I don't think it would be
16 very frequent and that was one of the comments that we
17 made, is with the proposed thermal standards it would be
18 less frequent than with the general use standards.

19 BY MS. WILLIAMS:

20 Q. Question 19, in your operating and maintenance
21 cost estimates how is, quote, "power costs" calculated
22 for Midwest Generation?

23 A. The unit costs, like the dollars per megawatt
24 hour we obtained from Midwest Generation, and they

1 calculated that for the short term based on actual
2 contracts they have and for the longer term based on
3 their estimates of the average between peak and off-peak
4 hours. So we're not in the business of estimating power
5 costs, so we obtained that from Midwest Generation.

6 Q. Are you saying that Midwest Generation purchases
7 electrical power off the grid?

8 MS. FRANZETTI: Objection, counselor, that
9 misstates his testimony.

10 MS. WILLIAMS: Well, that's the next
11 thing -- I'm sorry. That is the next -- I did rephrase
12 it.

13 BY MS. WILLIAMS:

14 Q. Does Midwest Generation purchase electricity off
15 the grid?

16 A. I don't know if they do or not, but that's not
17 really relevant to what we're saying here.

18 MS. FRANZETTI: Why don't you think it's
19 relevant?

20 THE WITNESS: Because the power costs that
21 they use for operating these towers is going to be
22 generated by that particular plant, it's going to come
23 of the books and it costs them money to generate that
24 power. For example, if -- for example at Fisk which is

1 rated at 348 megawatts, if they're generating 300
2 megawatts on a given day and they need to operate the
3 cooling tower, they're going to need to generate a few
4 more megawatts to power that cooling tower, which means
5 they're going to burn more coal, have more emissions,
6 more consumables. So it costs them money to generate
7 power, in addition to the potential loss of revenue of
8 selling that power.

9 BY MS. WILLIAMS:

10 Q. That's the value I'm trying to get at. What is
11 the -- what does that value represent, how is it
12 calculated, how much is it, what was it based upon, and
13 you're saying you were given the figures?

14 A. That's correct.

15 Q. What were the figures that you were given, were
16 they different for each plant?

17 A. I don't recall.

18 MS. FRANZETTI: It's in the report.

19 THE WITNESS: It's in the report.

20 MS. FRANZETTI: Mr. Ault, you've been sworn
21 in so why don't you answer it.

22 MR. AULT: We use the same value of \$36.71
23 per megawatt hour for all units based on -- from Midwest
24 Generation.

1 MS. WILLIAMS: \$36 --

2 MR. AULT: And 71 cents.

3 MS. WILLIAMS: And 71 cents.

4 MR. AULT: I believe that's the numbers.

5 BY MS. WILLIAMS:

6 Q. I want to try to understand because I think there
7 are some terms that are used that I'm not sure I
8 understood or I'm not sure I understood which ones were
9 the same. I've asked you about power costs. I think
10 we've also talked about -- I think you also use the term
11 estimated power loss revenues, does that sound familiar?

12 MS. FRANZETTI: Counsel, can you direct us
13 to either the report or a page of his testimony so we
14 can see the exact language you're referring to?

15 BY MS. WILLIAMS:

16 Q. At the bottom of page 13 of your testimony, the
17 last sentence partly cut off, it says, quote:

18 "These estimated costs include capital and
19 O and M cost estimates and estimated power loss
20 revenues." Let's talk about what you meant by that.

21 MS. FRANZETTI: Are you there?

22 THE WITNESS: Yes. The power loss revenues
23 are what we were talking about in the tables on section
24 five, like the 5.3.

1 BY MS. WILLIAMS:

2 Q. Then on page 16 there's a subpart and use of a
3 phrase "loss of plant generating capacity." Is that the
4 similar concept or is that different?

5 A. Yes, it is. That's a similar concept.

6 Q. Can you explain axillary power use? I know you
7 explained it a little bit, but can you flush out for us
8 the use of the term axillary power use?

9 A. Axillary power is the power that's used by the
10 generating station to run pumps and fans and other
11 equipment within the plant, and we calculated that for
12 the cooling towers because these cooling towers have a
13 lot of fans with this system, also would require
14 additional pumps, and so the power used to run those
15 pumps and fans is axillary power.

16 Q. That's part of the O and M cost?

17 A. Yes, it is.

18 Q. Would the information we've been discussing from
19 tables like 5-3, loss of generating capacity or power
20 loss revenues, are those part of the operating and
21 maintenance cost as well -- are they part of the costs,
22 I guess I should ask?

23 A. Well, they're not part of the capital costs and
24 they're not part of the O and M, operating and

1 maintenance costs. That is a separate cost that we
2 calculated and identify as a loss of revenue.

3 Q. When you outline in your testimony the total
4 costs, does that include the loss of revenue?

5 A. What are you --

6 MS. FRANZETTI: Counsel, again, where are
7 you -- I think it depends on where you're referring to
8 as the total costs.

9 BY MS. WILLIAMS:

10 Q. I was envisioning -- and I may be wrong. I'm
11 sort of picturing hearing how we'll sum this up and
12 Midwest Generation saying oh, this project's going to
13 cost X, and I know you provided a range. Have you --
14 maybe you didn't add a total. Do you always provide
15 capital and operating costs separately in your report?

16 A. Yes.

17 Q. Did you provide a total cost anywhere?

18 A. Well, the capital cost is basically a one-time
19 cost, where the operating cost we gave on a per-year
20 basis.

21 MS. FRANZETTI: Counsel, I'm not -- it may
22 help. In the last paragraph of his pre-filed testimony
23 on page 18, is that what you're trying to find, where he
24 said for all five Midwest Generation stations,

1 converting them to closed cycle cooling systems would
2 require an estimated total capital investment of nearly
3 \$1 billion and would result in over \$23 million per year
4 in operating and maintenance costs. Is that what you're
5 trying to find?

6 MS. WILLIAMS: It may be -- that clearly
7 separates the two, right?

8 THE WITNESS: Yes.

9 BY MS. WILLIAMS:

10 Q. Those two figures -- when you sum those up for
11 all five plants -- do not include loss revenue, is that
12 correct?

13 A. That's correct.

14 Q. The only power cost is -- well, is the only power
15 cost included in the O and M cost the axillary power
16 cost when you provide this per-year figure of 23
17 million? If I wanted to know what elements of the power
18 costs are included, is there anything besides axillary
19 power costs?

20 A. In the 23 million per year that's just axillary
21 power, the only power cost in the 23 million. There are
22 other operating and maintenance costs, but just
23 maintenance spare parts.

