

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

ILLINOIS POLLUTION CONTROL BOARD
June 22 and June 23, 2006

IN THE MATTER OF)
)
PROPOSED NEW 35 ILL. ADM.)
CODE 225 CONTROL OF)
EMISSIONS FROM LARGE) R06-25
COMBUSTION SOURCES) (Rulemaking - Air)
(MERCURY).)

RECORD OF PROCEEDINGS
BEFORE MARIE E. TIPSORD
HEARING OFFICER

This record of proceedings was before the Illinois Pollution Control Board taken on June 22 and June 23, 2006, at 9:00 a.m., at the offices of the Environmental Protection Agency, Springfield, Illinois, before Holly A. McCullough, an Illinois Certified Shorthand Reporter, a Missouri Certified Court Reporter, a Registered Professional Reporter and a Notary Public.

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

APPEARANCES:

MEMBERS OF THE ILLINOIS POLLUTION CONTROL BOARD:

Ms. Marie E. Tipsord, Hearing Officer
Dr. G. Tanner Girard, Board Member
Ms. Andrea S. Moore, Board Member
Mr. Nicholas Melas, Board Staff
Mr. Amand Rao, Board Staff
Ms. Alisa Liu, Board Staff

COUNSEL FOR THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY:

Mr. Charles Matoesian
Mr. John Kim
Mr. Richard Ayres

COUNSEL FROM SHIFF-HARDIN:

Ms. Kathleen Bassi
Mr. Stephen Bonebrake
Mr. Sheldon Zabel

COUNSEL FROM JENNER & BLOCK:

Mr. Bill Forcade
Ms. Katherine Rahill

COUNSEL FROM McGUIRE-WOODS:

Mr. James Harrington
Mr. David Rieser

FROM PEABODY ENERGY:

Ms. Dianna Tickner

FROM ENVIRONMENTAL LAW PROGRAM, CHICAGO LEGAL CLINIC:

Mr. Keith Harley

FROM MIDWEST GENERATION EME, LLC:

Mr. Kent Wanninger

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

INTERROGATION INDEX:

EXAMINATION OF DR STAUDT: PAGE 4
EXAMINATION OF DR. HAUSMAN: PAGE 274
EXAMINATION OF MR. NELSON: PAGE 448
EXAMINATION OF MR. KALEEL & MS. WILLHITE: PAGE 476
EXAMINATION OF MR. ROSS: PAGE 507

EXHIBITS:

Deposition Exhibit No. 53 -- Page 46
Deposition Exhibit No. 54 -- Page 50
Deposition Exhibit No. 55 -- Page 51
Deposition Exhibit No. 56 -- Page 104
Deposition Exhibit No. 57 -- Page 104-105
Deposition Exhibit No. 58 -- Page 105
Deposition Exhibit No. 59 -- Page 105
Deposition Exhibit No. 60 -- Page 106
Deposition Exhibit No. 61 -- Page 106
Deposition Exhibit No. 62 -- Page 106-107
Deposition Exhibit No. 63 -- Page 107
Deposition Exhibit No. 64 -- Page 107-108
Deposition Exhibit No. 65 -- Page 174-175
Deposition Exhibit No. 66 -- Page 272
Deposition Exhibit No. 67 -- Page 272
Deposition Exhibit No. 68 -- Page 273
Deposition Exhibit No. 69 -- Page 327
Deposition Exhibit No. 70 -- Page 344
Deposition Exhibit No. 71 -- Page 344-345
Deposition Exhibit No. 72 -- Page 425
Deposition Exhibit No. 73 -- Page 465

1 HEARING OFFICER TIPSORD: Good morning. My name is
2 Marie Tipsord, and this is day nine. I feel like Ted
3 Koppel. This morning we are continuing with Dr. Staudt,
4 who was sworn in yesterday. Dr. Hausman is also with us
5 today, in addition Chris Romaine and Jim Ross may be
6 adding in as we go along. They're from the agency. And
7 all of these people have been sworn in. I believe we are
8 ready to start with question number 75 from Amren.

9

10 EXAMINATION OF

11 Dr. James E. Staud, Ph.D., CFA:

12 A. 75, to the best of your knowledge, what is the
13 variability in designing a baghouse? Just as a matter of
14 clarification, are you looking for the variables that
15 affect the design of the baghouse?

16 MR. HARRINGTON: Yes.

17 A. Okay. The major issues that affect baghouse
18 design are the gas flow rate, particle mass loading,
19 pressure drop, location of ductwork requirement. Those
20 are the major variables. Most everything falls out of
21 that.

22 HEARING OFFICER TIPSORD: 76. Go ahead,
23 Mr. Harrington.

24 Q. (by Mr. Harrington) Is particle size and --

1 HEARING OFFICER TIPSORD: Hard to --

2 Q. Is particle size and deposition also
3 important?

4 A. Yes, those will play a role.

5 MR. HARRINGTON: Thank you.

6 A. 76, would not studies need to be performed to
7 determine the particulate emission that it might
8 experience independent of the halogenated activated carbon
9 to be injected? Well, studies would need to be performed,
10 yes. 77, if there was a particulate carryover from the
11 ESP, would it not require a larger baghouse? Yes, that's
12 why TOXECON system -- they've established sizing criteria
13 for TOXECON system.

14 Q. (by Mr. Harrington) In addition to what was
15 established for the TOXECON system, is it also necessary
16 to know whether any additional particulate will be
17 reaching the baghouse and what the characteristics would
18 be?

19 A. Additional material beyond the carbon?

20 Q. Beyond the carbon that's being ejected.

21 A. Yes.

22 Q. If it's also going to be used in conjunction
23 with dry flue gas scrubbing, would that also need to be
24 taken into account for designing the baghouse?

1 A. Correct.

2 Q. Would it require a larger baghouse?

3 A. Somewhat larger, yes.

4 MR. HARRINGTON: Okay.

5 HEARING OFFICER TIPSORD: Question 78.

6 A. 78, if there was particulate carryover from
7 the ESP, would it not require a larger baghouse?

8 HEARING OFFICER TIPSORD: That's 77.

9 A. Excuse me. I did 76. Sorry.

10 HEARING OFFICER TIPSORD: 78.

11 A. I lost track. I apologize. So, which am I
12 on?

13 Q. (by Mr. Harrington) 79, I don't think was
14 addressed.

15 A. Okay. If the baghouse received the additional
16 particulate matter, would that have a potential to
17 interfere with or reduce the mercury removal efficiency of
18 the baghouse? No, not if the baghouse was designed
19 properly for the application; there should be no problem.

20 80, what factors would influence the design and
21 capacity of the required fans to operate a baghouse
22 system? The main factors would be gas flow rate, gas
23 temperature, particle loading, fabric selection, inductor
24 arrangement are the main ones.

1 HEARING OFFICER TIPSORD: Mr. Harrington?

2 MR. HARRINGTON: Proceed to 81, and then I'll ask.

3 HEARING OFFICER TIPSORD: All right. 81.

4 A. How long would it take to determine those
5 variables on a typical installation? I would expect that
6 in a matter of a few months the detailed engineering plan
7 with specifications could be prepared.

8 MR. HARRINGTON: We can proceed.

9 HEARING OFFICER TIPSORD: 82.

10 A. 82, are you personally familiar with the
11 layout of some or all of the coal-fired electric
12 generating stations in Illinois? No.

13 Q. (by Mr. Harrington) From that, may I assume
14 that you would not know there are any particular design or
15 construction problems with installing baghouses at any of
16 the Illinois facilities?

17 A. I'm not familiar with the layouts of the site
18 plans. So, the answer would be, no, I don't know if there
19 would be a challenge in locating a fabric filter.

20 MR. HARRINGTON: Thank you.

21 HEARING OFFICER TIPSORD: 83.

22 A. 83, are you familiar with what problems there
23 would be in locating a baghouse at each of the coal-fired
24 electrical generating units in Illinois? I know the

1 factors in general, but not specific to each of the units.

2 MR. HARRINGTON: Thank you.

3 HEARING OFFICER TIPSORD: 84.

4 A. 84, will issues relating to locating the
5 baghouse at individual generating stations affect the fan
6 capacity required to move the flue gases from the outlet
7 through the baghouse and back to the stack? Yes, if
8 fabric filters were added, a booster fan or larger draft
9 fan would probably be necessary. Longer duct runs would
10 entail a higher pressure drop and require more power.

11 HEARING OFFICER TIPSORD: 85.

12 A. 85.

13 Q. (by Mr. Harrington) I don't think this is
14 covered elsewhere. If the additional fan capacity is not
15 properly designed, does it have the potential to impact
16 the operation of the electrical generating unit?

17 A. Potentially. And if a piece of equipment on
18 the plant is -- I mean, you could say that in general with
19 any piece of equipment on the plant is improperly
20 designed, it could affect whether a fan or any other piece
21 of equipment.

22 Q. Does it have the possibility of causing back
23 pressure or change in pressure regime within the facility?

24 A. That would be -- Normally you would -- If the

1 system were properly designed, it wouldn't be a problem,
2 but you're saying if someone improperly designed the
3 system, would there potentially be flow error or pressure
4 imbalance problems, and, yes, but these are things that
5 companies in the air pollution control industry have been
6 doing for decades, and they know what they're doing. So,
7 that's a pretty unlikely scenario.

8 Q. But is one of the reasons that the proper
9 design is a critical factor in installing a baghouse that
10 was required at a facility?

11 A. Could you repeat the question?

12

13 (Court Reporter read back last question.)

14

15 A. Is that a statement or a question?

16 Q. (by Mr. Harrington) A question. Is that
17 correct?

18 A. Well, proper design is indeed important.

19 MR. HARRINGTON: Thank you. You can proceed.

20 HEARING OFFICER TIPSORD: 85.

21 A. 85, do the fan and baghouse require
22 considerable electrical energy to operate? The fan
23 primarily does. The baghouse doesn't require very much,
24 but most of the electrical energy is associated with the

1 fan.

2 HEARING OFFICER TIPSORD: 86.

3 A. Have you estimated the electrical demands of
4 such systems on units in Illinois? Well, for the units
5 that we assumed TOXECON would be installed, parasitic
6 loads were assumed, and the cost is discussed in the
7 technology support document.

8 Q. (by Mr. Harrington) And just so the record is
9 clear, but that was without taking into account site
10 specific conditions; is that correct?

11 A. Well, I assumed a total pressure loss across
12 the system of either -- and I'm -- I don't recall for
13 sure, but it's either eight or nine inches typically. On
14 a fabric filter itself, you typically see -- My
15 understanding is that at Presque Isle, the system is about
16 a two or three inch pressure drop, but across the
17 baghouse, it would be a few more inches of pressure drop
18 to accommodate the ductwork. So, my opinion was eight to
19 nine inches should address -- should be a pretty good
20 estimate for the total pressure drop across fabric filter,
21 ductwork and whatnot, but certainly on any particular
22 facility, you might find a lower pressure drop or perhaps
23 an even higher one depending upon the circumstances.

24 MR. HARRINGTON: Thank you.

1 HEARING OFFICER TIPSORD: Dr. Staudt, could you
2 define "parasitic load"?

3 A. "Parasitic load" is when you add a piece of
4 equipment -- You know, power plants they like to produce
5 power, and that's what they sell, but it takes a certain
6 amount of power to run all the equipment in the power
7 plant. So, if you have -- You've seen -- You may have
8 heard that a plant has a gross megawatt generating
9 capability, say 200 megawatts gross, it also has a net,
10 where actually you can send out and sell as the net, and
11 you have to subtract what are called parasitic loads from
12 the gross to get to the net. So, you may have a gross
13 output of 200 megawatts, and if you have 10 or
14 15 megawatts of parasitic loads, there's -- you can only
15 actually sell about 190 megawatts.

16 HEARING OFFICER TIPSORD: Thank you. Mr. Zabel.

17 Q. (by Mr. Zabel) Just so the record is clear,
18 Dr. Staudt, there are two units, is that correct, that
19 your analysis assumed would install TOXECON?

20 A. That's correct.

21 Q. Were there any other units that you assumed
22 would install a baghouse in any configuration?

23 A. There are other units that I assumed that
24 would install baghouses due to their agreements under

1 consent decrees.

2 Q. But beyond the consent decrees and the two
3 with TOXECON, were there any others?

4 A. No.

5 MR. ZABEL: Thank you.

6 HEARING OFFICER TIPSORD: Question number 87.

7 A. 87, have you made an independent determination
8 whether the power transformers and supporting electrical
9 systems are available at the electrical generating units
10 in Illinois?

11 Q. (by Mr. Harrington) Clarification, to operate
12 baghouses assuming that those were installed.

13 A. I was going to ask you for that clarification.
14 No, I have not done that.

15 HEARING OFFICER TIPSORD: 88.

16 A. 88, construction issues: How many units do
17 you expect to be retrofitted with controls for mercury in
18 the State of Illinois? Well, how many actually -- Do you
19 want to include just baghouses or --

20 Q. (by Mr. Harrington) That's the next question.

21 A. I think we answered, the baghouses -- the only
22 ones I assumed for baghouses were the two outside units.

23 Q. Plus the consent decree?

24 A. Plus the consent decree, yeah. And the PRB --

1 I assume that the PRB units would install sorbent
2 injection, for PRB firing units would install sorbent
3 injections, and I assume a simple sorbent injection
4 system, and I assume that the unscrubbed bituminous units
5 would install sorbent injection. But bear in mind that
6 these -- this was my assumption in terms of how to
7 estimate the cost. These people who operate -- own and
8 operate the plants may find other approaches and hopefully
9 they will that are even more -- you know, lower cost, a
10 less expensive way to achieve the same result. So, that
11 was just my assumption. What number are we on?

12 MR. HARRINGTON: 89.

13 A. 89, assuming those units require a
14 TOXECON-type treatment system, i.e.: injection of
15 halogenated powder activated carbon after the ESP followed
16 by a baghouse, what is the estimated time for the
17 installation of one such unit? You know, we're only
18 talking -- The typical type would be within about two
19 years, under two years.

20 HEARING OFFICER TIPSORD: 90.

21 A. If all of the electrical generating units in
22 the State of Illinois using PRB coal needed such an
23 installation, what is the projected time for installation?
24 I think we touched on this yesterday. All the electrical

1 -- In my opinion, all the electrical generating units in
2 the State of Illinois using PRB coal will not -- you know,
3 will not -- this is, you know, such a remote scenario that
4 I don't see it happening.

5 Q. (by Mr. Harrington) Could it be done in three
6 years if it had to be done?

7 A. I believe so.

8 HEARING OFFICER TIPSORD: Question 91.

9 MR. HARRINGTON: And I think 91 was just answered.

10 HEARING OFFICER TIPSORD: Okay. Thank you,
11 Mr. Harrington. Mr. Forcade, do you have a follow-up?

12 MR. FORCADE: Yes.

13 Q. (by Mr. Forcade) Again, relating to question
14 91, as it pertains to the TOXECON systems, did I correctly
15 understand you to say it would take approximately two
16 years for the installation?

17 A. Well, to complete from beginning to being up
18 in commission, yes.

19 Q. Okay. What time frames are you allowing in
20 that for preparation of the permit application, securing
21 the permit, constructing the facility and then submitting
22 the permit application for the operating? Have you broken
23 that two-year period down into segments?

24 A. No, I haven't broken that period down into

1 segments.

2 Q. Did your two-year period include each of those
3 factors?

4 A. Well, my two-year period is based upon -- If
5 you look at Presque Isle, which from beginning to end was
6 two years, and, so, it's my belief that should be
7 representative of a fairly complex situation. If -- But
8 that's not to say that you may have administrative issues
9 that may be different here in Illinois. I'm not familiar
10 with the permitting process in Illinois.

11 Q. What I'm trying to determine is, does your
12 two-year period start from the commencement of
13 construction and go to completion of construction, or does
14 the two-year period start some earlier portion?

15 A. It would at least -- It would certainly
16 include -- go from beginning of commencement of
17 construction to beginning of construction, and studies
18 that I've seen show that it can be done in even less time
19 than that, and the permitting -- if you include
20 permitting, that's a matter of a few months.

21 Q. Does that include the time period for design
22 and engineering specifications? Does it include the time
23 for capital authorization requests prior to selecting the
24 system?

1 A. Well, a company's own business, how the
2 company makes internal decisions, that's a time frame they
3 control. So, that I can't comment on.

4 HEARING OFFICER TIPSORD: Mr. Zabel.

5 Q. (by Mr. Zabel) To follow-up on that, does it
6 include procurement and fabrication time?

7 A. Absolutely.

8 Q. (by Mr. Harrington) I think there was an
9 ambiguity in one of the answers that needs follow-up.
10 Earlier you mentioned that several months would be
11 necessary for engineering to determine the parameters of a
12 particular installation. Is that included in your
13 two-year time frame?

14 A. Well, what I said several -- I don't think I
15 said "several months". It would probably be a few months,
16 but you could develop within a few months a fairly
17 detailed design enough to go out and start procurement.

18 Q. Is that in addition to the two years you
19 mentioned?

20 A. No. That would be part of the two years.

21 MR. HARRINGTON: Thank you.

22 HEARING OFFICER TIPSORD: Question 92.

23 A. Do you have personal knowledge of the
24 availability of baghouses in the market today and whether

1 they would be available for installation in the next 36
2 months for all of the electrical generating units in
3 Illinois using PRB coal? Well, again, this is again what
4 I compare it to a, you know, asteroid. This is like a
5 giant asteroid hitting us, frankly, I'm more worried about
6 than all the plants having to put baghouses. But having
7 said that, you know, you have some very large companies,
8 GE. There are some very large companies in this business.
9 As I mentioned yesterday, GE, Siemens. We even -- In
10 Chicago, there's one of the major fabric filter companies
11 is located in Chicago that makes filter bags. I have no
12 doubt that if the asteroid did hit and all these plants
13 decided to install fabric filters, you know, the industry
14 would rise to the occasion as they did a few years ago
15 when they installed all those SCR systems.

16 Q. Is it correct then you do not have personal
17 knowledge of what the living time for baghouses are today?

18 A. I'm -- I don't go out and procure those. So,
19 no, I have not gone and out tried to purchase one.

20 Q. You're not aware as to whether there's been
21 any substantial additional time required for procurement?

22 A. Could you repeat the question, please?

23

24 (Court Reporter read back last question.)

1 Q. (by Mr. Harrington) On baghouses.

2 A. I'm not aware of that.

3 MR. HARRINGTON: Thank you.

4 HEARING OFFICER TIPSORD: Question 93.

5 A. Do you have personal knowledge of the
6 availability of skilled tradesmen necessary for these
7 installations, including electricians, steelworkers, pipe
8 fitters, etc.? That's easy. No, I don't keep these
9 statistics, but for sorbent injection systems, they are --
10 You may remember from the figure that was in, I think it
11 was, Exhibit 52. See, these are small pieces of
12 equipment. They're basically a silo, blower. It's skid
13 mounted. It can be delivered on a truck basically and
14 installed, frankly, on a weekend.

15 Q. (by Mr. Harrington) 94.

16 A. With respect to the foregoing answers, have
17 you taken into account the other pollution projects that
18 must be ongoing in the Midwest and throughout the country
19 in the same period of time? Yes. The sorbent injection
20 systems won't even make a dent in the demand for labor.

21 Q. With respect, the preceding questions dealt
22 with installation of baghouses.

23 A. Oh, okay. In the very unlikely -- extremely
24 unlikely event everyone decided to install a baghouse in

1 Illinois, I believe that, as I said, again, the industry
2 would be able to handle it. This is an industry with big
3 companies, lots of capabilities.

4 Q. 95.

5 A. 95, at the time you originally assisted in
6 preparing the technical support document and prepared your
7 testimony in this proceeding, did you have knowledge of
8 the availability of baghouses, fans and the necessary
9 engineering and skilled personnel to design, construct and
10 install such systems? Well, I think we've gone through
11 this, but I'm not sure if you agree or not.

12 Q. Is the answer "no"?

13 A. The answer is, I do not keep such statistics.
14 Okay. So, if that's what you're looking for. Do you mean
15 to ask me if I have detailed statistics?

16 Q. No. I mean, did you talk to people or make
17 other investigation as to what the actual construction
18 times were likely to be if this kind of installation were
19 required?

20 A. In my opinion, there was no reason for me to
21 ask, Well, how -- What would the installations be if
22 everybody installed a baghouse because, again, that's not
23 going to happen in my opinion. There might be two,
24 perhaps more people install a baghouse, but not every unit

1 in the State of Illinois. So, there was no reason to
2 pursue that.

3 Q. Just so --

4 A. As far as when I put together the TSD, I was
5 confident of the ability of the industry to provide
6 everything that was necessary to support what I -- the
7 installations that I projected in the TSD. I did not
8 pursue data on what if everybody in the entire state did
9 something that I believe is extremely unlikely.

10 Q. You were present at the public meetings held
11 in this room earlier on this rule?

12 A. That's correct. Yes.

13 Q. And you were present at those meetings when
14 questions were submitted by various companies concerning
15 this proposed rule; were you not?

16 A. I was present, yes.

17 Q. And you assisted in preparing answers to some
18 of those questions; did you not?

19 A. That is correct. Yes.

20 Q. And essentially the questions about the
21 ability to install baghouses on all or many of these
22 facilities were raised during that period, as well; were
23 they not?

24 A. I don't recall.

1 Q. Thank you.

2 HEARING OFFICER TIPSORD: Question 96.

3 A. 96, are you aware of other technologies that
4 are presently being developed for removal of mercury from
5 the flue gas and subbituminous fired electrical generating
6 units? Yes.

7 HEARING OFFICER TIPSORD: 97.

8 A. What are those technologies, and what is the
9 status of development? Well, there's electrocatalytic
10 oxidation that is one multi pollutant control technology
11 that controls mercury SO2 and NOx. It is much more
12 capital intensive than sorbent injection. And they are
13 installing their first commercial plant in Ohio. There
14 are other sorbents that I anticipate may be available at
15 some time in the future. There are mineral based sorbents
16 that I'm aware are going to be tested on plants here in
17 Illinois and other advanced sorbents, and they would be
18 able to be used in the same injection systems as these
19 halogenated carbons should they be proven to be more
20 advantageous to use than halogenated carbons. I discussed
21 minplus as another technology that's discussed in the
22 technology support technology.

23 Q. (by Mr. Harrington) Could you spell that for
24 the Court Reporter, please?

1 A. M-I-N-P-L-U-S. And there are -- As I
2 mentioned earlier, there's a lot of activity in this area.
3 So, there are -- I'm sure that there are other
4 technologies out there that don't immediately come to
5 mind.

6 Q. Are any of those ready for full-scale
7 commercial application?

8 A. Well, electrocatalytic oxidation is being
9 installed on full-scale commercial units at this time.

10 Q. Is that part of an experimental application?

11 A. Not according to First Energy or Power Span.

12 HEARING OFFICER TIPSORD: You had a question.

13 MR. WANNINGER: Yes.

14 HEARING OFFICER TIPSORD: And you need to identify
15 yourself for the record.

16 Q. (by Mr. Wanninger) Kent Wanninger, Midwest
17 Generation. Mr. Staudt --

18 A. Yeah.

19 Q. -- the electrocatalytic oxidation system,
20 isn't it true that that's a very capital sensitive multi
21 pollutant technology?

22 A. That is correct.

23 Q. Isn't it true that it's only been tested on
24 bituminous coals for mercury removal?

1 A. That is correct. Yes.

2 Q. Does the owner of that technology expect it to
3 get 90 percent removal on PRB coals?

4 A. 90 percent removal of what?

5 Q. Of mercury. I'm sorry.

6 A. I don't know. I know I've seen numbers of at
7 least about 80 percent.

8 Q. Are you aware that he's done some slip screen
9 testing on a PRB coal unit to add this technology because
10 he doesn't think he can get 90 percent removal with PRB
11 coals of mercury?

12 A. No, I'm not aware of that.

13 Q. Thank you.

14 HEARING OFFICER TIPSORD: Mr. Zabel.

15 Q. (by Mr. Zabel) Just one follow-up. Do you
16 know if First Energy is doing that pursuant to its consent
17 decree?

18 A. No, I do not.

19 Q. It could be, as far as you know?

20 A. Perhaps.

21 HEARING OFFICER TIPSORD: Question 98.

22 A. Does this include materials sprayed directly
23 on the coal to introduce halogens at that point? Yes.
24 There are people looking at putting chemicals into coal to

1 add halogens. Just for your benefit, on western coals,
2 one of the challenges that were found with western coals
3 is that they don't have a lot of chlorine in them as
4 eastern bituminous coals do, and as a result what some
5 people do in order to improve the capture, they add the
6 halogens to the coal. So, they spray some chemical that
7 has halogens on them on the coal, or they might get
8 halogens spraying in the furnace someplace else, and
9 instead of using the halogenating sorbent, they can use an
10 untreated carbon sorbent to get high levels of mercury
11 control.

12 HEARING OFFICER TIPSORD: 99.

13 A. When do you expect that these technologies
14 will be commercially available? You know, I do not know
15 since -- although I'm aware of the testing, I'm not aware
16 companies are actually selling them, except for testing or
17 offering them for sale.

18 MR. HARRINGTON: Thank you.

19 HEARING OFFICER TIPSORD: Question 100.

20 Q. (by Mr. Harrington) If I may rephrase it
21 slightly for display. Some of these technologies have
22 promised to be more effective and less costly than what is
23 currently available; is that not correct?

24 A. Than which ones that are currently available?

1 Q. Potentially even in the present sorbent
2 injection systems you testified about.

3 A. So, you're saying that sorbent injection is
4 currently available?

5 Q. No. You said that it is, and I'm going to
6 assume for purposes of this question.

7 A. As I mentioned, there are a lot of
8 technologies out there, and there are many ways to reduce
9 mercury. Halogenated sorbents are one approach. And my
10 understanding of the rule is that there are -- it's an
11 emission standard based rule, that people can use whatever
12 means they find least expensive to comply with the
13 emission standard of the rule. The only part of the rule
14 that is technology specific, it's my understanding, is the
15 technology based standard that in the event companies are
16 unable to meet the emission based standard.

17 HEARING OFFICER TIPSORD: Dr. Girard.

18 Q. (by Dr. Girard) Before we move out of this
19 area, I'm just going to ask a general question. Are there
20 any potential negative environmental impacts from using
21 the halogenated sorbents or any halogen controlled
22 methods?

23 A. EPA has examined this, the issues that -- you
24 know, they examined would there be potential carcinogens

1 like furans and whatnot. There's been a study done by
2 EPA, and they've found no contribution of DPF's.
3 Basically they're dioxins and what have you, chlorinated.
4 There's no contribution there. Another concern that EPA
5 examined was the possibility of would there be promine
6 going out as an ozone depleting agent, and they found that
7 that's not a problem either. So, these halogens, there's
8 been no indication that -- You know, and, of course, with
9 all the sorbents, both halogenated and non-halogenated,
10 there's been a lot of testing of these sorbents to see if
11 once the mercury gets there and eventually this gets the
12 mercury that's in the carbon, it's attached to carbon,
13 doesn't stay attached to the carbon, and there's been
14 leaching tests, and every single test that's been done has
15 shown that the mercury stays adhered to the carbon; it
16 does not -- it doesn't get released at a later time.

17 Q. (by Ms. Bassi) Just a follow-up. Over how
18 long a period of time has this mercury been attached to
19 the carbon that did not leach?

20 A. I'm not familiar with the details of those
21 studies, but these are specific tests EPA has prescribed
22 tests that used to characterize leaching. They're
23 standard tests special, you know, leaching tests that
24 are -- and they've passed. There's never been a problem.

1 Q. Okay. And one further question. It's my
2 either understanding or assumption from everything that
3 has been presented by Illinois EPA in its proposal, that
4 Illinois EPA does not agree with USEPA's views toward how
5 mercury should be controlled or the level to which mercury
6 should be controlled, and is this information regarding
7 negative impact from sorbents an exception to that general
8 view of acceptance of USEPA's proposal for mercury?

9 A. You need to ask the agency for their opinions
10 on things.

11 HEARING OFFICER TIPSORD: Mr. Ross is available as
12 part of the panel.

13 Q. (by Ms. Bassi) Basically the question boils
14 down, are you accepting part of it, but not all of it,
15 part of USEPA'S whole regime on mercury, but not all of
16 it?

17 A. (by Mr. Ross) I still don't understand the
18 question. What part of what of what?

19 Q. I'll be more specific. Dr. Staudt just
20 testified that USEPA has run tests to determine whether
21 there is leaching from the chlorines and promines that are
22 added to sorbents to control mercury emissions, and, yet,
23 USEPA has made other statements about mercury under the
24 CAMR that Illinois EPA has stated that it disagrees with

1 or it disevolves, you know, to sum it up. I want to know,
2 is this an exception to that disevolve of USEPA'S position
3 on mercury?

4 A. (by Mr. Ross) I think you're drawing a very
5 strange comparison. You're comparing technical
6 information with policy decisions. We are relying on
7 technical information from USEPA. We have drawn a
8 different policy conclusion in terms of level of control
9 should be required.

10 A. (by Dr. Staudt) Just another thing that might
11 be helpful in terms of this mercury on the sorbent, the
12 fly ash that's already being collected in the ESP's of
13 these power plants -- already we've heard about cobenefit
14 reductions -- well, that's already collecting mercury.
15 There's already mercury that's being collected deposit on
16 that fly ash, and that doesn't leach. So, you're not
17 creating a new environmental issue. You're just actually
18 putting more of the mercury into where it was going --
19 where some of it was going before.

20 A. (by Mr. Ross) And I would just like to add
21 that Dr. Staudt does address this in Section 8 of the TSD,
22 and we reviewed that, and we are in agreement with his
23 comments, and in addition, we asked our land pollution,
24 Bureau of Land, to review this issue, and they came back

1 with essentially the same conclusions Dr. Staudt reaches,
2 that this mercury binds in such a manner that it is
3 unlikely to leach out, and if disposed of properly, it
4 remains disposed of properly; that it doesn't contribute
5 to any other environmental impacts.

6 HEARING OFFICER TIPSORD: Mr. Zabel.

7 MR. ZABEL: I don't believe Mr. Romaine and Mr. Ross
8 identified themselves. It might be helpful for the Court
9 Reporter.

10 MR. ROSS: Jim Ross.

11 MR. ROMAINE: Chris Romaine.

12 HEARING OFFICER TIPSORD: Miss Bassi.

13 Q. (by Ms. Bassi) Is proper disposal anything
14 different from what the companies normally would do today?

15 A. (by Mr. Ross) I don't believe so. My
16 understanding of it is, it needs to be disposed of in a
17 landfill.

18 MS. BASSI: Okay.

19 HEARING OFFICER TIPSORD: Mr. Harrington.

20 Q. (by Mr. Harrington) Both for Dr. Staudt and
21 for the agency, are you aware of USEPA developing new
22 rules for cement kilns to preclude the use of fly ash
23 contaminated with mercury?

24 A. (by Mr. Ross) I am aware of that.

1 Q. You are aware of that?

2 A. (by Mr. Ross) I've heard it, yes.

3 Q. It's in many of the environmental
4 publications?

5 A. (by Mr. Ross) Yes.

6 Q. And because the basis for this is the
7 potential release of mercury from cement kilns that's
8 presently used in several amount of fly ash?

9 A. (by Mr. Ross) Yes, I've seen it discussed.
10 To the best of my knowledge, I'm not aware of any existing
11 regulations on that now.

12 MR. HARRINGTON) Thank you.

13 A. (by Mr. Romaine) I guess I just want to
14 follow-up. Are you testifying that USEPA has developed
15 regulations that limit fly ash in cement kilns?

16 Q. (by Mr. Harrington) No. I asked if you were
17 aware of any such development, and I believe the testimony
18 is "yes".

19 A. And I guess I would say that we would have to
20 be very cautious in terms of exactly what USEPA is
21 proposing to regulate in terms of cement kilns, whether it
22 involves fly ash, bottom ash, other types of bi-product
23 materials that might be sent to cement plants.

24 A. (by Mr. Ross) I think that's a more accurate

1 depiction. I've simply seen it in publications where it's
2 been discussed. I haven't actually seen a proposed
3 regulation or anything to that effect.

4 Q. For Dr. Staudt, are you familiar with any of
5 those discussions?

6 A. (by Dr. Staudt) I'm not familiar of any
7 regulations regarding any of the regulations -- any
8 possible regulations that you've raised.

9 Q. Do you believe there would be an issue with
10 using ash contaminated with mercury from sorbent injection
11 in cement kilns?

12 A. It's depending upon what control technology
13 the cement kilns have. The issue here is if you put
14 something with mercury into a cement kiln -- Now, right
15 now the ash -- much of the ash already has some mercury in
16 it. We talked about the cobenefit controls, that you get
17 some mercury capture even without adding activated carbon.
18 So, that mercury is -- That ash that may have some mercury
19 in it goes to the cement kilns, gets burned, then the
20 mercury gets released in gaseous form. And I'm only
21 talking as a technical person, not in terms of whether
22 there's a rule on something. I'm trying to help the board
23 understand some of the issues. So, that mercury, when it
24 gets burned, the same way when the coal gets burned in the

1 furnace, the mercury gets released in the gaseous form
2 again, and then what you would have to do then is capture
3 it. So, now some of the modern like precalciner kilns
4 that are well controlled --

5 HEARING OFFICER TIPSORD: Spell that.

6 A. P-R-E-C-A-L-C-I-N-E-R -- the modern cement
7 kilns have pretty good controls, acid gas controls, that
8 are likely to get captured, but some may not. So, it will
9 vary. I'm trying to explain the technical issues here.

10 HEARING OFFICER TIPSORD: Someone is vibrating on the
11 table with the microphone. Are we ready to move on to
12 question -- Mr. Zabel.

13 Q. (by Mr. Zabel) Dr. Staudt, in your analysis
14 of Chapter 8, you assumed after the installation of
15 sorbent injection that at least most of the companies that
16 were selling ash would be disposing of it. Was this one
17 of the reasons for that assumption?

18 A. No. Those -- My assumption -- What I did in
19 the TSD is for those plants that I expect -- in my
20 analysis said would be using sorbent injection would not
21 be using the TOXECON system -- okay -- that injected
22 sorbent, that if they were selling fly ash, that they
23 would now have to be disposed, and the reason is not a
24 mercury contamination issue per se. The real issue is,

1 what actually is more limiting is that the carbon --
2 cement kilns have a requirement for what can be in their
3 fly ash. There's a limitation to how much carbon, ASTM
4 standard that limits it, but there's another requirement
5 depending upon -- The activated carbon is basically a
6 sponge for chemicals. So, it absorbs an air entrainment
7 air mixture that is emitted to portland cement to try to
8 control its porosity and its strength. It can have an
9 adverse effect. The net result is, when I did my economic
10 analysis, I assumed that those plants that currently sell
11 their fly ash and that I projected to be installing
12 sorbent injection would as a result have to dispose of
13 their ash in lieu and forego those revenues and incur some
14 disposal costs.

15 HEARING OFFICER TIPSORD: Miss Bassi.

16 Q. (by Ms. Bassi) Just for a clarification, you
17 said when they sell their ash to cement kilns. Did you
18 mean concrete plants?

19 A. Well, it's sold for many uses. The most
20 valuable use is a concrete additive. That's the most
21 valuable use. Sometimes they do sell them to cement
22 kilns, as well, and sometimes they just sell them as some
23 other type of road fill or other lower additive.

24 HEARING OFFICER TIPSORD: Mr. Zabel.

1 Q. (by Mr. Zabel) This may be more for the
2 agency and something Mr. Ross said a moment ago. In that
3 case, Mr. Ross, maybe in your consultation with land or
4 water, would the disposal of the fly ash -- I guess it's a
5 two-part question. In the case where only sorbent
6 injection is used, would it present any problems in
7 disposing of that ash in the existing fly ash pond that
8 most of the utilities operate?

9 A. (by Mr. Ross) Not that I'm aware of, and we
10 presented the issue to them, discussed it with them, and
11 they indicated back to us no concerns whatsoever, and they
12 are familiar with how power plants do dispose of some of
13 their fly ash on-site. So, that was discussed.

14 Q. And are you talking about discussions with the
15 water bureau?

16 A. Bureau of Land.

17 Q. So, you haven't discussed it with the Bureau
18 of Water?

19 A. Well, it was also discussed to some degree
20 with the Bureau of Water. Kingsley, who wrote a portion
21 in Section 8 of the technical support document, I'm not
22 sure if that specifically was addressed in there, but he
23 addressed some water issues, and he did to some degree in
24 our consultations with both Bureau of Land and Bureau of

1 Water, we discussed that topic, and no concerns were
2 raised with it.

3 Q. And a narrower aspect of that, Mr. Ross, did
4 you discuss with the Bureau of Water the disposal of the
5 baghouse waste with sorbent injection used such as in a
6 TOXECON system in the ash pond?

7 A. To the best of my recollection, that
8 particular issue was not addressed.

9 Q. So, we don't know whether the existing
10 methodology that most of these plants use, which is ash
11 ponds, which are at least at that stage regulated by the
12 Bureau of Water, will be acceptable; is that correct?

13 A. That's correct, but I'm not sure if the
14 distinction between that type of mercury contaminated
15 waste and what you would regularly have in sorbent
16 injection system. Perhaps the experts could speak to that
17 better. The distinction is there. Maybe that's something
18 that needs to be explored further.

19 A. (by Mr. Staudt) I'll just speak. EPA has and
20 DOE, who sponsored many of these -- DOE sponsored the test
21 financially. They've done lots of testing on what -- you
22 know, leachability, does the mercury leach. And first of
23 all, keep in mind there's already mercury in the fly ash
24 that's being disposed of. What you're doing is you're

1 transferring more of the mercury into the fly ash that's
2 being disposed instead of having to go up the smokestack.
3 That's really what you're doing. Okay. So -- And it
4 doesn't leach now. The tests of the sorbent showed that
5 it doesn't leach. So, you know, I could just tell you
6 what the data is. I'm not an expert on water quality.
7 So, somebody from water quality -- knowledge of water
8 quality can tell you whether or not that establishes a
9 criteria for a problem.

10 HEARING OFFICER TIPSORD: Dr. Staudt, you spoke that
11 EPA tests and things like and where you worked with
12 TOXECON system. You already agreed to provide some
13 reports. Is some of this information going to be
14 included --

15 A. We can get it to you, yes.

16 HEARING OFFICER TIPSORD: Thank you. We would like
17 to have that, as well. Mr. Zabel.

18 Q. (by Mr. Zabel) Dr. Staudt, I'm not asking you
19 to respond to regulatory requirement of the Illinois
20 Bureau of Water, but just to clarify a little, you did
21 mention -- please correct me if this is a misunderstanding
22 -- that one of the problems of the use of the ash
23 collected in the non-TOXECON setting where sorbent
24 injection is used because that carbon tends to absorb a

1 spectrum of chemicals?

2 A. Well, as far as the cement kilns, it absorbs
3 the air entrainment add mixture, but the problem is in the
4 concrete industry.

5 Q. And in a TOXECON situation, for example, the
6 waste from the baghouse would have that add mixture in it;
7 would it not?

8 A. No. What comes out of the baghouse is going
9 to be what's captured from the power plant. The air
10 entrainment add mixture is actually something that's added
11 at the concrete plant when they mix all the material
12 together. Okay. Because it's a chemical that helps
13 control the porosity. You put the water in, you mix it
14 up, and you put it in, and then you try to set your cement
15 posts or whatever. The strength of the concrete is -- a
16 factor apparently is that porosity of that material, and
17 particularly it affects the absorb characteristics and
18 whatnot. So, there's a chemical that they put in to
19 control that porosity, and that's --

20 Q. And that's not my concern, and I appreciate
21 you clarifying that. I'm backing up again to the power
22 plant setting where -- Is this a correct statement,
23 basically that the use of sorbent injection will add only
24 to the ash pond the carbon itself and whatever mercury

1 adheres to it?

2 A. As far as I know.

3 Q. And, so, Mr. Ross, would it be your view, your
4 understanding of the Bureau of Water that that should make
5 no difference whether it's then disposed of in an ash pond
6 from existing ash collection hardware or from a baghouse?

7 A. (by Mr. Ross) Right, I'm not sure of the
8 difference between contaminated carbon that the mercury
9 adheres to that's collected in an ESP and then collected
10 from a baghouse. I think there may be a higher
11 concentration from what's collected in the baghouse. I'm
12 uncertain on that. That's one reason why we have the
13 experts here is to discuss that issue. But --

14 MR. KIM: Are some of your questions geared more
15 towards -- And I think, for example, your last question,
16 my sense is you're getting towards more specifically with
17 the Illinois EPA Bureau of Water perspective be on that
18 question; is that correct?

19 MR. ZABEL: Since they're the one that normally
20 regulate wet ash ponds, yes.

21 MR. KIM: What I was going to suggest was, instead of
22 putting Jim Ross of trying to speak for the Bureau of
23 Water, Marcia Willhite, who is with the Bureau of Water
24 who has already testified, she is out of town today, but

1 for these type of questions, I will check. I believe
2 she's in the office tomorrow, and if so, we can have her
3 made available to answer some of those specific, you know,
4 questions that what would the Bureau of Water's
5 perspective be. She's probably best situated to answer
6 that.

7 MR. ZABEL: And I'm happy to have that done,
8 Mr. Kim. My concern, of course, not just the view of the
9 Bureau of Water, but the impact that has on the cost if
10 disposal of either baghouse waste or fly ash waste is
11 impacted by sorbent injection.

12 MR. KIM: Understood. If nothing else, maybe affirm
13 any assumptions.

14 MR. ZABEL: If it's not a problem, it's not a
15 problem. We'd be happy with that.

16 MR. KIM: We'll try to have her available tomorrow.

17 HEARING OFFICER TIPSORD: Mr. Nelson, they're asking
18 for the perspective. You can have a couple seconds if you
19 think you can answer.

20 A. (by Mr. Sid Nelson) A little bit of technical
21 background, the sorbents that are absorbing mercury from
22 the air, both plain carbons and halogenated carbons,
23 similarly excellent sorbents in the water. So,
24 consequently what the EPA has found is that these

1 materials when they do leaching tests at most pH's will
2 actually had soil background mercury from the water.
3 Similarly measurements where these have been disposed of
4 on land, the mercury flux is from the dilute mercury in
5 the atmosphere in the air we all breathe to the pile. In
6 other words, these materials -- They don't release
7 mercury. They still have unutilized capacity, and they
8 actually will clean up the mercury from the ash pond or
9 clean up mercury from the air because that's what they
10 are. They're mercury absorbants.

11 Q. (by Mr. Zabel) I guess as a result of
12 Mr. Nelson's explanation, another question I'd like
13 Mr. Ross or Mr. Kim to pursue with the Bureau of Water,
14 will mercury monitoring on ash pond now be required, as I
15 don't think it's required in most?

16 HEARING OFFICER TIPSORD: Mr. Harrington. There was
17 two parts to that. Did we get your answer, or do we need
18 to --

19 MR. HARRINGTON: I think we can come back to that if
20 we need to.

21 A. (by Dr. Staudt) I lost track of where we are.

22 HEARING OFFICER TIPSORD: Question 101.

23 A. 101, with respect to all the data on the
24 various tests you have referred to, has statistical

1 analysis been performed to predict a statistically
2 reliable future performance of such systems? I'd have to
3 know your definition of "statistically reliable" to give
4 the specification. I think we talked about this
5 yesterday.

6 Q. (by Mr. Harrington) Yes, we did. I think you
7 indicated at that time that you did not consider yourself
8 an expert in predicting such type of statistical
9 limitations; is that correct?

10 A. I do not recall making that statement.

11 Q. I agree you did not make that statement.
12 "Statistically reliable" as I used it here in this
13 question is here to the same concept I mentioned
14 yesterday, predicting a limit that can be met with a high
15 degree of liability over a variety of normal circumstances
16 by taking into account the variability of data and the
17 limited amount of data, and there's a whole series of
18 questions that relate to that here, and if you're not the
19 person to answer them, that's fine. If you are, proceed.
20 But that was my definition.

21 A. Okay. Well, I provided you the information on
22 the data for these types of applications for the sorbent
23 injection system with correlation and correlation
24 coefficients and what have you, and you can decide for

1 yourself whether you believe that's statistically reliable
2 or not because you only know the criteria that you want
3 for statistically reliable.

4 102, is there not statistical variability in both of
5 the sampling of coal and its analysis, as well as in the
6 sampling and analysis of mercury in the flue gas? Well, I
7 am not an expert on sampling and measurement techniques.

8 HEARING OFFICER TIPSORD: Mr. Romaine.

9 A. (by Mr. Romaine) I will answer that one for
10 the agency and simply say, yes.

11 HEARING OFFICER TIPSORD: 103.

12 A. (by Dr. Staudt) 103 is, is there not
13 statistical variability in the coal itself and, therefore,
14 in the possible removal rates that will be achieved even
15 given a steady state treatment technology? And --

16 A. (by Mr. Romaine) I'll answer that again.
17 Yes.

18 Q. (by Mr. Harrington) And for Dr. Staudt?

19 A. I would say that would be, yes.

20 Q. Okay.

21 A. But one thing you might want to look at there
22 was, Mr. Nelson handed some results from a test, and you
23 can see there was a little bit of wiggle in that line for
24 the period -- for the 30 days being tested at a constant

1 injection rate, and that will give you an indication of
2 the kind of variability and what have you.

3 Q. Okay. Coming back to 103, is there
4 significant variability in the amount of mercury in coal
5 from even the same grade and from the same coal fields?

6 A. Well, to my knowledge, there can be, yes.

7 Q. And even given variability in mercury content
8 of coal from the same mine depending on what level it's
9 removed from?

10 A. I have not personally done studies on that.
11 So --

12 Q. Have you seen data to that effect?

13 A. I've seen data on different coals and coals
14 being burned at the same plant. I don't know if they were
15 necessarily from the same mine because I wasn't familiar
16 what the buying habits of the coal were.

17 MR. HARRINGTON: You can go ahead.

18 HEARING OFFICER TIPSORD: 104.

19 A. Is there not also statistical variability in
20 the efficacy of any of the treatment technologies? From
21 what I've seen, once you look for the sorbent injection
22 and based upon what -- you know, the data I provided,
23 that's actually -- there is some statistical variability,
24 but for a given coal type specific configuration, it seems

1 to be the variability is -- particularly for PRB, it's
2 pretty low. It's a little higher on the bituminous, but
3 pretty low on PRB. So, there is indeed some variability,
4 but it's not very much on particularly PRB.

5 Q. (by Mr. Harrington) That's based on the
6 short-term tests?

7 A. No. Some of them are 30-day tests. And the
8 other thing to keep in mind is that, you know, the rule
9 has a 12-month average. So -- And that's because there's
10 -- As industry rightly points out, there is some
11 day-to-day variability in what happens, but as you go for
12 a longer period of time, that day-to-day variability
13 becomes much less important because if you're going -- if
14 you're doing -- if you use a rolling average, you have
15 365 days to look at, and it's really the average that
16 counts. If you have one day that's off, it's likely to be
17 offset by a day that's off in the other direction.

18 HEARING OFFICER TIPSORD: Miss Bassi.

19 Q. (by Ms. Bassi) My understanding was that this
20 was a 12-month rolling average. So, you would average
21 each month. So, you don't have 365 days. Do I understand
22 that incorrectly? You have 12 months and --

23 A. Maybe the details of the rule may be -- Chris,
24 you could --

1 A. (by Mr. Romaine) I think we're saying the
2 same thing. When you're talking 12-month averaging,
3 you're still talking about averaging months that have 30
4 or 31 days. You're talking about combining 365 days of
5 data.

6 Q. Okay. But when you're averaging a month, to
7 get that monthly allowable, which I now understand, to get
8 that monthly allowable, you don't have -- is it not
9 correct that you don't have the whole 365 days for
10 maneuverability, if you will, or for the averaging to come
11 out -- The larger the number you average, the better it's
12 going to come out is what I'm getting at. Is that not
13 true? And, so, the restriction to 30 days is not as --
14 doesn't provide the same flexibility as the restrictions
15 for 365 days?

16 A. (by Mr. Romaine) There is some loss of
17 precision because of the methodology that aggregates the
18 12 months of data to come up with the annual total, but
19 you're still talking about taking data for 365 days. It
20 would not be that different.

21 MS. BASSI: Okay. Thank you. And I was not, by the
22 way, suggesting anything different.

23 HEARING OFFICER TIPSORD: Question 105.

24 A. What studies have been done to determine and

1 account for the statistical variabilities in projecting
2 enforceable removal rates or emission limits to your
3 knowledge? You mean studies by Illinois EPA or by others?
4 I'm not sure what you mean by that question. The answer
5 is, I'm not aware of any, other than what we've presented
6 in the TSD and in these discussions.

7 A. (by Mr. Romaine) And I'd like to follow-up.
8 In terms of continuous emission modern methodology, that
9 is something that USEPA has worked on and continues to
10 work on as it continues to work to improve --

11 HEARING OFFICER TIPSORD: Chris, you're not speaking
12 at all into the microphone.

13 A. (by Mr. Romaine) As it works to continue
14 improvement to mercury methodology for the implication of
15 the proposed rule, for that purpose I do have additional
16 Exhibit that provides an update on some of the work that
17 USEPA is doing.

18 HEARING OFFICER TIPSORD: If there's no objection, we
19 will mark the Clean Air Mercury Rule CAMR Implementation,
20 February Status of Mercury Monitoring as Exhibit No. 53.

21 (No response.)

22 HEARING OFFICER TIPSORD: Seeing none, it's marked as
23 Exhibit 53. Are we ready for 106?

24 A. (by Dr. Staudt) 106, is that normally done in

1 developing regulations and imposing mandatory
2 requirements? That's a better question for somebody from
3 the state. I'm not a regulator.

4 A. (by Mr. Romaine) My answer is, yes,
5 statistical variability is normally considered when
6 developing regulatory limits. This is particularly
7 important when standards are being developed that would
8 apply instantaneously or for which compliance would be
9 determined intermittently by performance stack tests that
10 may be relatively infrequently. As Dr. Staudt has already
11 explained, the issue of statistical variability becomes
12 less significant when you're talking about a standard
13 that's applied on an annual basis or a running total of
14 12 months of data.

15 HEARING OFFICER TIPSORD: Mr. Harrington.

16 Q. (by Mr. Harrington) Perhaps this is for
17 Mr. Romaine. If the mean performance of control equipment
18 on equipment on EGU's in Illinois under the rule is at
19 approximately or slightly above 90 percent removal using
20 the calculations that are in the rule for shorthand, what
21 is the possibility that at the end of a year it might come
22 in at 89 percent?

23 A. (by Mr. Romaine) You've provided a
24 hypothetical situation where you're describing something

1 that is complying with a short-term performance that's
2 above the regulation. I would have to come back to you
3 and ask you, what sort of variability are you assigning to
4 performance of that control technology? I think, in fact,
5 what you would like me to say, couldn't be sure that if in
6 fact, you give me an answer in compliance. You've just
7 told me the mean performance is better than the
8 regulation. If the average performance is better than the
9 regulation requires on an annual basis, the annual
10 performance should demonstrate it.

11 Q. If the one term means it's at 90 percent, is
12 there not a possibility that in any one year a report
13 could be 89 percent, the following year 91 percent?

14 A. (by Mr. Romaine) That is correct.

15 MR. HARRINGTON: Thank you.

16 A. (by Mr. Romaine) If somebody is operating at
17 the average to comply statistically, you would say half
18 the time they're in compliance and half the time they're
19 going to be out.

20 HEARING OFFICER TIPSORD: 107.

21 A. (by Mr. Staudt) Are you familiar with the
22 terms "commercially proven" and "commercially available"?
23 Please state your understanding of each. These are terms
24 that I actually have heard industry state usually preceded

1 by the word "not". Now, "commercially proven" is not a
2 term I recall using. So, I don't have an understanding of
3 what it means. From my perspective, "commercially
4 available" means that a gooder service is commercially
5 available when there is a provider willing to sell it.

6 HEARING OFFICER TIPSORD: If I may, Dr. Staudt --
7 excuse me, Mr. Harrington for jumping in on your question
8 -- but earlier when we were talking about whether or not
9 something was commercially available back on question 99,
10 you used the phrase "commercially available" -- you didn't
11 think it was commercially available, except for testing.

12 A. Well, I wasn't aware if the company was
13 actually selling it. I think what I may have said at that
14 point was that I wasn't aware if the company was actually
15 selling it.

16 HEARING OFFICER TIPSORD: So, if it's a available for
17 testing, you don't consider that commercially available in
18 your definition?

19 A. Well, I don't know if they're actually selling
20 it for a price or they're just offering it up for testing.

21 HEARING OFFICER TIPSORD: Thank you. I just wanted
22 to clarify that. I was confused between the two.

23 A. Sometimes these people have chemicals, they
24 say, "Well, here we'll give you some for free and try it

1 out and see what happens."

2 HEARING OFFICER TIPSORD: Thank you. Mr. Harrington,
3 I apologize.

4 MR. HARRINGTON: That completes this list of
5 questions. I do have one Exhibit that I'd like to hand
6 out and some questions. Perhaps it would be useful. I
7 don't know if it's appropriate to hand it out because I'm
8 going to ask Dr. Staudt some questions about it and
9 identify it and take a break so he can look at it.

10 HEARING OFFICER TIPSORD: Sounds like a wonderful
11 idea. Mr. Forcade.

12 MR. FORCADE: Me too.

13 HEARING OFFICER TIPSORD: From Mr. Harrington, I've
14 been handed "Control of Mercury Emissions From Coal-Fired
15 Utility Boilers, An Overview of the Status of Mercury
16 Control Technologies," and I'm not even going to list all
17 the names, which we will mark as Exhibit No. 54 if there's
18 no objection.

19 (No response.)

20 HEARING OFFICER TIPSORD: Volume 40, Issue 5 of the
21 Environmental Science & Technology Journal. I'll mark
22 this as Exhibit 54.

23 MR. HARLEY: We have the volume and the pages, but do
24 we know the date on which this was published?

1 MR. HARRINGTON: I believe it is March 1, 2006.

2 HEARING OFFICER TIPSORD: And for Mr. Forcade, I've
3 been handed the U.S. Department of Energy, National Energy
4 Technology Laboratory, April 25, 2006, Clarification of
5 the U.S. Department of Energy's Perspective on the Status
6 of Mercury Control Technologies for Coal-Fired Power
7 Plants, and we will mark this as Exhibit 55 if there's no
8 objection.

9 (No response.)

10 HEARING OFFICER TIPSORD: Seeing none, it's
11 Exhibit 56. Let's take a ten-minute break.

12

13 (A brief recess off the record.)

14

15 HEARING OFFICER TIPSORD: And I believe we are going
16 to continue with Amren's amended or additional questions
17 regarding Dr. Staudt's amended testimony.

18 MR. HARRINGTON: I have a few follow-up questions I
19 have on the handout.

20 HEARING OFFICER TIPSORD: Go ahead, Mr. Harrington.

21 Q. (by Mr. Harrington) That's Exhibit 54. Dr.
22 Staudt, do you have a copy of Exhibit 54, Control of
23 Mercury Emissions from Coal-Fired Electric Utility
24 Boilers?

1 A. I do.

2 Q. Are you one of the authors of this document?

3 A. Yes, I am.

4 Q. And I assume, therefore, you're familiar with
5 the document?

6 A. Well, somewhat familiar. It was written about
7 a year ago.

8 Q. When was it published?

9 A. It was published early this year. Usually
10 when you write something for a peer review journal,
11 there's a lot of -- it takes a long time to get the stuff
12 submitted, scheduled for publication and through a review
13 process.

14 Q. Well, would you publish -- Would you allow it
15 to be published if you did not agree with the conclusions
16 that were being stated at the time it was published?

17 A. Well, I was not -- This is a collaborative
18 effort. So, it reflects the opinions of five people, and
19 my input was primarily on technical matters, and four of
20 the people were with USEPA. So, it's fair to say that
21 some conclusions may be closer to what EPA's official
22 position is.

23 Q. It may take me a moment to go through this
24 because my notes are on a different copy than the one that

1 was copied for the group, and I think they're very close,
2 but imagination may not be exact.

3 HEARING OFFICER TIPSORD: We have nothing but time,
4 Mr. Harrington.

5 Q. (by Mr. Harrington) Under the section
6 "Sorbent Injections," there was a diagram. I'm only using
7 that for reference. I don't have questions about it. The
8 diagram is "Performance of halogenated PAC's compared with
9 that of standard PAC's." Are you familiar -- There's a
10 paragraph that begins right below that. It says,
11 "Although sorbent injection" -- Do you see that paragraph?
12 I'm trying to find it.

13 MR. KIM: That's Figure 2 of the document; correct?

14 MR. HARRINGTON: Yes, it is.

15 A. Yes, I see that.

16 Q. (by Mr. Harrington) Could you read that
17 paragraph out loud?

18 A. "Although sorbent injection appears to be a
19 very promising technology for mercury control, it is
20 important to consider any potential adverse side effects
21 that may significantly affect plant reliability. To date,
22 none of the PAC injection test programs have shown
23 significant adverse impact. However, some effects may be
24 cumulative and may only be revealed through long-term

1 field testing of several months or more."

2 Q. Do you agree with that paragraph?

3 A. Yes, but let me elaborate. The main things --
4 The cumulative effects would mainly deal with TOXECON on a
5 fabric filter, and those were examined with tests lasting
6 many months.

7 Q. Those tests were one prior to this; were they
8 not?

9 A. That is true.

10 Q. And the sorbent injection there is not talking
11 about the TOXECON rate; is it?

12 A. It's talking about sorbent injection in
13 general --

14 Q. All right.

15 A. -- including the TOXECON rate.

16 Q. Turning to the next page, there's a sentence
17 that starts "some evidence," the first part of it. I
18 think it's the second paragraph on the following page.

19 A. Yes, I see that.

20 Q. Would you read that paragraph, please?

21 A. "Some evidence exists that the cleaning
22 frequency of a fabric filter in the TOXECON configuration
23 or in combination with SDA may increase with sorbent
24 injection. Some evidence has also been found of a short

1 under five-minute increase in stack opacity immediately
2 after each fabric filter cleaning step. These concerns
3 must be addressed with additional tests."

4 Q. Do you agree with the conclusions of that
5 paragraph?

6 A. These -- There are some aspects I do and some
7 aspects I personally do not have information on.
8 Remember, this is a collaborative effort, and there were
9 other people -- there were four other authors here, and
10 they may have put something in there, added something that
11 they were aware of that I was not aware of.

12 Q. I assume you had an opportunity to read the
13 entire document before it was published with your name on
14 it; is that correct?

15 A. I imagine I did. Usually what happens is,
16 though, EPA -- there are revisions typically with EPA.
17 Those go through many levels of review of EPA. There
18 sometimes are revisions that the authors don't get to see.

19 Q. Do you know whether this was such a revision?

20 A. I don't know.

21 Q. Thank you. Moving further back in --

22 A. To make a point here, when we talk about some
23 evidence exists with the cleaning of the fabric filter,
24 one of the things I want to point out, and I made it

1 before and I'll make it again, fabric filters are an
2 extremely well understood technology. The Gaston test,
3 they did not test on a TOXECON arrangement. They
4 basically had a fabric filter downstream of an ESP and
5 decided to do the testing because it was convenient there,
6 and they determined as a result of those tests what the
7 right design characteristics for a TOXECON should be to
8 avoid issues that are raised in this paragraph.

9 Q. (by Mr. Harley) Dr. Staudt, you see that
10 there is a footnote that follows the sentence that begins
11 "Some evidence"? It's footnote number 16?

12 A. Yes.

13 Q. And if you look at footnote 16, "some
14 evidence" seems to be derived from a study of full-scale
15 activated carbon injection for mercury control in flue gas
16 derived from North Dakota lignite?

17 A. That's correct.

18 Q. Do you know what North Dakota lignite is?

19 A. I know it's a coal that's not burned in
20 Illinois.

21 MR. HARLEY: Thank you very much.

22 Q. (by Mr. Harrington) The TOXECON array, the
23 primary particulate being removed from the baghouse is the
24 activated carbon; is it not?

1 A. Mostly, but there is also some residual
2 particulate that may come over from the ESP.

3 Q. In the Gaston, Alabama situation, that
4 baghouse was originally installed and operated for removal
5 of the fly ash from the boilers; is that not correct?

6 A. For the very small amount of fly ash that the
7 hot side ESP did not capture -- the hot side ESP captured
8 the large majority of the fly ash and what was called COH
9 PAC arrangement. It's another patent EPRI technology,
10 just putting a fabric filter after an ESP. The purpose of
11 that is just to capture the very small amount of
12 particulate that escapes upstream hot side ESP.

13 Q. Are you aware of any similar studies on the
14 TOXECON arrangement where the primary particulate in the
15 baghouse has halogenated carbon or non-halogenated
16 activated carbon?

17 A. It would be halogenated or non-halogenated?

18 Q. With either one on the TOXECON type of
19 arrangement.

20 A. The TOXECON arrangement -- There are two tests
21 of the TOXECON arrangement full scale tests. There's the
22 Gaston and then Presque Isle, which is ongoing. But the
23 reason people think TOXECON is an interesting technology
24 is because it enables you to do two things: First of all,

1 take advantage of the -- you know, it's been well
2 established that with any fabric filter, if you inject
3 carbon, it catches -- the carbon goes up to the fabric
4 filter and excellent sorbent removal and low sorbent
5 injection rates. Most utility boilers already have ESP's,
6 only a few have fabric filters. And, so, if those people
7 with the ESP's decided to add a fabric filter downstream,
8 TOXECON is a way to take advantage of that.

9 Q. Are you aware of testing to determine the
10 potential impact on opacity of emissions from a TOXECON
11 unit operating solely just a TOXECON unit, not including
12 Gaston?

13 A. Not including Gaston or Presque Isle?

14 Q. Not including Gaston.

15 A. Well, Presque Isle test is ongoing.

16 Q. Do you know of any evaluation of opacity in
17 Presque Isle?

18 A. Well, I'm not familiar with all the results of
19 the testing at this time.

20 Q. Thank you. Turning to further back in the
21 article, it starts bold, "Outlook for Technology
22 Availability," could you read the second full paragraph
23 that starts "In general"?

24 A. "In general, the technology availability for

1 mercury control will vary by boiler configuration and coal
2 type and will depend on what direct and relevant data are
3 available and on the nature of the regulatory framework,
4 i.e., a spectrum from minimum risk to technology forcing.
5 The principal concerns for the broad-scale use of mercury
6 controls are the reliability of the reductions and the
7 risks of adverse side effects. To the extent that
8 required mercury reductions are within the capabilities of
9 the technology and pose minimal side effects, mercury
10 controls may be considered available. However, as
11 discussed in this article, some questions remain regarding
12 their performance for broad-scale use, and they are being
13 investigated."

14 Q. Do you agree with the conclusions of that
15 paragraph?

16 A. Not entirely.

17 Q. And with what do you disagree?

18 A. Well, I believe I primarily disagree with the
19 tone. Now, this is where you have five authors who all
20 collaborate, and the tone paints a much bleaker picture
21 than I believe really exists.

22 Q. Do you agree with the last sentence, "However,
23 as discussed in this article, some questions remain
24 regarding their performance of broad-scale use, and they

1 are being investigated"?

2 A. Well, the -- Let me point this out: There are
3 questions. My view is that there is an awful lot that we
4 do know about mercury control. There are some things we
5 don't know about mercury control. And when an EPA for
6 broad-scale use, they're thinking about every single
7 application that's out there. Here in Illinois, we have
8 -- for sorbent injection, there are basically only two
9 types of situations. There's PRB coal -- or, actually,
10 three types. There's PRB coals, but some have hot side
11 ESP and might go with the TOXECON, and then the other are
12 the bituminous. Well, those -- Aside from those, there is
13 a wide spectrum of other situations. And when EPA says
14 they're concerned about the -- making these required
15 across the board, well, there are people burning North
16 Dakota lignites, Texas lignites, spray dryer absorbers,
17 fabric filters. There are people who have a wide range of
18 boiler characteristics. And indeed in some of those
19 situations there's less data than there is with -- there's
20 a lot less data than there is with powder river basin
21 coals in particular, and there's a lot of information on
22 powder river basin coals, and the data is very good. So,
23 I agree, but what I disagree with is the general tone of
24 that because it tends to focus on the negatives and paint

1 the bleaker picture and leave more a negative impression
2 than I believe exists certainly in the case in Illinois.

3 Q. Would you read the next paragraph, please?

4 A. "Although some data, mostly from short-term
5 tests, have become available on mercury control approaches
6 for power plants, a broad and aggressive R and D program
7 now and under way will yield more experience and
8 information in the next few years. Accordingly, EPA
9 believes that PAC injection and enhance cobenefit controls
10 to provide mercury removal levels of 60 to 90 percent will
11 become available after 2010 for commercial application on
12 most, if not all, key combinations of coal type and
13 control technologies. Moreover, considering the progress
14 made with halogenated PAC sorbents and other chemical
15 injection approaches, EPA believes that optimizing multi
16 pollutant controls to reduce mercury levels by 90 to
17 95 percent will be available between 2010 and 2015 for
18 commercial application on most, if not all, key
19 combinations of coal type and control technologies. Such
20 optimized controls could include the less expensive use of
21 sorbent (standard or halogenated PAC) injection with
22 enhanced SCR and/or enhanced FGD systems."

23 Q. Do you agree with the conclusions of this
24 paragraph?

1 A. I believe that the -- I believe that the
2 technologies in the case of Illinois, for the applications
3 we're looking at in Illinois are currently available. I
4 don't think we need to wait until 2010. There may be
5 other -- You know, when EPA looks at across the country,
6 they may be thinking, you know, all of those different
7 types of applications, other applications that are out
8 there, but for the specific situations that exist in
9 Illinois, they are available well before then in my
10 opinion.

11 Q. Looking at the second sentence of that
12 paragraph, does it not indicate that the technologies
13 available in 2010, in the EPA's opinion, will get 60 to
14 90 percent removal?

15 A. Well, again, they're looking at trying to
16 cover most, if not all, combinations. Some combinations,
17 some applications are easier than others, and that's been
18 borne out with testing, and PRB applications are about the
19 easiest, and, so, if you limit it to PRB applications, I
20 would say over 90 percent is available. It's available
21 well before 2010. You don't have to wait until 2010. In
22 other cases, you might perhaps have to.

23 MR. HARRINGTON: I have no further questions on this
24 document.

1 HEARING OFFICER TIPSORD: Mr. Forcade.

2 Q. (by Mr. Forcade) Dr. Staudt, did I correctly
3 understand you to say that some of the revisions that
4 occurred may not have been subject to review, and,
5 therefore, the opinions expressed in this article may more
6 reflect the opinions of the USEPA?

7 A. There are five authors. I'm only one of them.
8 So, generally when I do work -- I do work for EPA and when
9 I do work for EPA, I limit all my work to technical
10 analysis. Anything that's associated with policy
11 development is left to them. So, if you read this and
12 anything that is associated with policy, any statements
13 regarding policy, that reflects EPA's position and not
14 mine.

15 Q. So, this is reflects EPA's position on policy?

16 A. On policy.

17 HEARING OFFICER TIPSORD: Anything further?

18 Mr. Forcade, go ahead.

19 Q. (by Mr. Forcade) Dr. Staudt, I believe I
20 asked you yesterday if you had any knowledge of the
21 Department of Energy's position on the commercial
22 availability of mercury controlled technologies, and I
23 believe that the response was, "no"; is that correct?

24 A. Well, I don't -- I said, no, but I don't fully

1 understand -- I can't represent that I know every aspect
2 of their position.

3 Q. Have you had an opportunity to review what is
4 marked as Exhibit 55 entitled "Clarification of U.S.
5 Department of Energy's Perspective on the Status of
6 Mercury Control Technologies for Coal-Fired Power Plants"?

7 A. Yes, I have.

8 Q. Could I direct your attention to what I
9 believe to be described as the second full paragraph?
10 There is some language from the original that is in bold
11 and italics, and ask if you could read that, please.

12 A. Yes. "There remains a number of critical
13 technology and cost issues that need to be resolved
14 through additional research before these technologies can
15 be considered commercially available for all U.S. coals
16 and the different coal-fired power plant configurations in
17 operation in the United States."

18 Q. Based upon this statement, would you now
19 believe that you understand what the DOE's policy is, even
20 if you don't understand the rationale for it?

21 A. Well, I guess that perhaps if that is their
22 policy, I can read it and understand what their policy is.
23 What I would like to point out is, what they state for all
24 U.S. coals and different coal-fired power plant

1 configurations, again, Illinois does not burn all U.S.
2 coals and all types of power plant configurations. We
3 have -- It's really limited to more or less two coals:
4 PRB, which is burned in most of the units, and bituminous,
5 and the configurations are also more limited.

6 Q. Right. And I understand that that is your
7 position.

8 A. Correct.

9 Q. Do you see any such limitation contained in
10 that sentence?

11 A. No. They're making a much more general
12 statement about their opinion about the entire coal fleet.

13 Q. Right.

14 HEARING OFFICER TIPSORD: Excuse me. Just for the
15 record, and I may have just missed this, did you have him
16 just read the bold and italics?

17 MR. FORCADE: That's correct.

18 HEARING OFFICER TIPSORD: I think, for the record, we
19 need to include that. The sentence begins, "However,
20 while DOE is very encouraged by the results of our mercury
21 control technology development efforts to date," and then
22 there's the bold/italic language.

23 A. Would you like me to reread it?

24 HEARING OFFICER TIPSORD: That's okay. I want to be

1 sure, that's not the entire sentence.

2 Q. (by Mr. Forcade) And could I then direct your
3 attention, Dr. Staudt, to Page 2 of that document?

4 A. Yes.

5 Q. There's a short paragraph immediately above
6 the bullet entitled "Co-Removal of Mercury". Could I ask
7 you to read that, please?

8 A. Yes. "Finally, DOE/NETL's current mercury
9 control field testing program has been limited to testing
10 at 28 coal-fired units, representing only about 2.3
11 percent of the 1,165 coal-fired generating units in
12 operation in the United States."

