ILLINOIS POLLUTION CONTROL BOARD
June 21, 2006

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

TESTIMONY OF DAVID FORTER
and SID NELSON

BEFORE MARIE E. TIPSORD
HEARING OFFICER

The testimony of David Forter and Sid Nelson, witnesses called in the rulemaking proceeding before the Illinois Pollution Control Board taken on June 21, 2006, at 9:00 a.m., at the offices of the Environmental Protection Agency, Springfield, Illinois, before Holly A. Schmid, Notary Public and Certified Shorthand Reporter, CSR No. 084-98-254587 for the State of Illinois.

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everyone. Welcome back. This is day seven I believe of our continuing -- eight. No. This is only Wednesday. Oh, yeah, it is day eight. So let's get on with it.

I'm Maria Tipsord. With us today are Andrea Moore and Dr. Tanner Girard, the presiding board members. Also present is Alisa Liu from our technical unit and Tim Fox who is Andrea Moore's assistant. Connie Newman and Erin Conley are going to be in and out today. Erin is working on some other actual board business, believe it or not, and John Knittle will also be in and out because he, too, also has the other board business to do. I can't believe there's anything else going on, personally.

We are going to continue with Mr. Nelson who is under oath. We will proceed with Kinkade Question No. 2. Before we do that, in speaking to Mr. Kim and the Agency, it's my understanding that they would like to and are hopeful that the schedule today will be the completion of Mr. Nelson, proceeding Mr. Porter and then Dr. Hausman and finishing with Dr. Hausman today, so that we could start with Dr. Staudt tomorrow. Given that, and given that I had already indicated that we would go late tonight, if it

looks like we are going to finish up with Dr. Hausman as the day proceeds, we may even go a little later than seven. I'm not going to keep you here until 10, but if it looks like we can finish up in another half hour at seven o'clock, we will finish and start with Dr. Staudt in the morning. That being said, Mr. Forcade.

CROSS EXAMINATION BY MR. FORCADE:

Q. Before we go to Question 2, I have some follow-up questions, if I could.

MADAM HEARING OFFICER: Follow-up questions to Question No. 1.

MR. FORCADE CONTINUES:

Q. Mr. Nelson, could you tell me what your degree in engineering -- what field or areas your engineering degree is in.

A. Technically, on the diploma, it says "Mining Engineering." It's from Penn State, which is a coal kind of university. I was in the mineral processing option of that, so --

Q. I'm sorry?

A. Mineral processing engineering, so.

Q. What courses in deposition modeling have you taken at an educational institution?

A. I don't have courses in deposition

modeling, but I spent four years at Harvard Kennedy School of Government. Much of that is a Kennedy Fellow of Science Technology and Public Policy where I do have quite a bit of experience in distilling science and technology in applying that to public policy issues.

Q. Did you take any educational courses at Harvard in atmospheric chemistry, deposition modeling, or similar matters?

A. No.

Q. Do you have any educational courses that you have taken on those topics?

A. No.

MADAM HEARING OFFICER: Question No. 2.

MR. NELSON: Question No. 2: "Have you reviewed Dr. Staudt's testimony?" Yes, I have. "If so did you rely on Dr. Staudt's testimony in forming any opinions or testimony?" No, I did not. So B and C don't apply. No. 3: "Have you reviewed the TSD?" Yes, I have. "If so, did you rely on the TSD in forming any opinions or testimony?" No, I have not, so B and C, again, don't apply.

MR. FORCADE CONTINUES:

Q. Mr. Nelson, I believe you indicated that

you have been provided a copy of the TSD at the early stages of your connection with the Illinois EPA relating to this matter. Is that correct?

A. I got an E-mail with it included, yes.

Q. Would it then be safe to say that you had no part in writing the sections of the TSD because you received a copy prior to being retained?

A. That would be correct. I had nothing to do with writing it.

Q. So you had no part in drafting the TSD?

A. None at all.

MR. NELSON: No. 4: "Have you reviewed the ISF report?" No, I haven't, so the rest of that is not applicable. Have you reviewed the information required by the Agency from any of site inspections at each of the Illinois coal power plants during the control configuration inspections during late April and early May of 2006?" I hadn't, until I got this question and then I asked for this data and some of it was provided to me. No. 6: "Did you assist in writing any portion of the TSD, and if so, which sections? No. I did not participate in that.

CROSS EXAMINATION BY MS. BASSI:

Q. On Question No. 5, you said you had not

seen the control configuration inspection reports, until you got the question, and then you -- some of it was provided to you?

A. Yeah. It came by E-mail and the file was too big, so I got an edited version of it with most of the data. A lot of the -- some of the graphics were very large, and they weren't included, so they couldn't get it to me by E-mail.

Q. Did someone -- did someone who was sending it to you edit it? Is that what you're saying?

A. Just to get the file size down. Again, it was photographs that were missing, and they take up a lot of room.

Q. The photographs were missing?

A. Most of the photographs.

Q. Who did the editing?

A. Dr. Staudt is the one who sent it to me. He broke it into a couple files because, like I said, it was a very large file.

MR. FORCADE CONTINUES:

Q. You said that most of the photographs were missing. Does that imply that you reviewed the complete document at a later time and made comparisons.

A. No. The photographs were really

unnecessary.

Q. How did you know there were photographs there?

A. By the layout. There would be some notes about these inspections, and then there would be a drawing of the configuration, and then there would be photographs, and like, there were one or two photographs in there, but you would see a couple blank pages. I don't think it was missing anything particularly important.

MADAM HEARING OFFICER: I am going to shut this questioning off about what was contained in that because right now that's not an issue. He testified he didn't receive that, until after his testimony came in. So far there hasn't been any questioning to him about what that material means, and so what was in that material I'm not sure is relevant at this point because, at this point, he didn't review this when he got his testimony, and so far none of Kinkade's questions have asked him to draw conclusions from that information. I'm not sure we need to belabor what was in it.

CROSS EXAMINATION BY MR. BONEBRAKE:

Q. I have a related question. Yesterday in

Exhibit No. 44 was introduced into the record, and it's the first page entitled "Statewide Coal-Fired Electric Utilities" and I think, Mr. Nelson, you discussed this briefly yesterday. Was this document with all these pages something you prepared or was it provided to you by somebody?

A. It was provided to me. I had no hand in preparing it. I had asked for an update for my own data as to what the configurations of the various plants were and what -- there's coal data in there, what kind of coals they are burning.

Q. And exhibit 44 -- you may have mentioned this yesterday and if so, I missed it, but when was it that you received Exhibit 44?

MADAM HEARING OFFICER: He did say the date on the document that he received was sometime in March, I believe, March 3.

MR. NELSON: My document was March 6, so it was after March 6.

MADAM HEARING OFFICER: They are going to provide us with that actual document.

MR. BONEBRAKE CONTINUES:

Q. So there's two versions of this because the version that's been entered into the record is dated

May 30, `06. So have you done any independent investigation to confirm the information that's provided in Exhibit 44?

A. No, I haven't.

Q. Did you rely upon the information of Exhibit 44 or the earlier version of that exhibit?

A. In forming some of the opinions that I have, but not in forming my testimony. That was submitted earlier.

Q. So you have some additional opinions, above and beyond, what's in the testimony. Is that correct, that you're offering today?

A. Any information that I have gathered forms the opinions that I will express today. You can't help it. There are no real significant new information in there. A few more plants have switched to sub-bituminous coals that clarifies some of the configurations. There have been some updates with respect to some of the boiler types and things of that nature.

MS. BASSI CONTINUES:

Q. Going back, then, to "The Compliance Configuration Inspection Report, did that form your opinions?

A. In particular, there's data in that on SO3, flue gas conditioning systems at numerous of the plants that are not in the fact sheets, so that would be some information that I've gathered within the last two weeks.

Q. And does that inform your opinions that you are going to express today?

A. Yes.

Q. Was the copy of that report that you received redacted at all? Did it have parts of it that were blacked out?

A. No. Nothing was blacked out, just a few missing photographs.

MR. KIM: If I may, first of all, any documentation that Mr. Nelson looked at there might be one additional piece of information -- well, let me back up. My understanding is one of the compilation documents that we submitted yesterday, which is dated in May of `06, was not the version that Mr. Nelson looked at. He looked at a version that was dated two months later. We are in this process of tracking that down. I think the only distinction is the May one might have a little more information than the March one, but there's no conflicting information is my understanding. If

there is an additional piece of information that he might have received from Dr. Staudt that is not that document, we're going to copy that, and make that available, as well. If that's the case, the only reason it hasn't been done is, frankly, we're just sort of drowning in paper on this, but that will be done, as well. I don't understand the relevance about the pictures and so forth. Whatever we present is going to have all the pictures that would ever be there, and if there's missing pictures that we didn't see we will take care of that. Having said all that, and just to inject a little more confusion, our intent in presenting Mr. Nelson and David Forter of ICAC was that they would be addressing sort of, in tandem, issues concerning technology availability and such. Mr. Forter, because of his organization's background, has a broader overview, and the questions I think, indeed, that were presented to him were a little more general in nature. Mr. Nelson has more specific questions. He has a greater number of questions and more specific to perhaps his company's products and some specific technology applications. I apologize, but because of some bad directions that Mr. Forter received, he was not here at exactly nine o'clock. We would have put him on at nine

o'clock, especially since Mr. Nelson is only on Question 2 this morning. If nobody has any objection, I would like to keep Mr. Nelson here at the table, so he can answer anything that comes up, but I would like to provide Mr. Forter because I'm hoping if he actually goes through his questions, which are shorter in length, but more general in nature, that might set some of the foundation for any questions that would be later answered by Mr. Nelson, and I apologize for jumping a little out of order, but I'm saying this now when we are only five or six questions into Mr. Nelson's testimony. If someone has a problem with that, we can continue on with this, but I'm just saying that I think Mr. Forter's questions and answers are probably a little more general in nature than some of the ones presented to Mr. Nelson.