24 Q. But not power?

1 A. But not power.

2 Q. Thank you. That's very helpful. I believe my
3 last question 20, on page five of your testimony you
4 state that the Joliet seven and eight towers are used
5 primarily to maintain compliance with the I-55 bridge
6 adjusted standards. In your analysis, how do you
7 differentiate between the technology and cost of that
8 technology necessary to achieve compliance with the
9 proposed rules and those necessary to allow Midwest
10 Generation the flexibility of never having to de-rate?

11 MS. FRANZETTI: Counsel, can I just ask you
12 to clarify that question? What do you mean by in his
13 analysis, how does he differentiate between technology
14 and the cost thereof to achieve compliance with the
15 proposed rules? I think that's what he did, right? I
16 mean, we would agree that's what he did and Sargent &
17 Lundy did in their report, correct?

18 MS. WILLIAMS: Right.

19 MS. FRANZETTI: That's what you're referring
20 to there, okay. But I don't know that he ever did
21 do -- try to figure out if there was a technology that
22 would give him the flexibility of never having to do
23 that. That's the problem, I'm not sure what you're
24 referring to as the alterative.

1 BY MS. WILLIAMS:

2 Q. Well, let's -- let me change never having to
3 de-rate to the terminology that you used in your report
4 which is to operate up to a capacity --

5 MS. FRANZETTI: I'm not trying to be
6 difficult. Do you just want him to say to what extent
7 did you give consideration to an approach that would
8 have involved perhaps more de-rating, but could have
9 worked to achieve and maintain compliance? Is that what
10 you're trying to get at? Is there -- is there some
11 alternative like that?

12 MS. WILLIAMS: Right.

13 MS. FRANZETTI: That is something different
14 than going to closed cycle with all these plants?

15 MS. WILLIAMS: That would be fine. Let's
16 try that.

17 THE WITNESS: No, we didn't consider that
18 because when we looked at the water temperatures we felt
19 that something that would require some of these plants
20 to shut down more than a hundred days per year was not
21 practical.

22 BY MS. WILLIAMS:

23 Q. When did you look at those numbers, the intake
24 numbers that you're describing that you found the

1 hundred days? When in the whole process did you look at
2 those numbers and make that comparison of how many days
3 per year it has to be de-rated?

4 A. A few months ago.

5 MS. WILLIAMS: Thank you.

6 I don't have anything further.

7 MS. FRANZETTI: That's him personally.

8 THE WITNESS: That I personally looked at.

9 MS. WILLIAMS: Okay. I don't think I have
10 anything further.

11 MS. FRANZETTI: I have a question to follow
12 up on that last one.

13 EXAMINATION

14 BY MS. FRANZETTI:

15 Q. If you were going to try to take into account
16 a higher frequency of de-rating across all of these
17 plants, what's the effect of that on what you would have
18 designed, what Sargent & Lundy would design, what's the
19 alternative? Because it isn't just simply no additional
20 cooling, correct?

21 MS. WILLIAMS: I would like to object or ask
22 you -- you said higher amount of de-rate. Higher than
23 what, higher than 75 percent or higher than 100 percent?

24 MS. FRANZETTI: Higher than what's in the

1 closed cycle. I'm doing the same comparison you were.

2 BY MS. FRANZETTI:

3 Q. Can you explain again, can you explain to the
4 Board why not go that direction? Why not have some
5 de-ratings with some cooling and not all the way to
6 closed cycle?

7 A. Because with the -- like I said, 100 days a year
8 you would have to shut down. If you wanted to put
9 cooling towers and operate once through, like Joliet
10 does now where you have the towers cooling the water
11 from the plant, if you wanted to avoid shutting down 100
12 days per year, those cooling towers would be bigger and
13 more expensive than what we're doing for closed cycle.
14 So the options are on meeting these requirements,
15 putting in -- you know, shutting down 100 days per year
16 plus de-rating, putting in cooling towers that are
17 bigger than what we have for closed cycle and de-rate
18 and shut down less than 100 days per year, but you would
19 still have to do some de-rating and shut down or go to
20 closed cycle, which is less expensive and allows you to
21 operate essentially all of the time. So to us it was
22 obvious that going closed cycle with cooling towers was
23 less expensive than putting in towers to try to meet the
24 conditions some of the time, it's a lower cost and

1 allows you more operating flexibility. So we don't see
2 any advantage of going to a scheme where you're
3 combining de-rates and shut downs and cooling towers.

4 Q. Mr. Henry, just so -- because I know you kind of
5 keep using it and I don't want it to take on a greater
6 meaning than I think you intended. You mentioned the
7 fact that in some cases it's as much as 100 days a year
8 based on the 2007 to 2010 data. But am I right in
9 understanding your testimony to mean even if it's -- it
10 might be 80 days or 70 days, your conclusions would
11 still remain the same?

12 A. Yes, that is correct.

13 MS. TIPSORD: Anybody else?

14 MR. GIRARD: I have a question.

15 EXAMINATION

16 BY MR. GIRARD:

17 Q. Mr. Henry, from your testimony in the area of
18 page five, so if you take a look at page five of your
19 testimony. Specifically I'm going to refer to the first
20 full paragraph in this area on page five, you're just
21 giving some general background information on power
22 plants. The first sentence there, in that first full
23 paragraph on page five, you make a general statement
24 that the amount of heat generated from condensing the

1 turbine exhausted steam is greater than the amount of
2 electricity generated. And then you go on and give a
3 specific example looking at units at Joliet 7 and 8.
4 But my question is also general, why can't this thermal
5 energy be put to a beneficial use before it's dissipated
6 in the environment? It's a lot of energy.

7 A. Yes, it is a lot of energy. A lot of people
8 looked at that. As far as I know, there is nobody who
9 has ever made a use for that energy. The problem is
10 it's at a low temperature, it's only a few degrees above
11 the ambient temperature and when you have a low
12 temperature differential it's not really practical to
13 use that. We've done in the past a few studies of
14 people who had ideas for using that, but as far as I
15 know nobody's done any more than studying it.

16 Q. Is that only in plants in the U.S. or are there
17 plants overseas that use any of that waste?

18 A. I'm not aware of any plants overseas that do that
19 and we've looked at plants overseas. There are some
20 plants -- and more overseas than in the U.S. -- where
21 they will take energy from the middle of the cycle,
22 maybe at pressures of 100 pounds and 6- or 700 degrees
23 and use that for a cogeneration process for district
24 heating, which is very common in Europe. But that's

1 taking it from the middle of the cycle, the tail end of
2 the cycle where it's only a few degrees above ambient
3 and it's a tremendous amount of energy. But at such a
4 low temperature, nobody's really found a practical way
5 to use that energy.