13 Q. Do you agree with that statement?

14 A. Well, I didn't develop that information.
15 Yeah, it doesn't really represent per se. I would
16 disagree with that, because if you look at the 28 units
17 and you divide that by the total units in the U.S., that's
18 probably 2.3 percent, but if you're looking at the types
19 of units that burn -- look at those units and see, well,
20 what kind of -- classified by characteristics, there have
21 been a lot of testing, in fact, a big area for testing for
22 the last few years has been power river basin coal with
23 coal site PSP. So, I would say that it's actually
24 representative of a fairly large percentage, a much larger

1 percentage -- I don't know exactly -- certainly a lot
2 bigger than 2.3 percent and an even larger percentage for
3 the State of Illinois because the State of Illinois burns
4 so much.

5 Q. And would I be correct that you're now
6 expressing your opinion rather than DOE's?

7 A. Excuse me. Am I expressing my opinion? I do
8 not speak for DOE. Okay. So, I cannot express -- I
9 cannot express DOE's opinion. So, obviously anything I
10 express is my opinion and not DOE's.

11 Q. And would I be correct that the date on this
12 document is April 25th, 2006?

13 A. Correct.

14 HEARING OFFICER TIPSORD: Mr. Harley, do you have a
15 follow-up?

16 Q. (by Mr. Harley) I do have a follow-up
17 question. Since we're approve texting here to establish
18 positions, would you please read the last sentence that
19 begins on the first page and then carries over to the
20 second page, which also reflects the sequence of DOE field
21 testing program?

22 A. "The progress" -- Starting at the bottom of
23 the first page, "The progress achieved under DOE/NETL's
24 field testing program has led to several recent

1 announcements of sales of ACI systems to the
2 electric-utility system."

3 Q. Is that consistent with your experience?

4 A. That is consistent with my understanding, yes.

5 Q. And is it consistent with your understanding
6 that the sales of ACI systems to electric utility industry
7 include units which are burning powder river basin coal
8 and applying cold side PSP's?

9 A. I would have to look at that. I don't know.

10 HEARING OFFICER TIPSORD: Mr. Forcade.

11 MR. FORCADE: No further questions.

12 HEARING OFFICER TIPSORD: Did you have additional
13 question, Mr. Harley?

14 MR. HARLEY: No.

15 HEARING OFFICER TIPSORD: Mr. Harrington.

16 Q. (by Mr. Harrington) Referring to Exhibit 55,
17 the second page, the sentence that -- I believe it's the
18 third -- fourth sentence, "The effect of continuous
19 long-term ACI operation," do you see that sentence?

20 A. The second page of the NETL document?

21 Q. Yes. The paragraph above the short paragraph
22 that says, "Finally DOE/NETL"?

23 A. "The effect of continuous," I see that.

24 Q. Could you read that starting with that

1 sentence through the end of that paragraph, please?

2 A. "The effect of continuous long-term ACI
3 operation on a power plant's particulate control device is
4 still under investigation. DOE/NETL field testing at
5 bituminous-fired power plant equipped with an ESP with a
6 relatively small collection area has shown that ACI can
7 have a detriment effect on ESP performance" -- and I will
8 have a comment for you on that -- "and lead to carbon
9 breakthrough from the ESP, which can affect operations of
10 the downstream sulfur dioxide emissions control equipment.
11 Therefore, further field testing is being carried out to
12 assess this and other technical performance issues."

13 Q. Do you believe that's an accurate statement?

14 A. I've looked at -- Yes, I disagree with that.

15 Q. And what specifically do you disagree with?

16 A. Well, I've looked at the report which we're
17 going to be putting into evidence, as we discussed
18 earlier, the quarterly report on that, I've looked at the
19 actual data, and I don't reach the same conclusion.
20 Basically my conclusion is that they took an old ESP that
21 was not working well, had high carbon in its ash already
22 and was already having operating problems. They injected
23 carbon into it and didn't particularly do a particularly
24 good job because they didn't check out the -- get the

1 distribution right. Low and behold, the ESP still had
2 operating problems.

3 HEARING OFFICER TIPSORD: And is this the facility
4 that you were talking about yesterday in response to a
5 question from Mr. Harrington?

6 A. Yes.

7 HEARING OFFICER TIPSORD: Thank you. Just for
8 record.

9 A. I looked at the same data and reached a
10 different conclusion.

11 MR. HARRINGTON: Thank you. I have no further
12 questions.

13 HEARING OFFICER TIPSORD: Miss Tickner.

14 Q. (by Ms. Tickner) I just had one other
15 question for you, Dr. Staudt. At the top of Page 2 in the
16 second paragraph, I think in response to a question I
17 asked you yesterday regarding --

18 MR. KIM: I'm sorry. Could you clarify which
19 Exhibit?

20 Q. (by Ms. Tickner) I'm sorry, Exhibit 55. You
21 had mentioned yesterday that there really weren't any
22 results for high sulfur. It looks like this section also
23 mentions the results of an actual test on high sulfur Ohio
24 coal and says that the results of that test were that ACI

1 was relatively ineffective. Are you familiar with that
2 test?

3 A. I'm not -- There have been a couple of tests
4 on Ohio coal. I'm not sure if it's the -- It may be a
5 test on Gavin. I don't have the test results. I'm not
6 familiar with the test results of that.

7 A. (Mr. Nelson) What they're referring to here
8 is a test that's currently ongoing as we speak. It's the
9 Conesville plant of American Electric Power. There are no
10 plants in Illinois like that plant. It's a very high
11 sulfur Ohio coal, and that project is currently ongoing.

12 Q. (by Ms. Tickner) Mr. Nelson, aren't there
13 planned to be some Illinois plants with higher sulfur coal
14 than Conesville uses?

15 A. (by Mr. Nelson) Not quite like Conesville,
16 but Dr. Staudt mentioned there's a couple of 30-megawatt
17 Meredosia units, potentially Hudsonville, while they're
18 not like Conesville, they're in that direction. And I
19 think that the Department of Energy's statement is where
20 they say all different types of coals, all different types
21 of configurations across the United States, I think it's
22 that situation of the very high sulfur Ohio coals that
23 they're talking about in the United States.

24 And another thing to look at or realize when you read

1 this press release, you can see somebody got his hands
2 slapped here because it didn't go with official policy.
3 This comes out of the National Energy Technology
4 Laboratory of the Department of Energy that's running
5 these programs, which is a research organization, and
6 they've done a great job over the last four years in doing
7 many of these major demonstrations, but as soon as this
8 thing becomes commercial information, they're now
9 commercial sales. States are going ahead. They lose that
10 budget. It's no longer research once it's commercial.
11 So, you have to understand the institutional reasons for a
12 press release such as this.

13 HEARING OFFICER TIPSORD: Mr. Harley.

14 Q. (by Mr. Harley) Dr. Staudt, regarding the
15 U.S. Department of Energy document, Exhibit 55, I'd like
16 to turn your attention to the footnotes and citations in
17 that document. Dr. Staudt, there are no citations in this
18 document, are there, to support the statements which are
19 made in this document?

20 A. (by Dr. Staudt) I don't see any.

21 Q. That would suggest it is more in the form of a
22 policy statement or a press release than an actual
23 technical document; is that correct?

24 A. That would be correct.

1 MR. HARLEY: Thank you, Dr. Staudt.

2 A. That was my understanding.

3 HEARING OFFICER TIPSORD: Mr. Forcade.

4 Q. (by Mr. Forcade) Mr. Nelson, are you
5 suggesting that the Department of Energy is
6 misrepresenting commercially available technology so it
7 can keep its budget?

8 A. (by Mr. Nelson) I think they were very clear,
9 that this is commercial, that the results of their efforts
10 have resulted in commercial sales. They're quite
11 explicit. It is commercial at least in the type of coals
12 and the type of systems, like perhaps not a Conesville
13 situation, but certainly in those types of systems that
14 they have had successful demonstrations on.

15 A. (by Mr. Staudt) And let me just state, in the
16 case of the high sulfur situation, that is a situation
17 that I've acknowledged is a difficult one both in the TSD
18 and in my testimony, but, fortunately, there are only a
19 few units that burn high sulfur coal, and they will get
20 a -- I expect them to get a fairly high level of cobenefit
21 removal because most of them are equipped with SCR and
22 FGRD. The four Meredosia units are the units that in
23 particular I think would be an issue. I'm not sure about
24 Hudsonville, depending upon what they decide to do in the

1 future with what they burn. But those are a couple of
2 fairly small units within the system. That certainly
3 ought to be small enough to accommodate within TSD.

4 HEARING OFFICER TIPSORD: Mr. Zabel, you had a
5 question. I'm sorry. Mr. Bonebrake.

6 Q. (by Mr. Bonebrake) I had a question regarding
7 Exhibit No. 55, Page 3 thereof.

8 A. Is 55 the NETL?

9 HEARING OFFICER TIPSORD: Yes.

10 A. Which page?

11 Q. (by Mr. Bonebrake) Page 3, "Cost of Activated
12 Carbon Injection".

13 A. Yes.

14 Q. In the first sentence in that paragraph, below
15 the bullet, "While mercury control via ACI is "relatively
16 inexpensive," on a capital-cost basis, the cost reported
17 by Mr. Feeley of 5 to \$7 per kilowatt was presented to
18 contrast with the relatively high capital cost of SO2
19 scrubbers." Do you agree that the capital cost associated
20 with the installation of ACI is in the 5 to \$7 per kw
21 range?

22 A. That's a little bit on the high side in my
23 opinion. And I know how DOE comes up with these
24 statements. It's a model that I'm familiar with, where

1 they have cost factors, and then there's factors for --
2 engineering factors, retrofit factors and other things
3 like that, general facilities, for example, and these
4 retrofit difficulty factors and what have you are usually
5 developed based upon -- they use the same factors for an
6 FDG technology. So, what you're doing is, when you put in
7 the sorbent injection systems, they're pretty simple.
8 They don't have the level of, you know, support equipment
9 necessary that you would for an FDG system.

10 Second, even if my estimates -- and I said this, even
11 if I'm off by a factor of three or four or five, it's
12 still the costs -- and if you look at the economics of
13 this, the cost is not -- doesn't matter because the real
14 cost of sorbent injection system is the operating costs
15 associated with buying the sorbent.

16 Q. What capital costs number did you use in your
17 calculation of capital costs associated with the
18 installation of ACI? And I'm referring to your testimony
19 -- written testimony in the section of the TSD that you
20 mentioned that you wrote yesterday?

21 A. I used about \$2.5 a kilowatt, somewhere in
22 that range. Also, I was provided information by the
23 Illinois EPA that says Dynegy had made an estimate that
24 for about a 2 megawatt Baldwin plant, they estimated 6

1 million dollars, which is \$3 per kilowatt. So, you know
2 -- But, again, even if somebody incurs seven-and-a-half
3 dollars in kilowatt capital cost, the economics -- it
4 doesn't matter very much in the economics.

5 A. (by Mr. Nelson) If I may interject.

6 Q. Actually, I have a follow-up for Dr. Staudt.
7 I think you just mentioned the Baldwin plant. I didn't
8 track all of your answer. What information from EPA --

9 A. It was a presentation that Dynegy made to
10 Illinois EPA.

11 Q. Okay. And what was the understanding -- your
12 understanding of cost information that was presented?

13 A. My understanding, based on that information,
14 it looked like they had planned 6 million dollars for ACI
15 at Baldwin.

16 HEARING OFFICER TIPSORD: Mr. Kim, did you have
17 something?

18 MR. KIM: Yeah, I just wanted to --

19 Q. (by Mr. Bonebrake) I did have some follow-up.
20 Still on the same paragraph, Dr. Staudt, if you move down
21 three sentences, the sentence starting with, "A
22 preliminary," do you see that -- "A preliminary DOE"?

23 A. Yes.

24 Q. Could you read that sentence into the record

1 for us?

2 A. "A preliminary DOE/NETL economic analysis has
3 revealed that the annual operating and maintenance (O and
4 M) costs associated with ACI represent over 80 percent of
5 the total levelized cost."

6 Q. Let me first ask you if you have an
7 understanding of what the term "levelized cost" means.

8 A. Yes, I have an understanding of that.

9 Q. Could you please describe that understanding
10 to us?

11 A. "Levelized cost" is when these projects get
12 evaluated over the lifetime of the project. So, you incur
13 an initial capital cost. That gets depreciated over the
14 life of the program -- the expected life of the equipment.
15 And there's also operating and maintenance costs. So,
16 that level -- The operating and maintenance costs are an
17 annual cost, but in addition to the levelized cost is, you
18 say what is the equivalent annual cost over this period of
19 time? So, what is -- What really matters is how you
20 distribute that capital cost that is actually paid
21 up-front but amortized over a period of time. So, a
22 portion of that is a factor. And I used -- You know, you
23 may use a capital recovery factor on the order of, say,
24 15 percent or something like that to allocate that capital

1 cost per year.

2 Q. Do you agree then with the sentence that you
3 just read into the record?

4 A. That is correct. Over 80 percent, yes.

5 Q. And is a significant portion of that
6 80 percent the cost of sorbent?

7 A. Yes.

8 Q. Would you expect EGU's in the next decade to
9 be -- a significant number of EGU's in the next decade to
10 be installing and operating ACI systems?

11 A. It depends upon what the regulations make them
12 -- you know, regulations are and what companies decide to
13 do. Under clean air mercury rule, EPA does not expect
14 many ACI units to be installed.

15 Q. Is that your position even with respect to
16 Phase 2 of CAMR?

17 A. You know, I'm talking nationwide, they don't
18 expect many installed. What companies decide to do is up
19 to them.

20 Q. Would you agree that if a significant number
21 of EGU's in this nation install and operate ACI, that the
22 cost of carbon will increase in the United States?

23 A. No, I would not expect that to happen.

24 Q. Same question with respect to sorbent.

1 A. No. Carbon is a globally -- Activated carbon
2 is a globally traded commodity, and that is currently a
3 glut. It's used for so many applications, water treatment
4 being the biggest. You know, there's plenty of carbon out
5 there should there be an increased need. And it's
6 probably also worthwhile to remember, even if there were a
7 specialized type of thing -- Industry had similar concerns
8 about catalysts about ten years ago for SCR and saying
9 they wouldn't be available, people wouldn't be able to
10 supply it. Low and behold, the industry stepped up, and
11 that's a much more specialized thing. It's not like
12 activated carbon. The catalyst designed specifically for
13 this type of application, the industry stepped up and
14 provided it, and, actually, catalyst prices dropped over
15 that time.

16 Q. In the TSD, Table 8.9, and this is Page 162 of
17 the TSD -- I'll give you a minute to get there, please.

18 A. Okay. I'm here.

19 Q. -- there's a column on that table with the
20 heading "sorbent cost".

21 A. That's right.

22 Q. And can you tell us how you derived the
23 numbers that are in that column?

24 A. I assumed a treatment rate, a treatment

1 concentration and multiplied it by an expected flow rate
2 -- volume flow rate for the particular size unit times the
3 cost for the sorbent and then -- with a capacity, then
4 assuming a capacity factor, you end up with a total cost
5 per year.

6 Q. What was your source for the capacity factor
7 that you used in your determination?

8 A. I estimated them based upon the fuel use
9 information, historical fuel use information.

10 Q. From what year did you have that information?

11 A. Well, we have -- I used that information --
12 the information that is one of the Exhibits that Illinois
13 EPA provided.

14 Q. That was Exhibit 44?

15 A. I think the most recent data may have been
16 2004, but I'm not sure. It may have been as recent as
17 2005.

18 Q. And you also, I think, mentioned that you used
19 a cost of sorbent in the equation you described?

20 A. That's correct. Yes.

21 Q. And what was the basis for your sorbent cost?

22 A. It was my understanding based upon previous
23 quotes I've seen for the cost of sorbent.

24 Q. What previous quotes are these?

1 A. Well, I'd have to see what -- Maybe that 85
2 cents a pound or 80 or 85 cents a pound, but I'd have to
3 see. It's documented in the TSD.

4 Q. What page are you looking at?

5 A. I'm looking through this. I don't know yet.
6 I think, at that time, I used 80 cents a pound, but I'm
7 not sure.

8 Q. If you used 80 cents per pound, what was the
9 basis for that number?

10 A. That was based upon previous information that
11 I had seen from people, Sorbent Technologies and NORAD,
12 who had sent published information on the technology.

13 Q. So, this was historic sorbent cost
14 information?

15 A. Well, it would have been historic some time in
16 the past, yeah.

17 Q. And did you build an inflation factor into the
18 cost number that you used in the equation?

19 A. This was done what's called a -- When you do a
20 levelized analysis, a 30-year levelized -- 20 or 30-year
21 levelized cost, you actually need to -- If you assume the
22 escalation of the sorbent is the same as general inflation
23 and use a levelized constant dollar amount is really the
24 right way to look at this for a long-term program. If

1 escalation of the sorbent is equal to inflation, they work
2 out. They basically cancel each other out in a levelized
3 constant dollar analysis.

4 Q. With the idea that the numbers for O and M in
5 your table reflect \$2,006?

6 A. Yes.

7 Q. The assumed treatment rate that you mentioned
8 in your equation, what was the basis for that assumed
9 treatment rate?

10 A. The basis was provided information on Figure
11 8.10 and 8.11 give you the information on why I selected
12 certain treatment rates. 8.10 assumed a treatment rate of
13 three pound per million ACF, which is about -- which
14 produces about 90 percent removal for PRB coal. Assuming
15 that a bituminous coal would get some level of cobenefit,
16 you assumed, I think it was, about six or seven pound per
17 million ACF for the bituminous -- for the couple of
18 bituminous units that I assumed would use ACI. There's
19 only a couple bituminous.

20 Q. Were those the only two treatment rates then
21 that you assumed in your cost equations?

22 A. The only one that I think was different is,
23 and, quite frankly, I was surprised when I saw this, I was
24 provided some information on Dynegy, and they said that

1 they had 80 percent cobenefit removal at the Baldwin
2 plant, which I thought was high, but it's good news. So,
3 I think I may have adjusted that down to a lower treatment
4 rate to take into account that they only needed to get an
5 additional 50 percent removal from 80 percent to get to
6 90 percent.

7 Q. And I think the last piece of your equation
8 was estimated flow rate?

9 A. That's correct. Yes.

10 Q. Can you describe the basis for the flow rate
11 that you used in your equation?

12 A. Let's see. That's described in the TSD. If
13 you want me to, I can go to the page and read what I
14 assumed, but that's in the TSD.

15 Q. It is in the TSD?

16 A. That is in the TSD. It is basically a cubic
17 feet per megawatt -- actual cubic feet for megawatt per
18 hour. That's stated in the TSD.

19 HEARING OFFICER TIPSORD: Mr. Zabel.

20 MR. ZABEL: Just so the record is clear, I have some
21 additional questions on a slightly different area on the
22 charts, but I realize some of the submitted written goes
23 to those questions, and it may be better if I wait.

24 HEARING OFFICER TIPSORD: I think Mr. Bonebrake has

1 covered a lot of the written questions from Amren.

2 MR. ZABEL: I have some additional.

3 MR. BONEBRAKE: I had some follow-up, too, that deal
4 with that.

5 HEARING OFFICER TIPSORD: I think that might be more
6 appropriate. Mr. Harley.

7 Q. (by Mr. Haley) I do have one or two questions
8 about this table that I don't believe are reflected in the
9 questions that we'll hear subsequently. The final two
10 columns on Table 8.9, Dr. Staudt, are using your assumed
11 treatment rates, expected flow rates, either, calculated
12 at mercury reduced?

13 A. That's correct.

14 Q. And, so, for the first plant that we see here
15 that would use SI, we see mercury reduced, and you have
16 the Figure 6608; is that correct?

17 A. That's correct.

18 Q. Is that grams of mercury that would be
19 reduced?

20 A. Oh, those are -- I believe those are ounces.

21 Q. Ounces of mercury that would be reduced from
22 that facility?

23 A. Yeah, based upon a 90 percent removal.

24 MR. HARLEY: Thank you.

1 HEARING OFFICER TIPSORD: And I think we're ready to
2 begin with Amren's questions, and I would note that it's
3 sort of my quick look-through some of Amren questions have
4 been addressed. If you could take a look over the lunch
5 break. Mr. Harrington, you point out when we get to
6 questions if you feel have been addressed. But,
7 Mr. Forcade, if you could do the same with Kincaid's
8 question, it may help move things quicker in the
9 afternoon. Obviously we will save ourselves from
10 repeating ourselves. So, we'll start with Amren's
11 additional questions number 1.

12 A. Question number 1, at Page 2 of your amended
13 testimony, you state that, "My testimony includes Section
14 8 of the TSD." Please explain in detail the changes to
15 Section 8 of the TSD and the various tables, including
16 specifically 8.10, that would be required based on the
17 amendments to your testimony and any new information that
18 has come to your attention. The change would be
19 associated with the small Meredosia units that I believe
20 might not be able to comply with emission requirements of
21 the rule. It might require compliance through a TTBS.
22 Also, in my testimony, I noted that a more recent estimate
23 of the quote of the sorbent was about 90 cents a pound.
24 So, that might adjust some of the costs slightly.

1 Q. (by Mr. Harrington) You envision the only
2 changes would be for the Meredosia units?

3 A. Primarily. Possibly Hudsonville.

4 HEARING OFFICER TIPSORD: Question number 2.

5 A. Please describe what additional information
6 you received after submission of your original testimony
7 that resulted in the two amendments to your testimony that
8 have been submitted. One piece of information was that
9 small Meredosia units were not firing PRB coal, which is
10 mainly fired at the plant, but not on the small boilers.
11 When I looked at the -- When I was working on the TSD,
12 originally I used that coal information, and the coal
13 information shows the coal that goes to the plant and
14 almost is PRB coal, a small amount of other coal. So, I
15 actually discovered or actually going through EPA
16 emissions data, they were actually burning high sulfur
17 coal. So, I needed to amend my testimony for that reason.
18 The other -- So, as a result I have doubts about that and
19 possibly Hudsonville about being able to achieve the
20 emissions limits of the rule.

21 The other thing that caused me to make my second
22 amendment was the TTBS, which I thought was a significant
23 change to the rule, that required me to revise my
24 testimony a second time.

1 Q. (by Mr. Harrington) Did you recommend
2 including the TTBS?

3 A. I have been in favor of including the TTBS,
4 yes.

5 MR. HARRINGTON: And I have some further questions on
6 that, but we can get through it as we get to the rest of
7 the questions.

8 HEARING OFFICER TIPSORD: Question 3.

9 A. Please provide any documents that you were
10 provided by the Illinois Environmental Protection Agency
11 or anyone else which resulted in the changes to your
12 testimony in the two amendments. I think I provided that
13 in the TTBS, and the other was just data. When I talked
14 about the Meredosia units, that was actually the data
15 through EPA's web site on what emission rates are. I keep
16 that data for -- you know, for the work I do.

17 Q. (by Mr. Harrington) Did you also receive
18 diagrams of some of the plants?

19 A. Yes, I did. That was after -- I can't
20 remember if I got -- That was after the first submission,
21 and I don't know if it was before or after the second
22 submission, but it was probably before the second
23 amendment.

24 Q. Did the diagrams have anything to do with your

1 amended testimony?

2 A. You know, the influence in some respect
3 because I hold knowledge -- as I indicated earlier, I was
4 aware that there were many units that used gas
5 conditioning and had -- and I was aware of some of the
6 issues regarding ESP size, and I saw that, and I said,
7 "Okay." It's what I thought, but there may be more of
8 them than I originally anticipated.

9 Q. Did SO3 conditioning have anything to do with
10 your amended testimony?

11 A. To some degree because SO3 can impact the
12 performance of halogenated sorbent, as I've testified
13 already, but, you know, it's my opinion that in many cases
14 this can be addressed, but it does create an issue, but I
15 think that can be addressed in most cases.

16 MR. HARRINGTON: I think we're on number 5.

17 HEARING OFFICER TIPSORD: Question number 5.

18 A. Please describe in detail your role in
19 drafting the amendment to the rule making proposal
20 described as the temporary technology based standard or
21 TTBS. My role -- It was actually drafted by the Illinois
22 EPA, and I essentially was asked for input on it, and I
23 provided input and comment.

24 Q. (by Mr. Harrington) Did you have any input in

1 the selection of the 25 percent eligibility factor?

2 A. I was consulted on it, and I will say that in
3 anticipation of your question, I was in favor of not
4 having a limitation.

5 Q. And why is that?

6 A. Well, because I look at things -- I'm not a
7 policy person. Okay. So, I don't have to look at the
8 issues that the policy makers do. My -- I look at from
9 the cost -- I try to look at what can you do for what
10 cost, and, you know, my goal is that the TTBS there exists
11 to provide some plants who may install a technology, do
12 the best they can, but they need time to do it a little
13 bit better, and, you know, the concern is that I think
14 that 25 percent should be adequate, but there's always a
15 chance that it might not, and I'd like to eliminate risk.
16 So, that's really why I was -- You know, I was consulted
17 on it. You know, I recommended that there not be a limit,
18 but I don't have -- I'm not responsible for controlling --
19 you know, setting the rules for controlling emissions.
20 So, there's a policy decision by Illinois EPA.

21 MR. HARRINGTON: Thank you.

22 HEARING OFFICER TIPSORD: Question number 6.

23 A. On Page 3 of your amended testimony, you have
24 stricken the following language: "Illinois bituminous

1 coal is washed and some of the mercury is removed in the
2 washing. However, most of the coal burned in Illinois is
3 subbituminous coal from the western U.S. that is not
4 washed because it is naturally low in sulfur and ash. For
5 this reason and because of the higher energy content of
6 bituminous coal, mercury content of bituminous coal as
7 fired in Illinois power plants is typically below that of
8 subbituminous coals on a heating value equivalent basis."
9 Please explain why you deleted this from your testimony,
10 including what additional information you received that
11 caused you to delete these statements. Well, I deleted it
12 because I didn't think it added anything, to be honest,
13 and because I was making revisions to my testimony was
14 getting longer at that point due to the changes. So, in
15 my opinion, I don't think it was -- I didn't think it
16 really added to the testimony. I don't take issue with
17 it. I just didn't think it really added anything, and I
18 wanted to shorten the testimony.

19 HEARING OFFICER TIPSORD: Mr. Harrington.

20 Q. (by Mr. Harrington) Do you still support the
21 statement that mercury content of bituminous coal in
22 Illinois power plants is typically below that of
23 subbituminous coal?

24 A. Based upon the information I received from

1 Illinois Geological Survey, and they have the data, that's
2 the information I had, and that's what it's based on.

3 Q. So, that's based on the Illinois Geological
4 Survey, not some independent investigation of your own?

5 A. Yes.

6 HEARING OFFICER TIPSORD: Mr. Zabel.

7 Q. (by Mr. Zabel) If I could revert to follow-up
8 on question number 5. Did you comment or participate in
9 the decision in the TTBS to exclude hot side precipitator
10 equipped unit?

11 A. That was discussed. You know, the decision --
12 You know, the decisions on the rule are made by Illinois
13 EPA and not by me. I'm only an advisor.

14 Q. I understand you favored no limit on the
15 25 percent?

16 A. That's correct.

17 Q. Did you have a position on the hot side
18 precipitator?

19 A. Originally -- At one point when we were
20 looking at the TTBS, we were looking at hot side
21 precipitators.

22 Q. And was it your opinion that they should be
23 included?

24 A. You know, it's my view that if you included

1 them, it reduces the cost of the rule. If you exclude
2 them, it increases the cost of the rule. That's
3 basically -- It's not my -- You know, my point to them
4 when I shared information to Illinois EPA, my opinion to
5 the EPA was, if you exclude them, it could potentially
6 increase the cost of the rule. So, that's a decision for
7 them to make. So, I just informed them based upon what I
8 know.

9 Q. Unlike the 25 percent limit, you didn't take a
10 position on the hot side precipitator question?

11 A. I don't recall if I took a position so to
12 speak. I just wanted to point out that it would raise the
13 cost of the rule, and I'm not -- you know, my personal
14 view is, it's always better to reduce cost than increase
15 it, but it's up to the state to decide how they regulate
16 the power plants.

17 MR. ZABEL: Thank you.

18 HEARING OFFICER TIPSORD: Question number 7.

19 A. You have inserted the language: "Mercury
20 removal from the coal before combustion through washing
21 will contribute to lower mercury emissions from the
22 plant." Please explain this additional statement. This
23 was really just to -- It's part of the other change that
24 we talked about in that -- in question 6. It's basically

1 saying the same thing shorter. So, that's really what my
2 objective was.

3 HEARING OFFICER TIPSORD: Question number 8.

4 A. You testified that washing all coal would
5 contribute to lower mercury emissions. Does this apply to
6 powder river basin coal? Well, I don't remember -- You
7 mean in my written testimony? Is there a specific
8 sentence that you're --

9 Q. (by Mr. Harrington) It was just a follow-up
10 on 7, was simply making it clear that washing coal was not
11 a suggestion you were making for powder river basin?

12 A. No.

13 Q. Just for clarification.

14 A. Powder river basin is typically not washed.

15 Q. I understand that. We're getting into comic
16 relief momentarily.

17 HEARING OFFICER TIPSORD: Question number 9, but you
18 don't need to read the bold portion.

19 MR. HARRINGTON: I appreciate that, but you can
20 laugh.

21 A. I was hoping you'd let me read it. On Page 4
22 of your amended testimony, you have stricken the words
23 "showed that" and inserted the words "provided data" that
24 indicates that the following cobenefit removal rates may

1 be expected. Please explain the reason for this change in
2 your testimony. Not reading but referring to the note,
3 would you prefer to delete the question or weasel out of
4 it?

5 Q. (by Mr. Harrington) Weasel out of it.

6 A. I'm not trying to weasel out of anything.
7 Frankly, you know, I thought when I made the decision to
8 revise the testimony, I said, "Well, I really" -- I
9 thought the expected language really was better because it
10 reflects what my role is as an expert. My job is to look
11 at the data and give you my opinion on what I think is
12 going to happen, not just report necessarily report on the
13 data. So, you know, I'm just stating what I expect based
14 upon the data.

15 Q. And I understand. If you use the word
16 "expected" in your testimony -- written testimony and in
17 your oral testimony and I just -- for clarification, my
18 reading of it was that you are looking at the existing
19 data and looking to the future and what you predict will
20 happen. Is that what you mean by "expected"?

21 A. Well, I'm looking at the existing data, and
22 I'm looking what I believe the technology is capable of
23 doing and what -- not just sorbent injection, but
24 cobenefits and what I think people can do.

1 Q. Let me see if I can get a better understanding
2 of it. As an engineer or as a scientist, you have a set
3 of data that assumes a limited number of tasks that
4 establishes a point. You then can make a judgment as to
5 whether you expect that to be a future test will show, but
6 that's a judgment -- professional judgment you make at
7 that point; is that correct?

8 A. That would be correct.

9 Q. So, when you use "expected," you're simply
10 stating, this is your professional judgment and what
11 future data is likely to show under similar circumstances
12 based on the data you already examined?

13 A. Let me read what the testimony said.

14 Q. It's in numerous places.

15 A. I use the word "expected," that's correct.

16 Q. All right. Clarifying that, that's what's
17 involved?

18 A. I believe that, yes. I agree with that. It's
19 basically I am saying what I expect is possible with the
20 technology as described in my testimony.

21 MR. HARRINGTON: Thank you.

22 HEARING OFFICER TIPSORD: Question 10.

23 A. In each of the bullet points on Page 4 of your
24 amended testimony, you have inserted the words "expected

1 to be" or changed "likely" to "expected". Are these
2 changes intended to indicate that, in fact, the data
3 received by USEPA did not conclusively demonstrate these
4 conclusions, but allows you to make some prediction of
5 what might be achieved in the future? It's part of the
6 same discussion.

7 Q. But basically the same answer as previous?

8 A. Yeah.

9 HEARING OFFICER TIPSORD: Question number 11.

10 A. In the first bullet point on Page 4, you state
11 that cobenefit mercury capture is expected to be about
12 90 percent. Does this mean that cobenefit mercury capture
13 is likely to be in the range of 90 percent, but perhaps
14 lower, as well as perhaps higher? That is correct.

15 HEARING OFFICER TIPSORD: Question number 12.

16 A. Does this mean that consistent mercury removal
17 of greater than 90 percent with SCR, ESP and FGD is not
18 fully demonstrated? Well, first of all, 90 percent may
19 not be necessary to comply with the Illinois rule due to
20 the output based standard, and this is particularly so for
21 Illinois coals that it's my understanding have lower
22 mercury in the coal to begin with. But it's fully
23 demonstrated -- I don't know what you mean by "fully
24 demonstrated". So, you know, I believe that the units can

1 comply through cobenefit, and that if they fall short in
2 any way, any additional needs will be fairly small, but I
3 don't know what you mean by "fully demonstrated".

4 MR. HARRINGTON: Thank you. He answered that
5 question. Thank you.

6 HEARING OFFICER TIPSORD: Question number 13.

7 A. In the second bullet point on Page 4, you
8 changed the phrase "will usually" to "is expected".
9 That's all part of the same discussion.

10 MR. HARRINGTON: Thank you.

11 HEARING OFFICER TIPSORD: Question 14.

12 A. 14, on Page 5 of your testimony, with respect
13 to sorbent injection, you state: "Power companies have
14 entered contracts for commercial systems, some with
15 statutory requirements to achieve 90 percent or more
16 mercury removal. Please identify each contract this
17 statement contemplates, the state for which it is located
18 and the corresponding statutory requirements to achieve
19 90 percent mercury removal, when it is required, and the
20 predominant coal type used in those states. Please
21 identify each state where more than 90 percent removal is
22 required, when it is required, and the predominant type of
23 coal used in those states. Okay. The states are -- And
24 when you say "contract this statement contemplates," I

1 just want to -- I'm not a lawyer. I don't know -- You
2 just want me to tell you what projects they are?

3 Q. (by Mr. Harrington) Yes.

4 A. Okay. The plants that I'm aware of, the
5 Mercer plants in New Jersey, and they have a 90 percent
6 requirement or I think it's .006. They also have an
7 output base standard .006 per pound per gigawatt hour,
8 Mercer 1 and 2. Connecticut has a 90 percent for
9 Bridgeport Harbor, and they are installing sorbent
10 injection, as well, and they have -- Now, New Jersey and
11 Connecticut, one of them is 2007 and the other is 2008. I
12 don't remember which is which, the dates. Okay. The
13 other -- Massachusetts eventually gets the 95 percent in
14 2012, and the plant affected there is Braden Point. All
15 units, I believe, are firing a South America coal, which I
16 actually expect to be more difficult to control than the
17 PRB coal because they have slightly higher sulfur content
18 than the PRB. Their SO2 emissions are about .8 BTU. PRB
19 you're looking at .5. So, SO2, as we know, or sulfur or
20 bituminous, SO3 can be a problem. So, you can get an
21 indication based upon how tough it might be looking at the
22 SO2 emissions.

23 HEARING OFFICER TIPSORD: And I think -- Mr. Zabel,
24 go ahead.

1 Q. (by Mr. Zabel) Just as a follow-up, Dr.
2 Staudt, do you know if the Connecticut Bridgeport Harbor
3 is just using sorbent injection or is it installing a
4 baghouse?

5 A. In the case of Bridgeport Harbor, they're
6 putting in a baghouse, but in the case of Mercer, it's
7 just injecting upstream of the ESP.

8 Q. And in the case of Bridgeport Harbor, do you
9 know the cost of the contract you refer to is?

10 A. No.

11 Q. Do you know with whom it is?

12 A. I believe it's Wheelaerator. I'm not sure,
13 but typically ADA Technology supplies the sorbent
14 injection technology.

15 Q. You mentioned that these companies have
16 entered contracts. Have you actually seen the contracts?

17 A. I have not seen the contracts, but it's been
18 reported by these two clean air companies.

19 Q. Have you seen the guarantees, if any, in those
20 companies?

21 A. Guarantees are not reported, are generally not
22 made public. They're part of something negotiated in the
23 contract.

24 Q. So, I take it, you don't know what those are?

1 A. I don't know what the guarantees are.

2 MR. ZABEL: Thank you.

3 HEARING OFFICER TIPSORD: Mr. Bonebrake.

4 Q. (by Mr. Bonebrake) The Mercer facility that
5 you mentioned, does it have a scrubber?

6 A. It will at some point in the future have a
7 scrubber, but it won't have it in time for this
8 requirement.

9 Q. Do you know when that scrubber is to be
10 installed?

11 A. I think it's by -- There's a consent decree on
12 that plant. I think it's by 2012.

13 Q. And does the Mercer facility have an SCR?

14 A. Yes, they do.

15 HEARING OFFICER TIPSORD: Mr. Zabel.

16 Q. (by Mr. Zabel) If you know, Dr. Staudt, what
17 are the compliance dates that the mercury for the units
18 you just mentioned?

19 A. For Connecticut and New Jersey, I can't
20 remember. One of them is in 2008, and the other is in
21 2007. I don't remember which one.

22 Q. And Massachusetts?

23 A. Massachusetts has the eventual date for
24 95 percent removal is 2012, and I think the interim,

1 there's an 85 percent requirement in 2007, I think.

2 HEARING OFFICER TIPSORD: And I think there are
3 follow-up addressed. Mr. Harrington.

4 Q. (by Mr. Harrington) Some of the follow-up
5 questions are addressed. Dr. Staudt, are you familiar
6 with what the consequences are under Connecticut,
7 Massachusetts or New Jersey law for failure to achieve the
8 required removal levels?

9 A. No, I'm not aware of that.

10 Q. You don't know what penalties would be
11 incurred or not incurred; is that correct?

12 A. No, I don't.

13 MR. HARRINGTON: Thank you.

14 HEARING OFFICER TIPSORD: And proving that great
15 minds do think alike, 15, 16 and 17 I think have been
16 addressed. Question number 18. As I said, great minds do
17 think alike.

18 A. 18, in the next sentence, you refer to the use
19 of the powder activated carbon for mercury control on
20 municipal waste combusters. What is the difference in the
21 chemical form of mercury in mass burn municipal waste
22 combusters from power plants burning bituminous or
23 subbituminous coals? Municipal waste combusters have
24 ionic mercury, and it is at a higher concentration, and

1 that is why more utility applications -- new sorbents were
2 developed. That's basically become part of the deal, DOE
3 program and people like Sorbent Technologies and NORAD and
4 others have been working on. So, the sorbents have been
5 developed are specially formulated to address coal
6 applications.

7 HEARING OFFICER TIPSORD: Miss Bassi.

8 MS. BASSI: While we're here, can I ask my question
9 of Mr. Romaine? It's kind of related.

10 HEARING OFFICER TIPSORD: Sure.

11 Q. (By Ms. Bassi) My question is, Mr. Romaine,
12 do you recall when the Robinson incinerator, which is a
13 municipal waste incinerator, was shut down?

14 A. Are you asking me the date?

15 Q. No. Just the year. Not the date of the year,
16 just the year.

17 A. I don't recall the exact year. I don't recall
18 how long it struggled on.

19 HEARING OFFICER TIPSORD: It's still struggling on, I
20 believe.

21 Q. (By Ms. Bassi) It is. The question is when
22 did the Robinson incinerator close, which was a municipal
23 waste incinerator?

24 MR. HARRINGTON: Just for the record, I will point

1 out that the Robinson waste energy facility used refuse
2 derived fuel and not characterized by the agency or owner
3 as an incinerator.

4 MS. BASSI: Sorry.

5 HEARING OFFICER TIPSORD: If you don't know, that's
6 fine.

7 A. I would express a decade, and I think it
8 barely made it to 2000.

9 MS. BASSI: Good enough.

10 HEARING OFFICER TIPSORD: All right. Question 19
11 starts asking some questions about cost and getting into
12 some more detailed information, and I have five after
13 12:00. Mr. Kim has a series of Exhibits, I believe, we're
14 going admit.

15 MR. KIM: Would you rather me do it when we get back
16 from the break?

17 HEARING OFFICER TIPSORD: I would rather do it now.
18 We've got a couple of minutes. The meeting doesn't start
19 until 12:15.

20 MR. HARRINGTON: I do have a couple follow-up
21 questions on municipal incinerator issues, but I can hold
22 those.

23 HEARING OFFICER TIPSORD: You can ask them while
24 Mr. Kim is bringing up the Exhibits.

1 MR. KIM: The first document -- This first document
2 is in response to questions raised about rates, concerning
3 the technical support document, and I apologize I don't
4 have a page number off the top of my head, but we made
5 reference to some calculations performed, and associated
6 with the calculations, we referenced a U.S. document, and
7 I think we had the incorrect citation. It was on Page 68
8 of the TSD.

9 HEARING OFFICER TIPSORD: I've been handed
10 Preliminary Analysis of Affluent Mercury Data Illinois
11 latest casing from IEPA, November, 2005, which I will mark
12 as Exhibit No. 56 if there's no objection.

13 (No response.)

14 HEARING OFFICER TIPSORD: Seeing none, it's
15 Exhibit 56.

16 MR. KIM: Next is a set of documents -- I think it's
17 one set -- it's one Exhibit that addresses a question that
18 was raised by Chairman Girard for the various water
19 segments. And in addition to that, the next Exhibit is a
20 list of waste water treatment facilities that monitor
21 their affluent for mercury and discharge to mercury
22 impaired water bodies, which, again, came up during Miss
23 Willhite's testimony.

24 HEARING OFFICER TIPSORD: We will mark that as

1 Exhibit No. 57, if there's no objection.

2 (No response.)

3 HEARING OFFICER TIPSORD: Seeing none, it's Exhibit
4 No. 57. And the waste water treatment information will be
5 marked as Exhibit 58, if there's no objection.

6 (No response.)

7 HEARING OFFICER TIPSORD: Seeing none, it is
8 Exhibit 58.

9 MR. KIM: Then next is a list of -- and this may be
10 the last -- the 78 assessment units in the 2006 assessment
11 database that I think was addressed during Miss Willhite's
12 testimony.

13 HEARING OFFICER TIPSORD: We are on Exhibit 59, if
14 there's no objection. I'll give him a minute to pass it
15 out.

16 (No response.)

17 HEARING OFFICER TIPSORD: Seeing no objection, this
18 is marked as Exhibit 59.

19 MR. KIM: Next, I have a question for you. You can
20 treat this as a separate or the same. A request was made
21 that we provide the questions and comments that were
22 submitted to the Illinois EPA during our outreach
23 meetings. That is contained in this set of documents. In
24 addition, we received some time after that comments from

1 Prairie State concerning the TTBS?

2 HEARING OFFICER TIPSORD: Let's do it two different
3 ones.

4 MR. KIM: So, the first one would be the outreach
5 questions.

6 HEARING OFFICER TIPSORD: This is a series of variety
7 of things, it looks like e-mails, questions, etc., which
8 we will mark as Exhibit No. 60, if there's no objection.
9 The first document is -- the top is an e-mail, and it's
10 printed out from Jim Staudt, and this will be Exhibit 60,
11 if there's no objection.

12 (No response.)

13 HEARING OFFICER TIPSORD: Seeing none, it's Exhibit
14 No. 60. And the second is the Prairie State comment, and
15 we will mark it as 61, if there's no objection.

16 (No response.)

17 HEARING OFFICER TIPSORD: Seeing none, it is
18 Exhibit 61.

19 MR. KIM: Three more, and then I'm done for now. The
20 next document is the -- I think is it Exhibit 44, which is
21 the --

22 HEARING OFFICER TIPSORD: Yes.

23 MR. KIM: -- this would be the March version of
24 Exhibit 44.

1 HEARING OFFICER TIPSORD: This was provided to
2 Mr. Nelson?

3 MR. KIM: Exactly. Yes.

4 HEARING OFFICER TIPSORD: And this will be Exhibit
5 No. 62, if there's no objection.

6 MR. KIM: Next, during, I believe, Dr. Keeler's
7 testimony, he indicated that he reviewed a list he
8 obtained from USEPA of -- I think it's all -- it's a 1999
9 emissions reporting list.

10 HEARING OFFICER TIPSORD: Okay.

11 MR. KIM: And this is that list.

12 HEARING OFFICER TIPSORD: And we'll mark that as
13 Exhibit 63, if there's no objection, and I will wait until
14 you've all seen them before I officially mark them.

15 MR. KIM: And then the last document I'm giving you
16 right now is a copy of an e-mail that was received by Jim
17 Ross, and this accompanied the information we provided
18 earlier, and I don't have the Exhibit number off the top
19 of my head, but it was the information that led to Table
20 10 point something. I can't remember the number.

21 MR. BONEBRAKE: Did this have to do with fish and
22 wildlife?

23 MR. KIM: Yes, fish and wildlife.

24 HEARING OFFICER TIPSORD: Exhibit 38 -- accompanies

1 Exhibit 38, and it will be marked Exhibit 64, if there's
2 no objection.

3 (No response.)

4 HEARING OFFICER TIPSORD: Seeing no objection, these
5 will be marked Exhibit 62, 63 and 64 as previously
6 identified.

7 MR. KIM: The last at least for now -- We're still
8 working on getting some other copies. I think they're
9 almost all involving color. So, that's taking a little
10 longer. But we also indicated that we were looking into
11 trying to obtain a copy of Dr. Keeler's study regarding
12 Steubenville and its form with USEPA, and the status of
13 that effort is that we have contacted someone at USEPA
14 headquarters, and they are looking into the situation.
15 Their initial response is that they have a manual or
16 policy that states that peer review documents such as this
17 are not disclosed. However, what we're trying to do is
18 find out if that's actually their official position, and
19 if it is or if it's not, regardless, we're trying to get
20 someone's name and preferably something in writing that we
21 can provide to you at least that shows where we are. So,
22 if they tell us that it's okay with them, then we'll
23 contact Dr. Keeler and hopefully get the report available.
24 If they will not agree to turn it over, I'm not sure what

1 more we're going to be able to do. Our hands are kind of
2 tied because, again, we don't physically have a copy of
3 the report.

4 HEARING OFFICER TIPSORD: I think that Dr. Keeler
5 thought that the publication date now, I believe, is
6 July 1st was what he said.

7 MR. KIM: And that was something we brought up in our
8 conversations, and we asked them to take that into account
9 as to when they might be able to get something to us.
10 Hopefully we'll find something -- Well, as soon as we find
11 something out, we'll let everybody know.

12 HEARING OFFICER TIPSORD: Okay. With that, let's
13 take a break.

14 MR. GIRARD: How long is it going to take for your
15 questions? Five minutes?

16 MR. HARRINGTON: Probably about two minutes.

17 HEARING OFFICER TIPSORD: Let's finish. They can't
18 start without the acting chairman.

19 Q. (by Mr. Harrington) Could you describe the
20 differences in the flue gas from a municipal incinerator
21 and electric power plant for the record, please?

22 A. The difference would be, first, there's more
23 of it.

24 Q. Mercury?

1 A. No. Also, there's a lot more flue gas in a
2 power plant because typically they're bigger. Another is
3 that the mercury content in a power plant is lower than
4 that in a municipal waste combustor.

5 Q. By about how -- Can you give rough numbers?

6 A. It's a pretty significant number. It's a lot
7 smaller. I don't have a number off the top of my head.
8 It's not half or something like that. It's something --

9 Q. Like a tenth perhaps?

10 A. Perhaps.

11 A. (by Mr. Romaine) I guess I would agree with
12 the characterization of a tenth. It's more difficult to
13 get a general characterization because there's more
14 variability in mercury emission rate that can be achieved
15 with municipal waste combustors.

16 Q. Thank you. What other differences are there
17 on flue gas conditions between the two?

18 A. (by Mr. Staudt) There's higher chlorine
19 contents in a municipal waste combustor and have more --
20 more mercury is in the oxidized form.

21 Q. Also, lower sulfur content?

22 A. Typically, yeah. It depends upon the type of
23 coal, but, yeah, typically it would be lower than many
24 coal applications.

1 Q. Any other significant differences?

2 A. I think moisture level might be higher in an
3 MSW than -- But I think the important thing the data that
4 we've been showing here and that forms my opinion on
5 performance is not MSW data. I haven't shown any MSW data
6 in the TSD, nor in any of my testimony. So, you know,
7 performance is based upon -- performance that I expect is
8 based upon tests with honest to god electric power plants
9 burning coal and the types of coal that are here in
10 Illinois.

11 MR. HARRINGTON: Thank you. That's all I have.

12 HEARING OFFICER TIPSORD: Great. Let's break until
13 1:30 then.

14

15 (A recess for lunch at this point.)

16

17 HEARING OFFICER TIPSORD: We are on question 19.

18 A. Question number 19, at Page 6 under
19 "Controlling Mercury From Illinois Units," you state,
20 "Coal-fired units in the State of Illinois are capable of
21 meeting the requirements of the proposed mercury control
22 rule at a cost close to that described in the TSD." Are
23 you referring to costs described in Table 8.8 of the TSD?
24 I think Table 8.7. I would say not Table 8.8. 8.8 refers

1 to fly ash.

2 Q. (by Mr. Harrington) 8.7?

3 A. I would say 8.7, yes.

4 HEARING OFFICER TIPSORD: Question number 20.

5 A. 20, if not, to which costs are you referring
6 to?

7 HEARING OFFICER TIPSORD: You answered that.

8 A. 21, when you refer to "at a cost close to that
9 described in the TSD," please describe what you mean by
10 "close to". Please provide the costs you estimated for
11 this purpose and the analysis you did to derive the costs.
12 I came up with an estimate unit by unit to develop sort of
13 an aggregate cost. The total costs are shown in 8.7. The
14 unit by unit costs are shown in Table 8.9.

15 HEARING OFFICER TIPSORD: Mr. Harrington.

16 Q. (by Mr. Harrington) Were there any revisions
17 to those costs as a result of the TTBS, or were there any
18 revisions to those costs revision of the TTBS?

19 A. Well, I haven't had the opportunity to make
20 any revisions to the TTBS which was issued and -- but any
21 changes I would expect -- as I mentioned, the main ones
22 regarding Meredosia -- more units of Meredosia that may
23 fall under a TTBS. There would be higher sorbent costs,
24 but those are small units. So, the actual impact for the

1 total costs of the rule would be fairly small.

2 MR. HARRINGTON: Thank you.

3 HEARING OFFICER TIPSORD: 22.

4 A. 22, should the cost in the TSD, particularly
5 Table 8.8, be amended based upon the amendments to your
6 testimony as referenced in this paragraph?

7 Q. (by Mr. Harrington) 8.7.

8 A. 8.7. Well, should they -- That was based upon
9 the information I had at the time. If it's desirable to
10 have them modified, I can do that. I don't think it's
11 going to make a huge difference, but that would be --

12 HEARING OFFICER TIPSORD: I think it would be
13 probably interesting to see what effect the TSD has on
14 those. So, I would like to see those revised.

15 A. In that same paragraph, you state, "There is a
16 risk that a small number of coal-fired units in Illinois
17 may need a temporary technology based standard until they
18 bring their emissions reductions in compliance." How many
19 units are you referring to? Well, per my discussion, the
20 small Meredosia units are candidates for a TTBS. The two
21 units at Hudsonville are potential candidates depending
22 upon if they decide to continue to burn high sulfur coal.
23 There is a risk that some of the smaller, older units that
24 perhaps limited duct space might use a TTBS, which would

1 give them more time to get their injection systems, but
2 it's not possible to determine certain which of the units
3 will be candidates for a TTBS at this time. I do expect
4 that less than 25 percent of the capacity should use a
5 TTBS.

6 HEARING OFFICER TIPSORD: Question 25. I think 24,
7 to which units, you answered.

8 A. 25, what is the nature of the risk that these
9 plants will not be able to achieve compliance with the
10 standard? If we could have a clarification on that
11 question. The units that do not -- the risk for the units
12 that do not comply with the emission standard and go to
13 TTBS?

14 Q. (by Mr. Harrington) Yes, why would some of us
15 have to take advantage of the TTBS?

16 A. As I mentioned, a big factor in terms of the
17 performance of the sorbent. Well, certainly we mentioned
18 Meredosia small units. There may be other units that may
19 just need more time to get their sorbent injection systems
20 getting good distribution of the sorbent. And, you know,
21 that's really what I envision may take a little bit of
22 time. It's really to address the situation that some
23 units may need a little more time to get their systems
24 running if they decide to go that road.

1 HEARING OFFICER TIPSORD: Question 26.

2 A. What additional costs would you expect these
3 plants to incur if they did not have temporary technology
4 based standard? Well, that would vary. You know, one
5 would be -- You know, there may be some kind of regulatory
6 relief. They might request some kind of regulatory
7 relief. Were that not possible, they might have to look
8 at installing more costly hardware.

9 Q. (by Mr. Harrington) Do you have any
10 particular hardware in mind?

11 A. You know, some folks might decide, you know --
12 One we've talked about is the possibility of TOXECON
13 system. But depending on what a company's plans might be,
14 they may choose to, you know, go ahead and install SCR and
15 pursue compliance in another way so they get more
16 cobenefit removal.

17 MR. HARRINGTON: Thank you.

18 HEARING OFFICER TIPSORD: 27.

19 A. Will these plants not ultimately have to incur
20 these costs even if they do have a temporary technology
21 based standard? I don't believe so, and, you know, I
22 certainly don't expect it because there are a lot of ways
23 you can -- If you employ the TTBS and you're putting in
24 that sorbent, there are couple of things. First of all,

1 improved sorbents may come along. Second, and given more
2 time, my expectation is that given more time, someone may
3 be able -- if initially they put their sorbent injection
4 system and not getting good distribution, it may take more
5 time to make the adjustments. The other is they could
6 probably just try to get more cobenefit removal, and there
7 are ways to do that. So, I don't think the TTBS
8 necessarily delays the inevitable as you might -- because
9 I don't think it necessarily is a matter of delaying the
10 situation a baghouse or something like that. I think the
11 time could be beneficially used by these plants.

12 MR. HARRINGTON: Thank you.

13 HEARING OFFICER TIPSORD: Question 28. I'm sorry.
14 Mr. Zabel.

15 Q. (by Mr. Zabel) I'm just curious. Dr. Staudt,
16 you mentioned you'd get more cobenefit. I'm wondering
17 what you might have in mind with that?

18 A. That would be -- Some cases you can get more
19 cobenefit through making modifications to your combustion
20 system so you get more cobenefit from your ESP. That's
21 been shown to be the case in some situations. There's a
22 wide range of possibilities to do that. You may try -- We
23 talked about the Mercher (phonetic) technology. Somebody
24 may start with the halogenated sorbent and go with some of

1 these additional chemicals that Alston has available to
2 improve the sorbent capture -- the mercury capture,
3 rather, more. So, there are a lot of things that they
4 could potentially do and I think they would do and should
5 do prior to going to a much more costly approach.

6 Q. Prior to going to a baghouse or ESP expense?

7 A. You know, something that involves a large
8 capital expense.

9 HEARING OFFICER TIPSORD: 28.

10 A. 28, on Page 7 of your amended testimony, you
11 reference two 30-day continuous trials where 93 percent or
12 more mercury removal was achieved over the period. Which
13 trials were those? There was the Meramec -- Amren's
14 Meramec -- M-E-R-A-M-E-C, I think -- and DTE St. Clair.

15 What was the size of the ESP on each of those units,
16 the size of the boilers and the coal type fired during the
17 trials? Meramec is PRB fired at 140 megawatts, and the
18 ESP's -- the specific collection area of the ESP is 320.
19 St. Clair fires mostly PRB, about 85 percent, sometimes a
20 hundred percent, is 160 megawatts and has an ESP with an
21 SCA of 700.

22 30, was there any impact on operation of the ESP
23 during either of these trials? And not that I'm aware of.

24 31, how does the size of the ESP's in those trials

1 compare to the size of the ESP's in the Illinois
2 facilities listed in Table 8.8? I think you mean Table
3 8.9. There are ESP's in Illinois that are larger and
4 several that are smaller than Meramec. Of course, St.
5 Clair is the larger one measured in terms of SCA. But,
6 however, for the reasons that I've already discussed, I
7 don't believe that ESP size is a limitation on the removal
8 -- limitation on the removal efficiency sorbent injection.

9 Q. (by Mr. Harrington) Just so the record is
10 clear, do you believe it's a limitation extent that the
11 smaller ESP may not be able to handle as much carbon as
12 the larger ESP?

13 A. I think -- Actually, I'm looking for one of
14 the Exhibits that you entered, and I want to point
15 something out. It's basically the EPA --

16 Q. Exhibit 54.

17 A. If you -- What page is this? If you start at
18 the bottom of the first page, it shows that -- and I'll
19 read this -- "Calculations" -- Not the first page. The
20 sixth page. I apologize. It's the one with Figure 2 --
21 the page with Figure 2 that shows the halogenated carbons.
22 I'm just going to read this off. "Calculations and
23 full-scale tests reveal the increase in PM loading due to
24 PAC injection is relatively modest, under four percent,

1 and is even lower when halogenated sorbents are injected.
2 This change in PM loading is likely to be less than the
3 loading change seen with routine fuel or fuel batch
4 changes in a power plant. Calculations suggest that the
5 increase in PM2.5 (fine PM under 2.5 microns in diameter)
6 loading (i.e., PM 2.5 added with sorbent injection
7 relative to total PM mass in the flue gas) with a sorbent
8 injection rate of 10 pound per million MMacf would be
9 under 0.2 percent." Now, keep in mind that 10 pound per
10 million ACF, we're suggesting -- for a PRB unit, you're
11 looking at about 3 pound per million ACF. So, it would be
12 less than a third of what is estimated here.
13 "Furthermore, the PM 2.5 removal efficiency of ESP's is
14 typically about 96 percent." Overall removal efficiency
15 for ESP's is much higher than that typically, but for PM
16 2.5, which is defined as a fraction, it's 96 percent.
17 "Accordingly, sorbent injection would be expected to
18 increase direct PM 2.5 emissions by under 100th of 1
19 percent." Okay. "These indications need to be
20 substantiated with measurements," and I haven't -- as I
21 indicated, I haven't seen any tests that persuade me to
22 believe that sorbent injection properly running ESP is
23 going to be increased PM emissions. So, that hopefully
24 addresses your question.

1 I'm not sure which question we're on.

2 HEARING OFFICER TIPSORD: 32.

3 A. In the next sentence, in your amended
4 testimony, you have increased the cost per hour from 160
5 to \$180 per hour and the price of sorbent from 80 cents to
6 90 cents per pound. Does this change in your testimony
7 reflect the change in the cost of sorbent since your
8 testimony was originally prepared? If not, why was your
9 testimony changed in this regard? It reflects the change
10 in my understanding of price of sorbent since my original
11 testimony was prepared.

12 Q. (by Mr. Harrington) Was that based on a
13 change in price of sorbent over that period?

14 A. Well, I don't know what -- how much -- It
15 would be a change in the price of sorbent. It's a change
16 in my understanding of the price of sorbent. So, I don't
17 know -- When I prepared the TSD, I had historical
18 information on the price of sorbent, and I don't recall
19 exactly when that information was from. The change in my
20 understanding of the price of sorbent and I did get more
21 recent information that caused to change the number.

22 Q. Do you know whether the market price of
23 sorbent, particularly the patented sorbents, has changed
24 over recent period of time?

1 A. This is the price for a proprietary sorbent.

2 MR. HARRINGTON: Thank you.

3 HEARING OFFICER TIPSORD: Question 33.

4 A. In the next sentence, you state that mercury
5 removal will be better when sorbent is injected upstream
6 of retrofit fabric filters. What specific data do you
7 have to justify this assertion? What are the costs of
8 such retrofits? Have those costs been accounted for in
9 your calculations? Well --

10 Q. Perhaps to simplify it, what did you mean by
11 "retrofit filters" in this case?

12 A. Retrofit fabric.

13 Q. Installing TOXECON?

14 A. Something like a TOXECON.

15 MR. HARRINGTON: I think we've covered that now.

16 HEARING OFFICER TIPSORD: Okay. 34.

17 A. 34, are there any long-term tests to establish
18 this? Yes, Gaston is a long-term test.

19 HEARING OFFICER TIPSORD: 35.

20 A. 35, later in that paragraph, you state, "There
21 is a risk, however, that on some subbituminous-fired
22 units, the design of the existing particulate control
23 device may limit the injection rate of sorbent due to PM
24 control issues or the use of SO3 flue gas conditioning may

1 limit sorbent effectiveness, thereby limiting mercury
2 emissions reduction." At which units would you expect
3 this to be an issue? This might be an issue with SO3
4 conditioning and limited ductwork space upstream of the
5 ESP. For some of the smaller ESP's that may have a
6 problem that already make them marginal performance, there
7 could be an issue, too. But as I've said before, for SO3,
8 I think buy and large that can be addressed either by
9 repositioning the injection -- by repositioning the
10 injection system upstream of the SO3, sorbent injection of
11 the SO3 or using alternative methods to control to treat
12 your flue gas.

13 HEARING OFFICER TIPSORD: Mr. Harrington.

14 Q. (by Mr. Harrington) Several times you've
15 mentioned putting the sorbent injection upstream of the
16 SO3. Do you know how far upstream that would have to be
17 done in order to achieve the kind of removal you've talked
18 about?

19 A. Well, it would depend upon how good a job you
20 did with mixing them. That's one thing that I would
21 recommend to everybody who looked at installing one of
22 these units, to do a pretty good flow modeling study to
23 try to get the best distribution, and if you use -- if you
24 do a good job of distributing the sorbent and getting it

1 mixed, you don't need much distance because the limiting
2 thing is mixing, not the chemical reaction. The chemical
3 reaction that causes the mercury to be attached to the
4 sorbent occur very quickly.

5 MR. HARRINGTON: Thank you.

6 HEARING OFFICER TIPSORD: Mr. Bonebrake.

7 Q. (by Mr. Bonebrake) I think you mentioned
8 earlier that you were aware of some units in Illinois that
9 you were using flue gas conditioners different from SO₃?

10 A. Yes, I did.

11 Q. And can you identify for us which units are
12 offering these conditioners?

13 A. Well, it's my understanding that the Midwest
14 -- based upon the reports, that the Midwest Generating
15 actually have their coal treated in advance rather than
16 using SO₃, and that they basically have a sodium compound
17 sprayed on the coal prior to getting it to the plant.
18 Then there are a couple of other -- And Midwest Generating
19 also have smaller ESP's is my understanding. So, there
20 are -- It's my understanding that they may be trying to
21 test another approach at Meredosia, and off the top, those
22 are a few of them. So, you're looking at Midwest
23 Generating, possibly some of Meredosia units and perhaps
24 others.

1 Q. Have there been any studies, to your
2 knowledge, on whether the sodium compound used by Midwest
3 Generation will impact the performance of an ACI system?

4 A. Not that I know of, but based upon my
5 discussions with the people who -- ADA Environmental --
6 Mike Durham at ADA Environmental Solutions, they're
7 experts in both flue gas conditioning and experts in
8 injecting sorbent. Sorbent Technologies and ADA are the
9 two primary suppliers of -- are among the primary
10 suppliers of this sorbent technology, and he said that
11 they -- although there haven't been testing based upon --
12 it works under a very different mechanism -- they wouldn't
13 expect a problem. They've actually been trying to get DOE
14 to fund those kind of tests.

15 Q. And when did you have these conversations with
16 Mr. Durham?

17 A. Several weeks ago.

18 Q. Was it in preparation for this hearing?

19 A. Well, everything that's happened since I
20 started working for the Illinois EPA is in preparation for
21 this hearing.

22 Q. Would it be true that the information that you
23 referred that you received from Mr. Durham, you don't have
24 any other information indicating whether the sodium

1 compound used by Midwest Generation would interfere with
2 the performance of an ACI system?

3 A. That's correct.

4 HEARING OFFICER TIPSORD: Mr. Forcade, did you have
5 some follow-up?

6 MR. FORCADE: To that question?

7 HEARING OFFICER TIPSORD: No. I thought you raised
8 your hand.

9 MR. FORCADE: No.

10 HEARING OFFICER TIPSORD: I'm sorry. Mr. Harrington.

11 Q. (by Mr. Harrington) Where would the carbon be
12 injected at the SO3 conditioning if injected upstream of
13 the air heater?

14 A. Well, you would either have to relocate the
15 SO3 to downstream of the air heater, or what you would do
16 is, you'd have to have another location. Basically you
17 have to have the carbon injected upstream of the SO3. So,
18 I don't see any reason why you couldn't put SO3 downstream
19 of the air preheater, unless there was some kind of
20 limitation on the ductwork.

21 MR. HARRINGTON: Thank you.

22 HEARING OFFICER TIPSORD: Question number 36.

23 A. 36, are you aware of any data on these
24 facilities demonstrating this to be true? I think we

1 talked about this.

2 HEARING OFFICER TIPSORD: 37.

3 A. 37, what are the design issues you reference
4 in the above statement? Let me just see here. You know,
5 we talked about, you know, industry has raised specific
6 collection area the size of ESP as an issue. Although I
7 don't believe the size of the ESP -- I think it's more
8 important the condition of the ESP is probably more
9 important than even the size. That could be a factor.
10 And raise SO3 could potentially be a factor if there
11 aren't ways -- I believe there are ways on most units to
12 address that.

13 HEARING OFFICER TIPSORD: 38.

14 A. What is your understanding of the use of SO3
15 flue gas conditioning prior to ESP's and the reason for
16 it? The reason utilities have gone to SO3 conditioning is
17 because previously they used high sulfur coal, and as I've
18 explained earlier, the operation of the ESP relies on --
19 the performance is affected by the charge carrying
20 characteristics of the particles that you're trying to
21 collect. SO3 it turns out does impact, influence the
22 charge carrying characteristics of those particles, and
23 when you switch from high sulfur coal to low sulfur coal,
24 you've changed the charge carrying characteristics of the

1 particles, and, therefore, what they do is, they restore
2 the charge carrying characteristics using -- injecting a
3 little bit of SO3 that previously was there because they
4 burned high sulfur coal. But what alternative flue gas
5 conditioning methods do, they change the charge carrying
6 characteristics just using different chemicals because
7 some people don't like to have sulfur and SO3 on-site
8 because it's toxic, and there are other reasons people
9 might not want to have sulfur around, but it's really a
10 matter of controlling the charge carrying characteristics,
11 and like many things, there are multiple ways to do it.
12 One way to address the charge carrying characteristics
13 issue is adding SO3.

14 Q. (by Mr. Harrington) Does halogenated
15 activated carbon have the same charge carrying capacity as
16 normal particulate and flue gas?

17 A. No. Carbon has -- Well, it depends. See,
18 some particulate has much of the -- Fly ash normally
19 contains a fair amount of carbon. So, activated carbon
20 has similar charge carrying characteristics as the carbon
21 that's produced from coal that doesn't fully burn, but it
22 is different from the mineral matter that's in the coal.

23 Q. Does halogenated activated carbon have the
24 same charge carrying capacity as the characteristics as

1 the carbon in coal?

2 A. It would be -- It would be similar. I mean, I
3 would expect it to be similar.

4 Q. Do you know if it loses the charge rapidly
5 before it can be collected in the collection place in an
6 ESP?

7 A. Well, what I can say is that it depends.
8 There is some data -- and I think Sid Nelson will testify
9 about this -- to suggest that some halogenated carbons can
10 actually provide performance and act as a substitute for
11 SO₃, and there's some data he'll be prepared to share with
12 you.

13 Q. You're not -- You yourself don't have that
14 data?

15 A. I have seen the data. He's shown it to me,
16 and he's prepared to talk about it.

17 MR. HARRINGTON: Thank you.

18 Q. (by Mr. Forcade) Dr. Staudt, you stated that
19 PRB coal typically have a fair amount of unburned carbon
20 in the fly ash?

21 A. Well, not as much as bituminous coal typically
22 do.

23 Q. What percentage unburned carbon would expect
24 the PRB unit in Illinois to produce?

1 A. Perhaps a few percent, if that much.

2 Q. Would you be surprised if it were less than
3 half a percent?

4 A. No. In some cases, I would expect it to be
5 well below a percent.

6 MR. FORCADE: Okay. Thank you.

7 HEARING OFFICER TIPSORD: Question number 39.

8 A. 39, of units using flue gas conditioning
9 systems, how prevalent is the use of SO3 as the
10 conditioner in the industry and in Illinois? As I -- I
11 don't have statistics on nationwide. Generally SO3 is
12 more widely used, but in Illinois, as I mentioned, the
13 Midwest Generating, my understanding is that they don't
14 use SO3. They put sodium on their coal or sodium
15 compound. But the Dynegy and Amren plants by and large
16 use SO3.

17 HEARING OFFICER TIPSORD: Question number 40.

18 A. 40, are you aware of data indicating this
19 impact of SO3 flue gas conditioning. I think we've talked
20 about this. I thought we had, but -- You want another
21 answer?

22 Q. (by Mr. Harrington) I think the question is
23 just "yes" or "no", do you have data that indicates that?

24 A. I am aware of data, yes.

1 Q. As part of the sequence of questions, for the
2 record, I think it would be useful to have an answer what
3 you believe that data indicates.

4 A. The data indicates that in some cases SO3 can
5 have an adverse effect on removal efficiency of the
6 halogenated carbons.

7 MR. HARRINGTON: We can go on.

8 HEARING OFFICER TIPSORD: Question 41.

9 A. What is the mechanism by which SO3 flue gas
10 conditioning limits the effectiveness of sorbent injection
11 for removal of mercury? It's believed that SO3 will
12 reduce sorbent effectiveness and that it competes with
13 mercury for absorption on the carbon.

14 HEARING OFFICER TIPSORD: Go ahead. 42.

15 A. 42, what are the halogenated sorbent injection
16 rates that would be required to overcome SO3 flue gas
17 conditioning impacts on sorbent effectiveness? There may
18 not be an impact if the sorbent is injected upstream of
19 the SO3, but if that is not possible, the impact will
20 depend upon SO3 injection rates, as well as other flue gas
21 conditions, and as I mentioned, Sid Nelson has information
22 that he can share with us on testing that indicated that
23 they were able to get the same performance without the SO3
24 while they are injecting halogenated carbon.

1 HEARING OFFICER TIPSORD: 43.

2 A. 43, based on your understanding of the
3 mechanisms that might impact sorbent effectiveness with
4 SO3 flue gas conditioning, why would you expect that
5 increasing the injection rate be expected to overcome
6 those impacts? Well, I would -- It would work to -- It
7 may work to a certain point. It depends upon how adverse
8 their impacts would be. But I do not expect the adverse
9 impacts because most facilities can address the situation.