MADAM HEARING OFFICER: Does anybody have any objection?

MR. KIM: They will both be together as a panel.

MADAM HEARING OFFICER: Then let's bring up Mr. Forter, and we will pick up on Question 7 for Mr. Nelson.

MADAM HEARING OFFICER: I have been

handed a copy of David Forter's prefiled testimony. If there's no objection, we'll mark that as Exhibit No. 45. Seeing none, it's marked as Exhibit 45, and could we have Mr. Forter sworn in, please.

(Exhibit No. 45 was admitted.)

(At which point, Mr. David Forter was sworn in by the court reporter.)

MR. KIM: Mr. Forter hasn't been a party to any of the testimony that's happened so far, so he's fresh.

MADAM HEARING OFFICER: Then I believe Kinkade and Prairie State had one question, as well, but it's similar to Question 7 of Kinkade, so if you want, we will start with Kinkade.

MR. KIM: Thank you for the accommodation.

MADAM HEARING OFFICER: Mr. Forter, what we have been having the witness do is read the question and then respond to it.

MR. FORTER: I will read the question and then answer the question. "Did you receive any information from the Agency prior to forming any opinions, including, but not limited, to the opinions contained in your testimony? A, "If so, describe that

information in detail and if so, did you rely on the information in forming any opinions in your testimony? If so, specifically, what opinions or parts of the testimony did you rely on the information that you received from the Agency." The body of the question is, "Did you receive any information from the Agency prior to forming any opinions, including, but not limited, to the opinions contained in your testimony?" And the answer is no. Question No. 2: "Have you reviewed Dr. Staudt's testimony? If so, did you" -- the answer is no. Actually, I haven't. "If so, did you rely on Dr. Staudt's testimony?" and the answer would be no. "If so, which parts?" And the answer is still no. C: "If so," still no.

MADAM HEARING OFFICER: Question No. 3.

MR. FORTER: "Have you reviewed the Technical Support Document?" And the answer is yes, parts of it. I seen that just recently and had taken a look at it primarily just as it reflects back on my comments that were already made. "If so, to which parts of the testimony did you rely?" In general, again, we have broader questions and broader issues, and it was looking at general issues that were being brought up.

MR. FORCADE CONTINUES:

Q. Just as a follow up, did you provide any information to the Agency that would have formed the basis for information in the TSD or were you contacted after the TSD had been prepared?

A. I was contacted after the TSD was prepared.

MR. BONEBRAKE CONTINUED:

Q. Based upon your review of the TSD, were there any assertions or statements in the TSD that you disagreed with?

A. It was a general overview just before actually this hearing, just to kind of understand a little of what was in there. Nothing in particular jumped out at me.

MR. FORTER: "Have you reviewed the ICF report attached as appendix C to the TSD?" And the answer is no. "Have you reviewed the information acquired by the Agency from any state inspections at each of the Illinois coal-fired power plants control configuration inspections during late April or early May of 2006?" I have seen a summary of those things. I'm not sure which date it was, and that was just prior to this hearing.

MR. FORCADE CONTINUES:

Q. For clarification, that would be after you made your prepared testimony?

A. After my prepared testimony.

Q. Therefore, you didn't rely on that in your prepared testimony?

A. Not at all.

MADAM HEARING OFFICER: Question No. 6.

MR. FORTER: "Did you assist in writing any portion of the Technical Support Document?" The answer is no. Question 7: "What is your definition of `commercially available'"? And there is no generally-accepted definition, but we assume as an institute, Institute of Clean Air Companies, when something has been offered for sale, it's been -- it's commercially available. Once it's been sold, it's definitely commercially available.

MR. FORCADE CONTINUES:

Q. Are you suggesting that any time a company who puts an advertisement out offering a product for sale that it's commercially available?

A. Some qualification there, I think if there was a likely prospect of a market out there to buy it.

I know of products that have been out there on the market for 20, 30 years with no prospect of being sold. In this case, there was a regulatory environment, at least, on a federal basis that makes it a likely market for technologies.

Q. Would it be safe to say, then, your definition of commercially available has to do simply with the purchase an sale of such pieces of equipment?

A. Yes.

Q. It has nothing to do with whether or not the equipment will achieve the goals identified?

A. The goals that are achieved or what are developed between the customer and the vendor, and it also trying to meet a permit requirement, so there are, for instance, there's selective catalytic reduction devices out there, which will achieve maybe in a range of 20 percent, so to say it's commercially available only at a certain achievement, would be wrong because that technology has been available for over 15, 20 years in this country.

Q. What I'm trying to get at is, if you're saying, as I believe you did, that "commercially available" was simply the act of someone offering it and possibly someone purchasing it, there's no component of

that evaluation on the achievability of that particular piece of equipment in your definition, is there?

A. Every application is different, so the achievement will be different in different applications. We know -- for sorbent injection, it has very broad range of achievement on different types of coals and different configurations. It's offered for sale. It's actually been sold. I think whether it's commercially available is a moot point at this point. One of the things we have also up on our website is a list of 16 different sales that actually have occurred around and including sorbent injections. At that point, there's actually been a contract made between a customer and a vendor and that product has been sold.

Q. If a product is sold, do you subsequently follow it to see if it achieves the objectives identified?

A. No.

Q. So you could have a product that's commercially available that did not achieve the goals of -- is that correct?

A. That's correct.

MR. FORCADE: I'm confused as to whether I should repeat the questions for both witnesses

or we have switched witnesses.

MADAM HEARING OFFICER: We have switched witnesses. We will go back to Mr. Nelson because there are many more questions for Mr. Nelson, so rather than treat them as a panel, I think --

MR. FORCADE: I'm just confused.

MADAM HEARING OFFICER: We'll go on with Mr. Forter and go back to Mr. Nelson because there are many, many more questions. I also would note that this question of commercially available is the one that Prairie State asked, as well, so we are covering Prairie State's question at the same time.

CROSS EXAMINATION BY MR. HARRINGTON:

Q. Does commercially availability convey with it any concept of the volume of material or the ability to meet any particular market?

A. The Institute deals with a wide range of air pollution control devices and technologies. In fact, some of those cases, they are technologies, and it's a way of doing something, as opposed to an actual piece of hardware, or in this case, a free agent, which is injected. So these technologies are commercially available when they meet sort of a performance specification. They do achieve something, obviously, in

order to be able to work. It does not specify that. When a customer gets in with a vendor, they will work up different language in their contracts as to what they will achieve with so much free agent and things like that.

MR. HARRINGTON: Would you read back the question, please.

(At which point, the prior question was read by the court reporter.)

MR. HARRINGTON CONTINUES:

Q. By that, I'm not talking about its performance, just for clarification, but for example, does it say, "Yes. It's available to anybody who might want it?" or could it have very limited supply and still be commercially available?

A. Again, we are into an area where there is no definition of "commercially available." My best --

Q. What do you mean by "commercially available" in your testimony?

A. My best gauge is when something has been sold. We can backtrack that to when it was being offered, and in this case, we are well beyond being offered. We are being sold. It actually has been sold.

Q. But that does not tell us or the Board

whether the suppliers can supply one plant or 100 plants. It says some has been sold to somebody, and that's all we know when you say "commercial availability." Just those terms. I'm not worried about any particular product.

A. Right.

Q. Does it mean that it has passed any Highland test to demonstrate it's effectiveness?

A. Typically, I know that the Department of Energy and even EPA will talk about commercially available, and they will show how something actually goes through the initial testing, the RND phases, demonstrations, which we have had more demonstrations on activated carbon injection than I think anything I have ever seen before, before it actually being sold, but there is no -- again, there is no clear-cut definition of how that actually occurs, but in this case, we have clear-cut demonstration on many different configurations, many different coal types.

MR. HARRINGTON: Would you read back the question, please?

MADAM HEARING OFFICER: I'm sorry.

(At which point, the prior question was read by the court reporter.)

MR. HARRINGTON CONTINUES:

Q. Just the term "commercial availability" is all I'm asking, not particular product.

A. I will go back to the beginning.

Q. That's a yes or no.

A. The offering of a technology for sale and that technology can, both, be hardware, software, human ingenuity. That is the technology.

MR. FORCADE: I'm sorry. But we're getting nonresponses to our questions. The questions are really quite specific, and we can keep asking them, and we can keep asking the court reporter to repeat them, but if the answer doesn't relate to the question, this is going to be a very long day and --

MR. KIM: I think the witness is trying to answer the best he can. It may be that some of these questions don't lead to an easy yes-or-no answer. With that in mind, if we can -- I certainly have no problem if maybe that point is not being made, or if we can focus more on the answer then we'll definitely do that because I want to cut to the chase, too, but I'm just saying that maybe some of these things are -- I think he's doing the best he can to answer. I think it sounds like it's a fuzzy area.

MR. AYRES: Madam Hearing Officer, the witness has said there's no definition of "commercial" -- this is a term which they are asking him about which doesn't have a definition. Now, all these follow-up questions are trying to flush out what a definition is, which the witness has already said there isn't one.

MADAM HEARING OFFICER: I must respectfully disagree. The question -- his first question was concerned the availability, the volume, whether or not it could supply one plant or 100 plants, and I think his answer was that the definition of "commercially available" doesn't cover whether there's enough product out there to cover one or 100, and the second question was whether or not "commercially available" also meant that there was -- that it worked, in effect.

MR. HARRINGTON: That it had been tested.

MADAM HEARING OFFICER: And his answer was it's been tested, but that doesn't necessarily mean that it is contained within the definition of "commercially available."

MR. HARRINGTON: His definition.

MADAM HEARING OFFICER: His

definition, so I respectably disagree. I think you may not be getting the answer you want to hear, but I do think he is answering the questions to the best of his ability about commercial availability and I'm getting coffee at the break, I promise.

MR. HARRINGTON: If I might politely say, you did a fine job of answering those questions. If I heard that from the witness, we wouldn't be having this discussion. Thank you.