6 MR. GIRARD: Thank you.

7 MS. TIPSORD: Off the record for just a
8 second.

9 (Brief off-the-record discussion.)

10 MS. TIPSORD: Let's go ahead and go back on
11 the record and we'll go with Prairie Rivers and the
12 Sierra Club.

13 Mr. Ettinger.

14 MR. ETTINGER: By the way, I represent both
15 so it's not two sets of questions.

16 EXAMINATION

17 BY MR. ETTINGER

18 Q. Were you asked by Midwest Generation to look at
19 the cost of reducing impingement at any of the plants?

20 A. No.

21 Q. I never get to -- just to make sure I don't make
22 a mistake here. I never understood the difference
23 between impingement and entrainment, but were you asked
24 to look at entrainment either?

1 A. No.

2 Q. Would moving to a closed cycle system reduce
3 impingement or entrainment?

4 A. Well, I haven't studied impingement or
5 entrainment at any of the Midwest Generation plants, so
6 I'm not really in a position to answer that question.

7 Q. But it will take less water in through the
8 system, so presumably you've got less critters going
9 into the intake?

10 A. It would take less water, yes.

11 Q. We've gone over this a little bit, but you said
12 at page one of your testimony you state that Sargent
13 & Lundy conducted at least 15 studies for addition of
14 cooling towers that will last 30 years. What other
15 plants were studied?

16 A. I'll list those plants by the location. In the
17 State of Illinois we did studies for Clinton, Coffeen,
18 Dresden, and Zion stations. In Indiana Cayuga, Wabash
19 River stations. Wisconsin, Rock River station.
20 Florida, Bayside, Crystal River, and a recent project
21 that's confidential. In Louisiana we did a study for
22 the Baton Rouge cogeneration facility. In California
23 for Potrero. New Jersey, Salem. North Carolina, Allen.
24 Delaware Indian River. Texas, Monticello.

1 Pennsylvania, Shawville, and in New Zealand, Huntly.
2 That's 18 in total and that does not include the five
3 that we did for Midwest Generation.

4 Q. You said that they're actually doing a retrofit
5 on a Belleville plant in Indiana, was that one of the
6 ones you studied?

7 A. Well, it was a Noblesville plant --

8 Q. I'm sorry, Noblesville.

9 A. It was a Noblesville plant and that was in done
10 in 2003, but we never did a study. The utility made a
11 decision to go to closed cycle.

12 Q. Do you know why they did that?

13 A. I don't know.

14 Q. You studied 18 plants and what did you conclude
15 from those 18 studies?

16 A. Well, in most of these studies we did a similar
17 study that we've done for the Midwest Gen plants. We
18 did a conceptual design and cost estimate and we've
19 evaluated the performance impact. So the conclusion was
20 really what's it going to cost and what's going to be
21 the impact of the cooling towers.

22 Q. You concluded 18 times it was too expensive or
23 what did you come up with?

24 MS. FRANZETTI: Well, wait, counsel,

1 objection. He didn't say that that's what their reports
2 covered. They lay out the cost for the -- to the
3 client. It's up to the client to decide.

4 BY MR. ETTINGER:

5 Q. You got 18 studies in which you laid out the cost
6 for 18 plants, and to your knowledge how many times did
7 the utility decide not to build the cooling based on
8 your study?

9 A. I think in the majority, I'm aware of a few of
10 these where they put in helper towers similar to Joliet
11 7 and 8, but to my knowledge none of these plants
12 converted to closed cycle cooling.

13 Q. Some of them did put in helper towers?

14 A. Yes.

15 Q. You don't know which ones those are?

16 A. I know Cayuga station in Indiana put in helper
17 towers, that's one I know.

18 Q. It was decided it -- well, you don't know. They
19 felt it was cheaper to put in helper towers in the case
20 of the Cayuga plant than it was to go to a closed cycle
21 system?

22 A. I don't know that for a fact, but I assume that's
23 probably.

24 Q. I think we've done three. Four, what is the

1 basis of your statement on page six that Fisk, Crawford,
2 Will County, and Joliet plants all lack land necessary
3 for ponds or sprays?

4 MS. FRANZETTI: Okay, hang on. We have a
5 pictorial to handout to help with the answer to this.
6 So let me offer as -- we can do this as a group exhibit
7 with one exhibit number or you can give each one a
8 different exhibit number. They're all -- I'm sorry.
9 They're all aerials of each.

10 MS. TIPSORD: Since they're each a different
11 plant, let's give them a different exhibit number.

12 MS. FRANZETTI: Okay. Hang on just a
13 second.

14 THE WITNESS: There are four exhibits
15 because we included both Joliet stations on one.

16 MS. TIPSORD: For the record, I have been
17 handed four pictures, one is Crawford station, Google
18 Crawford station, Google Fisk station, Google Joliet
19 station, and Google Will County station.

20 If there's no objection, Crawford station
21 will be marked as Exhibit 441, Fisk as Exhibit 442,
22 Joliet as Exhibit 443, and Will County as Exhibit 444.

23 Seeing no objection, those are marked.

24 MS. FRANZETTI: Just for the record, the

1 Joliet aerial, you can actually see both Joliet stations
2 on that one aerial. So that's why there's only one
3 aerial for both Joliet stations.

4 Albert, can you go ahead then, using these,
5 to start to answer your question?

6 BY MR. ETTINGER:

7 Q. I think there was a question pending. You can
8 now use your exhibit to answer the question.

9 A. Okay. If you look first at the exhibit for
10 Joliet station --

11 MS. FRANZETTI: 443.

12 THE WITNESS: 443, as we mentioned that
13 includes both Joliet unit six which is on the south side
14 of the river and unit seven and eight which is on the
15 north side of the river. Joliet six we looked at and
16 we felt that that was the one that was close to being
17 feasible for having a cooling lake and so we laid out in
18 orange here the size of the cooling lake we would need.
19 We'd need about 380 acres of cooling lake and you can
20 see that's quite a large area. Midwest Generation does
21 not own that property. Most of it is open farmland, but
22 the one area there on the right I believe is an asphalt
23 plant. So to build a cooling lake, Midwest Generation
24 would have to buy all this property, demolish the

1 existing structures and clear the land. Plus, in the
2 area of Joliet, you go down just a few feet and you hit
3 rock, so it probably would not be practical to dig a
4 lake here. You would have to build berms around the
5 outside and have a perched lake where the lake would
6 actually be above the ground. And based on that, we
7 don't believe there would be any real costs savings with
8 doing that and the schedule would be longer, especially
9 if you consider the time it would take to buy property
10 from multiple property owners who may decide not to
11 sell.