10 HEARING OFFICER TIPSORD: Mr. Zabel.

11 Q. (by Mr. Zabel) Do you know, Doctor, if the
12 SO3 competes with the mercury for absorption on the ACI
13 that's injected into the gas stream, would that adversely
14 affect the particulate control improvement that the SO3 is
15 there to accomplish?

16 A. It potentially could, but also keep in mind
17 that the SO3 primarily works by getting absorbed onto
18 particles in the flue gas and helping. So, it may or it
19 may not, but there's a possibility.

20 Q. There could be less SO3 for the particles that
21 were there before the ACI injection?

22 A. Perhaps.

23 HEARING OFFICER TIPSORD: Mr. Bonebrake.

24 Q. (by Mr. Bonebrake) You said on a number of

1 occasions now that the formulation was either many or most
2 facilities can address SO3 impact, and my question for you
3 is, which facilities in Illinois cannot?

4 A. I don't know which facilities cannot address
5 them. I am hopeful all of them will, but I don't know
6 which facilities will not be able to address those
7 impacts.

8 HEARING OFFICER TIPSORD: Question 44.

9 A. Would those sorbent injection rates
10 potentially interfere with particulate compliance? Well,
11 there is -- The word here is "potentially," and I said
12 perhaps, but bear in mind that the TTBS allows those units
13 that are unable to achieve the emission standard that can
14 be accommodated with the TTBS. So, indeed there is a
15 chance that there may be some impact. I don't expect
16 that. I expect that with the TTBS, it can be
17 accommodated.

18 HEARING OFFICER TIPSORD: 45.

19 A. Would they change your cost calculations, and
20 by how much? Well, you know, as I indicated, it's really
21 a matter, you know, what would happen if people used the
22 TTBS. It's impossible for me to estimate at this time how
23 many plants would end up using the TTBS. As I said, I
24 think it's likely to be less than the limit, but that

1 would really be determined by how many plants did that.

2 MR. HARRINGTON: Basically we've answered previously
3 46 through 49. I'm not sure if we answered 50.

4 HEARING OFFICER TIPSORD: I knew I liked you
5 Mr. Harrington. 50 or 51.

6 A. I'm reading 50, but it refers to "such
7 methods". I've got to find out what the "such methods"
8 are.

9 Q. (by Mr. Harrington) Alternative flue gas
10 conditioning methods.

11 A. Have such methods ever been used in
12 conjunction with testing halogenated activated carbon
13 injection? And not that I'm aware.

14 HEARING OFFICER TIPSORD: 51.

15 A. 51, are you aware of tests that demonstrate
16 that such flue gas conditioning is equally effective in
17 assisting and maintaining particulate and opacity
18 compliance? I think that, you know, since one of the
19 major utilities in the state uses an alternative method, I
20 hope that they find it effective. So -- And, again, they
21 do have the smallest ESP's in the state.

22 HEARING OFFICER TIPSORD: 52.

23 A. 52, what would the cost impact of using
24 alternative flue gas conditioning methods? It keeps

1 dropping. My understanding is that the costs are about
2 the same. The reason more utilities haven't gone from SO3
3 to the other approaches, first of all, there isn't a big
4 cost advantage, but they're accustomed to using the SO3.
5 It's been around longer. So, you have to have a good
6 reason to change. As I said, there are companies that use
7 other approaches.

8 HEARING OFFICER TIPSORD: 53.

9 A. 53, what time requirements might be necessary
10 to design, procure and install alternative flue gas
11 conditioning systems? Well, that would depend, but, you
12 know, if it's one of the ones that people like ADA or, I
13 think, GE Betts and there's another company, Benitech
14 (phonetic), they actually spray stuff into the flue gas
15 with the SO3. The equipment is very similar to what you
16 might see with sorbent injection system or even in the
17 sense -- except they have pumps, and they spray it in.
18 They have an array of nozzles. So, it's equipment that
19 can be designed and installed within six months in that
20 case. As for, you know, if someone does something like
21 Midwest Generating does where they treat the coal, that's
22 a different situation. It's a matter of making an
23 arrangement with the coal supplier, and perhaps they'd
24 probably test it to see how well it worked, and there

1 would be some time associated with that.

2 HEARING OFFICER TIPSORD: Mr. Bonebrake.

3 Q. (by Mr. Bonebrake) Are you aware of any
4 recent pollution control projects either the cost or
5 schedule of which has been impacted by a shortage of
6 labor?

7 A. I am not aware of any.

8 Q. Is that an issue --

9 A. Are you talking about recent ones?

10 Q. I'm talking about recent EGU pollution control
11 projects.

12 A. Not that I'm aware of, no.

13 Q. Have you done any research in that regard?

14 A. No. In terms of research on availability of
15 labor or what's happened recently in terms of what's going
16 on recently? I don't maintain statistics on this.

17 Q. Have you researched the question whether there
18 is adequate labor?

19 A. Actually, I have. Yes, I did work for EPA
20 under their study. There was a study that they published
21 a couple of years ago. We looked at the study of labor
22 supply, as well as all their materials, things like
23 activated carbon, steel, ammonia for SCR, looking at the
24 clear skies act and how much labor -- how much -- how

1 implementing the clear skies act would impact a demand for
2 labor and what have you. So, that's been examined.

3 Q. And have you researched that issue more
4 recently than, I think you said, a couple years ago with
5 regard to that act?

6 A. Since we're really here to talk about the
7 Illinois rule, what really matters is the Illinois rule,
8 not so much other things. And as far as I'm concerned,
9 the Illinois rule, if people are installing simple sorbent
10 injection systems, which are going to be, you know --
11 which are likely in many cases and very, very large
12 capital intensive projects, as a result of it, I just
13 don't see how it even makes a dent in the supply on the
14 sorbent injection systems.

15 Q. Baghouses that are installed as part of the
16 TOXECON system require additional labor; do they not?

17 A. Well, I only expect two additional baghouses
18 as a result of the Illinois rule over what's currently
19 planned.

20 Q. And what is the typical time for design and
21 fabrication of a baghouse?

22 A. I think we went through this already, but if
23 you'd like me to explore this, we can do that.

24 Q. Because there were some folks on this side of

1 the room that felt perhaps we had not touched on that
2 issue. That's why I'm asking it then.

3 A. Well, I can tell you the Presque Isle
4 facility, there's a full TOXECON facility, very complex
5 retrofit that went from initiation to start-up was two
6 years. So, I would expect on a simpler retrofit would be
7 less than two years, and I'm aware of having worked with a
8 company that supplied fabric filters, they can be
9 delivered and done within about a year if necessary.

10 Q. And are you aware of any -- Let me refrain.
11 Have you reviewed any proposals or contracts with respect
12 to installation of baghouses in Illinois, say, in the last
13 year or so?

14 A. No, I have not.

15 HEARING OFFICER TIPSORD: Mr. Harley.

16 Q. (by Mr. Harley) In terms of sorbent injection
17 system installations, I'd like to read you a very brief
18 excerpt from testimony of Sid Nelson that was prefiled
19 with the board to see if you agree with his assessment.
20 He indicates on a non-expedited basis, it takes about six
21 months from order to actual system operation at the plant
22 site. Little to no source specialized labor is required.
23 The silo feeder system are constructed off site and can be
24 installed on a concrete platform at the utility site.

1 They can be installed while the plant is still operating.
2 Is that consistent with your understanding of the
3 installation of sorbent injection system?

4 A. Yes, that's consistent with my understanding
5 of installation of sorbent injection system.

6 Q. And sorbent injection systems, in your
7 opinion, would be the approach that would be taken at the
8 vast majority of the Illinois facilities?

9 A. That's my belief, yes.

10 MR. HARLEY: Thank you.

11 HEARING OFFICER TIPSORD: Question number 54.

12 A. In the next sentence, you state, "Therefore, I
13 would expect few, if any, units would use a TTBS until
14 they could comply with the reduction requirements of the
15 rule." What is the basis for this statement? Well, I
16 think most units will be able to comply with the reduction
17 requirements of the rule, and that's why.

18 HEARING OFFICER TIPSORD: Question 55.

19 A. Which units would be most likely to require a
20 TTBS?

21 HEARING OFFICER TIPSORD: I think you've answered
22 that. Meredosia and then the other one, Hudsonville.
23 Number 56.

24 A. 56, which units presently using flue gas

1 conditioning do you believe would achieve compliance with
2 the rule within the deadline currently set forth in the
3 rule without the TTBS? I believe that all the units with
4 flue gas conditioning, except maybe Hudsonville that
5 continues to burn high sulfur coal, are capable of meeting
6 the emission limit of the rule in the time provided, but
7 as I've noted and described before, there is a risk that
8 some might need a little more time.

9 HEARING OFFICER TIPSORD: 57.

10 A. In the next paragraph, you state that
11 bituminous coal units with SCR and FGD will either achieve
12 the regulatory rate or can do so through scrubber
13 optimization. Please state what you mean by "scrubber
14 optimization". First of all, there are many things that
15 can be modified on a scrubber. Adding oxidizing chemicals
16 is one possibility, and I discussed that earlier. There
17 are -- Others might be taking measures to promote more
18 oxidization. Others include moving gas to liquid contact
19 by upgrading adimizers or other things, but anything that
20 improves gas/liquid contact should improve it, as well,
21 and that could have a benefit with regard to SO2 control.
22 So, the scrubber there are a lot of things that you can
23 potentially do to improve the capture.

24 HEARING OFFICER TIPSORD: Mr. Bonebrake.

1 Q. (by Mr. Bonebrake) Would the alternatives
2 that you just described require the retention of an
3 engineering firm to develop some designs and then
4 fabrication of hardware and equipment?

5 A. Well, depending upon what someone chose to do.
6 For the oxidizing chemicals, it would be a minimal need
7 because these would be simple skid-mounted systems that
8 just add chemicals into some place in the scrubber system.
9 If someone actually went through and made modifications to
10 their scrubber to upgrade it, that would entail some
11 improvement. It would entail using an engineering firm.

12 HEARING OFFICER TIPSORD: Mr. Harrington.

13 Q. (by Mr. Harrington) Are you aware of data
14 that most of the units on SO2 and bituminous coal using
15 SCR and FGD are averaging less than 90 percent removal?

16 A. Excuse me?

17 Q. Are you aware of data indicating that looking
18 at seven major units -- existing units using SCR and FGD
19 are averaging under 90 percent removal?

20 A. Well, I think I've been pretty clear that on
21 any particular unit, you may not get exactly 90 percent,
22 but you're going to get close, possibly higher, possibly
23 lower, and depending on the data you pick, you may end up
24 with an average of under 90 percent, but you're not going

1 to end up with an average that's very low, that's well
2 below 90 percent.

3 MR. HARRINGTON: Thank you.

4 HEARING OFFICER TIPSORD: Question 58.

5 A. Please state what scrubber chemical additives
6 you refer to in this paragraph. I think we've covered
7 this perhaps yesterday, but I can go through this again.
8 Chemicals are being developed by several firms. Babcock
9 and Wilcox has probably been the most active in this area
10 with sulfide agent that reduces emissions of re-admission
11 of oxidized mercury. Other companies including my
12 understanding Frontier Geo Sciences, I understand that
13 they have chemicals. I haven't seen their testing,
14 though. EPRI is working on testing chemicals, as well.
15 EPRI and URS have done some testing under DOE programs.

16 HEARING OFFICER TIPSORD: And for the Court Reporter,
17 we've used EPRI. That's E-P-R-I all caps.

18 Q. (by Mr. Harrington) Have those chemicals been
19 demonstrated in the field to allow units using -- burning
20 bituminous coal and FDG and SCR to achieve 90 percent?

21 A. Which chemicals? Any of those chemicals?

22 Q. The scrubber additives referred to.

23 A. The scrubber additives? Yeah, certainly the
24 Babcock and Wilcox additives have shown that they do a

1 very good job, particularly on limestone forced oxidation
2 units that are typically used in this area.

3 Q. To achieve 90 percent removal consistently?

4 A. Well, yes, to get over 90 percent removal.
5 What do you mean by "consistently"?

6 Q. Consistently so that would comply with the
7 proposed Illinois 90 percent --

8 A. It would certainly be adequate certainly
9 enough to comply with the rule.

10 Q. And what units are those being used on?

11 A. Well, again, they're not -- They have been
12 tested in some time for a period for several weeks or
13 months. There was testing done at Mount Storm. Testing
14 was done at Mill Creek. And I'm just going to limestone
15 forced oxidation units. There are a couple of others
16 listed in this paper that you -- I'd like to thank you for
17 providing it because it's got a few citations that I was
18 looking for.

19 HEARING OFFICER TIPSORD: And this is Exhibit 54,
20 Control of Mercury Emissions.

21 A. Yes. Endicott Station, which is limestone
22 forced oxidation unit, Zimmer in Ohio, but Zimmer uses a
23 different type of scrubber -- a different type of scrubber
24 technology called magnesium enhanced lime, but it

1 doesn't -- their additive works best on limestone
2 oxidation and consistently worked pretty well on those
3 units.

4 MR. HARRINGTON: Thank you.

5 HEARING OFFICER TIPSORD: Question number 59.

6 A. 59, please state whether these costs were
7 included in Table 8.8 of the technical support document.

8 Q. (by Mr. Harrington) And refer to 8.9, please.

9 A. Excuse me?

10 Q. 8.9.

11 A. Oh, okay. Please state whether these costs
12 were included in Table 8.9 of the TSD, and if not, why
13 not? I didn't because, first of all, at this point, I
14 can't determine which units, if any, of these scrub units
15 would need any additional costs beyond -- any additional
16 removal beyond the cobenefit removal, but, if so, it's my
17 -- in any event, if so, it's my expectation that it would
18 be a pretty small amount because of the small amount of
19 additional reduction that would be needed, and, therefore,
20 the costs -- compared to the costs that are associated
21 with units with not so much cobenefit, the costs would be
22 small.

23 HEARING OFFICER TIPSORD: Question 60 asks
24 specifically for the costs.

1 MR. HARRINGTON: I think we said 61.

2 HEARING OFFICER TIPSORD: 61.

3 A. You have struck the language "Full scale tests
4 have shown that halogenated sorbents can achieve high
5 removal rates on low to medium sulfur bituminous coal,
6 albeit at somewhat higher injection concentrations than
7 for PRB fuels." Actually, I go to -- 61 and 63 are
8 basically associated with the -- essentially they're
9 associated with the same thing. I didn't make the change.
10 In 61 and 63, essentially I took one statement and
11 substituted another. All right. So -- So, 61 I read
12 that. 63 is, on Page 8 of your amended testimony, you
13 state "Full scale tests have shown that halogenated
14 sorbents can achieve high removal rates on medium sulfur
15 coal, albeit at slightly higher injection concentrations
16 than for PRB fuels." Which tests do you refer to here and
17 what rate of removal did they achieve? Well, I didn't
18 make the change because it was untrue, and that's
19 referring to question 61. It was replaced by the sentence
20 in question 63, which left out "low sulfur bituminous
21 coals," which I actually meant to include because they
22 would also apply to that sentence.

23 HEARING OFFICER TIPSORD: 62.

24 A. 62, the original testimony also stated,

1 "Combined with some cobenefit removal, over 90 percent
2 mercury removal with halogenated sorbent injection in the
3 range of 6 to 7 pound per million ACF has been shown at
4 several units." Which units are these, what coals were
5 fired and under what conditions was this demonstrated?
6 Okay. I think I showed this data in some of my earlier
7 questions. We talked about Allen; we talked about, you
8 know, Monroe, which I included, and then also using
9 untreated sorbents for a point achieve 90 percent using an
10 untreated carbon, but at much higher injection rates
11 because it's an untreated carbon. And Braden Point -- I
12 believe the unit that they tested at Braden Point, I know
13 they have some flue gas conditioning at Braden Point
14 called an Eprigon (phonetic) system, but it's an SO3 based
15 system. At Salem Harbor, I believe, 93 percent cobenefit
16 was achieved under some conditions.

17 HEARING OFFICER TIPSORD: Question 64.

18 A. 64, you reference 90 percent mercury removal
19 of halogenated sorbent injection. Over what period of
20 time was this removal rate achieved and how was the
21 90 percent removal calculated? Is this question in
22 reference to bituminous coals or both bituminous and
23 subbituminous?

24 Q. (by Mr. Harrington) Bituminous.

1 A. Bituminous. My understanding is that they
2 were all parametric tests that may have lasted a few
3 weeks -- you know, a few days to a few weeks. So, on each
4 data point during the test, it may have been several hours
5 to a few days. Today, you know, right now DOE requires
6 the minimum of 30-day tests for all of their programs.
7 And, so, we'll be having 30-day data available now as a
8 result of those programs.

9 HEARING OFFICER TIPSORD: 65.

10 A. What was the minimal removal achieved during
11 the tests, and what was the maximum removal achieved
12 during the tests? Well, when we're talking about --
13 You're reference to the test? First of all, as far as
14 minimal removal, parametric tests are designed to go from
15 the minimum capabilities of the technology to the maximum
16 capabilities of the technology. So, when you talk about
17 the minimum removal, that's kind of meaningless because
18 that's either when you're injecting no sorbent or, you
19 know, no sorbent or even very little. So, the parametric
20 tests -- With regard to parametric tests, the minimum with
21 no sorbent injection. So, it doesn't make sense to
22 discuss that. But in the case of the bituminous coals,
23 the maximum combined cobenefit and sorbent removal was
24 around 90 percent, sometimes a little better, in some

1 cases, you know, higher. Based upon my review of the
2 data, I believe that higher removal rates will likely have
3 been achieved at some of these test sites if these tests
4 were performed at higher injection rates. In the case of
5 PRB coals, over 90 percent removal from sorbent alone was
6 shown, and tests with fabric filters also show over
7 90 percent removal.

8 HEARING OFFICER TIPSORD: Question number 66.

9 A. You state that "for the unscrubbed high sulfur
10 coal capacity, less mercury removal is likely,"
11 referring apparently to Meredosia's smaller units. What
12 mercury removal do you expect them to achieve on a
13 consistent annual basis? It's hard to predict at this
14 point, and that's why I have stated that there are likely
15 to be candidates for the TTBS.

16 HEARING OFFICER TIPSORD: Question number 67.

17 A. I think I've in a sense answered that.

18 HEARING OFFICER TIPSORD: 68.

19 A. You then state, "I expect that the much larger
20 Meredosia number five is capable of over 90 percent
21 removal of halogenated activated carbon." Please state in
22 detail how you arrived at this conclusion. My
23 understanding is that it is a 240 megawatt unit firing PRB
24 coal and has an ESP with an SCA of about 350 and a

1 reasonably long duct run upstream of the ESP. So, with a
2 longer duct run, I expect that they're likely to be able
3 to address any concern about SO3 conditioning, and as a
4 result, I would expect similar performance as was
5 experienced at St. Clair or Meramec.

6 HEARING OFFICER TIPSORD: And did he not -- am I
7 mistaken -- answer 69 and 70, 71, 72 in that answer?

8 MR. HARRINGTON: I think all the way through 74.

9 HEARING OFFICER TIPSORD: Question 74.

10 MR. HARRINGTON: I think he covered 74.

11 HEARING OFFICER TIPSORD: Okay. 75.

12 A. What level of -- Next 75?

13 MR. HARRINGTON: Go to 76.

14 MS. BASSI: Why would we not want to do 75?

15 A. I can do it.

16 HEARING OFFICER TIPSORD: Go ahead.

17 A. 75, what level of removal would the Meredosia
18 number five unit need to achieve in order to average over
19 90 percent control with Meredosia boilers number one
20 through four? And that can't be determined without
21 knowing what the small units are capable of, and as I've
22 noted, I can't determine what their capable of at this
23 time.

24 HEARING OFFICER TIPSORD: 76.

1 A. As I said, there's -- the prediction, I
2 assume, has to do with --

3 Q. (by Mr. Harrington) Predicting the removal
4 rate.

5 A. Of which one?

6 Q. Of the larger unit.

7 A. On the larger unit. I feel what -- with
8 degree of confidence -- as I feel very confident if you --
9 I feel very confident based upon the information I have
10 seen.

11 HEARING OFFICER TIPSORD: 77.

12 A. 77, would you or your company take a contract
13 to install and operate the boilers you describe at
14 Meredosia with severe penalties, including paying any
15 compliance or other costs incurred by the owner of these
16 boilers, if they failed to achieve the 90 percent
17 reduction you project? I'm not in that business. So --
18 No, because that's not what I do for a living.

19 HEARING OFFICER TIPSORD: Mr. Harley.

20 Q. (by Mr. Harley) You testified that many of
21 the tests that establish a 90 percent more or less removal
22 of mercury are done in a relatively short time frame,
23 sometimes a few days to a few weeks; is that correct?

24 A. Yes. Yes. That's correct.

1 Q. Isn't it also true that you've testified that
2 one thing that will enhance the level of removal
3 efficiency is the optimization of these systems with other
4 plant operations and components?

5 A. That is correct. Yes.

6 Q. So that if a facility installed this
7 technology, you would expect that over time, as they
8 optimize their system, they would get even higher and
9 better levels of removal efficiency?

10 A. That is perhaps possible, yes.

11 Q. And the requirement to optimize the efficiency
12 by integrating with other plant operations and equipment,
13 that would be an operator obligation; is that correct --
14 not a vendor obligation?

15 A. The optimization?

16 Q. Yes.

17 A. Yes, that would typically be done by the
18 operator, though sometimes they will call on a vendor to
19 assist.

20 Q. Would three years be an adequate period of
21 time for an ACI to be optimized by other facility
22 operations?

23 A. I would think so.

24 MR. HARLEY: Thank you.

1 HEARING OFFICER TIPSORD: Mr. Harrington.

2 Q. (by Mr. Harrington) Would your answer be the
3 same if there are other major changes to the facility such
4 as installing other pollution control devices at the same
5 time?

6 A. To the extent installing other pollution
7 control devices might affect either the location of the
8 injection system, that may -- that could -- that would
9 probably mean you would have to go ahead and re-optimize
10 after you move, say, the injection locations. But within
11 three years, if you -- The fact is these systems are very
12 simple to install. It's nowhere near the complexity of
13 some of the other equipment that utilities are accustomed
14 to, and, frankly, that's why there's been so many tests of
15 this because, you know, these guys come with a
16 skid-mounted system, with a silo and a blower and put some
17 pipes in the ductwork, and they're ready to test pretty
18 much. It's pretty -- Of course, there's a little more
19 involved with a commercial system, but it's really not a
20 whole lot more extravagant than that.

21 HEARING OFFICER TIPSORD: Question 78.

22 A. Would my company do so for any unit with an
23 SO3 flue gas conditioning system? Of course, I'm not in
24 the business of selling equipment.

1 MR. HARRINGTON: I think that takes us down through
2 80.

3 A. Okay. Would the SO3 system impact the level
4 of guarantee you might offer? I'm not in the business of
5 selling these. So, I don't --

6 HEARING OFFICER TIPSORD: Right. 81.

7 A. If the Meredosias number one through
8 four shifted to a low sulfur coal as you suggest is
9 possible, would you project that they would achieve over
10 90 percent reduction with halogenated activated carbon
11 injection at these specific facilities? Well, just to be
12 clear, I said that it may be possible for the smaller
13 Meredosias boilers one through four to shift to the same
14 low sulfur coal that is burned in unit five. I did not
15 say that it was possible, but it may be. But if changing
16 coals was possible, I expect the units should be capable
17 of getting 90 percent removal or at least very close to
18 it.

19 HEARING OFFICER TIPSORD: 82.

20 A. 82, will you expect these facilities to
21 require SO3 injection to achieve compliance with the
22 opacity and particulate limitations? Well, as I said, as
23 I mentioned earlier, there are alternatives to SO3. So,
24 they might choose to use SO3 or they might choose to use

1 something else if they can't find a way to use the SO3
2 downstream of the sorbent.

3 What are the size of the ESP's on each of these
4 units? It's my understanding that the specific collection
5 area of the small ESP's on the small Meredosia units are
6 166, and as I've noted, I don't see ESP size as a
7 limitation for sorbent injection.

8 HEARING OFFICER TIPSORD: 84.

9 A. 84, where would you inject halogenated
10 activated carbon on each of these units? And that would
11 be a location upstream of the ESP.

12 HEARING OFFICER TIPSORD: 85.

13 A. On Page 9, you state, "In the event that some
14 units comply through a TTBS until they can achieve the
15 required mercury emission reductions, the cost difference
16 will be only slightly higher. There is, however, a small
17 risk that some units will be unable to comply with the
18 rule as anticipated in the TSD due to the limitation on
19 the allowable megawatt that may use a TTBS. In this case,
20 these units will require more costly controls." So, 85 is
21 a statement. I guess the question is 86. Which units
22 would be required to install additional controls
23 ultimately to come in compliance with the rule? And I
24 can't say at this time. As noted, it is not possible --

1 if it is not possible to change coals at the small
2 Meredosia units or if newer SO3 tolerant sorbents that
3 are -- There are actually SO3 tolerant sorbents that are
4 being tested of Department of Energy studies this year.
5 If they're not successfully developed or the coals can't
6 be switched at Meredosia, they might incur higher costs.
7 So, they are the only ones, except possibly for
8 Hudsonville, but my understanding is that Hudsonville may
9 be switching to PRB coal. So, the Meredosia units are the
10 only ones that I expect to be clearly at risk if these
11 things aren't developed.

12 Q. (by Mr. Harrington) As I read the statement
13 on Page 9, it clearly implied to me that it's possible, in
14 addition to those units that complied with the TTBS, there
15 might be additional units that are not qualified for TTBS
16 and could not achieve compliance?

17 A. Well, I can't say how -- Personally I believe
18 that it's -- Although I think there's a low probability, I
19 do believe there's a low probability that there will be
20 more than 25 percent of the capacity would be able to --
21 would be applying for the TTBS. Again, you know, people
22 may not share this view. I do try to be conservative
23 being an engineer. I'm acknowledging that there is a risk
24 because of that limitation.

1 Q. I believe you already testified you do not
2 recommend that limitation; is that correct?

3 A. That is correct.

4 MR. HARRINGTON: Thank you.

5 A. 87, what additional controls or measures would
6 you expect those utilizing the TTBS to incur in order to
7 ultimately come into compliance? It will depend upon the
8 unit and the decision is ultimately up to the owner.

9 HEARING OFFICER TIPSORD: 88.

10 A. 88, which units do you believe will not be
11 able to comply with the rule as anticipated in the TSD due
12 to the limitation on the allowable megawatts that may use
13 a TTBS? Well, yeah, because of the way -- If either unit
14 -- Because of the way the units are grouped together, if
15 either unit at Kincaid is unable to comply with the rules
16 and emission requirements, they would not be able to take
17 a TTBS because their size and the relative size of the
18 units they're grouped with, but based upon the information
19 I have, I expect that the Kincaid plant should be able to
20 comply with the rules and emission standards.

21 HEARING OFFICER TIPSORD: Mr. Forcade.

22 Q. (by Mr. Forcade) Is Kincaid the only facility
23 in the State of Illinois that would not be eligible for
24 the TTBS?

1 A. You know, that's -- Basically any that --

2 MR. ZABEL: He's fighting with his counsel. Let the
3 record reflect that.

4 A. There's a -- If the -- The Baldwin unit is a
5 pretty large part of Amren's system. So, potentially
6 that's -- if you look -- but each of the units are less
7 than --

8 MR. ZABEL: I must object to the answer. Baldwin is
9 not part of the Amren.

10 A. Dynegy.

11 MR. ZABEL: You shouldn't fight with your counsel.

12 A. Part of the Dynegy system. There may be
13 others. Kincaid stuck out. I can tell you Kincaid stuck
14 out.

15 Q. (by Mr. Forcade) Would it be correct to say
16 that the TTBS is intended to address those situations
17 where a facility attempts to implement activated carbon
18 injection -- I'm a lawyer -- and it is not successful for
19 some reason?

20 A. Yes. In a sense, yes.

21 Q. That will take some period of time; won't it?

22 A. What will take some period of time?

23 Q. To fully implement activated carbon injection
24 and determine whether it will work to achieve the goal.

1 A. Getting the system installed and starting it
2 up, in most cases, I think won't take a long time. You
3 know, the systems can be installed in six months. Tests
4 can be run --

5 Q. Do you have any idea how long it takes to
6 prepare a construction permit application? Do you have
7 any idea how long it takes to get a construction permit?
8 Do you have any idea how long it takes after you get a
9 construction permit to get approval of your stack test
10 protocol?

11 A. No, I don't.

12 Q. Do you feel confident that your six-month
13 schedule is realistic?

14 A. I know once you place the order, it will be
15 there in six months. There may be something you do before
16 that six month period.

17 Q. Can you place an order in Illinois before you
18 have a construction permit?

19 A. That's a question for someone else.

20 Q. We'll address in argument, but -- Assuming for
21 purposes of my question that it does take at least six
22 months to get the unit up and operating and you properly
23 operate it according to the protocols, but you can't
24 achieve the reductions required, what would your

1 suggestion be as to the next course of conduct for a
2 facility such as Kincaid?

3 A. Well, first thing I would do -- and I'm
4 thinking as an engineer here, how you would make these
5 systems work as well as possible and increase your
6 probability for success, one of the first things you'd do
7 is get a good model study and try to understand the
8 injection, make sure you've got the right injection
9 strategy because that is important in getting -- is as
10 critical as getting good performance. The other thing
11 that, you know -- That's something you do. Once the
12 system was installed, you may make adjustments to the
13 injection system. And those are the main things you may
14 find, that they need to make adjustments to the
15 injections. You may be able to reduce those chances if
16 you do some homework up-front.

17 Q. Are you suggesting then that there's no
18 situation under which an activated carbon injection system
19 could not be made to work at Kincaid?

20 A. What I'm saying is, based upon the information
21 that I'm aware of, I fully expect that they ought to be
22 able to comply with the emission reduction requirement.
23 You know, as a last resort, I guess you can try to get
24 some administrative regulatory relief with a variance or

1 something like that.

2 Q. There would be no opportunity to get a TTBS;
3 is that correct?

4 A. You are correct.

5 Q. Okay. And the deadline for submission of the
6 Title 5 permit application, I believe, is December 31st,
7 2008, and if you consume six months of time, assuming you
8 get an instantaneous construction permit to order and
9 install the device, does that leave you any time to
10 install any other technology?

11 A. Well, again, these are all the things that I
12 was thinking about when I suggested -- recommended against
13 the -- I advised the agency that I did not -- I was not in
14 favor of the limitation.

15 Q. Of which limitation?

16 A. Of the limitation of the 25 percent limitation
17 on TTBS. So, I think we all know that.

18 MR. FORCADE: Okay.

19 HEARING OFFICER TIPSORD: Number -- Mr. Zabel. I
20 apologize.

21 Q. (by Mr. Zabel) Thank you. Just following up
22 on Mr. Forcade's questioning, I recall earlier in your
23 testimony, you indicated you liked to eliminate risk; is
24 that correct?

1 A. Yes.

2 Q. If you were managing the Kincaid plant, as
3 Mr. Forcade have described in that exchange, their risk
4 would be -- there's nowhere for them to go if what you
5 think works doesn't work; isn't that correct?

6 A. Well, I think that there are various ways to
7 manage risk, and one way would be to do some testing, do a
8 testing study now or very soon to make sure that -- to get
9 some information. You wouldn't want to wait until the end
10 of 2008 to start thinking about it.

11 Q. What kind of testing do you have in mind?

12 A. Some of these tests -- Similar to these other
13 tests that we've seen DOE sponsor because I think it makes
14 sense for a company to try to examine what they believe
15 they can and can't do.

16 Q. Are you thinking of slip screen testing?

17 A. Potentially that might be initially or a
18 30-day test on the ESP and the ductwork.

19 Q. And another way they might manage the risk is
20 simply not to gamble and to build a baghouse?

21 A. That would be a very expensive insurance
22 policy, but that's one way to go.

23 Q. But the risk of no insurance would be possible
24 enforcement action to close the facility; would it not?

1 A. Well, again, that's -- You know, what all the
2 regulatory -- What would happen in a regulatory scenario I
3 don't know. I'm not a -- That's for somebody from the
4 agency to discuss.

5 Q. And one last question along the same lines.
6 Wouldn't the Marion plant have a similar problem of not
7 qualifying?

8 A. You know, perhaps. Marion is combined with
9 Kincaid.

10 Q. No, Marion is not. Joppa may or may not be.
11 I don't speak to that. But Marion is the Southern
12 Illinois cooperative plant that stands alone.

13 A. Perhaps. As I said, Kincaid stuck out. So,
14 that was an obvious one because it's such a big plant.

15 MR. ZABEL: My apologies for Mr. Forcade.

16 MR. HARRINGTON: As we're going forward, I would just
17 like to note for the record that the only testimony that
18 was submitted in support of the amendment was Dr.
19 Staudt's. A lot of these questions about how the
20 amendment works was directed to him, although they may
21 have been covered elsewhere, but he was the proponent of
22 the amendment when it was submitted, and, therefore, asked
23 and directed many questions to him as we thought
24 appropriate.

1 HEARING OFFICER TIPSORD: Ready to go to question 89?

2 MR. HARRINGTON: Yes.

3 A. What additional controls would these units
4 require? I'm trying to keep track of which units.

5 Q. (by Mr. Harrington) Those that could not
6 qualify for the TTBS. I think you've discussed it.

7 A. Yeah, I think we discussed it. Would they
8 require a TOXECON system? Perhaps. There may be other
9 approaches.

10 91, would not such additional controls be
11 considerably more expensive than estimated in the
12 technical support document, and, if so, how much more?
13 You know, it depends on the particular technology. If it
14 is a TOXECON system, it would be considerably more
15 expensive.

16 HEARING OFFICER TIPSORD: 92.

17 A. 92, how do you arrive at the conclusion that
18 the limitation on the amount of generating capacity that
19 may use a TTBS is likely to be sufficient to address the
20 small number of units that may require extra time to
21 comply?

22 MR. HARRINGTON: I think we've discussed that.

23 HEARING OFFICER TIPSORD: And 93 is what are the
24 units expected to do with the extra time?

1 Q. (by Mr. Harrington) Referring to the extra
2 time on the TTBS.

3 A. What are the units expected to do with the
4 extra time? I expect that they'll try to optimize their
5 cobenefit removal, also make sure that the sorbent
6 injection system is getting good mixing between the
7 sorbent and the gas, and they can try to improve sorbents
8 as they become available. That's actually, you know, a
9 provision of the TTBS, that I suggested the ability to use
10 new and improved sorbents. The intent is that with extra
11 time and effort, the plants that take the TTBS will
12 hopefully be able to meet the emission control requirement
13 of the rule and then drop out of the TTBS, no longer need
14 the TTBS. There's no guarantee that the units will be
15 able to comply with the emissions requirement within the
16 set period sorbent injection alone. So, there may be --
17 As I mentioned, there is a risk that some units may have
18 to pursue other means.

19 MR. HARRINGTON: Subject to what others may say, I
20 think basically you've discussed the issues raised up to
21 and including 103.

22 A. Okay. Making some progress here.

23 MR. HARRINGTON: Repeating it several times won't be
24 necessary.

1 A. Okay.

2 Q. (by Mr. Harrington) Just for the record,
3 those questions dealt with why you recommended 25 percent.
4 Since you didn't do that, that's irrelevant.

5 A. 104, is it fair to say that the costs of the
6 proposal depend largely and perhaps exclusively on whether
7 your performance assessment is correct? You know, the
8 true cost of the rule if finalized will be determined by
9 what actually unfolds, not -- As I indicate, my cost
10 estimates are my best guess of what people might do, but I
11 know that -- or I believe that there may be companies
12 considering the addition of scrubbers to comply with CAIR
13 or whatnot, and they may change the amount of cobenefit
14 removal. So, in fact, the incremental cost could be less.
15 But, obviously, if I'm far off my estimate of performance,
16 then my cost -- if I'm far off, obviously I'm far off.
17 But I believe that in terms of the scenario, if people
18 actually pursue the scenario that I've laid out, I don't
19 think I'm that far off, but as I mentioned, there may be
20 -- companies are considering other things than mercury
21 control, and there may be others to change the boiler
22 configurations.

23 Q. Let me see for the record that it's clear.
24 Your cost assumptions were based -- Strike that. Your

1 cost calculations and TSD were based on your conclusion
2 that all of the units, other than the two outside ESP's,
3 comply with halogenated activated carbon injection; is
4 that correct?

5 A. My original cost estimate, yes.

6 Q. And then subject --

7 A. Except for the ones that were scrubbed, and
8 they would have cobenefit removal.

9 Q. And if that conclusion is incorrect and they
10 need further technology, whether TOXECON or something
11 else, then your cost estimates will be off?

12 A. That would be correct, yes.

13 MR. HARRINGTON: Thank you.

14 HEARING OFFICER TIPSORD: I'm sorry. Mr. Bonebrake.

15 Q. (by Mr. Bonebrake) Did your cost estimates in
16 the TSD take into account any costs of analysis of the
17 flue gas drain from the boilers to the stack for national
18 fire protection agency coal compliance issues?

19 A. No.

20 Q. And did your cost estimates take into
21 consideration infrastructure improvements such as upgrades
22 to electrical systems that might be required in connection
23 with installation of the pollution controls?

24 A. My cost estimates were -- The capital cost

1 estimates were based upon, you know -- were approximate.
2 They're not intended to be detailed cost estimates, and I
3 think we've gone through this a number of times. I didn't
4 go out and get quotes for every one of the plants. I
5 wouldn't have been able to do it in that amount of time.
6 So, I used basically estimates based upon what I've seen
7 in the literature, and, frankly, as I mentioned before,
8 for the sorbent injection systems, even if I'm off by a
9 factor of three or four, it doesn't change the economic
10 significantly.

11 Q. But my question about taking into
12 consideration infrastructure improvements that might be
13 required as a result of --

14 A. I'm assuming that that's included in my
15 estimate.

16 Q. You're assuming it is?

17 A. Well, I could -- You saw a picture -- Let me
18 find the Exhibit, and we can look at what a sorbent
19 injection looks like, and you can tell me what
20 infrastructure is necessary for that small skid-mounted
21 system.

22 Q. Let's take the example of a baghouse. Aren't
23 some infrastructure improvements sometimes --

24 A. That was assumed to be an all-inclusive price.

1 Again, they're trying to get -- I did not do detailed
2 engineering estimates. So, I'm not sure what you're
3 trying to get at, other than these costs, if somebody
4 actually procures a baghouse, there are a lot of things
5 that go into it.

6 Q. I just want an answer to the question with
7 respect to your projected cost for baghouse --

8 A. They were all inclusive. Think of everything
9 that's included with installing a piece of equipment and
10 that a utility would include in a capital cost, and that
11 is included.

12 Q. And that would include --

13 A. Everything includes everything.

14 MR. BONEBRAKE: Okay. Thank you.

15 HEARING OFFICER TIPSORD: Mr. Zabel.

16 Q. (by Mr. Zabel) Dr. Staudt, if your assessment
17 of the performance of sorbent injection is correct, would
18 a requirement merely to install sorbent injection or in
19 the case of a few of your facilities you listed as
20 cobenefit demonstrate equivalent performance achieve the
21 same mercury results you expect?

22 A. Repeat the question.

23

24 (Court Reporter read back last question.)

1 A. I'm confused by that question.

2 Q. That's all right. Let me see if I can
3 rephrase it. You believe that for, with the possible
4 exception of Meredosia and certain other facilities with
5 cobenefit, sorbent injection will achieve 90 percent
6 reduction; is that correct?

7 A. Yes.

8 Q. So, if the regulation mandated sorbent
9 injection and required a demonstration for those units
10 that don't do it of equivalent performance for their
11 cobenefit, would it achieve -- without a specific emission
12 limit or without a specific removal requirement in it,
13 would it achieve the same results that you expect from the
14 rule?

15 A. It would probably achieve similar results.

16 Q. When you say "similar," close?

17 A. Similar, close, yes.

18 MR. ZABEL: Fair enough. Thank you then.

19 HEARING OFFICER TIPSORD: Mr. Forcade.

20 Q. (By Mr. Forcade) Following up on that, if it
21 turned out that your statement about reducing risk was
22 true, would you perceive that the risk to management would
23 be substantially reduced if they simply had an obligation
24 to install the technology and operated properly as opposed

1 to achieving a 90 percent reduction in all cases?

2 A. You know, perhaps, yes. If the requirement
3 was only to install the equipment and operate it properly
4 versus a specific emission requirement, then perhaps that
5 would be the case. That might be similar to what a TTBS
6 is about.

7 MR. FORCADE: Kincaid wouldn't know.

8 A. I understand that.

9 HEARING OFFICER TIPSORD: Question number 105.

10 A. Is it fair to say that the costs of the
11 proposal are incorrect unless your assessment is correct?

12 Q. (by Mr. Harrington) I think that's answered.
13 I think 106 was answered way back in the beginning of your
14 testimony.

15 HEARING OFFICER TIPSORD: You know what? At this
16 point, it's 3:15. Why don't we take a ten-minute break?

17

18 (A brief recess off the record.)

19

20 HEARING OFFICER TIPSORD: I believe we're ready to go
21 back on the record, and I believe we're on Amren's
22 additional questions number 107. Mr. Zabel first.

23 MR. ZABEL: Could I follow-up on something I asked a
24 few moments ago?

1 HEARING OFFICER TIPSORD: Sure.

2 Q. (by Mr. Zabel) We were talking about Kincaid,
3 Dr. Staudt, and maybe Marion and the need to minimize
4 risk, as you say, to do testing in advance, I assume,
5 committing to what your ultimate compliance would be at a
6 given plant. My question for you is, does something like
7 a slip screen test would involve some physical activity at
8 the plant; would it not?

9 A. Yeah, it would probably involve some, but less
10 than some limited amount.

11 Q. What other kinds of tests that you might have
12 in mind?

13 A. Somebody tested, say, one of the ducts that
14 goes into their ESP or something like that. That might be
15 an alternative.

16 Q. And I'm wondering, and you may not be able to
17 answer this question, but I'd like to put it on the
18 record. Some of those kind of testings would consume a
19 certain amount of time; would they not?

20 A. Yes.

21 Q. And some of them might require permitting from
22 the agency; might they not?

23 A. I don't know about that.

24 MR. ZABEL: Thank you.

1 HEARING OFFICER TIPSORD: Mr. Forcade.

2 MR. FORCADE: Not that the answer would be needed
3 right now, but I would like an answer to the question
4 whether slip screen would require a construction permit
5 from the agency. I don't need that answer now, but --

6 HEARING OFFICER TIPSORD: Mr. Romaine is back there.
7 Can he answer that now? He's hiding in the back.

8 A. (by Mr. Romaine) We have issued permits for
9 slip screen testing on power plants for projects.

10 MR. FORCADE: Thank you, Mr. Romaine.

11 HEARING OFFICER TIPSORD: You're not going to ask
12 which project -- I'm curious, I have to ask -- have you
13 issued for slip screen? Which facilities?

14 A. (by Mr. Romaine) I can't remember off the top
15 of my head. I see Curt pointing to himself. So, I
16 suspect that Midwest Generation project is a slip screen
17 project. Amren is also involved in the project. I'm
18 afraid I don't recall which ones are slip screen projects.

19 HEARING OFFICER TIPSORD: Mr. Bonebrake.

20 Q. (by Mr. Bonebrake) Mr. Romaine said that the
21 agency has issued permits. Are permits required in such
22 circumstances?

23 A. (by Dr. Staudt) At this time, I believe
24 they're required because these projects are being

1 undertaken to address a newly proposed regulation.

2 HEARING OFFICER TIPSORD: Miss Bassi.

3 Q. (by Ms. Bassi) Well, that was my question,
4 but now I have another one, and that is I think what I
5 asked before, is when is it not newly? When does new end?

6 A. I don't believe that we have thought about
7 that yet.

8 MS. BASSI: Okay. That's all. Thank you.

9 HEARING OFFICER TIPSORD: And then, Mr. Kim, did you
10 have something before we --

11 MR. KIM: I have some housekeeping matters.

12 HEARING OFFICER TIPSORD: Go right ahead.

13 MR. KIM: First of all, an issue had come up
14 concerning some of the information found in Exhibits 44
15 and -- which is the May, '06 report with the outline of
16 the state on the cover and also the March, '06.

17 HEARING OFFICER TIPSORD: Which is Exhibit 62.

18 MR. KIM: And I think there was a question as to some
19 of the source of that information, and there was -- I
20 think one of the witnesses stated that we perceived some
21 information from the Platts company as far as a listing of
22 the fuel supplier. The list identified the facility, the
23 mine or coal source, the coal type, year total tons, and
24 that information was summarized in the Exhibits, and we

1 indicated we would look into -- I think someone asked if
2 that information could be provided. We said we would look
3 into that. We have contacted our sister agency that
4 provided us with that information.

5 HEARING OFFICER TIPSORD: PPCO.

6 A. Yes. They were perhaps a bit generous with
7 providing us with that information. From a legal
8 standpoint and through a series of conversations with them
9 and without getting into too much more on that line, they
10 have indicated that it would not be appropriate for us to
11 provide that information, that is it would exceed their
12 ability or their rights as far as what they can do with
13 that information. We indicated that we wanted to provide
14 it to the board for purposes of review on the rule making.
15 That in doing so, it would likely become a public
16 document, anyone could come in and inspect it, and they
17 indicated that that was not within their ability to do.
18 So, unfortunately, all I can tell you is that that is the
19 information -- that was the source of the information;
20 that's where we got it, but we have been informed we
21 cannot provide that, but I'm guessing at least one or two
22 of the utilities here are probably subscribers, and they
23 probably even know better than I do that there are
24 limitations as to information that's gleaned from that

1 surface. But, again, that's what we confirmed with DCEO
2 and through their contacting Platts. So, I wish I had
3 more information or more documentation we could give you
4 than that.

5 Then the other thing we had also indicated -- this
6 goes back to, I believe, Marcia Willhite's testimony --
7 that there had been a preliminary deposition or that there
8 had been some deposition modeling performed, but it was
9 never completed, and there was either some testimony or
10 some statements or questions concerning any preliminary
11 results that we might have received. She indicated that
12 she and/or Rob Kaleel would go back and search their
13 records and what have you to see if they had anything.
14 Miss Willhite I don't believe was able to find anything,
15 but we were able to track it down through an attachment
16 through an e-mail. Miss Willhite has been in and out all
17 week, but we've been able to confirm with her that this
18 is, in fact, what she received. What I was going to do is
19 hand this out today as an Exhibit, and you don't
20 necessarily have to rule on it yet. She, again, is out of
21 the office today, but she will be here tomorrow. So, at
22 that point, if there are questions concerning the
23 information here -- It's a two-page document. It was just
24 an attachment to the e-mail, but she and Rob Kaleel

1 tomorrow will be able to answer any questions, but I want
2 to give it now so people --

3 HEARING OFFICER TIPSORD: In our copious amount of
4 spare time. We will mark this as Exhibit 65, and I'm
5 going to go ahead and enter it if there's no objection as
6 Exhibit 65, with the understanding that any questions that
7 you have about the Exhibit can be asked of Miss Willhite
8 tomorrow. Mr. Rieser.

9 MR. RIESER: Yeah, and I will have questions because,
10 you know, obviously have to try to get a sense who this is
11 from and the source of this. If I can ask, Mr. Kim, was
12 the e-mails to which this was attached indicate the source
13 of it? Is that something that's produceable?

14 MR. KIM: This was my understanding and --

15 MR. RIESER: Fortuitously left the room.

16 MR. KIM: Yes. I believe -- I want to say it was
17 ICF. Whoever the modeler was, and it may be somebody
18 totally different, it was sent from the modeler to us.

19 MS. BASSI: I believe she said this was Hammick
20 (phonetic).

21 MR. RIESER: If there is any chance of getting --

22 MR. KIM: They should know off the top of their head.

23 MR. RIESER: The last time I asked her she didn't
24 remember.

1 MR. KIM: I think Rob may have a better
2 understanding.

3 MR. RIESER: Thank you.

4 HEARING OFFICER TIPSORD: Exhibit 65. Only 35 more
5 to go to 100. Then I think we're ready to go back to Dr.
6 Staudt on question number 107.

7 A. (by Dr. Staudt) 107, relates to 106. I don't
8 think we did 106.

9 MR. HARRINGTON: The question really isn't relevant.
10 You answered what the company's role was at the beginning.

11 A. Would this proposal contribute to the
12 fragmented or mixed allowance markets you describe? Yes.

13 With respect to the proposed TTBS, what role did you
14 have in drafting it? It was drafted by the agency, and I
15 commented on it.

16 HEARING OFFICER TIPSORD: Mr. Harley.

17 Q. (by Mr. Harley) Dr. Staudt, you've testified
18 that you did not recommend the 25 percent cap on TTBS that
19 appears in the draft rule; is that correct?

20 A. That's correct.

21 Q. Dr. Staudt, as to other numeric standards that
22 are contained in the rule, including reduction targets and
23 rate of emission targets, did you recommend those numeric
24 standards that are contained in the rule?

1 A. Well, I didn't recommend the standards. I
2 evaluated. The standards were actually developed by the
3 agency.

4 Q. Do you concur with those numeric standards?

5 A. What I can say, I don't -- How much removal is
6 up to the -- How much removal the state wants to require
7 is up to the state, but what I did do is, I evaluated the
8 emission levels or, rather, the reduction rates required
9 by the rule, and it's my opinion that the reduction rates
10 are achievable in the time provided.

11 Q. And under the agency's rule, each operator
12 would have flexibility as to the array of pollution
13 control equipment and operating practices as to how they
14 would achieve those numeric goals; is that correct?

15 A. Well, yeah, the rule provides for some
16 flexibility in terms of averaging and also using 12-month
17 averages.

18 Q. Now, as to the sorbent injection system, which
19 would be so central for the regulated entities to achieve
20 these numeric goals, the optimization phase to achieve
21 these numeric goals will require each operator to make
22 judgment calls about the type of sorbent that they'll use;
23 is that correct?

24 A. Yes.

1 Q. The rate of sorbent that they'll use?

2 A. Yes, would require that, as well as how they
3 inject.

4 Q. The residence time of the sorbent?

5 A. How to get the sorbent into contact, yes.

6 Q. As well as generally coordinating with
7 facility operations, any other facility equipment; is that
8 correct?

9 A. That's correct.

10 Q. Without any numeric reduction requirement, it
11 would be difficult, if not impossible, to ensure any
12 individual's plant systems are being operated at an
13 optimized level; is that correct?

14 A. Well, it basically provides a motivation for
15 the plants to do their best to achieve that emissions
16 target.

17 Q. Not merely to do their best, but what you
18 believe the technology is capable to do; is that correct?

19 A. That's correct.

20 Q. If the sorbent injection system is not
21 optimized, it's possible that it could be installed and
22 operated but not operate at a level close to what you
23 believe it's capable of achieving, that is a 90 percent
24 reduction?

1 A. Well, that's a possibility.

2 Q. Would you care to comment any further on the
3 value of having numeric limits as a reduction target in
4 the rule?

5 A. Well, again, the amount of -- It's not for me
6 to determine how much mercury there should be removed or
7 how much reduction there are. That's a policy decision by
8 the agency. But an emissions target has the advantage of
9 providing motivation for people to actually install and
10 operate the equipment in the best way they can.

11 MR. HARLEY: Thank you, Dr. Staudt.

12 HEARING OFFICER TIPSORD: Mr. Zabel.

13 Q. (by Mr. Zabel) Thank you. Just to follow-up
14 on Mr. Harley's question, if there were an installation
15 requirement, equipment requirement that we talked about
16 and, I think, Mr. Harley was asking about, and there were
17 a trading program, that would be additional insensitive to
18 optimize the control; would it not?

19 A. Perhaps. I haven't thought about that. A
20 trading program --

21 Q. In the sense that it would allow them to
22 generate additional allowances but optimizing the control
23 equipment and have those allowances to sell?

24 A. It depends, but then on the other side,

1 there's somebody that's not controlling. So, again, the
2 whole construct of the rule and the policies and why --
3 you know, the why is and where force of the rules are best
4 directed at the agency. You know, I'm here to talk about
5 technology.

6 Q. We sucked you into something else. I
7 understand, Doctor.

8 A. I'm not a policy maker.

9 MR. ZABEL: Thank you.

10 HEARING OFFICER TIPSORD: Question number 109.

11 A. With respect to subpart B, eligibility of the
12 TTBS, why were brand name sorbents listed? The reason is
13 that -- Well, first of all, somebody can use whatever
14 approach they want if they're able to achieve the emission
15 standards. There's no requirement to use these or any
16 other sorbents if you're able to achieve the emission
17 standard by some other means. But if you participate --
18 If you choose to participate in the TTBS, the reason that
19 brand name sorbents were specified, these are sorbents
20 that have been tested, we have test data on, they've been
21 published. So, there's a level of confidence that these
22 sorbents have the ability to provide the reductions that
23 we're anticipating they would require. Having said that,
24 the TTBS also provides for, if another sorbent that is

1 able to -- is demonstrated to be equally effective, that
2 can also be added to -- included into the TTBS or someone
3 can use it as part of the TTBS, but there's a provision to
4 be able to do that is my understanding. And, also, the
5 TTBS allows people to test new sorbents as they become
6 available and hopefully new sorbents that may provide
7 advantages to the ones that are specified in the TTBS.
8 But, again, if somebody complied with the emission
9 standard, they don't need to use the TTBS. The
10 specification of brand name sorbents was really for a
11 level of quality control.

12 HEARING OFFICER TIPSORD: Mr. Harley.

13 Q. (by Mr. Harley) Have you seen improvement in
14 the removal efficiency of sorbents during the course of
15 your career?

16 A. Yeah. I mean, one of the things that's very
17 interesting, when I first started looking at mercury --
18 mercury control a number of years ago, and we saw some of
19 the testing with untreated sorbents. In fact, the testing
20 with untreated sorbents at places like Pleasant Prairie
21 station, they weren't able to get better than 70 percent
22 removal, and they saw that at other western coal sites,
23 and that's one of the reasons there was so much time and
24 effort put into developing these halogenated sorbents that

1 can address the issues regarding western coals.
2 Ironically, five years ago or, you know, a number of years
3 ago western coals were considered the hard things to deal
4 with. Thanks to the developments of halogenated sorbents,
5 they're considered the easier application versus
6 bituminous, and now bituminous is actually somewhat more
7 difficult because they've addressed -- Bituminous was
8 considered easier before, but now the emphasis is going to
9 go on to address these sulfur issues on bituminous coal.
10 So, there's been a lot of advances.

11 Q. If you had a rule which simply required the
12 installation of equipment and there were advances in
13 sorbents, a company would have no motivation to take
14 advantage of more advanced sorbent that could get a higher
15 level of mercury removal; is that correct?

16 A. Well, certainly there would be no advantage
17 unless it cost them less money. That would be really the
18 only motivation.

19 Q. So, another advantage of the numeric standard
20 is that it provides a motivation to continuously improve
21 systems?

22 A. That's correct.

23 MR. HARLEY: Thank you, Dr. Staudt.

24 HEARING OFFICER TIPSORD: Mr. Forcade.

1 Q. (by Mr. Forcade) If you achieve 90 percent
2 with your existing sorbent, what's the motivation to
3 achieve a higher level if you've got a 90 percent level?

4 A. Well, what happens is a new sorbent that comes
5 along, if it is indeed improved, it means you're probably
6 -- it has some advantage over what you're currently using,
7 whether you're looking for 90 percent removal or
8 95 percent removal or 80 percent removal. That advantage
9 typically would be some reduced cost. I mean, I've been
10 in the air pollution control business for enough years to
11 know that the main motivation for the buyers is to comply
12 at the lowest cost. So, for somebody who, you know,
13 starts out with halogenated sorbent, what would motivate
14 them to new sorbent would be they would say, "Well, you
15 know, I can now get 90 percent removal, but I can try this
16 new and improved formulation of sorbent."

17 Q. So, in that case, they would have a motivation
18 to try the new and improved whether there was a 90 percent
19 requirement in the permit or not; correct?

20 A. Well, if there's no requirement for control
21 level or if there's no requirement to -- if there's
22 nothing that motivates -- Let me step back. If the only
23 requirement is install the equipment and inject some
24 sorbent, there's very little motivation to do more than

1 that -- okay -- than just buy the equipment and inject
2 some sorbent. So, having some kind of target does provide
3 an incentive to try to do the best you can.

4 Q. I believe you're changing the factual basis.
5 The original basis was that you have an obligation to
6 install the system and operate it in an optimized manner.
7 Now you're suggesting just dump some sorbent in there.

8 A. I guess the issue is, what does an optimized
9 manner mean? That's a very gray area. So, you'd have to
10 somehow try to specify that. You know, so, sure if
11 someone put it in and operated it to truly an optimized
12 manner, you know, that would be good. If they -- If
13 somebody installed the equipment -- If the only
14 requirement was to install the equipment, put it in and
15 then there wasn't any optimized manner what might be, you
16 don't know what they're going to do beyond installing the
17 equipment and injecting sorbent.

18 HEARING OFFICER TIPSORD: Mr. Zabel.

19 Q. (by Mr. Zabel) Are you aware, Doctor, that
20 the Illinois EPA frequently in operating permits requires
21 pollution control equipment good operating practices?

22 A. I'm not familiar with what their requirements
23 are.

24 Q. And are you aware, Doctor, even though not

1 aware of that provision, that they have frequently brought
2 enforcement actions to what they deem to be not good
3 operating practices?

4 A. I'm not aware of that.

5 MR. ZABEL: Thank you.

6 HEARING OFFICER TIPSORD: Then I believe we're ready
7 for question 110, which is asking about the sorbent.

8 A. Are they all equally effective and
9 interchangeable? As far as I can tell, all three of those
10 sorbents are pretty effective with regard to both the
11 NORAD sorbent sold by ADA and the Sorbent Technologies
12 sorbent. You would use basically the same -- you could
13 use the same equipment, so, if somebody bought one or the
14 other. I believe that's true for the Alston sorbent, as
15 well. So, if somebody has to -- puts one in and for
16 whatever reason they decide they can get a better price or
17 better performance with the other one, for some reason
18 they want to use another supplier, they do have
19 alternative suppliers.

20 HEARING OFFICER TIPSORD: Mr. Harrington.

21 Q. (by Mr. Harrington) As you pointed out, there
22 is a provision in the rule to use alternative sorbents
23 that have equivalent effectiveness. Are you familiar with
24 that provision?

1 A. Well, I'd have to get the rule out and look at
2 it specifically if you're going to have questions.

3 MR. KIM: I'll show it to you. You're talking about
4 the TTBS; correct?

5 MR. HARRINGTON. Yes.

6 MR. KIM: It's 225.234(B)(2), is that where you're
7 looking at?

8 MR. HARRINGTON: I believe that's correct.

9 Q. (by Mr. Harrington) Do you see the provision
10 in front of you?

11 A. Yes.

12 Q. It names the various sorbents, and would you
13 read the whole provision for us, please?

14 A. Sure. "The owner or operator of the EGU is
15 injecting halogenated activated carbon in an optimum
16 manner for mercury emissions, which shall include
17 injection of Alston, NORAD, Sorbent Technologies or other
18 halogenated activated carbon, that the owner or operator
19 of the EGU has similar or better effectiveness or control
20 of mercury emission at least at the following rates."

21 Q. Stop right there for a moment. Do you know
22 how the owner/operator would demonstrate an alternative
23 sorbent would meet that requirement?

24 A. It would probably be through some kind of

1 test.

2 Q. Do you know whether it would have to show --

3 A. Whether on their facility or on a similar one
4 someplace else, but how that person -- what would be
5 accepted to the agency, I can't speak. That would be --
6 Someone else would have to tell you what the criteria
7 would be.

8 Q. Could someone from the agency perhaps address
9 that question?

10 HEARING OFFICER TIPSORD: I believe Mr. Romaine
11 actually did discuss this exact language previously.

12 MR. HARRINGTON: I don't believe at least --

13 HEARING OFFICER TIPSORD: We can have him do it
14 again, Mr. Harrington.

15 MR. HARRINGTON: If I'm not mistaken, we didn't get
16 how the alternative demonstration would be made.

17 HEARING OFFICER TIPSORD: I think he did, but we'll
18 have him do it again. Not a problem.

19 A. (by Mr. Romaine) The demonstration would be
20 made by using the alternative carbon and determining what
21 level of removal efficiency for mercury would be achieved.
22 That could be done on the unit itself or on another
23 similar unit. From that data performance curve would be
24 developed for the carbon, that could then be compared to

1 the performance curves that are available in the
2 literature for the cited carbons.

3 MR. HARRINGTON: Thank you very much.

4 HEARING OFFICER TIPSORD: Mr. Zabel.

5 Q. (by Mr. Zabel) Mr. Romaine, before you sit
6 down, a follow-up question. If that were done on the same
7 unit, the one that had a TTBS or seeking a TTBS, would it
8 have to be done under subsection E225.234?

9 A. (by Mr. Romaine) Well, if the unit is already
10 operating under the TTBS, that is correct. If it is in
11 the pre-application stage, the source would be free to do
12 that sort of evaluation as part of its ongoing evaluation
13 of a number of different sorbents and approaches to
14 control of mercury emissions.

15 Q. Would it need a construction permit at that
16 stage?

17 A. No. I shouldn't say that as quickly. But
18 assuming that the activated carbon injection had ample
19 flexibility to handle a number of activated carbons, then
20 there would be no physical changes to the activated carbon
21 system that would trigger the need for a construction
22 permit.

23 Q. Would it be a change in method of operation
24 under the new source review?

1 A. I don't believe so.

2 MR. ZABEL: Thank you.

3 HEARING OFFICER TIPSORD: Mr. Harrington.

4 MR. HARRINGTON: You can go forward.

5 HEARING OFFICER TIPSORD: Okay. Question number 111.

6 A. (by Dr. Staudt) Did you select the injection
7 rate for subbituminous coal at 5 pounds per million actual
8 cubic feet? The actual selection, anything that's in the
9 rules actually is determined ultimately by the agency, but
10 I was consulted on these things.

11 A. (by Mr. Romaine) I will follow-up on that.
12 This is Chris Romaine. As Dr. Staudt indicated, we
13 consulted with Dr. Staudt on appropriate injection rate.
14 Obviously, the purpose of the TTBS or what happened with
15 the TTBS is a source emitting more than .008 pounds per
16 gigawatt hour or less than 90 percent control. It is not
17 achieving the numeric emission standards. Accordingly, we
18 want to make sure that a unit operating under the TTBS is
19 achieving the maximum reduction in mercury emission that
20 is feasible, readily achievable with activated carbon. We
21 asked Dr. Staudt for his opinion on appropriate default
22 activated carbon rates for this purpose. Dr. Staudt
23 provided us a range of between 5 and 6 pounds for
24 subbituminous coal and between 10 and 12 pounds per

1 million ACF for bituminous coal. He pointed us to the
2 data and Figures 8.10 and 8.11 of the technical support
3 document. We then conducted our own independent review
4 and concluded that the values at the bottom of the range
5 recommended by Dr. Staudt would be sufficient to achieve
6 the objectives of the temporary technology based standard.

7 MR. HARRINGTON: Thank you very much. That would
8 take us to question 116.

9 HEARING OFFICER TIPSORD: Mr. Bonebrake.

10 Q. (by Mr. Bonebrake) I did have a follow-up.
11 The 5 and 6 pound rate, is that above the feed rate that
12 you assumed in your cost calculations?

13 A. (by Dr. Staudt) Yes. You know, normally I
14 would expect about a 3 pound per million ACF to be
15 adequate. As you can see, the -- I was asked to provide a
16 range that would provide a high level of certainty that
17 the rates could be achieved, and although my expectation
18 is that 3 pound per million ACF is the most likely number
19 on most units, 5 -- it could be around 5 -- as much as
20 around 5 based upon the data that I had in figure 8.10.

21 Q. So, your cost calculations then don't take
22 into consideration the rate that would need to be met by
23 some units to qualify for the TTBS?

24 A. At this time, my cost calculations did not

1 include -- the cost calculations of TTBS did not
2 include -- based upon my expected sorbent injection rates
3 for most units. Since there was not a TTBS at the time,
4 there was no way to evaluate the cost of some units with
5 TTBS.

6 HEARING OFFICER TIPSORD: Mr. Forcade.

7 Q. (by Mr. Forcade) Am I correct in
8 understanding from your testimony and Chris Romaine's that
9 the parameters that you established here were to assist in
10 making a determination that a unit operating under the
11 TTBS was operating at optimum efficiency?

12 A. (by Dr. Staudt) Was that question directed to
13 me or Chris?

14 HEARING OFFICER TIPSORD: Both, I think.

15 Q. (by Mr. Forcade) I think the original
16 document I understand came from you. So, I'd ask you
17 first.

18 A. Referring to the TTBS or --

19 Q. I believe you said you provided Chris Romaine
20 with a set of parameters.

21 A. I was asked to provide input on what would be
22 levels that would be high enough to have a high degree of
23 confidence that they were adequate to achieve the
24 emissions rates, and, as I indicated, I think for most

1 units, 3 pound per million ACF I think will be the right
2 amount on average. There is always a possibility that it
3 could be higher. On lignite coals, 5 pounds per million
4 ACF seems to be the right amount for 90 percent and some
5 lignite coals. So, it could be -- And they share some of
6 the same issues.

7 Q. Would I be correct that under the TTBS, these
8 would be conditions that apply to facilities that cannot
9 achieve the 90 percent reduction?

10 A. TTBS only applies to facilities that cannot
11 achieve the emission standard and then elect to go for a
12 TTBS.

13 Q. And for those facilities, were the parameters
14 that you provided to the agency intended to establish
15 optimal operating conditions for the facilities that do
16 not achieve 90 percent?

17 A. (by Mr. Romaine) I'll jump in and say, no and
18 yes.

19 Q. Actually, I prefer, since Dr. Staudt provided
20 the document, I'd prefer to hear his answer.

21 A. (by Dr. Staudt) The reason I'm hesitating is
22 because the answer is sort of like "no" and "yes". And,
23 no, in the sense that, you know, optimal conditions mean a
24 lot of things. Okay? It means making sure you're

1 injecting well and injecting well, getting good mixing.
2 Also -- But, yes, in the sense that indeed there would
3 be -- But, yes, in the sense that you would be providing
4 an incentive for people to try to do the best they can to
5 get their -- it would be a high assurance of getting high
6 removal rates, at the same time people would be motivated
7 to get into that more normal range, which I think would be
8 about 3 pounds per million ACF, which I expect on average
9 for PRB coals.

10 Q. Same question for Mr. Romaine.

11 A. (by Mr. Romaine) My answer was built on the
12 technical answer Dr. Staudt has provided. It's not
13 optimal because it's a regulatory definition of the
14 default activated carbon injection rate. A default
15 regulatory number cannot ideally address the circumstances
16 at individual plants. For purposes of the regulations,
17 however, it was believed to be an appropriate injection
18 rate, a default injection rate that if placed in the rule
19 would be sufficient to assure that people who were
20 operating under the temporary technology based standard
21 were injecting activated carbon at a sufficient emission
22 rate, that they were getting well at or above the amount
23 of reduction that can be achieved with activated carbon.
24 I need to say that the other way. That they're injecting

1 activated carbon at a rate at or above that necessary to
2 get the maximum performance with activated carbon for
3 their particular unit.

4 Q. In that case, would it be appropriate to say,
5 following the same protocol, that in the absence of a
6 numerical standard, this would provide a standard which
7 would optimize the treatment of the unit without having
8 numerical limitation?

9 A. (by Mr. Romaine) Yes, it is certainly an
10 operating standard that's established in a regulation. It
11 is a technology based standard as stated. As a matter of
12 policy, we do not believe that it is appropriate to rely
13 upon this technology based standard on a long-term basis.
14 Certainly, as Dr. Staudt has stated, the activated carbon
15 injection rate that may be routinely needed to achieve the
16 emission rate objectives of the rule hopefully will be far
17 less than the default injection rate that's specified in
18 the temporary technology based standard.

19 Q. Am I correct that the procedures here allow
20 you to make a demonstration of an alternative injection
21 rate if you show it is equivalent?

22 A. (by Mr. Romaine) Yes.

23 Q. So, the narrative standard provides for that
24 already; doesn't it?

1 A. (by Mr. Romaine) But, again, we're talking
2 about a situation where the source, the unit is not
3 complying with the numeric emission standards which are
4 the objective of the regulation.

5 MR. FORCADE: Thank you. I have no further
6 questions.

7 HEARING OFFICER TIPSORD: Ready for -- I'm sorry.
8 Mr. Harley.

9 Q. (by Mr. Harley) If this rule becomes
10 effective, it's likely that regulated entities will
11 evaluate how different types of coal they might use will
12 affect their mercury emissions; do you agree?

13 A. (by Dr. Staudt) Perhaps, yes.

14 Q. One strategy that might be employed would be
15 to use coal sources that would have predictably lower
16 mercury emissions?

17 A. That is one thing they might do.

18 Q. If you had a technology only standard, that
19 would not provide any incentive for a regulated entity
20 then to consider coal switching strategies that might
21 achieve a numeric standard; is that correct?

22 A. Well, I haven't thought about that until this
23 point, but perhaps.

24 MR. HARLEY: Thank you.

1 HEARING OFFICER TIPSORD: Mr. Zabel.

2 A. (by Mr. Romaine) I will answer the question
3 not related to your focus on coal switching strategies,
4 simply to state that if you had a one dimensional rule
5 that simply focused on activated carbon, there would not
6 be incentive to evaluate other means of reducing mercury
7 emission, be it add-on controls, changes to operation that
8 reduce or improve the control of mercury by existing
9 units, as well as switching fuel, which seems to be one of
10 the less likely changes that sources will make in response
11 to this rule.

12 MR. HARLEY: Thank you.

13 HEARING OFFICER TIPSORD: Mr. Zabel.

14 Q. (by Mr. Zabel) In your experience, Doctor,
15 with pollution technology, any fuel analysis would require
16 consideration of all pollutants impacted by that fuel?