MADAM HEARING OFFICER: I did not incorrectly characterize your answers, did I?

MR. FORTER: No. You summarized them very well.

MR. FORCADE: I was unable, when Mr. Forter came on, to go back to the fundamental questions of education, which I did for Mr. Nelson. Could I have him inquire about his educational background?

MADAM HEARING OFFICER: Sure.

MR. FORTER: I have a Bachelor's in Microbiology from the University of Maryland. That is my educational background.

MR. FORCADE CONTINUES:

Q. You have no engineering degree?

A. I have no engineering degree. I have engineer course work, but no degree.

Q. What professional classes have you taken since your undergraduate degree in microbiology that would be applicable to the technology that you are describing today?

A. I have been involved in air pollution control for almost 20 years and my classes have been on-the-job training both at the Metropolitan Washington Council of Government. U.S. EPA, was on the transport Commission with ICAC. My formal training has probably been through my peer work.

MR. BONEBRAKE CONTINUES:

Q. Mr. Forter, are you currently an officer with an Industry of Trade group?

A. I am a part of the board as executive director for the Institute of Clean Air Companies.

Q. Can you tell me what the mission of that particular institute is?

A. It is to develop and disseminate information about the technologies for air pollution control.

Q. And do you view yourself to be an advocate for that institute?

A. I do.

Q. Is Mr. Nelson's company a member of the institute?

A. Not at this time.

Q. Does the institute represent a number of companies in the pollution control business?

A. We have 90 members.

Q. Is Mr. Nelson's company one of those members?

A. No.

MADAM HEARING OFFICER: We are ready to move on to Question No. 8? Question No. 8.

MR. FORTER: "What is your definition of cost effectiveness?" Again, this is my definition of "cost effectiveness," and it has to do with a technology that is effective at reducing pollution, and then the costs that's associated with that. And it varies from pollutant to pollutant and from technology to technology. We will find for NOx control, the cost effectiveness would be very different than it is for mercury. Mercury, as you know, is a hazardous air pollutant, and the effectiveness of that and the benefits of that are much greater because its an air toxic.

MR. FORCADE CONTINUES: Will we be get getting answers to the same questions for Mr. Nelson now?

MADAM HEARING OFFICER: We will go back to Mr. Nelson and cover these questions. You asked these questions of Mr. Nelson, and we will cover those when we are done with Mr. Forter. Question No. 9.

MR. FORTER: "What is your definition of "economically feasible"? And again, its having a technology that is available and then the economics of it working within some marketplace, and usually, a market is driven by some regulatory driver, such as a federal rule or state rule, even local rules, so it's being available and meeting some cost performance there.

MR. FORCADE CONTINUES:

Q. Are you then suggesting that a technology required by any adopted or proposed regulation is, by definition, economically feasible?

A. I'm sorry. Could you repeat the question?

Q. Are you suggesting, then, that a requirement imposed by any adopted or proposed regulation is, by definition, economically feasible?

A. Generally, when these rules and policies are made, they look at the economics, and generally,

what is being proposed is economically feasible. They go through a whole economic analysis, something that I don't do, and not required to do as part of my responsibilities.

Q. Since the particular regulation under consideration here has not been adopted by any entity, would it be safe to say that you have no idea whether it is economically feasible?

A. Again, I will refer back to the fact that we have -- there's been sales at -- 16 different sales we have on our website that shows somebody believes it's economically feasible to buy this. We have some handouts on that. It's also on our website, which is www.icac.dom, so the assumption here is somebody has bought it for some regulatory requirement and the economics are proving out themselves.

Q. Then would it be correct that you are not incorporating any evaluation of the total cost of construction in the operation of the equipment compared to the amount of pollutant reduction that would be achieved by that in making your definition of "economically feasible"?

A. Well, the economic feasible -- are we talking about sorbents? Are you referring to that?

Q. I'm just referring to the term "economically feasible" which actually came from Mr. Nelson's testimony, since that's where the questions were directed, but the concept is that the terms "commercially available" and "cost effective" and "economically feasible" have been spread throughout the testimony, and while there may or may not be definitions to those, we are trying to find out what the individual witness who uses that term means by it because it has significant potential impact on the direction the Board may choose to go in this proceeding, and I'm trying to find out from you what you mean if you have used the words "economically feasible" and what I'm hearing so far is it has to do with adopted regulations, and I'm trying to inquire if there's other aspects of an evaluation you would use to determine if something is economically feasible.

A. The economics in this case are overwhelmed with the benefits from this. Using the information from EPA, which says, for every dollar spent, you get 22 dollars back. For the capital costs for sorbents, we are talking about somewhere less than -- around a million dollars, so the economics here are such that it's very feasible for achieving a reduction, but what

that reduction level might be is really up to the regulatory body or to customers to determine what that's going to be.

Q. In your definition of "economically feasible" you make reference to an EPA report of some type. Could you tell me what that report is and where it is in the record?

A. I'm trying to -- I would have to review my testimony where it referred back to an EPA document.

MR. AYRES: Could you point out where it is in his testimony?

MR. FORCADE: It came from his answer he just gave me.

MR. FORTER: EPA -- in doing their Office of Research Development, within EPA, produced a report that was used as a Technical Support Document to CAMR, and I believe it's in proposal phase, and they talked about the feasibility of the different technologies and everything else. Their conclusion -- I disagree with it -- was that -- the body of the document is very good. The conclusion I disagree with.

MADAM HEARING OFFICER: Excuse me. Before we go on, we have been handed a document that we haven't marked as an exhibit. We need to get that taken

care of before we move on to any more exhibits. "Commercial Mercury Control Technology Bookings" is going to be marked as Exhibit 46, if there's no objection. Seeing none, it's marked as Exhibit 46. And then, Mr. Forcade, your next question.

(Exhibit 46 was admitted.)

MR. FORCADE CONTINUES:

Q. I'm trying, again, to explore this economically feasible concept, and you said you relied for your definition of that term upon some U.S. EPA reports which you have just identified. I asked if those reports have been produced into the record. You also said you had not agreed with all of them, and I need to explore which portions you disagree with, but it's hard to do, if I haven't got the document.

MR. KIM: The witness can correct me if I'm wrong, but I don't think he said he referred to that. I think he said he was using those as his examples going beyond his testimony. I just flipped through his testimony quickly. I didn't see him make any reference to any U.S. EPA document, other than U.S. EPA mechanisms that were implemented in other U.S. EPA programs, but I didn't see him make reference to another document. If I'm wrong, then he can correct me.

MR. FORCADE CONTINUES:

Q. The reference to the U.S. EPA document was in response to my question relating to what he considered to be economically feasible.

A. EPA has -- the CAIR and the CAMR programs have had a lot of analysis with them where EPA has gone out publicly and talked about the cost benefit ratio of, for every dollar spent, you get 22 dollars back in response. That makes a lot of technologies economically feasible within that range because we are still not even tapped up to the 22-dollar-a-ton range at this point.

Q. Could you explain to me how, for every dollar spent, you get 22 dollars back?

A. That's EPA's analysis. I can't talk about that. It's based on direct health benefits coming from -- it's actually not a ton. It's, for every dollar spent, you get 22 dollars back in direct health benefits.

Q. So you're relying upon a U.S. EPA report on economic benefits, with which you disagree, and can't explain the 22-dollar return on dollar investments. Is that correct?

MADAM HEARING OFFICER: We are getting way off field here. You asked him what he -- you asked

him economic reasonable. He gave you a definition that tracks a definition that is used by the U.S. EPA in adopting CAMR and now you want to question the U.S. EPA's conclusions with him. They are not a part of this record, and I think it's time to move on.

MADAM HEARING OFFICER: Mr. Zabel.

MR. ZABEL CONTINUES:

Q. Let me follow up on that, Mr. Forter. As I heard your testimony, I got two different definitions of "economically feasible." One is that the benefits exceed the costs. Is that correct?

A. That's one aspect of it, yes.

Q. That's one aspect of your definition?

A. One aspect of my definition.

Q. And the other one I got sounded like it's economically feasible if someone is compelled to do it.

A. If it's compelled -- I mean, the driver for the purchasing is usually -- it could be a compelling thing. It could also be through a voluntary type program. I would not make that part of my definition.

Q. I thought you had said if it's regulatorily required.

A. Regulatory requirement is one mechanism

for driving that purchase, but it's not the only mechanism for driving it.

Q. Is that part of your definition of "economically feasible"?

A. It would not be -- it would be having some driver. It would not necessarily be in the regulation, some market driver.

Q. What would that be?

A. It could be odor control in a local township. It could be someone -- a plant wanting to do something for general public good. It doesn't have to be a forced requirement on somebody to do that.

Q. So the fact that somebody does it for whatever reason makes its economically feasible?

A. It makes it feasible because they now are going to be in a purchasing agreement.

Q. On your table, Exhibit 46, do you know Mr. Forter, how many of these -- looks like -- 16 projects are receiving government funding?

A. I don't know that. I don't know if anyone is receiving government funding, so I don't know.

Q. You don't know whether any of them are receiving government funding?

A. Sid is pointing out that the Press Guile

(phonetic) does receive government funding.

Q. Is that name -- which one is that?

A. Number 1, Unit No. 1.

Q. Any of the others?

A. No.

Q. No?

A. According to Sid Nelson, the answer is no.

Q. Well, we can ask Mr. Nelson that question. Do you know Mr. Forter?

A. I do not know.

Q. That's what I thought your answer was, Mr. Forter. Mr. Nelson can answer for himself.

MR. BONEBRAKE CONTINUES:

Q. Just a resulted question. Of the 16 projects on Exhibit 46, do you know which, if any, of these are designed to test a particular technology?

A. To test a particular --

Q. Test the effectiveness of any particular technology?

A. This is a list that we have compiled based on vendor information, and a lot of the information for this is not available, not transparent. What you see is what we know. So the answer is I do not know if any of these are into testing.