12 BY MR. ETTINGER:

13 Q. Did you talk to any of these quarry owners?

14 A. No. But I don't think there's any quarries
15 nearby that are 380 acres.

16 Q. I understand that. But there's -- you can buy
17 property from more than one guy and combine them, can't
18 you?

19 MS. FRANZETTI: Objection to form, counsel.
20 Because I don't even know where you're talking about and
21 whether or not wherever you are talking about it would
22 be feasible to locate the cooling pond there.

23 BY MR. ETTINGER:

24 Q. Well, that wasn't my question. My question is

1 you've got 380 acres that you identified here and I see
2 a quarry to the left of it or to the west of it, right?

3 A. Right.

4 Q. There's a quarry to the right of it?

5 A. Yes.

6 Q. I agree with you that the whole 380 acres could
7 not be made up of any one of these quarries. My
8 question is did you investigate the possibility of
9 acquiring one of the quarries and combining that with
10 some portion of the 380 acres that you've identified
11 here?

12 A. No, we did not look at that. But for the lake
13 to really be effective it has to be more or less
14 contiguous, than doing a piece over here and a piece
15 over there, because you would have to pipe and pump the
16 water between the various sections.

17 Q. And that's impossible. What's this down here in
18 the bottom left-hand of the Joliet plant, it looks like
19 a couple of ponds. Do you know what that is?

20 A. No, I don't.

21 Q. Did you investigate the possibility of combining
22 the acquisition of this property with conversion of this
23 property with some sort of treatment wetlands for
24 nitrogen or phosphorus?

1 A. No.

2 MS. FRANZETTI: Just for the record,
3 objection on relevancy on that question.

4 BY MR. ETTINGER:

5 Q. And --

6 MS. FRANZETTI: Counsel, he's not done with
7 his answer to your question.

8 MR. ETTINGER: I'm sorry. I was just going
9 to get done with Joliet before we went on.

10 MS. WILLIAMS: Can I ask a quick question?

11 I would just like to -- if it's possible to
12 verbally identify the intake of the plant on the map?

13 I see there's a canal going to the northern
14 facility, is that the intake?

15 THE WITNESS: You're talking about Joliet
16 seven and eight, the ones north of the river?

17 MS. WILLIAMS: Yes.

18 THE WITNESS: Yes. If you look, there's a
19 canal and the intake is -- you can see it, the inlet of
20 that canal flows to the canal into the plant and then
21 a discharge is the canal that's along the cooling towers
22 to the southwest.

23 MS. WILLIAMS: Can you describe where the
24 intake is for the other facilities?

1 THE WITNESS: For Joliet six it's a
2 little bit difficult to explain, but you can see
3 there's -- actually this is an ash pond and immediately
4 to the left there's a lighter area, the intake structure
5 is there.

6 MS. WILLIAMS: Thank you.

7 THE WITNESS: And then the discharge is that
8 small canal to the southwest.

9 MS. FRANZETTI: Can you do that one more
10 time; show the Board members.

11 THE WITNESS: The Joliet six, this is the
12 ash pond I'm talking about. The intake is right here,
13 the discharge is down there.

14 MR. ETTINGER: Ms. Franzetti, if you want to
15 go on to the other plants or do you want us to finish
16 Joliet?

17 MS. FRANZETTI: You can finish Joliet.
18 We're going to stay on the same topic, correct, when you
19 say finish Joliet?

20 MR. EETINGER: We're going to talk about
21 other pieces shown on your map of land and we're going
22 to discuss --

23 MS. FRANZETTI: Your topic that if there's
24 room for a cooling pond?

1 MR. ETTINGER: If there's room for a cooling
2 pond -- let's ask something else related to this.

3 BY MR. ETTINGER:

4 Q. You said in your testimony also a spray. What is
5 a spray?

6 A. Well, a spray pond is where people use -- usually
7 it's a series of canals with mechanical devices that
8 spray the water into the air to get extra heat transfer.

9 Q. What's the advantage of that?

10 A. It requires less land area than a cooling lake,
11 but I'm not aware of any large power plant that uses
12 that. Some people have tried using it, but they were
13 basically failures and they eliminated it.

14 Q. Which ones are you aware of that initially they
15 tried it and failed?

16 A. Quad Cities station.

17 Q. That's Exxon now.

18 A. Yes.

19 Q. Nuclear plant on the Quad Cities?

20 A. That's correct.

21 Q. North of this area that you've identified as 360
22 acres, there's also some stuff up here. It looks like
23 sort of a putrefied pond or something above it, do you
24 know what that property is?

1 A. Where is that?

2 Q. If you look at your 380 acres, there's a thing
3 that's sort of pinkish at the bottom and then a kind of
4 murky green above that. Do you know what that property
5 is?

6 A. That is a quarry that the plant uses for
7 disposing of their ash.

8 Q. So that's currently being used by Midwest
9 Generation as an ash disposal site?

10 A. That's correct.

11 Q. Then over -- the other side of the road here,
12 there's a couple of other ponds. Are those also
13 abandoned quarries?

14 A. I don't know where you're talking about and -- I
15 guess I don't know.

16 Q. I'm sorry. Look to the north, it looks like the
17 northeast, there's two little -- they look like ponds
18 with a thing called Cecelia Avenue between them?

19 A. Yes, I see what you're talking about. I don't
20 know what those are.

21 Q. You don't know what those are either. Do you
22 believe it would be impossible physically to connect
23 these sites, so as to find your 380 acres by combining
24 these plants to these sites?

1 A. I wouldn't say it would be impossible, but I
2 think impractical and expensive.

3 Q. Why impractical?

4 A. Well, because you would need lots -- again, you
5 would -- again you would have to purchase the land, I
6 don't know who the owners are. You would have to
7 purchase some land in between to build canals or piping,
8 plus the cost of the piping and pumps could be very
9 expensive.

10 Q. The only thing I see in between these are roads.
11 Can't you just put a pipe under the road and, lo and
12 behold, they're connected?