17 A. The decision to change fuels involves a lot
18 more than just mercury.

19 Q. And among other things, it would involve not
20 only other emission -- impact on other emissions, but
21 existing control technologies that the plants have in
22 place?

23 A. Yes.

24 HEARING OFFICER TIPSORD: Ready for question 116.

1 A. With respect to either rate, do you expect any
2 adverse impact over the long-term on operation,
3 maintenance and performance of the ESP's? I don't expect
4 adverse impact, particularly at the injection rates we're
5 recommending. But having said that, the TTBS is provision
6 that -- I'm pretty sure the provision in the TTBS that
7 indicates if there's a problem with PM control, that there
8 can be an adjustment.

9 HEARING OFFICER TIPSORD: Mr. Ayres.

10 Q. (by Mr. Ayres) If we could go back one step
11 to the discussion that we had earlier on the suggestion of
12 Mr. Forcade, and I wanted to ask a question of
13 Mr. Romaine. Mr. Romaine, was part of the reason for the
14 lack of interest in a larger TTBS than the one that you
15 have -- larger in the sense of allowing more sources to
16 take advantage of it -- was that in part driven by
17 enforcement concerns as compared to the rule itself? In
18 other words, would a standard of that sort simply require
19 a certain technology to be installed be less enforceable
20 than a standard of the sort that you have?

21 A. (by Mr. Romaine) Listen carefully, Jim, to
22 the answer. I think the aspect of the rule that you're
23 addressing is really part of a number of factors in the
24 drafting of the rule. The rule, in fact, is temporary.

1 It is limited to a certain capacity of units. It is not
2 available to everybody. Those are all things that address
3 the degree to which concern about enforcement will factor
4 in allowing for a technology based standard.

5 Q. And is the form of the main rule being as it
6 is rather than simply a requirement to install, let's say,
7 ACI, your choice, in other words, of emission limitations
8 or percent reductions, were those choices also driven to
9 some extent by considerations of enforceability?

10 A. Absolutely.

11 MR. AYRES: Thank you.

12 HEARING OFFICER TIPSORD: Mr. Harley.

13 Q. (by Mr. Harley) How so? For purposes of the
14 record, how so?

15 A. (by Mr. Romaine) In terms of the rule that is
16 in effect in a continuous basis in Illinois for all units,
17 there are specific numerical limits with which units had
18 to comply and with which compliance could be determined.

19 Q. Would it be difficult in the absence of a
20 numeric limit to know on a facility by facility basis
21 whether or not systems were being optimized by plant
22 operators?

23 A. I'd simply say it would be a very different
24 regulatory context for the rule. You would be relying

1 upon determinations of operating practices for something
2 that is fairly complicated that's been discussed in lieu
3 of compliance with a numeric standards, which is a much
4 more objective evaluation of compliance. Notwithstanding
5 Mr. Zabel's comments, the language and permits dealing
6 with good air pollutant control practice is not something
7 that I have thought could be routinely enforced in terms
8 of making sure that people optimize control practices or
9 take reasonable measures to improve the performance
10 control systems when it becomes available. It's more of a
11 general, "Don't screw up and do stupid things. Do the
12 basic stuff that everybody expects you to do with a
13 baghouse or a scrubber, and if you screw up and do
14 something stupid, we'll force against you."

15 Q. (by Mr. Ayres) Can I ask another question?
16 Mr. Romaine, would it have been difficult to demonstrate
17 to the Federal Environmental Protection Agency compliance
18 with the requirements that they've put and laid down on
19 mercury with a system of the sort that Mr. Forcade
20 described?

21 A. (by Mr. Romaine) Absolutely.

22 HEARING OFFICER TIPSORD: Mr. Forcade.

23 Q. (by Mr. Forcade) Mr. Romaine, if we were to
24 adopt the federal CAMR in Illinois as a federally

1 enforceable provision, would that establish numerical in
2 every market? It's a simple "yes/no".

3 A. (by Mr. Romaine) I think you are aware that
4 that would not establish emission limitations for a permit
5 or any permit.

6 Q. Once Illinois assigned the allocations, would
7 it?

8 A. It depends if allocations were assigned, and
9 if the allocations were assigned by rule, the allocations
10 found in the rule would simply be referenced in the
11 permit. If there was a varying allocation method, then
12 that allocation method might be described in the
13 regulation. Since we don't have a CAMR, I can't exactly
14 say what we would do with respect to allocation.

15 Q. And would it be safe to say that if Illinois
16 adopted the federal CAMR, USEPA might accept that?

17 A. I think that's a rhetorical question. The
18 answer obviously is, yes.

19 Q. And then if laid on top of that was a state
20 only rule requiring optimal operation of an activated
21 carbon injected system, would that also provide additional
22 controls in the State of Illinois?

23 A. Yes, it would.

24 MR. FORCADE: Thank you.

1 HEARING OFFICER TIPSORD: Mr. Zabel.

2 MR. ZABEL: I'd like to go back to his answer to 116,
3 but I don't want to disrupt this explode.

4 HEARING OFFICER TIPSORD: I think we're ready to go
5 back to the answer to 116. I think we are ready.

6 Q. (by Mr. Zabel) I wasn't sure of your answer,
7 Dr. Staudt. I know you said if there are ESP problems,
8 that TTBS has a specific recognition of that possibility.
9 My question is, in your experience, would you anticipate
10 that the 5 pound and 10 pound injection rate would cause
11 or could cause ESP problems?

12 A. (by Dr. Staudt) No, I don't anticipate that.

13 HEARING OFFICER TIPSORD: Question 117.

14 A. At what facilities similar to those in
15 Illinois were these injection rates used over any extended
16 period of time? For the PRB units, we have some injection
17 rates close to 5 pound per million BTU, and we have seen
18 injection rates of -- and those are -- some of them
19 were -- but those were under shorter periods of time. But
20 we have seen injection rates of higher levels on
21 bituminous coal units, and, you know, in fact, we have
22 seen even higher levels than 3 or 6 pound per million
23 BTU's, you know, used in various tests.

24 HEARING OFFICER TIPSORD: Mr. Harrington.

1 Q. (by Mr. Harrington) Have we seen 10 pounds
2 injection rates?

3 A. For bituminous?

4 Q. For bituminous.

5 A. Yes, we've seen 10 pounds tested in some
6 facilities.

7 Q. Could you reference?

8 A. Well, for the Yates testing, which they went
9 up to 18 points per million ACF, and in my opinion, they
10 didn't see an adverse impact on the ESP because the ESP
11 already was having trouble. We've seen 20 pounds per
12 million ACF at breakpoint in parametric testing. So,
13 there's not -- I don't have an expectation that there's
14 going to be a problem with ESP. And bear in mind, even
15 with those injection rates, it's still a small amount of
16 material compared to the total material that would be --
17 that the ESP is handling.

18 Q. I think you can take 118 and 119, and this may
19 be for Mr. Romaine. Basically there is a limit -- The
20 injection is limited by not interfering with opacity or
21 particulate. My question was, would it be appropriate to
22 also limit the injection rate so it did not interfere with
23 the safe operation of the ESP?

24 A. (by Mr. Romaine) I'm referring back to you,

1 Jim.

2 A. (by Dr. Staudt) You're referring that to me.
3 You know, what the rule should or should not have in it is
4 really not for me to decide. What I'll comment on is not
5 what the rule should or shouldn't have. What I'll say, I
6 don't expect a problem with the safe -- I don't expect any
7 problems with the safe operation of the ESP.

8 A. (by Mr. Romaine) I can now answer the
9 question. I don't think the rule needs to address the
10 safe operation of the ESP.

11 Q. Thank you. Now, I'll rephrase the last
12 question, and I think that will be the end of this set,
13 and that is essentially, I believe, earlier when
14 Mr. Romaine was testifying -- and this may be for him, as
15 well -- indicated that if there was a problem with new
16 source review or ESP as a result of the addition activated
17 carbon, that can be taken care of under the rule. Am I
18 misstating what I heard earlier?

19 A. (by Mr. Romaine) No. You have correctly
20 stated what was stated, that the temporary technology
21 based standard does include provisions that accommodate
22 the injection rate affecting particulate for plants.

23 Q. And that would trigger new source review or
24 PSD?

1 A. That is correct.

2 Q. Thank you. Would there be any objection to
3 clarifying that language if there's any doubt in the
4 lawyers' minds when reading it?

5 A. (by Dr. Staudt) John.

6 MR. KIM: No.

7 MR. HARRINGTON: That's all I have on these
8 questions. Thank you very much for your patience and
9 cooperation.

10 HEARING OFFICER TIPSORD: Mr. Harley.

11 Q. (by Mr. Harley) I always feel guilty about
12 continuing to ask so many questions, but I think I'm still
13 about 300 shy.

14 MR. ZABEL: We have to let him catch up.

15 Q. (by Mr. Harley) The whole approach to the
16 TTBS seems to be based on the assumption that the more
17 sorbent you use, the greater level of mercury control you
18 achieve; is that correct?

19 A. (by Dr. Staudt) Well, yeah, that's certainly
20 part of it, yes.

21 Q. But it's also been your testimony that there's
22 a cost associated with sorbent; is that correct?

23 A. That's correct.

24 Q. So, the more sorbent you use, the greater the

1 cost there is for any operator?

2 A. Correct.

3 Q. So, if you have a numeric standard of
4 90 percent, an operator would have the option of operating
5 an SI system and adding more sorbent to the system in
6 order to achieve the level of reduction as mandated by the
7 rule; is that correct?

8 A. Yeah. Basically they would inject up to the
9 amount that they needed to achieve compliance.

10 Q. And that would be a cost to the operator?

11 A. That would be a cost to the operator.

12 Q. If you had a technology only rule, then the
13 operator would be much more free to inject any level of
14 carbon that it chose to achieve any level of mercury
15 reduction that it felt was necessary?

16 A. If you had a technology only rule?

17 Q. Yeah.

18 A. If you had a technology rule only without any
19 specified injection rate, that's correct. There wouldn't
20 be any -- Without any specified injection rate or any
21 target, there wouldn't be any motivation to try to get
22 increased reduction.

23 MR. HARLEY: Thank you, Dr. Staudt.

24 HEARING OFFICER TIPSORD: Mr. Zabel.

1 Q. (by Mr. Zabel) Is the relationship between
2 carbon injection and mercury removal linear?

3 A. No. As I've testified before, it's
4 non-linear.

5 Q. So, there's an optimal point?

6 A. No. I mean, if you're trying to get a certain
7 removal rate, you inject up to that point, or if you want
8 to give yourself a safety factor, you inject beyond it.

9 Q. But at some point, the additional injection
10 yields very little mercury; is that true?

11 A. Well, the additional injection removes a --
12 does remove more mercury, but it doesn't -- you know, you
13 do reach a point where you don't get as much -- as large a
14 percentage improvement for each increment of sorbent
15 injection.

16 Q. So, that not only percentage improvement, but
17 wouldn't the first pound of ACI injected or halogenated
18 ACI injected capture more mercury than the 6 or the 8
19 pound?

20 A. Well, it depends upon where you are on the
21 curve.

22 Q. I understand that.

23 A. But certainly further up the curve -- farther
24 up the curve, the increment amount of mercury removal is

1 less.

2 Q. So, it's not a random thing to inject mercury
3 as one sees fit if one is trying to optimize the
4 operation, maximize the control effectiveness of the
5 technology?

6 A. Well, it depends upon how you define "control
7 effectiveness".

8 Q. I'll take any definition you like.

9 A. Well, I'm not sure -- I'm not sure if you --
10 If you could ask the question again and just be --

11 Q. Well, even from a cost versus control
12 analysis, there would still be an optimum point at which
13 you're getting dollars per ounces of mercury removal?

14 A. Essentially the way the rule is written is
15 90 percent or an output based standard, and you would
16 presumably inject up to that point and not put in a whole
17 lot more.

18 Q. And if there is no 90 percent rule in the
19 technology based one, there would still be an optimal
20 operating point?

21 A. Well, I don't know how you would establish the
22 optimum operating point. That's the challenge.

23 A. (by Mr. Romaine) I would jump in, as well,
24 and say one of the difficulties is that there is a curve,

1 and any further addition of activated carbon beyond the
2 current level will give you more reduction of mercury.
3 So, there has to be some regulatory definition of what is
4 meant by "optimum" in this context. Otherwise, you'll get
5 the best reduction of mercury if you toss in a hundred
6 pounds of activated carbon or a thousand pounds of
7 activated carbon based upon the value that is placed by
8 the State of Illinois, the board and the rule making
9 context on reducing mercury emissions from a particular
10 plant.

11 Q. I understand. Does the curve basically become
12 acidotic at some point?

13 A. (by Dr. Staudt) A hundred percent -- It
14 doesn't go above a hundred percent.

15 Q. I understand. Does it get to a hundred
16 percent?

17 A. Not that I'm aware of.

18 MR. ZABEL: Thank you, Doctor.

19 HEARING OFFICER TIPSORD: Mr. Forcade, I believe
20 we're ready to move on to Kincaid Generations questions.
21 And, again, if you'd help us, if you see those that we've
22 already answered --

23 MR. FORCADE: Right. I'm going to have to look at
24 them.

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

(A brief discussion off the record.)

HEARING OFFICER TIPSORD: Okay. Go ahead.

Q. (by Mr. Forcade) I believe we've answered questions 1, 2 and 3, but I must admit I forgot which sections of the TSD you wrote?

A. I prepared Section 8, most -- virtually all of Section 8 with input from EPA.

Q. I don't believe we answered question 4.

HEARING OFFICER TIPSORD: I agree.

A. That's correct. Have you reviewed the ICF report attached to Appendix C to the TSD? Yes. If so, did you rely on the ICF report in forming any opinions or testimony? No.

MR. FORCADE: I think that finishes 4. And I think we asked and received responses to question number 5 repeatedly. 6 the same. 7 the same. I think we've answered 8, also. I think we've answered 9. I think we've answered 10.

HEARING OFFICER TIPSORD: I wasn't sure about "a". Far be it for me to insist that you ask a question, but I wasn't sure -- If you're comfortable with "a" --

MR. FORCADE: Actually, I would like to read "a" first and see whether we have. Yes, I'd like to ask if we

1 could answer "a".

2 A. On Page 4 of your amended testimony, you
3 changed previous statements. Please explain the following
4 changes and your understanding of the effect of each of
5 those changes: The change from "results of measurements
6 of cobenefit mercury removal rates taken in response to
7 the USEPA's ICR as part of the development of the federal
8 clean air mercury rule and subsequent test programs since
9 the ICR program showed" to "results of measurements of
10 cobenefit mercury removal rates taken in response to the
11 USEPA's ICR as part of the development of the federal
12 clean air mercury rule and subsequent test programs since
13 the ICR program provided data that indicates that the
14 following cobenefit removal rates may be expected." It's
15 essentially similar to my answer to what I discussed
16 before. I changed the language from "to expect" because I
17 thought my role as an expert up here to talk about what I
18 believe can be done based upon the information I've seen.

19 Q. Okay.

20 A. And "b", I'd say that's sort of the same.

21 HEARING OFFICER TIPSORD: Yeah, I think "b", "c", "d"
22 and "e", those were similar. Question number 11.

23 A. On Page 6 --

24 HEARING OFFICER TIPSORD: Give him a second. He's

1 going to review it.

2 MR. FORCADE: I believe we've answered 11.

3 HEARING OFFICER TIPSORD: Okay.

4 A. Okay.

5 HEARING OFFICER TIPSORD: 12.

6 MR. FORCADE: I believe we've answered 12. I believe
7 we've answered 13. 14 I don't recall, but I don't believe
8 we've answered.

9 HEARING OFFICER TIPSORD: Yeah, I don't think so
10 either.

11 A. The basis of my statement is really you need
12 no --

13 MR. AYRES: You need to read the question.

14 A. Oh. What is the basis for your statement on
15 Page 8 that the incremental cost of the Illinois rule over
16 CAMR will be between 32 and 37 million dollars per year
17 spread across all of the Illinois units for the period of
18 2010 to 2018? That's based upon the analysis, and I need
19 to check the table numbers. There's Tables 8.9 -- My
20 estimates are based upon Table 8.9 and 8.10 and summarized
21 in Table 8.7. So, those basically show what my ballpark
22 estimates of what the cost would be and comparing one to
23 the other. The summary is in --

24 Q. (by Mr. Forcade) Could we have just a second

1 until we find the table?

2 A. 157 is table 8.7.

3 Q. Could you repeat the answer?

4 A. My answer is, the basis is the analysis in the
5 TSD that's outlined in these Tables 8.9 and 8.10 and
6 summarized in Table 8.7 and also some of the background
7 materials discussed in the TSD.

8 Q. And what was the source for the information of
9 8.7?

10 A. That comes from the Tables 8.9 and 10.

11 Q. And we previously discussed those tables. I
12 believe we previously discussed those tables.

13 A. Yeah, I think we did.

14 HEARING OFFICER TIPSORD: Mr. Zabel.

15 MR. ZABEL: As I think I mentioned earlier, I have a
16 lot of questions on those specific questions, but I think
17 they'll be a little more coherently after Mr. Forcade's
18 questions.

19 HEARING OFFICER TIPSORD: Okay.

20 A. What do you predict will be the incremental
21 cost of the Illinois rule over CAMR prior to the 2010 to
22 2018 time period? It's my understanding there's about --
23 Basically the Illinois rule starts about six months prior
24 to CAMR, and, so, basically if you look at the --

1 Obviously, there's no control cost for CAMR during that
2 six-month period, but there would be control costs under
3 the Illinois rule for that six-month period. So, in
4 effect, you would take the costs that are shown for the
5 cost of complying with the Illinois rule by itself for a
6 year and roughly divide by two.

7 Q. (by Mr. Forcade) And which column would that
8 be?

9 A. If you look at Table 8.7, the total annual
10 cost shown as 66 million dollars. So, you divide that by
11 two, because you take that full year cost divide by two
12 because it's only being incurred over six months.

13 Q. (by Ms. Rahill) So, for that six months, it
14 would be 33 million dollars?

15 A. That's correct.

16 HEARING OFFICER TIPSORD: Mr. Bonebrake, do you have
17 a follow-up?

18 Q. (by Mr. Bonebrake) I do with respect to the
19 last question that you answered. Installing a baghouse to
20 comply with the Illinois rule would start incurring
21 associated costs prior to beginning of the year 2009;
22 wouldn't it?

23 A. There would be costs -- capital costs
24 associated with installing the equipment.

1 Q. Incurred in 2008?

2 A. Well, the way costs are accounted for in most
3 companies, including utilities, is that costs, the way
4 they're accounted for, they get put on the books and
5 depreciated over time. That's the way capital expenses
6 are handled. So, what this cost -- What this shows is an
7 annualized cost, and that annualized cost includes an
8 amount allocated for the capital that would be expended,
9 and that gets addressed on an annualized basis. You
10 raised a question earlier about levelized cost. That's
11 what "levelization" means. The main thing that how you
12 handle capital.

13 Q. What I want to be clear on, prior to the year
14 2009 of the Illinois rule installing baghouses, in fact,
15 you're going to have cash outlays prior to 2009?

16 A. That is correct, but the way it gets accounted
17 for -- the way it gets accounted for is it gets amortized.
18 That's the way capital expenses are handled in
19 corporations.

20 Q. (by Ms. Bassi) Wouldn't the amortization
21 start earlier than 2009?

22 A. No. It doesn't start until the equipment is
23 put in place. That's my understanding.

24 MS. BASSI: Okay. I understand.

1 HEARING OFFICER TIPSORD: Mr. Forcade.

2 Q. (by Mr. Forcade) I believe we've answered 12,
3 but I have a follow-up to the earlier answer. Can you
4 tell me when you first discussed -- 17. Could you tell me
5 when you first discussed the TTBS with the agency as a
6 concept?

7 A. That was shortly after I was engaged by the
8 agency. In fact, it was something that they raised. It
9 was something that we were discussing right from the
10 start.

11 Q. And approximately when was that?

12 A. I think I was brought in sometime late
13 January. Those of you who were at that first stake holder
14 meeting, I was engaged shortly before that.

15 Q. Did you provide any opinions to the agency
16 during this early stage as to what should be included in
17 the TTBS?

18 A. Well, we discussed it. Yes, I did provide
19 some opinions.

20 Q. What were those opinions?

21 A. Well, I was asked about different types of
22 facilities and characterizing different types of
23 facilities and technologies and how they might be -- what
24 configurations might be included in a TTBS.

1 Q. As a matter of policy or as a matter of
2 technical necessity?

3 A. Essentially -- Well, again, as a matter of
4 policy, they make those decisions, but I was asked for my
5 input on what the cost would be or what the impacts might
6 be for including or -- well, including certain
7 configurations for the TTBS and, you know, what type of
8 equipment might be listed as applicable.

9 Q. And did you provide the agency with these cost
10 estimates?

11 A. Well, I was giving them my ballpark idea of
12 costs, all the cost information sort of reflected in the
13 technology based standard, but certainly as a question was
14 raised earlier about did hot sites come up, yes, indeed I
15 was asked about that, and at one point, there was a
16 discussion -- it was discussed to include hot sites, but
17 then there was a discussion about whether or not they
18 should be included. I was asked about what I thought that
19 would do to the cost of the rule if hot sides were
20 included. That's just one example of the type of input
21 that I gave.

22 Q. Were these communications in writing?

23 A. No. They were mainly in meetings.

24 Q. Was that during the January period?

1 A. Well, we had several meetings when I would
2 come out for these -- for the share -- stake holder
3 meetings. The shareholder meetings? Sometimes we might
4 discuss it beforehand because the stake holder meetings
5 are in the afternoon. We'd discuss it before or after the
6 stake holder meeting.

7 Q. Prior to the agency filing the regulation with
8 the board, were you asked whether or not they should
9 include a TTBS in that regulatory filing?

10 A. I've always been in favor of including a TTBS.
11 So, yes, I was in favor of including the TTBS in the
12 original filing.

13 Q. Did they ask you whether it should be included
14 in the initial regulatory filing?

15 A. I don't remember if they asked -- specifically
16 asked me if it should, but I probably -- I may have
17 recommended it.

18 Q. Were you aware that when the original rule was
19 filed, it did not include that?

20 A. Was I aware of when it was filed that it did
21 not include that?

22 Q. Uh-huh.

23 A. Yes, I was aware of that.

24 Q. Okay. Were there conversations after the

1 original filing between you and the agency about a TTBS?

2 A. Yes.

3 Q. And when did those occur?

4 A. You know, specific dates, I don't remember,
5 but we had continuing discussions.

6 Q. During those continuing discussions, did you
7 have any written correspondence, or is it, again,
8 essentially --

9 A. Mostly phone calls.

10 Q. Mostly phone calls. And then were you
11 provided an opportunity to review the language before the
12 amendment was filed?

13 A. I was given the opportunity to comment on it,
14 yes.

15 Q. Did you have comments on it?

16 A. Yes. Didn't provide written comments. I
17 basically said -- Or I don't recall providing written
18 comments, but I did provide comments on it.

19 Q. What were those comments?

20 A. Some of the things were -- One was that there
21 be some provision that people could try other sorbents or
22 use a better sorbent if something came along, and there
23 should be some testing. There was -- At one point later
24 on, there was a discussion about the limitation, of

1 course, as I testified.

2 Q. Which limitation?

3 A. The limitation on how many megawatts.

4 Q. 25 percent limitation?

5 A. Yeah. As I have said, I commented that I was
6 in favor of not placing the cap in the TTBS. And nothing
7 else comes to mind. Oh, yeah. I was asked about how
8 to -- regarding the TTBS, another thing was how do you --
9 because it has injection rates pound per million ACF, and
10 I don't think plants typically have a million ACF meter on
11 their ESP, and how you would do that, and, so, I made some
12 recommendations about how that -- you know, where you
13 should either measure it or account for it.

14 Q. And I would be safe in assuming you still
15 believe the TTBS is warranted?

16 A. Yes, I do.

17 MR. FORCADE: I think that's the extent of our
18 questions. I think all others have been answered.

19 HEARING OFFICER TIPSORD: Thank you, Mr. Forcade.
20 Mr. Zabel, you indicated that you had some questions about
21 8.8.

22 MR. ZABEL: Yes, about the tables in Chapter 8 of the
23 TTBS. I'd like to start on page 157 with Table 8.7.

24 MR. KIM: Was there one pre-file question for

1 Mr. Staudt?

2 MS. TICKNER: It was the same as Mr. Forcade.

3 Q. (by Mr. Zabel) Dr. Staudt, you prepared this
4 Table; is that correct?

5 A. That is correct.

6 Q. And the numbers here come from Tables 8.9 and
7 8.10?

8 A. Yes.

9 Q. The question I note for footnote -- the
10 asterisks footnotes indicates that no credit is taken for
11 the cobenefit mercury reduction. That would apply to both
12 CAMR and Illinois rule; would it not?

13 A. Well, that's mainly in terms of accounting for
14 how much is removed when I did the dollar per ounce,
15 dollar per pound calculation.

16 Q. What I'm really getting at, if we put the
17 25,000 back in, it wouldn't change that calculation; would
18 it?

19 A. The denominator would be a little bit higher,
20 but -- So, it might be a little lower.

21 Q. But the basic --

22 A. The numbers would be pretty similar.

23 Q. And as I read this, the cost per pound of
24 mercury removed is about 40 percent higher for the

1 Illinois rule than CAMR?

2 A. That's about right.

3 Q. And is it fair to state that to the extent the
4 cost for the Illinois rule went up or the cost for CAMR
5 went down, that differential would be greater?

6 A. That would be true. If the cost -- Yeah, if
7 those costs went up and if the Illinois costs went up and
8 CAMR went down, the difference would be greater.

9 Q. If either of those would?

10 A. Yeah, if either of them.

11 Q. So, an increase in the cost for Illinois rule
12 would increase the differential in dollars per pound of
13 mercury removed?

14 A. That's correct.

15 Q. And a decrease in the CAMR cost would also
16 cause an increase in the differential?

17 A. That is correct.

18 Q. Could we then turn to Table 8.8, please? It's
19 on Page 161. This table appears to be -- and correct me
20 if I'm misunderstanding -- focused on the cost of ash
21 disposal?

22 A. Cost of the ash disposal and also revenues
23 from ash sales.

24 Q. And was the data derived or presented on Table

1 8.8 used to calculate your numbers for ash disposal on
2 Table 8.9?

3 A. Yes.

4 Q. If you'll turn just briefly so I can give
5 reference to this. You can look at it or not. On Page
6 154, I believe you indicate the disposal cost that you use
7 \$25 per ton; is that correct? It's in the last paragraph
8 on Page 154.

9 A. Well, that's basically the combined effect of
10 both losing revenue and --

11 Q. You anticipated my next question. It includes
12 both the lost revenue of sales of ash and the cost
13 disposal?

14 A. That's correct.

15 Q. That's fine. If we might take a look using
16 Amren's Newton plant initially on Table 8.8, it shows
17 102,000 tons of ash were sold; is that correct?

18 A. Yes.

19 Q. And let me back up. Table 8.9 is your
20 calculation of cost for the Illinois mercury rule; is that
21 correct?

22 A. Excuse me?

23 Q. Is your calculation of the costs -- Table 8.9
24 shows your calculation of the cost for the Illinois

1 mercury rule; is that correct?

2 A. Yes.

3 Q. And Table 8.10 on Page 165, that's your
4 calculation of the cost for CAMR in 2010?

5 A. 8.10?

6 Q. Yes.

7 A. That's correct.

8 Q. Coming back to -- Let's look at Table 8.9 for
9 a moment, if we may, and I'm interested in the source of
10 your data, and why don't we take it basically column by
11 column, starting with the capacity rates for the units
12 you've listed? Was that Exhibit 44?

13 A. Excuse me?

14 Q. Would the source of the capacity factors of
15 the unit listed on Table --

16 A. No. The capacity factors are not listed in
17 that.

18 Q. I misspoke. You're quite right. The capacity
19 of the units is listed on that table?

20 A. That's correct.

21 Q. And did that come from Exhibit 44?

22 A. I don't remember whether I used 44 or another
23 reference.

24 Q. You used 67?

1 A. Perhaps.

2 Q. Taking the next column, the technology that
3 you list, and this is true -- this question really applies
4 to both 8.9 and 8.10 -- were those your determinations of
5 the technology that would be used?

6 A. That was my determination of one approach that
7 the companies might pursue in order to comply with the
8 rule based upon what I knew, because, as I said, the
9 companies might do something else if they see it as being
10 less expensive.

11 Q. And something less expensive, is that --

12 A. If they can find a cheaper way to do it, I'm
13 sure they will.

14 Q. Might they also want to do something different
15 to assure compliance or reliability?

16 A. Companies will make their own minds about what
17 they do, and that's something that they need to make their
18 own decisions.

19 Q. You talked about risk earlier. They might
20 expend more money to avoid risks at a later point in time;
21 is that possible?

22 A. Perhaps.

23 Q. And to the extent those technology choices may
24 be different, it would change your cost analysis; would it

1 not?

2 A. If the technology choices were different, it
3 would be -- they might be more expensive or they might be
4 less expensive.

5 Q. It could go either way?

6 A. That's right.

7 Q. But it would change your cost analysis?

8 A. That's right.

9 Q. The capital cost column, those are your
10 calculations?

11 A. Yes.

12 Q. They appear to be based on two-and-a-half
13 dollars installed kilowatt; is that correct?

14 A. That's correct.

15 Q. No matter the size of the unit?

16 A. That's correct.

17 Q. Sorbent cost, what was that based on, Doctor?

18 A. That was based upon -- That's subscribed in
19 the TSD about the -- there was -- and I think we went
20 through this before.

21 Q. I think we did. I don't think we need to
22 repeat that. The TOXECON costs, which I think only apply
23 to two units on 8.9 and 8.10, those are your estimations?

24 A. That's correct.

1 Q. And the ash disposal costs are derived, I
2 assume, from the \$25 per ton we pointed out and identified
3 on Page 154 and the tonnages shown on 8.8?

4 A. That's correct. Yes.

5 Q. There's some specific questions. I want to
6 ask you about those.

7 A. Okay. And as I started, let's start with the
8 Newton plant of Amren on Table 8.8.

9 A. Yes.

10 Q. It shows 102,000 tons were sold; is that
11 correct?

12 A. That's correct.

13 Q. And on Table 8.9, for Newton, we show a cost
14 of ash disposal of \$2,550,000; is that correct?

15 A. That is correct.

16 Q. That would be \$25 times 102,000 tons?

17 A. That's correct.

18 Q. You probably have a calculator on you.

19 A. I don't have a calculator.

20 Q. I can loan you one.

21 A. I'll take your word for it. It seems close
22 enough.

23 Q. We used to say close enough for government.
24 Those words might be inappropriate. I have a little bit

1 of different concern when I look at the Baldwin plant.
2 Table 8.8 shows that Baldwin sold 101,000 tons of ash.
3 For Table 8.9 is not showing cost of ash disposal. I'd
4 like you to explain why that happened.

5 A. Oh. For Baldwin, the reason is actually
6 Baldwin is installing fabric filters already, and they
7 have ESP's. So, they will actually have a TOXECON --
8 equivalent of a TOXECON. So, the reason is they are under
9 consent decree to install fabric filter. So, they, in
10 fact, will be able to have a TOXECON arrangement, and the
11 cost of that fabric filter, I was not going to attribute
12 to the rule. That's why that's SI there, but, in fact,
13 they're -- because they will have the equivalent of
14 TOXECON, most of the fly ash will still be removed in ESP.
15 Okay? And the carbon would reasonably expect the fabric
16 filter to put the carbon in front of it.

17 Q. First, do you know what the timing of those
18 installations at Baldwin?

19 A. I don't know exactly.

20 Q. And if they are later than this, it wouldn't
21 help them for compliance with this rule; would it?

22 A. Well, if it was later than this, they would
23 probably put this sorbent in in a different location. It
24 might affect the ash.

1 Q. And might that affect the cost?

2 A. Just for those years, though. Just for those
3 years.

4 Q. Right. But there would be added cost for
5 those years that this table does not show?

6 A. That's correct.

7 Q. Didn't you testify that you understand that
8 the Baldwin units currently get 80 percent removal?

9 A. That's what my understanding was based upon
10 information that was provided.

11 Q. So, there is a cost missing here for Baldwin
12 at least of the carrying charges of earlier installation?

13 A. Those would -- If you wanted to include
14 additional costs, those as additional costs.

15 Q. I want to come up with what the impact of
16 these things on your estimation of the cost differential
17 between Amren and the Illinois rule. I don't want to
18 spend more money.

19 A. When does the consent decree become effective?

20 Q. When did it become effective?

21 A. When are they planning to put these --

22 Q. I don't want -- The hearing officer asked me
23 to be sworn and be testifying. She's threatened me with
24 that once already.

1 A. If I can be provided that information --

2 Q. But I can provide it as an assumption.

3 A. I would have to also know the costs of the
4 equipment that they're installing because I can't put in a
5 carrying charge for that period of time unless I have the
6 cost for the equipment that they're putting in.

7 Q. If you were to assume that those had to go in
8 in 2010, 2011, and 2012 rather than 2008 or '09 to comply
9 with this rule, there would be additional costs in the
10 carrying charge; would there not?

11 A. Instead of putting it in 2012, they put it in
12 in 2009, there would be a cost. They would incur that
13 charge earlier.

14 Q. And if that were in this table, it would
15 increase the Illinois rule in your table?

16 A. By some amount, yes.

17 Q. And that would be true for each of those
18 units?

19 A. It depends upon what the timing is.

20 Q. Well, my assumption was one was 2010, one was
21 2011 and one was 2012.

22 A. 2010 is pretty close, but 2011 and 2012 there
23 might be a difference.

24 A. (by Mr. Romaine) To simplify the record, I

1 will state the dates specified in the consent decree for
2 the baghouses to be installed are as stated -- as assumed
3 by Mr. Zabel, December 31st, 2010; December 31st, 2011;
4 December 31st, 2012.

5 HEARING OFFICER TIPSORD: Mr. Harley, you had a
6 follow-up to that.

7 Q. (by Mr. Harley) If it were necessary to
8 install a selective sorbent injection unit on a short-term
9 basis on this facility, that would then be a salable asset
10 that the facility that they could decommission and sell to
11 a third party?

12 A. Could you say that again?

13 Q. If they install a sorbent injection unit at
14 their facility for a short-term, they install a fabric
15 that makes sorbent injection no longer necessary, they
16 could sell the sorbent injection unit to a third party at
17 that point?

18 A. The sorbent injection system would still be
19 useful. All you change is the injection point. So, there
20 wouldn't be any need to just throw away the sorbent
21 injection.

22 Q. But if you were achieving mercury control as a
23 cobenefit of fabric filter and ESP, then sorbent injection
24 is no longer necessary at the facility, you would still be

1 able to sell the sorbent injection unit; it would be an
2 asset?

3 A. Well, potentially, yes.

4 Q. (by Mr. Zabel) Assuming Mr. Harley's
5 hypothesis is correct that the hardware could be sold, in
6 your experience, Doctor, is used equipment sold at the
7 same price?

8 A. My expectation is that if the sorbent
9 injection was installed by 2009, the same equipment would
10 just be used after the fabric filter was installed. You
11 just change the injection point.

12 Q. Is it likely that they'd do that if they were
13 meeting it without the injection for assurances or for
14 backup?

15 A. Perhaps.

16 Q. And, otherwise, the four-and-a-half million
17 dollars you estimate the cost of sorbent injection less
18 the salvage value that Mr. Harley suggested would be
19 wasted?

20 A. No. What I'm telling you is I don't believe
21 that's a scenario that's likely to happen. If someone
22 would install the system, and then they just move it,
23 not --

24 Q. I understand your belief. I guess that wasn't

1 the question. The question was under Mr. Harley's
2 hypothesis, not mine.

3 A. I see that now.

4 HEARING OFFICER TIPSORD: Mr. Zabel, do you have
5 several more questions?

6 MR. ZABEL: Yes, I do.

7 HEARING OFFICER TIPSORD: Then why don't we take ten
8 minutes and come back?

9

10 (A brief recess off the record.)

11

12 HEARING OFFICER TIPSORD: Go ahead, Mr. Zabel.

13 Q. (by Mr. Zabel) Dr. Staudt, still looking at
14 the Baldwin plant on Tables 8.8 and 8.9, we had talked
15 about the increased carrying charge because of the earlier
16 expenditure capital. There would also be a loss of
17 revenue because of the earlier expenditure sale of ash;
18 would there not?

19 A. Well, it's really not -- You don't -- My
20 understanding of what you're describing is sort of an
21 either/or. If somebody installs the fabric filter
22 earlier, there would be an incremental carrying charge for
23 those two years, or there would be -- the alternative is,
24 for those two years, if they did not -- you know, if they

1 delayed, there would be some loss in the ash sales, but
2 it's really -- again, it's just for those two years. It's
3 not for the entire period of time. It's only for 2010
4 through 2012. So, like three years. And then the rest of
5 the time to 2018 would be consistent with what I have
6 here.

7 Q. It would be consistent in the sense that you
8 consider the cost the same under CAMR as the Illinois
9 rule?

10 A. No. No. What I'm saying is the effect -- My
11 assumptions here would be -- The only -- What you've
12 raised is the possibility that during -- if they had to
13 install, my assumption was that they would put in the -- I
14 was making something that I thought would be
15 representative and close for all the years. Now, the
16 timing of some of these early retrofits -- these consent
17 decree retrofits might impact the cost here, but that's
18 just for those first couple years, and, so, it would be an
19 either/or situation. If you move those retrofits up
20 early, indeed the change I would make here would be to put
21 the additional carrying charge of installing capital
22 earlier. Alternatively, if we went back to the normal
23 time, if we installed it at a normal -- on the 2011 and
24 2012 and what have you, alternatively, it would be what's

1 the effect on fly ash during that period of time? And,
2 again, Dynegy who owns the Baldwin plant would go through
3 that analysis and figure out what's the best way to incur
4 capital cost sooner or just --

5 Q. I'm sure there will be a great deal by all the
6 companies. What I'm trying to focus on is whether there
7 are dollar amounts not shown in your tables as to the cost
8 of these two rules and under your assumptions ought to be
9 in the table. If you follow along with me, I think we can
10 do that quickly.

11 A. Okay.

12 Q. You indicated, as I pointed out on Page 154,
13 that the cost of disposal is approximately \$25 a ton. If
14 they install early at Baldwin, they'll incur some disposal
15 costs earlier that they aren't incurring currently?

16 A. Disposal --

17 Q. For ash.

18 A. If they install the fabric filters earlier,
19 that's what makes the disposal costs go away.

20 Q. The injection is what imposes the disposal
21 costs that you have in the column called "ash disposal" on
22 Table 8.9?

23 A. Well, the amount of sorbent -- Okay. The
24 sorbent costs at 80 cents a pound, which is what was used

1 in this Table, is \$1,600 a ton. Now, let's assume for the
2 moment that that sorbent is really what you're disposing
3 of that comes out of the fabric filter, and you're
4 disposing of it at \$25 a ton. So, you effectively
5 increase the cost of the sorbent from \$1,600 a ton to
6 \$1,625 a ton. I mean, we can --

7 Q. Let me try this differently, Doctor. We're
8 really not getting there.

9 A. One percent difference there.

10 Q. I'm not trying to make this that complicating
11 and maybe it is, and that's maybe what we have to do.
12 When we talked about the Newton plant, \$2,550,000 dollars
13 in your Table 8.9 as a cost that Newton will incur with
14 sorbent injection because it will now have to dispose of
15 102,000 tons of ash that it was previously selling; is
16 that correct?

17 A. That's correct.

18 Q. And your assumptions as to Baldwin with
19 earlier installation than required under the consent
20 decree, they're going to have to dispose of some ash that
21 they were selling earlier than they would have under the
22 consent decree; is that not the case?

23 A. Okay. Let me clarify this. Okay?

24 Q. Feel free.

1 A. And I thought I addressed this earlier, but
2 I'll explain it again, and perhaps I wasn't clear. I know
3 it says "SI" next to Baldwin. Now, in reality, the way I
4 estimated sorbent injection rates for Baldwin were based
5 upon the fact that they were planning to put in a fabric
6 filter, and they also currently even -- Frankly, I think
7 what will happen with Baldwin, once they install the
8 fabric filter, if they were already getting 80 percent
9 cobenefit control with an ESP, if they put in a fabric
10 filter, I don't think they'll need to inject any sorbent.
11 They'll get the rest of the way most likely with the
12 fabric filter if they're already getting that close. But
13 be that as it may, once they have the 80 percent -- with
14 that 80 percent removal, you have to get another
15 50 percent to get to 90 percent, and that's what the
16 sorbent injection is based upon. My assumption about --
17 The reason I pulled out the cost of fly ash disposal is
18 because my assumption was that they would be installing --
19 they were installing fabric filters, and what fabric
20 filter is is sort of like the TOXECON arrangement. My
21 understanding they will still have their ESP. They're not
22 removing their ESP. That's my understanding. And they're
23 putting in equipment downstream that includes a fabric
24 filter. Well, what you would do in that case, you would

1 still remove your fly ash. The bulkier fly ash would be
2 pulled from that ESP, and you would inject the sorbent
3 someplace downstream of that ESP, and, therefore, your fly
4 ash would not be impacted. Fly ash sales would not be
5 impacted under that scenario.

6 Q. That was not the scenario you described to
7 Mr. Harley. You indicated that the injection would
8 precede the ESP until the fabric filter was installed?

9 A. Look, perhaps what Mr. Harley -- Someone said,
10 "Well, what would you do in the meantime until you got the
11 fabric filter installed, prior to installing the fabric
12 filter?" If you install the fabric filter in 2012, what
13 would you do between 2009 and 2012? During that time, you
14 would inject the sorbent upstream of the ESP, and during
15 that time, indeed your fly ash could be affected.

16 Q. And in that case, there would be a cost?

17 A. During those two years or so, the fly ash
18 would be affected.

19 Q. And if we could quantify that cost as you did
20 for Newton, it would be -- I guess we have to stagger it.
21 It would be \$25 times 101 is the current -- would be the
22 current cost of disposing of all of the fly ash; is that
23 right?

24 A. 25 --

1 Q. \$25 a ton times 101,000, I get about
2 two-and-a-half million dollars.

3 A. Basically what's in there is somewhere around
4 two-and-a-half million dollars, that's right.

5 Q. And over the course of those three years, that
6 would increase the Illinois rule by seven-and-a-half
7 million dollars?

8 A. Well, just to make it clear, the total cost 7
9 million, but we're looking at this on an annualized basis.
10 So, only for those three years on an annualized basis, it
11 would be far less.

12 Q. And maybe we can expedite this. But we do the
13 same analysis for the Dynegy Havana unit where you show on
14 Table 8.8 23,000 tons or so and no ash disposal cost on
15 8.9.

16 A. Yeah. I don't know when Havana is due to
17 install their fabric filter.

18 Q. I believe the -- Assume that the consent
19 decree calls for it in 2012. I don't want to testify, as
20 I said, Doctor.

21 HEARING OFFICER TIPSORD: Just for the record, we
22 used 2012 for Baldwin. We used 2012 for all three, but
23 you did say three years, which was --

24 A. Phased in.

1 MR. ZABEL: Mr. Romaine testified that the consent
2 decree was 2010, 2011 and 2012 for the three Baldwin
3 units. I'm asking him to assume it's also 2012 for the
4 one Havana unit.

5 HEARING OFFICER TIPSORD: Okay.

6 MR. ZABEL: Mr. Romaine, can testify if he wishes.

7 HEARING OFFICER TIPSORD: I misunderstood what you
8 testified to before.

9 Q. (by Mr. Zabel) So, coming back to the Havana,
10 you'd have a similar --

11 A. You'd do a similar.

12 Q. And there would be a similar cost?

13 A. That's correct.

14 Q. It wouldn't be similar?

15 A. Much less because Havana is a smaller plant.

16 MR. KIM: I think Exhibit 44 has for the Dynegy
17 pages, it might have those actual dates for the consent
18 decree. It's probably already in there.

19 MR. ZABEL: I don't think the consent decree is in
20 the record.

21 MR. KIM: No. The dates that are referenced in the
22 consent decree, which probably mirrors what Mr. Romaine
23 testified to.

24 Q. (by Mr. Zabel) You might look next, Doctor --

1 I think I understand, but I'd like it in the record. On
2 Table 8.8, again, for the Waukegan plant -- Midwest
3 Generation's Waukegan plant, it indicates that 42,700 tons
4 were sold. And I can lend you a calculator. If we
5 multiply that by \$25 per ton, the cost would be almost 1.1
6 million. I get 1,007,000. If we then turn to Table 8.9
7 for Waukegan, we show only \$636,000 as the cost. Can you
8 explain that -- It's your table. Can you explain that
9 difference for me?

10 A. Oh, yeah. The reason is, what I did is, I
11 allocated -- One of the units is installing -- I'm
12 assuming one of the units Waukegan installs a TOXECON
13 system. So, the impact is less than what you would have
14 if that wasn't there.

15 Q. That's the explanation you gave a moment again
16 when you're talking about Baldwin, that some of the ashes
17 would remain salable?

18 A. That's correct.

19 Q. Because it wouldn't be impacted by the sorbent
20 injection?

21 A. Yes.

22 Q. I'm curious how you calculated -- I mean, it's
23 less than all of the 1 million plus that I calculated.
24 Was it simply a ratio of load?

1 A. I believe so. Probably the ratio of load or
2 estimate of fuel use.

3 Q. And I think we have a similar situation, but I
4 will ask you for Will County.

5 A. It would be a similar.

6 Q. It's, again, the case of the TOXECON will
7 preserve the salable of some of the ash?

8 A. That's correct.

9 Q. Now, turning to Table 8.10, I noticed that a
10 number of the units listed on this table for which you
11 assumed sorbent injection under the Illinois rule, you
12 have not assumed sorbent injection here; is that correct?

13 A. That's correct.

14 Q. What was the reason for that difference?

15 A. My goal was to estimate how much would it cost
16 to comply with the Illinois allocations using sorbent
17 injection, and it's -- So, you don't need to use as much
18 sorbent injection to get down to the -- under the
19 allocations for CAMR.

20 Q. And I assume because there's no -- Well,
21 there's no attribution in this table of allowance cost;
22 you weren't assuming those units by allowance?

23 A. I think we talked about this. Allowances --
24 Obviously under CAMR, people have a choice in how they can

1 comply, whether it's installing technology to comply or if
2 it's -- or they may choose to just buy allowances, and the
3 allowances won't be free. That, I think, perhaps you
4 might agree with me.

5 Q. I stipulate to that.

6 A. We can stipulate that. And as I think as I've
7 testified before, experience has shown that the allowance
8 prices actually tend to be -- the costs tend to be higher
9 than the marginal -- the cost of the marginal units on the
10 margin for control. So -- And I think I discussed that I
11 gave some history about NOx allowances and 1999 OTR, OTC
12 market and 2003 experience with the Sip (phonetic) call.
13 I mean, that's just the way the market works because
14 people charge what the market will bear. And, so, this is
15 just one way to estimate what it will cost. I believe
16 that the Illinois units are in a good position to generate
17 allowances from their units because of the PRB firing
18 units.

19 Q. I have one more question on Table 8.10. If
20 you turn to the second page and look at Waukegan, you show
21 a higher ash disposal cost on Table 8.10 for Waukegan than
22 8.9, but you still have no sorbent injection on the 320
23 megawatt unit. I'm curious why that is.

24 A. Let me just see. Off the top of my head, I

1 don't know.

2 Q. I would assume it should be the same in both
3 tables.

4 A. I'm not sure what my rationale was for the
5 difference. I'd have to think and look at that.

6 Q. It could have been a transposition error?

7 A. Excuse me?

8 Q. Putting a number in the table error?

9 A. It could have been an error. That's a
10 possibility.

11 MR. ZABEL: That's all that I have on the tables.
12 Thank you.

13 MR. KIM: Can I just ask one quick follow-up?

14 HEARING OFFICER TIPSORD: Sure.

15 Q. (by Mr. Kim) As to -- And I don't know if
16 Mr. Zabel asked this, but -- Would you then believe that
17 the figure for ash disposal in Table 8.10, for example,
18 for Midwest Waukegan in that case would be the same as
19 what you showed in Table 8.9, or is it that you're not
20 sure about that?

21 A. Off the top of my head, I expect I probably
22 would, but I don't know. I'd have to look at that.

23 MR. KIM: Okay.

24 HEARING OFFICER TIPSORD: Mr. Zabel.

1 Q. (by Mr. Zabel) One other question. This is
2 on a different -- Coming back to the Baldwin question.
3 Under CAMR, do you think it would be necessary -- assuming
4 the 80 percent which we talked about and they will be
5 installing a baghouse and STA on that unit, would it be
6 necessary to meet CAMR to have the sorbent injection?

7 A. For which unit?

8 Q. The Baldwin unit.

9 A. In my expectation, that Baldwin might not,
10 and, in fact, even for the Illinois rule, I think there's
11 a good chance -- if they're getting 80 percent cobenefit
12 right now, add a fabric filter, I think they're going to
13 get over 90 percent.

14 Q. With the capital cost under CAMR and under the
15 Illinois rule would go down?

16 A. Excuse me?

17 Q. Capital costs?

18 A. Under both scenarios could potentially go
19 down, yes.

20 HEARING OFFICER TIPSORD: Mr. Bonebrake.

21 Q. (by Mr. Bonebrake) The disposal cost for ash
22 disposal reflected in your Table 8.9, those are based upon
23 the fly ash information reported in the 2004 form 767 EIA;
24 is that correct?

1 A. You're referring to Table 8.8?

2 Q. Let's start at 8.8. Maybe that's easier. The
3 values listed in the "sold" column on Table 8.8, those are
4 from the 2004 Form 767 EIA?

5 A. That's correct.

6 Q. And then when you were determining from those
7 numbers anticipated annual costs, then you were making the
8 assumption that those same level of sales would continue
9 to happen in the future years?

10 A. Yes.

11 HEARING OFFICER TIPSORD: Mr. Harley.

12 Q. (by Mr. Harley) Are you certain that ash will
13 no longer be suitable as a commodity?

14 A. No, that's not certain.

15 Q. What factors would go into whether or not the
16 ash that resulted from a mercury controlled process would
17 or would not be suitable as a commodity?

18 A. Right now there's a likelihood that they may
19 not be suitable, but there are a couple of things -- there
20 are -- Sorbent Technologies has a sorbent that's supposed
21 to be cement friendly. The other things going on is EPRI
22 has a technology for treating fly ash that has carbon in
23 it, and that's been tested and tested at PPL monitor.
24 Also, the Englehart (phonetic) and other companies are

1 developing mineral based sorbents that won't have -- that
2 if they're successful won't have an impact on fly ash
3 sales. So, there's a good possibility with a little of
4 this activity going on and then you can see from the
5 numbers here that there's a significant cost with the fly
6 ash, and that provides a lot of motivation for people to
7 develop technology to solving that potential problem. So,
8 there's a likelihood that we'll be able to address that in
9 the future.

10 Q. Is it also possible that testing on a batch by
11 batch basis will allow for some batches of fly ash still
12 to be used as a commodity while others may not be
13 suitable?

14 A. Well, yes. What you also might see -- The
15 biggest problem really is not so much the selling -- the
16 biggest part of the cost is usually not -- I'll start over
17 again. In the economic, that \$25 per ton number, the
18 biggest -- that's actually the difference between -- you
19 know, I picked an average toward the high end of what the
20 number showed to be the difference between the combined
21 effect of the revenue and the disposal. In most cases,
22 the disposal cost is really what drives -- is the biggest
23 part of that. And you can see from the Midwest Generating
24 plants probably because they're close to Chicago, it's

1 much more expensive to dispose. They're the most
2 expensive places to dispose of the ash. But there may be
3 alternatives -- alternative uses that don't produce as
4 much revenue as concrete and where you don't get paid
5 quite as much, but you don't have to toss it away, pay to
6 have it disposed.

7 MR. HARLEY: Thank you.

8 HEARING OFFICER TIPSORD: Mr. Bonebrake.

9 Q. (by Mr. Bonebrake) Is it true, Dr. Staudt,
10 that there is a cement shortage in the United States?

11 A. I'm not familiar with the cement industry --
12 so -- what the needs are.

13 Q. Would you agree if there was a shortage of
14 cement in the United States, that that would likely drive
15 up the cost of fly ash that's suitable for cement
16 applications?

17 A. That what would drive?

18 Q. Shortage of cement in the market.

19 A. Well, if there's a shortage, yeah, costs could
20 go up.

21 Q. The so-called cement friendly sorbent that you
22 mentioned in response to a question from Mr. Harley, at
23 what facilities has this cement friendly sorbent been
24 used?

1 A. Well, no one is using it on a regular basis
2 for the same reason very few people are controlling
3 mercury right now. The rules haven't been there to force
4 it. I've never known a utility company to install
5 controls unless they saw a need to do it.

6 Q. And do you know, Dr. Staudt -- Back up. I
7 think we earlier talked about LOI, loss on ignition.

8 A. That's correct.

9 Q. Is that equivalent to carbon content?

10 A. It's close.

11 Q. And do you know what LOI content is typically
12 required by ash marketers in the State of Illinois?

13 A. I don't know its requirement, but I don't know
14 if there's a specific requirement in the State of
15 Illinois, ASTM or others.

16 HEARING OFFICER TIPSORD: Okay. Then we need to have
17 Mr. Ross and Mr. Romaine. They are both back there. We
18 had a series of questions reserved from the general agency
19 questions by Mr. Ross to be directed to a panel that
20 included Dr. Staudt and Mr. Ross. I think most of these
21 have been answered, but just to be on the safe side, to be
22 sure they're all covered, we go back through.

23 MR. KIM: Mr. Romaine has a previous engagement. He
24 has a hearing on a permit today. So, he has left the

1 building. Out of the pan and into the fire.

2

3 (A brief discussion off the record.)

4

5 HEARING OFFICER TIPSORD: I don't think there's
6 really any that Mr. Romaine needs to be here for. I
7 honestly believe they're all answered. For the purpose of
8 the record, we're going to go through them. And we'll
9 start with -- We'll start with Dynegy. Since
10 Mr. Bonebrake asked the question, we're going to start
11 with you guys. We reserved question number 10, which is
12 how does the size of the ESP at gate discussed on Page 134
13 of the TSD compare to ESP's in Illinois?

14 MR. AYRES: We discussed that at length.

15 HEARING OFFICER TIPSORD: Okay.

16 MR. KIM: Dynegy 10 through 13?

17 HEARING OFFICER TIPSORD: Yeah. Number 11, has
18 Sorbent Technologies tested its product in operations in
19 different seasons and different climates for long periods
20 of time, and I believe Mr. Nelson did answer that quite
21 very good. Number 12, does the agency assume only the
22 installation of ACI in its cost estimates of the control
23 options available on Page 147 of the TSD?

24 A. (by Dr. Staudt) The question again.

1 HEARING OFFICER TIPSORD: Does the agency assume only
2 the installation of ACI and its cost estimates of the
3 control options available on Page 147 of the TSD?

4 MR. ZABEL: I wonder if that should be 157.

5 HEARING OFFICER TIPSORD: The next question is 157.
6 On 13, on Page 157 of the TSD, the agency states that the
7 allowances purchased and CAMR from out of state sources
8 that have access allowances will have a cost reflecting at
9 least cost of implementing control technology. So, those
10 questions are together.

11 A. I think we talked about that, but --

12 HEARING OFFICER TIPSORD: Have they been answered, or
13 would you like --

14 MR. ZABEL: They've been touched on, but I don't know
15 if they'd be directly answered.

16 HEARING OFFICER TIPSORD: Then we'll ask Dr. Staudt
17 and Mr. Ross to address question number 12.

18 MR. BONEBRAKE: You can assume 12 refers to 157.

19 HEARING OFFICER TIPSORD: Does only the installation
20 of ACI in its cost estimates of the control options
21 available on Page 157 of the TSD?

22 A. (by Dr. Staudt) It assumes what's shown in
23 Tables 8.9 and 8.10.

24 MR. ZABEL: And I think we've addressed that.

1 HEARING OFFICER TIPSORD: Then question 13 is the
2 one, the agency states that allowances purchased under
3 CAMR from out of state sources that have excess allowances
4 would "have a cost reflecting at least the cost of
5 implementing control technology." What is the basis of
6 this statement?

7 A. Okay.

8 HEARING OFFICER TIPSORD: What is the basis of the
9 statement? They wanted an answer. I think we've been
10 around it, but --

11 A. The basis of the statement is that the price
12 in the market will be what the market will bear, and if
13 someone is producing allowances, they're going to charge
14 at least what it's costing them or more. Otherwise, there
15 would be no motivation to create the allowances.

16 HEARING OFFICER TIPSORD: Mr. Zabel.

17 Q. (by Mr. Zabel) The first question, what do
18 you mean by the cost of generating the allowances?

19 A. Well, the allowances don't come out of thin
20 air. Somehow they have to be produced. And, moreover,
21 you know, people will charge what the market will bear,
22 and experience has shown that they generally end -- the
23 prices generally end up being more than the cost of the
24 technologies that would be used to produce the allowances.

1 Q. The variable cost or the total?

2 A. The prices paid in the marketplace are more
3 than what the cost for the technologies to produce the
4 allowances.

5 Q. When you say "cost variable," fixed or both?

6 A. Well, if you look -- if you look at both
7 variable and an amortized -- amortized capital cost.

8 Q. So, you're talking total cost?

9 A. I would be talking total cost.

10 Q. In your economic training, have you ever
11 encountered a situation where someone might sell a product
12 at a cost above its variable and below its total cost?

13 A. Not that I'm aware of.

14 HEARING OFFICER TIPSORD: Sub "b" is the generally
15 held theories relative to emissions trade the following:
16 That sources would not buy allowances for purposes of
17 compliance unless either, one, they had an unforeseen
18 event occur requiring additional allowances, or, two, the
19 cost of allowances is cheaper than the cost of
20 controlling?

21 A. Well, first of all, I'm not aware of the
22 generally held theory that you refer to are generally held
23 or not. So, I can't comment on that. But, again, this
24 all goes down to the prices paid in the market

1 historically have exceeded what the technologies were to
2 produce them. So -- And since -- Go to the page in the
3 TTBS. There's a figure somewhere in the TTBS that shows
4 DOE's projected costs for controlling mercury, and they
5 tend to be compared to various configurations, but the
6 costs for PRB controlled PRB units are basically one of
7 the cheapest. So, if somebody is trying to make
8 allowances to sell, it's not going to -- the PRB units are
9 going to be among the least expensive ones to make those
10 allowances.

11 HEARING OFFICER TIPSORD: Miss Bassi.

12 Q. (by Ms. Bassi) So, then does it follow based,
13 upon what you're saying -- Maybe I still have it screwed
14 up in my head. Does it follow that the PRB units for whom
15 it is so cheap to control would be sellers of allowances?

16 A. Perhaps they might, but in reality, from what
17 I have seen, is that one of the reasons that market prices
18 tend to be high is people generally like to produce enough
19 for themselves and only go to the market when they need
20 to.

21 Q. Okay. And does the last statement that you
22 made then answer number 1 in the affirmative?

23 A. The last statement I made, number 1 of what?

24 Q. Goes to market when they need to. "B1," that

1 they go to the market when they need to, is that an
2 affirmative to that subsection?

3 A. Well, let me read that again.

4 HEARING OFFICER TIPSORD: Actually, the question is
5 they had unforeseen event occurring requiring --

6 A. You said an either/or. Well, it's not --
7 There are a number of reasons why people might go to the
8 market, but those are some of them, but the way you're
9 wording it, it says those are the only reasons someone
10 might go to the market, and you're also saying a generally
11 held theory, and I don't know whether or not it's
12 generally held.

13 Q. Let me rephrase it. Would an owner of a
14 company go to the market for allowances if that were
15 available at a time -- I believe you said when they need
16 to -- and it's when they need, could when they need to
17 mean an unforeseen event requiring additional allowances?

18 A. Could you read the question back, please?

19 A. (by Dr. Hausman) I would be happy to address
20 this when I have an opportunity to testify. But if you're
21 talking about market dynamics and bidding strategies, I
22 think that's more my area than his.

23 HEARING OFFICER TIPSORD: Mr. Zabel.

24 Mr. Zabel: I did have a follow-up.

1 HEARING OFFICER TIPSORD: Go ahead, Mr. Zabel.

2

3 (A brief discussion off the record.)

4

5 Q. (by Mr. Zabel) Dr. Staudt, once -- I'm
6 looking at this from the facility's point. Once the
7 facility installs control equipment, it is likely to run
8 that to meet its allowance requirement or its allowance
9 surrender requirement; isn't it?

10 A. Yeah, once they install equipment, it will
11 tend to run it.

12 Q. The source that chooses the option of buying
13 allowances always has the option of changing that choice
14 by installing the equipment; doesn't it?

15 A. They do have that choice.

16 Q. And that option is worth some price presumably
17 above the cost merely of installing the equipment?

18 A. There is -- You know, there are people who do
19 pricing -- price options, but then we'd be going into
20 things like using the Black Shoals model and whatnot,
21 which I think probably would go far beyond the type of
22 cost analysis you're looking at here.

23 Q. But there is an opportunity cost that's
24 surrendered once you put in the equipment?

1 A. There is a benefit to some optionality.

2 MR. ZABEL: That's really the only point of my
3 question.

4 HEARING OFFICER TIPSORD: I think that takes care of
5 the Dynegy questions that have been reserved completely.
6 Let's go to Kincaid. Question number 8, and I believe
7 we've covered this.

8 MR. KIM: These are questions to the agency?

9 HEARING OFFICER TIPSORD: Yeah.

10 MR. FORCADE: Are we not taking questions
11 attributable to Dr. Hausman now?

12 HEARING OFFICER TIPSORD: I did not have any
13 questions noted to be reserved for Dr. Hausman.

14 MR. FORCADE: But we were reserving some of the
15 questions asked with respect to economic aspect.

16 HEARING OFFICER TIPSORD: Right. Those you can ask
17 with Dr. Hausman. But the questions we are looking at now
18 are questions specifically were addressed to the agency
19 that was specifically noted on the record that the agency
20 did not address and would address with Dr. Staudt, and
21 that starts with question 8.

22 MR. FORCADE: Yes.

23 HEARING OFFICER TIPSORD: Question 9.

24 MR. FORCADE: It starts with question 8.

1 HEARING OFFICER TIPSORD: Right. Then 8, 9, 10b and
2 11 through 19. I'm wondering if you don't think some of
3 these have already been addressed by Dr. Staudt's
4 testimony.

5 MR. FORCADE: Question 8 being, did you perform an
6 independent --

7 HEARING OFFICER TIPSORD: Yes.

8 MR. FORCADE: Question 8 actually relates to not only
9 the economic information provided by Dr. Staudt, but the
10 economic information in the TSD provided by Dr. Hausman.
11 So, I'm confused what part of it I'm supposed to be --

12 HEARING OFFICER TIPSORD: You want to reserve
13 question number 8 for Dr. Hausman; is that what you're
14 saying?

15 MR. FORCADE: Yes.

16 HEARING OFFICER TIPSORD: Thank you. Okay. Question
17 number 9.

18 MR. FORCADE: Answered.

19 HEARING OFFICER TIPSORD: 10b.

20 MR. FORCADE: 10b was not answered. It may have been
21 answered in some of the subsequent discussions, but I
22 don't recall the specific answer.

23 HEARING OFFICER TIPSORD: That's fine. Question 10b
24 from Kincaid, the general questions. I can read it to

1 him, John.

2 MR. KIM: I can give it to him.

3 A. The question is, Tables 8.5 and 8.6 of the TSD
4 list typical mercury content of coal and projected mercury
5 and coal. This is 10b?

6 HEARING OFFICER TIPSORD: Uh-huh.

7 A. If analytical inaccuracies showed a mercury
8 content that was 5 percent higher or lower than the actual
9 value, what impact would this have on the nature of the
10 control technology required to achieve a 90 percent
11 reduction? I'm not sure if you mean analytical
12 inaccuracies in the data that was provided to us by the
13 Illinois Geological Survey or if you're going back to
14 people taking daily coal samples.

15 Q. (by Mr. Forcade) People taking daily coal
16 samples.

17 A. My opinion is that while -- you know, I can't
18 speak to the details of coal sampling, because you're
19 working with a long-term average fortunately, and I think
20 you probably agree it's good that we're not talking about
21 a daily requirement for control, it's an annual average,
22 and we've discussed how that average is -- Chris Romaine
23 did. So, that, you know, 5 percent up or down on a daily
24 basis on an average is not going to be a big concern

1 because over the year things will average out.

2 HEARING OFFICER TIPSORD: Go ahead.

3 Q. (by Mr. Forcade) What if those inaccuracies
4 had a bias?

5 A. If there was a systematic error rather than a
6 random error, but you're saying it would be 5 percent
7 higher or lower -- but consistently 5 percent higher or
8 consistently 5 percent lower?

9 Q. Yes.

10 A. If there was a way -- If you knew that you had
11 a systematic error and there was -- and systematic errors
12 can actually be corrected for, but I don't know whether
13 within a procedure they allow them to happen, but
14 generally systematic errors are errors that you understand
15 and you can correct for. Random errors you can't correct
16 for; you kind of average out.

17 Q. For coal samples showing a systematic bias
18 either positively or negatively by 5 percent, would that
19 affect, in your opinion, the amount of mercury reduction
20 that would be achieved by control technologies that you've
21 described in this proceeding?

22 A. On a -- Well, if you're measuring based upon
23 mercury in versus mercury out, perhaps that would, yeah,
24 but, again, if it's a systematic error and you can

1 document what it is and you know what it is, then you can
2 correct for it. So, if you correct for it, it's not a
3 problem.

4 Q. Would it be safe to say that correcting a
5 systematic error on something like coal sampling analytic
6 tests which require concurrence by government agencies?

7 A. Well, if it's part of a complying with a
8 regulation, that would be true.

9 HEARING OFFICER TIPSORD: And, actually,
10 Mr. Kincaid -- Mr. Forcade, in looking at the rest of your
11 questions that we have reserved, I believe they're all
12 economic questions, and they are more properly for Dr.
13 Hausman, and those are 11 through 19.

14 MR. FORCADE: I agree with 12 on. Let me read 11,
15 please. I'm sorry. I don't remember the answer to 11, if
16 it was clearly answered on the record or if there was a
17 short answer.

18 HEARING OFFICER TIPSORD: I don't believe it was, but
19 I thought you wanted that for Dr. Hausman. That's why I
20 was including it in my numbers.

21 MR. KIM: I think I had the same thing as you. We
22 have 11 through 16, we do have noted for Dr. Hausman, as
23 well.

24 MR. FORCADE: That's fine.

1 HEARING OFFICER TIPSORD: Mr. Zabel.

2 MR. ZABEL: There's a preliminary question whether he
3 had any participation in the TSD. Otherwise, 11 wouldn't
4 be relevant for Dr. Hausman.

5 A. I can address 11. I think you're talking
6 about something I wrote.

7 HEARING OFFICER TIPSORD: All right.

8 A. As far as the risks, the risks are that if
9 someone were trying to make a decision about going to the
10 market and saying, "Well, I'm not going to put any
11 controls in. I'm just going to go to the market come
12 2010," and now you have a market that there's no history
13 of price discovery. You have no idea what those
14 allowances are going to cost. So, it's a pretty risky
15 endeavor to say, "Well, gee whiz, I'm just going to go to
16 the market and buy those allowances, and I have no idea
17 what they're going to cost," because the market hasn't
18 even started yet. That's what I'm talking about the risk
19 of just relying on the market for compliance.

20 And I think we talked about the costs of trading
21 mercury in a couple of previous questions, but as far as
22 the risks, my opinion is the risks are for someone -- a
23 utility going forward saying, "I'm just going to buy
24 allowances in the market." To me -- In my opinion, that's

1 pretty risky because there isn't even a market there now,
2 and you have no idea what they're going to cost.

3 MR. KIM: I'm sorry. I was just looking over our
4 notes, and I just spoke with Jim Ross. My recollection --
5 and I could be wrong -- was that 17, 18 and 19 of
6 Kincaid's agency questions were answered by Mr. Ross, and
7 those were just asking for names of people who --

8 HEARING OFFICER TIPSORD: You're correct. You're
9 correct. I do believe he answered those. I think he
10 actually started out telling everyone who did what with
11 the TSD and like that.

12 MR. KIM: So, for the Kincaid agency questions, we
13 thought 8 and 11 through 16 would be best for Dr. Hausman.

14 HEARING OFFICER TIPSORD: And then Amren had a number
15 of questions also reserved for Dr. Staudt, and I do
16 believe most of these have been asked and answered, but
17 I'll check with Amren before we let Dr. Staudt go. The
18 first one we had was question 31, which refers back to
19 question 30, and it involves describing settings and
20 conclusions for impact of sulfur dioxide injection for gas
21 conditioning upon the effectiveness of halogenated powder
22 activated carbon injection prior to the ESP's.

23 MR. HARRINGTON: I believe that's been discussed.

24 HEARING OFFICER TIPSORD: Has IEPA made any

1 determination of the cost of installing such technology,
2 other than that set forth in Dr. Staudt's testimony in
3 Chapter 8 of the technical support document, and 38 is, if
4 so, please describe.

5 A. Other than what's in the technology support
6 document, I'm not aware of anything else.

7 Q. (by Mr. Harrington) I believe it asked for
8 the agency, whether the agency had made any other
9 determination, and I'm not sure that that was answered
10 before.

11 A. I don't know if the agency has made any
12 determinations separately.

13 A. (by Mr. Ross) Which question is that?

14 HEARING OFFICER TIPSORD: Number 37, has Illinois
15 made any determinations as to cost of installing such
16 technology? And that's referring back to question 36,
17 which is the ACI basically.

18 A. (by Mr. Ross) I think I answered this, at
19 least I have it checked off.

20 HEARING OFFICER TIPSORD: And I have it highlighted.
21 So --

22 A. (by Mr. Ross) For the most part we relied
23 upon Dr. Staudt. However, we did do our own analysis, and
24 that's when I referred to we did literature research,

1 spoke with experts, etc., etc. So, I'm sure I answered
2 this question. But I believe you had some follow-up is
3 why it was -- and maybe the follow-up questions were
4 referred.