Q. So they all may be or none of them may be?

A. From my experience, many facilities will do testing before they go into the full-scale operation.

MR. ZABEL CONTINUES:

Q. Do you mean pre-startup testing or do you mean testing of the technology?

A. Testing of different sorbents, different injection points, different ports, different flow rates. They can test their system. Again, none of these power plants were ever designed to do mercury control or any other air pollution control, in most cases.

Q. So these could be experimental projects?

A. These are purchases that are occurring, so I don't know that they are experimental. Some of these projects are state-regulatory requirements, some are from consent decrees, which are very publicly available information. In fact, you get more information than what I have on this sheet just from that, so I would have to say, just from those, these are not experimental at all.

Q. You don't think that a project done under a consent decree is experimental. I think that was a double negative. Could a project under a consent decree be experimental?

A. I have seen a consent decree that talks about testing out different configurations of technology before they go into the full-scale project, so they could do some testing, but they are aiming at a long-term operation.

Q. Of course the consent decrees you say are publicly available. Is that correct?

A. Via the Internet, I believe.

Q. Yet, we can't identify them because you haven't given us the names of the projects here.

A. The names of the projects are usually something that's only released by the customer or the vendor, but the vendor needs to get permission to do that.

Q. Not of the names on a consent decree. That's a court-entered document, which is public. If you know there's consent decree, you know publicly who the company is.

A. I don't have that information here, but it is publicly available, if you were to search for that.

MADAM HEARING OFFICER: If I may, the purpose of this exhibit is to establish that these companies or these units have bought the sorbent, correct?

MR. FORTER: That's correct.

MADAM HEARING OFFICER: Not the purpose for which the sorbent was bought?

MR. FORTER: No.

MADAM HEARING OFFICER: Or why they bought the sorbent. Do you, personally, have knowledge of why any of these units purchased the sorbent or what they doing with the sorbent?

MR. FORTER: No.

MADAM HEARING OFFICER: Ms. Bassi.

MS. BASSI CONTINUES:

Q. Going back to your definition of "commercially available," and based on your responses to the various questions to No. 9 about what is economically feasible and the questions to Exhibit 46, do experimental projects -- do purchases for experimental projects fall into your definition of "commercially available"? In other words, if someone purchased a product because they were doing some experimentation or doing some testing to see what's going to work there, does that make the product commercially available?

A. That's a gray area. We have -- like, for mercury measurement, there is a research and

development. There's testing, and there's also being offered for sale some of that equipment. It gets into a little bit of a gray area. Those vendors will go out -- so a lot of these technologies are continuously being upgraded to improve the technology. That's the nature of the engineering around air pollution control. I will -- when I talk to vendors sometimes, I will talk about whether or not they are selling for research only, and they tend to have very small sales and we're beyond research-only sales.

MR. HARRINGTON CONTINUES:

Q. Just so the record is clear, is it correct you don't know whether there were any performance guarantees included with any of these sales?

A. A performance guarantee would be information held between the customer and the vendor and not publicly available.

Q. So to your knowledge, there were no performance guarantees?

A. My understanding is that, when there is a permit in place, that the vendor is providing satisfaction to meet that permit condition. You can call that what you want, but that's what -- they will satisfy the permit conditions.

Q. Meaning you don't know, and you're not testifying today if someone guarantees this 50 percent removal or 90 percent or 10 percent. Is that correct?

A. Yeah. As an association, we do not talk about something that guarantees. That occurs between a customer and an individual vendor because vendors will use that as marketing their product.

MR. FORCADE CONTINUES:

Q. This is -- what exhibit is this, please?

MADAM HEARING OFFICER: 46.

MR. FORCADE CONTINUES:

Q. Looking at Exhibit 46 and directing your attention to Unit No. 1, can you tell me when the contract was signed?

A. No, I can't.

Q. Can you tell me when the equipment was installed?

A. No, I cannot.

Q. Can you tell me how long the equipment has been operated?

A. No, I cannot.

Q. Can you tell me whether the equipment has succeeded in achieving, at least, 90 percent reduction of mercury in all circumstances?

A. In this case, if it's part of the demonstration, then that information will be available through demonstration, but otherwise, I do not.

Q. So you have no information -- I'm going to collectively ask then for Units 2 through 16. Would your answers be the same, if you have none of that information?

A. I have not included to that information, and I do not have access to that information.

Q. So in essence, this is just a list of sold technologies?

MADAM HEARING OFFICER: I believe he answered that question when I asked it earlier.

MR. ZABEL CONTINUES:

Q. Just for clarity, and I understand you said the gray areas, but you've used it seems to me four different terms, research and development, testing, sale, and now demonstration. Can you define those for me, as gray as they may be?

A. Well, it's a continuum. In fact, you look at the programs like environmental technology, verification program with the EPA. It will often take commercially available technologies and go through a whole testing to show how that technology actually

performs, so it can help get into the market. As the Department of Energy would call "The Valley of Death" when you have something commercially available and no buyers, so it is a continuum, and to try to put cut points on any one of these things, I think is just -- we would be here all day trying to define those cut points because we would all have different opinions.

Q. So it is possible that RND project there may be a demonstration that involves testing of a sorbent or technology?

A. In the RND project, that's true.

Q. And somebody in that RND project which involves testing for a demonstration of a technology could have paid somebody for the material?

A. They could have paid for that material.

Q. Thank you.

CROSS EXAMINATION BY DR. GIRARD:

Q. Mr. Forter, I have a question, in fact, a couple questions coming out of a sentence in your testimony. Do you have your testimony there in front of you?

A. I do.

Q. If you look at the first page I'm looking at the second paragraph, which comes under the

subheading "Commercially Available Technology." I'm at the first sentence, "Despite the lack of a strong national mercury requirement for coal-fired utilities, a number of mercury-controlled technology options are commercially available while other options are still in development and testing phases and their deployment can benefit from regulatory certainty." First, what would you consider a "strong national mercury requirement"?

A. A strong national mercury requirement would be something that pairs the required outcome, which is a health benefit issue, with the technology's capabilities, and in this case, for mercury, we have a wide range of different technologies everywhere, from something that is sort of do nothing co-benefit kind of approach all the way to very specific mercury control technologies. It's a pairing of those two together. We believe, as an association, that when EPA put out its rule it did not fully use the control technologies that are available. In fact, in many cases, it looks just at the co-benefit approach, which is, if you're going to be putting on an SCR, selective catalytic reduction, followed by an MGA (phonetic), you are going to get a certain level of control, and that's good enough because that comes out of the CAIR program. In CAMR, kind of

just follows along, at least, in the first phase of that, and it's not until later in the phase when you start getting into some more mercury-specific control technologies that are currently available that the federal program put in place, so the definition is to use the available control technologies well. I mean, that's my definition.

Q. So basically, what you're saying is the federal program, which has been proposed as a cap and trade, you say is not as strong as, say, a program where they come out and say everybody has to have a 90 percent reduction in mercury emissions?

A. Those would be probably two different ends of the spectrum on these kind of things. The 90 percent part of my testimony is using flexibility in there, too, to allow different configuration, different goals to achieve different levels of control. But the -- there's no mistake that we do not agree with EPA's program at all. We feel that it seriously does not use the technologies that are currently available.

Q. My second question goes to the last phrase there in that sentence where you say, "Their deployment can benefit from regulatory certainty," and so what do you mean by that?

A. There are market drivers out there and regulatory certainty is, obviously, one of those. It provides an opportunity for competition within the vendor community to improve upon the technologies that they currently have for sale and to introduce other technologies out there for sale, so the regulatory certainty is the driver, and it allows for a free market commercial innovation to occur within that market. We were already seeing that as soon as even the federal rule came out even being despite it being weak, we see that as a driver, and it does provide lots of opportunities for different vendors to come in, and we have lots of different technologies that are being looked at, researched, and development within different companies going through demonstration along those lines. Does that answer your question?

Q. Yes.

MR. ZABEL CONTINUES:

Q. I'm sorry. Mr. Forter, in the answer to Dr. Girard's question, is it your view that there are no health benefits from the CAMR rule with respect to mercury?

A. No. The CAMR rule, as it tracks CAIR, there's a tremendous amount of benefits that occur

there.

Q. For mercury?

A. Well, because you are using co-benefits control, primarily, that produces mercury reductions in the first phase.

Q. And therefore, those dollars do yield public health benefits, do they not?

A. Those do. In getting back to the cost issue, the question is does CAMR produce another cost on top of CAIR. If you are already doing it for CAIR, then the costs associated to CAMR may be zero.

Q. But it still yields health benefits with respect to mercury?

A. In many of the pollutant control programs, we have -- you will see cross benefits from different pollutants out there.

Q. Is your answer yes?

A. The answer does CAIR produce health benefits?

Q. For mercury control.

A. Yes.

MADAM HEARING OFFICER: Ready for question 10 I believe.

MR. FORTER: "On page one of your

testimony, you state that there are a suite of options available to cost effectively control mercury emissions from power plants of different configurations and coal types. List all the different options and explain how each one works." I will just state right up front that we have a lots of options on our website. There are -- EPA has documented lots of the different control options. It would be -- would not be possible to list all the different options there. There are a number of different things that are even being done that Sid probably knows about, but I don't, different configurations of sorbents that are being looked at, some amending coals that I don't know about, so there's a lot out there that's going on. The purpose of my statement was that there is a range anywhere from co-benefits, which is your SCRfD combination, all the way to your mercury-specific types of controls and everything in-between. I'm assuming that a purchaser will look at all the different options that are out there.

"What are the costs associated with each of those options?" Those costs vary. As I mentioned, with the co-benefits control, if you assign the cost back to CAIR, the costs are zero. When we get

into some of the mercury-specific controls, it depends on what level of effectiveness you are trying to achieve and someone like Sid Nelson, or any of the particular vendors, would know more about what that cost might be for any particular plant configuration and coal type. We, as an association, do not go out there and put a mark on what the cost would be for any particular control.