13 A. You still need access to the property between
14 them.

15 Q. Well, those are roads, right?

16 A. Right.

17 Q. So we'd have to cut a deal with the county to
18 build a hole under their road?

19 A. Right.

20 Q. Let's go on to the other plants --

21 A. I guess on Joliet we didn't lay out a cooling
22 lake for Joliet seven and eight, but it would have to be
23 three and a half times the size of a cooling lake we
24 identified for Joliet unit six.

1 Q. I happen to know there's a little less space over
2 there, but we don't have the map -- I thank you for the
3 map, of course. But did you look at the -- there is
4 some area, I've forgotten what else is over there, but
5 there is some area to the north of seven and eight where
6 there's also some space too, isn't there?

7 A. Well, we'd need 1100 acres for a cooling lake and
8 we didn't really look at that site, that area there, but
9 I think it would be very difficult to find 1100 acres of
10 land. Plus, Midwest Gen would have to purchase the land
11 because they don't own it.

12 Q. In any of your considerations here did you
13 consider, like, a combination of using an open cycle
14 system with having less than a completely sufficient
15 cooling pond?

16 A. You said open cycle or do you mean closed cycle?

17 Q. I'm sorry, open cycle. Did you consider looking
18 at your -- how many days you're going to have to be
19 shut down, how many days you would have to be shut down
20 if -- maybe you don't have a 380 acre pond, but only a
21 200 acre pond. Did you look at sort of combinations of
22 what you might use as an approach?

23 A. No, we didn't look at that. But when you look at
24 the temperatures, I still believe that any cooling lake

1 with size, any practical size, we would still not be
2 able to meet the limits all the time.

3 Q. All the time. Let's go on.

4 A. The next one to take a look at is the drawing for
5 Fisk station.

6 MS. FRANZETTI: That is Exhibit 442.

7 THE WITNESS: Putting a cooling lake at Fisk
8 station doesn't pass the laugh test.

9 BY MR. ETTINGER:

10 Q. I agree with you, so let's go on.

11 MS. FRANZETTI: Now just for a minute,
12 before we all start laughing. Is the area that you
13 would need for the cooling pond depicted in orange,
14 those orange lines?

15 THE WITNESS: Yes, it's depicted in orange
16 and we'd need about 350 acres of cooling lake. We need
17 all the land between Cermak Road and the canal, from
18 Racine, through Ashland, beyond Damen.

19 The other issue with Fisk and it also
20 applies to the Crawford station is on a cooling lake in
21 the wintertime you're going to be generating a lot of
22 fog because you're heating up that water higher than the
23 air. And if you have a north wind which we frequently
24 have in the wintertime, you're creating a lot of fog,

1 you would produce fog and icing on Interstate 55 and we
2 consider that a fatal flaw, we don't think that would be
3 acceptable. A cooling tower, mini cooling towers you
4 will see generates a lot of fog, but we based our cost
5 estimate on using plume abated towers which minimize
6 the amount of fog and we believe that the plume abated
7 towers would not cause a problem for fogging and icing
8 on the interstate that something like a cooling lake
9 would.

10 The next one is Crawford station --

11 MS. FRANZETTI: That's Exhibit 441.

12 THE WITNESS: We didn't lay out a cooling
13 lake here. The plant is located just about in the
14 center of the drawing.

15 MS. FRANZETTI: Why don't you hold it up and
16 show it to them.

17 THE WITNESS: It's just north of the canal
18 and east of Pulaski and for a Crawford station we would
19 need about 585 acres, so we didn't even lay that out.
20 That would be similar to the Fisk station and not at all
21 practical and again you would have an icing problem with
22 Interstate 55.

23 The next one is Will County station.

24 MS. FRANZETTI: That is Exhibit 444.

1 THE WITNESS: On Will County station we'd
2 need about an 850 acre cooling lake. Again we didn't
3 lay it out. Again it would require the purchase of a
4 lot of land. There are highways in the area that
5 could -- you know, could be a potential fogging problem
6 in the wintertime. So we don't believe any of these
7 sites would be practical for putting in cooling lakes.

8 BY MR. ETTINGER:

9 Q. What's on the east side of the river here on Will
10 County?

11 MS. FRANZETTI: I'm not sure what you mean
12 when you say what's on the east side?

13 BY MR. ETTINGER:

14 Q. Well, I see green here, a big blob of green to
15 the east of the plant and that's what I mean.

16 MS. FRANZETTI: So is your question is there
17 property on the east side of the plant?

18 MR. ETTINGER: I realize that there's part
19 of the earth there. I asked what is there?

20 BY MR. ETTINGER:

21 Q. Do you know what the ownership of the property is
22 or anything about it?

23 A. No, we don't.

24 Q. You didn't inquire whoever that owner is as to

1 whether there would be any possibility of putting a
2 cooling plant there?

3 A. No, we did not.

4 Q. I'm going to withdraw five. When I read the
5 question -- when I read the sentence I didn't understand
6 it, but I just had an epiphany. So maybe we'll --

7 MS. FRANZETTI: No, actually you are right
8 there. There's a mistake.

9 MR. ETTINGER: Oh, okay. Please correct
10 your mistake. Maybe I'm reading past something I saw
11 before.

12 THE WITNESS: There was an error in the
13 statements in two places where we said -- where I said
14 once through, that should have been closed cycle. The
15 corrected --

16 BY MR. ETTINGER:

17 Q. That's the problem.

18 MS. FRANZETTI: You know what? Let him read
19 it for the record, so we don't need to correct it
20 otherwise.

21 THE WITNESS: The corrected text should read
22 as noted above, although there have been several studies
23 of existing plants with once-through cooling systems to
24 evaluate retrofitting them to closed cycle cooling, few

1 have actually converted to closed cycle cooling because
2 of the high capital cost, impact on plant performance,
3 and the complexity of converting an operating station
4 from once through to closed cycle cooling.

5 BY MR. ETTINGER:

6 Q. So the problem was just -- you said once through
7 on the second line there when you meant to say closed
8 cycle?

9 A. That is correct.

10 MS. TIPSORD: For the record, that is the
11 first full -- or is the last full paragraph before
12 sub D on page nine.

13 THE WITNESS: Yes.

14 BY MR. ETTINGER:

15 Q. Question number six. Why do you believe on page
16 ten that adding cooling might trigger new source review?

17 A. We have a detailed, a 10-page detailed
18 explanation in our report from section four, from 4-1 to
19 4-11 that explains that. To summarize it, it would be
20 we believe the solid particle emissions from the cooling
21 tower, because even though we would have very low drip,
22 still the small water particles that the tower does emit
23 has dissolved solids in them and those tiny drops
24 evaporate and then that's considered particular

1 emission. For Joliet seven and eight and Will County
2 three and four we did a detailed calculation which is
3 explained in the report and determined that those plants
4 could potentially emit through that cooling tower drip
5 more than 25 tons per year, which would trigger new
6 source review.