5 Q. (by Mr. Harrington) You have no document that
6 you have compiled that shows anything different than in
7 Chapter 8 of the TSD; is that correct?

8 A. (by Mr. Ross) That's correct.

9 MR. HARRINGTON: Thank you.

10 HEARING OFFICER TIPSORD: Question 41, 42 and 43. 41
11 it says, has Illinois EPA made any determinations of the
12 availability of engineering staff that design such systems
13 for each of the EGU's in the State of Illinois, and, if
14 so, please describe is 42, and I believe Dr. Staudt has
15 talked extensively about that.

16 Q. (by Mr. Harrington) And I believe the
17 question was whether the agency has made any such study.
18 Dr. Staudt said he had not, and the agency's answer is --

19 A. (by Mr. Ross) Yes, I had said, no, also.

20 MR. HARRINGTON: Okay.

21 HEARING OFFICER TIPSORD: 43, has Illinois EPA made
22 any independent determination of the availability of
23 skilled labor, such as electricians, steel workers, pipe
24 fitters, etc., to install such systems on each EGU in the

1 State of Illinois by the deadline specified by the
2 proposed regulation?

3 MR. HARRINGTON: I believe both Dr. Staudt and
4 Mr. Ross said "no" previously.

5 A. (by Mr. Ross) Correct.

6 HEARING OFFICER TIPSORD: And then 84 and 85 are the
7 last two I had for Amren.

8 A. (by Mr. Ross) Just to be clear, I said I
9 didn't expect the requirement to be very taxing based upon
10 what's in the TSD, but I didn't go to develop statistics,
11 just to be clear.

12 MR. HARRINGTON: Thank you.

13 HEARING OFFICER TIPSORD: And question 84, if a
14 facility installs a halogenated powder activated carbon
15 injection with a baghouse for mercury control to comply
16 with Illinois EPA's mercury proposal, would that not be
17 inconsistent with burning Illinois bituminous coal in the
18 future because the facilities would use dry scrubbing with
19 the baghouse to achieve SO2 reductions?

20 A. Let me see the question. 84. Well, perhaps,
21 but facilities -- as you folks know, facilities' fuel
22 costs are far more -- many of the things that drive
23 facilities is fuel choice. So, if you plan to switch to
24 Illinois bituminous coal, you'd probably try to pursue

1 another way to comply with the rule than installing a
2 baghouse, I would suspect.

3 Q. (by Mr. Harrington) In other words, the
4 baghouse would be inconsistent with burning Illinois coal?

5 A. Certainly high sulfur coal.

6 MR. HARRINGTON: Thank you.

7 HEARING OFFICER TIPSORD: And question number 85, if
8 the companies suggest that the Illinois mercury proposal
9 would require installation of baghouses on virtually all
10 of the facilities presently burning subbituminous coal,
11 would that not effectively discourage any use of Illinois
12 coal in the future by making the investment substantially
13 obsolete if the facility was to switch to Illinois coal?

14 A. Well, as I think I've indicated before, I
15 think there's an extremely remote possibility, but in this
16 hypothetical situation, indeed people would not -- people
17 would put in fabric filters and not use high sulfur coal.

18 HEARING OFFICER TIPSORD: Mr. Zabel.

19 Q. (by Mr. Zabel) When you say "unlikely
20 situation," you're referring to all facilities installing
21 baghouses?

22 A. All and even most.

23 HEARING OFFICER TIPSORD: I think that takes care of
24 all the questions I had reserved for Dr. Staudt, and we're

1 ready to go to Dr. -- Oh. Mr. Forcade.

2 MR. FORCADE: At several points during Dr. Staudt's
3 testimony, he described tests that had been conducted on
4 activated carbon injection and provided what I may
5 incorrectly describe as secondary sources and also
6 described that complete DOE test reports were available at
7 some location and would be provided to the record. Have I
8 categorized that reasonably accurate?

9 MR. KIM: I apologize. I was listening to something
10 else.

11 MR. FORCADE: At several points in Dr. Staudt's
12 testimony, he provided tests that had been conducted to
13 demonstrate the efficiency of mercury removal by the
14 various 30-day and short-term tests using activated
15 carbon.

16 MR. KIM: I thought that was leading up to a
17 question. That's why I tuned you out.

18 MR. FORCADE: If I correctly understand what
19 happened, we asked for the primary sources, which were the
20 DOE reports, but what has been introduced so far is only
21 the secondary sources. Could you tell us when those
22 primary reports will be made available, A, and, B, after
23 reviewing those primary reports, if we have additional
24 questions, can we ask Dr. Staudt?

1 MR. KIM: I can answer the first and try and answer
2 the second. As to the first, I think we have two. We
3 have the Meramec and St. Clair studies, and I think we
4 have those ready now. So, we can give those. There were
5 a number of others that we have found links to. The
6 shortest one, I think, was nine pages. The longest was
7 568 or something like that. We were hoping that maybe
8 anything under 50 pages we would be happy to provide.
9 Anything over that, we could maybe get away with providing
10 a link and just doing it that way. That's what we've been
11 able to find so far. And the reason we hadn't brought
12 that up is there were maybe just a few we were still
13 tracking down links to and then we were going to give
14 total.

15 MR. FORCADE: I think independent what the board
16 might have, I think we'd be willing to discuss that
17 outside of the record. The second question is, if we
18 review those reports and we have additional questions,
19 what do we do?

20 MR. KIM: I don't know what Dr. Staudt's -- I don't
21 know when your questions would come up, and I don't know
22 how that jives with his schedule. I'm assuming that --
23 Let me ask him.

24 DR. STAUDT: I'm leaving tomorrow.

1 MR. KIM: He's leaving tomorrow. So, I think unless
2 -- And I don't even want to bring up the "M" word. I
3 suppose, unless something -- Unless you had a question by
4 tomorrow, we would certainly -- if the question was
5 provided to the board, what have you, the best we could do
6 at that point would be to provide very quick written
7 follow-up or written comment, but I'm not sure unless,
8 again -- I'm assuming that the hearing ends tomorrow.
9 Therefore, we'll certainly answer everything up to
10 tomorrow, and anything beyond that, at the very least we
11 would answer by written response.

12 MR. FORCADE: I just find it very difficult to
13 believe I'll be able to read the reports, particularly the
14 500 page one, consult with technical questions before the
15 close of business tomorrow while also being --

16 HEARING OFFICER TIPSORD: There's also a possibility
17 that you might review those documents and not have any
18 questions. That's a possibility.

19 MR. FORCADE: On the same level of the asteroid.

20 MR. KIM: You know, I guess I feel compelled to bring
21 up -- And I understand that we're talking about a
22 secondary source, but, again, that's what was provided,
23 that was what was relied upon. If the conclusions want to
24 be drawn beyond that, I suppose we can go there. We

1 provided exactly what was referred to. I don't think Dr.
2 Staudt necessarily looked at all the reports that we're
3 drudging up now. So, we're giving you beyond what we
4 relied upon to prepare the TSD.

5 MR. FORCADE: That will satisfy my needs. I can't
6 speak for the board.

7 HEARING OFFICER TIPSORD: Well, I think a link is not
8 sufficient because we can't put a link in the record. So,
9 I think we need at least one copy of everything, and
10 certainly with the huge document, one copy will be
11 sufficient. We'll enter it as an Exhibit here, and then
12 people can make arrangements to copy and that sort of
13 thing. As much as and fast that we're moving into
14 electronic age, I'm not sure that a link to a document is
15 going to --

16 MR. KIM: Would it be acceptable if the copy -- Some
17 of these have color in them, I think, and --

18 HEARING OFFICER TIPSORD: Oh, no. You use your color
19 ink.

20 MR. KIM: Not even so much --

21 HEARING OFFICER TIPSORD: It's the end of union.

22 MR. KIM: It's not so much the money. Would it be
23 okay to provide a black and white copy?

24 HEARING OFFICER TIPSORD: I will go so far as to say

1 if it's a substantial copy, if you provide to us
2 electronically, either on a CD or electronically send it
3 to us, that would be fine. We are more than happy to read
4 them electronically, and then if we do have to produce
5 them for some reason, we can do it that way. You can do
6 that instead of a hard copy.

7 MR. KIM: If that's the case, we can try to burn
8 enough copies to give that to everybody.

9 HEARING OFFICER TIPSORD: And we can just enter the
10 CD.

11 MR. KIM: You want me to provide the two studies we
12 have now?

13 HEARING OFFICER TIPSORD: That will be great, and
14 then Mr. Forcade will have something to do tonight.

15 MS. BASSI: You can't ask any more questions?

16 HEARING OFFICER TIPSORD: Yes, Miss Bassi, how can I
17 help you?

18 MS. BASSI: I was just going to ask, on the gigantic
19 documents, if maybe the first page --

20 HEARING OFFICER TIPSORD: 66 and 67.

21 MR. KIM: What we could possibly do is, when we do
22 that, we could maybe with the CD just have a printout, a
23 list of what the documents are in order.

24 MR. BONEBRAKE: An index?

1 MR. KIM: Yes.

2 HEARING OFFICER TIPSORD: I have been handed
3 "Evaluation for Sorbent Injection For Mercury Control,"
4 principal author is Sharon S-J-O-S-T-O-R-M, and I'm not
5 going to try to pronounce it, which I will mark as 66, if
6 there's no objection.

7 (No response.)

8 HEARING OFFICER TIPSORD: Seeing none, it is
9 Exhibit 66. The Exhibits are not put on the web site.
10 The reason behind that is that some of the Exhibits are
11 like this. Our scanner is not big enough to do that. As
12 a general policy, we just don't put them on. People are
13 always free to come see us at the board.

14 "Advance Utility Mercury Sorbent Field Testing
15 Program," Sid Nelson, Jr., Recipient, Project Director,
16 we'll mark it as Exhibit 67, if there's no objection.

17 (No response.)

18 HEARING OFFICER TIPSORD: Seeing none, it's
19 Exhibit 67.

20 MR. KIM: Are we done with Dr. Staudt?

21 HEARING OFFICER TIPSORD: I believe we are done with
22 Dr. Staudt for now. Dr. Staudt, thank you very much. I
23 echo Mr. Harrington's comments. We appreciate your
24 comments, and I appreciate -- I do want to say that I

1 appreciate the questions. I think we've got a good record
2 here. Thank you very much.

3 MR. ZABEL: May I say one thing to Dr. Staudt. I
4 want to apologize for my tiff with you yesterday.

5 DR. STAUDT: I've already forgotten about it.

6 MR. ZABEL: I'm sorry to have brought it up.

7 HEARING OFFICER TIPSORD: You have another Exhibit?
8 You're really going to get to 100.

9 MR. KIM: We neglected to produce his CV.

10 HEARING OFFICER TIPSORD: Mark Dr. Staudt's resume as
11 Exhibit 68, if there's no objection.

12 (No response.)

13 HEARING OFFICER TIPSORD: Seeing none, it's
14 Exhibit 68. And then we go to Dr. Hausman. I remind you
15 that you're under oath and welcome.

16 DR. HAUSMAN: Thank you.

17

18 (A brief discussion off the record.)

19

20 HEARING OFFICER TIPSORD: Whose questions are we
21 starting with, Mr. Kim?

22 MR. KIM: I will leave that to Dr. Hausman. We have
23 questions from Dynegy Midwest and Kincaid Generation. So,
24 I will leave it to Dr. Hausman what he would like to begin

1 with.

2 HEARING OFFICER TIPSORD: Dynegy has the shorter
3 number.

4 MR. KIM: They do.

5 MR. ZABEL: I would not assume that we don't have
6 others.

7 HEARING OFFICER TIPSORD: We are only going until
8 7:00 o'clock tonight, by the way. So, just so you all
9 know, I'm not going to keep you here until we're --

10 MR. FORCADE: Are we taking Dynegy first?

11 DR. HAUSMAN: That's fine.

12 HEARING OFFICER TIPSORD: Dr. Hausman, we're having
13 you read your question and then you can answer your
14 question.

15

16 EXAMINATION OF

17 Ezra D. Hausman, Ph.D.:

18 A. All right. Questions from Dynegy and Midwest,
19 the first question is, number one, please state the dates
20 on which Dr. Hausman obtained the degrees listed in his
21 prepared testimony. And having submitted my CV, they're
22 all listed on the second to last page. I'll be happy to
23 go through them.

24 HEARING OFFICER TIPSORD: That's quite already. I

1 think Exhibit 68 is sufficient.

2 A. Number 2, does Dr. Hausman have any college or
3 post graduate degrees. I told my wife about this
4 question, and she was horrified. The answer is, no.

5 3, does Dr. Hausman have any college or post graduate
6 degrees in economics. The answer is, no. I did not
7 receive any degrees from economic departments of any
8 college or universities, although economics was a
9 component of my training, specifically in my engineering
10 degree from Tufts University.

11 Q. (by Mr. Zabel) How many economics courses did
12 you have in that program?

13 A. Well, I had a class on engineering economics
14 in that program, and I worked closely with a professor of
15 economics in work on my thesis. He was on my thesis
16 committee. I did an econometric analysis of water use in
17 Massachusetts. I also took an economics course at Harvard
18 while I was in my doctoral training.

19 Q. What kind of economics?

20 A. Natural resource economics.

21 Q. And the companies for which you work's
22 pronunciation.

23 A. Synapse Energy Economics.

24 Q. Does it have trained economists on staff?

1 A. Well, when you say "trained economists," you
2 mean economics degrees from economics departments?

3 Q. Yes, I'll start with that.

4 A. As you're probably aware, there is no such
5 thing as professional certification in economics. So,
6 it's kind of hard to say. But, you know, I believe the
7 answer to that question is, yes, although I can't go
8 through the degrees that are on staff.

9 Q. In preparing your testimony for today, did you
10 work with anyone else at Synapse?

11 A. Yes, I did.

12 Q. And who would that be?

13 A. I worked with Dr. Bill Steinhurst, who does
14 have a degree in economics.

15 Q. Doctor in economics, do you know?

16 A. I would have to check that.

17 Q. Anyone else?

18 A. I worked with Bruce Biewald, who has a degree
19 from MIT. It's a Bachelor's degree. And, again, I'm
20 sorry that -- I'm not sure exactly what he studied.

21 Q. That's all right. I have examined Mr. Biewald
22 before. I can always look it up. Anyone else?

23 A. And then I worked with -- I supervise some of
24 the analyst staff, who helped me with some of this work.

1 Q. Thank you.

2 A. Oh, and Dr. David -- I'll to -- I'm sorry that
3 I'm not familiar with all the degrees of everyone who
4 assisted or reviewed the testimony. Dr. David White also
5 worked on it. And, again, I'd be happy to come back
6 tomorrow with the list of degrees.

7 Q. That would be fine.

8 A. Okay.

9 HEARING OFFICER TIPSORD: Question number 4.

10 A. Number 4, does Dr. Hausman have any formal
11 training in economics? I would say that in my specialty
12 of energy market economics, my training has mostly been
13 practical training, that I've been working, consulting,
14 modeling and testifying in this area for eight years.
15 That is primarily where my experience and expertise comes
16 from.

17 Q. (by Mr. Zabel) Beyond the specific courses
18 you've described, what you've just described is what I
19 would call on-the-job training rather than formal
20 training; is that fair?

21 A. That's fair.

22 MR. ZABEL: Thank you.

23 HEARING OFFICER TIPSORD: Question number 5.

24 A. Dr. Hausman's prepared testimony lists two

1 employers. Following graduation from college, has he been
2 employed elsewhere? And the answer to that is, yes.
3 Every job since college, including --

4 MR. ZABEL: Well, I believe your resume has now
5 become an Exhibit describes that. So, there's no reason
6 to belabor.

7 HEARING OFFICER TIPSORD: Okay. Question number 6.

8 A. When was Dr. Hausman retained by the Illinois
9 EPA to be a witness in this proceeding? The answer to
10 that is that Synapse Energy was contacted by LADCO in
11 March of -- later March, maybe around March 20th, and I
12 was brought in right away as the person who would be the
13 expert for the analysis in this proceeding.

14 HEARING OFFICER TIPSORD: Miss Bassi.

15 Q. (by Ms. Bassi) Do you know why it was LADCO
16 rather than Illinois EPA that contacted you?

17 A. I don't know.

18 Q. Have you been retained by LADCO rather than
19 Illinois EPA?

20 A. Yes.

21 HEARING OFFICER TIPSORD: Mr. Zabel.

22 Q. (by Mr. Zabel) Is LADCO then retained by
23 Illinois EPA for this proceeding?

24 A. I don't know what the financial arrangement

1 between Illinois EPA and LADCO.

2 A. (by Mr. Ross) All the experts are under
3 contract through LADCO. We fund LADCO, and they in turn
4 reimburse the experts for their expenses.

5 Q. Maybe for the record you should describe what
6 LADCO is.

7 A. (by Mr. Ross) LADCO is the Lake Michigan Air
8 Consortium -- Air Directors Consortium. The acronym does
9 not directly correlate with the name of the organization.
10 But they're similar to NESCAUM, in that they're a regional
11 organization that many states rely upon. I think they're
12 funded by USEPA funds and state funds to provide guidance
13 and assistance on environmental matters.

14 Q. It's made up of directors of all the states on
15 Lake Michigan; is that a fair assumption?

16 A. (by Mr. Ross) I believe all the directors are
17 members, correct.

18 Q. I guess I'm curious because you raised the
19 issue. Dr. Hausman and the other experts have been
20 retained by LADCO, who pays them?

21 A. (By Mr. Ross) They are directly paid through
22 LADCO, but we are the source of funding.

23 Q. So, Michigan or Wisconsin isn't picking up our
24 cost of this?

1 A. (by Mr. Ross) That's correct.

2 HEARING OFFICER TIPSORD: Miss Bassi.

3 Q. (by Ms. Bassi) I believe, Mr. Ross, that some
4 of the earlier experts we asked this question of said they
5 were retained by Illinois EPA.

6 A. (by Mr. Ross) It may be a matter of
7 semantics. I mean, we are the ones who the bills come to,
8 and we are the ones who -- Dr. Hausman was contacted
9 through LADCO. In other cases, we contacted the experts
10 directly.

11 HEARING OFFICER TIPSORD: I was going to say, Miss
12 Bassi, was a time factor, when you were contacted, not
13 necessarily retained.

14 MS. BASSI: I'm jumping ahead.

15 HEARING OFFICER TIPSORD: I believe Dr. Hausman heard
16 "retained". I could be wrong, but I believe, in fairness
17 to the witnesses, "contacted" is what was used.

18 MR. BONEBRAKE: I would point out, in our questions
19 to Dr. Rice, the first question was, had Dr. Rice been
20 retained by the agency?

21 HEARING OFFICER TIPSORD: I apologize.

22 MR. RIESER: And not to jump on the hearing officer,
23 who has done a wonderful job, I also asked that question
24 of Dr. --

1 HEARING OFFICER TIPSORD: I stand corrected.

2 MR. RIESER: And he said he was retained by the IEPA.

3 Q. (by Ms. Bassi) So, were all of them actually
4 retained by LADCO, even though a bill comes through LADCO
5 to you?

6 A. (by Mr. Ross) I'd have to go back and review
7 the contracts, but I believe the contract is actually
8 between LADCO and the experts, but I believe it says, "You
9 shall perform the following services for the Illinois
10 EPA." So, that's why I say it may be a matter of
11 semantics.

12 HEARING OFFICER TIPSORD: Excuse me. That does
13 remind, though. We were supposed to get the scope of work
14 for someone.

15 MR. ZABEL: Dr. Keeler.

16 HEARING OFFICER TIPSORD: Dr. Keeler, that's correct.

17 A. (by Mr. Ross) And Mr. Ayres.

18 A. (by Dr. Hausman) A copy of the agreement is
19 asked of me.

20 MR. ZABEL: To limit it to the scope of --

21 MR. KIM: Mr. Ayres.

22 MR. AYRES: I have it in my computer.

23 MR. ZABEL: It doesn't help me, unless you want to
24 give me your computer.

1 HEARING OFFICER TIPSORD: Mr. Rieser.

2 Q. (by Mr. Rieser) Well, I guess that begs the
3 main question, which is why they're being retained by
4 LADCO and not through the IEPA?

5 A. (by Mr. Ross) That's the funding source that
6 was available to retain the experts.

7 Q. I'm sorry. What did that mean?

8 A. I think to provide a more detailed answer, I'd
9 have to go back and speak to everyone that was involved in
10 the process. I was not the only one involved. The
11 question wasn't prefiled. So, I'd have to go back and
12 review. We can provide an answer.

13 MR. RIESER: Thank you.

14 HEARING OFFICER TIPSORD: 6a, you're going to provide
15 the scope of work. Mr. Rieser.

16 Q. (by Mr. Rieser) And this goes back to the
17 qualifications. Could you describe your qualifications
18 and experience in performing analyses of macro economic
19 impacts?

20 A. (by Dr. Hausman) You're referring to the
21 aspects of my testimony that have to do with effects on
22 the Illinois economy job impacts?

23 Q. Correct.

24 A. That is not my primary area of analysis. I

1 work closely with Dr. William Steinhurst on that. I
2 supervise his work. We had some discussions with the
3 agency as to whether he would be provided as a witness, as
4 well, and write testimony in that, but the decision was
5 that I would supervise his work and review it and present
6 it as part of my testimony.

7 Q. So, there are portions of your testimony that
8 were prepared by other people?

9 A. Under my supervision.

10 Q. Under your supervision. What other portions
11 of your testimony were prepared by other people?

12 A. I would say that is it in terms of areas of my
13 testimony that were prepared by other people. I would say
14 that -- No, that's not true. Actually, the Exhibits at
15 the end of my testimony were by my request prepared by
16 David White. And, furthermore, I had someone else on my
17 staff -- on Synapse staff research the reliability rules
18 so I could characterize those because those seem to change
19 on a day-to-day basis.

20 Q. What are your personal qualifications and
21 experience in the economics to sport fishing and wildlife
22 and associated recreation activities?

23 A. Merely that I reviewed the studies and the
24 available data and reported what they said. I didn't do

1 any primary analysis in that area, nor would I be
2 qualified to do so.

3 Q. And what are your personal qualifications and
4 experience with the health effects of mercury which you
5 also describe?

6 A. Once again, as you see in my testimony, I
7 reviewed specific reports, and I related what they say. I
8 confirm that the information in the report was accurately
9 characterized, and I put it in the context of the overall
10 macro economic analysis.

11 Q. But those conclusions are not your own?

12 A. The conclusions in terms of the health impact?

13 Q. Correct.

14 A. No, those are not my own.

15 Q. What experience -- personal qualifications and
16 experience in performing economic impact analyses?

17 A. When you say "economic impact analyses," are
18 you referring to cost to consumers in the electric sector?

19 Q. Correct.

20 A. I have a great deal of experience modeling
21 electricity markets under different pricing systems. I've
22 taught seminars in that area and, you know, looking at how
23 the costs of electricity and those market dynamics.

24 Q. And it's correct that that would fall under

1 the category of on-the-job training that Mr. Zabel asked
2 you about?

3 A. That would be correct, yes.

4 Q. And would the same answer be true of the
5 experience and qualifications regarding cost benefit
6 analysis?

7 A. Yeah. Yes, I've done cost benefit analysis in
8 a number of years, which are detailed in my CV, but, yes,
9 that is something that I have learned to do and
10 professional experience.

11 MR. RIESER: Thank you.

12 HEARING OFFICER TIPSORD: Mr. Bonebrake.

13 Q. (by Mr. Bonebrake) You mentioned that you
14 were relying on part on Mr. Steinhurst and Mr. White, and
15 you earlier indicated that you also worked with Bruce
16 Biewald?

17 A. Yes.

18 Q. Did you also rely on Mr. Biewald in relation
19 to the testimony you prepared?

20 A. I discussed the issues of testimony with
21 Mr. Biewald, and he participated in a lot of -- some
22 discussions, which I'm sure we'll be discussing later,
23 with the Illinois EPA staff, but I wouldn't say that I
24 relied on him for any of the conclusions or analysis in

1 the testimony. I would say that he served as someone to
2 discuss it with and review it with.

3 Q. And what specific issues were you discussing
4 with Mr. Biewald?

5 A. The issues related to the modeling of the --
6 the IPM modeling of the proposed rule, specifically with
7 respect to how the rule was implemented in the IPM model
8 and what some of the implications of that might be in
9 understanding the model results. That's an area that we
10 discussed at length.

11 Q. You also mentioned, if I understood you
12 correctly, that you were on some conference calls with Dr.
13 Biewald and some agency representatives?

14 A. Yes. That's correct.

15 Q. And how many of those conversations took
16 place?

17 A. I would say two or three.

18 Q. And it was you and Mr. Biewald on one end and
19 agency representatives on the other?

20 A. There was one call that involved myself,
21 Mr. Biewald, there may have been other Synapse staff
22 there, perhaps David White was there, agency
23 representatives and also a couple of staff people from
24 ICF, the company that did the original modeling that's

1 reported in the TSD. And other than that, I would say it
2 was myself, Mr. Biewald and agency personnel, and I'm not
3 sure if there were any -- if other Synapse staff
4 participated.

5 Q. And who was on those phone calls from ICF?

6 A. Jim was just about all the time. Maybe John
7 was at least once. I can't tell you beyond that. But Jim
8 was our primary contact for us.

9 MR. KIM: That question was who from ICF, not IEPA.

10 A. (by Mr. Ross) From ICF, I believe who was on
11 the call, was Boddu Venaesh, B-O-D-D-U, V-E-N-A-A-E-S-H.
12 50/50 percentage chance that is correct. And the other
13 personnel from ICF was Juanita Haydel, J-U-A-N-I-T-A,
14 H-A-Y-D-E-L. Those were our two primary contacts with ICF
15 throughout the modeling and the post modeling discussions.

16 Q. (by Mr. Bonebrake) And there are multiple
17 phone calls with representatives of ICF, as well as Dr.
18 Hausman and Bruce Biewald from Synapse?

19 A. (by Dr. Hausman) I believe there was only one
20 phone conversation in which we had representatives from
21 ICF, as well as the Illinois EPA representatives. In
22 fact, only one time when we talked to the ICF
23 representatives on the phone. I believe there was only
24 one phone conversation that included both Synapse

1 representatives and ICF personnel.

2 Q. And did you personally then only have one
3 conversation with ICF representatives?

4 A. On the phone, yes.

5 Q. How about in person?

6 A. No meetings in person. We did -- I'm
7 trying -- I don't even think we exchanged e-mail because
8 just about all the information -- any interaction with
9 them went through the agency staff.

10 Q. And what was the purpose of your conversation
11 with ICF staff?

12 A. As we were reviewing the IPM model results, we
13 had a number of questions, things that we weren't sure
14 that we fully understood in terms of how the models were
15 documented, and, furthermore, in order to diagnosis the
16 results and, you know, understand how they came out the
17 way they did, we felt it was important to obtain
18 intermediate data that was not reported to the agency.
19 When I say "intermediate data," I mean, when you run a
20 computer model of an electricity market, just about
21 anything else, the model produces a lot of information,
22 which will then not necessarily be what we consider to be
23 the model results. Shadow prices are very important to
24 people who are trying to diagnosis these things. So,

1 we're asking for shadow prices and other kinds of
2 information that would help us understand the model
3 better.

4 Q. And was that information provided to you in
5 writing?

6 A. Some of it just in discussion on the
7 telephone, and then they actually provided an electronic
8 file with some additional data.

9 Q. And the contents of that electronic file, do
10 you know if that's contained within or attached to the TSD
11 or to your testimony?

12 A. As far as I know -- Well, they're definitely
13 -- No, they're not attached to either of those documents,
14 and I don't know if they've been made available.

15 HEARING OFFICER TIPSORD: Mr. Zabel.

16 MR. ZABEL: Just to follow-up, I think our
17 consultants, for the same reason that Dr. Hausman wanted
18 that intermediate file, we'd like to see their review of
19 the ICF model. Is that possible, Mr. Kim, to obtain that?

20 MR. KIM: There are a number of documents that I
21 think were associated with the model, and we're still
22 compiling the copies, and I think we're hoping to have
23 those no later than tomorrow morning, what we have as far
24 as the requests that we've received.

1 MR. ZABEL: Does that include the information
2 Dr. Hausman was just referring to?

3 MR. KIM: I believe so. I need to double-check.

4 MR. ZABEL: You can show him what it is, and if it's
5 there, it's there. If it isn't, he can --

6 MR. KIM: Exactly.

7 MR. BONEBRAKE: There were a number of specific
8 questions that I think had been addressed to Mr. Ross for
9 underlying that data, and that's when this issue came up
10 last week.

11 MR. KIM: And I was a little confused because some of
12 the descriptions of the information were starting to
13 overlap. I think we have a handle on what it is we're
14 exactly looking for, and I think we have most of it.
15 Before I'd say we have everything or that we're allowed to
16 turn everything over, I want to double-check that tonight,
17 and tomorrow morning we'll have that and get closer to the
18 triple digit number as far as the exhibits go.

19 HEARING OFFICER TIPSORD: Mr. Zabel, did you have
20 some additional follow-up?

21 Q. (by Mr. Zabel) A couple of follow-ups on what
22 Mr. Rieser asked. You answered considering wildlife
23 economics. I don't know if the question included
24 recreation economics. Was your effort in the recreational

1 efforts to review other people's work?

2 A. Yes.

3 Q. And as you concluded on health defects, the
4 conclusions in your report are based on that review?

5 A. Yes. That's correct.

6 Q. They're not your own?

7 A. I did not do primary research in that area.

8 Q. On the ICF report, would your involvement with
9 ICF be described after they completed their modeling
10 effort?

11 A. Yes.

12 Q. So, you had no input into that modeling?

13 A. I had no input.

14 Q. Are you a member of the American Economic
15 Association?

16 A. I am not.

17 MR. ZABEL: I have nothing more.

18 HEARING OFFICER TIPSORD: Question 7 and 8 look like
19 they're going to take us some time. So, that being the
20 case --

21 MR. RIESER: We finished 6 and --

22 HEARING OFFICER TIPSORD: We did finish 6 because we
23 talked about retention for contact.

24 MR. RIESER: I think we were jumping ahead, but in

1 terms of the nature of the retention and things of that
2 nature.

3 MR. ZABEL: Scope of the work which presumably will
4 answer that question.

5 MR. KIM: I thought that was more a document request
6 than a testimony request.

7 MR. ZABEL: It sounds like litigation.

8 HEARING OFFICER TIPSORD: Let's wrap it up this
9 evening.

10

11 (Proceedings adjourned for June 22, 2006.)

12 (Proceedings continue on Friday, June 23, 2006.)

13

14 HEARING OFFICER TIPSORD: Good morning. And question
15 number 6.

16 Q. (by Mr. Rieser) I think it was my lack of
17 satisfaction that we were debating, if I may say that.
18 And even though we're going to get the scope of work, Dr.
19 Hausman, could you tell us simply what you were retained
20 by the IEPA to do?

21 MR. AYRES: Before we go to that question,
22 yesterday -- I don't remember which of the attorneys for
23 the utilities asked, but one of the questions put to Dr.
24 Hausman related to the qualifications of his colleagues at

1 his firm, and I think he's prepared to speak to that point
2 this morning. I wonder if we shouldn't start there and
3 move on to questions that you had.

4 MR. RIESER: That's fine.

5 A. (by Dr. Hausman) All right. I mentioned Dr.
6 William Steinhurst, who has a Ph.D. in mechanical
7 engineering and a Master's degree in statistics both from
8 the University of Vermont, and who served as director for
9 regulated utility planning at the Vermont Department of
10 Public Service from 1986 to 2003, and has since been a
11 consultant in electricity market economics and has
12 performed studies, written papers and reports, offered
13 testimony in impacts of electricity market regulations for
14 numerous clients and states.

15 Dr. David White has a Ph.D. in civil and
16 environmental engineering from Massachusetts Institute of
17 Technology and a Master's in Physics from Case Western
18 Reserve, and he has also been working since 1980 in energy
19 and environment economics.

20 Mr. Bruce Biewald, who is the President of Synapse
21 Energy Economics, has a Bachelor's degree in architecture
22 from MIT and has done a certain amount of coursework at
23 Harvard University and Harvard Extension School, and I
24 don't know the specific courses in economics that he's

1 taken, but he's taken a number of economic classes there.

2 So, despite having among us 11 college and post
3 graduate degrees from some of the most highly respected
4 universities in the world, despite over 80 years of
5 combined experience in energy and environment economics
6 and the fact that we have offered hundreds of papers and
7 reports in this area and relied upon by clients, including
8 numerous government agencies, both federal and state, for
9 our expertise in this area, no one on our team has ever
10 pursued a degree in the field of economics from any
11 university.

12 MR. AYRES: Which probably explains why the
13 understanding is there.

14 MR. ZABEL: Are you testifying or questioning,
15 counsel?

16 MR. AYRES: I have a question.

17 HEARING OFFICER TIPSORD: He has been sworn in.

18 MR. ZABEL: I've never been able to distinguish.

19 Q. (by Mr. Ayres) Dr. Hausman, have you taught
20 any classes related to the economics of utility markets?

21 A. Yes, I have. I have taught seminars at the
22 Massachusetts Institute of Technology on electricity
23 pricing under the LMP system, on hedging of electricity
24 using the financial transmission rates or their analogs in

1 different markets. I have also led seminars in those
2 areas for FARC (phonetic), for the staff at ERCOT, twice
3 actually at ERCOT and twice at FARC (phonetic) and for
4 numerous private clients and for groups on a pay per
5 student basis.

6 Q. And just a final question. Have you authored
7 any peer review writings in this field?

8 A. I have. I have written two papers which were
9 in peer review journals on electricity market issues. One
10 was on the California electricity prices and some of the
11 dynamics having to do with demand under scheduling in that
12 -- during this period, and another on pricing of losses in
13 electricity markets, and my other reports, most of which
14 are listed on my resume -- it's not completely up-to-date
15 -- have not been in peer review papers. They've often
16 been requested by clients or been Synapse papers that have
17 been put out.

18 HEARING OFFICER TIPSORD: Mr. Rieser's question.

19 Q. (by Mr. Rieser) So, back to my question, what
20 were you retained by the agency to do?

21 A. We were retained by the agency specifically to
22 review the economic impacts aspects of the TSD. We were
23 asked to review the IPM model results that were produced
24 by ICF and to give our opinion of their -- just sort of

1 give a second look at those, whether we felt they were
2 reflective of the -- whether they represented the rule
3 accurately and were reflective of the impact that it was
4 likely to have on the Illinois electricity sector and on
5 the economy in general.

6 Q. Do you know why you were retained by the IEPA
7 to do this?

8 A. Well, I think they were just being
9 particularly cautious. They felt the IPM model results
10 were a crucial part of the foundation, the justification
11 for the rule, that they would be challenged by anybody who
12 was questioning the rule, and that they wanted to make
13 sure all their ducks were in a row in terms of making sure
14 that they had been adequately reviewed by experts in the
15 field.

16 Q. And was it your conclusion as expressed in
17 your testimony that their ducks were, in fact, in a row?

18 A. My conclusion as expressed in my testimony is
19 that the ICF -- the IPM model results were extremely
20 conservative, and that they -- the way that they had
21 actually modeled the rule tended to exaggerate the cost
22 impacts on electricity costs and, therefore, by extension,
23 the impacts on the economy in Illinois. So, that it was,
24 in fact, a very conservative study.

1 Q. And at the time when you were retained, had
2 the IEPA -- do you know whether the IEPA had already filed
3 the TSD?

4 A. Yes, they had already filed the TSD.

5 MR. RIESER: Thank you.

6 HEARING OFFICER TIPSORD: Question number 7.

7 Q. (by Mr. Rieser) I'm sorry. If I can. It's
8 correct that you had no involvement whatsoever in the
9 drafting of the Section 9 of the TSD that deals with the
10 ICF report?

11 A. That's correct.

12 Q. And you had no contact with ICF while they
13 prepared the report that is attached to the TSD?

14 A. Yes. That's correct.

15 MR. RIESER: Thank you.

16 HEARING OFFICER TIPSORD: Question number 7.

17 A. Question number 7, did you rely on testimony
18 or information prepared by Dr. Staudt? I would say I
19 relied on information prepared by Dr. Staudt in the sense
20 that I relied upon the conclusions that are presented in
21 Chapter 8 of the TSD. And I also did exchange e-mail with
22 Dr. Staudt when I wanted clarification of what some of
23 the -- what those numbers represented or confirmation of
24 my understanding.

1 HEARING OFFICER TIPSORD: Mr. Bonebrake.

2 Q. (by Mr. Bonebrake) You mentioned that you had
3 e-mail communications with Dr. Staudt?

4 A. Yes.

5 Q. How many?

6 A. I would say perhaps two times regarding
7 content of the TSD.

8 Q. And you sent some inquiries in writing?

9 A. Through e-mail, yes. I know -- I certainly
10 know that I did once and I probably did twice.

11 Q. And did he respond to you in writing?

12 A. Again, at least once and perhaps twice.

13 Q. On that one occasion that you do specifically
14 remember, what was the nature of your inquiry?

15 A. My inquiry was what -- I wanted to confirm
16 what dollar years -- what year dollars his results were
17 presented in.

18 Q. And did you get a response?

19 A. Yes, I did.

20 Q. And what was that response?

21 A. 2006 -- That I should assume they're in 2006
22 dollars.

23 Q. And was that inquiry regarding what years
24 specifically directed to Table 8.7 of the TSD?

1 A. Yes.

2 Q. And do you recall any other communications
3 specifically with Dr. Staudt regarding the TSD?

4 A. Not specifically, no.

5 HEARING OFFICER TIPSORD: Mr. Rieser.

6 Q. (by Mr. Rieser) Did you make any attempt to
7 assess the quality of Dr. Staudt's cost estimates?

8 A. I did not.

9 Q. Okay. Did you compare Dr. Staudt's estimates
10 of the control technology cost to those used by ICF in its
11 IPM analyses which were provided to ICF by IEPA? And I
12 can direct your attention to Table 3.2 of the Appendix of
13 the ICF report. Table 3.2, which is actually in the
14 Appendices to the ICF report. So, it's towards the end.
15 It's actually the second to last page. It says, "Changes
16 in Mercury Control Cost," Table 3.2.

17 A. I did not specifically compare those costs to
18 the costs that are in the TSD.

19 Q. Do you have an understanding of what Table 3.2
20 represents?

21 A. I would say not completely, no.

22 Q. Have you seen Table 3.2 before?

23 A. No, I have not reviewed Table 3.2.

24 Q. So, you didn't review the complete ICF report

1 in preparing your testimony?

2 A. My instructions were specifically not to audit
3 the underlying data and replicate the model in the study
4 based on the fact that there was not a great deal of time
5 between the time that we were retained and the time that
6 testimony had to be filed. So, our instructions were to
7 review their modeling approach and the outcome of their
8 model and to accept -- We were not auditing their data.

9 Q. So, your task was to -- My recollection is
10 that you said your task was to review what they had done
11 and make sure all their ducks were in a row, I think was
12 the phrase you used?

13 A. Specifically with regard to their modeling
14 approach and whether they did a reasonable job in our
15 opinion of representing the proposed rule, yes.

16 Q. And in evaluating their modeling approach, you
17 didn't think it was important to look at the cost inputs
18 or other data that they used?

19 A. Again, our understanding communicated by the
20 Illinois EPA was that that had already been thoroughly
21 reviewed, that there had been a process involving Dr.
22 Staudt, involving EPA staff and ICF of going through the
23 data, and that our task was not to audit the data, but to
24 review the modeling approach.

1 Q. It's correct then that you're not in a
2 position to testify in support of any of the cost inputs
3 or other data used by ICF in preparing their reports or
4 the information that's contained in Section 9 of the TSD;
5 correct?

6 A. I would not say that it's correct that I -- I
7 am prepared to testify with regard to data that is
8 presented or results that are presented in Section 9 of
9 the TSD, taking as given that I did not participate in
10 producing the underlying data inputs to the model.

11 A. (by Mr. Ross) This is Jim Ross with the
12 Illinois EPA. And questions regarding that, I am on the
13 panel to address, along with Dr. Staudt behind you, who
14 had a role in that, and any other questions on Section 9
15 and Section 10.

16 MR. RIESER: I'm sorry. Miss Court Reporter, could
17 you read my question back?

18

19 (Court Reporter read back following question:
20 "It's correct then that you're not in a position to
21 testify in support of any of the cost inputs or other data
22 used by ICF in preparing their reports or the information
23 that's contained in Section 9 of the TSD; correct?")

24

1 Q. (by Mr. Rieser) And the answer to that
2 question, as I understand it, yes, that is correct?

3 A. No, I disagree with that. There were two
4 parts of your question. One had to do with data, in which
5 I am not prepared to either endorse or criticize the input
6 data because I did not have a part in producing it, nor
7 did I audit personally. However, as far as the
8 information presented in Section 9 of the TSD, I took that
9 as a broader question, and I am prepared to testify on
10 that -- on much of that information.

11 Q. And is there somebody from the agency who is
12 prepared to testify about the validity of the input data
13 used by ICF?

14 A. (by Mr. Ross) Yes, I believe so. From the
15 agency, plus Dr. Staudt is here, who had a role in the
16 modifications made to that table that we supplied to
17 ICF -- the table in reference.

18 Q. I see. Maybe Dr. Staudt could describe his
19 role in the modifications of this particular table?

20 A. (by Dr. Staudt) Table 3.2 is essentially a
21 look-up table that is used in the integrated planning
22 model. What it does is, it has -- The way IPM works is it
23 looks -- for each plant, it looks for a particular
24 configuration, whether coal type, existing pollution

1 control technology, sulfur grade low or high, and what it
2 does is, it looks at -- it then calculates the capital
3 cost components and OM cost components, and for each one
4 of those 2, 3 and 4, there are algorithms that are
5 referred to. So, my role was to take that look-up table
6 that ICF already had, but uses what is my opinion outdated
7 information from several years ago that was put together
8 based upon input from me several years ago to EPA, and
9 then bring it up-to-date in recognition of the available
10 technologies that exist today.

11 Q. Could you tell us what IPM's cost and percent
12 removal assumptions were before you changed them?

13 A. (by Dr. Staudt) They had -- I think there
14 was -- I don't recall exactly what they were. They had
15 different -- Here we go. They had a 60 percent removal,
16 and there was also a 90 percent -- I believe there was a
17 90 percent removal look-up table, one look-up table for
18 60 percent, one look-up table for 90 percent.

19 HEARING OFFICER TIPSORD: Mr. Bonebrake.

20 Q. (by Mr. Bonebrake) Can you identify the
21 document that you were using to refresh your recollection?

22 A. This is -- This document is a marked up
23 version. It comes from the IPM report. It's basically a
24 discussion of background on the IPM that is available on

1 EPA's web site, and essentially it is a look-up table
2 that's in the integrated planning model. I marked it up
3 to bring it up-to-date to what the state of current
4 technology is.

5 Q. The document you were just looking at is not
6 included in Exhibit C?

7 A. I don't know what Exhibit C is.

8 Q. It's the ICF report.

9 A. (by Dr. Hausman) You mean Appendix C?

10 Q. It's marked as Exhibit C or Appendix C.

11 MR. RIESER: It's Appendix C.

12 A. (by Mr. Ross) The actual marked up document
13 is not in there. The final version that IPM used or ICF
14 used in the IPM model is the version contained in the TSD.
15 This is more like what I would describe as a notes page
16 with Dr. Staudt's handwriting on it where he scratched
17 some notes. We had a conference call with ICF, with Dr.
18 Staudt on the line, where we discussed a lot of this
19 information and revisions we were making to the input that
20 ICF would go forward with to model our rule. We had
21 several conference calls with ICF, in fact, to discuss how
22 they would model our rule and the inputs they would use.

23 Q. (by Mr. Bonebrake) So that I'm clear then, is
24 the final list of inputs as revised by Dr. Staudt then

1 listed anywhere in the ICF report that was filed with the
2 TSD?

3 A. (by Mr. Ross) I believe it's the table you
4 referred to, Table 3.2. That's what we've been
5 discussing.

6 Q. So, Table 3.2 reflects whatever updates then
7 that Dr. Staudt made?

8 A. (by Mr. Ross) That's correct.

9 Q. (by Mr. Rieser) It's correct, isn't it, that
10 one of the changes that you made was to ask ICF to look at
11 a 90 percent control strategy?

12 A. (by Mr. Ross) We asked ICF to model our rule.
13 We provided them with the parameters of our rule at the
14 time and asked them for guidance and assistance on how
15 best to model it to reflect the -- or to provide results
16 that would reflect the economic impact of the rule.

17 Q. And what control assumptions did you ask ICF
18 to use with respect to the rule?

19 A. (by Mr. Ross) I believe that's what's
20 reflected in the table.

21 Q. I believe -- and correct me if I'm wrong --
22 that that was one of the things that you had changed from
23 what they had done before?

24 A. (by Mr. Ross) That's correct.

1 Q. And what did they do before, and what did you
2 change it to?

3 A. (by Mr. Ross) Well, the main change that was
4 done is the cost of mercury controls were changed to
5 reflect what was believed to be the current costs
6 associated with those controls per Dr. Staudt's research.

7 Q. So, for example, with respect to the
8 bituminous -- the items on the bottom of Table 3.2,
9 they're listed as subbituminous from 20 down, number 20 --

10 A. (by Dr. Staudt) Yes.

11 Q. -- through 26? Is it correct that one of the
12 changes that was made here was that ICF had all of these
13 facilities requiring fabric filters to meet 90 percent
14 control level?

15 A. (by Dr. Hausman) I'd like to speak to that
16 because ICF --

17 Q. I'm sorry, Dr. Hausman. I believe you said
18 that you hadn't reviewed this before?

19 A. I'd like to speak to how this is implemented
20 in the model.

21 Q. I'm not asking how it is implemented in the
22 model. I'm trying to figure out what data he used, and
23 that question is directed to Mr. Ross and Dr. Staudt
24 because apparently they know what is in the table.

1 A. (by Dr. Staudt) Just so you understand how
2 this is used, the information that ICF previously had in
3 its model was based upon strictly untreated carbon -- okay
4 -- and untreated carbon is not capable of 90 percent
5 removal upstream of an ESP on subbituminous coal. Okay.
6 So, the background is that ICF's model -- with the data
7 that ICF had had, which I had a role in preparing years
8 ago, is dated because the new technology that I've
9 testified about. As a result of the new technology, the
10 improvements in technology, it was -- I felt it was
11 important in order to get an accurate -- the best
12 information on what the current rule would cost to update
13 the control technology cost configurations that were in
14 IPM, and that is why they were updated by me.

15 Q. Okay. And is it true that one of the updates
16 that you made was the removal of the cost of fabric filter
17 for the subbituminous facilities?

18 A. (by Dr. Staudt) That is correct.

19 MR. RIESER: Thank you.

20 HEARING OFFICER TIPSORD: Dr. Hausman, I'd like to
21 hear what you have to say how this material is used in
22 modeling, if you have anything to add.

23 A. (by Dr. Hausman) My pleasure. The way the
24 model works is that the -- it's a long-term equilibrium,

1 it's a capacity expansion model, so that it minimizes cost
2 over the entire study period subject to certain
3 constraints. And one of the ways the model can meet
4 constraints such as emissions controls is by selecting an
5 optimal mix -- optimal with respect to the input data --
6 an optimal mix of pollution control technology for the
7 resources that are represented in the model, which is what
8 I was taking issue with. The ICF does not choose
9 exogenously to the model what technologies will be put on
10 which resources at which time. The model itself is used,
11 in fact, largely the part of the model, the model itself
12 chooses from a menu of options, each of which has cost and
13 emissions control characteristics, what to put on
14 different plants during different years of the study
15 period. So, what Dr. Staudt updated were the
16 characteristics of that menu of options. What was the
17 cost of certain retrofits for emissions control and what
18 were their effects in terms of reducing emissions from the
19 plants.

20 HEARING OFFICER TIPSORD: Thank you, Dr. Hausman.
21 Mr. Zabel.

22 Q. (by Mr. Zabel) Yes. Dr. Hausman, you
23 mentioned you had gotten some intermediate results from
24 ICF; is that correct?

1 A. Yes, I did.

2 Q. And I believe Mr. Kim said we would get
3 copies. Let me ask you concerning those, were those model
4 runs?

5 A. The intermediate results?

6 Q. Yes.

7 A. They were -- Yes, they were produced in the
8 course of model runs.

9 Q. And did they use the updated version of Table
10 3.2 with Dr. Staudt's update, or were they run on the
11 earlier version of Table 3.2, if you recall?

12 A. Well, it's not a matter of recollection. It's
13 a matter of I can only report what they told me, which is
14 that the intermediate results were specifically for the
15 model runs that were used for the TSD. So, I would say
16 that they used the updated data from Dr. Staudt.

17 HEARING OFFICER TIPSORD: Excuse me, Mr. Zabel. I'd
18 like to make a point of clarification. You talked about
19 an updated version of Table 3.2. I believe that Table 3.2
20 is what was the information used by ICF to prepare the
21 information technology support document. So, I don't
22 think it's technically correct to say an updated Table
23 3.2, just for clarification on the record.

24 Q. (by Mr. Zabel) Do you know whether ICF did

1 any runs on the earlier version of Table 3.2?

2 A. Again, I agree with Madam hearing officer that
3 there was no earlier version of Table 3.2. ICF had been
4 using an earlier look-up table for the purposes of doing
5 CAMR analysis for the USEPA, but my understanding -- and
6 Mr. Ross can confirm this -- is that they used the updated
7 version for their runs that are reported in the TSD.

8 Q. Does that mean that their work for CAMR would
9 have overstated technology costs?

10 A. For the USEPA?

11 Q. Yes.

12 A. I'm not going to comment on whether it
13 overstated technology costs because I'm not an expert on
14 technology costs, but it would not have been consistent
15 with the costs that we've heard about today.

16 Q. It would not have been consistent with the
17 inputs that Table 3.2 that Dr. Staudt made?

18 A. Yes. That's correct.

19 MR. ZABEL: Thank you.

20 HEARING OFFICER TIPSORD: Mr. Rieser.

21 Q. (by Mr. Rieser) They would, in fact, be
22 higher; correct?

23 HEARING OFFICER TIPSORD: Which would be higher?

24 MR. RIESER: The costs.

1 HEARING OFFICER TIPSORD: Which costs, the CAMR?

2 MR. RIESER: No. The costs that Dr. Hausman was just
3 talking about would not be consistent.

4 A. (by Dr. Staudt) When you say "the costs that
5 Dr. Hausman" was describing, which costs that he was
6 describing?

7 MR. RIESER: Would you please read his answer back?

8

9 (Court Reporter read back following answer: "I'm not
10 going to comment on whether it overstated technology costs
11 because I'm not an expert on technology costs, but it
12 would not have been consistent with the costs that we've
13 heard about today.")

14

15 Q. (by Mr. Rieser) So, what we're talking about
16 are the technology costs that you said were overstated?

17 HEARING OFFICER TIPSORD: I believe --

18 A. (by Dr. Staudt) I didn't say that.

19 Q. (by Mr. Rieser) You said they were -- Go
20 ahead.

21 A. (by Dr. Staudt) Let me address that. In the
22 event IPM -- and IPM considers many things, besides
23 mercury control technology costs in selecting -- in making
24 a selection, but in the event when you look at this Table

1 3.2 versus what was originally -- the original look-up
2 table in IPM, the costs reflected for each one of these
3 configures in Table 3.2 for a given configuration would be
4 less than for a given configuration and fuel type in the
5 original look-up table.

6 HEARING OFFICER TIPSORD: Mr. Zabel.

7 Q. (by Mr. Zabel) That's due to the elimination
8 of the need for fabric filters on certain of those
9 configurations?

10 A. (by Dr. Staudt) In part, but also because of
11 the elimination -- because of the lower sorbent demand due
12 to halogenated sorbents being more effective than
13 untreated sorbents.

14 Q. Which in turn is part of the reason for the
15 elimination of fabric filters?

16 A. (by Dr. Staudt) That is correct.

17 HEARING OFFICER TIPSORD: We're ready to move on to
18 question 8.

19 MR. RIESER: Not quite yet.

20 Q. (by Mr. Rieser) Dr. Hausman, why did you rely
21 on Dr. Staudt's technology costs estimates, not the cost
22 estimates that the IEPA collected for the ICF to use?

23 A. Why did I rely -- Could you repeat the
24 question?

1 MR. RIESER: Could you read it back, please?

2

3 (Court Reporter read back last question.)

4

5 A. (by Dr. Hausman) In reviewing the ICF model
6 runs, I was reviewing the modeling approach subject to the
7 data that ICF was instructed to use by the Illinois EPA.
8 In looking at the cost of implementation or one example of
9 the cost of implementation, I looked at the costs that are
10 presented in the TSD for implementation, aggregate costs
11 which were produced by Dr. Staudt. I did not feel that
12 the aggregate costs that were produced by the ICF model
13 were representative of the actual costs because that model
14 was overly conservative in the way that it was
15 implemented. My understanding is that the technology
16 costs that were implemented in the ICF model were provided
17 by Dr. Staudt and are consistent with the technology costs
18 that are presented -- that were presented in all parts of
19 the TSD.

20 MR. RIESER: Thank you.

21 HEARING OFFICER TIPSORD: Question number 8. And I
22 think we've covered this. We discussed the one table.
23 What information did you rely on in the TSD?

24 A. In the TSD -- I was going to just look at a

1 table of contents to give you a thorough answer. Well, I
2 mentioned that I reviewed -- I relied on the aggregate
3 costs of implementation of the rule, both the variable
4 costs and the capital costs that are presented in Section
5 8 of the TSD. I relied on aspects of Section 9 of the
6 TSD, but more specifically on the ICF report that was
7 provided with the TSD, at least provided to me with the
8 TSD, and appendices, specifically Appendix A and B of the
9 ICF report, for my understanding of -- my initial
10 understanding of the IPM model implementation. I was
11 assisted in understanding the proposed rule through the
12 TSD, specifically Section 7 of the TSD, and I found
13 Section 3 of the TSD helpful in giving me a sense of how
14 the Illinois EPA interpreted health effects and in guiding
15 me in research in that area. And, finally, I used Section
16 10 of the TSD similarly as -- I reviewed Section 10 of the
17 TSD and used that as a basis of my research in looking at
18 other impacts.

19 HEARING OFFICER TIPSORD: Go ahead, Mr. Zabel.

20 Q. (by Mr. Zabel) Yesterday, Dr. Hausman, I
21 believe you testified that for your conclusions on health
22 effects, you relied on things you reviewed. Was Chapter 3
23 the only thing you relied on?

24 A. No, it's not. I've looked at the source

1 material that was used for Chapter 3. I did some
2 independent research to see whether there were other
3 sources I could rely on for modification of health impacts
4 of mercury contamination. And I obtained or read a
5 Harvard/NESCAUM study so that I could fully understand the
6 basis of those health estimates that are presented in the
7 TSD.

8 Q. Aside from the items referenced in Chapter 3
9 and the Harvard studies, you mentioned other studies.
10 Could you identify them for us, please?

11 A. I was unable to locate other studies that I --
12 any other studies really that monetized the health impacts
13 of mercury loadings.

14 Q. So, it was the sources referenced in Chapter 3
15 and the Harvard study, those were the things you reviewed?

16 A. Yes, primarily the Harvard/NESCAUM study.

17 Q. And for the conclusions you reached on Chapter
18 -- Strike that. And for the conclusions you reached on,
19 for instance, recreational benefits, if you will --

20 A. Yes.

21 Q. -- you relied on the sources cited in Chapter
22 10?

23 A. Yes. Once again, I tracked those sources
24 down. I looked at the original source material on which

1 it's based, which comes from the U.S Fish and Wildlife
2 Service, the American Sport Fishing Association and the
3 Illinois Department of Natural Resources. I believe and I
4 confirmed that those were the numbers -- those numbers
5 were accurately reported, and that they were appropriate
6 for use as they were used in the TSD, in my opinion.

7 Q. When you say "looked at," you read them?

8 A. Yes, I did.

9 Q. No outside sources but those you cited in
10 Chapter 10?

11 A. In terms of the economic value of sport
12 fishing in Illinois?

13 Q. Yes.

14 A. No other sources.

15 HEARING OFFICER TIPSORD: Mr. Bonebrake.

16 Q. (by Mr. Bonebrake) In Section 3, there's a
17 citation for Trasande study. Do you recall that reference
18 in Section 3 of the TSD?

19 A. Can you refer me to a page number?

20 Q. There's a Table 3.1, for instance, on Page 47
21 of the TSD.

22 A. Okay. I see table 3.1.

23 Q. In the upper right, you reference Trasande?

24 A. Yes.

1 Q. And did you rely upon that study?

2 A. I did not review that study.

3 Q. You did not review it?

4 A. I did not, no.

5 Q. So, that means you did not rely on it?

6 A. That is correct.

7 HEARING OFFICER TIPSORD: Then b, to your knowledge,
8 who prepared the information that's contained in the TSD?
9 I think it wasn't directly answered.

10 MR. ZABEL: I think that's been answered.

11 HEARING OFFICER TIPSORD: If you're fine with it, I'm
12 fine with it. That takes us to Kincaid's prefile
13 questions, Ezra Hausman.

14 MR. FORCADE: Dr. Hausman, I don't know if the first
15 question has been asked specifically, but I don't believe
16 we've answered it specifically.

17 A. The first question from Kincaid?

18 MR. FORCADE: Correct.

19 A. Did you receive any information from the
20 agency prior to forming any opinions, including, but not
21 limited to, the opinions contained in your testimony? The
22 answer to that is, yes. I received the TSD. I received
23 the ICF report and the appendices thereto. I received the
24 model output that ICF had delivered to the EPA in terms of

1 the results of their model runs that are described in the
2 ICF report. And upon request, I received the intermediate
3 files that I have earlier described.

4 HEARING OFFICER TIPSORD: Miss Rahill.

5 Q. (by Ms. Rahill) Did you say EPA or IEPA?

6 A. I don't know what I said, but I meant IEPA.

7 Q. (by Mr. Forcade) Did you say that you had
8 also reviewed the inputs to the model?

9 A. I don't think I referred to reviewing anything
10 in my answer to the previous question. I said what I
11 received.

12 Q. Did you receive the inputs to the model?

13 A. I received the appendices to the ICF report,
14 and they describe the changes to the inputs in the model.
15 Appendix C, which is something identified earlier,
16 describes the changes to the inputs to the model.

17 HEARING OFFICER TIPSORD: E.

18 A. E. We have a funny numbering scheme here. E,
19 is, if so, did you rely on that information in forming any
20 opinions or testimony? The answer is, yes, I did.

21 F, if so, specifically what opinions or parts of your
22 testimony rely on the information that you received from
23 the agency? The answer is all of the analysis of the IPM
24 model runs relies in part on information that I received

1 from the agency. And as I described earlier, my research
2 and my conclusions regarding the broader economic impact
3 of the rule also rely in part on information that was
4 received from the IEPA.

5 Q. So, the information would be -- you relied
6 upon would be material that you received from Illinois
7 EPA?

8 A. Yes.

9 Q. And the research that you described in
10 response to a request from Mr. Zabel?

11 A. Are you asking me if that's the sum total of
12 what I relied upon?

13 Q. Yes.

14 A. No, that is not the total I relied on.

15 Q. What remaining information did you rely on?

16 A. I relied upon a study which was produced by
17 Synapse analyzing the employment impact of changes in
18 electricity rates in Illinois specifically, which was
19 produced by Dr. William Steinhurst in 2003, which I have
20 provided to Mr. Kim, and I believe we have copies -- we
21 are making copies of that study because I anticipate that
22 the board and counsel will want to review that. But that
23 study using the REMI model, which is an economic model,
24 assessed for a proposed comment rate increase in 2003 what

1 the employment impact would be and, as a part of that,
2 developed a relationship between electricity prices and
3 employment in the State of Illinois. So, I relied on that
4 in part for my testimony. Can I finish the question?

5 MR. ZABEL: Sure. Go ahead.

6 A. And in addition, I would say that I relied a
7 great deal on my own experience and knowledge in modeling
8 and analyzing electricity markets.

9 HEARING OFFICER TIPSORD: Remember, you're dealing
10 with lawyers. We see a pause. It's time for a question.
11 Mr. Zabel.

12 Q. (by Mr. Zabel) I only did that because I
13 didn't want to interrupt Mr. Forcade, but I wanted to know
14 if that's the CUB study you refer to in your testimony --
15 Citizens Utility Board study?

16 A. I guess I have to look at my testimony.

17 Q. I think --

18 A. I've actually done studies for CUB.

19 Q. I think it's on Page 21. It may save me
20 asking that question later.

21 A. Yes. That is correct. That's the CUB study.

22 Q. And we're getting copies of that?

23 A. Yes.

24 MR. ZABEL: Thank you. Excuse the interruption.

1 A. Let me just note that it says on the cover, I
2 noticed as I was giving it to Mr. Kim, it says "Draft. Do
3 not cite or circulate." You may disregard that note on
4 the cover of the study.

5 HEARING OFFICER TIPSORD: Ready to go on.

6 MR. FORCADE: Uh-huh.

7 HEARING OFFICER TIPSORD: Question 2 and 3 were
8 similar to questions from Dynegy. Would you like to take
9 a second to see if you have any follow-up on those.

10 MR. ZABEL: I have follow-up.

11 Q. (by Mr. Zabel) Did you do any independent
12 modeling in connection with your work for the Illinois
13 EPA?

14 A. Well, the word "modeling," you know, is a very
15 broad word. If your question is, did I run an electricity
16 market dispatch model similar to ICF or Market Zip or
17 Maps, the answer is, no.

18 MR. ZABEL: I'll accept that amendment to my
19 question. Thank you.

20 HEARING OFFICER TIPSORD: Mr. Forcade, did you want
21 to check 2 and 3.

22 MR. FORCADE: No, I have nothing on 2 and 3. I'm
23 ready for 4.

24 HEARING OFFICER TIPSORD: Thank you. We'll move on

1 to question number 4.

2 A. Question number 4 is, have you reviewed the
3 information acquired by the agency from any of the site
4 inspections at each of the Illinois coal-fired power
5 plants (control configuration inspections) during late
6 April, early May of 2006? And the answer to that is, no.

7 HEARING OFFICER TIPSORD: Question 5.

8 A. Did you assist in writing any portion of the
9 TSD? I think we've already covered that, and the answer
10 is, no, I did not.

11 HEARING OFFICER TIPSORD: Question number 6.

12 A. Question number 6, in your testimony, you
13 state that you rely on data provided by ICF Corporation.
14 Again, are you satisfied that this has been answered?

15 Q. (by Mr. Forcade) I believe so. We're talking
16 about the material you described receiving from ICF, plus
17 the Appendix C information?

18 A. Appendix -- I received all of the appendices
19 to the report. There are three of them.

20 Q. Uh-huh.

21 A. And I would say that I relied most heavily on
22 Appendices A and B, which describe the output. Appendix A
23 is tables summarizing the output of the model, and B is a
24 description -- let's see how do they describe it -- yeah,

1 overview of the modeling framework. So, since, again, my
2 task was to review the model and not to audit the data, I
3 relied less heavily on Appendix C.

4 Q. And for sub "b" of that, you would
5 specifically not having audited the data, did not know who
6 participated in the evaluations and preparation of that
7 data, other than ICF?

8 A. I only know through hearsay. Jim could
9 probably address that question better if you'd like.

10 A. (by Mr. Ross) This is regarding inputs to the
11 model, how did we arrive? That's addressed in Section 9
12 of the TSD. As far as what was revised, Page 167, there's
13 a bullet point listing of the parameters that were
14 revised, and these were arrived at through discussions
15 with -- well, we discussed several times, as I mentioned,
16 in conference calls with ICF on how best to model
17 Illinois' rules, and, of course, one of the things that we
18 all agreed upon was we needed accurate data to model. So,
19 there's four bullet points there, and they enumerate the
20 changes to previous inputs that were in the model. Cost
21 of mercury controls is the first one. Coal type utilized
22 by Illinois EGU's was the second one. And that has been a
23 steady switching of coal types in Illinois from bituminous
24 to western subbituminous coals. The third bullet point is

1 existing control configurations at Illinois EGU's. They
2 provided this with the previous control configurations
3 that they had modeled, and we found errors and corrected
4 them. And the fourth bullet point is the estimated
5 mercury emissions from Illinois EGU's. As a result of the
6 switching of coals and the increased coal use, the mercury
7 emissions in Illinois have also increased, and, so, we've
8 revised the emissions that they model.

9 Q. (by Mr. Forcade) Again, I believe it was
10 directed more literally to who participated in the
11 evaluation and preparation? When you say "we," would that
12 be the Illinois EPA?

13 A. (by Mr. Ross) Illinois EPA provided the data,
14 along with Dr. Staudt, to ICF.

15 HEARING OFFICER TIPSORD: Mr. Rieser.

16 Q. (by Mr. Rieser) Mr. Ross, if you turn over to
17 Page 169 of the TSD, there's a description about the
18 second bullet point, which starts out second. It says,
19 "Rather than model unit level emission rate for existing
20 units, ICF simulated level emission rates on unit level
21 caps calculated by IEPA." Do you see that?

22 A. (by Mr. Ross) Yes, I see that.

23 Q. Do you know whether the IPM is capable of
24 modeling unit specific rate limits?

1 A. (by Mr. Ross) I do not know that. I know
2 that we discussed with ICF several times, and they
3 provided guidance to us on how best to model our rule, and
4 we provided them with the information that they
5 recommended, and we asked them to fully explain all the
6 changes and limitations of the modeling in their final
7 report, and that's what you see represented here, is
8 basically a publishing of their final report in our TSD.

9 Q. So, do you know whether unit specific rate
10 limits was one of the choices that the IEPA had for ICF to
11 perform the modeling?

12 A. I believe the final choices were made by ICF.
13 We relied on their knowledge and experience on how best to
14 model our rule.

15 A. (by Dr. Hausman) Would you like me to comment
16 on that, as well?

17 Q. If you have some information on what the
18 discussions were between IEPA and ICF.

19 A. Well, my comment would be based on my
20 knowledge of a wide range of electricity market simulation
21 models.

22 Q. Okay.

23 A. And my conclusion would be that I don't know
24 of any model of this type, that is to say past the

1 expansion model, which can specifically model unit level
2 emission rate limits. What they usually would model is
3 either a total emissions or emissions by some subclass of
4 the model resources. So, in the case of modeling the CAMR
5 rule, the IPM model was used to -- the constraint was
6 total emissions throughout the United States of mercury.
7 In the case of modeling the proposed Illinois rule, the
8 constraint was total emissions by plant in Illinois. So,
9 it would be much more complicated from a modeling
10 standpoint. And then, as I say, as far as I know, it's
11 not been implemented in capacity expansion model to have
12 one of the -- to have one of the constraints be the
13 emission rate on a unit level.

14 Q. Do you know whether the IPM model is capable
15 of performing analysis used in unit specific rate limits?

16 A. I am not privy to the internal workings of the
17 IPM model any more than I could derive based on looking at
18 their intermediate data. So, I don't say that I know the
19 full capabilities of that model. As I say, I don't know
20 of models that can use that as a constraint. You can
21 model -- You know, the wording here can be interpreted
22 different ways. You can put rates -- The word "limits"
23 applies to a constraint. You certainly can model unit
24 level emission rates, but not unit level emission rate

1 limits in this kind of model.

2 MR. KIM: Just in case this comes back up, I want to
3 get this out.

4 HEARING OFFICER TIPSORD: This is the article that we
5 were discussing earlier, "Synapse Energy Economics, Inc.,
6 Fewer Jobs For Illinois, Employment and Other Impacts of
7 the Commonwealth Edison, Proposed Electricity Rate
8 Increases," dated November 12th, 2003, and we will mark
9 this as Exhibit 69, if there's no objection.

10 (No response.)

11 HEARING OFFICER TIPSORD: Seeing none, it's marked as
12 Exhibit 69.

13 A. (by Mr. Ross) I will say that during the
14 discussion we had with ICF on housing model our rule,
15 there were occasions where they offered us a choice. We
16 can do A, or we can do B, and the general guidance was,
17 select the more conservative approach. So, when we would
18 ask which one will give them more conservatives, and they
19 would answer, and we would say, "Do that. Model it that
20 way."

21 Q. (by Mr. Rieser) Do you know in what way
22 modeling from caps produces more conservative results?

23 A. (by Mr. Ross) No, I do not. I can't speak to
24 that.

1 A. (by Dr. Hausman) I'd be happy to address
2 that.

3 Q. That would be fine. Thank you.

4 A. Okay. Modeling based on unit level caps
5 decreases the flexibility of the model. So, the way that
6 the model as a working is that if a unit achieves a
7 90 percent -- a unit is allowed a certain level of mercury
8 emissions, which is based on a reduction from historical
9 emissions, the model is not allowed to re-optimize by
10 increasing the output of that unit because the emissions
11 of mercury per unit of output are already fixed. So,
12 there's much less flexibility in the model, and in that
13 sense, any time you decrease the flexibility in an
14 optimization model, you get -- you pay a penalty in terms
15 of the objective function, which in this case is the cost
16 of implementing the rule.

17 That's true. Another issue, which does not directly
18 relate to the question of rate caps, is that there's no
19 averaging in the model. It's just unit level -- I guess
20 it does relate to your question. There's unit level rate
21 caps instead of system level emission standards.

22 Q. And would it be accurate that the ICF
23 performed IPM model runs that looked at unit specific rate
24 limits for USEPA as part of the MacMurtry (phonetic) rule?

1 A. I'm not familiar with any runs that they did
2 looking at unit specific rate limits for the mercury rule.
3 I don't know why they would have since that is not the
4 nature of the penalty rule.

5 Q. And with respect to your answer about the caps
6 being lower -- I'm sorry -- the cap producing more
7 conservative results, is it also possible that if the cap
8 is set lower than what a unit can achieve with maximum
9 technology, then it has to reduce generation?