MADAM HEARING OFFICER: C.

MR. FORTER: "Which of these options have been demonstrated to obtain the level of control currently called for in the IEPA's proposed mercury control regulations 100 percent of the time under all operating conditions of the facility of the size and the type of the Kinkade facility?" I'm not familiar with the Kinkade facility, so I can't -- as an association, I do not go into that level in depth -- some individual companies may and maybe they can give you that kind of information. But some of the questions here about 100 percent of the time availability, coal-fired power plants aren't available 100 percent of the time. Turbines are not available 100 percent of the time. Or power it doesn't come from any one particular source 100 percent of the time, so absolutes like that just don't

work in the real world for almost anything. "All operating conditions" assumes that a lot. If I were to drive a car under all operating conditions, and then try to assign the responsibility back to the manufacturer is just not a feasible thing to do, so there's usually -- when these contracts are developed, the operating conditions are discussed between the customer and the vendor to optimize power output and for control effectiveness, and again, with the Kinkade facility, I'm just not familiar with it.

MS. BASSI CONTINUES: May I ask a question on this one first, please. This is kind of a general gripe I guess. We are required to prefile questions, so that the Agency's witnesses, the Agency and its witnesses could be prepared to answer the questions that are presented. If Mr. Forter, as an example, is not familiar with the Kinkade facility, it seems to me that part of the responsibility of the Agency and the witness was to become familiar and to be able to answer the question. And I'm sorry, maybe this is my schoolteachering (sic), but I thought that was part of the purpose.

MR. KIM: The questions I believe were intended to follow up on the testimony provided by the

witnesses. I don't think anything in Mr. Forter's testimony or in his prefiled testimony or in his statements today indicates that he would have the background or the reason to delve into the specificity of the questions here, so in other words, just because a question is asked, regardless of whether or not it goes beyond what the witness has clearly provided us the scope of his knowledge doesn't mean that that witness also has to start honing up on information that he's never looked at before just to provide an answer. he's answered to the best of his ability, and if conclusions want to be drawn to that as to whether this witness should be taken to go to that extent as far as his reach, then that's fine, but I don't see that that's -- I don't understand how "I don't know" or "That's not my expertise" is an invalid answer.

MADAM HEARING OFFICER: Because I agree with you. I disagree with you, Mr. Kim. He should have been given the information on Kinkade to answer this question. If the Agency had a problem with this question -- these questions were prefiled in enough advance of time that the Agency could easily -- heavens knows we have seen plenty of paper in this proceeding -- could have filed objections in this case. I don't

disagree with what Ms. Bassi is saying, and I think part of this is some of the frustration we talked about the other day that we also you have the prefiled questions, and yet, we are still reading questions and saying, "Well, I can't answer that." Then you need to bring us who can. It is your job, as the proponent, to support your rule.

MR. KIM: Having said that, my follow-up to Ms. Bassi's response is, however, even if he had been provided with the specifics of the Kinkade facility, I believe, in his answer, he just stated, regardless of the facility type, it's impossible to make that statement that a 100 percent guarantee could be provided for anything. He gave an example of how it could be. He did answer the question that you can't make an absolute 100 percent guarantee for anything, regardless -- even if he had all of the Kinkade specifics in front of him.

MADAM HEARING OFFICER: But as an attorney, you, yourself, know and I suspect that what Mr. Forcade's follow-up is granted it doesn't operate 100 percent of the time, but 100 percent of the time it's operating. Let's be realistic. He literally answered the question, but he was asked, specifically,

about Kinkade and now we are in the position where Kinkade has asked the question and it's my understanding and I have gleaned this from this proceeding that Kinkade is sort of a unique operation or has some unique operations as was talked about the TTBS yesterday. Kinkade's not even eligible for the TTBS because of the way it runs. Do I remember that correctly?

MR. FORCADE: Yes.

MADAM HEARING OFFICER: So they are trying to get at whether or not sorbents are commercially available and economically feasible for their facility and one of your witnesses about the availability of sorbents isn't familiar with Kinkade. All that being said and all that chastising going on, there's not much we can do about it right now so.

MR. KIM: I would say this, Mr. Nelson has indicated he will be able to answer that question. If you want, he can answer that now, but again, I would still say the question asks which of these options has been demonstrated to maintain a level of control currently called for in the regulations 100 percent of the time, under all operating conditions, at a facility of the size and type of the Kinkade facility, and I believe Mr. Forter's answer is, "I'm not specific with

Kinkade. However, regardless of that" -- so I think his answer -- I think his answer is -- and we can have it read back -- he doesn't think you can guarantee 100 percent.

MADAM HEARING OFFICER: I understand his answer, but like I said, you understand what the next question probably is. Again, all that being said, and I can only say that now I wish you had them better prepared, but we can't do anything about that now. We need to continue on.

MR. AYERS: Mr. Nelson is prepared to answer the question.

MR. KIM: That's why he's here as a panel. We, specifically, have them here.

MADAM HEARING OFFICER: Now I'm now confused because it was my understanding that we were going to go to Mr. Nelson, and I, specifically, had Mr. Forcade hold the identical questions.

MR. KIM: That's fine. I'm just saying, if the question needs to be answered right now, we've always indicated that no one witness is going to be able to answer every single question, and that's just because of the breath of the subject matter.

MADAM HEARING OFFICER: We will let

Mr. Nelson answer this question now and we'll let Mr. Forcade follow up with Mr. Forter and Mr. Nelson on this question.

DR. GIRARD: We are going to be here a couple weeks if we keep going back and forth like this. If a witness doesn't know the answer, there's nothing wrong with saying, "I don't know." If we say that, we move on to the next question, and then we'll go to Mr. Nelson. If a witness takes an "I don't know" and turns it into two paragraphs, then we are going to have six follow-ups.

MR. KIM: Yes.

DR. GIRARD: Don't be afraid to say, "I don't know."

MR. KIM: I would agree with that wholeheartedly.

MR. FORTER: I don't know.

MADAM HEARING OFFICER: Mr. Nelson, if you would answer the question and Mr. Forcade, you can address the follow ups to Mr. Nelson.

MR. NELSON: Specifically, what is the question on Kinkade? "Which of these options has been demonstrated to obtain the level of control currently called for in the IEPA's proposed mercury control

regulations 100 percent or the time, under all operating conditions of the facility of the size an type of the Kinkade facility? Again, when we get to demonstration -- nothing has been demonstrated 100 percent of the time, particularly because we don't have any regulations. There currently is not -- even though we have a lot of different mercury control technologies out there, there isn't a single power plant in the United States that is intentionally getting mercury out on a day-to-day basis, so nothing is going to be claimed to be 100 percent of the time. We haven't necessarily ran into 100 percent of the conditions. However, Kinkade is actually a configuration of type that is pretty easy for mercury control. It burns, essentially, 100 percent PRB coal. It has SCR. Halogenated sorbents have been demonstrated at many plants with very similar configuration coal types to Kinkade and demonstrated over 90 percent of removal, but even then, it doesn't necessarily get it 100 percent of the time. It may get 90 percent some hours. It may get 85 percent some hours, but overall you can reach a high level of control, particularly in the sense that you can always inject more sorbent and get more mercury out, so that one particular technology has been demonstrated to be

very good. Particularly if it's combined with some kind of flew gas scrubbing, which is a technology that's commercially available. It would certainly be more expensive, but certainly, the technologies are out there. It's technologically doable.

MR. FORCADE CONTINUES:

Q. Could you tell me which facility in the United States has had the sorbent technology utilized the longest period of time for power plant mercury removal?

A. Our particular products have been demonstrated at two plants very similar to this, and we can get into this in my testimony, St. Clair and Stanton one. There's a competitor's product that's very similar to ours that has been demonstrated at Meramec in Missouri and some others that, again, are very similar.

Q. The question is how long --

A. In each of those, the Department of Energy required a one-month trial.

Q. Are you aware of any trials or any operational activities with carbon absorption that has been demonstrated for a period longer than 30 days?

A. Yes. The Gaston plant, Gaston of Southern Company had, basically, a one-year continuous trial, but

that plant is different than Kinkade. It burns bituminous coal as a hot side ESP.

Q. Sticking then with then the cold side ESP Kinkade type plants, would it be correct to say there were three that you identified?

A. At least, three. There's some others I'm not aware of or some others that are slightly different than that plant.

Q. Were there any documents prepared as a result of these -- I'm sorry, trial runs? Test runs? What would you call them?

A. We call them trials, one-month trials. They are full scale. The plant is supposed to operate the way it usually does. It doesn't make any consideration for the tests. This is the structure of the Department of Energy program that each of those three trials was part of.

Q. For each of those trials, was there any document prepared that would be a report that would show the configuration of the facility, the size of the various pieces of equipment?

A. Yes.

Q. The type of carbon absorption, the amount of removal from all the tests?

A. Yes. That's part of it. There's one available on the Department of Energy website I know for St. Clair and Meramec. Those final reports, or at least, topic or reports are available. The one at Stanton One is not yet available because that was done last fall.

Q. Would it be possible for you to produce those reports, so that we could review them?

A. Certainly.

Q. Am I correct now we have just the three for the cold side ESP plants with sub-bituminous that you know of?

A. There are others that include that's the lowest cost of course. If you include spray dryers or fabric filters, then there's few more plants. There's the Holcum plant. There's ADA that had an ESP, as opposed to a fabric filter, but had a spray dryer, which is actually a more difficult situation called Laramy River. When we get into my testimony I can go over these 30 demonstrations.

Q. Do it later?

MADAM HEARING OFFICER: Yeah. Let's move on with Mr. Forter.

MADAM HEARING OFFICER: Question No.

11.

MR. FORTER: "Again, on page one, you list certain existing control insulation such as fabric filters and electrostatic precipitators as achieving high levels of mercury reductions. The question are those high levels of mercury reductions sufficient to meet the level of control currently called for in the IEPA's proposed mercury control regulations 100 percent of the time, under all operating conditions, at every one of Illinois facilities that would be subject to those regulations?" I don't know.