7 Q. I understand your explanation and we won't
8 discuss the law. Does Midwest Gen believe that adding
9 cooling to its Joliet plant triggered new source --

10 A. I don't know what Midwest Gen believes. But when
11 you look at those towers, those are the existing cooling
12 towers at Joliet seven and eight are only about
13 one-third the size of what we would propose for closed
14 cycle cooling, plus that is a once-through tower. So
15 the water coming in is basically river water quality so
16 the drip would be river water quality, and the closed
17 cycle, as we explained before, we'd go to five cycles of
18 concentration. So the dissolved solids concentration in
19 the drip would be five times the concentration in the
20 river or in the existing cooling tower.

21 Q. Seven, have you considered how putting cooling
22 towers at upstream plants might affect the extent of
23 need for cooling at downstream plants?

24 A. Well, we believe this impact would not be

1 significant. We didn't model -- we didn't try to model
2 the entire river system. But as we explained before,
3 looking at Fisk, the upstream river temperature in some
4 years exceeded the proposed limits 55 days per year. So
5 that if you didn't have -- if Fisk didn't add any heat
6 to the water, then that same standard would apply to
7 Crawford and so it wouldn't really have any real -- I
8 mean Crawford would still have a problem.

9 Q. Did you look at Will County and Joliet?

10 A. Yes. We looked at -- in terms of inlet river
11 temperatures, I looked at all five stations.

12 Q. If you put cooling on Will County, that would
13 demonstrably lower the intake temperature at Joliet,
14 wouldn't it?

15 MS. FRANZETTI: Objection, lack of
16 foundation for that question.

17 MR. ETTINGER: You objected --

18 MS. FRANZETTI: You haven't -- you're
19 assuming a fact out of thin area, Albert, and saying
20 that it would. But it -- do you understand the
21 question?

22 THE WITNESS: Yes.

23 MS. FRANZETTI: You can answer it.

24 THE WITNESS: Again I believe the impact

1 would be small. It would not -- if you were to say you
2 put cooling towers in Will County, I believe we would
3 still need to put cooling towers in Joliet nine and
4 seven and eight, based on the -- to meet the proposed
5 limits we would still need to go closed cycle to have a
6 practical solution.

7 BY MR. ETTINGER:

8 Q. Based on your studies does the temperature of
9 the -- rather does the heat discharge at Will County
10 affect the intake temperature at Joliet?

11 A. As I mentioned earlier, we didn't do a model of
12 the river. We just looked at each individual station.
13 We looked at the inlet temperature and the limits and
14 what we would need to do at each station to meet the
15 proposed limits.

16 Q. You don't know how much the Will County land
17 affects the intake temperatures at Joliet?

18 A. I don't have a specific number.

19 MS. FRANZETTI: Do you know approximately
20 what the river mile distance is between Will County and
21 Joliet?

22 THE WITNESS: I think it's seven or eight
23 miles linear distance from Will County to Joliet.

24 MS. FRANZETTI: Also just for the record,

1 it's true that as of the end of last year, two of the
2 Will County units in fact shut down already, correct?

3 THE WITNESS: That's correct.

4 MS. FRANZETTI: Your analysis assumes that
5 they would be shut down, correct, in this S and L
6 report, you knew that?

7 THE WITNESS: Yes.

8 BY MR. ETTINGER:

9 Q. Did you then go in when you looked at your
10 historical data and backout what the affects would have
11 been from shutting down those two plants?

12 A. No.

13 Q. Can the cooling towers be combined with wetlands
14 that would serve to treat water for nitrogen?

15 MS. FRANZETTI: Objection to relevancy.

16 MS. TIPSORD: Go ahead and answer to the
17 best of your ability.

18 THE WITNESS: Well, it would be possible to
19 use a combination of cooling towers and cooling waters,
20 small cooling towers and smaller cooling lakes, but we
21 believe that the overall cost would be greater than just
22 using cooling towers. And in terms of treating water
23 for nitrogen, we didn't look at that at all, that's not
24 my area of expertise so I have no idea what the impact

1 would be.

2 BY MR. ETTINGER:

3 Q. How much did it cost Midwest Generation to buy
4 the plant?

5 A. I don't know.

6 MS. FRANZETTI: I'll just again object to
7 relevancy. I don't think for economic reasonable issues
8 it matters what Midwest Gen bought the plants for.

9 MR. ETTINGER: I won't bother to argue that
10 since he's answered the question anyway.

11 BY MR. ETTINGER:

12 Q. If Fisk and Crawford were to close, would that
13 affect intake temperatures at Will County?

14 A. I'm not aware of any plans to close Fisk and
15 Crawford stations and we did not really try to analyze
16 that, so my question would just have to be hypothetical
17 because that's not looked at in our study. But as I
18 mentioned before, based on looking at the river
19 temperatures, putting -- converting Fisk and Crawford to
20 a closed cycle would essentially have the same impact in
21 the downstream units as shutting them down and we
22 believe that would not be significant and would not
23 change our recommendations for the downstream plants.

24 Q. Going back to something else you said. You

1 testified that the intake temperatures at all of
2 the -- at a number of these plants would be above the
3 proposed standard much of the year. What is your
4 understanding of the heat inputs to the system?

5 MS. FRANZETTI: Albert, can you explain what
6 you mean by heat inputs?

7 BY MR. ETTINGER:

8 Q. What are the sources of heat that are raising the
9 temperature in the system that we're analyzing?

10 MS. FRANZETTI: Where -- do you want him to
11 start at Fisk and have to go all the way down and
12 mention all the heat inputs?

13 MR. ETTINGER: I asked a general question.
14 If he can't answer a general question, we can go piece
15 by piece, if you prefer.

16 MS. FRANZETTI: I'm just -- your general
17 question is not very clear in terms of either --

18 MR. ETTINGER: Well, thank you, counsel.
19 We'll break it down.

20 MS. FRANZETTI: The geographic scope that
21 you're asking about or otherwise so --

22 MR. ETTINGER: I thought we were talking
23 about the whole system, but, counsel, we'll break it
24 down for you.

1 BY MR. ETTINGER:

2 Q. What do you believe are the thermal inputs
3 affecting the intake temperature at the Fisk power
4 plant?

5 A. I don't know. I just looked at the temperature
6 at Fisk. I didn't evaluate why those temperatures were
7 high or low or where it was coming from.