10 A. Well, first of all, it's important not to
11 confuse the model with the real world. So, the model only
12 represents the technology choices and effectiveness that
13 are given to it. So, if a model is given technological
14 options that would -- We could do a numerical example, but
15 since what's constrained in the model is the total output
16 of mercury, so, if the model has a technology choice which
17 reduces mercury by 90 percent, then it might choose that
18 at a higher level of electricity output or if there were
19 some technology choice that would only produce lower level
20 of mercury reduction, then the model would reduce the
21 output and choose that technology choice. So, in that
22 sense, it isn't a direct analog to the actual proposed
23 rule. It can choose this option of inferior technology
24 choice and lower output for a given unit.

1 Q. But it's correct, speaking about the model,
2 I'm assuming the IEPA put the model forward because it
3 served a purpose of representing a set of costs that they
4 thought would be useful to the board?

5 A. Yes, thought would be useful because --

6 Q. Excuse me. I'm not done with my question.
7 That was all preface, and you can attack it.

8 A. I don't intend to attack it.

9 Q. But based on that, based on what they did
10 produce, the question was specific to the idea as to
11 whether using a cap rather than a unit specific rate
12 produces more conservative or less conservative results --
13 the testimony was it's more conservative -- and I guess my
14 point is that isn't the other side equally true, that the
15 model terms may find it less expensive and more
16 economically efficient to simply reduce generation, which
17 is pretty much what ICF found anyway?

18 A. I suppose if you wanted to, you cook a model
19 to show that. It's not my sense that that was done in
20 this case. I think that the technology choices that were
21 given were all ones which reduced mercury emissions
22 consistent with the proposed rule, and, so, I can concur
23 with the agency that the modeling run was conservative and
24 possibly overstates the cost of the rule.

1 A. (by Mr. Ross) And I would say that on Page
2 169, on the second bullet point that we're referencing,
3 that the second to last sentence states, quote, "Note that
4 using caps to simulate a rate limit is a more restrictive
5 policy," unquote. So, that is ICF's statement. So, the
6 modelers themselves believed it to be a more restrictive
7 policy.

8 HEARING OFFICER TIPSORD: Mr. Zabel.

9 Q. (by Mr. Zabel) I think I understand, Dr.
10 Hausman, what you mean when you say "conservative," but it
11 seems your testimony goes beyond that, and I'll point out
12 what I'm looking at in your testimony, and you can explain
13 it to me. Page 2, you state that you believe your
14 analysis is more realistic, and I quote, "more realistic".
15 That I can understand. On Page 5, you indicate that the
16 IPM analyzes the problem in an, and I quote, "highly
17 simplified manner," close quote. On Page 7, you indicate,
18 and I quote again, "It is impossible to get meaningful
19 results," end of quote, and, finally, you say also on Page
20 seven, that the IPM model is, and I quote, "too coarse
21 grained and large scale," close quote, to provide adequate
22 precision. That seems to me to be more than a criticism
23 of conservative. Could you explain those comments for me,
24 please?

1 A. Sure. Could we take them one at a time?

2 Q. Do whatever you like.

3 A. We start on Page 5, and I say that, "In

4 tackling both complex problems at once of necessity, it

5 does both in a highly simplified manner." This is not a

6 criticism of the model. Okay? It is a model. All models

7 are simplifications of the systems that they are designed

8 to represent. If what I'm trying to imply here -- I think

9 it's clear in the paragraph if you read it as a whole.

10 What I'm trying to imply is that if one is modeling only

11 systems operations for, say, a one-year simulation or is

12 trying to model capital investment decisions without

13 trying to model the -- operate the detailed operations,

14 then either of those can be represented in a more detailed

15 and somewhat -- this is where the word "highly" comes in

16 -- a less simplified manner, but trying to model both

17 operations and investment and retrofit -- so, that's not

18 both, all -- all three types of decisions in the same

19 modeling exercise in a single -- in a single optimization

20 problem, they are forced as any modeling implementation,

21 even using super computers would be forced to do, they're

22 forced to simplify each of those aspects more than they

23 would do if they were modeling them alone, and that's

24 because of the exponential nature of the complexity of

1 modeling as you start to include more variables and
2 constraints. So, that is not a criticism of the model.
3 That is merely a statement of what happens when you try
4 and model. Okay.

5 Q. I don't mean to interrupt you. I'm going to
6 take them piece by piece. Maybe that's the best way to do
7 it. When you say "not a criticism," the model is
8 inherent?

9 A. It is inherent in trying to do that kind of
10 modeling exercise, yes.

11 Q. And what does it do to the liability or
12 precision of the results?

13 A. I would say that it does compromise the
14 precision of the results, and in terms of the reliability,
15 as with any modeling study, you make your set of
16 assumptions, you look at the output, you do a reality
17 check on it, and you have to use your judgment, and that's
18 why I have -- you know, my experience of running
19 electricity market models, analyzing the results has been
20 brought to bear on this, and I draw conclusions which I
21 describe in my testimony.

22 Q. We can take the next one.

23 A. So, we're moving to Page 7?

24 Q. Yes.

1 A. Now, which paragraph were you looking at?

2 Q. There were two, I believe, on Page 7. Let's
3 see if I can find them. The first full paragraph at the
4 end -- No. Wait. Sorry. I have many things underlined,
5 Doctor.

6 A. First one?

7 Q. "It is impossible to get meaningful results,"
8 and I'm looking to see where I found that in.

9 A. This paragraph describes a numerical
10 hypothetical situation, and the reason -- and what I'm
11 describing here is that if you take two large numbers,
12 each of which has five percent of uncertainty in it -- so,
13 say, you're subtracting a thousand plus or minus 50 and,
14 you know, another thousand plus or minus 50 or, say, 900
15 plus or minus 50, well, you might subtract those and say,
16 the difference is a thousand minus 900, and that's a
17 hundred, but, in fact, you do not know -- And in this
18 example, I actually say the difference is less than 2
19 percent. So, a better example a thousand plus or minus 50
20 and 999 plus or minus 50. Now, you tell me -- No, don't.
21 You're not supposed to testify. I will tell you --

22 Q. Thank you.

23 A. -- that I cannot conclude whether the answer
24 to that is, in fact, greater or less than zero. But this

1 does not specifically relate to the IPM model runs. This
2 paragraph is an example of why precision is lost when
3 you're trying to difference two large numbers with a small
4 difference between them.

5 Q. And do you believe this kind of precision was
6 lost in the IPM modeling?

7 A. I believe the reason I included this is that
8 there was some loss of precision, yes. I think that the
9 precision of the model is large compared to the difference
10 that it's trying to -- that it's trying to illustrate,
11 yes. That's why I have this. But as far as the specific
12 numbers, 5 percent and 1 percent, those were offered for
13 illustrative purposes.

14 Q. If I can do a different example just to make
15 sure I understand. If you're looking for the number 2 and
16 your accuracy is plus or minus 3, in the world where we
17 don't have negative numbers, that's the kind of
18 imprecision you're talking about? The range would be
19 between 5 and minus 1?

20 A. Well, I guess I need a context for that.

21 Q. I'm not going to try and belabor the analogy.
22 I think I understand what you're saying. And it does
23 relate to the IPM model?

24 A. Yes, it does.

1 Q. I think the last one was also on this page.

2 HEARING OFFICER TIPSORD: Go ahead, Mr. Rieser.

3 Q. (By Mr. Rieser) Just to follow-up, you talked
4 about the loss of precision. Did you quantify the loss of
5 precision or make any determination as to what impact that
6 had on the numbers that the IPM model produced?

7 A. I'm afraid I had no way of doing that. IPM is
8 a deterministic model, which means it gives you one
9 answer, and no estimate of the uncertainty of the model
10 was given to the Illinois EPA, and, so, none was given to
11 me. So, I can't quantify that.

12 HEARING OFFICER TIPSORD: Mr. Bonebrake.

13 Q. (by Mr. Bonebrake) While we're on Page 7, the
14 fourth line from the top, is it a phrase --

15 HEARING OFFICER TIPSORD: Excuse me, Mr. Bonebrake.

16 Let's finish with Mr. Zabel's quotes. Can we do that?

17 MR. BONEBRAKE: That's fine.

18 MR. ZABEL: He'll yield to me.

19 HEARING OFFICER TIPSORD: Before we toss more
20 questions. Okay. We'll go to Mr. Zabel's last quote that
21 he wanted to discuss.

22 A. And this was also on Page 7?

23 Q. (by Mr. Zabel) Yes. The last sentence of the
24 next to last paragraph.

1 A. Yes. So, that relates to my assessment
2 without being able to quantify it, as I just said. My
3 assessment that the uncertainty associated with this model
4 is probably so large that you cannot distinguish between
5 say 33 million in costs or 10 million or 50 million.

6 Now, let me just also say that the model could not
7 show a decrease in costs associated with the rule. So, we
8 do, in fact, live in the world you postulated where
9 negative numbers don't exist, and the reason is that
10 additional constraints were added to the model in order to
11 represent the Illinois rule. So, you cannot have a
12 decrease in model cost, but in terms of whether the
13 increase in costs is a dollar or a million dollars or 10
14 million dollars or probably even a hundred million
15 dollars, you cannot -- I don't think that that could be
16 resolved using this model, and I would say that that is
17 why I relied for aggregate costs, in addition to the fact
18 that I was instructed to, I think it is more reasonable to
19 rely on an actual assessment of the costs prepared by Dr.
20 Staudt, which is not a least cost implementation of the
21 model -- it's not even designed to be -- as I mentioned in
22 my testimony, the least cost estimation, but what we show
23 there is that, in fact, compliance can be achieved at a
24 cost -- in that example, 33 million dollars per year.

1 HEARING OFFICER TIPSORD: Now, Mr. Bonebrake, if you
2 would like to talk about something else on Page 7.

3 Q. (by Mr. Bonebrake) And it may be related, but
4 I wanted a clarification. On Page 7, it's the fourth line
5 from the top.

6 A. Yes.

7 Q. You have the statement, "My judgment is that
8 IPM is ill suited for analysis," and it goes on from
9 there.

10 A. Yes.

11 Q. Can you tell us what you mean by that
12 statement "ill suited"?

13 A. Well, I'm referring to the same issues, and I
14 guess if I were to rewrite this sentence, I don't think I
15 would say "for analysis of". I would say "for high
16 precision analysis of". I would say that, "The precision
17 of the IPM model as it was implemented for this rule is
18 not sufficient to give a good quantitative -- high
19 precision quantitative estimate of the impact."

20 HEARING OFFICER TIPSORD: Are we ready to go back to
21 Mr. Forcade, question number 6?

22 MR. RIESER: No.

23 Q. (by Mr. Rieser) There seems -- What I'm
24 trying to get at is the characterization of high precision

1 and different levels of precision and what they actually
2 do for the board's analysis of the TSD and the ICF models
3 that's been presented to the board as that document cites
4 as economic impact. Do you have a way -- Well, I asked
5 this. There's no way you can quantify the lack of
6 precision or put a percentage on it or anything else in
7 terms of what levels of reliability the board should
8 subscribe to the -- ascribe to the numbers that were
9 presented by the IEPA in the TSD?

10 A. I would say that, actually, Dr. Staudt has
11 thoroughly discussed the precision of the cost estimates
12 that were presented in Section 8 of the TSD with respect
13 to what are the factors that add uncertainty to those cost
14 estimates and what their impact would be on the final rule
15 cost. I would say that there is no way, based on the data
16 that has been prepared and presented by ICF, to estimate
17 the uncertainty in those costs because, again, there's
18 only one model run. There are no sensitivity studies,
19 which would be one way to get a sense of the uncertainty.
20 And indeed I don't know -- It would be difficult to do
21 sensitivity studies that would give you a good sense of
22 uncertainty in a statistical sense because the issue --
23 because of the issue of how to implement the rule.

24 Q. You also gave part of the discussion -- and

1 correct me -- I'm sure you will correct me if I'm wrong.

2 A. I'll do my best.

3 Q. Good. Thank you. You talked about, you know,
4 that the difference in compliance costs could be a
5 thousand, it could be 5 thousand, it could be 10 million,
6 it could be a hundred million, the model still couldn't
7 account for them; is that correct? There was a broad
8 range of numbers that you threw out with the implication
9 that the model's level of precision would not approach
10 even at the hundred million level?

11 A. That was my sort of outside estimate of what
12 the model might come up with under those circumstances.
13 It was not meant to imply that I think the costs of the
14 rule could be anything approaching that because I do
15 believe that the model was implemented at an extremely
16 conservative manner, as I've described, and, so, my
17 opinion, from having reviewed the implementation of the
18 model, and, again, subject to the input data, my opinion
19 is that the model overstates the costs of implementation.

20 Q. If we had somebody from ICF here testifying,
21 do you know whether they would be able to identify or
22 quantify the level of precision that they assign to their
23 own work?

24 A. I know we have very loose rules for testimony

1 here. No. I would guess if they were here and if they
2 tried to give a quantification, I think that I would have
3 a lot of trouble swallowing it because the issues have to
4 do not with uncertainty in, say, load or fuel costs or
5 technology costs, but, in fact, the fact that the rule was
6 implemented in a very conservative manner in the model.

7 Q. You talk about the level of error of
8 uncertainty in the model. It's correct that what the
9 model does is, it prepares three different scenarios;
10 correct?

11 A. That's correct.

12 Q. Okay. And, so, if there's error inherent in
13 the model, doesn't that error cancel out if it's applied
14 across the three scenarios? In other words, it's the same
15 error, whatever error there is, it's the same applying to
16 three scenarios?

17 A. Yeah, I don't consider it to be an error. I
18 consider it to be a simplification in the model
19 implementation. Well, some of them are consistent on the
20 three scenarios, and I could give you examples of that if
21 you'd like, and some of them are not consistent on the
22 three scenarios. And specifically the unit level emission
23 caps which are implemented in order to represent the -- in
24 the proposed rule are only present in the proposed rule of

1 what they call a policy case.

2 Q. But isn't the point of the model to give
3 orders of magnitude to comparisons among the three
4 scenarios?

5 A. The point of the model?

6 Q. Correct.

7 A. You mean if you asked ICF, why should we hire
8 you to run this? I guess you'd have to look at their
9 modeling literature. I don't think they would say that
10 the point of their model is to give you an order of
11 magnitude, which would be to say, as I said 1, 10, a
12 hundred, a thousand, a million, I don't think they'd agree
13 that that's the point of their model, but I think that in
14 some cases, that is an accurate characterization of the
15 capability of the model.

16 Q. And is that capability diminished at all by
17 the uncertainties inherent in the model that you
18 described?

19 A. I'm sorry. Could you read that back for me?

20

21 (Court Reporter read back last question.)

22

23 A. What capabilities specifically?

24 Q. (by Mr. Rieser) I believe I was just working

1 with your answer. You're talking about the capability of
2 the model and what the model is capable of doing and what
3 results the model is capable of producing. So, that's
4 what the model is capable of doing?

5 A. Yes.

6 Q. Then is that capability diminished at all by
7 the inherent uncertainties that you have described?

8 A. I won't say "diminished". I will say the
9 capability is limited by those inherent uncertainties and
10 simplifications which are in the model representation.

11 MR. RIESER: Thank you.

12 HEARING OFFICER TIPSORD: Then I think we're ready to
13 go back to question 6c, which is, "How did you originally
14 obtain a copy of this data?" And the data to which we're
15 referring to, because it's been awhile, is the data
16 provided by ICF Corporation. And I think we've actually
17 discussed that. I think it all came from the IEPA.

18 MR. KIM: Can I ask him a question before we move on?

19 HEARING OFFICER TIPSORD: Sure.

20

21 (A brief discussion off the record.)

22

23 MR. KIM: We're on question 6c?

24 HEARING OFFICER TIPSORD: Yeah.

1 A. The question relates to the intermediate data
2 which I received through the Illinois EPA and whether that
3 would answer his question, and indeed that was some of the
4 data that I relied on that was provided by ICF
5 Corporation. So, I think that is relevant to your
6 question.

7 MR. KIM: And, unfortunately, the information -- It's
8 about 1 megabyte of information. I printed off a hard
9 copy this morning, and it came out to about 2 or 300 pages
10 long, and it's not easy to read because if you read a
11 spreadsheet over that many pages, you start losing columns
12 and so forth. So, I put it on a disk, if that's
13 appropriate. It's the information that --

14 HEARING OFFICER TIPSORD: Was e-mailed to Dr.
15 Hausman.

16 MR. KIM: In addition to what's in the TSD, which is
17 the report.

18 HEARING OFFICER TIPSORD: If there's no objection to
19 it being admitted to Exhibit on Cd, then we'll accept it
20 as an Exhibit on CD. We'll mark this as Exhibit 70.

21 MR. KIM: And I can do it later. As long as we're
22 talking about CD's, the information -- the study
23 information that we referenced yesterday, I do have CD's
24 of that, as well.

1 HEARING OFFICER TIPSORD: Why don't we go ahead and
2 enter that as Exhibit 71, if there's no objection?

3 MR. KIM: And along with that is a hard copy printout
4 of the studies that are on the CD, and since I bought
5 these CD's myself this morning, these have cases.

6 HEARING OFFICER TIPSORD: We will mark both the CD
7 and the list as Exhibit 71, if there's no objection.

8 (No response.)

9 HEARING OFFICER TIPSORD: Seeing none, they'll be
10 marked as Exhibit 71. Yes, Mr. Forcade.

11 MR. FORCADE: 71 is the CD and the paper?

12 HEARING OFFICER TIPSORD: Yes.

13 MR. FORCADE: I just wanted to make sure we're
14 both --

15 A. (by Dr. Hausman) Madam hearing officer, my
16 contact lens has wandered off in the far corner of my eye.
17 I was wondering if we could take a break?

18 HEARING OFFICER TIPSORD: Yes. I was going to
19 anyway. So, let's do that at this point.

20 A. (by Dr. Hausman) Thank you.

21

22 (A brief recess off the record.)

23

24 HEARING OFFICER TIPSORD: We're ready to go back on

1 the record with Dr. Hausman. Mr. Zabel.

2 Q. (by Mr. Zabel) Would it be possible, Dr.
3 Hausman, to briefly describe what that intermediate data
4 is so that when we get people to look at it, we know what
5 to look at?

6 A. Yes. The sheet that I'm looking at is
7 actually included in the data. It's one of the
8 spreadsheets, and it describes the contents of all the
9 other worksheets in the model. The first spreadsheet in
10 that intermediate model data gives what they call
11 segmental energy prices and generation by season for the
12 Mano region and neighboring regions. So, the model
13 results that were originally given to Illinois EPA have
14 annual average energy prices for each region, but they did
15 not give any of the underlying data that were used to
16 calculate those averages, and the IPM model uses five
17 representative market -- sets of market conditions for
18 each of two seasons -- I believe it's five; it's possible
19 that's it's six, but I think it's five -- for each of two
20 seasons and then takes a weighted average of those, and
21 they have a weighting scheme, which actually is not
22 presented in the data they gave me, but can be teased out
23 by further analysis of the data. But they have taken a
24 weighted average of those segments in order to represent

1 the annual average costs by region. Mano, M-A-N-O, is the
2 region that includes Illinois and some of the surrounding
3 areas in the model. So, it's separated in different
4 market areas, and Mano is the one of interest and for
5 which they have reporter results as Illinois results.

6 The second sheet has the energy and capacity market
7 revenues for each run year. It's for the two cases, which
8 I believe refers to the CAIR case and the proposed rule
9 case. So, it has the revenues for each of those segments,
10 which could be derived for the prices and generation.

11 Sheet three has emissions allowance prices per each
12 run year. Those prices are the -- That's what I referred
13 to yesterday as shadow prices. So, in order to calculate
14 the emissions prices, the model determines what it would
15 be worth in terms of decreased total costs on a nationwide
16 basis to relax each individual constraint by one unit.
17 So, for example, if the total emissions is, say, for NOx
18 is measured in tons nationally, then if you raise that cap
19 by 1 ton and recalculate the total costs of producing
20 electricity for one of these segments in the model, how
21 much money -- what would be the change in the total cost
22 of production. So, I'm sure I've lost some people with
23 that one. It's a very complicated sort of operations
24 research construct, but that's how the model -- I'd be

1 happy to describe it further, if it won't put anybody to
2 sleep.

3 Q. I think that will be enough for us to figure
4 who to give --

5 A. I'll be happy to take a look at it. Okay.
6 Where was I? Number 4, sheet 4 has coal and natural gas
7 prices for the Mano region. So, the model actually
8 calculates endogenously or as part of its overall scheme,
9 it calculates what gas prices and coal prices would be.
10 It doesn't take those from an external source such as a
11 Nimax (phonetic) which is often used in modeling studies.
12 It actually calculates those, and we address those later
13 on in my questions.

14 Number 5 is demand and energy for the Mano region by
15 year -- energy production that is.

16 6 is an explanation -- a brief explanation regarding
17 ICF's implementation of the caps for the mercury rule, and
18 this explanation is consistent with the explanation in the
19 TSD. We had asked them to give us sort of another run-by
20 so we understood it, and it is consistent.

21 Number 7, capital costs, FOM costs and VOM costs for
22 Illinois units. So, that's some of the input data but
23 broken down to a better level of precision.

24 Number 8 is energy flows to and from the Mano region

1 to the neighboring regions. So, once again, ICF had
2 reported the change in exports from Illinois, which,
3 again, really, they model this region that isn't exactly
4 Illinois, but fairly close, the Mano region, and, so, we
5 asked for the specific numbers of exports just so we could
6 understand the model runs better.

7 Sheet 9 was explanations on why the Hudsonville is
8 partially retiring. So, that had to do with the question
9 of partial retirements, which comes up in this model. And
10 the issue there is that the model calculates a number of
11 megawatts of retirement and ends up with -- not with
12 retiring part of a unit, which, of course, can't really
13 happen in the real world. So, we wanted to make sure we
14 understood why that occurs and how that model is
15 implemented. And, again, for people who are familiar with
16 these models, that's kind of diagnostic information that
17 helps you understand how to relate the model output to the
18 real world.

19 Number 10 was a spreadsheet showing the derivation of
20 retail electricity prices. So, that tells you -- Since
21 they report electricity prices in the TSD, we wanted to
22 make sure we understood exactly how those are derived.
23 And I won't go into explanation, unless somebody asks me
24 to.

1 MR. ZABEL: That's fine.

2 A. And number 11, past editions by plant type for
3 the Mano region. Again, just more detail about what
4 capacity was being added to the model -- added by the
5 model to the region in terms of optimizing investment
6 decisions subject to the constraints in the model.

7 And number 12 were the capital costs used in the
8 model for the generic capacity editions. So, the model
9 has to define what the options are for new capacity in
10 terms of engineering -- some engineering characteristics
11 and capital cost. And, so, we wanted some detail about
12 that. And all those data for your reading pleasure are
13 included on the CD which you have received.

14 HEARING OFFICER TIPSORD: Thank you, Dr. Hausman.
15 Mr. Rieser.

16 Q. (by Mr. Rieser) Let me ask about one more.
17 It's model input rather than output.

18 A. Okay.

19 Q. And I suspect that Mr. Kim is going to have to
20 dig this out somewhere, but it's the caps -- the unit
21 specific caps that the model applied to the individual
22 units that were used in the model, and I don't believe
23 that's in the TSD anywhere or any of the appendices, and I
24 didn't hear that in the list of things that you talked

1 about, Dr. Hausman.

2 A. Yeah, I don't believe that those are included
3 on that CD.

4 MR. RIESER: So, if we could get the unit specific
5 caps that you used, that would be very useful -- or that
6 you gave to ICF. I'm not sure how it happened.

7 MR. KIM: We'll look into that right away.

8 A. (by Mr. Ross) And I do know that we have that
9 in a spreadsheet that we can provide. However, the
10 individual that would have that on his computer is not
11 here today.

12 MR. KIM: We'll be able to find it. We'll look at
13 lunch.

14 MR. RIESER: That's fine. And if it's not today,
15 that's fine.

16 HEARING OFFICER TIPSORD: I think that takes us back
17 to question 6d of Mr. Forcade's question for Kincaid.

18 MR. FORCADE: Yeah.

19 HEARING OFFICER TIPSORD: Were you directed to rely
20 on this data by the agency?

21 A. Yes.

22 HEARING OFFICER TIPSORD: Question number 7.

23 A. Question number 7, your testimony includes
24 some criticisms of the ICF data. Did you find it to be

1 unreliable to some extent? And to what extent? My
2 testimony contains no criticisms of the ICF data, nor does
3 it contain an endorsement of the ICF data. I did not
4 audit the ICF data, as I stated earlier. My testimony
5 does include a discussion of ways in which I feel that the
6 implementation of the IPM model was conservative.

7 Q. (by Mr. Forcade) That would be based on the
8 assumptions that ICF used?

9 A. Based on the way that they implemented the
10 rule -- the Illinois rule, yes. That would be my
11 assumption.

12 HEARING OFFICER TIPSORD: Mr. Harley.

13 Q. (by Mr. Harley) I'd like to call your
14 attention to Page 2 of your testimony, where you --

15 A. Hold on. Let me get there.

16 Q. -- where you bullet point --

17 A. I'm sorry. I guess, in turning pages in my
18 testimony, I've misplaced the first few. Here, I have it.
19 Okay. Page 2. Yes.

20 Q. Page 2, where you bullet point in your
21 testimony some of the key conclusions based on your
22 review, and there are six of these, the sixth being on
23 Page 3. When you characterize your analysis and that you
24 feel like the conservative in terms of the data, are these

1 conservative conclusions?

2 A. Let me just be clear that what is referred to
3 in terms of my conclusions on the cost of producing
4 electricity and the impact of retail prices is not based
5 on the ICF model runs. So, this is based on my own
6 analysis, and this is why I said in response to
7 Mr. Zabel's question about modeling, did I perform
8 modeling? Well, I did perform analysis which can be
9 subscribed as modeling, not using one of the big dispatch
10 models. The numbers here are based on my own analysis,
11 which are based on costs -- in part on costs that were in
12 Section 8 of the TSD. So, do I consider these
13 specifically the costs in terms of like rate impact?

14 Q. Well, you have six conclusions here.

15 A. Yes.

16 Q. Are all six of them conservative in nature?

17 A. I believe that they are conservative in nature
18 for reasons that I then go on and detail later in my
19 testimony. I have several discussions of why I believe
20 that this is actually a conservative upper bound of the
21 cost impact. And among those are some that Dr. Staudt
22 described in the previous two days in terms of his own
23 analysis. For example, the cost doesn't take into account
24 any decreases in the cost of sorbent over time or any

1 opportunities that your very clever engineers, as Dr.
2 Staudt characterized them, would have to find lower cost
3 ways to reduce mercury emissions. So, in the sense that
4 these are based, again, a simplified model, in this case
5 spreadsheet model, of cost impacts and on what I consider
6 to be conservative technology costs, they are -- I would
7 say these are conservative, but not as conservative as the
8 IPM model run.

9 Q. There was one aspect of your conclusions that
10 I wanted to ask you a question about.

11 HEARING OFFICER TIPSORD: I lost that Mr. Harley.
12 I'm sorry.

13 Q. (by Mr. Harley) There was one aspect of your
14 conclusions that you reach on Page 2 and Page 3 that I
15 wanted to ask you about, and that is that you calculate
16 that the impact on Illinois consumers may be zero?

17 A. Yes.

18 Q. But you calculate the total impact on
19 consumers in the broader region as being up to 60 million
20 dollars annually. How is it that Illinois consumers may
21 pay nothing for the benefits through the mercury reduction
22 and that those costs may actually be borne by consumers of
23 Illinois generator electricity in other states?

24 A. I guess, as I seem to do every time, I'm going

1 to take issue with the word. I wouldn't say that the cost
2 impact on Illinois consumers may be zero. I use zero as
3 the lower bound, which is to say I don't believe that
4 Illinois consumers are going to save money because of this
5 rule. However, I believe that the impact may be quite
6 small, and that has to do with how electricity prices are
7 formed in electricity markets, so that the price of
8 wholesale electricity is set by a single generating
9 unit -- It's more complicated than that. This is why I
10 lead seminars on this topic. But to a first
11 approximation, there's one marginal unit that is setting
12 the wholesale price during any hour, and only if the bid
13 price of that particular unit has increased as a result of
14 this rule will it have an impact on the wholesale cost of
15 power during that hour. And then there is a question of
16 how does that get passed onto the retail price impact of
17 consumers, and that could be very close to zero just
18 because there are a lot of things that go into setting the
19 retail cost impact, and I'm afraid Illinois consumers are
20 going to be hearing a great deal about that in the next
21 few years, not because of this rule, but because of the
22 other things that are going on in the electricity market
23 in Illinois.

24 MR. HARLEY: Thank you.

1 HEARING OFFICER TIPSORD: Question number 8. Go
2 ahead and read the question, Dr. Hausman, question number
3 8.

4 A. Oh, okay. Question number 8, is it your
5 contention on Page 15 and 16 of your testimony that the
6 gas prices estimated in the IPM model are unrealistically
7 low? Please explain. Yes, it is my contention that it is
8 a low estimate of gas prices. As I mentioned earlier, the
9 IPM model calculates endogenously the gas prices that it
10 uses in the model based on market dynamics, which I
11 believe to be outdated. We now live in a period of gas
12 shortage, and it leads from a market perspective where
13 scarcely prices are being extracted. We live in a
14 globalized gas market where LNG will increase, that is to
15 say liquid by natural gas, will increasingly play a role
16 in gas markets. And if you look at the future prices --
17 Actually, when I wrote the testimony, the future prices
18 were quite high. I think I characterized them at \$10 or
19 so per million BTU's. Now they're a little bit lower than
20 that, but still considerably above the prices that are
21 calculated in the model. So, based on both my sense that
22 the dynamics that one would use -- again, I don't know
23 exactly how it's done in the IPM model, but the dynamics
24 that would be used to calculate gas prices would almost

1 inevitably be out of date just because things have been
2 changing so fast in that market, and by a comparison of
3 the data they sent me and that are included on the CD and
4 what was just received with forward prices today, I think
5 that those gas prices are low.

6 HEARING OFFICER TIPSORD: Question number 9.

7 A. Question number 9, if gas prices are
8 underestimated, would the IPM model not also underestimate
9 the costs and electric rate impacts of using more
10 gas-fired generation and less coal-fired generation as a
11 result of the proposed rule? I would be very bold to
12 address how the IPM model would respond to a change in gas
13 prices with any kind of specificity, especially with
14 respect to something which is several steps removed with
15 such as what's addressed in this question. If you'd like
16 I can give my own opinion -- well, I don't have much of an
17 opinion in this regard -- on what the electric rate
18 impacts would be, but I don't think what we're really
19 seeing in either the model results or what we'd see in
20 reality is much of a change to gas-fired generation as
21 opposed to coal-fired generation as a result of the
22 proposed rule. So, I disagree with all of this question.

23 HEARING OFFICER TIPSORD: Miss Rahill.

24 Q. (by Ms. Rahill) In your testimony, you talk

1 about the retirement of units not being as much of a
2 concern because they would be replaced by natural
3 gas-fired units; is that correct?

4 A. I don't think that's correct. You want to
5 point me to a page and a paragraph?

6 Q. On Page 19 and 20.

7 A. Oh, I think I know what you're talking about.

8 Q. I'm probably mischaracterizing it, but --

9 A. Okay. So, do you want to --

10 Q. If natural gas prices are higher, wouldn't
11 then the cost of electricity go up to consumers if these
12 coal-fired generation units are replaced by natural gas
13 units?

14 A. If natural gas units for those hours in which
15 natural gas units are setting the marginal cost of
16 electricity in the wholesale market, for those hours,
17 which in the Midwest are very few and are likely to be
18 very few for a long time to come, during those hours, if
19 the cost of natural gas is higher, then it is likely that
20 the wholesale cost of electricity will be higher, and if
21 that has been taken into account in bidding to serve
22 retail load in the future Illinois retail market, then
23 that might have some price impact, which would be a
24 positive -- positive in the sense of higher, not positive

1 for consumers -- that, yes, there might be some small
2 effect in that regard, but, again, natural gas is very
3 unlikely to be the determining factor in Illinois retail
4 electricity prices for a long time to come.

5 HEARING OFFICER TIPSORD: Question number 10. Go
6 ahead, Dr. Hausman.

7 A. I'm sorry. I'm not used to doing both the
8 questions and the answers. 10, you identify employment
9 gains from installation and maintenance of mercury
10 controls as a potential economic benefit of the proposed
11 rule. Please explain how the revenues that would support
12 those jobs are not directly offset by the costs imposed on
13 Illinois electric utilities, which are then passed on to
14 Illinois consumers. Of the revenues that would support
15 those jobs -- When I looked at this earlier, I was looking
16 at jobs. I see now you're addressing revenues. Would not
17 be directly offset by costs imposed on Illinois utilities?
18 Well, I mean, if "directly" means dollar for dollar, I
19 think it's unlikely to be directly offset. I agree that
20 utilities will have to hire people, and I hope they'll pay
21 them in order to install and maintain those mercury
22 controls. I believe that there may be some costs,
23 although, as was discussed earlier, they could be quite
24 small imposed -- No. I'm sorry. There would be costs

1 imposed on Illinois electric utilities. But let me make a
2 point here. I do not believe that on net we have
3 established that the costs on Illinois utilities will be
4 positive because there will also be additional revenues.
5 So, if those wholesale electric rates are increased, not
6 just in Illinois, but in the region as a whole, there will
7 be added revenues for Illinois generators. And, frankly,
8 if you look at those IPM model results, which I have not
9 endorsed as being -- I think they're conservative
10 specifically in this regard, but if you look at those
11 results, one might wonder why there are any utilities
12 opposing this rule because the price impacts are far in
13 excess of the cost impacts. So, it actually looks, based
14 on those data, like utilities are going to make a lot of
15 money with this rule. And by my analysis, I don't think
16 it's going to be quite as rosy a picture, but I believe
17 that there would be some impact on the cost of electricity
18 because most of the costs of the rule are associated with
19 variable costs, and those will increase -- that will
20 increase the price of electricity during some hours, and
21 because the costs are quite small relative to the general
22 economics of the electric industry, the additional
23 revenues may well be more than enough to offset those
24 costs. It won't be -- There will be some winners and some

1 losers, but on a small scale. Yes, ma'am.

2 Q. (by Ms. Bassi) With the preface that I have
3 absolutely no intention of jumping into this, did I
4 understand you to say that you think this rule will result
5 in increased revenues to the companies?

6 A. It will certainly result in increased revenues
7 to the companies.

8 Q. How will the companies make money from this
9 rule?

10 A. Well, first of all, you asked me about
11 revenues. You didn't ask me about profits.

12 Q. Okay.

13 A. Revenues will increase because if the marginal
14 cost of electricity is higher during any hour, which is
15 set by one unit -- Okay. So, the way the electricity
16 market works is, in any given hour for first
17 approximation, there's one unit whose bid price is setting
18 marginal cost of electricity, and all units in that area
19 are receiving that price for their electricity. So, if a
20 unit whose bid price has increased because they also have
21 to pay for sorbent, for example, in order to produce their
22 electricity, that will increase the marginal cost of
23 electricity. So, anybody else who is running during this
24 hour will also receive increased revenues during that hour

1 that will go to their bottom line. Now, whether those
2 increased revenues will exceed the increased costs, I
3 can't tell you with great confidence, although my analysis
4 suggests that it will, and ICF's analysis is that it will
5 by a factor of perhaps 5 or 10.

6 HEARING OFFICER TIPSORD: Mr. Zabel.

7 Q. (by Mr. Zabel) If that marginal unit were an
8 Indiana unit that didn't have to install sorbent
9 injection, would your answer be the same?

10 A. If the marginal unit were an Indiana unit and
11 -- You see, in order to answer that question, I need to
12 know whether the marginal unit would have been that
13 Indiana unit in the absence of the rule.

14 Q. Assume so.

15 A. And the bid price for that unit has not
16 changed as a result of that rule, but for that hour -- for
17 that hour --

18 Q. Let's make that assumption.

19 A. -- there would be no impact on the wholesale
20 cost of electricity.

21 Q. It would not go up?

22 A. That is correct.

23 Q. And there would be no increased revenue to
24 those Illinois units that did install sorbent injection?

1 A. For that hour, that's correct.

2 HEARING OFFICER TIPSORD: Mr. Forcade.

3 Q. (by Mr. Forcade) And while no increase in
4 revenues, there would be an increase in operating costs?

5 A. For that hour?

6 Q. Yes.

7 A. If those units were generating during that
8 hour, then there would be an increase in their variable
9 operating costs, yes.

10 Q. That might be the reason we're all here then.

11 A. Well, if you're all here based on looking at a
12 single hour that -- you know, revenues from a single hour
13 that an Indiana unit is on the margin, I think you're
14 wasting your time.

15 HEARING OFFICER TIPSORD: Question number 11, Dr.
16 Hausman.

17 A. Here I go again. All right. Number 11,
18 please explain the basis for your reliance on the
19 Harvard/NESCAUM study to estimate the economic value of
20 the alleged health benefits of the proposed rule. My
21 basis for that, as I mentioned earlier, is that it was the
22 only study that I found which specifically related
23 monetized the benefit of reduction in environmental
24 loading of mercury -- emissions of mercury. It had a

1 specific relationship. And I felt given my familiarity
2 with both Harvard University and the northeast states,
3 NESCAUM, I felt that they were both highly credible
4 scientific institutions and that I could rely on their
5 estimate with attribution. So, you can make your own
6 judgment.

7 HEARING OFFICER TIPSORD: Mr. Forcade.

8 Q. (by Mr. Forcade) If I could go back again
9 just briefly to the issue of revenue. Are you familiar
10 with the consent of power purchase agreement?

11 A. Yes, I am familiar with that.

12 Q. If you have a long-term power purchase
13 agreement with power six rates --

14 A. Yes.

15 Q. -- are you not setting the price that you will
16 deliver electricity for an extended period of time?

17 A. Well, it depends on the specific terms of the
18 power purchase agreement, but if you have a power purchase
19 agreement which is for delivering a set amount of power
20 for a set price, yes, I would say you are setting both the
21 quantity and the purchase of the power.

22 Q. If that did not contemplate the Illinois
23 mercury rule and those costs are not absorbed in the power
24 purchase agreement, would you see the company as gaining

1 significant additional revenues on the marginal price
2 increase?

3 A. Well, first of all, you've described two
4 entities here. One was the power purchase agreement, and
5 one was the company. Now, perhaps for the purpose of your
6 question you're assuming that the company is selling
7 100 percent of its power under a power purchase agreement,
8 which I find to be unlikely.

9 Q. Yes.

10 A. And, so, I guess that, yeah, bummer.
11 Presumably they took regulatory uncertainty in setting the
12 price, and guess what? Chickens came home to roost. But
13 probably not many because I say the cost impact is quite
14 modest.

15 HEARING OFFICER TIPSORD: Mr. Rieser.

16 Q. (by Mr. Rieser) Back on the same revenue
17 subject, is there a way of predicting which -- you know,
18 looking at all the regulatory choices that the facilities
19 have now, etc., a way of predicting which of the -- what
20 the marginal price will be over a period of years given a
21 set of regulatory assumptions?

22 A. The marginal price or the marginal price
23 impact?

24 Q. Both.

1 A. Well, sure. I mean, people spend a lot of
2 time and money predicting those things. It doesn't mean
3 they're right. But, yes, people do use models, such as
4 the Maps model, which I have used extensively for that
5 very purpose, to predict prices, to forecast prices, and
6 one of the things one uses it for is to look at the impact
7 of regulations, and I myself have performed numerous
8 studies that have two different cases in order to look at
9 the cost impacts of regulations. You know, forecasting is
10 very important in this industry, and one hopes that a
11 responsible modeler is confident of the uncertainties of
12 all of that.

13 Q. But you would assume that the modeling that
14 you do with respect to the prices had the level of
15 reliability that allows the people who purchase your
16 services to rely on your predictions?

17 A. Well, we could get in a very long discussion
18 of that. The way I would characterize it, in order to not
19 get in a long discussion, is that any predictions that I
20 do are my forecast of electricity prices subject to the
21 best knowledge that I'm able to -- the best information
22 that I'm able to obtain at the time that I do the study,
23 with an acknowledgment that if something changes,
24 regulations, gas prices, forecasted load, that those

1 forecasted prices would no longer be valid, and if you
2 wanted to look at that change, you'd have to do another
3 study, and then one way to deal with that, of course, is
4 to perform sensitivity studies around those variables,
5 but, yeah, forecasts I would say are a reliable basis
6 given the information that I have as a basis of the
7 forecast.

8 Q. And one way that people -- one model that
9 people use to predict the cost benefits of these types of
10 regulatory changes with respect to electricity prices is
11 the IPM model; correct?

12 A. Well, I don't know that people in general do
13 that, but that certainly is a model that ICF Corporation
14 uses, and that there are public entities such as the USEPA
15 and in this case Illinois EPA that hire them to use the
16 model for that case, yes.

17 MR. RIESER: Thank you.

18 HEARING OFFICER TIPSORD: Question number 12.

19 A. Okay. I'm learning. This is my last
20 question.

21 HEARING OFFICER TIPSORD: Oh, no. We have more.

22 A. Please explain the basis for your selection of
23 the range of estimated benefits per ton of mercury
24 emission reductions from the Harvard/NESCAUM study. And

1 the basis of that is that it was the range -- As I noted
2 in my testimony, I selected the range of estimated
3 benefits per ton of mercury emissions that was reported on
4 Page 193 of the Harvard/NESCAUM study, and that is the
5 only estimate that I could find in reading that whole
6 study that specifically addresses the benefit -- and as I
7 say, looking and trying to find other sources, as well --
8 is the only estimate I could find of the monetized benefit
9 per ton of mercury emissions.

10 HEARING OFFICER TIPSORD: Mr. Rieser.

11 Q. (by Mr. Rieser) Would you agree that the
12 numbers that you ascribe, the 182 to 94.5 million dollars
13 per ton of mercury removed, that these numbers are at the
14 upper end of the estimate to which Harvard subscribed a
15 decrease in certainty?

16 A. I do not have the study in front of me, and
17 before I would comment on that, I would want to look at
18 those particular paragraphs. But it was not my sense that
19 this was at the upper end of the range. I don't think I
20 would have used it. Furthermore, the underlying
21 assumptions regarding the value of -- I'm sorry -- the
22 cost of increased mortality and of lost IQ points were
23 fairly standard numbers. But let me just say, on a
24 personal level as a father, I don't think I would sell one

1 of my children's IQ points for \$8,000.

2 Q. Do you know what percentage of the total costs
3 represented IQ decrement and what percentage of the cost
4 represented other health related costs or impact?

5 A. The majority of that cost relates to increased
6 mortality, which is -- I believe it's 6 million dollars
7 per premature death, although now that I think about it --
8 yes, it's 6 million dollars per premature death, and we
9 can talk about how that's estimated. Again, not if it's
10 my children. But I feel that that is partly because the
11 other aspects are even more dramatically undervalued, like
12 loss of IQ points in children.

13 Q. When you say they're "dramatically
14 undervalued," does that mean you disagree with the Harvard
15 study that you've cited?

16 A. The Harvard study uses standard values for
17 these particular costs -- these particular health related
18 costs and intellectual impairment in children. So, what
19 I'm saying is that based upon the standard valuation of
20 those things, I think the Harvard study accurately
21 characterizes the costs. I personally -- Perhaps I
22 shouldn't have gotten into this. I personally think those
23 costs are too low.

24 Q. Do you know whether the Harvard -- authors of

1 the Harvard study cautioned against the use of these
2 values without caveats with respect to their assumptions
3 and basis for the estimates?

4 A. I am not familiar with whatever caveat you are
5 describing. I don't know if the study is in evidence in
6 this proceeding, but if you wanted to look at it and tell
7 me specifically, I'd be happy to address.

8 Q. Do you know whether -- Going back to the
9 percentage of mortality, I think you said that the
10 large -- a large percentage of this price per ton that you
11 identified -- cost per ton that you identified was
12 associated with mortality; is that correct?

13 A. Yes.

14 Q. Do you know what percentage that is?

15 A. I don't know specifically. It's quite high.

16 Q. It's quite high; is that what you said?

17 A. That's how I would characterize it.

18 Q. Would 95 percent seem about right to you?

19 A. I don't know specifically.

20 MR. RIESER: Thank you.

21 HEARING OFFICER TIPSORD: Mr. Bonebrake.

22 Q. (by Mr. Bonebrake) Do you know if USEPA
23 ascribes significantly lower monetized benefits to mercury
24 reductions than the Harvard study?

1 A. I don't know.

2 Q. So, you have not reviewed any USEPA study
3 materials in that regard?

4 A. As I noted, I was unable to find any other
5 studies which -- I have no doubt you guys will, but I look
6 forward to seeing them. I have not been able to find any
7 other studies which specifically ascribed monetized
8 benefits to reduction in mercury emissions, and I find
9 these to be highly credible organizations. So, I felt
10 like I could rely on them, again, with citations so you
11 can draw your own conclusion regarding the credibility of
12 the sources.

13 HEARING OFFICER TIPSORD: Mr. Rieser.

14 Q. (by Mr. Rieser) Did the EPA include a
15 monetized health cost benefit analysis as part of its
16 regulatory analysis for CAMR?

17 A. I'm not familiar with that.

18 MR. RIESER: Okay. Thank you.

19 HEARING OFFICER TIPSORD: Further?

20 (No response.)

21 HEARING OFFICER TIPSORD: Then I believe we had
22 reserved some of the general questions from Kincaid. I'm
23 sorry.

24 MS. RAHILL: Can I ask one additional question?

1 HEARING OFFICER TIPSORD: Absolutely.

2 Q. (by Ms. Rahill) You said in your testimony on
3 Page 19, in talking about the retirement issue, that RTO's
4 have tools and structures in place that prevent retirement
5 that are needed for reliability reasons?

6 A. That's right.

7 Q. What are those tools and structures?

8 A. Well, specifically with respect to Illinois?

9 (Ms. Rahill nods her head.)

10 A. Illinois is part -- different parts of the
11 state are in different reliability regions. North
12 Illinois is part of the PJM region, and PJM can designate
13 individual units as RMR, which stands for reliability must
14 run units, which means that they are not allowed to
15 retire, but they will be paid their running costs for --
16 made whole for their costs of staying on-line. So, they
17 will negotiate an RMR contract with an individual
18 resource. And as part of the PJM agreements, the
19 generator has to be -- can be prevented from retiring on
20 that basis, although it's not often used because -- well,
21 because there aren't a lot of capacity shortages at this
22 time. Specifically in Illinois, there's no capacity
23 shortage in the region. The Midwest ISO, which at least
24 was the reliability -- I'm sorry -- the market operator

1 for Southern Illinois, has a designation of system support
2 resource, SSR, which is for all intents and purposes
3 similar to the RMR and PJM.

4 Q. Where does the money come from to pay for
5 those -- the RMR contracts?

6 A. It's added to rates, to electricity rates.

7 Q. So, that's passed on to the consumers then?

8 A. That is passed on to the consumer, yes.

9 It's -- I'm trying to -- I'm sort of smiling because other
10 things that they're coming up with for reliability regions
11 are quite expensive RMR, which is something quite
12 inexpensive as a way to assure reliability in these
13 regions because basically you just have to pay the
14 difference between the running costs and their revenues --
15 not you personally, but -- well, I guess you as a --

16 Q. I pay for electricity.

17 A. -- which is quite modest in the overall scheme
18 of electricity pricing.

19 HEARING OFFICER TIPSORD: Mr. Bonebrake.

20 Q. (by Mr. Bonebrake) I've got another follow-up
21 on the NESCAUM study, and if I could refer you to Page 25
22 of your testimony. In the first full paragraph, the
23 second sentence, you refer there to a dollar amount per
24 ton of mercury removed. Do you see that reference?

1 A. Yes.

2 Q. When you use the phase "mercury removed,"
3 removed from what?

4 A. As I said, I do not have the study in front of
5 me. My recollection is it refers to removed from
6 emissions so that it is a decreased emissions record.

7 Q. So, the amount of emissions going out the
8 stack from a plant?

9 A. That is correct. Yes.

10 Q. And did the NESCAUM study make any prediction
11 or discuss deposition modeling for mercury?

12 A. The NESCAUM study did not -- The
13 researchers -- That is not a deposition modeling study,
14 no, although it relied on research into transported
15 deposition of mercury.

16 Q. Do you know if there's a reduction on the ton
17 of emissions going out the stack from a facility what the
18 correlative, if any, reduction in methylmercury fish
19 tissue would be?

20 A. I believe there are other experts who have
21 testified on that topic, but I'm not an expert on that.

22 Q. That's not your area of expertise?

23 A. That is not my area of expertise, that's
24 correct.

1 Q. And is it also true that it is not your area
2 of expertise regarding the issue of what level of
3 reduction in mercury emissions in Illinois would result in
4 reductions of mercury deposition in Illinois?

5 A. That is correct.

6 Q. So, the benefits that you're talking about in
7 this particular sentence, you do not know what portion, if
8 any, of those benefits would accrue to citizens of
9 Illinois; is that also fair?

10 A. That is correct. Yes.

11 HEARING OFFICER TIPSORD: Just a point of
12 clarification for the record, this may be because it's
13 Friday and day 10 and I'm losing it, but the sentence
14 where the 2,400 pounds per year that we're talking about,
15 I just want to be clear that he's taken that for the TSD.
16 So, that's where that number came from. The TSD indicates
17 that the increment of mercury removal due to the proposed
18 rule is approximately 2,400 pounds per year. And I got
19 confused if we were talking about something that came from
20 the NESCAUM study. So -- And it may be because it's day
21 10 and it's me, but I wanted to clarify that.

22 A. Thank you for that clarification.

23 HEARING OFFICER TIPSORD: Okay. Then are we ready to
24 go to -- I believe we had several questions under

1 Kincaid's general questions that we reserved for Dr.
2 Hausman and Mr. Ross together, starting with question
3 number 8.

4 MR. RIESER: I do have some additional questions for
5 Dr. Hausman.

6 HEARING OFFICER TIPSORD: I would appreciate that.

7 MR. ZABEL: I have some, as well, but I think
8 Mr. Forcade would probably answer that.

9 MR. KIM: And I was asked that would it be possible
10 before we go to the lunch break to maybe walk through a
11 list of the outstanding things that you're waiting for
12 from the agency so we can try to get everything or at
13 least as much as we can to get done through the end of the
14 day. I think I've a list, but if nothing else, if you
15 hear my list as I walk through it, if you tell me if it
16 looks like I've got everything.

17 HEARING OFFICER TIPSORD: Absolutely. That's an
18 excellent idea.

19 A. Madam hearing officer, I have an addendum to
20 an answer I gave yesterday.

21 HEARING OFFICER TIPSORD: Give your addendum.

22 A. I am now a member of the American Economic
23 Association.

24 MR. ZABEL: I'm sure they appreciate your dues.

1 A. I clarify also that I will not be billing my
2 \$90 annual dues to the Illinois EPA. I pay that myself.

3 HEARING OFFICER TIPSORD: Mr. Forcade.

4 MR. FORCADE: I don't recall what question --

5 HEARING OFFICER TIPSORD: Question number 8, did you
6 perform any independent verification of the economic
7 information used in the TSD?

8 MR. FORCADE: I believe we've answered that.

9 HEARING OFFICER TIPSORD: Okay. If you're
10 comfortable, then I believe it's question number 12.

11 MR. KIM: It's 12 through 16; is that correct?

12 HEARING OFFICER TIPSORD: I believe that's correct,
13 yes.

14 MS. BASSI: I thought we changed it to 11.

15 HEARING OFFICER TIPSORD: No. He answered 11.
16 Mr. Ross answered 11 because we were going back and forth,
17 Mr. Ross and Dr. Staudt said they could address 11. So,
18 they did.

19 MR. KIM: I think the question asked for the agency's
20 basis. That's why Mr. Ross tried to answer that.

21 HEARING OFFICER TIPSORD: Question number 12 is,
22 please explain the statement that, quote, "the cost
23 associated with the CAIR rule on electric rates and the
24 power sector are several magnitude higher than those of

1 the proposed Illinois mercury rule," close quote. Cite
2 Page 185 of the TSD. Is this statement based upon
3 comparison of the national cost compliance with CAIR/CAMR
4 to the cost of the Illinois proposed mercury regulation in
5 Illinois. And for the Court Reporter, CAIR is C-A-I-R all
6 caps.

7 A. Do you want me to address that?

8 HEARING OFFICER TIPSORD: However. Mr. Ross
9 indicated that he wanted you present with --

10 A. Well, it wasn't my statement because, as we
11 noted, it's in the TSD, and I didn't write it. So, I
12 would be speculating based on the table. So --

13 HEARING OFFICER TIPSORD: Mr. Ross, can you address
14 the question?

15 A. (by Mr. Ross) I believe what was referred to
16 here is that the cost of the controls associated with the
17 CAIR rule, that is the controls that are required to
18 reduce the emissions of SO2 and NOx are much more
19 expensive than the cost of mercury removal as Dr. Staudt
20 has testified to. So, that was the basis of the
21 statement, although in discussions regarding it with Dr.
22 Hausman, it is perhaps somewhat unclear on that. So, it
23 could have been worded better.

24 Q. (by Ms. Rahill) I'm sorry. The sentence was

1 referring not to the effects on rate --

2 HEARING OFFICER TIPSORD: Miss Rahill, I don't think
3 it's working much. So, perhaps --

4 Q. (by Ms. Rahill) Just to clarify what you were
5 saying, the sentence really is about the cost of controls
6 and not the effect on rates?

7 A. (by Mr. Ross) Well, and this is probably
8 where I would defer to Dr. Hausman, that when you have
9 more expensive controls, those costs are passed on to the
10 power sector, which in turn has an affect on rates.

11 A. (by Dr. Hausman) The way I would characterize
12 it, if you look at Exhibit A7 in Appendix A of the ICF
13 report, there's a lot of numbers in this table, but I'll
14 try to guide you to the ones that are helpful in this
15 regard. This is Page 8 of 13 in Exhibit A.

16 HEARING OFFICER TIPSORD: The jets are arriving for
17 the air show.

18 A. Oh, all right. Then I'll lean a little
19 closer. If you look at the cost -- So, in the third
20 table, we have a comparison of production costs under
21 CAIR/CAMR with production costs without CAIR/CAMR, and
22 indeed one would look at the national costs because it is
23 a national policy, and that would be a characterization of
24 the total costs, which I think is what the sentence refers

1 to. And the third set of columns shows the change in cost
2 -- total production costs, which are -- note these are in
3 billions of dollars. So, the totals here are between
4 2.4 billion dollars and 4.4 billion dollars in terms of
5 what the ICF model predicts for cost of implementation of
6 CAIR on a national level.

7 If we look at the top table on that page, similarly
8 this is a comparison of the policy case with the Illinois
9 rule and the base case with CAIR/CAMR. And, again, if
10 we're going to look at the total cost of implementing
11 this, it makes sense to look at the national costs, and we
12 find that the total cost difference is between 147 million
13 dollars and 267 million dollars depending on the
14 simulation year. Once again, model results and, in my
15 opinion, overstating the true difference in costs. But
16 even in this case, perhaps the characterization of several
17 orders of magnitude is a little over the top, but it's at
18 least -- it's more than one order of magnitude and less
19 than two based on these model results.

20 HEARING OFFICER TIPSORD: Are you ready for question
21 13? Please explain the IPM modeling results indicating
22 that more than one-half of the compliance costs will be
23 borne by states other than Illinois. That's table 9.4,
24 Page 176.

1 A. Well, if I may, I would once again refer to
2 the same page in Appendix A, which is more detailed and
3 comprehensive than the tables referred to in the question.

4 HEARING OFFICER TIPSORD: Mr. Forcade.

5 Q. (by Mr. Forcade) I'm sorry. Before you said
6 that, I closed the page.

7 A. It was Page 8 of 13 in Appendix A. Now, in
8 the question -- I guess I need the question read back to
9 me because I want to make sure we're talking about
10 production costs and not costs to consumers. So, could
11 you read the question back to me.

12 HEARING OFFICER TIPSORD: I'll read it. I've got it
13 in writing. Please explain the IPM modeling results
14 indicating that more than one-half of the compliance costs
15 will be borne by the states other than Illinois.

16 A. Well, I guess that's ambiguous with regard to
17 what we mean by "compliance costs". The costs to the
18 productions costs will be borne by -- well, I would still
19 say not by Illinois because it will be borne by the
20 shareholders of the companies represented in this room,
21 who are not necessarily Illinois residents. So, I guess
22 in terms of production costs, that will be borne by the
23 shareholders, although, as I say, that may be more
24 compensated by increased revenues. But in terms of the

1 retail rate impact, we would have to look at a different
2 table in this Appendix, and that would be, for example, on
3 Page 7 of 13, Exhibit A6, and this shows by sector -- I
4 should wait for people to find it. If I look at the top
5 table of this Exhibit, you see that it breaks down -- and,
6 again, the third set of columns is the difference between
7 the Illinois rule and the CAIR/CAMR rule, and if you look
8 at where those retail rate impacts in million dollars
9 occur, we see that on the top three columns, which
10 represents the State of Illinois, we have numbers that are
11 between 2 and 8, whereas if we look at the national
12 numbers, we have numbers that are between 7 and 22. I
13 don't have particular weightings to use so that we can
14 come up with an exact number, but I think it is a fair
15 characterization to say that more than half of the cost
16 impact will be outside of the State of Illinois.

17 HEARING OFFICER TIPSORD: Sub "a" of that question is
18 what then are the economic implications of the Illinois
19 proposed mercury regulations for utilities and consumers
20 in nearby states.

21 A. Modest.

22 HEARING OFFICER TIPSORD: I'm sorry?

23 A. Modest.

24 HEARING OFFICER TIPSORD: Mr. Zabel.

1 A. Modest, but positive.

2 Q. (by Mr. Zabel) Just so I understand, Table A6
3 is monthly Delta that we were looking at?

4 A. That is correct. Yes. If you look at Table
5 A5, that would be annual, and I have, in fact, verified
6 that if you multiply Table A6 by 12, you get Table A5.

7 Q. Then we don't have to do that; do we?

8 A. Subject to the precision of the numbers.

9 MR. ZABEL: Thank you.

10 HEARING OFFICER TIPSORD: Mr. Rieser.

11 Q. (by Mr. Rieser) The table you're looking at
12 is monthly expenditures for electricity by sector; correct
13 -- A6?

14 A. That is correct.

15 Q. Okay. That's not the same as rates; is it?

16 A. That would be, I think, better for answering
17 this question than rates because presumably -- now, again,
18 this is data reported by ICF, that I'm not privy to all of
19 the calculations, but presumably they weighted electricity
20 rates by demand in each sector.

21 Q. And if you look at Exhibit A4, Page 5 of 13,
22 these are retail electricity prices; correct?

23 A. That is correct. Yes.

24 Q. So, this would really be the actual price

1 outputs, if you will; this is what the price of
2 electricity costs people --

3 A. Yes. That is correct.

4 Q. -- and the impact of the rule? And then if
5 you compare the Deltas under the Delta 3 in the top table,
6 the Deltas are not nearly as significant compared between
7 Illinois and national; in fact, Illinois costs seem to be
8 greater?

9 A. Yes. And that is because more electricity is
10 consumed by a long shot in the nation as a whole than in
11 Illinois just by itself. And, in fact, if you look at the
12 IPM model results in detail, there are costs -- there are
13 costs impacts in that model throughout the nation. I
14 don't know about Hawaii, but they do show up because of
15 the way the model works. It's all interrelated. So,
16 that's why a more modest average price impact is listed.
17 This includes the price impact in California, which would
18 be quite small, and the price impact in Indiana, which
19 would be somewhat larger. If you take the average price
20 impact and multiply it by the loads in all the regions in
21 the model, you would come up with a larger aggregate price
22 impact. But, again, I just want to say -- I want to
23 re-emphasize that this is based upon the IPM model
24 results, and I don't necessarily endorse these as being

1 quantitatively accurate.

2 HEARING OFFICER TIPSORD: Question number 14, I
3 believe is to Mr. Ross. Please provide the names,
4 background, education and experience of all people who
5 assisted in the preparation of Table 10.3, summary of cost
6 benefit analysis, Page 2 of 7 of the TSD.

7 A. (by Mr. Ross) I passed the button on that one
8 earlier. This table is a summary of available information
9 and was prepared by agency staff in the air quality
10 planning section and was edited by several people. It is
11 nothing more than a summary of information and was not
12 meant to present any new information.

13 HEARING OFFICER TIPSORD: And question 15 is the list
14 and all documents used in the preparation of Table 10.3,
15 summary of cost benefits analysis.

16 A. (by Mr. Ross) And that's the studies are
17 listed in the table itself and include the ICF modeling,
18 information compiled and submitted as part of the
19 technical support document by Jim Staudt, which is in
20 Section 8 of the TSD, USEPA studies performed for CAMR,
21 which can be found on their web site and I believe were
22 used in the reference, and information provided by Dr.
23 Rice, which is also in the references.

24 HEARING OFFICER TIPSORD: Mr. Forcade.

1 Q. (by Mr. Forcade) If we could go back, please,
2 to question 14, which asks for names, background,
3 education, I believe the answer I got was agency staff?

4 A. (by Mr. Ross) Yes. And that kind of goes
5 with question 15, in that it was nothing more than a
6 summary of information. There's no -- It's just a table.

7 Q. Am I correct then that every sentence or every
8 fact contained in Table 10.3 comes from one of the other
9 supporting documents in the record here?

10 A. (by Mr. Ross) I believe that's correct, yes.

11 Q. You believe it's correct?

12 A. (by Mr. Ross) That is correct.

13 Q. It is correct.

14 HEARING OFFICER TIPSORD: Mr. Rieser.

15 Q. (by Mr. Rieser) Looking at Table 10.3,
16 Mr. Ross, you've got health benefits value provided from
17 USEPA health benefits of mercury control.

18 A. (by Mr. Ross) Okay.

19 Q. Do you see that?

20 A. (by Mr. Ross) Yes, I do.

21 Q. Do you know whether that was the monetized
22 health impacts that were taken from the Illinois EPA
23 associated with the CAMR process?

24 A. (by Mr. Ross) Yeah, the regulatory impact

1 analysis. That is my understanding, yes.

2 Q. All right. And these are the monetized health
3 impacts that USEPA prepared?

4 A. (by Mr. Ross) Yes, I believe that's true.

5 Q. And then also on the Harvard/NESCAUM study,
6 these are the -- under the Harvard/NESCAUM study --

7 A. Yes.

8 Q. -- you've got 75 to 194 million annually
9 nationally in benefits from neurological defects in the US
10 CAMR. Do you see that?

11 A. (by Mr. Ross) Yes, I do.

12 Q. So, of the effect calculated by
13 Harvard/NESCAUM, this actually breaks out the neurological
14 as opposed to the potential mortality from other impacts?

15 A. (by Mr. Ross) It appears to do that.

16 Q. Did you break this down to a cost per ton as
17 did Dr. Hausman?

18 A. (by Mr. Ross) This was simply pulled from
19 these documents and was meant to summarize for
20 informational purposes what those documents reflect. The
21 directions were not to change wording, change meaning.

22 Q. Okay.

23 A. (by Mr. Ross) So, I would assume the
24 statements stand for what they are.

1 Q. So, looking at the actual statements and
2 looking at the 26 ton cap, the 75 billion dollar figure
3 breaks down to 3 million dollars per ton; is that correct
4 -- approximately?

5 A. (by Mr. Ross) Approximately, correct.

6 MR. RIESER: Thank you.

7 HEARING OFFICER TIPSORD: Mr. Bonebrake.

8 Q. (by Mr. Bonebrake) I had asked a question of
9 Dr. Rice when she was here about whether she was aware of
10 some changes that had been made to the Trasande study
11 numbers based upon some criticisms that had been leveled
12 by USEPA, and we had a conversation about that on the
13 record. Mr. Ross, do you know if the numbers contained in
14 Table 2.3 reflect the Trasande study numbers before
15 revision?

16 HEARING OFFICER TIPSORD: I think you mean Table
17 10.3.

18 Q. (by Mr. Bonebrake) Excuse me. Table 10.3.

19 A. (By Mr. Ross) It's my understanding that the
20 Trasande study has not been revised yet, at least to my
21 knowledge. So, this would reflect the numbers as
22 published.

23 Q. And do you know if the authors of that study
24 intend to revise their numbers?

1 A. (by Mr. Ross) No, I do not know. I would
2 like to reflect one error that was made, I believe, and
3 that's in Dr. Staudt's -- reflecting his numbers. It was
4 brought to my attention that the 29 million should
5 actually be 32 million annually from 2010 to 2017.

6 HEARING OFFICER TIPSORD: I think that takes us to
7 question number 16. Does the agency believe cost benefit
8 analysis summarized in Table 10.3 meets the accepted
9 standard for such analyses in support of the regulatory
10 impact assessment?

11 A. (by Mr. Ross) I don't believe we've made a
12 determination as to whether -- I hesitate because I
13 remember answering this question, but the agency has not
14 made a determination as to whether such standards are met,
15 nor was it our intent to meet such standards with that
16 table. Again, the table is merely a summary of costs and
17 benefits taken from existing studies.

18 HEARING OFFICER TIPSORD: All right. That takes care
19 of the general questions that we had reserved.

20 MR. FORCADE: Did we cross 17 and 18 and 19 earlier?

21 HEARING OFFICER TIPSORD: Yeah.

22 MR. FORCADE: I think I just have one follow-up
23 question. This relates to the -- Actually, two follow-up
24 questions, if I could. In Exhibit C, Table 1-11, Page 11

1 of 13.

2 HEARING OFFICER TIPSORD: You're again talking about
3 the ICF report?

4 MR. FORCADE: Yes.

5 HEARING OFFICER TIPSORD: Thank you.

6 A. I'm sorry. Is this in Appendix A? I'm not
7 sure where you are.

8 Q. (by Mr. Forcade) It's the ICF consulting
9 analysis of the proposed Illinois mercury rule, and it's
10 on Page 11 of 13 of the text --

11 A. Oh, the text.

12 Q. -- immediately preceding Appendix A.

13 A. Comparison of --

14 Q. No. Cumulative coal mine retirement.

15 MR. KIM: Is there an Exhibit associated with that, a
16 number?

17 MR. RIESER: It's Exhibit C of the ICF report.

18 MR. BONEBRAKE: It's in the text before Appendix A.

19 A. Oh, I see. Okay. Page 11 of 13. Yes.

20 Q. (by Mr. Forcade) Is this predicting the coal
21 plant retirements in Illinois over a period in the future
22 from 2009 to 2018?

23 A. (by Dr. Hausman) I would say that this is --
24 Again, I refer to the detail tables in Appendix A, but my

1 understanding is that this is cumulative coal plant
2 retirements over the period -- over the modeling period
3 under the proposed rule and under Illinois CAMR, and it
4 shows the data both for plants in Illinois and nationally.

5 Q. The first bullet under the conclusions there
6 talks about a 15 percent reduction by 2015.

7 A. Yes.

8 Q. I seem to having a little trouble seeing where
9 the 15 percent comes from.

10 A. This is a 15 percent reduction in coal-fired
11 generation, not in installed capacity.

12 Q. And it would not be directly related to the
13 plant retirements then?

14 A. No, it would not be directly related to plant
15 retirements.

16 Q. Then the last question I have is the computer
17 modeling that was done by ICF. It was a series of inputs
18 run through a computer model to produce the series of
19 outputs; is that correct?

20 A. You could characterize it that way, yes.

21 Q. Did you recreate that model run by using their
22 inputs to produce the outputs?

23 A. I couldn't do that. I don't have access to
24 their model.

1 Q. Okay. Can you then verify the results of
2 their model outputs?

3 A. Can I verify that they --

4 Q. Not recreate them. Can you verify them?

5 A. In the sense if you ran their model with their
6 inputs, you would achieve those outputs?

7 Q. Do you know that the results reported
8 accurately reflect the inputs to the model being run
9 through the model?

10 A. I don't know that, no.

11 MR. FORCADE: Thank you.

12 HEARING OFFICER TIPSORD: All right. With that, it
13 is quarter after 12:00.

14 MR. MATOESIAN: Can we ask a clarification?

15 HEARING OFFICER TIPSORD: Why don't we go through the
16 list of things Mr. Kim is looking for. And then before we
17 do that, it is my intention that we do finish up today. I
18 understand that Mr. Nelson has to leave at 3:30. So, when
19 we finish with Dr. Hausman, we will go to Mr. Nelson until
20 3:30, and then any questions that Mr. Nelson does not get
21 answered by 3:30, we will have him work with the agency to
22 supply written answers, and we'll set up a date for that
23 later on. So -- And then we also have some things to
24 finish up with agency personnel, as well. So, it would be

1 my intention that we stay until we're done tonight. I
2 think it's realistic that we're not going to be here until
3 midnight tonight. So, that being the case, I do think
4 we'll be able to finish up today. With that being said, I
5 will re-visit the prefiling deadlines, as I indicated
6 earlier, for the August hearing. I also will take any
7 motions that you might have at this time, oral motions
8 that you want to make. I would just note that I'm still
9 going to reserve a ruling on Steubenville until we know
10 where we're on Steubenville, and that may, in fact, be a
11 written motion. Mr. Zabel first and then --

12 MR. ZABEL: I was just going to say, with respect to
13 the Steubenville matter, I know Mr. Kim is still pursuing
14 that. We thought we would wait and see what the response
15 was. We believe you invited a motion last week.

16 HEARING OFFICER TIPSORD: I indicated that I would
17 hear any motions, yes. Mr. Rieser.

18 MR. RIESER: It's really part and parcel of the same
19 question, which is whether we've not been asking day by
20 day whether we were going to do anything new on
21 Steubenville, and my assumption is that there being
22 silence on the subject, that we don't have --

23 HEARING OFFICER TIPSORD: We did get an update
24 while --

1 MR. RIESER: I'm sorry.

2 HEARING OFFICER TIPSORD: They're still checking.
3 The USEPA has sort of said, no, but they're still working
4 on it.

5 MR. KIM: We're making inroads, but we're not there
6 yet. We're trying to get either an official "yes, that's
7 fine," or an official "no," and if it's an official "no,"
8 we're hoping we can get someone that we can offer and say,
9 "So and so person told us this," and even better yet,
10 maybe they sent it to us in an e-mail. We're trying to
11 get formal response one way or the other.