MR. HARRINGTON CONTINUES:

Q. In the second sentence on the last paragraph on page one you list the various control technologies and say, "They are currently achieving high levels of control." Do you know what levels of control fabric filters by themselves, without activated carbon injections, achieve?

A. EPA -- a lot of this information came from the 1999 ICCR data where EPA looked at configurations of plants and what they were achieving, and that document, that information that was part of the stakeholder process part of the rulemaking and everything else. I do not know -- I don't recall what the fabric filter was

getting without anything in front of it because you are talking about some sort of oxidation characteristics or some other things that might be effecting its capture.

Q. I would like to just have these questions answered for the record by Mr. Forter, if I could. Is the fabric filters -- you don't know. Is your answer the same as to electrostatic precipitators?

A. I'm sorry?

Q. Is your answer the same, that you do not know what removal of mercury would be achieved by electrostatic precipitators by themselves?

A. Again, that's part of the EPA record?

Q. You don't personally know?

A. No.

MADAM HEARING OFFICER: U.S. EPA record.

MR. HARRINGTON CONTINUES:

Q. For the two scrubbers is your answer the same?

A. SO2 scrubber depends on if it also has oxidation occurring in front of it, like an SCR, SO2. When that occurs, then you are at 90-plus percent reduction.

Q. Is that bituminous coal only?

A. The different coals will have different characteristics, but that's one of the real workhorses in getting co-benefits.

Q. But SO2 scrubbers with selected catalytic reduction do not achieve 90 percent removal on mercury for sub-bituminous coal, do they?

A. I don't know that configuration. I don't know.

Q. You say "and others." What others does that refer to? Third line of the last paragraph, last two words.

A. Could you read the whole paragraph, the whole?

Q. "Based on recent demonstrations, results significant amount of mercury and the sentence, "existing control installation, such as fabric filters, electrostatic precipitators, SO2 scrubbers, selective catalytic reduction, and others, are currently achieving high levels of mercury reductions." And the question I'm asking is -- gone through the first of those, and I'm asking what "and others" is for purposes of the record, so it's clear?

A. There are other technologies that are being looked at with oxidizing catalysts put into the

stream. It depends on the coal and the coal configuration as to what else could be used. Amended silicants and so forth.

Q. Are those others and I assume, obviously, we have already talked about activated carbon injection, and I will assume that's not one of these, but is there something other than those that are listed here activated carbon injection that are currently achieving high levels of mercury reductions?

A. In some of the manufacturers' testing, there's been use of amended silicants. There's been amended coals. Those are others that do work in this. There's also a catalyst produced by a company with a guaranteed oxidation rate, so that would be one of the others.

Q. Now, they are currently achieving high levels?

A. Depends on the configuration that they are going to be in, but the answer would be, generally, yes.

MR. ZABEL CONTINUES:

Q. Just a very brief question. When you refer to S02 scrubbers, are you referring to, both, wet and dry?

A. To both. It's been the wet scrubber

that's been most commonly associated with the oxidizing catalyst before.

MADAM HEARING OFFICER: 11-B.

MR. FORTER: "Do you know if these high levels of mercury reductions are sufficient to meet the level of control called for in the federal CAMR 100 percent of the time, under all operating conditions, at every one of the Illinois facilities that will be subject to these regulations?" I do not know, to meet all these things. Again, a lot of qualifications in there.

MADAM HEARING OFFICER: So C is then, since you can't answer A or B, C is -- because I assume that's 11-A-B-C. Then question 12.

MR. FORTER: "Please explain your statement on page one of your testimony with the implementation of mercury regulatory requirements beyond incidental co-benefits level of control and number of options for optimizing existing controls will be implemented to provide cost effective reductions." It's the basic thing we have talked about before, which is when you have a market driver out there, in this case, it being something a regulatory program that goes beyond a market driver already established in CAIR, then you

create a new market, new tunnels, new innovation, and obviously, vendors respond to that.

MR. FORCADE CONTINUES:

Q. Would I be correct then you are talking about changes in the vendors and in the marketplace, as opposed to changes that would be made at the facility, itself?

A. The change -- what they would do is they would respond to the different requirements of a facility, so different coal, different configuration different operating parameters. They will respond to those kinds of changes. But it's primarily dealing with the advancements in the technologies finding halogenated activated carbon when you didn't have it before because you're responding to a new opportunity, new driver.

MADAM HEARING OFFICER: As Dr. Girard has just pointed out to me, Questions 13, 14 both deals, specifically, with Kinkade generation.

MR. FORTER: I will make a point, just from an association, we would not go on a specific plant and make that kind of recommendation. You are -- it's requesting some sort of engineering level analysis that might occur. We would not be doing that as an association. I represent 90 different member companies

and to get a consensus on what a Kinkade-like facility might look like is probably a monumental task.

MADAM HEARING OFFICER: I guess my point being, if the answer is "I don't know," there's not much point in even reading the questions, if you don't know the answers.

MR. FORCADE: Just reflect that he's answering "I don't know" to the following questions.

MADAM HEARING OFFICER: 13 and 14.

MR. FORTER: 13 and 14 are both Kinkade, yeah.

MR. FORCADE CONTINUES:

Q. Are there facilities, other facilities in Illinois where you would be able to answer a question of this type or is it no to all facilities in Illinois?

A. As an association, again, because we would not go in because we -- basically, what you are looking at is saying the association knows this kind of level of control or everything that happens at this facility. That's not going to occur. That kind of discussion would occur between a customer and an individual vendor, not within the association making that kind of a requirement. What we can do is talk about the different things from an experience list what has actually

occurred, what kind of sales have actually occurred, what kind of demonstrations have actually occurred, but we can't go into that level of analysis, so the answer would be any other facility like that, same response.

MADAM HEARING OFFICER: Question 15.

MR. FORTER: What is the basis for your statement `Multicontrol approaches, as well as other mercury-specific technologies provide low cost, innovative approaches toward mercury control`"? That is based primarily on the fact that activated carbon injection was looked at and it was much more cost effective than some of the other co-benefits control. If you were -- did not have a requirement for NOx and S02, beyond acid rain or something else, putting on a scrubber, that would cost you tens of millions of dollars, a very expensive proposition. Putting on an activated carbon injection system, which costs about a million dollars, is much more cost effective to do, so there are other approaches to deal with this, but it really depends on your regulatory frame work how, much a customer might be relying on taxes, credits, allowances, things like that, to make these kinds of decisions, but the other technologies are low cost because we know what the cost is of combining an SCR with an FGD.

Q. I'm having some confusion here where we continue to use the phrase "low cost," but when asked about costs, we can't get answers to the question because you don't know. Can you define "low cost"?

A. We're talking about ranges of costs here, so the ranges of cost for an SCR is something about 50 million dollars to put in place. To put on an FGG (phonetic) it's somewhere around 100 million dollars, so that's usually my upper bound of that cost. Anything that's going to cost less than that would be a low cost. When we're down to the margins of one million dollars for capital costs, I would say that's very low cost.

MADAM HEARING OFFICER: 15-A.

MR. FORTER: "What, specifically, are the multipollution control approaches and other mercury specific technologies to which you refer to in this statement?" Again, this is a range of different technologies that are out there. It difficult to characterize because there are so many innovations that are occurring, and I mentioned a few of those, the amendments to coal that some companies are putting out there that help to get mercury reductions. I mentioned there's another company that actually has oxidation catalyst, which puts guarantees on the catalyst, so

there is a whole suite of different types of controls that are out there to be used. There are also amended silicants, which are being used, and almost monthly you will see another press announcement of somebody else who has got another control for mercury.

MADAM HEARING OFFICER: I think we have answered B and C because I think you actually had the follow-up on asking him to define low cost, but go ahead.

MR. FORCADE CONTINUES:

Q. The same question I posed somewhat earlier. I'm not sure what page of Mr. Nelson's testimony. Can you provide us any additional examples of situations where carbon injection has been utilized beyond those provided by Mr. Nelson, and if so, are there any reports identifying the nature of the unit, the types of controls, effectiveness of the controls and how long the test was run.

A. The DOE demonstration projects are probably the Bible of the controlled technologies that have been used that demonstrate. At each of those demonstrations, there's a cost involved in that, and there's usually a report that comes out of that, so that is the best documented demonstration that occurs. My

understanding is that some companies will also do RND, some companies set up RND research facilities, and I don't know what its intention is in developing documents that will be put out there. My guess is that RND is mostly -- the beneficiary of that is going to be southern companies, not other companies.

Q. Again, going to the idea that if you are identifying other active programs, research activities that demonstrate the effectiveness over time of activated carbon absorption, are there reports you can submit into the record that we can look at?

A. The reports would be the same as the ones Sid Nelson was talking about.

Q. So you have no reports, other than those --

A. No. Those are the only documentation that I'm aware of. Individual vendors that have been involved in those programs may put out information on that, but my understanding is that that's all been through an agreement set up like that.

Q. We are going to get the information from Mr. Nelson?

MR. KIM: Yes. We will work to get that.

MADAM HEARING OFFICER: Question No. 16.

MR. FORTER: "Do you believe that regulatory programs with flexibility have value for the regulators to regulate community and the public?" I have, in our comments, we actually talk about flexibility, and as an association, we agree that having flexibility allows for innovation within the market, other controls to be used in different places. I come from a background of public policy in using cap-and-trade programs for NOx control, so I, personally, believe, and our association believes, in flexibility. What I don't believe in is putting flexibility in front of caps because it's always called a cap-and-trade kind of program, so what you want to do is assign a certain level of reduction that you need to achieve and then provide the flexibility, so the companies that might need that to find innovative and low cost mechanisms to achieve those caps. I could go on about different types of trading things, but I'm not going to, but some level of flexibility, but it is not an absolute and definitely should not be in front of caps.