8 Q. You have no idea why the Fisk would be higher
9 than what IEPA is proposing for the water quality
10 standards?

11 A. That's correct, I do not know.

12 Q. Would that answer also be true as to Crawford?

13 A. Yes.

14 Q. And Will County?

15 A. Yes.

16 Q. And Joliet?

17 A. Yes.

18 MR. JOHNSON: And generally.

19 THE WITNESS: And generally.

20 BY MR. ETTINGER:

21 Q. Okay, here is the final question, is number 11.
22 What is the current revenue being made at the five
23 stations?

24 MS. FRANZETTI: The same objection in terms

1 of relevancy, but answer the question.

2 THE WITNESS: I don't know.

3 MR. ETTINGER: I'm done.

4 MS. TIPSORD: Are there any other question
5 for Mr. Henry?

6 MS. DONATO: May I ask a question?

7 MS. TIPSORD: Absolutely, as long as they're
8 relevant. You need to identify yourself for the record.

9 MS. DONATO: I'm Marla Donato. I'm here
10 with Columbia College on behalf of the students.

11 Some of these things might be pretty basic,
12 but you're using river water in order to generate the
13 steam turbines. Is that what we're trying to cool down
14 here in general?

15 THE WITNESS: We're using river water to
16 cool the steam generators.

17 MS. DONATO: And the water for the steam
18 to -- to generate the turbines is coming from where?

19 THE WITNESS: That's a separate isolated
20 cycle. We're generating steam in a boiler, the steam
21 turns the turbine, then when it exhausts the turbine we
22 have to condense that steam and so we have a heat
23 exchanger that uses river water to condense that steam,
24 then that condensed steam then goes back to the boiler

1 and that's the closed loop cycle.

2 MS. DONATO: The water that's turning the
3 turbines, where is that coming from that's generating
4 the steam?

5 THE WITNESS: That is makeup water. I don't
6 know where the source of the makeup water that these
7 plants is, but that's extremely pure water so that just
8 goes around in a closed loop.

9 MS. DONATO: Right now what's existing as
10 far as cooling?

11 THE WITNESS: All of these plants use the
12 river water for cooling.

13 MS. DONATO: You're saying these are
14 proposed standards. The current existing standards are
15 what?

16 MS. FRANZETTI: I don't think this witness
17 can explain to you all the proposed standards. They're
18 thermal standards that would apply in the receiving
19 water.

20 MS. WILLIAMS: She asked current, though,
21 she didn't ask about proposed. They're pretty simple
22 now.

23 MS. FRANZETTI: The secondary contact are
24 the thermal standards.

1 MS. TIPSORD: Let's just refer to the rules
2 of the -- if you look at the Board's rules and
3 regulations at 35 Ill App Code 301, 302, 303, they
4 delineate exactly what those standards are and you can
5 get those from our website. That's probably easier than
6 us trying to explain what the secondary contact current
7 ones are, but they are on the website and you can get
8 them there.

9 MS. DONATO: And this would -- theoretically
10 you have to cool the water down more from what it is
11 currently?

12 THE WITNESS: That is correct.

13 MS. DONATO: Do you know what the difference
14 is between -- about?

15 THE WITNESS: Well, it varies over the year
16 and the difference is big enough that it would not be
17 practical to try to cool that water down. What we have
18 estimated is that we would need to put in cooling
19 towers, basically a complete closed system where we'd
20 only be taking water from the river for makeup, that we
21 would use cooling towers for essentially all the
22 cooling, we'd no longer be using the river for cooling.

23 MS. DONATO: Then do you have any idea of
24 how much volume of water you would use in this closed

1 system from the river?

2 THE WITNESS: The amount of water we would
3 have to withdraw from the river for makeup?

4 MS. DONATO: Uh-huh.

5 THE WITNESS: I think that may be in our
6 report. It's a few percent of the total amount of water
7 that we're using now. But understand that the water
8 that we're using now, we're taking out of the river and
9 putting it back in. So it's not really -- it's we're
10 just taking it out, adding some heat, and putting it
11 back in.

12 MS. DONATO: That would be the same with
13 this closed system?

14 THE WITNESS: Well, the closed system, no.
15 We would be -- the heat would be dissipated to the air
16 from cooling towers and we would just need a small
17 amount of water from the river to make up what is lost
18 through evaporation.

19 MS. TIPSORD: Anything else for Mr. Henry?
20 Thank you very much.

21 Mr. Read, you have something.

22 MR. READ: Thank you, Madam Hearing Officer.

23 My name is Matthew Read. I'm here on behalf
24 of ExxonMobil and I'd like to make a request that

1 ExxonMobil be allowed to -- specifically Bob Elvert from
2 ExxonMobil be allowed to make a public comment on the
3 record. It's very brief, it's about two paragraphs, and
4 it deals with how they plan to participate in this rule
5 making. Since the record is open, we thought it would
6 be a good opportunity.

7 MS. TIPSORD: Is there objection to that?

8 MS. WILLIAMS: Just to clarify, we can ask
9 him questions about his comments if we have any?

10 MR. READ: Well, since it's a public
11 comment, we just want it read into the record.

12 MS. TIPSORD: Yes, we won't swear him in.

13 MR. READ: And it's really not very -- we're
14 not talking about substance here. We're talking
15 about --

16 MS. FRANZETTI: I have a feeling we'll argue
17 about this longer than it'll take him to say it.

18 MR. ETTINGER: No, no, I'm not going to
19 argue. He's here, if he wants to read two paragraphs.
20 But I think in the future we should tell people a
21 written submission would be good enough.

22 MS. TIPSORD: All right. With that we'll
23 let Mr. Elvert read his couple of paragraphs.

24 MR. ELVERT: Thank you.

1 Good afternoon. My name is Bob Elvert, the
2 state regulatory advisor for the midwest region for
3 ExxonMobil Corporation. ExxonMobil has been an active
4 participant in this rulemaking as evidenced from my
5 testimony at an earlier hearing during the --

6 MS. TIPSORD: Mr. Elvert, slow down just a
7 little bit.

8 MR. ELVERT: I'm sorry. I've testified on
9 the ExxonMobil security and safety concerns regarding
10 the stretch of the Lower Des Plaines River where the
11 Joliet refinery is located. ExxonMobil intends to
12 continue it's participation in this rulemaking.
13 Although we are not offering testimony in Subdocket C,
14 ExxonMobil will have testimony during Subdocket D when
15 the Board hears testimony on the proposed water quality
16 standards. At this time ExxonMobil has identified
17 several issues with the proposed standards which I or
18 another representative of ExxonMobil will more fully
19 explain during the Subdocket D proceeding. ExxonMobil
20 also intends to present testimony at that time of the
21 cost of compliance with the proposed standards. I
22 appreciate this opportunity to update the Board on
23 ExxonMobil's plans to present testimony in Subdocket D
24 rather than Subdocket C. ExxonMobil rests respectfully

1 and reserves the right to do so. Thank you.