12 MR. RIESER: Thank you.

13 MR. KIM: They're obviously not too keen on asking
14 any questions about mercury right now. The list of things
15 that I had that were outstanding, starting with Marcia
16 Willhite -- and I informed her secretary that she would
17 have to show up for a few minutes this afternoon. She was
18 going to pass it on to Marcia. I think we submitted
19 Exhibit 65 yesterday, I believe.

20 HEARING OFFICER TIPSORD: Of the deposition model.

21 MR. KIM: And she and Rob Kaleel will be available to
22 answer any questions representing those slides.
23 Mr. Rieser had asked me if possible if we could produce
24 the PDF files of those documents, and I will look into

1 that, and then we'll -- I don't know how -- I mean, we can
2 send electronically PDF files to the utility companies,
3 and I guess I could do the same thing to you. I'm not
4 sure how you want me to handle that.

5 HEARING OFFICER TIPSORD: You can just e-mail a PDF
6 to me. It's already in the record. The only thing we
7 would use if for is to print off more color.

8 MR. KIM: It's just going to be a bigger version of
9 what's already provided.

10 MR. RIESER: I appreciate that. Thank you.

11 MR. KIM: Sure. These I'll knock off real quick.
12 One of the questions that was addressed to Marcia Willhite
13 -- and I don't remember the context of this -- part of the
14 testimony she was addressing water quality standard and
15 whether or not that was looking at methylmercury or total
16 mercury, and her response was total mercury. Follow-up
17 could be directed to her. We were going to look for some
18 sources of information that related to questions 8 through
19 13 submitted by Dynegy Midwest Generations. I think she's
20 going to respond to that. This is done. This is done.
21 This is done. There was a question concerning Exhibit 17.
22 I think it had the title -- or had the word "current" in
23 the title, and there was a question as to what "current"
24 means. Apparently that information was gathered from the

1 period of 1998 to 2003. So, that would be the definition
2 of "current" as applied to that Exhibit. This is done.
3 This is done. Mr. Forcade asked a follow-up question in
4 response to an Exhibit that we provided. I don't recall
5 the number, but we stated that it was an Exhibit that was
6 not included in -- it was mistakenly omitted from the TSD,
7 and there was a citation to a different document in its
8 place. We provided that. Mr. Forcade has asked that some
9 follow-up be given as to some calculations that were found
10 within that document, and I will try and have an answer
11 for that this afternoon, as well. There was another
12 question that I believe Mr. Forcade asked. That was
13 whether the affluent data represented filtered or
14 unfiltered samples. I don't know if you remember this
15 question.

16 MR. FORCADE: Yes.

17 MR. KIM: And it would be unfiltered would be the
18 answer.

19 HEARING OFFICER TIPSORD: Mr. Forcade.

20 MR. FORCADE: There were actually a whole series of
21 questions which are now being described as a document or a
22 single word, and I'll need to explore that at some level.

23 MR. KIM: That's fine. I was trying to give short
24 answers. She'll be here for follow-up. I think there was

1 a request for a page number for a statement out of the
2 1999 Ken Haynes (phonetic) document concerning a statement
3 that bilaminarily estimates showed that approximately 10
4 percent of women have mercury levels within one-tenth of
5 potential hazardous levels. This is going back a ways. I
6 haven't been able to get ahold of Dr. Rice to get the page
7 number citation to that. If I don't have that by the end
8 of the day, then we'll maybe provide that as part of a
9 written comment. I think that's just a citation request.

10 The scope of work that was provided in the contracts
11 or agreements with Mr. Ayres and Dr. Hausman, I think
12 we'll hopefully -- I think I can have Dr. Hausman's this
13 afternoon. We'll work to get Mr. Ayres, as well. Web
14 site --

15 MS. BASSI: I think someone also asked for Keeler's.

16 MR. KIM: Well, we can provide that, as well. I
17 think I have that. There was a question about Page 91 of
18 the TSD concerning some information that we presented
19 concerning the State of Connecticut and a standard there.
20 There was a misplaced decimal point in our TSD. I don't
21 know if it's an errata point or not. There's a number
22 there that's .06, and I think it's supposed to be .6. So,
23 it's a misplaced decimal point. It was just a typo
24 basically.

1 I'm going through. Some of these we already
2 provided. The references to the TSD, Sections 8, 9 and
3 10, Section 8 we can give that right after lunch if you'd
4 like. Section 9, I think the only reference point we were
5 going to get back was that it's basically everything that
6 we've been talking about now is taken straight out of the
7 IPM modeling information. Section 10, I've got some
8 information. I can do that, as well, after lunch.

9 We talked about that. We talked about that. There
10 was a question concerning referencing the TTBS -- well,
11 this might have been a series of questions. This is some
12 of what we were looking for clarification for. Certain
13 provisions in the TTBS, there was a suggestion maybe that
14 it would reference back to the act in terms of trying to
15 clarify review times or appeal decisions and things like
16 that. Is that what we needed clarification on? And,
17 also, some definitions that were included maybe just on
18 the regs as a whole.

19 HEARING OFFICER TIPSORD: Yeah.

20 MR. KIM: And I think I was gone when you went
21 through that. If you have something specific --

22 HEARING OFFICER TIPSORD: The main thing is that the
23 testimony of Mr. Romaine indicates that both in the rule
24 itself and in the TTBS, any decision by the agency or the

1 decisions by the agency are going to be made in the permit
2 context. There's a lot of discussion in both the rule and
3 the TTBS about what is required when you apply for these
4 things, and that the agency will make a decision, but
5 there's no cross-reference to appeal provisions of the act
6 or the provisions of the board's rules on permit appeals
7 and like that, and that has left I felt some ambiguity as
8 to what the appeals were. So, I wanted you to look at
9 that. Mr. Forcade.

10 MR. FORCADE: The questions from the board were
11 related to that. I think some of the questions that came
12 from us were simply from the date of the rule to the date
13 of compliance, how will each of these things fit on a time
14 schedule, and will there be an adequate period of time,
15 and I've got some follow-up questions on that that I'd
16 like to address.

17 HEARING OFFICER TIPSORD: The definitions were --
18 Specifically the definition of "coal derived fuel" is
19 awkward, and then "output based emission standards" and
20 "rolling 12-month basis" both have a limited phrase as to
21 subpart "b", and given that 225 is going to contain both
22 the CAIR and the mercury rule at some point if the board
23 adopts both of those or either of those or any of those,
24 and, therefore, I need to know if all your definitions

1 that are now in subpart "a" are only to subpart "b" and --
2 So, just -- And I think that's literally a result of
3 different people drafting different sections of the rule.

4 MR. KIM: I think that's correct, but we'll look into
5 that, yes.

6 HEARING OFFICER TIPSORD: And I asked about the
7 phrase "for cause" in 210d.

8 MR. KIM: I think that's something we raised
9 something from the CAMR language.

10 HEARING OFFICER TIPSORD: And that's something that
11 Jake Haar (phonetic) will notice. And I did also caution
12 everyone that with the second publication of the first
13 notice, Jake Haar (phonetic) did make changes to the rule,
14 presumably nothing substantive, but I think there's at
15 least one of them she made that we are going to change
16 back if we go to second notice because it did affect the
17 rule. So, use the Illinois regs of the rule.

18 MR. MATOESIAN: Were you looking for oral answers or
19 written?

20 HEARING OFFICER TIPSORD: No. I think you need to
21 make -- These are errata type things, an errata sheet on
22 the rule.

23 MR. KIM: And Exhibit 40, which I think was the
24 agency's comments to USEPA, we were going to try to

1 replace that with a final version, and I think we're still
2 just trying to get copies made of that. And I think when
3 we were talking about that, there were only a few little
4 changes here and there.

5 MR. RIESER: The differences seemed like they were
6 pretty minor. Probably taking out the line about "Don".

7 MR. KIM: That's all I had on my list.

8 HEARING OFFICER TIPSORD: Does anybody have anything
9 else? I didn't either.

10 MR. MATOESIAN: You want that errata sheet by the end
11 of today?

12 HEARING OFFICER TIPSORD: No, no, no, no.

13 MR. MATOESIAN: I thought you wanted --

14 HEARING OFFICER TIPSORD: No, no.

15 MR. KIM: Some of this obviously we'll try to get
16 done today, but some of these are post hearing type.

17 HEARING OFFICER TIPSORD: Yes. Then we'll go to
18 lunch and come back with Mr. Rieser and Mr. Zabel's
19 additional questions for Dr. Hausman.

20

21 (A recess for lunch at this time.)

22

23 HEARING OFFICER TIPSORD: I understand that Mr. Zabel
24 and Mr. Rieser have some additional questions for Dr.

1 Hausman.

2 Q. (By Mr. Zabel) Dr. Hausman, on the table we
3 talked about at the beginning this morning, Table 3.2 in
4 the ICF report, in Appendix C of the ICF report, and these
5 may be more for Dr. Staudt, I just want to get
6 clarification on what it is. It's captioned "changes in
7 mercury control costs," but as I understood the
8 description, it's really the table from changes Dr. Staudt
9 made; is that correct?

10 A. (by Dr. Staudt) Table 3.2?

11 Q. Yes. Called the look-up table this morning.

12 A. (by Dr. Staudt) I just want to make sure I'm
13 looking at it. Well, Table 3.2 is a look-up table that
14 goes into the integrated planning model, and what you see
15 there reflects the inputs after I made updates.

16 Q. Okay. What was confusing to me, Doctor, was
17 it says "changes in mercury control costs," and then we
18 talked about changes you had made. I wasn't sure if this
19 was showing me the end result or just the changes.

20 A. Well, where it says "changes in mercury
21 control costs" -- keep in mind, I didn't enter that table
22 into that report, but the table itself underneath is --

23 Q. Reflects your changes?

24 A. -- reflects changes that I provided to ICF.

1 Q. And just one other question. There's a
2 reference in the ICF report to this is an EPA web site
3 where you can find this information. Do you know if this
4 is now -- this is the same table that I would find there?

5 A. (by Dr. Staudt) You would -- It would be a
6 similar table, but with different numbers entered.

7 Q. That's fine. That's all I wondered on that.
8 Thank you. Dr. Hausman -- Thank you Dr. Staudt. On Page
9 3 of your testimony -- and I'm going to try to go through
10 my questions quickly and pretty much in order of your
11 testimony, and hopefully these are relatively brief. Hope
12 springs internal.

13 A. (by Dr. Hausman) I'll do my best.

14 Q. At the bottom of the page, in the very last
15 paragraph beginning on Page 3, you refer "in the
16 short-term, the set of capacity resources," etc. What did
17 you mean by "short-term"?

18 A. With regard to this particular discussion,
19 there's some overlap between short-term and long-term, but
20 I would say -- I would characterize "short-term" as three
21 to five years or less.

22 Q. And are you talking here in part at least
23 about the addition of capacity resources, new generation?

24 A. Right. My point is that in the short-term,

1 you're stuck with what's in the ground, you're trying to
2 look at an analysis that's a decade or two in the future,
3 and you would assume that there will be unit additions and
4 retirements, which will be an important part of the
5 modeling exercise.

6 Q. Dr. Hausman, have you ever been involved in
7 the planning design construction of new coal-fired
8 generation?

9 A. I have not.

10 Q. Do you have any idea how long it might take
11 from the point of someone determining to build one to the
12 time it's synchronized with the grid?

13 A. Determining to build one, if you include
14 permitting, I think six years is probably not a bad
15 estimate.

16 Q. It's probably a good estimate, actually.

17 A. Thank you. Was that testimony?

18 Q. Could you turn to Page 8 of your prepared
19 testimony, please? The table on Page 8, I believe you
20 indicated the numbers are taken from Table 8.7 in the TSD;
21 is that correct?

22 A. That's correct.

23 Q. You didn't derive or create any of these
24 numbers yourself; is that correct?

1 A. Except that I took the difference myself.

2 Q. Did the arithmetic?

3 A. Using my considerable subtraction skills, yes.

4 Q. And it's your understanding, is it not, Dr.

5 Hausman, that the numbers on Table 8.7 of the TSD are

6 derived from Tables 8.9 and 8.10 of the TSD?

7 A. That is my understanding, yes.

8 Q. And did you do any independent verification or

9 check either on the sources of that data or the

10 calculations of the numbers in Tables 8.9 and 8.10?

11 A. I personally did not. I believe that someone

12 at Synapse actually did.

13 Q. Do you know who that was, do you recall?

14 A. I think it would have been Dick Doolittle

15 (phonetic), an analyst there.

16 Q. And it is your understanding that in part the

17 data on Tables 8.9 and 8.10 were derived from Table 8.8;

18 is that correct? I think it's in the 160 something range.

19 A. Yeah, I have the tables.

20 HEARING OFFICER TIPSORD: 162, 63.

21 A. I'm sorry. The data in --

22 Q. (by Mr. Zabel) To make this quicker, Table

23 8.8, I believe, was used to derive the cost of ash

24 disposal primarily at least in Table 8.9?

1 A. (by Dr. Staudt) That's better for me. That
2 was used to -- Table 8.8 shows data taken from Form 767
3 submittals for 2004 and, based upon that, estimated dollar
4 per ton revenue and disposal.

5 Q. And the data from that was used in part in
6 Table 8.9?

7 A. (by Dr. Staudt) In part, yes.

8 Q. To create that?

9 A. (by Dr. Staudt) Yes.

10 Q. And is that your understanding now, Dr.
11 Hausman?

12 A. (by Dr. Hausman) Yes.

13 Q. You, again, did not do it?

14 A. That was my assumption, although I did not
15 personally recreate all the calculations that are shown
16 here.

17 Q. Thank you. On Page 8, in the last full
18 paragraph, and you've used this phrase before, and it
19 might help for clarity of the record, and you have a quote
20 "on the margin". Could you define that for us?

21 A. "On the margin" refers to the generating unit
22 which is sending the cost of electricity by its bid for
23 any given market period, usually an hour, and a dispatch
24 model of many systems have a 5-minute price. So, it could

1 be for a 5-minute period.

2 Q. Have you ever done that without computers?

3 A. I don't think so.

4 Q. At the end of that paragraph, there is the
5 sentence, "I believe that a reasonable range of the annual
6 electricity wholesale market costs to Illinois customers
7 is between zero and 11 million dollars." Do you see that
8 sentence?

9 A. Yes, I do.

10 Q. If it were zero, then whatever the cost of the
11 rule would be would be borne by the generators; is that
12 correct?

13 A. Well, this does specifically refer to Illinois
14 customers. So, there are also costs that are calculated
15 as proposed on customers in a broader area. So, I would
16 not agree that it's correct in that narrow sense.

17 Q. Okay. And I'll broaden it then. If the cost
18 to all customers impacted by the rule, however you might
19 want to define that, were zero, the cost would be borne by
20 the generators; is that correct?

21 A. I'm afraid, once again, I have to get a little
22 more specific.

23 Q. Sure.

24 A. If the impact on the wholesale price of

1 electricity everywhere were zero, then all of the costs
2 would be borne by the generator owners.

3 Q. That's fine. No problem with the
4 clarification. On the next page, Page 9 of your
5 testimony, in footnote 2, you have calculated on the
6 margin, and you used two different data sources, as I
7 understand it. One was the PJM annual data for 2005. One
8 was the MISO -- By the way, just for the record, what does
9 "MISO" mean, M-I-S-O?

10 A. Midwest Independent System Operator.

11 Q. Thank you -- monthly data for March 2006. Was
12 there any reason you used monthly data from one source and
13 annual data from another?

14 A. I actually am not sure offhand whether it was
15 monthly data from MISO. It was a monthly report, but it
16 may be that they -- I believe that they actually report
17 data for a longer period in each of those monthly reports.

18 Q. If you'll look at the -- And I may be reading
19 this wrong, and please correct me if I am. The
20 parenthetical that begins in the third line of footnote 2
21 says -- which indicate -- it's referring to the monthly
22 report for April of 2006, quote, "(which indicates on Page
23 77 that coal was on the margin about 86 percent of the
24 time in MISO in that month)" end of paren, end of quote.

1 A. I stand corrected. Now that I read that more
2 carefully, I probably did use a monthly estimate of time
3 the coal was on the market.

4 Q. I'm wondering, Doctor, if you would know if
5 there would be some inconsistency or certainly some change
6 in the result had you used annual data from both or
7 monthly data from both sources?

8 A. I probably used those because they're what I
9 had at hand, and if you look at the argument that it's
10 supporting, it's a fairly rough estimate of the time that
11 coal is on the margin for a number of reasons that I think
12 some of which are probably more significant contributions
13 to uncertainty than that. For example, I don't know
14 offhand without doing a very detailed modeling study how
15 much of the broad region -- Well, this refers
16 specifically -- Yeah, I don't know --

17 Q. I'm throwing these at you. You may not have
18 read it recently.

19 A. There is a certain amount of uncertainty
20 associated with this estimate, and I think I characterized
21 it that way in my testimony. If I were to choose upon as
22 a proxy for annual -- the annual percent for which coal is
23 on the margin, I think March would be a reasonable month
24 to choose as a shoulder period. So, it is not one of the

1 highest, one the lowest energy demand months in the
2 region.

3 Q. Okay. Thank you. On this page, you
4 indicate -- And I'm looking to see if I can find it. A
5 lot of this is highlighted. You indicate that you
6 inspected, and I quote, "The capacity supply curve
7 compared with low levels," end of quote. Could you
8 explain what that means and exactly what you did?

9 A. I'm sorry. Can you point me to the paragraph?

10 Q. I've written down the quote. Now I'm going to
11 have to find it.

12 MR. RIESER: It's at the end of footnote 2.

13 MR. ZABEL: Thank you, Mr. Rieser.

14 MR. RIESER: I'm not testifying. I'm just trying to
15 be helpful.

16 MR. ZABEL: You can be helpful.

17 Q. (by Mr. Zabel) Did you find it Dr. Hausman?

18 A. Yes. "The capacity supply curve" refers to
19 the ordering of all units in the system from least
20 expensive to most expensive in terms of marginal costs,
21 and the reason one does that is that the presumption is
22 that the units will be turned on or dispatched in that
23 order. That's referred to as merit order. So, first you
24 turn on your least expensive units, hydro power, nuclear

1 power, then you move on to coal units, and depending on
2 what the load level is, you can determine what is the
3 last, most expensive unit that's needed in any given hour
4 to meet load. So, the way you would determine which unit
5 was on the margin is through this process. So, you have
6 to know both what the supply curve is, as I've described
7 it, and what characteristic load levels were, and then you
8 could say, well, at this particular load level, you could
9 say what kind of resource would be on the margin.

10 Q. Does that assume, if I may use the phrase,
11 perfect market?

12 A. It doesn't assume a perfect market. It
13 assumes merit order for the resources. If I were to use
14 the expression fresh and perfect market -- I wouldn't use
15 that expression, but I might say "a perfectly competitive
16 market," which is an ideal market in which everyone bids
17 their marginal cost of energy into the power pool. So,
18 this does not necessarily assume a perfectly competitive
19 market because units could be bidding higher than their
20 marginal cost as long as they don't disturb the merit
21 order of the resources.

22 Q. But, in fact, because suppliers don't know
23 what other suppliers may be bidding, they not only might
24 bid higher than their marginal costs, might they not also

1 bid out of that order?

2 A. Well, you want to stipulate that suppliers
3 don't know what their competitors are bidding. I don't
4 necessarily agree with that.

5 Q. Take both assumptions, and I'll take your
6 answer to the question. One that they do and one that
7 they don't.

8 A. I think suppliers try very hard and sometimes
9 through their assumptions on whatever those are found by
10 what their competitors are doing, suppliers try to both
11 raise their bids if they can and retain the merit order of
12 the dispatch, but it is, in fact, just what you
13 identified, the danger of going out of merit order that
14 keeps them from -- in a competitive market; it keeps them
15 from raising their prices far above marginal costs.

16 Q. And in that market, if a group of the
17 suppliers -- one group of the suppliers knows that another
18 group is going to be incurring some additional costs,
19 they're not -- they take that into account in their
20 bidding?

21 A. They might.

22 Q. In talking about the supply curve here on Page
23 9, what was your data source for that?

24 A. I believe -- I believe I used the supply

1 curves that were provided by ICF marginal costs.

2 Q. Are they in their report, do you recall?

3 A. Those would actually be in the data -- They
4 would be in the data that was provided originally to
5 Illinois EPA with the model results.

6 Q. And do you recall whether they're in Exhibit C
7 to the TSD?

8 A. You mean Appendix?

9 Q. Either in the Exhibit -- Exhibit C is the
10 report, and then it's got three appendices, A, B and C.
11 So, I was referring to the whole packet.

12 A. I do not believe that -- I didn't type it in
13 from here. They were provided in electronic files.

14 Q. Can you supply those to us?

15 A. I believe they were made published when the
16 TSD was published.

17 Q. To expedite this, I'm happy to have you check
18 it later, and if they're not there, you can furnish them.
19 That would be acceptable. Is that acceptable to you,
20 Mr. Kim?

21 MR. KIM: And I'm sorry. I had a couple
22 conversations going.

23 MR. ZABEL: I don't know if they're here, and we
24 don't want to take the board and the witness' time to see

1 if they're here. I'm happy to let him do that.

2 MR. KIM: And I apologize. What exactly was it that
3 you were asking Dr. Hausman about?

4 MR. ZABEL: On Page 9, footnote 2, his use of the
5 capacity supply curves compared with load levels, and he
6 believes they are in -- they were ICF supply curves.

7 A. They were based on data supplied by ICF.

8 Q. (by Mr. Zabel) So, you created the curves
9 yourself?

10 A. Yeah. And exactly the Exhibits and my
11 testimony.

12 Q. Are those the EDH 1 and 2?

13 A. Yes. EDH Exhibit 1 is the variable cost
14 supply curve for Illinois generating units under the
15 proposed mercury rule compared with the supply curve under
16 the CAIR/CAMR only case, and that is based on IPM model
17 data and results. And in addition to providing the supply
18 curve as an illustrative output example, I showed the
19 average Illinois load level so you could get a sense of
20 what units would be on the margin under average
21 conditions.

22 Q. And you jumped ahead to my question. I was
23 going to ask if you have it, the unit data on which you
24 constructed those two curves.

1 A. And that came from the same model -- the
2 output files that were provided to Illinois EPA, and
3 correct me if I'm wrong, John, were made public when the
4 TSD was filed.

5 MR. KIM: My guess is it's either in the documents
6 that are in Exhibit C, which, as you noted, has appendices
7 within, or possibly within the information that we've
8 provided on the disk today, but I believe in one of those
9 two locations it is found, to the best of my knowledge.

10 Q. (by Mr. Zabel) I'll come back to where I was.
11 Could I ask Dr. Hausman to check if it's in there or let
12 us know? That's fine.

13 A. I know it is not on the disk. It's not in the
14 file that I know about that's on that disk.

15 Q. We just needed to know if the data from which
16 those curves were constructed are here. If we've got it,
17 that's fine. If we haven't, we'd like to obtain it.

18 A. Those would be the IPM model output files.

19 Q. Took care of a question or two. On top of
20 Page 12, although the sentence starts on the bottom of
21 Page 11, Dr. Hausman, you indicate that, "Fuel through
22 electric power plants in Illinois amounts to about 2
23 billion dollars per year." Is that all fuels?

24 A. Yes. Based on the same IPM model reports,

1 that is all fuel. Remember that I don't necessarily
2 endorse the data. In fact, I think that it's probably
3 low.

4 Q. Well, just -- That's fine. I understand your
5 qualification on it. Make whatever you want. But when we
6 say "all fuels," let's be very clear, are we including
7 nuclear fuel?

8 A. Yes, we are.

9 Q. And, Doctor, do you believe it would be higher
10 or lower?

11 A. Than the 2 billion dollars?

12 Q. Yes.

13 A. My judgment is that it would be higher, but I
14 also would point out that I do say about 2 billion dollars
15 per year, which indicates a very low level of precision of
16 that estimate. I'm merely trying to compare that order of
17 magnitude to the cost referenced in the paragraph.

18 Q. In the next paragraph, and I think you've
19 referred to this earlier, you indicate that, "The
20 generators as a group" -- and I'm quoting in the next to
21 last sentence -- "will be better off financially with the
22 rule than without it. Of course, in this scenario there
23 are winners and losers," and the sentence goes on. And I
24 realize this is a construct that you've made. But did you

1 do any investigation of who those winners and losers might
2 be?

3 A. I didn't. That would require a full dispatch
4 model analysis, which I did not perform.

5 Q. And that's a regional number; is it not?

6 A. The 60 million dollars annually?

7 Q. Yes, sir.

8 A. Yes, sir, that was a broader regional number.

9 Q. So, the winners could be all outside the State
10 of Illinois?

11 A. I think that's highly unlikely.

12 Q. That wasn't the question, but I appreciate
13 your qualifier. They could all be outside the State of
14 Illinois?

15 A. I will have to say, no, they could not all be
16 outside the State of Illinois.

17 Q. Could a majority of them be outside the State
18 of Illinois?

19 A. Well, this isn't necessarily such good news to
20 you and your colleagues here. I'm quite sure Exelon would
21 be a big winner.

22 Q. I don't represent Exelon. So, it's no big
23 news to me one way or the other. The nuclear plants could
24 be winners; is that what you're suggesting?

1 A. Any plant which has marginal costs lower
2 than -- Any plant which has an incremented marginal cost
3 due to the rule which is between zero and the incremented
4 marginal cost due to the rule of the marginal plant --

5 Q. The plant on the margin?

6 A. The plant on the margin, yes -- would be a
7 winner for that given hour in the sense that they would
8 make more money -- make more additional money than their
9 additional costs would be.

10 Q. And like the nuclear plant, that --

11 A. The nuclear plants will have no incremental
12 costs associated with this rule, and to the extent that
13 wholesale electricity prices increase even a very small
14 amount, they'll make more money.

15 Q. And the plants in Indiana and Missouri
16 wouldn't be impacted by this nuclear or --

17 A. That is correct.

18 HEARING OFFICER TIPSORD: Mr. Rieser has a follow-up.

19 Q. (By Mr. Rieser) Just sort of to bring it down
20 to specific terms, the winners would be the nuclear
21 facilities and coal-fired power plants outside of the
22 State of Illinois and the losers would be the coal-fired
23 power plants within the State of Illinois?

24 A. I would not necessarily characterize it that

1 way.

2 Q. Why not?

3 A. Well, the reason is that there will be
4 coal-fired power plants in the State of Illinois, as
5 you've been hearing over the last couple of days, which
6 will incur very low costs in order to comply with this
7 rule. In fact, the costs may be zero because they may be
8 able to comply with the rule purely on the basis of
9 cobenefit mercury emissions reduction. The owners of
10 those plants will be winners under this construct. Any
11 plant which has particularly high costs will either be
12 setting the marginal price or will be making less money as
13 a result of that.

14 Q. (By Mr. Zabel) Turning to Page 14 of your
15 testimony, Dr. Hausman, you indicated that -- and this is
16 the section that has the caption "Electric System
17 Reliability Impact of Proposed Rule," and I believe it's
18 the beginning of the second sentence, quote, "My judgment
19 is that this prediction is overstated," close quote. Why
20 is that, Doctor?

21 A. Well, the rest of this -- of the bullet
22 points, and it says "my reasons are as follows," and then
23 it gives six bullet points, which I describe more fully if
24 you'd like or --

1 Q. No. That's fine. What I was really trying to
2 get at it, and I guess I didn't phrase that very well, is
3 there any other reasons you think the retirements in the
4 ICF report were overstated?

5 A. I think I've characterized my reasons in the
6 bullet points that follow.

7 Q. And did you do -- As a result --

8 A. There is one more reason, which is that I
9 believe that the -- No. I think I've characterized them.

10 Q. On Page 17 of your prepared testimony, under
11 caption "Sharing the Reserves," you're talking about the
12 various reliability pools, and as I read this -- and let
13 me ask you, Doctor, is it your opinion that prior to the
14 formation of what's now called Reliability First, capacity
15 was either not available or less available to Illinois
16 from what was then ECAR and MAAC?

17 A. There was no, as far as I know, reserves
18 sharing or the same kind of -- same availability of
19 reserves sharing for meeting capacity requirements in a
20 smaller region -- in the smaller regions individually.
21 Once Reliability First was formed, the capacity
22 requirements for load serving at these to have capacity
23 under -- excess reserve margin was decreased, and the
24 reason is that when you have a broader region and share

1 reserves, not all regions -- not all parts of the regions
2 are likely to have peak demand at the same time. So, you
3 can have a lower reserve margin in all the areas, and they
4 will be able to have the same level of reliability.

5 Q. That's because you can transfer generation
6 that results in electricity from one part of the region to
7 another?

8 A. Yes. That's not quite how it happens
9 physically, but, yeah, you have the capacity available to
10 move more power into the region where it's needed.

11 Q. It's sort of moved in a cascade fashion from
12 here to here to here to here, if you follow what I'm
13 trying to describe?

14 A. I follow what you're trying to describe, but
15 you can't follow electricity quite that way.

16 Q. Could you describe how it works?

17 A. How it works is that there's a large
18 interconnected regional grid, and certain resources put
19 power on the grid, and other loads take power off of the
20 grid, and there are flows between areas where there's
21 excess generation relative to load -- two areas where
22 there's excess load relative to generation. So, I think
23 it is fair to say that there will be some transport of net
24 change toward increased import of power into regions that

1 are having under peak circumstances relative to when
2 they're not.

3 Q. Does that depend on the quality and number of
4 interconnections and the transmission systems?

5 A. Yeah. Yes. To the extent that transmission
6 capability was not available to deliver capacity from one
7 part of the region to another -- of course, one doesn't
8 really deliver a capacity. It's sort of complicated, the
9 places to describe. But, yes, transmission resources are
10 important for reserve sharing. How about that?

11 Q. Have they improved since Reliability First was
12 created in comparison to when ECAR and MAAC still existed?

13 A. Has the potential global capacity of the
14 transmission system improved?

15 Q. Yes.

16 A. I don't believe that it has improved
17 materially in the short time since Reliability First was
18 formed as far as physically of the transmission resources.
19 However, I do believe that it is being operated more
20 efficiently, and that's the point of forming these larger
21 region areas.

22 Q. Why is it more efficient now, if you could
23 explain that?

24 A. Well, because there's greater of reserves

1 sharing, because there's dispatch over a larger region so
2 that the single operator is optimizing the dispatch all
3 the way from the eastern seaboard to Chicago. It's just
4 -- You know, when you put the whole thing into one
5 optimization model, ideally, and I think to some extent,
6 really, you do get a more efficient use of your resources
7 and lower costs to producers.

8 Q. On Page 18, the next page, under the "Rules
9 Governing Retirements" portion of your testimony, you've
10 indicated that both PJM and MISO can take steps to keeping
11 a unit operating if necessary, and you use specifically
12 that there are tools and structures in place that prevent
13 retirement. Are those what you described earlier today?

14 A. Yes.

15 Q. Have you reviewed the agreements under which
16 those two entities operate -- PJM and MISO?

17 A. I have reviewed the tariff language. I have
18 not reviewed specific agreements between market operators
19 and generating unit owners.

20 Q. And was the description you gave of this
21 ability of PJM and MISO in the tariff language?

22 A. Yes, it is.

23 Q. Turning to Page 22, if you would.

24 A. Let me just amend that to say that to get the

1 full picture, you may have to look beyond the tariff
2 language into operating rules, as well.

3 Q. Did you go beyond the tariff language?

4 A. Yes, I have. Yes.

5 Q. And what was the beyond that you went to, if I
6 might ask?

7 A. I have notes if you want me to look for them
8 that tell me what specific resources I used for that. I
9 don't think that I included them in my testimony.

10 Q. Let's save time. If you could give those to
11 Mr. Kim, and he could send them to me, that would be
12 adequate, unless the board wants to do it on the record.
13 I don't need to.

14 A. It would just take me a second.

15 HEARING OFFICER TIPSORD: Go ahead and get it on the
16 record. Did you have a follow-up?

17 MR. RIESER: Yes, when Dr. Hausman is finished
18 answering Mr. Zabel's question.

19 HEARING OFFICER TIPSORD: While Dr. Hausman is doing
20 that, I must give a slight chastisement, and I suspect
21 that this goes to Mr. Rieser, as well. We did have a
22 prefiling deadline for questions, and I did say that Dr.
23 Staudt could -- but a lot of questions on the specific
24 testimony, I --

1 MR. ZABEL: In my defense, I didn't know whether the
2 data that came in Dr. Hausman's two revisions of his
3 testimony, we knew it could impact Dr. Hausman; we didn't
4 know whether it would. I had started to prepare, and
5 these are the remnants of that.

6 HEARING OFFICER TIPSORD: And I can appreciate that,
7 but I just want to note for the record that --

8 MR. ZABEL: And that's why I'm trying to do them as
9 quickly as possible.

10 HEARING OFFICER TIPSORD: I appreciate that. Thank
11 you.

12 MR. KIM: While Dr. Hausman is looking for that, I do
13 have the scope of work from his --

14 HEARING OFFICER TIPSORD: That would be great. Let's
15 mark that as an Exhibit. This is Dr. Hausman's scope of
16 work; correct?

17 MR. KIM: It's addressed to Mr. Biewald, but I
18 believe -- Mr. Biewald is the President of Synapse.

19 HEARING OFFICER TIPSORD: We will mark this as
20 Exhibit 72, if there's no objection.

21 (No response.)

22 HEARING OFFICER TIPSORD: Seeing none, this is marked
23 as Exhibit 72.

24 A. I'm not having as much luck -- Oh, wait. Here

1 we go. Well, I looked at what was in Module E of the MISO
2 energy markets tariff, which describes the ability of MISO
3 to use system support resources, to which I referred
4 earlier. And I'm missing a page here.

5 Section 6 of the PJM operating agreement and Section
6 of the PJM open access transmission tariff were the
7 resources I used to look at what the specific rules for
8 reliability must run units are in PJM.

9 Q. (by Mr. Zabel) On page 22, Doctor --

10 A. Yes.

11 Q. -- Page 22, in the middle paragraph, I think
12 it's the second sentence, says, quote, "Furthermore, were
13 these retirements to occur, it is likely that the retired
14 capacity would be replaced by new or more efficient
15 plants, quite possibly even in the same location." There
16 would be some time lapse for that replacement; would there
17 not?

18 A. Yes.

19 Q. And is it possible that that loss generation,
20 in fact, could be replaced not by new facilities, but by
21 available generation within the Reliability First area?

22 A. Lost capacity?

23 Q. But if we retire a plant, we've lost some
24 capacity?

1 A. Yes.

2 Q. And there's excess capacity, as I understood
3 your testimony, in the Reliability First theory?

4 A. Yes.

5 Q. So, there might be no need to build that new
6 plant?

7 A. That is possible, yes.

8 Q. And that excess capacity could also be outside
9 the State of Illinois; could it not?

10 A. Yes, though I would say the sites for building
11 capacity are in fairly short supply, and as load grows, I
12 would expect if there are suitable sites for generation,
13 there would be new entry in those areas, but that's just
14 what I assume would happen.

15 Q. Finally, Doctor, on Page 24, where you're
16 talking about impact of enhanced sport fishing and other
17 wildlife activities, you testified this morning that you
18 only reviewed other documents concerning that issue; is
19 that correct?

20 A. That's correct.

21 Q. To your recollection, were any of those
22 documents either Illinois specific or this rule specific?

23 A. It was a state specific breakdown, and I
24 believe Jim Ross provided the study, but it was a state

1 breakdown of economic value of sport fishing.

2 Q. And did it have any discussion of how
3 environmental regulations may change that data, may
4 increase?

5 A. No, it didn't, and as a result of that and
6 because I had no basis on which to estimate that, I merely
7 postulated as an illustrative example, if sport fishing
8 were to increase by 1 percent as a result of this rule,
9 and, frankly, that seems modest to me, but I don't know.

10 Q. It's modest only if you assume that sport
11 fishermen respond to rules like this; isn't it?

12 A. Well, they wouldn't be responding to the rule.
13 What they would be responding to is that it's unsafe to
14 eat a lot of fish that are caught in the State of Illinois
15 right now, and, so, it may be that people don't come here
16 to fish, wouldn't want to eat their catch. I think that
17 it's not unreasonable to think that there are some people
18 who would choose to fish more if they felt they could eat
19 the fish that they catch.

20 Q. Do you know how mercury content in Illinois
21 fish compare to mercury content in other states?

22 A. I do not know.

23 Q. And what was the basis for your statement that
24 they're bad or worse? I forgot exactly the word you used.

1 A. I know there are mercury advisories in just
2 about all Illinois waterways. So, if you were to take
3 that into account, because I certainly were if I were
4 catching fish to feed to my family, I would decide not to
5 do that.

6 Q. Do you know how those advisories were derived
7 and established?

8 A. I do not.

9 Q. Do you know what advisories may exist in other
10 states?

11 A. I don't.

12 Q. Would you check that before you decided
13 whether to fish in Illinois or not?

14 A. I would check that before I decided to fish
15 and then eat the fish that I caught, yes, and I think that
16 the general public perception, which is correct, is that
17 there are risks associated with eating fish -- many
18 different kinds of fish, and, so, I would assume that
19 serves as some disincentive to fishing for the purpose of
20 consuming the fish.

21 Q. But you have no idea how the fish of Illinois
22 compare to either surrounding states or salt water fish
23 that are sold here?

24 A. Well, the tuna I had the other night was

1 delicious, but it wasn't caught in Illinois, as far as I
2 know.

3 Q. I would hope it wasn't. You couldn't taste
4 mercury in the tuna, Doctor?

5 A. I don't know. You know, I'm out on a limb
6 here. I'm happy to say, I'm not saying that people look
7 at the map of the United States and say, "Gee, where
8 should I go catch fish?" Actually, maybe people do. If
9 they want to go on a fishing vacation, they're not likely
10 to choose to go to a place where they couldn't eat the
11 fish that they catch. So, if there are places where's
12 it's safer to do so, I think people would choose to do so.
13 I was, by the way, a psychology major in college, but I
14 didn't concentrate on this particular issue.

15 Q. The assumption being that they would actually
16 look?

17 A. The assumption being that they would have some
18 awareness of that, yes.

19 MR. ZABEL: We won't beat the fish to death anymore.
20 That's all I have.

21 HEARING OFFICER TIPSORD: Mr. Harley, do you have a
22 follow-up?

23 MR. HARLEY: Strictly follow-up.

24 Q. (by Mr. Harley) Is it correct that there are

1 multiple factors that will dictate in any given hour which
2 power plant will be utilized through the regional
3 wholesale power market?

4 A. Which plant would be utilized?

5 Q. Yes. That's right.

6 A. Well, again, the simplified model, is that low
7 cost units will be turned on first, and they'll be turned
8 on in increasing order of marginal cost until load is met.

9 Q. And when you talk about low cost units, what
10 are the major factors that contribute to a unit being a
11 low cost unit, in your experience?

12 A. The major factor -- By far the dominant factor
13 is fuel cost, which is controlled by both the price of the
14 fuel and the efficiency of it.

15 Q. And will fuel cost be affected by the mercury
16 rule?

17 A. I can't say whether it will be affected at
18 all, but it will be a very, very small effect if it were.

19 Q. And will combustion efficiency be affected by
20 a mercury rule?

21 A. Again, Dr. Staudt could probably speak to that
22 better than I, because pollution control equipment often
23 does have a small impact on the question of efficiency. I
24 have actually discussed this with Dr. Staudt, but he's

1 more of an expert.

2 Q. Isn't it true that, in fact, any incremental
3 additional costs due to mercury control in Illinois will
4 be trivial -- trivial by comparison to the cost that
5 you've described relating to fuel consumption and
6 combustion efficiency?

7 A. Yeah. I think this is where the expression
8 "several orders of magnitude" is certainly appropriate.
9 It would be much, much smaller, on the order of perhaps 50
10 cents per megawatt hour, whereas fuel costs are closer to
11 \$50 per megawatt hour.

12 Q. Is it true that it states that you use the
13 federal CAMR approach?

14 A. I'm sorry. You know what I threw out some
15 numbers. Having done that, I want to make sure I've got
16 them right.

17 Q. It is in your testimony, but --

18 A. Sid says they're good.

19 Q. What's not in your testimony is how those
20 numbers would compare to the other kinds of costs that
21 would make that decision as to what are the most efficient
22 units?

23 A. That's correct.

24 Q. It states you used the federal CAMR approach.

1 There will be costs on electric generating units to comply
2 with the federal CAMR; wouldn't there?

3 A. Yes, there will. Let me go back. The CAMR
4 rule, I believe, is -- The targets can largely be met
5 through cobenefit capture. So, if you look at the CAIR
6 rule and the CAMR rule, those costs would be extremely
7 modest to the point of negligible of the additional costs
8 of meeting the CAMR rule at least in Illinois.

9 Q. If you look at your Exhibit EDH 1, which you
10 discussed with Mr. Zabel, it's attached to your testimony,
11 is it fair to say that the states that are not using an
12 approach comparable to Illinois, the black line on this
13 chart would be expected cost to electric generating units
14 in those states?

15 A. Yes, that is how I would characterize those.
16 And, again, we're talking about the marginal costs, the
17 avoidable cost.

18 Q. And sort of the olive color would be what
19 would be the cost to Illinois units; is that correct?

20 A. Well, olives come in a number of colors. I'm
21 sorry. Yes, that would be the incremental costs supply
22 curve based on with the Illinois rule in place.

23 Q. And, once again, does this seem to indicate
24 that the cost to Illinois electric generating units by

1 comparison to their out of state counterparts are trivial?

2 A. The addition to cost for the Illinois rule I
3 would characterize as close to trivial. I have trouble
4 saying that, you know, 30 million dollars is trivial, but,
5 again, in the context of its impact on the marginal cost
6 of electricity, it would be quite small.

7 MR. HARLEY: Thank you.

8 HEARING OFFICER TIPSORD: Mr. Rieser.

9 Q. (by Mr. Rieser) Just one follow-up to
10 Mr. Harley's questions. If the cost of compliance with
11 the mercury rule in Illinois was shown to be significantly
12 more than that estimated by Dr. Staudt, would all of your
13 answers with respect to triviality change?

14 A. I can't answer that offhand. If the costs
15 were significantly higher, then it would be a larger
16 increase in the marginal costs, if the variable costs were
17 higher. So, remember, we're only talking about the
18 variable costs. So, if there are capital costs associated
19 with installing the technology, those are unlikely to be
20 reflected in the cost of electricity. But, yes, if the
21 variable costs were higher, for example, if you ended up
22 needing twice as much sorbent, then that would have more
23 of an impact on the wholesale cost of electricity.

24 MR. RIESER: Being mindful of hearing officer's

1 chastisement, I'm going to keep this as brief as I can.

2 HEARING OFFICER TIPSORD: But please do ask all your
3 questions.

4 MR. RIESER: Thank you.

5 Q. (by Mr. Rieser) On Page 9 of your testimony,
6 at the bottom of the page, you say, "Compliance narrow
7 introduced in the TSD is a simple one. There may ways
8 that the market responds to the rule which would achieve
9 compliance at a lower cost." Do you see that?

10 A. Yes, I do.

11 Q. And then there's several ideas on how that
12 might be, including increasing electricity imports,
13 decreasing exporter time, generators installing other
14 emission control technologies. Do you see that?

15 A. Yes.

16 Q. Isn't that what -- I'm sorry. Don't you agree
17 that's what the IPM model doesn't account for and Dr.
18 Staudt does not?

19 A. Well, ideally, if the IPM model were actually
20 finding the optimal implementation of the rule, then, yes,
21 that would be the case, although even in that case, the
22 IPM model can only come up with retrofit ideas that are
23 provided to it as a menu of options. So, for example,
24 just to make an illustrative example, if someone were to

1 come up with a less expensive sorbent in order to control
2 mercury emissions, there's no way that that could be
3 captured by the IPM model because the IPM model was given
4 specific costs for sorbents to use in emissions control.
5 Furthermore, as I've discussed, the IPM model was
6 constrained in such a way that it was not able to find
7 what would be in reality the least cost implementation of
8 the rule, even given this limited menu of retrofit
9 options. And I think as proof of that, you know, quite
10 clear proof is the fact that we have in the record Dr.
11 Staudt's solution to reducing mercury emissions at a much
12 lower cost than the cost that was identified in the IPM
13 model.

14 Q. Do you know -- Well, let me go through that
15 answer. It was my understanding based on Dr. Staudt's
16 testimony earlier today that he provided the costs to the
17 IPM people, and that was that Table 3.2 of Appendix C to
18 Exhibit C that we talked about in the TSD. In other
19 words, those were the list of changed data inputs that
20 went into the ICF model; correct?

21 A. I can't speak to all the Exhibit numbers.

22 Q. I understand.

23 A. Yes.

24 Q. So, Dr. Staudt's numbers were put into the ICF

1 model; is that correct?

2 A. Yes, they were.

3 Q. When you say they were constrained, is that
4 because that they were looking not at rates to be --
5 individually unit rates to be achieved, but at specific --
6 each plant was designed a specific mercury emissions cap;
7 you could not emit any more mercury than what was in that
8 cap?

9 A. I would say that's a primary reason that I
10 believe the model was highly constrained and conservative.

11 Q. And one of the reasons that the model or the
12 results of the model is that there's less generation in
13 Illinois and that the generation shifts to other states is
14 because the units couldn't efficiently operate above a
15 certain level because of that cap?

16 A. I generally agree with that statement, yes,
17 although I don't necessarily feel that -- as I indicated
18 in my testimony, the general results that exports are
19 power from Illinois might decrease to some very small
20 degree as a result of this rule, I think that's probably
21 accurate.

22 Q. I'm sorry. The exports would decrease from
23 Illinois?

24 A. Yes.

1 Q. You think that's accurate or inaccurate?

2 A. I think that is accurate, yes. I think that
3 would probably occur to a small degree.

4 Q. And on Page 13 -- and this goes directly to
5 this point -- you say that, "The IPM results imply that 33
6 million in annual production cost increases would
7 translate to hundreds of millions of dollars of annual
8 costs to consumers." That's in the first paragraph --
9 first sentence at the top paragraph on Page 13. Do you
10 see that?

11 A. Yes, I do.

12 Q. Okay. Where do the IPM results imply that
13 there are 33 million dollars in annual production costs --
14 cost increases?

15 A. I don't -- That's not the right number to use
16 here, actually. The correct number to use would be the
17 number -- in terms if you were to actually say what the
18 IPM model indicates, you should use the costs of the IPM
19 model, which is more like in the order of 50 million
20 dollars in annual cost increases, but the point stands
21 that the results imply that revenues -- aggregate revenues
22 for generators would be many, many times what the increase
23 in costs were. That's just what the numbers show from the
24 model.

1 Q. And, in fact, speaking to that issue, Table
2 1-3, which is on Page 5 of 13 of the ICF report --

3 A. You've got to let me get there.

4 Q. -- Exhibit C.

5 A. I'm sorry. Which page?

6 Q. 5 of 13 of the report itself.

7 A. Yes.

8 Q. And, so, that the increased cost nationally,
9 the total cost of the rule among not only the Illinois
10 plants, but the other plants that have to produce power in
11 response to the Illinois rule is 147 million in 2009, 267
12 million in 2015 and 248 million in 2018?

13 A. Yeah, that's what it says for the national
14 cost.

15 Q. So, those are the types of numbers that we
16 should be talking about in terms of what the IPM results
17 state with respect to annual production cost increases?

18 A. Yes. In terms of total costs nationally, I
19 would agree that the IPM model suggests that those would
20 be the changes in total costs, yes.

21 Q. And given that -- and you asserted again --
22 where does that windfall to generators happen?

23 A. So, if I look at Exhibit A-5 -- I'm sorry.
24 That's retail. Although it's probably the same. I think

1 that's the best we'll do is in terms of -- So, what the
2 models show is that the increase in expenditures for
3 electricity will be close to a hundred million dollars per
4 year nationally. And let me find the total production
5 costs corresponding table. It's on Page 8. Nationally --
6 In this case, this does not support my contention that the
7 increase in revenues will increase -- will be greater than
8 the increase in costs on a national basis from the rule.
9 However -- however, I would like to point out, once again,
10 that we were talking about a hundred to 200 million
11 dollars nationally, whereas total costs that we're talking
12 about are more like a hundred billion dollars nationally.
13 So, we're talking about one part of 1,000. And while I
14 agree that this does not support the statement that I made
15 in my testimony regarding the IPM model results, I also
16 would say that this certainly has the numerical problem
17 that I was describing earlier, which is you're subtracting
18 two enormous numbers and trying to learn something from
19 the difference between them, which is quite small compared
20 to certainty -- to what I would impute the uncertainty in
21 the model.

22 Dr. Staudt has pointed out to me that it's similar to
23 trying to determine the weight of a flea by weighing a dog
24 without the flea and then weighing the same dog with a

1 flea on it. I think you'd have trouble getting a very
2 precise estimate.

3 HEARING OFFICER TIPSORD: Clearly getting to be
4 Friday afternoon.

5 A. Point well taken.

6 MR. RIESER: Variables. Wet dog or dry dog?

7 A. Indeed there would be many different variables
8 to be taken in that case, as well.

9 Q. (by Mr. Rieser) Before we go completely goofy
10 here, on Page 10 of your testimony, you state, "The rate
11 impacts may be zero of companies not passing cost on to
12 customers." What would this imply for the profitability
13 of the generating units?

14 A. I'm sorry. I haven't caught up with you.
15 Page 10. Where is it? What paragraph?

16 Q. We're going to withdraw that question until we
17 can find a specific quote. Had you said that, though --
18 No. You had a discussion with Mr. Zabel about this 60
19 million annual cost on Page 12 -- the first full paragraph
20 on Page 12, and what you say is that, "The cost impact of
21 this to Illinois" -- I'm sorry -- speaking about the
22 megawatt rate itself -- "The cost impact to Illinois
23 electricity customers would be 11 million dollars";
24 correct?

1 A. I estimated that the impact would be, yes,
2 between zero and 11 million dollars.

3 Q. So, taking the 11 million dollar number and
4 understanding it's at the top of your range, that's a
5 third of the total cost of the Illinois generators than 33
6 million; correct?

7 A. If those are the right numbers, yes.

8 Q. So, where is -- What happens to that 22
9 million that's not passed on to the customers? Is that
10 absorbed by the companies?

11 A. No. The companies are paid -- Under
12 locational marginal system, such as that which pertains to
13 in Illinois, the companies are paid the marginal cost of
14 electricity, and load pays the marginal cost of
15 electricity, and this is over a broad regional area. So,
16 you really can't go one to one and say that there's, in
17 addition to power going across the borders, there's money
18 flowing across the borders. So, hopefully the other
19 direction. So, you can't say one to one that the 20
20 million dollars is absorbed by the companies.

21 Q. Then who is absorbing it? Where is it going?

22 A. Well, by this rough calculation, I estimated
23 that there would be 60 million dollars in increased costs
24 over the broad regional area because the price of

1 electricity would be slightly higher during some hours, so
2 that there would be some generating companies, if these
3 numbers are accurate -- and as I think I make clear in my
4 model, I come out with an answer that the generation
5 owners would be made whole or more than made whole, but it
6 may be -- it could be a little less, it could be a little
7 more, but based on my analysis, more generation owners
8 would make money on balance from this rule than would lose
9 money because of the increase in costs, but, again, very
10 small numbers compared to the economics of the electricity
11 sector.

12 Q. I think when we talked about making money what
13 we were talking about is revenues, which are only one part
14 of the making money question.

15 A. When I was referring to it just now I meant
16 net profit. There are some -- Clearly there's some
17 companies that would make more money because of this
18 rule -- electric generating companies, and I gave Exelon
19 as one example, but also owners of the electric generating
20 units which don't have to retrofit either because of
21 cobenefit capture is sufficient to meet the standard or
22 because they're not in Illinois or because their cost of
23 the compliance is lower than whatever the weighted average
24 marginal increase in cost is. So, those companies would

1 make more than it would cost. So, they'd have a net
2 benefit. And companies which have on the margin higher
3 compliance costs than what they increased revenue would
4 come out a little worse.

5 Q. And of the coal-fired power plants in
6 Illinois, do you have any idea which of them will have
7 installed cobenefits necessary to comply with CAIR by
8 2009?

9 A. I don't know. There are certainly other
10 witnesses who have discussed the individual plants in
11 detail. I don't know.

12 Q. Do you know if there are any?

13 A. Well, from the record in this proceeding, I
14 believe there are probably plants that are in compliance
15 already.

16 Q. With the mercury rule -- with the proposed
17 mercury rule?

18 A. What do you think?

19 A. (By Dr. Staudt) You can -- I think Tables 8.9
20 and 8.10 show you which units that I expect are -- where
21 it indicates a cobenefit are either currently in
22 compliance or darn close.

23 HEARING OFFICER TIPSORD: Mr. Bonebrake.

24 Q. (by Mr. Bonebrake) I just had a follow-up.

1 You were talking with Mr. Rieser about the 11 million
2 dollars per year that would be paid by Illinois customers,
3 and he was also just talking with you about your estimated
4 annual compliance cost of 33 million dollars. Is the
5 assumption in that discussion that the 22 million dollars
6 per year would be paid by customers outside of the State
7 of Illinois?

8 A. (by Dr. Hausman) Look, I gave a range base of
9 these, and, so, I'm not willing to say 22 million dollars
10 a year, 27 million dollars a year will be paid by
11 customers outside of Illinois, but there certainly will be
12 -- if electricity prices increase during some hours as a
13 result of this rule, that cost impact will be borne by
14 consumers both in Illinois and in the surrounding region
15 because it is an interconnected electricity market.

16 HEARING OFFICER TIPSORD: Mr. Rieser.

17 MR. RIESER: I'm sorry. Just a minute.

18 MR. BONEBRAKE: I had another follow-up.

19 HEARING OFFICER TIPSORD: Go ahead.

20 Q. (by Mr. Bonebrake) We were talking about one
21 of the Exhibits to your report earlier, I think, in
22 response to maybe a question that Mr. Harley had raised,
23 Exhibit EDH-1, the variable cost Exhibit?

24 A. Yes.

1 Q. And I understood you to say that the capital
2 costs for pollution controls will not impact the costs of
3 electricity. Did I understand you correctly?

4 A. The capital costs are not included in this
5 supply curve, and by and large, in a competitive
6 electricity market, capital costs are not reflected in the
7 price of electricity --

8 Q. And if those --

9 A. -- are not directly reflected in the price of
10 electricity.

11 Q. If those capital costs are not directly
12 reflected then in the price of electricity, is that
13 because the owners and operators of the power producing
14 facilities eat those costs?

15 A. I'm sorry. Because they what?

16 Q. They have to absorb those costs?

17 A. Well, if we look at this curve, the marginal
18 price would be set by the location where the load crosses
19 the curve, and all units which are running, which are all
20 the units to the left of that point, will receive that
21 price. So, since all of the units to the left of that
22 point have a lower cost than the current wholesale price
23 of electricity, they will be making more money than their
24 variable costs, and that's how they recover their capital

1 costs, and that's just how the market works. That's how
2 this kind of competitive clearing price market works.

3 Q. But is it not true that variable production
4 costs do not include by definition capital costs?

5 A. That is true, yes, by definition.

6 HEARING OFFICER TIPSORD: Mr. Rieser.

7 Q. (by Mr. Rieser) Just one last question, which
8 is the discussion about what costs are included in the
9 price and not included in the price. All of that changes
10 if and when the state moves to an auction system --
11 reverse auction?

12 A. That is not correct, because, remember, we
13 have to -- there's a wholesale price and a retail price.
14 So, the wholesale price of electricity will still be set
15 by the marginal unit under the LMP system, which is in
16 effect in both PJM and in MISO.

17 MR. RIESER: Thank you.

18 HEARING OFFICER TIPSORD: Anything else for Dr.
19 Hausman? Dr. Hausman, thank you very, very much.

20 DR. HAUSMAN: You're welcome.

21 HEARING OFFICER TIPSORD: And I thank all of you.
22 Your questions were very helpful in forming the record.
23 We're going to go ahead and go with Mr. Nelson now, I
24 believe, and we'll get as many questions as we can. And

1 before we start, Mr. Nelson, I personally want to thank
2 you for your patience for hanging around. It's greatly
3 appreciated by the board. And we will get you out of here
4 by 25 after 3:00, but we'll answer what questions we can.
5 Thank you very much. And I do remind you, you are still
6 under oath. And I believe we were at Amren's question
7 number 8.

8

9

E X A M I N A T I O N O F

10

Mr. Sid Nelson:

11

A. What is your definition of cost effective?

12

HEARING OFFICER TIPSORD: No. Were all the fields
13 being utilized?

14

A. Okay. 8, Does the SCA you report correspond
15 to all the fields?

16

HEARING OFFICER TIPSORD: That's number 9. Number 8,
17 were all the fields being utilized for particulate
18 collection during the test of Sorbent Technologies
19 sorbent?

20

A. Were all the fields being utilized for
21 particulate collection during the test of Sorbent
22 Technologies sorbent?

23

HEARING OFFICER TIPSORD: And I believe we're talking
24 about the St. Clair power plant.

1 A. As I said earlier, no. During our testing,
2 two of the six fields were not working. So, its effective
3 SCA for the entire period was about 470 square feet per
4 thousand ACFM.

5 Does the SCA you report correspond to all of the
6 fields? No.

7 Do you know the halogen content of the coal blend
8 that was used at that facility? I don't know precisely
9 the PPM of ACL. The plant varied in its operation.
10 Sometimes it would be hundred percent western
11 subbituminous coal under lower load conditions. The
12 majority of the time it was at 85 percent subbituminous
13 blend with 15 percent bituminous coal. And U.S.
14 subbituminous coals are usually between 5 and 40 ppm
15 chlorine. Our measurements of gaseous ACL in St. Clair
16 were never above 10 parts per million. One thing to note
17 is western subbituminous coal were outgoing, and they will
18 absorb sometimes ACL, but in any event, they were low
19 numbers.

20 HEARING OFFICER TIPSORD: Mr. Harrington.

21 Q. (by Mr. Harrington) I may have misunderstood.
22 You said the mercury content in the flue gas was 10 parts
23 per million?

24 A. It was never measured above 10 parts per

1 million by us.

2 Q. Going into the trape or coming out of the
3 trape?

4 A. It would be either way. The carbon is not
5 going to absorb ACL.

6 Q. I thought you said it was a measurement.

7 A. A gas phase measurement of hydrochloride acid
8 gas in the flue gas.

9 MR. HARRINGTON: Okay. Thank you.

10 A. In any event, it's low chlorine plant, as are
11 most Illinois plants.

12 What time of year was this? This was done in the
13 autumn.

14 Do you know whether any flue gas conditioning such as
15 SO3 was used at this facility? No, St. Clair did not use
16 SO3 flue gas conditioning.

17 HEARING OFFICER TIPSORD: Mr. Nelson, could you read
18 the question numbers, as well?

19 MR. KIM: Just add one to whatever number I have
20 here.

21 A. Number 13, do you know the source of the
22 subbituminous coal used at this facility? I don't know
23 the particular mine. I do know that it came from the
24 Montana extension of the powder river basin. The PRB

1 coals tends to be pretty uniformed as far as mercury is
2 concerned, and how they respond to sorbents. It's not
3 necessary U.S. subbituminous coals.

4 Do you know -- Number 14, do you know what mines?
5 No, I don't exactly. St. Clair actually uses a blending
6 station. So, they get a pretty consistent coal. They
7 have separate facilities that blends it prior to going to
8 one of two power plants that they have.

9 Number 15, do you know how the size of the ESP
10 compares with the size of ESP's in the State of Illinois?
11 I don't have personal knowledge of the distribution of
12 physical sizes of the ESP's in Illinois. I have looked at
13 the data in the -- that we talked about earlier from some
14 of those site visits. 470 would be on the large end. It
15 would probably be about 70th percentile nationally.
16 That's a guesstimate. We can talk a little bit later
17 about the Illinois context.

18 HEARING OFFICER TIPSORD: Miss Bassi, as a follow-up.

19 MS. BASSI: Pardon me?

20 HEARING OFFICER TIPSORD: You have a follow-up?

21 MS. BASSI: Oh, yes.

22 Q. (by Ms. Bassi) Going back to number 13, did I
23 hear you correctly that you said that powder river basin
24 coal tends to be pretty consistent in its mercury content;

1 is that what you said?

2 A. Well, with respect to mercury either in its
3 mercury content or the way it responds to mercury
4 sorbents.

5 MS. BASSI: Okay. Thank you.

6 HEARING OFFICER TIPSORD: Mr. Harley.

7 Q. (by Mr. Harley) You mentioned that St. Clair
8 has a blending station. Are there blending strategies
9 that could be used by either coal suppliers or by the
10 operators of coal-fired power plants that would reduce the
11 cumulative amount of mercury in the coal which they're
12 using as fuel?

13 A. Two points to answer that. One is, yes,
14 particularly when you have the emission standard like .008
15 pounds per gigawatt hour, you could simply burn a very low
16 mercury coal. It might not get you all the way there, but
17 it might get you 50 or 80 percent of the way there. So,
18 you do have flexibility in your coal suppliers or how much
19 you preprocess the coal because the mercury tends to be
20 associated with the sulfites, which are associated with
21 fly ash. A second possibility -- not my firm, but another
22 firm has done experiments or full-scale trials where they
23 blended a bituminous coal like here with a western coal,
24 and you can -- they've shown you've been able to achieve

1 significant mercury reductions simply by blending, and
2 what that does is boost that over the accidental removal
3 that you get from the carbon. This could put more
4 chlorine, for example, into the coal that's burned. So,
5 yes, that is one strategy for trying to reduce your
6 mercury reduction.

7 Q. As a coal plant operator or the purchaser of
8 coal that has been previously blended by a supplier, this
9 would be another strategy that you would be able to employ
10 in order to meet a numeric limit?

11 A. Yes.

12 MR. HARLEY: Thank you.

13 HEARING OFFICER TIPSORD: Mr. Bonebrake.

14 Q. (by Mr. Bonebrake) Is it true that in
15 considering coal blending options that you just mentioned,
16 you also need to consider emission limit requirements
17 associated with other substances, such as sulfur dioxide?

18 A. Certainly. Right now when a power plant makes
19 its coal purchasing decisions, mercury is totally outside
20 the -- it doesn't even consider it. They consider SO2.
21 They consider ash. They consider BTU. They consider
22 price. So, they have no incentive to burn low mercury
23 coal, for example. As soon as mercury does enter into
24 their equation, and they can get it out either before it

1 gets in the plant gate or they can purchase some kind of
2 control technology to get it out once it is in the plant
3 gate, so, it will now enter their whole cost reduction
4 strategy, and they have to consider SO2, as well as NOx,
5 as well as availability, all those things, BTU.

6 Q. But at this particular point in time, a
7 company may have committed to a control strategy, as you
8 mentioned, that does not include mercury, from which it
9 will take at least a significant period of time to change
10 that strategy to accommodate coal blending in the manner
11 you've talked about?

12 A. Well, different -- Certainly if you're a mine
13 mouth (phonetic) plant, which there aren't any in
14 Illinois, you're restricted in your coal supply. There
15 are both long-term and short-term contracts, certainly
16 three years out, where you can certainly alter things, but
17 it's going to be very plant specific for what their
18 purchasing contracts call for.

19 HEARING OFFICER TIPSORD: Question 16.

20 A. Your testimony refers to the Great River
21 Energy Stanton Station. Yes, it does. Were you
22 personally involved in the study of that facility? No, I
23 was not, and that study was a Department of Energy
24 contract to the EERC of the University of North Dakota.

1 That's the Energy Environmental Research Center of North
2 Dakota. The actual operation of that trial was
3 subcontracted to the URS Corporation, their former radiant
4 group. What we did -- That was -- URS is not a sorbent
5 supplier. They're kind of an independent engineering
6 group. And they tested our materials. They tested Galgon
7 materials. They tested NORAD materials and the parametric
8 part of that program. So, we simply supplied them with
9 sorbent to try out. Based on the parametrics, ours was
10 shown to be the most cost effective at that plant. So, we
11 were chosen to supply the materials for the long-term
12 30-day run. So, we simply sent a truckload of sorbent out
13 for that run.

14 Number 17, do you know what size the ESP is at that
15 facility? According to the reports, it was also 470.

16 Do you know the halogen content of the subbituminous
17 blend that was used in that facility? Again, I don't know
18 it specifically, but this was hundred percent
19 subbituminous coal. So, I'm sure it was very low.

20 What time of year was that study run? And that was
21 also in the autumn.

22 Do you know whether any flue gas conditioning, such
23 as SO3 injection, was used prior to the ESP at that
24 facility? And I'm not aware. I haven't read anything

1 that said that they did have SO3 conditioning. So, I
2 assume they did not.

3 Do you know the source of the subbituminous coal?
4 No, I don't.

5 Do you know what mine it was? No, I don't.

6 HEARING OFFICER TIPSORD: We're at question 23.

7 A. 23, do you know the size of that ESP at that
8 facility compared to the size of ESP's in the State of
9 Illinois? Again, that would probably have been a bit
10 larger than average. In looking at the data -- Maybe I
11 can go over this at this point. To look at the selective
12 SCA's, it looks to me like about a third of the capacity
13 -- a third of the units are above 300 in Illinois, about a
14 third are between 200 and 300 and about a third are below
15 200. So, you do have a fraction that are below average
16 and above average.

17 HEARING OFFICER TIPSORD: Mr. Harrington has a
18 follow-up.

19 Q. (by Mr. Harrington) This is about a follow-up
20 and just getting a couple points there later that the
21 timing might let us get to today. One of the questions
22 later is, have you ever referred to ESP's under 200 SCA as
23 being tiny?

24 A. Well, it was actually the ESP at Yates that I

1 may have used that at some point. They had 144. And I
2 would consider anything in the lowest 15th percentile or
3 so to be tiny, and I think the 144 would probably qualify.
4 But, again, as Dr. Staudt pointed out, the size -- let me
5 clarify something -- the size of the ESP has nothing to do
6 with its mercury removal capability. Where it may enter
7 the equation is if it turns out -- when we get to the SO3
8 issue, if it turns out you have to alter the SO3 injection
9 at the plant and you have to turn it off and use something
10 else might, you know, create a particulate emission
11 problem, and there's a whole slew of SO3 injection
12 questions. It might be best to talk about that there.
13 Because you're only adding about 1 percent. When we
14 inject the sorbent, it's only about 1 percent relative to
15 the fly ash that the ESP takes out. So, we're not adding
16 a whole lot of material. In fact, on an hour by hour
17 basis, the fly ash, the ash content of the coal is going
18 to vary 10 percent on an hourly basis, and that's going to
19 translate to 10 percent, you know, more or less going into
20 the ESP. So, adding 1 percent compared to even an hourly
21 10 percent is going to be lost in the noise of the data.

22 HEARING OFFICER TIPSORD: I think Mr. Harrington had
23 an additional question.

24 A. Sure.

1 Q. (by Mr. Harrington) You mentioned that the
2 concern is not that mercury removal, but it is the
3 possible facts on the opacity or particulate in the
4 system, the SO3 or size?

5 A. That's what I would be -- Yeah, that's the
6 concern. The ESP's pick up the carbon that we inject, and
7 we find all the mercury in the fly ash that comes out of
8 the hopper of the ESP. So, we're picking up all the
9 sorbent that we inject or at least 99 percent of it.

10 Q. At the large units at which -- large SCA units
11 in which your tests were run; correct?

12 A. Well, there have been -- In the ones we've
13 done, yes, and the ones other people have done, as well,
14 that there haven't been -- at the standard sorbent
15 injection demonstrations that have been done, there
16 haven't been any opacity issues at a single one. The only
17 ones that I'm aware are the issue with the electrical
18 system, which is not the ESP itself. It's the electrical
19 controls and potential for arcing at Yates. And there's
20 something called TOXECON 2, that there is a trial done, a
21 short-term trial, not a longer term trial at Independence,
22 and I think there they -- that's where they're injecting
23 the sorbent not in front of the ESP, but actually halfway
24 through the ESP, and there the flue gas is going at only

1 one-tenth of velocity, and I do believe they saw some pass
2 through of the particulate through that ESP. Now, that
3 TOXECON 2 process and at Yates, those are both kind of
4 designed -- they have a scrubber behind the ESP. So,
5 anything that gets through doesn't go up the stack. It
6 basically goes into the wet scrubber. So, it's not like
7 it goes up the stack. But technically a little bit in
8 those special cases, which are not standard injection that
9 was modeled here in the analysis that was done for the
10 State of Illinois, in those special variations that people
11 are testing, a little bit did get through, not out the
12 stack.

13 MR. HARRINGTON: Why don't we proceed?

14 HEARING OFFICER TIPSORD: Question 24.

15 A. Question 24, on Page 3 of your testimony
16 references experiments at Meramec -- Meramec station. Do
17 you know what type of coal was burned in that trial? And
18 it was a hundred subbituminous, I believe.

19 25, how would you affect the removal that was
20 achieved? For carbon like the one they used, they didn't
21 use ours. They used one called NORAD Darco HG-LH. I
22 think it would be a very good fit because that's the kind
23 that works well on subbituminous coals.

24 Do you know the size of the ESP that was tested at

1 that unit? And that was 320 square feet per thousand
2 ACFM, 320.

3 Q. (by Mr. Harrington) Do you know what the size
4 capacity of that unit was, not the ESP, but the generating
5 unit?

6 A. How many megawatts capacity?

7 Q. Yes.

8 A. I do have that. These tests -- The Department
9 of Energy wants relatively small units for these tests
10 because you learn the same amount of information on a 150
11 megawatt unit as you do on a 450 megawatt unit. The costs
12 are three times as much on the larger units. So, for a
13 lot of these tests they tend to be smaller units for
14 simply cost reasons. At Meramec, the size of the unit was
15 140 megawatts.