MR. HARRINGTON CONTINUES:

Q. Do you think that some form of cap-and-trade program for mercury regulation would be appropriate?

A. The cap and trade -- flexibility does not have to only be a cap-and-trade program. I believe that a cap-and-trade program could be one mechanism for flexibility. It's not necessarily my preferred mechanism in dealing with an air toxicant.

Q. Have you reviewed the proposed Illinois regulation?

A. I have.

Q. Do they provide the level of flexibility you would normally look for?

A. In its proposal, it has -- there's quite a bit of flexibility in the first phase, and it has a lot of components. We have seen a lot of different states and lots of types of flexibility. The level of use of those mechanisms varies quite a bit.

MR. BONEBRAKE CONTINUES:

Q. Has your association taken a public position with respect to whether it does or does not endorse CAMR?

A. No, we have not.

MR. ZABEL CONTINUES:

Q. Maybe I didn't hear you right. Did you use "level of abuse" in your answer to an earlier question?

A. I don't recall, if I did. Maybe I misspoke, "level of use" maybe.

Q. Use.

MADAM HEARING OFFICER: Question No. 17.

MR. FORTER: "Do you agree that regulatory programs with flexibility are economically efficient?" This is asking for a comparison I would guess. We have found, from experience, that the economics work better when you have some level of flexibility involved. It allows the customer and the vendor to find technologies that can be done at a lower cost and are more effective. It's economically efficient. I would say, in general, we see some efficiencies that occur there. Caveating that with the cap is the driving mechanism of flexibility is there for those who need it to make some economic choices, and to find the technologies that fit their particular situation.

MADAM HEARING OFFICER: Question No. 18.

MR. FORTER: "Do you agree that low cost, reliable electricity is essential in our economy?" We have made public statements about coal. We believe that coal is a mainstay in our society and will remain so for many years. It's reliable. It's abundant, low cost, and it can be made clean and probably our biggest issue with the CAMR rule would be that it doesn't make coal clean in respects to mercury reductions, so again, this is not an absolute -- low cost, reliable electricity should not be an absolute for our society, but is one of the mechanisms, one of the things we need in society.

MADAM HEARING OFFICER: Question No. 19.

MR. FORTER: "Do you believe that the proposed mercury control regulations to be cost effective, and please explain?" And I'm assuming that the reference is to the IEPA rule and that -- I guess I don't really know, on a larger scope, of how this actually pans out. There is some flexibility in there. This is a proposed rule. It really -- it will determine -- when a final rule is in place, the vendors will then respond, and that's where you are going to find your most cost-effective solutions starting to really emerge

because then it will be looking at plant specific configurations, coal types and issues as you start to go through the engineering and architectural engineering analysis for those facilities. Historically, when we looked at selective catalytic reduction for NOx control, not every plant that was being looked at needed to -- had to go through an architectural and engineering analysis, and as it turns out, it was extremely cost effective on NOx reductions, probably even more so on the reliance on allowances these days, but really, it's going to depend on what the final rule looks like, and how it's going to play out, but typically, you will find the cost is reduced after the rule is put in place because you have the competition between technologies and technology vendors.

CROSS EXAMINATION BY MS. BUGEL:

Q. I have one follow-up on some earlier questions about commercial availability. Mercury specific controls, not co-benefits, but mercury specific controls, are they passed the RND phase."

A. There are mercury specific controls that are out there that are passed the RND phase. I would say, with any technology, any air pollution control technology, there are's going to be continuing RND. We

have that occurring in every aspect of air pollution control I can possibly think of. For instance, for particulates, electrostatic precipitators, there's continuing RND on electrostatic precipitators, how to make them clean, how to apply them to new generation, but activated carbon injection, now that it's being sold -- and it's about a million dollars of capital cost for the activated carbon injection systems -- I would say that's passed the RND phase. Sid and others would be wise to continue down the RND path to find lower cost solutions.

Q. Do you believe some combination of co-benefit technology, mercury-specific controls, including ACI, is available to meet the goals of the Illinois proposed rule?

A. Yes.

MADAM HEARING OFFICER: Question No. 20.

MR. HARRINGTON: Could I have that read back to me?

(At which point, the prior question was read by the court reporter.)

MR. HARRINGTON CONTINUES:

Q. For clarification, do you believe that

such technology is available to meet the limits in the Illinois rule by the dates stated in the Illinois rule or do you have an opinion on that subject?

A. I would say, because I'm not familiar with all the facilities and how they would be configured, I do not have an opinion on it.

MR. ZABEL CONTINUES:

Q. In the question that Ms. Bugel asked previously co-benefit technology with ACI, in your answer, what did you assume she meant by "co-benefit technology."

MS. BUGEL: I'm sorry. I don't think that was my question, if it could be read back.

MR. ZABEL: Surely.

(At which point, the prior question was read by the court reporter.)

MR. ZABEL CONTINUES:

Q. In answering the question, what did you assume she meant by "co-benefit technology"?

A. I was assuming it was some of the technologies that could be used to do oxidation in the systems where it's needed, that if there are an FDG system, wet or dry FDG system that would be operating the fabric filter and electrostatic precipitator is

acting, in some way, of a co-benefit approach. All these technologies are integrated to deal with a number of different pollutants, and obviously, mercury is a pollutant de jour for this hearing, but they are integrated to deal with the whole suite of different pollutants.

Q. Is it your view that ACA alone would be sufficient to do that?

A. To do what?

Q. I think her question was to meet the requirements of the proposed rule, but I can have it read back.

MR. HARRINGTON: Goals of the proposed rule.

MR. FORTER: Yeah. Not just because we do activated carbon injection is being used in different configurations itself. There are two different technologies here, the Toxicon I and Toxicon II, and apparently, there's a Toxicon 1.5 or 3 out there now, so they do not, in any case, rely just on activated carbon injection.

MR. ZABEL CONTINUES:

Q. But my question is just ACI. There are units in the state that have none of those other

technologies currently on. Is it your view that all of those units with just ACI could meet the goals of the proposed regulation?

A. The goal is 90 percent?

Q. Yes, sir, or .08.

A. I really don't know.

MADAM HEARING OFFICER: Question No. 20.

MR. FORTER: "In your testimony, you list the creation of jobs as a benefit of the proposed mercury control regulations. Who would pay for these jobs?" In our industry, the payment of the jobs is -- it's like building something on your house. I end up paying for it, but I think, in society, we end up -- everybody pays for these kinds of jobs. It's, obviously, a benefit, and I don't look at it as a negative in who pays for the jobs. Job creation is a good thing in this country. These are technologies that require often times, depending on the different technologies, some other skilled laborers, including electricians and craftsmen and stuff like that, so who pays? I think if it's done through a rate-pay system. If not, then the power plant, who is in business of creating power costs, pays for it, but I think it's the

installation cost will actually pay for it.

MR. FORCADE CONTINUES:

Q. Would you anticipate any circumstance in which the expenditure for the control devices and operating expenses of ACI would result in a need by a company to reduce employment in other areas?

A. I cannot foresee that, but I don't know.

MADAM HEARING OFFICER: Anything else for Mr. Forter? Thank you very much, Mr. Forter.

MR. KIM: Thank you very much for allowing us to put him up first.

MR. HARRINGTON: This is not for the witness. This is a question of procedure, really two questions. Number one, is it my understanding that the goal is to get through the economic modeling today, and then get to the technology with Dr. Staudt tomorrow?

MR. KIM: Working backwards from our hoped end date of Friday and taking into account that everyone's appetizing up to the main course of Dr. Staudt, we are trying to leave as much time for him, so we would be able to have, at least, two full days for Dr. Staudt. That's why maybe we're being a little aggressive, is our way, but we're hoping to get through these three witnesses today.

MR. HARRINGTON: In terms of trying to meet the schedule, if we can meet it -- and that's not my problem. The question I raised both with the Agency and with the Board is my understanding all economic modeling rests on the technology testimony and conclusions of Dr. Staudt. Reversing those two means that, if Dr. Staudt changes conclusions as we go through these plants as to what the economics are and what the technology is then, the modeling testimony is going to be left up in the air. If the Agency wants to proceed that way, I guess that's between them and the Board, but I think we should be aware of the fact that there is a real danger that things will be out of whack. I don't need an answer right now.

MR. KIM: I understand what you're saying, and that certainly makes a lot of sense. To be honest with you, I think a big part of our suggestion is more, again, logistics. I, honestly, haven't asked Dr. Staudt about his availability for next week. I haven't wanted to think about it. I know Dr. Hausman is not available next week and I know Dr. Hausman has about, at least, on paper, about a seventh of the number of questions that Dr. Staudt has, so that was, again, I was just thinking more from a logistical standpoint that

somebody that has fewer questions and I know he's not available next week, and someone who has a lot more questions. That was a big part of it. What you're saying makes sense, and if I knew somehow that we were going to get through everybody by Friday, I would have no problem with --

MR. ZABEL: Just to add a fact to that analysis, yes, there are a great deal fewer questions filed for Dr. Hausman, but that was because he was relying on Dr. Staudt and it was changing so fast, and we simply didn't file the questions. I have a great many question for Dr. Hausman, but I didn't file them because I didn't know where that was going to land.

MR. KIM: I'm assuming that there's going to be a lot more than on paper for Dr. Hausman, but I'm assuming there's a lot more for Dr. Staudt, and I Dr. Staudt has some 150, 160 questions and Dr. Hausman I think has 20, so that was part of tit. We will do what the Board asks, and we'll accommodate and roll with the punches as best we can.

MADAM HEARING OFFICER: We will take a break and we'll come back. Before we take the break though I just want to let everyone know for those of you who, like me, think mercury is the be all and end all of

our existence right now, the board has a special board meeting for 12:15 tomorrow, so the board members will have to be at a video conference, so we will take a break around noon tomorrow and it will be until like 1:30. I felt that was probably the best way to work it in with these hearings, but the board does need to hold a special meeting tomorrow. With that, let's take a 10-minute break.