2 MR. ETTINGER: I actually like the testimony
3 or statement because that brings us to our next topic
4 which is how we're going to deal with the relationship
5 of C and D.

6 MS. TIPSORD: Do we need to have this on the
7 record, do you think, or can we do it off the record?

8 MS. WILLIAMS: I would like to say one thing
9 though, then, on the record before we go off. I don't
10 have a problem with Mr. Elvert's statement either, but
11 I do think it's sort of unrealistic to distinguish
12 between testimony and public comments in the same
13 transcript -- -

14 MS. TIPSORD: We do it all the time. It's
15 not unusual for the Board to take public comments at a
16 hearing for a public comment.

17 MS. WILLIAMS: Okay, that's fine. Thank
18 you.

19 MS. FRANZETTI: I was just looking to spare
20 MS. TIPSORD reporter. I don't mind if we have it on the
21 record. I guess I would just quickly say, Albert, that
22 the reason we presented it, I can't speak for anybody
23 else, but the reason that we presented Mr. Henry at this
24 time was once the two dockets got bifurcated, I do think

1 there is an economic reasonableness issue that is raised
2 by the Illinois Environmental Protection Act with
3 respect to any proposed rule, that it is to be
4 economically reasonable, so the use designation rule
5 should pass that test. We wanted to get in our economic
6 testimony to be able to refer to in that guise. With
7 respect to Subdocket D, we would not repeat this
8 testimony, although we would ask that it be also
9 considered in Subdocket D. Now, might we add to this
10 for Subdocket D purposes? Yes, but not duplicate.

11 I don't know if that helps.

12 MR. ETTINGER: It sounds like we more or
13 less agree. The problem is and I don't necessarily
14 agree with your analysis of when cost is relevant or
15 not --

16 MS. FRANZETTI: I understand.

17 MR. ETTINGER: I think we all agree that
18 arguably testimony could have gone in under C or D. I
19 think what we just heard from the representative of
20 ExxonMobil and some of us else have, is we intend to
21 offer economic testimony or other testimony that we
22 thought was relevant more to D than to C and I think
23 there was just a concern that we just heard and that we
24 have similarly, that we don't want to be held later to

1 have been somehow precluded because we didn't offer it
2 in C. Also, you know, hypothetically you could adopt
3 the proposed use designations that IEPA has proposed and
4 then come up with criteria that didn't cost you as much
5 to meet, as what you've just testified. So we're going
6 to -- all I wanted to say is we haven't objected to the
7 people who have come in testifying now, even though I
8 think personally it's more properly D, I don't care,
9 we just did it, it was fine. I just want to make sure
10 that nobody's precluded later from offering economic
11 testimony on the reasonableness of this because, you
12 know, they didn't get it in on C because they thought
13 it should be in on D.

14 MS. TIPSORD: And I would just like to say
15 for the record, and this is as the hearing officer, I
16 would have to have a pretty strong argument to keep
17 something like that out in Docket D, and partly because
18 we have our ROA-9 and in ROA-9 we had a whole lot of
19 hearings before we went A, B, C, and D, and we already
20 have had the instance with Dockets A and B where for
21 example the district is filing cheers in both B and A,
22 and we're already seeing that there is, even though
23 we've split them out, there is overlap and I think that
24 that's true, is going to be even more true as we go

1 through with C and D. So I would say that as long as
2 it's relevant and not overly repetitious, that I would
3 be willing to take the --

4 MR. ETTINGER: I'm not even arguing that
5 our current witness couldn't come back in D if there's
6 something he wants to clarify, in view of what has
7 happened or revised criteria. I just wanted to
8 make -- I was more concerned about being precluded than
9 duplicative.

10 I think Fred has something to say, just from
11 the way he's nodding, but also I have another issue to
12 raise which has to do with the Water Reclamation
13 District which is I don't think we've seen their
14 proposal yet on dissolved oxygen, zinc, and whatever
15 else it was, cyanide, as regulatory language.

16 MR. ANDES: I think that if you read the
17 exhibits, the attachments to Ms. Wozniak's testimony,
18 there are detailed proposals presented there.

19 MR. ETTINGER: I read -- I saw -- I mean
20 there was something that I could draft, the detailed
21 proposal, but I didn't see an actual regulatory
22 proposal. Do you have something like that?

23 MR. ANDES: I don't believe that we provided
24 actual regulatory language there. I think we provided

1 the basis for a regulatory language and it would be
2 fairly straightforward from the draft, but we didn't
3 feel that was a necessity point.

4 MR. ETTINGER: Well, here's my point. They
5 did in fact foreshadow that they were going to make some
6 proposal like that. Frankly, we did not expect the sort
7 of drastic proposal that they offered. We did not think
8 about certainly in our pre-filed testimony, we were not
9 trying to respond to their proposal since we haven't
10 seen it yet. So at some point further down the road,
11 and again I'm not faulting what was done, we're all sort
12 of stumbling through, fitting things into these boxes.
13 I'm just saying, though, we need time to offer our own
14 pre-filed testimony and our own analysis of their
15 specific proposal that we haven't really seen until six
16 weeks ago or whenever it was.

17 MR. ANDES: That's fine. I assumed there
18 would be that opportunity at some point.

19 MR. ETTINGER: I was concerned that there
20 would not be.

21 MS. TIPSORD: Is there anything else?

22 All right. We'll see you all at 9:00
23 o'clock tomorrow morning.

24 (Hearing adjourned at 12:40 o'clock p.m.)

1 STATE OF ILLINOIS)
)SS.
2 COUNTY OF C O O K)

3

4 DAVID J. DEMSKI, being first duly sworn on oath
5 says that he is a court reporter doing business in the
6 City of Chicago; that he reported in shorthand the
7 proceedings given at the taking of said hearing on the
8 9th day of March, 2007, and that the foregoing is a true
9 and correct transcript of his shorthand notes so taken
10 as aforesaid, and contains all the proceedings given at
11 said hearing.

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DAVID J. DEMSKI - CSR# 084-004386

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