16 Q. Are you aware the test was only run on half
17 the unit, only run at 170?

18 A. Was it 170?

19 Q. Only one is my understanding, but I'm asking
20 you.

21 A. Okay. Well, it could be. We do it like that,
22 too. Frequently you'll two ESP's in parallel, and that's
23 a good arrangement to do a trial only because you can
24 inject into one side, and then you can measure both the

1 outlet without particulate in it from both units. So, you
2 have treated and untreated. So, it provides a good
3 comparison as to how much mercury has gotten out.

4 HEARING OFFICER TIPSORD: 27.

5 A. Do you know how that size compares? Again,
6 320. There are quite a few Illinois ESP's larger units
7 that are around 320. For example, the Newton plant, I
8 believe, is around 300, one is 300 and one is 320. The
9 larger unit at Meredosia is 360. The two units at Kincaid
10 are both very large boilers are around 330. Here in the
11 city of Springfield, you have three that are 290 and two
12 that are 350. So, that's very common.

13 HEARING OFFICER TIPSORD: Question 28.

14 A. 28, are you aware there are also experiments
15 that were run at the Labadie Station of Amren in Missouri
16 where halogenated activated carbon was injected on a
17 subbituminous coal-fired electric generating unit? I was
18 not aware of these. And I'd like to ask, has Amren made
19 Labadie Station public?

20 Q. (by Mr. Harrington) I honestly can't answer
21 that question at this point. I don't have an answer to
22 it, and I don't have -- the client could not be here
23 today, but material will be provided later in these
24 proceedings. I didn't want to bring it up when you had

1 not heard of the issue beforehand.

2 A. Well, yeah, if they weren't made public,
3 obviously I can't be aware of them.

4 HEARING OFFICER TIPSORD: Mr. Harley.

5 Q. (by Mr. Harley) But to be clear, the Meramec
6 station, which you were just describing, and the Meramec
7 station that you described in your written testimony, that
8 achieved 90 percent average removal using a hundred
9 percent bituminous coal was an Amren facility; is that
10 correct?

11 A. Yes, that was an Amren facility. I believe it
12 was 93 percent long-term average. That was not my
13 company's demonstration.

14 Q. So, we do have the results from that facility?

15 A. And, in fact, I believe the state has made the
16 topical report that that is available in the record now.

17 HEARING OFFICER TIPSORD: Mr. Harrington.

18 Q. (by Mr. Harrington) Just for clarification,
19 you said "long-term results". What did you mean by
20 "long-term"?

21 A. The 30-day trial.

22 MR. HARRINGTON: Thank you.

23 HEARING OFFICER TIPSORD: And, Mr. Harrington, since
24 he's not aware of the Labadie Station, then 29 through 33

1 are probably not appropriate?

2 MR. HARRINGTON: Yeah.

3 HEARING OFFICER TIPSORD: Question number 34.

4 A. I would like to try to answer them.

5 HEARING OFFICER TIPSORD: I really don't think you
6 can answer if you're not aware of the study.

7 A. Okay.

8 HEARING OFFICER TIPSORD: 34.

9 A. All the way down to 34?

10 HEARING OFFICER TIPSORD: Right.

11 Q. (by Mr. Harrington) It starts, "Would your
12 company be willing to enter into a guarantee" --

13 A. Okay. Before we move on to that, let me
14 enlarge on my answers about -- because Dr. Staudt had
15 earlier had some questions about sulfur trioxide flue gas
16 conditioning, and this is where -- because this plant had
17 sulfur trioxide flue gas conditioning apparently, this is
18 where I was going to address that.

19 HEARING OFFICER TIPSORD: Go ahead.

20 A. My company has just recently had a plant that
21 had sulfur trioxide flue gas conditioning. This is the
22 Lee station of the progress center that burns a bituminous
23 coal. Other than that, it has coal side ESP. There were
24 some earlier questions on that that I'd like to address

1 that. I think Dr. Staudt, in summary, why a plant using
2 SO3 or any flue gas conditioning. Particularly when a lot
3 of plants switched to subbituminous from bituminous
4 coal -- this is the handout -- flue gas conditioning is
5 one way of making your electrostatic precipitator work
6 better. What it does is it -- Some ashes have high resist
7 activity, and if you inject various chemicals that can
8 absorb under the surface of these fine particulates, then
9 they take a charge better, they perform better, have lower
10 resistivity. The ESP takes them out more effectively, and
11 they stay on the plates, don't become re-entrained, which
12 can cause the emissions problems that I mentioned, and
13 there are gas conditioning agents. SO3 happens to be the
14 most popular, but there are -- You can use ammonia. You
15 can use water. There are at least four manufacturers I'm
16 aware that supply chemicals in liquid form. In fact, I
17 believe at Meredosia, for example, Amren uses an RK
18 provides chemicals that are a substitute for SO3. Midwest
19 Generation doesn't use SO3 at any of their plants, but I
20 believe at Crawford and Waukegan, they use an alternative
21 where they treat the coal. The coal is sprayed with a
22 sodium carbonate chemical, and that changes the ash
23 resistivity.

24 At least at some plants, it looks like SO3 impedes

1 the performance of carbon sorbents from mercury. You have
2 to inject more carbon to get equivalent removal. At
3 southern companies stationed in Plant Daniel, they call
4 it, they have an SO3 gas conditioning system. We injected
5 carbon after the flue gas conditioning system. They
6 didn't -- They got poorer results than when they changed
7 it and moved the SO3 flue gas conditioning system to right
8 in front of the ESP, and when they did that, they still
9 had got the benefits with respect to particulate control,
10 but then injecting the mercury sorbent before the SO3 flue
11 gas conditioning, they got much higher mercury removal.
12 So, simply changing the location is a way of getting
13 around it if you don't want to change the particular
14 chemicals. What's been handed out is some very
15 interesting results that we got.

16 HEARING OFFICER TIPSORD: Excuse me, Mr. Nelson. If
17 there's no objection, we will mark the SO3 Flue Gas
18 Conditioning Was Unneeded with B-PAC as Exhibit 73.

19 (No response.)

20 HEARING OFFICER TIPSORD: Seeing none, it's Exhibit
21 73.

22 A. The Lee station was a plant like some of the
23 plants that were mentioned here, perhaps Labadie, where
24 they need SO3 to lower the resistivity of the fly ash so

1 that they don't emit -- particularly at high load, they
2 don't emit too much particulate. And what we saw -- We've
3 actually seen indications of this earlier, but particulate
4 data moves around. I mentioned how you get minute by
5 minute or hour by hour variations. You need a whole lot
6 of data to really confirm particulate emission issues.
7 But this we were seeing indications in the parametrics
8 that the halogenated activated carbon sorbents were acting
9 themselves as a flue gas conditioning material, and
10 consequently we actually ran the 30 days for the first
11 time in -- I don't know -- a decade. The Lee station was
12 able to turn off their SO3 flue gas conditioning system.
13 And if you look at this data, there are two periods. The
14 first period is what we call the baseline period where
15 we're not injecting sorbent. If you looked at periods
16 where they had stable load, along the "X" axis is the
17 boiler load. You can see this -- As they go to higher
18 boiler loads, if you look at the red squares, you get
19 higher opacity, and the problem is at the higher load.
20 When we turn the B-PAC on -- So, the red is the typical
21 operation, when they had SO3 flue gas conditioning on and
22 no mercury sorbent injection. When we turned the mercury
23 sorbent injection on, as I said, we were able to turn off
24 the SO3 flue gas conditioning system, and the blue circles

1 there show, you know, a statistically identical curve with
2 respect to load versus opacity. So, we were basically
3 getting a cobenefit here. The mercury sorbent -- the
4 halogenated mercury sorbent is not only getting out
5 mercury, but it was also acting as an flue gas
6 conditioning agent, saving them quite a bit of money with
7 respect to that system. And, also, without the SO3, you
8 got the higher mercury performance. We averaged
9 85 percent over the 30 days here. This is a bituminous
10 coal. 85 percent according to the continuous monitors,
11 and 88 percent pursuant to the sorbent trap monitors. So,
12 in fact, at Labadie, if they would inject the brominated
13 (phonetic) carbon, our sorbent, the B-PAC, and turn the
14 SO3 flue gas conditioning off, they may very well be able
15 to save a lot of money and not have that SO3 flue gas
16 conditioning.

17 HEARING OFFICER TIPSORD: Mr. Harrington.

18 Q. (by Mr. Harrington) At what rates were you
19 injecting carbon?

20 A. This is in the State of North Carolina where
21 they're not considering a 90 percent. We did -- They're
22 on the sub -- is hundred bituminous coal at 8 pounds per
23 million ACF for the 30 days.

24 Q. Bituminous did you say?

1 A. It's bituminous. The data that I showed you
2 here, the Lee station is a hundred percent bituminous
3 coal.

4 Q. What's the sulfur content in the coal?

5 A. About 1 percent. And that is why they needed
6 an SO3 flue gas conditioning system. If you have very
7 high sulfur coal, equally you lose SO3 in the flue gas
8 naturally usually -- usually that you don't need the SO3
9 flue gas conditioning.

10 Q. What was the size of SCA at Lee?

11 A. At Lee? Give me a second. This was actually
12 pretty large, which is -- That's a good point. At Lee's
13 station, they had an SCA of 330.

14 Q. 330?

15 A. 330. Whereas, for example, at the Buck
16 station or Cliffside -- It was at Buck, I believe, had an
17 SCA of 240 -- excuse me -- yeah, they had 240, but the
18 progress energy at Lee was 330. So, you have a relatively
19 large SCA, and still this plant had real issues with
20 respect to opacity. So, as Dr. Staudt pointed out, it's
21 not simply SCA. There's many, many things that go into
22 those issues.

23 Q. I don't recall, but do you state what the
24 carbon injection rates were during the tests shown on

1 the --

2 A. 8 pounds per million cubic feet of gas.

3 Q. Can you explain the chemistry by which your
4 B-PAC would have served as a gas conditioner?

5 A. We're doing testing right now to kind of
6 really nail it down, but our belief at this time is, when
7 you talk about the half percent or 1 percent or half
8 percent or .1 percent of particulate that gets through an
9 ESP, that usually comes from one of three phenomenon.
10 It's possible -- This is probably minority, but it's
11 possible that some of the fly ash does not get charged
12 correctly and goes to the plates and basically goes
13 through the system. A lot of it -- Probably on average
14 50 percent of what gets through is through a process of
15 what we call re-entrainment, and that's -- yeah, the ESP
16 picks it up, but when it's on the plate, they usually bang
17 the plate once the plate is full, and then the ash falls
18 to the hopper below, and some of it gets swept up in the
19 gas, and they call that re-entrainment, and makes it
20 through. There's a third phenomenon called sneakage, and
21 that's Dr. Staudt mentioned poor design or poor
22 distribution within the ESP itself, and this is stuff that
23 sneaks around the plates through the bottom and top of the
24 hopper, things like that. We believe that the reason we

1 performed -- that the sorbent made the ESP perform a lot
2 better at Lee is because we reduce significantly the
3 re-entrainment losses. Carbon is actually a
4 semi-conductor, and consequently it has low resistivity,
5 and while it's on the plate, mixed in with that fly ash --
6 as I mentioned it's only 1 or 2 percent -- it lowers the
7 average resistivity of the filter cake on the plate, and
8 consequently you can get higher power levels in the whole
9 ESP or you have lower re-entrainment losses. At least
10 that's our working hypothesis currently. I can't say that
11 that's a fact, but that's our current belief as to why
12 this phenomena happened.

13 HEARING OFFICER TIPSORD: Mr. Bonebrake.

14 Q. (by Mr. Bonebrake) Is there a baghouse at the
15 Lee plant?

16 A. No.

17 Q. Is there a scrubber?

18 A. No. Just a coal side ESP.

19 Q. With respect to Daniel's facility, you
20 mentioned, I think, they had moved the SO3 entry point?

21 A. They moved the SO3 injection point, right.

22 Q. Can you describe for us the physical
23 activities that are required to move the injection point?

24 A. It's a matter of putting some additional

1 piping in and punching holes or using some additional
2 holes in the ductwork.

3 Q. How much piping is required?

4 A. Well, it would depend from where the SO3 flue
5 gas conditioning unit is and where the ductwork is.

6 Q. So, in the particular case of Daniel, do you
7 know what the cost of that change was?

8 A. I don't know at Daniel's, but at Lee, we
9 looked because we thought -- until we found this
10 phenomenon, we thought we were going to have to change the
11 location of the flue gas conditioning at Lee, and we got a
12 quote back. I believe it was something in the order of
13 \$70,000 or \$60,000 to change that location.

14 Moving on. We're at number --

15 HEARING OFFICER TIPSORD: 34.

16 A. 34, would your company be willing to enter
17 into a guarantee that if sorbent injection utilizing your
18 company's sorbents was installed on the EGU's and failed
19 to achieve 90 percent reduction in accordance with the
20 Illinois rule, that your company would pay for any
21 necessary retrofits and any fines or penalties that were
22 imposed for failure to achieve that limit? Okay. Let me
23 kind of explain my company's current situation with
24 respect to guarantees. And I can't talk with other

1 companies. But for retrofit situations, we require for a
2 guarantee that our sorbent be tested at the plant at full
3 scale using the coals that they intend to burn. We have a
4 mobile test unit that can just drive up to the site. We
5 can hook the carbon, install some lances into the ductwork
6 and run a trial for a week, and we see what we can get.
7 This is very similar to what's done in NOx control that I
8 believe some of your plants are using or have used. So,
9 we test actually on the unit at the plant full scale with
10 the coals, and we see what we get. Because, as was
11 mentioned, it's not simply a matter of injecting sorbent.
12 There's a lot of other things that the plant can do that
13 would help or hinder the particular mercury removal
14 results. So, we see what we get. And up 'til now, we've
15 been pretty successful, and we develop a curve of mercury
16 removal rate versus sorbent injection rate, and then we
17 base our guarantees based on that. Consequently, what
18 we're really guaranteeing is the quality of the sorbent
19 that we provide in the future is equivalent to the quality
20 of the sorbent that we're providing today, and that's
21 really all we can control. We can't control all these
22 other factors on how the plant operates to either improve
23 or bring down the removal rate.

24 Now, if it's financially in our interest, I mean, we

1 would certainly consider. Guarantees are something that
2 -- There's no requirement that there's a guarantee. The
3 plant would like it, and we would like to give it if we
4 can. If it's in our financial interest to give
5 particularly strict guarantees, you know, we're willing to
6 talk about it, but there's got to be a financial incentive
7 for us. So, I would not say that, you know, my company
8 could guarantee that you get 90 percent at every plant no
9 matter how they operate here in Illinois, and, frankly, I
10 don't know that such a guarantee would be worth a whole
11 lot because of the size of my company.

12 HEARING OFFICER TIPSORD: Did you have a follow-up?
13 If not, it's --

14 MR. HARRINGTON: I do have a couple of them.

15 HEARING OFFICER TIPSORD: Yes, because he has to
16 leave in the next five minutes.

17 Q. (by Mr. Harrington) On the guarantee issue,
18 part of my question you just answered, that guarantee is
19 only as good as the financial resources of the person
20 giving it?

21 A. That's correct. The way we do it, though, or
22 the way we expect to do it is -- Because, again,
23 guarantees are always limited. We have the advantage --
24 And we're not talking about guarantees like scrubbers or

1 catalytic reduction for NOx controls. Those are big, you
2 know, hundred million dollar systems, and if they don't
3 work properly, to make them work properly costs BMW or
4 Alston or some of these companies lots and lots of money
5 because you're doing major construction or reconstruction
6 on the one hand and, two, generally you have to pay for
7 the cost of the replacement power in those kind of
8 situations. We're fortunately not in that situation.
9 What we would do is simply, if it turns out you get
10 90 percent, you need to inject at four-and-a-half pounds
11 instead of three-and-a-half pounds, we can simply supply
12 some free sorbent and maybe not make any profit on the
13 deal. So, it's just a matter of kind of pressing the
14 accelerator and putting in a little more sorbent.

15 Q. When you do give a guarantee, it's a basically
16 guarantee that you'll supply additional sorbent?

17 A. Yeah, to reach that amount.

18 Q. And that's based on the assumption that that
19 will be sufficient to cure the problem?

20 A. Well, whatever -- We've never been in a plant
21 where, you know, injecting more sorbent didn't get you
22 higher mercury removal. That's the way it works. That's
23 the way it's designed.

24 Q. Quickly, I'll call your attention to Page 141

1 of the technical support document. At the top of that
2 page, it appears to be what is a guarantee from your
3 company.

4 A. Oh, yes. And that's a little bit different
5 situation. That was a brand new plant, but it was going
6 to have a fabric filter. With a fabric filter, we're very
7 comfortable that you can get higher removal rates.
8 There's some wiggle room there. We didn't do it -- We
9 expect to perform significantly better than the guarantee
10 there, but if you're going to have a fabric filter, you
11 know, we are comfortable in making stricter guarantees.

12 Q. And is the only consequence of failure to meet
13 the guarantee would you supply more sorbent?

14 A. And it's usually costs up to the amount of
15 contract or something like that.

16 MR. HARRINGTON: Okay. Thank you very much. That's
17 all I have.

18 HEARING OFFICER TIPSORD: We'll take a break, and one
19 of the things that we will address before the end of the
20 hearing is how best to handle the rest of Mr. Nelson's
21 questions. Mr. Nelson, thank you again very much.

22 MR. NELSON: You're welcome.

23

24 (A brief recess off the record.)

1 HEARING OFFICER TIPSORD: I believe we're going to
2 Miss Willhite. Could you sit right down here for the
3 Court Reporter's ease? And Rob Kaleel.

4 MR. KIM: Again, Miss Willhite and Mr. Kaleel are
5 being presented to answer any remaining questions that
6 were previously identified in our discussion, as well as
7 address any questions concerning Exhibit 65, which was
8 provided yesterday.

9 HEARING OFFICER TIPSORD: And I remind you both,
10 you're still under oath. Mr. Forcade.

11 MR. FORCADE: 65 or 56?

12 MR. KIM: I think it was 65.

13 HEARING OFFICER TIPSORD: The dispersement modeling.

14 MR. RIESER: I do have the mercury modeling risk.

15 HEARING OFFICER TIPSORD: Congratulations. Your hand
16 went up first.

17 MR. RIESER: Thank you.

18 HEARING OFFICER TIPSORD: You get to go.

19

20 EXAMINATION OF

21 Mr. Rob Kaleel and Ms. Marcia Willhite:

22 Q. (by Mr. Rieser) Miss Willhite, do you know at
23 this time who produced the study?

24 A. (by Ms. Willhite) I believe that Environ did

1 the work.

2 Q. Environ. And did you review it or review it
3 with Environ in terms of what its findings were?

4 A. I did not review it with Environ.

5 Q. Do you know if anybody at the IEPA reviewed it
6 with them?

7 A. Rob Kaleel was our main contact. He was the
8 project manager.

9 Q. So, he would be the person to whom I direct
10 questions about what this model purports to show or
11 doesn't purport to show; is that correct?

12 A. I would defer those questions to Rob.

13 Q. Okay. Mr. Kaleel, did you discuss these
14 findings with Environ?

15 A. (by Mr. Kaleel) I did have a number of
16 conversations with Environ throughout the course of this
17 study.

18 Q. What did you ask Environ to do?

19 A. We had talked to Environ about trying to
20 update work that had been done by initially Wisconsin DNR.
21 Wisconsin commissioned Environ, and specifically Jerry
22 Darwood (phonetic) is the project manager in Environ, to
23 update the CAMX model. It's a fairly well known model for
24 photo chemical reactions. It was originally developed for

1 ozone, and particulate matter was added to it, and
2 Wisconsin asked that mercury chemistry be added to the
3 model, as well. They -- "they" being Wisconsin DNR --
4 wanted to use the model or at least evaluate the model to
5 see if it could be used to look at mercury deposition in
6 Wisconsin.

7 Q. And the use of the CAMX model --

8 A. Yes.

9 Q. -- that was in lieu of using the CMAAC model
10 or a similar model to CMAAC?

11 A. Yes, it was. I think they considered CAMX to
12 be generally easier to use than CMAAC.

13 Q. Do you know why that was?

14 A. Well, I think it has more to do with computer
15 resources, the computer run times, the amount of disk
16 storage, the amounts of input and output, you know, just
17 the size of the files and computer run times.

18 Q. So, it would be accurate that the IEPA knew
19 about the Wisconsin DNR activities and knowing that that
20 was going on when it asked Environ to do these model runs
21 of Illinois?

22 A. That was the thinking. Marcia Willhite had
23 talked to me last Fall about what it would take to model
24 deposition in Illinois, and I was familiar with the

1 Wisconsin work, also familiar with some problems that
2 Wisconsin experienced in doing their work. So, I think
3 the discussion we had is, if we were able to take some
4 next steps in the work that Wisconsin did, that we might
5 be able to get decent results here in Illinois. There was
6 no guarantee going into it that we'd get good results, but
7 at least we wanted to take the next steps based on
8 Wisconsin's recommendations.

9 Q. And what were the problems that you thought
10 had been discussed with respect to the Wisconsin report?

11 A. There were -- Wisconsin did a full model
12 performance evaluation with -- Environ did it on behalf of
13 Wisconsin, and there were a number of steps to that.
14 There was comparisons with ambient measurements, the
15 mercury deposition that we've talked about during this
16 hearing. They had done a number of model sensitivity runs
17 where you zero out emissions, you zero out boundary
18 conditions, you simplify the chemistry or turn off the
19 chemistry. The idea is to try to figure out where the
20 deposition is coming from. Is it coming from emissions
21 within the grid, is it coming from emissions outside the
22 grid, is it coming from chemical mechanisms, or is it
23 coming from primary emissions? So, Wisconsin did all of
24 that. The results -- And Environ provided these to

1 Wisconsin.

2 The results were not satisfactory for a number of
3 reasons. One of the results that they had identified --
4 one of the weaknesses in the model was that when Environ
5 set up the model domain, their experience then with
6 running ozone in PM 2.5 and set up the modeling domain too
7 shallow. The top of the domain was set at 7 kilometers,
8 which was high enough for ozone, but not near high enough
9 for mercury. So, that was one of their recommendations is
10 set the top boundary at least 10 kilometers or 15
11 kilometers into the atmosphere that puts into the lower
12 layers of the stratosphere. The other problem that was
13 identified in that study was that the basic input to the
14 CAMX model, meteorological conditions by another model
15 called MM5 -- it's a model similar to what the National
16 Weather Service uses -- that the precipitation fields
17 provided by that model to CAMX didn't do such a good job,
18 especially in regards to Midwestern conditions. The model
19 MM5 produced a biased amount of precipitation, almost a
20 factor too much rainfall, and the location -- spatially
21 the location of these rainfall events was wrong. The
22 result is that the mercury deposition predictions provided
23 by CAMX were high by a factor by 2. They were severely
24 high.

1 So, when we -- Marcia and I talked last Fall, we
2 said -- we talked about the idea that it would be easy to
3 fix the top boundary because there was new MM5 data
4 available for the year 2002. It would be more difficult
5 to fix the precipitation problem. So, any results that we
6 would see in this meteorological database would have to
7 undergo a thorough evaluation. We'd have to see whether
8 or not the new results did, in fact, correct the bias in
9 the precipitation. If it did, then we would be in a
10 position to do a full performance evaluation, again, model
11 sensitivities and looking at the effect of boundary,
12 looking at the effect of emissions, some of those same
13 things I described in the Wisconsin study.

14 Q. And when you talk about expectation of looking
15 for good results, when you use the term "good results" in
16 that context, what were your expectations?

17 A. I mean adequate model results, good science,
18 the results matched with some reasonable expectation what
19 we're seeing with the monitoring data, what the
20 precipitation fields look like compared to National
21 Weather Service data, bias the numbers -- error numbers
22 based on statistics.

23 Q. And is it correct -- Did you say that the --
24 I'm going to ask, did you say that the CAMX model

1 consistently overstated the amount of mercury deposition;
2 is that correct?

3 A. With Wisconsin's results. I mean, again, the
4 results were biased not necessarily because of any
5 inherent problems in the model, but because, as I
6 mentioned, the top boundary was too low. So, it biased
7 the results. There was too much influence from boundary
8 conditions to the top -- from the top and, also, because
9 of the bias in the basic input of rainfall amounts.

10 Q. There's too much rainfall; so, it was bringing
11 down more mercury?

12 A. Exactly.

13 Q. Got you. Do you have what was presented as
14 Exhibit 65 in front of you?

15 A. Yes, I do.

16 Q. Okay. Are these the only results of the work
17 that they did for Illinois?

18 A. These two pages are all that we received from
19 the study.

20 Q. Okay. And when did you receive these?

21 A. I believe the top, the one for June, the one
22 month result, we received in late January, and the -- I
23 don't have specific dates or don't remember. The one for
24 the summer months was in early February.

1 Q. And they were characterized to you, as it
2 states on the top of both pages of Exhibit 65, that these
3 were preliminary results?

4 A. Yes.

5 Q. And did you do any evaluation of these results
6 to determine whether they represented the type of good
7 results that you were looking for?

8 A. Unfortunately, there was no performance
9 evaluation done on any of this modeling.

10 Q. And why was that?

11 A. Well, there's probably a number of reasons for
12 it. One reason for it is that we had set up a budget
13 initially for doing a couple of things. We fully intended
14 to spend as long as a year on this project. I guess it's
15 important to note that we started these discussions last
16 Fall. We initiated this contract in November. And we
17 hoped to get additional funding from other states. So,
18 what -- You know, I think Marcia's strategy was to let
19 Illinois take the lead, try to kick off the study, work on
20 it for six or nine months, solicit additional
21 contributions from other Midwestern states and really
22 expand on it and really shake out any kinds of performance
23 problems that we might be seeing in the model. There was
24 no expectation that we would see good results on the first

1 run, certainly not good results, viable results in one
2 month. There's just far too much work to do.

3 I give Environ a hand for doing as much as they did
4 within that month. In that month or two months that they
5 were doing this work, we had the Governor's announcement
6 in January. Marcia, in the meantime, had tried to find
7 other states to contribute, was unsuccessful. So, it
8 didn't look like we were going to have the funds to do all
9 of that work. And towards late January, well, the work
10 was well on its way to do this rule proposal. LADCO had
11 organized a mercury workshop in February. And at that
12 point, Marcia became familiar with the work of Dr. Keeler.
13 So, I guess I let her characterize it. But based on
14 discussions that we had at the time and given our
15 expedited schedule because of this rule making, we decided
16 that we should pull the plug on the site, that there's no
17 way we could get to a point -- where we're going to get it
18 to the point where it would be useful work product in time
19 to help this ruling.

20 Q. So, the decision was made not because of the
21 quality of the preliminary work, it was made for reasons
22 internal to the IEPA; would that be correct?

23 A. (by Ms. Willhite) I would add to that, before
24 you answer, as I testified previously, the water program

1 needs was to understand, you know, a little bit about
2 atmospheric deposition loading, and my concern was that
3 this scale -- this large scale wasn't going to help us
4 understand that clearly. So, that was certainly a strong
5 factor in deciding not to continue the project. So, to
6 some degree, that was an evaluation of the results and
7 whether they would meet the need I envisioned for it.

8 Q. Was there any discussion with Environ about
9 improving the resolution of the maps produced or looking
10 at some of the data behind the maps so they could look at
11 individual grid squares to give you that information that
12 you needed?

13 A. (by Mr. Kaleel) Absolutely. The discussions
14 were that we would try to do the work -- the Illinois
15 portion of the work in two phases, again, with an
16 expectation that there would be a third phase involving
17 other states. The first phase was to just try to pull
18 together the new meteorological dataset with the higher
19 top boundary condition and to update as best they could
20 the Illinois portion of the emission inventory for EGU's.
21 We were certainly aware of major shift in coal type
22 between the 1999 time frame which was Wisconsin's original
23 emissions inventory and the 2002 year that we were using
24 here to evaluate, certainly a large shift towards western

1 coal, and, you know, the resulting changes in mercury
2 emissions. So, we tried to make those changes and get a
3 result by January.

4 We also tried to look at -- a first look at what
5 would happen with a large emission change in Illinois, and
6 simulated here was a 90 percent reduction from Illinois
7 point sources. So, that was the first phase of the work.
8 This was all done with a horizontal grid resolution of 36
9 kilometers, which is very coarse. The hope was to rerun
10 the model in our second phase at 12 kilometers for an
11 entire year and as fine as 4 kilometers for individual
12 rainfall events. So, we were planning to go much further
13 in terms of evaluating local scale input.

14 Q. And Environ had the capability of manipulating
15 the model to provide that information to you?

16 A. Yes.

17 Q. Looking just at the third picture, the change
18 in mercury to total deposition, on the first page of 2A,
19 it's the one that's in green --

20 A. Yes.

21 Q. -- looking at the units, the G/HA -- this is
22 on the scale to the left of the picture -- that's grams
23 per hector?

24 A. Per hector, that's right.

1 Q. So, this model suggests that the greatest rate
2 of change is 7.0 times 10 minus 4 to .007 grams is the
3 result of the grams per hector as a result of the Illinois
4 rule?

5 A. Well, that would be the smallest value that
6 the model is showing, and unfortunately this result
7 doesn't show either the maximum or minimum values, but
8 that is the lowest end of the scale. That is 7 times 10
9 to the minus 4 grams per hector.

10 MR. RIESER: Okay. Thanks. If there are other
11 questions, why don't you go ahead?

12 HEARING OFFICER TIPSORD: Miss Bassi.

13 Q. (by Ms. Bassi) I believe Dr. Keeler said --
14 and perhaps someone else can help me with this -- that he
15 used MM5 in his Steubenville study. Do you know if that's
16 the case?

17 A. (by Mr. Kaleel) I believe that's the case,
18 yes.

19 Q. Would this be the same MM5 meteorological
20 modeling platform that Environ used in this model?

21 A. It's the same model. I don't know if it's
22 exactly the same version. They update the versions of the
23 model every six months or so. I also don't know if it's
24 the actual same dataset. There's many different groups

1 that run MM5. IEPA runs it, and Jerry Keeler may have
2 well developed his own data fields using the same model as
3 Environ did.

4 Q. So, the 5 doesn't denote a version in
5 the UMAV?

6 A. Well, as you know, UMAV had multiple versions.

7 Q. That's true. Mr. Kaleel, you're a
8 meteorologist; correct?

9 A. Yes.

10 Q. Could you explain what a "wind rows" is?

11 A. Yes. It's a wind frequency distribution.
12 It's basically what is the frequency that the wind blows
13 for a particular time period. Typically you would look at
14 all the wind directions around a compass and express it as
15 a percent of time from each direction.

16 Q. In Mr. Keeler's testimony at Page 10 --

17 MS. BASSI: Is there a copy over there somewhere?

18 MR. KIM: Is that the page that begins "peer review
19 publications"?

20 MS. BASSI: No. I'm sorry. It's not his testimony.
21 It's the TSD. It's Exhibit B to the TSD. I apologize.

22 MR. KIM: Which page?

23 MS. BASSI: 10.

24 MR. KIM: With the Figure 7?

1 MS. BASSI: Yes.

2 MR. KIM: Okay.

3 Q. (by Ms. Bassi) Are those wind rows in Figure
4 7?

5 A. Figure 7, these are not wind rows. These
6 would be back trajectory.

7 Q. What is "back trajectory"?

8 A. "Trajectory" is a representation of where the
9 wind came from and where the wind blew starting at a
10 particular point and working your way back. For example,
11 what he's calling Cluster 1, it appears that he's
12 represented several different events in the same picture,
13 but the end point appears to be Chicago, and for this
14 particular cluster what he's representing is a number of
15 events that point back towards the south or southeast. I
16 haven't looked at this previously. So, I don't know how
17 far back he goes. Typically you go back two days
18 trajectory analysis.

19 Q. Well, on these back trajectories on Figure 7,
20 there are little dots. Do you see the little dots?

21 A. I have to take my glasses off. I see some
22 little dots, yes.

23 Q. What do those mean? Does each of those dots
24 perhaps represent a day?

1 A. Typically -- And, again, I haven't seen these
2 before, but some of these dots may be just from bad copy,
3 but it's often done with these trajectory analyses that
4 you show where in an air parcel might have been at some
5 time interval in the past, either one hour or three hours
6 or six hours, and then you would continue that for two
7 days or three days or five days, whatever your simulation
8 is trying to show. So, you see a series of dots that
9 would represent discreet time intervals less than
10 two days.

11 Q. So, then could the space between the dots
12 differ because of wind speed? If the dots represent a
13 specific period of time, the space between the dots on a
14 back trajectory could be closer together or longer
15 together if you're looking at two or three of them?

16 A. If I'm understanding your question, if you
17 take two separate events, if wind speeds were twice as
18 high on one event as on the second event, then you would
19 expect the dots to be twice as far apart. What it is
20 representing is an air parcel moving along that trajectory
21 would get twice as far if the winds were twice as fast.

22 MS. BASSI: Thank you.

23 HEARING OFFICER TIPSORD: Mr. Rieser.

24 Q. (by Mr. Rieser) I'm sorry. I did have one

1 more question if I can find the document. Again, looking
2 at the first page of this Exhibit 65, the scales
3 associated with the two pictures on top that are primarily
4 blue, the scales to the left of each of those, those units
5 are also grams per hector?

6 A. Yes, they are.

7 Q. And then the top of that scale is .07 grams
8 per hector?

9 A. Yes.

10 MR. RIESER: Okay. Thank you.

11 HEARING OFFICER TIPSORD: Mr. Bonebrake.

12 Q. (by Mr. Bonebrake) I think, Mr. Kaleel, you
13 mentioned that there were a couple weaknesses in the model
14 as applied in Wisconsin that led to a consistent
15 overstatement of the amount of deposition in Wisconsin
16 under the model; is that right?

17 A. That's right.

18 Q. Were those weaknesses corrected when the model
19 was applied to Illinois and modeling that resulted in
20 Exhibit 65?

21 A. We believe we corrected one of those. One of
22 those was that Wisconsin identified was the depth of the
23 model, how high up is the top boundary of the modeling
24 domain. We believe we corrected that the domain we used

1 here is 15 kilometers, which puts it in the stratosphere.
2 I have no way of knowing whether or not the second issue
3 with regards to precipitation was corrected because, I
4 mean, we didn't do that evaluation.

5 Q. So, it's possible that that weakness of the
6 Wisconsin study continued and was in play in the modeling
7 for Illinois, which would have resulted in consistent
8 overstating of Illinois deposition?

9 A. It's possible, yes. Again, we just didn't
10 evaluate those results. This is a different dataset than
11 Wisconsin used. Whether or not the precipitation was
12 similarly biased either in terms of magnitude or spatially
13 I don't know if it's present or not.

14 HEARING OFFICER TIPSORD: Anything else of Miss
15 Willhite or Mr. Kaleel? You had some additional
16 questions?

17 MR. FORCADE: We had asked, I think, on the first or
18 second day of hearing questions relating to the statement
19 in the TSD relating to the total MPS discharged of
20 mercury.

21 MR. KIM: I don't mean to interrupt your questions.
22 Then is Mr. Kaleel done as far as questions from the
23 panel? I didn't want to hold him.

24 MR. RIESER: Thank you.

1 HEARING OFFICER TIPSORD: Go ahead, Mr. Forcade.

2 MR. FORCADE: I have some questions about the
3 statement on Page 3. Miss Willhite's testimony repeated
4 in the TSD total annual loading of mercury to Illinois to
5 45 pounds. We had also asked questions relating to the
6 references which were cited for calculating the total
7 mercury discharge. And I believe yesterday we were
8 provided with what I think is Exhibit 56.

9 MR. KIM: Is that the document entitled "Preliminary
10 Analysis of Mercury in Illinois".

11 HEARING OFFICER TIPSORD: That is Exhibit 57.

12 Q. (by Mr. Forcade) And directing your attention
13 to Page 28, which essentially repeats the same evaluation,
14 it describes the total MPS discharge as 44.5 something
15 pounds. Could you tell me precisely how that number was
16 calculated?

17 A. (by Ms. Willhite) Well, it's described on
18 Page 14 of that document how the loads were calculated.

19 Q. And would it be safe to say that for the
20 average load -- I'm directing your attention to what I
21 believe is Appendix B, which describes the average and
22 maximum flow and the average and maximum load --

23 A. Okay.

24 Q. -- that the 45 pounds was calculated by taking

1 the column in Appendix B called "average concentration"
2 and multiplying that by average flow to get average load?

3 A. I'm looking for the end of the spreadsheet
4 here.

5 Q. Right.

6 A. That would be my expectation.

7 Q. And then those values were summed?

8 A. That would be my expectation.

9 Q. Okay. Would it be also correct to say that
10 the maximum value was calculated by taking the maximum
11 concentration times the maximum flow to calculate the
12 maximum load?

13 A. That would be my expectation.

14 Q. And then summing those for the total?

15 A. Unfortunately, the staff person that did the
16 analysis isn't in the office for me to ask, but that was
17 my expectation and assumption.

18 Q. Would it be correct that this is -- and I
19 didn't count them -- on the order of 150 facilities?

20 A. That's what the description said, yeah.

21 Q. And there are how many facilities in the State
22 of Illinois that have MPS discharge?

23 A. Well, going back to the first page and
24 description of the calculation -- description of the data

1 is Page 7 of the document, it says that there were 2,371
2 active MPS facilities in Illinois, excluding active storm
3 water permits, and divides up the permittees between
4 individual and general permits.

5 Q. So, would it be safe to say that the values
6 included on Page 3 of your testimony and then the
7 technical support document makes no contribution for the
8 remaining -- and I'll allow someone else to subtract --
9 158 from 2,371 facilities?

10 A. The facilities for which we have data are the
11 ones that monitor for mercury. So, our dataset are those
12 that monitor for mercury.

13 Q. Would it be safe to say then that the value of
14 approximately 45 pounds probably does not represent the
15 total loading from MPS discharges in Illinois?

16 A. Perhaps not total, but we set monitoring
17 requirements based on expectation of whether something's
18 going to be in the discharge and the likelihood that
19 that's going to cause a quality issue. So, for example, a
20 sand and gravel mining operation would be not expected to
21 have significant amounts of mercury or other types of
22 facilities that are not -- food processing or a public,
23 you know, water supply or something like that are types of
24 discharges that are not likely to have mercury levels, a

1 POTW, some sort of industrial discharge that we couldn't
2 anticipate would have processed water with a mercury
3 content, those are the ones. So, what we have are the
4 ones that have the highest likelihood of counting a
5 mercury content to their discharge, and it's a subset of
6 total MPS permantine.

7 Q. Were you present during Dr. Keeler's testimony
8 when I asked him questions about the likelihood of
9 detecting mercury in the MPS discharges in Illinois?

10 A. I'm sure I was here.

11 Q. Do you happen to recall his answer that he
12 would expect to find it in all MPS discharges at the level
13 of protection in his methodology he employs?

14 A. It is ambiguous saying -- I mean, there's
15 background level in soils.

16 Q. Do you have a numerical value for the total
17 MPS gallons discharged per year?

18 A. No.

19 Q. I asked that for the second day of hearing.

20 A. I'm sorry. I didn't remember that you asked
21 for it.

22 Q. We also asked if you could provide the method
23 detection limit for the analytical testing that was
24 conducted from 1985 to 19 something. Do you have that

1 value?

2 A. I don't have that. Sorry.

3 MR. KIM: We don't have that. I apologize. I didn't
4 have that written down as something that was outstanding.

5 MR. FORCADE: Yes, it was. Well, let's go about it
6 another way. Could I direct your attention to Appendix A
7 of the same Exhibit?

8 A. Okay.

9 Q. You see the column marked "mercury
10 concentration milligrams per liter" with subcategories of
11 "minimum," "maximum" and "average"? Would it be safe to
12 say that with one or two exceptions, as you go through
13 that chart, the minimum concentration detected was
14 0.0001 milligrams per the liter.

15 A. Right.

16 Q. Would that be equivalent to a tenth of a part
17 per billion?

18 A. Yes.

19 Q. Would you believe that that was a reasonably
20 likely method detection limit for the methods employed to
21 derive the values contained in Appendix A?

22 A. Possibly. I'm sorry. I just don't know.

23 Q. Okay. Maybe we can try it a second way. Are
24 you familiar with USEPA Method 1631?

1 A. I've heard of it. I wouldn't say that I'm
2 familiar with it.

3 Q. Well, neither am I. I do happen to know,
4 however, that -- Would it be safe to say that it has a
5 fairly low level of method detection limit?

6 A. That's my understanding.

7 Q. And --

8 A. But --

9 Q. For purposes of our argument, I will suggest
10 that it may be in a nature of a tenth of a part per
11 trillion, and I believe you testified earlier when I
12 suggested a method detection limit of part of a part per
13 billion, that that was too high, and that you felt the
14 methodologies were available to go lower than that?

15 A. I don't remember that testimony --

16 Q. Okay.

17 A. -- but there might be. It sounds like
18 something someone said, but I'm not sure I can say it was
19 me.

20 Q. Okay. Do you happen to know when Method 1631
21 was originally created?

22 A. No.

23 Q. Is there a possibility you would be able to
24 give me the method detection limit for whatever method was

1 employed to determine the --

2 A. It might be challenging because it might be
3 quite a research project to get that because the
4 information that's contained in this dataset comes
5 directly from the dischargers themselves, and they don't
6 provide us necessarily information about how they sample
7 and analyze. For the constituents, we ask them to report
8 it to us.

9 Q. Well, then we'll try it another way. Assuming
10 for purposes of argument that the 0.0001 milligrams per
11 liter represents the detection limit, and I believe you
12 stated earlier that an appropriate statistical approach
13 when you have data of non-detect is to use half of the
14 method detection limit as the concentration used for
15 statistical purposes; is that correct?

16 A. There was testimony along those lines, yeah.

17 Q. If you took half of the method detection
18 limit, which appears to be from Appendix A, and multiplied
19 that times the total number of gallons MPS discharges in
20 the State of Illinois, would you derive a number that
21 would be the minimum value that you would use for
22 statistical purposes in calculating the total mercury
23 loading to Illinois waterways?

24 A. Okay. I'm having trouble following. Say it

1 again.

2 Q. Okay. If you have a sample from an MPS
3 discharge in Illinois using an analytical method with a .1
4 part per billion detection limit and you get non-detect,
5 if you were to use that data in subsequent analysis, what
6 value would you assign to the mercury level for that
7 particular facility? Would it be one-half of the method
8 detection limit?

9 A. In my understanding -- I think it was actually
10 Dr. Hornshot (phonetic) who talked about this issue -- is
11 that there's practice in kind of -- in two ways. One is
12 you use the method limit detection. One you use half the
13 detection limit. And I guess both of those are equally
14 used.

15 Q. Okay. Using either one of those methods then,
16 if you took the method detection limit or one-half of the
17 method detection limit and multiplied it by the total MPS
18 discharges for the State of Illinois for a year, wouldn't
19 you derive the statistical average that would occur for
20 mercury discharges to the state?

21 A. Well, it seems to me that part of what you
22 need to do in that analysis is figure out how many are at
23 the detection limit and how many are above the detection
24 limit to see if that would be an appropriate analysis.

1 Q. That's the reason I said that would be the
2 minimum level you would use for statistical purposes for
3 calculating MPS loading.

4 A. Now I'm following you.

5 Q. Would you agree with that approach?

6 A. Well, it would be a minimum, but I don't know
7 if it would represents reality if your data suggests
8 something else.

9 Q. It would be the minimum. That would assume
10 that every facility in the State of Illinois tested and
11 every facility in the State of Illinois received a
12 non-detect; is that correct?

13 A. I'm following your example.

14 Q. And is it possible to get that number?
15 Because my belief is that number will be several orders of
16 magnitude larger than 45 pounds, and I'm trying to -- the
17 agency has put 45 pounds in play, and I'm trying to
18 explore how valid that number actually is.

19 A. It seems like -- Well, we will answer the
20 question about what the total, you know, average -- Would
21 you want average discharge, because obviously -- or design
22 average flow for the discharger or -- When you say "what
23 is the total" --

24 Q. I will be happy with the average flow for all

1 MPS dischargers, and I believe that that number will show
2 a number significantly larger than 45, and that's assuming
3 no one detected mercury at all. That's the number I'm
4 trying to explore, and if it would be possible if I could
5 get that, I'd appreciate it.

6 MR. KIM: I may be missing the gist of your question,
7 as well. If you're asking for not a calculation, but just
8 information that we may be able to provide in terms of
9 total output or what have you, if that information was
10 available, we can definitely provide that in written
11 comment.

12 MR. FORCADE: That would be great, and then I can do
13 the multiplication with the assistance from an engineer.

14 MR. KIM: Beyond that, I would state we tried to
15 explain the information we had, and I'm sure you can do
16 your calculations.

17 MR. FORCADE: That's what I'm trying to get,
18 fundamental background information so that we can explore
19 whether 45 pounds total loading through Illinois
20 waterways --

21 A. On average. As you noted, that is taking the
22 average mercury concentration and the average flow.

23 MR. FORCADE: Right.

24 MR. KIM: We will try to get that information in

1 written comment as quickly as we can. And just so we're
2 clear, though -- I apologize. I didn't have that on my
3 list. That's kind of why I went through that list before
4 lunch just to make sure I had everything. In addition to
5 that, is there anything else that you were expecting or
6 looking for?

7 MR. FORCADE: No. My sole goal is to get the number
8 that would occur if you had non-detects in all of the
9 facilities at their average daily flow for a period of one
10 year.

11 MR. KIM: And, again, I would thank Mr. Forcade for
12 catching the fact that in Page 68 of the TSD, there was --
13 at the bottom of the text, I think there was an incorrect
14 citation. The correct citation should have been to what
15 is now Exhibit 56.

16 A. 65.

17 MR. KIM: No. 56.

18 HEARING OFFICER TIPSORD: It's late. It's late. Is
19 there anything else for Miss Willhite?

20 MS. LIU: I believe Mr. Zabel had reserved a question
21 for Miss Willhite regarding permit and fly ash.

22 MR. ZABEL: I think we had questions about whether
23 mercury monitoring would be required on fly ash disposal
24 ponds that were receiving the waste product from a fabric

1 filter in a TOXECON configuration, that is one that's
2 collecting only the sorbent injected material and whatever
3 is absorbed if that was sleuthed or otherwise as to one of
4 the MPD's permitted ash ponds.

5 A. (by Ms. Willhite) I can think of at least one
6 case where I believe that is a requirement, but I would
7 have to look more -- well, not from TOXECON necessarily,
8 but I know that I can think of at least one situation
9 where we put in a requirement for mercury monitoring.

10 Q. Is that a river basin permit?

11 A. I was thinking it was the Randolph prep plant
12 permit.

13 Q. Prep plant for coal?

14 A. Yeah.

15 Q. Is that the only one you can think of?

16 A. That's the only one I can think of, but if we
17 can provide that in writing, I can check into that.

18 Q. Well, that's not an ash pond; is it?

19 A. Now you're getting into the extent of my
20 knowledge about different types of facilities, which is a
21 different matter.

22 Q. I'm assuming it was prospective because I
23 don't think there are any -- I'm not aware of any mercury
24 sorbent injection projects currently in operation in

1 Illinois.

2 A. But your question was whether we put that
3 requirement in any MPS permits?

4 Q. We were discussing this before.

5 HEARING OFFICER TIPSORD: Would we?

6 A. Would we?

7 HEARING OFFICER TIPSORD: Would we because I think
8 it's prospective.

9 Q. (by Mr. Zabel) There were two hypotheticals.
10 One was assuming it's injected in front of the
11 precipitator so that the injected ACI or halogenated
12 injected ACI is collected along with all the other ash,
13 and the other situation would be what if it were collected
14 separately in a TOXECON kind of configuration?

15 A. My general answer -- and I'll check into if
16 that's what your request is and provide the information
17 later, but our typical approach to setting monitoring
18 requirements is looking to see what constituents would be
19 of concern from a water standpoint might be discharged and
20 put in monitoring requirements that would demonstrate
21 compliance with those limits. So, if we had a concern
22 about mercury or some other constituent being discharged,
23 then it would be typical for us to put limitations and
24 monitoring requirements in the permit to address that.

1 Q. Just as a hypothetical -- there's two
2 different ones -- in both cases the waste stream would end
3 up in an ash pond that was not exclusive in the TOXECON,
4 but it was not exclusive for that waste product?

5 A. And, again, we would do an evaluation to see
6 whether that constituent concern could be in the discharge
7 and put limitations and monitoring requirements as
8 appropriate.

9 MR. KIM: Just so we're clear, because your question
10 was more prospective and kind of hypothetical, I'm
11 assuming that answers the question because I don't think
12 there's anything that we've noted that we probably have
13 that's existing right now that would monitor for that.

14 MR. ZABEL: And presuming the agency has some
15 criteria or kinds of things it looks at, it gets
16 prospective first time situations frequently.

17 MR. KIM: I don't want to stand on the shoes of Miss
18 Willhite, but I think that's what she tried to address.

19 HEARING OFFICER TIPSORD: Mr. Harrington.

20 Q. (by Mr. Harrington) When you sample MPS
21 discharge for mercury, do you know whether that sampling
22 is for total mercury including that which might be found
23 in particulate?

24 A. I think it is for total.

1 HEARING OFFICER TIPSORD: Mr. Forcade.

2 Q. (by Mr. Forcade) I believe I asked the same
3 question earlier, and the answer that I thought I got from
4 Mr. Kim earlier today was that the samples were filtered?

5 A. Unfiltered. It should be unfiltered.

6 Q. Unfiltered samples?

7 HEARING OFFICER TIPSORD: Yeah. She said unfiltered.

8 MR. FORCADE: I have about four more questions for
9 Mr. Ross and no more questions.

10 HEARING OFFICER TIPSORD: Okay. Anything else for
11 Miss Willhite?

12 (No response.)

13 HEARING OFFICER TIPSORD: Thank you for coming in.

14

15 (A brief discussion off the record.)

16

17 HEARING OFFICER TIPSORD: Mr. Ross, welcome back.

18 Mr. Forcade.

19

20 E X A M I N A T I O N O F

21 Mr. Jim Ross:

22 Q. (by Mr. Forcade) Mr. Ross, I'm trying to
23 explore some answers that I believe we received yesterday
24 or the day before from Chris Romaine relating to

1 permitting and relating to the time schedules that would
2 be applicable in this rule.

3 A. Right.

4 Q. My understanding from Mr. Romaine's testimony
5 was that if a facility wanted to do an engineering test to
6 evaluate the effectiveness of an activated carbon
7 injection system, that that would require a construction
8 permit in Illinois. Is that your understanding, also?

9 A. I believe there was a specific type of testing
10 cited, and for that specific type, he said he believed so,
11 but that he hadn't really contemplated it to a large
12 degree, but it was something that we, I think, stated we
13 would look into and potentially get back to everyone on.

14 Q. Right. I believe he at least said for one
15 facility conducting such a test, they did issue a
16 construction permit.

17 A. It was a slip testing or something -- slip
18 screen.

19 Q. And I believe we had Mr. Nelson testify about
20 his activated carbon process; they wanted to do a full
21 pilot plant study by bringing in a portable piece of
22 equipment to inject activated carbon in.

23 A. Right.

24 Q. If that type of test were to be run as

1 engineering evaluation, that would be the kind of
2 information I would want to know whether it requires a
3 construction permit.

4 A. Okay.

5 Q. And the second component of it would be,
6 assuming that engineering test worked well and assuming
7 that the company wanted to install that kind of pollution
8 control equipment, my understanding from Mr. Romaine is
9 that would require a second construction permit because
10 you'd be constructing a piece of pollution control
11 equipment. If I'm correct or incorrect, if you could
12 possibly let me know.

13 A. Okay.

14 Q. And then the last piece of information I'd
15 like to know is if the agency keeps track of the time
16 period for issuing construction permits so that we could
17 derive minimum, maximum and average time frames for
18 construction permit issuance.

19 A. I think we have data that we can look back on
20 and probably come up with something. I think the case
21 being here, are you referring to a construction permit
22 specifically for a control device?

23 Q. If the agency can break the information down
24 that way, that would be fine.

1 A. Because I think the time frame on that is
2 historically much shorter, you know, compared that to a
3 PSD project or something.

4 Q. That would be great if the agency can provide,
5 in any event, the best information you have on the average
6 time for issuing a construction permit?

7 MR. KIM: So we're clear, I think if we had the
8 information Mr. Ross is indicating specifically as to
9 construction permits for control devices, is that
10 specifically what you're looking for?

11 MR. FORCADE: That would not be only adequate, it
12 would be better.

13 MR. KIM: Great.

14 Q. (by Mr. Forcade) And then the last question I
15 believe I have is, Section 225.220(a)(2)(A) -- and I'll
16 give you a second to look at it -- relating to Title 5
17 permit applications.

18 MR. KIM: Is this in the rule or the TSD?

19 MR. FORCADE: It's the rule.

20 MR. KIM: Could you give me the citation again?

21 MR. FORCADE: Yes. It is Section 225.220, Clean Air
22 Act permit program, permit requirements, in Section
23 (a)(2)(A).

24 Q. (by Mr. Forcade) Do you have that?

1 A. (by Mr. Ross) Yes, I have that.

2 Q. I believe that requires -- and you correct me
3 if I'm wrong -- that any facility that commenced operation
4 before December 31st of 2008 must submit a Title 5
5 operating permit application by December 31st, 2008; is
6 that a fair reading of the rule?

7 A. For EGU's that commenced initial operation on
8 or before December 31st, 2008, the owner or operator of
9 such EGU's must submit an initial permit application or
10 application for cap permit modification. So, yes, that
11 would be a Title 5 operating permit application.

12 Q. Would it be correct that a Title 5 application
13 would not be deemed complete if the construction permit
14 had not been issued, if the equipment had not been
15 installed and the appropriate pollution control had not
16 been completed and a report demonstrating compliance?

17 A. Under Title 5 provisions, you can issue a
18 permit that has a compliance schedule in it. So, I don't
19 believe that to be an accurate statement. We can go back
20 and review that, but I think we could -- And, again, it's
21 not something that was contemplated or discussed at
22 length, but I believe we could still issue the permit with
23 a compliance schedule in it.

24 Q. Okay. The reason I'm asking is because we've

1 been assuming July 1st, 2009 is the compliance deadline.

2 A. Yes.

3 Q. And if, as I would suggest is the case under
4 other Title 5 application, you have to demonstrate
5 compliance prior to submitting your application, then this
6 section could be interpreted to require compliance six
7 months earlier? And that's a question that I think would
8 be helpful to me and my client, but for the board to know.

9 A. Well, I'm not sure if that's an accurate
10 statement that you have to demonstrate compliance prior to
11 submitting a Title 5 application. They do contain a
12 certification of compliance -- the application does, but
13 as we've seen with many Title 5 applications, they can
14 have asterisks all over that certification to compliance.
15 And, again, we can still issue a Title 5 permit to a
16 source that is not 100 percent in compliance with a
17 compliance schedule.

18 Q. The point I'm trying to explore -- and you can
19 respond as the agency best sees -- is what activities must
20 be completed prior to the submission of the Title 5 permit
21 application --

22 A. Right. I follow.

23 Q. -- so that we can back calculate what steps
24 had to be taken between the rule being adopted and

1 December 31st, 2008 to ensure that there's an adequate
2 period of time for those activities to take place.

3 A. Okay.

4 Q. Is that a reasonable request?

5 A. That's reasonable.

6 HEARING OFFICER TIPSORD: Anything further? Anything
7 further of Mr. Ross? Thank you, Mr. Ross. Mr. Harrington

8 MR. HARRINGTON: Not for Mr. Ross, but for Mr. Kim.

9 MR. KIM: I've not been sworn in.

10 MR. HARRINGTON: We did recall another document that
11 was mentioned in testimony, and I believe Dr. Staudt said
12 he could prepare a chart or something which would show how
13 he arrived at the treatment technologies shown on Table
14 8.10, Page 165 of the technical support document, which is
15 the technologies he designated for CAMR. We asked about
16 what they were. He said it would be easier to prepare a
17 document.

18 MR. KIM: I apologize. I do remember that.

19 MR. HARRINGTON: I had forgotten, but I was reminded.

20 MR. KIM: We will add that to the list.

21 MR. HARRINGTON: Thank you.

22 HEARING OFFICER TIPSORD: That being the case, we
23 have a couple of housekeeping things that we need to take
24 care of. Relax, Miss Bassi. One of which is there was a

1 motion before the board, and the board deferred that, by
2 several people about the scheduling, and one of the issues
3 in that scheduling was the prefiling of testimony for the
4 August hearing. The board deferred that partially because
5 they felt we'd be in a better position today to know what
6 the people who are going to be prefiling for the August
7 hearing need. So, that being the case, the current
8 schedule has prefiling by July 17th. Some of you
9 requested a whole lot more time than that, like later in
10 the year. Others were willing to accept July 28th. My
11 question to primarily the utilities, who are at this point
12 the ones that are going to start questions or start the
13 testimony or be at least presenting testimony in August,
14 what is your feeling? I certainly understand if you want
15 it bumped. I certainly understand given Dr. Staudt's
16 testimony coming in so late that you may need more time.
17 And I'm willing to go to July 28th if that's what you
18 would like. Mr. Forcade?

19 MR. FORCADE: I think one of the problems at least
20 I'm having is until we get some additional documentation
21 from the agency, particularly as it relates to what will
22 happen with the deposition modeling report, that may or
23 may not be provided.

24 HEARING OFFICER TIPSORD: It's not a deposition

1 modeling report. It's the Steubenville study that we're
2 waiting on. That is a distinction because we have other
3 studies in the record already that covers some of the same
4 information. But go ahead.

5 MR. FORCADE: And then I also believe we had
6 questions about some of the primary source articles for
7 the control technology demonstrations which were
8 referenced from secondary sources in Dr. Staudt's
9 testimony.

10 HEARING OFFICER TIPSORD: Right. But my
11 understanding is Dr. Staudt relied on the secondary
12 sources, not the primary sources. So, those things being
13 -- All things being equal, I think, at this point, that
14 you guys need to be ready to start to put on your case in
15 August. And if when the rest of the stuff comes into the
16 record you feel additional Cross Examination, I'm more
17 than willing to hear written motions or oral motions in
18 August to that, but my personal feeling right now is that
19 based on these two weeks of hearing, the agency has
20 presented their information. Whether it's sufficient or
21 not, that's not up to me to decide. I certainly
22 understand that you may want more from the agency later,
23 but I think at this point, we need to plan on the
24 utilities begin presenting their positions in August.

1 MR. FORCADE: Actually, that wasn't even --

2 HEARING OFFICER TIPSORD: I'm sorry. See, I always
3 did try to anticipate you; didn't I? And usually I'm
4 wrong.

5 MR. FORCADE: The point I'm trying to make, if upon
6 receiving those Steubenville or the primary source reports
7 we find information that would prompt us to alter or
8 supplement our testimony, we'd like to retain the ability
9 to make adjustments once those documents are provided to
10 us and a reasonable period of time thereafter.

11 HEARING OFFICER TIPSORD: That we can do. Why don't
12 we pick a date, and if -- if -- if -- If I say "if" one
13 more time, I'm going to scream.

14 MR. KIM: I was going to say, we have provided the
15 primary studies. So, you have those now.

16 MR. FORCADE: All of them.

17 MR. KIM: Yes, I believe so. The combination of the
18 two hard copies and CD, you have all the studies. And
19 obviously, as the hearing officer noted, those weren't the
20 source of the TSD, but be that as it may. I guess the
21 discussion about the Steubenville report, study, what have
22 you, again, we'll try and get an answer as quickly as we
23 can out of USEPA headquarters, but I guess it's of concern
24 to me, because it seems as though there's this sense that

1 the agency has some control over how this document is
2 going to be handled --

3 HEARING OFFICER TIPSORD: I don't think that's true.
4 I think everyone understands that you're trying to get the
5 Steubenville report. I don't think anyone here --

6 MR. KIM: We would like nothing better.

7 HEARING OFFICER TIPSORD: All right. That being the
8 case, we'll set July 28th for prefiling of testimony. If
9 you need additional time or if there's a need to amend the
10 testimony, file a motion with me to do it, and we'll
11 address that.

12 MR. BONEBRAKE: What does that mean for prefiling
13 questions?

14 MR. KIM: I had two questions. What does that mean
15 for prefiling of questions? And as a precursor to that,
16 with the idea or the hope that the two weeks in
17 Springfield was sort of a learning exercise in terms of
18 how best to move things along, when we presented the TSD
19 and the documentation that we had and then we followed up
20 with the testimony -- the written testimony, obviously the
21 sequence was me trying to give as much as the study and
22 informational material we had with the initial filing and
23 then provided the specific testimony. It would, I'm sure,
24 refine our questions whether -- in whatever prefile form

1 they're going to be, if they are, or certainly as they're
2 ultimately presented at the hearing, if we could have any
3 original test data or studies that may be used as early as
4 possible, even before any deadline for prefile testimony,
5 and I'm not asking for any conclusions that are going to
6 be drawn, but the sooner we have that the sooner we'll be
7 able to review that, much in the same way we had to get
8 our supporting documentation out as quickly as we could
9 with the initial rule. I'm not asking to bump the 28th.
10 I mean, I think Mr. Bonebrake's question, as far as
11 questions, is mine, as well. Setting that aside, is it
12 possible for us to receive any kind of original test data
13 and original methodology and background information, and
14 if there's going to be studies being used, if published,
15 if nothing else, a reference to it or a citation so that
16 we could begin to prepare ourselves basically for Chicago?
17 In other words, if we don't get testimony and any kind of
18 information or test data or what have you, I think the
19 quality of our questions and the likely of the questions
20 is not going to be conducive of a useful hearing and a
21 useful record for the board. I'm trying to improve upon
22 whatever presentation and questions happened these past
23 two weeks.

24 HEARING OFFICER TIPSORD: Mr. Forcade.

1 MR. FORCADE: I would point out we would have
2 appreciated the same courtesy. I believe we have now six
3 inches of new fundamental reports that were provided as
4 Exhibits in this proceeding, not that that means we would
5 try to withhold information. I would point out that this
6 is a two-sided sword. And I think it's a fair stack of
7 paper that we're hauling back to Chicago that is new in
8 this proceeding.

9 MR. KIM: Again, our position is -- honestly, I don't
10 have a list of the Exhibits -- everything that we relied
11 upon -- and there probably are exceptions to that; I'm
12 sure there were some oversights and some mistakes, but we
13 did provide everything we relied upon. I think most of
14 the information we provided was probably information that
15 came up through questioning in the sense of, "Well, it
16 would be nice if we had that information," not something
17 we relied upon, but simply part of an answer to a
18 question, "Well, maybe that's out there. Well, could you
19 look that up and see if you could find that?"

20 HEARING OFFICER TIPSORD: Mr. Rieser.

21 MR. RIESER: And just both in observation and a
22 suggestion, you know, obviously the agency had control
23 when it was going to put all its information because
24 that's when they filed it, and then the deadlines went

1 from that. It's hard to -- I mean, the honest answer is
2 that I think people would be willing to do that if they
3 knew what we were going to be doing before we filed the
4 testimony, but a lot of that, the answers to the question
5 has to do with what's the testimony in the sense we won't
6 know that until we file that. That's going to be hard --
7 I think that's going to be hard to do. I don't know that
8 anyone has got -- I can't speak for everybody else. I
9 don't know that anybody has a problem saying, "We know
10 it's going to be there," or "We know it's going to be
11 that," and it's a big thing that somebody would be well
12 advised to look at beforehand and try to do that. I don't
13 think we're going to know.

14 HEARING OFFICER TIPSORD: Okay. What I was thinking
15 about was July 28th for prefilng of testimony and August
16 7th of prefilng for questions. 7th for prefilng of
17 questions. I realize that only gives about a week to
18 review those questions, which is tight, but, I mean, we
19 could go back. We could go back July 24th, which gives
20 you additional prefile testimony and then prefile
21 questions due like the middle of that next week, the 2nd
22 of August.

23 MR. RIESER: Can we talk for a second?

24 HEARING OFFICER TIPSORD: Sure. Let's go off the

1 record.

2

3

(A brief recess off the record.)

4

5

HEARING OFFICER TIPSORD: Mr. Bonebrake, we'll go

6

back on the record.

7

MR. BONEBRAKE: We've had a chance to talk, and our

8

suggestion is that we have two prefiling testimony dates

9

that would be selected at the option of the companies,

10

that one would be the 28th, with a corresponding prefile

11

question date of August 7th, which I think is what you

12

had, Madam hearing officer.

13

HEARING OFFICER TIPSORD: Uh-huh.

14

MR. BONEBRAKE: Alternatively, at our option and if

15

we're in a position to do so, we could prefile testimony

16

on the 24th of July, which would mean that the IEPA would

17

simply file its questions with respect to any testimony

18

filed on the 24th on August 3rd -- August 4th of '06.

19

MR. RIESER: There is a group of the testimony that

20

as we were talking it was clear that some things that we

21

could get earlier than others, and to the extent we can do

22

that, then we will, and that will break it up and provide

23

some more time. So, it seemed like a good compromise.

24

HEARING OFFICER TIPSORD: Is that acceptable to you,

1 Mr. Kim, to have the two separate prefiling dates?

2 MR. BONEBRAKE: There's a prefiling date for the
3 testimony, which would correspond to our prefiling date
4 for the questions, and then both of those would change.

5 So --

6 MR. KIM: Just so I'm clear, it could be then that if
7 you have a list of, say, ten witnesses, you're saying
8 maybe five of those you'd like to prefile on the 28th and
9 five of those on the 24th; is that kind of your approach?

10 MR. BONEBRAKE: I don't know what the numbers would
11 be, but that would be a possibility.

12 MR. ZABEL: The theory basically is that some of the
13 testimony from the agency is all done. So, we can start
14 earlier. Some of the things we're still waiting for, and
15 some of it is just more complicated. We thought it would
16 be expeditiously for the agency to respond with written
17 questions the sooner they had the testimony and not get a
18 giant dump all at once.

19 MR. KIM: I guess to follow-up on what Mr. Zabel just
20 said, if we were going to do that -- and, I guess, you
21 know, just thinking quickly, I don't have a big objection,
22 with some provisos -- would it be a possibility -- and it
23 sounds like it might not be inconsistent with what you
24 just said, that you may have some witnesses that have

1 subject matter that expands it, and then you may have some
2 that are fairly limited. Would it be possible to the
3 extent we're talking about subject matter that, for
4 example, if we had taken that approach, our health impact
5 witnesses would have all had their testimony done by the
6 24th, and perhaps -- In other words, what I'm getting at
7 is, when we're going to be working with our people on our
8 side, it would be easier if we could get, to the extent
9 possible, subject matter at the same time, subject matter
10 testimony at the same time and not broken up.

11 HEARING OFFICER TIPSORD: And I'm not sure that's
12 going to be possible because keep in mind, you're at least
13 working with three companies.

14 MR. KIM: Believe me, I know.

15 HEARING OFFICER TIPSORD: The chances Keith Harley
16 and Environment Illinois and all those people -- I mean,
17 there are other people that may prefile for this. So, I
18 don't know if that's -- I think internally that's
19 something you have to work out.

20 MR. KIM: Can I ask this: Would it be possible then
21 to -- and, again, this is to help us structure our people
22 and so forth -- as early as possible, even if it's by --
23 well, even if it's in the first week of July, which, I
24 guess, is just next -- it's two weeks from now, if we

1 could know who you anticipate filing on the 24th and who
2 you anticipate on the 28th?

3 HEARING OFFICER TIPSORD: John --

4 MR. KIM: I'm not saying by subject matter. I'm
5 trying to find out --

6 HEARING OFFICER TIPSORD: I don't know that they know
7 yet who their witnesses are going to be.

8 MR. ZABEL: You have to understand that to answer
9 your subject matter request, some of the same subject
10 matter witnesses will come in the first batch and some in
11 the second due to vacations and planning problems. Our
12 alternative is to do it all on the 28th as the hearing
13 officer suggested. If this wouldn't be helpful to you, I
14 don't think we really care.

15 MR. KIM: Well, I think that's probably going to be
16 fine.

17 HEARING OFFICER TIPSORD: All right. Then we'll go
18 with those two dates, and I'll do a written hearing
19 officer order on Tuesday that sets this out. I don't
20 think I'm going in Monday. The other outstanding issue we
21 have is Mr. Nelson's -- there were still questions for
22 Mr. Nelson. There were -- There was question 35 through
23 52 from Amren, and he didn't direct any of Dynegy's. Have
24 you talked to him, John? Is he going to be available in

1 August?

2 MR. KIM: I was not going to get into that with Mr.
3 Nelson as he was leaving the building today.

4 HEARING OFFICER TIPSORD: Let's do it this way:
5 We'll have him file written answers. When would you like
6 the written answers? I mean, he should for -- He's had
7 the questions. So, they should be ready.

8 MR. KIM: The only preface I'm going to have is that
9 Mr. Nelson --

10 HEARING OFFICER TIPSORD: Should we go off the
11 record?

12 MR. KIM: Yes.

13 HEARING OFFICER TIPSORD: Go off the record.

14

15 (A brief discussion off the record.)

16

17 HEARING OFFICER TIPSORD: How about Mr. Nelson's
18 responses due July 10th? Then once we see Mr. Nelson's
19 responses, we can talk again.

20 MR. KIM: That may be longer than he was expecting.
21 If we get them done quicker, we will.

22 HEARING OFFICER TIPSORD: Once you see the written
23 answers, if you want follow-up from Mr. Nelson, let me
24 know, and we'll deal with it then. Okay? Fair enough?

1 MR. ZABEL: Yep.

2 HEARING OFFICER TIPSORD: Let me know if you need any
3 additional follow-up from Mr. Nelson, and we'll deal with
4 that at that point. There are a couple things I want to
5 say. I want to thank each and every one of you for your
6 courtesy to the board, your courtesy to me and your
7 courtesy to one another and the witnesses. It's been
8 greatly appreciated. And I know how hard I pushed, and I
9 thank you for your good naturedness and for sticking with
10 me so we could get this hearing in the books, and I really
11 do appreciate that. With that, the second hearing is
12 scheduled for August 14th at 1:00. We will not be going
13 until 7:00 o'clock because they kick us out by 6:00. They
14 will be shorter days in Chicago. Thank you very much, and
15 we're adjourned.

16 * * * * *

17

18

19

20

21

22

23

24