(A 10-minute break was taken.)

MADAM HEARING OFFICER: Before break, we were discussing and Mr. Harrington and Mr. Zabel both brought up the point about the Agency's participated order, and the Agency indicated would do what the board preferred. As I indicated to Mr. Kim off the record yesterday, I, personally, would have liked to see Dr. Staudt way earlier. That was just my personal preference, but in talking, we feel that Dr. Staudt will have some impact on the economics, and I agree with the points made by Mr. Zabel and Mr. Harrington that Dr. Hausman's testimony is, if it's not technically feasible, it's not economically reasonable and vice versa, so I think we need to hear the technical testimony next, so it would be my goal to finish with Mr. Nelson before we finish for lunch and zoom through

these questions and get there, but I do want to take this opportunity -- I do appreciate that we are all working towards the goal of leaving Springfield on Friday, and I appreciate that, so that would be our choice. We will go with Mr. Nelson and Dr. Staudt.

MR. ZABEL: Just so the record is clear because this has been hinted at a number of times and this may help for Dr. Hausman, in a way, we have always read your order of May 4 as saying that, if we don't conclude Friday the proponents' case, that they will continue on August 14, not next week. The order specifically, said, in the unlikely event that any person -- that includes the Agency -- to prefile testimony for the June 12 hearing cannot testify because time does not allow, that person will testify at the beginning of the August 14 hearing. We have prepared, both, availability of our lawyers and our experts who are observing these hearings for that eventuality, but not for one that goes next week.

MADAM HEARING OFFICER: I understand that that would be an interpretation of my Hearing Officer Order. However, the intent behind that when I drafted it was that, if someone other than the Agency prefiled testimony, I do not see any benefit, if I may,

of holding off, until two weeks in August, to continue with the Agency when the two weeks in August is, specifically, set aside for the people who don't agree with the Agency's proposal, and that was the intent of that hearing, and I think that was emphasized in the prehearing conferences we held. Because how can you possible be ready to respond to Agency testimony that has not had a chance to cross-examine on in that August hearing?

MR. ZABEL: That's exactly the issue we raised in our motion to be ruled on by the Board. We have forewarned the Board of that risk, and we have to take it because you continue the Agency's presentation into August, and have ours follow immediately after it, that would be a basis we'll raise on the record as an objection, and we'll continue and we will go forward with that objection on the record.

MADAM HEARING OFFICER: I understand that. As I indicated after the Board ruled that they were not going to give direction at the hearing officer at this time. We will discuss that as we reach Friday if. Let me just tell you that my -- if we don't start again on Monday, if the Agency is not done, I am disinclined to wait until August to continue with the

Agency. That's for a variety of reasons. I do think that you all deserve your day, and as far as prefiling, and things like that, if, for some reason, we don't finish tomorrow -- Friday, if we do not finish on Friday, obviously, one of the things that we would certainly discuss is even the requirement of having you prefile testimony. That may be something that we do not do. That you are required to prefile testimony because you won't be able to get that to either the Agency or the Board in any realistic fashion.

MR. ZABEL: Let me say, I didn't want to wait until five o'clock on Friday to raise this issue. I wanted to make clear what my client's position is on this. We have tried to accommodate timing, and if Dr. Hausman is unavailable next week and that's the sequence we go in, and you believed another hearing sometime between now and August were appropriate, we are certainly open to that consideration. I just wanted to today, Wednesday afternoon, not Friday evening, to make our position clear, so you could have it under consideration.

MR. KIM: Obviously, you just stated that if we do go past Friday, one of the options you would look into would be relieving them of the

responsibility of submitting prefiled testimony, obviously, if that was going to happen, we would want to take that up with some discussion, as well, because that would put us at a disadvantage, and we don't control, at this point, the pace of the questions.

MADAM HEARING OFFICER: I would disagree with that. I would disagree, to some extent, you do control the pace of answering the questions.

MR. KIM: Answering, yes, but the number of questions, no.

MADAM HEARING OFFICER: We could debate that, but we won't at this point. I think this is premature. I still believe that there's a very real possibility that we could be done by Friday. So with that, Mr. Harrington.

MR. HARRINGTON: Second matter. Earlier we identified Exhibit 31, the response to significant public comments received in the response to the revision of the December, 2001, regulatory finding of emission hazards, air pollutants, basically, responds to the comment document and said we would provide copies for the parties and the Board, and we are doing that at this time.

MADAM HEARING OFFICER: I believe we

entered as Exhibit 31 the actual Federal Register Reconsideration Decision, and we will admit this as a separate exhibit.

MADAM HEARING OFFICER: We will mark this as Exhibit 47, if there's no objection. Seeing none, it's marked as Exhibit 47.

(Exhibit No. 47 was admitted.)

MADAM HEARING OFFICER: I believe we are ready then to continue with Mr. Nelson. Question No. 7 from Kinkade.

MR. NELSON: Question No. 7: "What is your definition of `commercially available?'" I think that's very simple, common sense. If you are able to purchase it, it's commercially available. Are Cadillacs commercially available? Yes. You are able to purchase them. Does the supply of Cadillacs -- could General Motors supply every person in the United States today with a Cadillac? No. They could not. They don't have the capacity. If there was a law that they had to, that everybody could only drive Cadillacs, I'm sure, in short order, they would have a production capacity for that. To be commercially available, it simply has to be able to be purchased, doesn't have to supply a demand that doesn't currently exist. That would be --

MR. FORCADE CONTINUES: Would I be correct, then, that commercially available does not imply any statement relating to the technology of achieving a 90 percent reduction?

A. No. Is it commercially -- is technology available that has been demonstrated at many sites to be able to achieve 90 percent? Is that technology commercially available? Yes. At every plant, when you say "commercially available" is there a standard that automatically is attached to the term "commercially available"? No.

MS. BASSI CONTINUES:

Q. Does "commercially available" mean that it will meet the demand for, in terms of supply and demand that it will meet the demand?

A. If the demand is there, I guarantee that the supply will be there. There will be an economic incentive to do so. For example, right now we can supply a number of plants on a day-to-day basis from my existing production facility. That's just my company. There's other companies that has a larger capacity than we do, but as I mentioned before, there isn't a single plant in the country that, on its own volition, is getting mercury out any more than it is accidently

today, so my plant 90 percent of the time is not operating.

Q. I'm sorry. I don't understand. Does your plant supply the hardware or just --

A. This is just the sorbents.

Q. Just the sorbents. What about the hardware? And when I refer to "hardware" here I mean the whole gamut of what's necessary to comply with this rule. Is that hardware going to meet the demand? Is the production of that hardware sufficient to meet the demand?

A. Yes. In my testimony, I asked the question that's been asked here, "Is activated carbon injection technology commercially available today?" Of course, it is. We have incinerators all around the country for the last five to 10 years. We have these exact same systems, silos, the feeders, the blowers, the transporters, the injection lances. They have been provided and are operating today at incinerators in this country, and even longer in Europe. The carbons, the activated carbon is supplied for mercury control and in incinerators today. There's trucks going out, and it's being used for that today. Is it commercially available? Yes. Can we, if there's increased demand,

can we expand it? Yes. What we need is a little bit of regulatory certainty. I'm not going to build -- already, as I mentioned, I have a plant I have invested in, and it's sitting idle 90 percent of time. I'm not going to expand production three years ahead of time. That's just throwing money away. The delays caused by regulatory uncertainty and the lawsuits against the regulations that make it uncertain, and that's why we delay the production capacity buildup, but if the demand is there, there's an economic incentive for the supply.

MR. ZABEL CONTINUES: Using your Cadillac analogy, Mr. Nelson, if the regulatory requirement that they supply everyone in the country with a Cadillac, everyone driving stayed within the law, if we can, they couldn't do it tomorrow, could they?

A. No, they couldn't.

Q. There would be some time lag, would there not?

A. Exactly, to build up the capacity to create all those Cadillacs.

Q. I realize your plant is idle, but do you know how long it would take to build up the capacity, not just the sorbent, as Mr. Bassi asked, but for the entire pathway it would take to comply with this rule?

A. The issue would be the various halogenated sorbents, themselves. Right now there is tremendous excess capacity in the world in activated carbon. Even in this country, Calgon has production lines that they have mothballed because of there isn't enough demand. There's excess capacity in Germany and China, for example, for base carbons. All we do, that my company does, for example, is -- we don't actually produce the carbons. We simply bromate them. We halogenate them, which is a very simple process kind of a one-step process to treat the existing product. Particularly, if Illinois is going to have, instead of the whole country, it might be -- I would say there would be some issues with respect to timing, if the whole country was going to 90 percent control within two years. If just Illinois, or Illinois and a few other large states do it within three years, I don't think it's an issue at all.

Q. Is that true, not just for halogenated activated carbon, but for the hardware and the craft unions and other things in Illinois that would go with complying?

A. I'm going to speak, specifically, to sorbent injection. There are competing technologies. If you are talking able putting in scrubbers, you do

need specialized trades labor in that case. With respect to -- I mean, all we are talking about is a silo, as you drive around Illinois here, and you pass the grain silos and things that's that. We're talking about a feeder and simply a blower. This is 100-year-old technology, just blowing a powder through a pipe. It's not real high-tech, so with respect to activated carbon injection technology, there's no trade labor involved. You can even install these systems while the plant is currently operating. There's not long lead times, necessarily. Now, if you are talking about some of the other mercury control technologies, like if you have to install a new fabric filter, or if you have to install a scrubber or something of that nature, then you can be talking a couple years lead time in trade labor, and that's a more involved procedure, but for sorbent injection, it really isn't an issue.

Q. You do need penetrations of the duct, do you not?

A. Yeah. You can hot tap while the plant is going. All you do is drill a hole in it. That's not hard. It would be preferable to have a scheduled outage, but it's not required.

Q. What kind of trade labor is needed for

that?

A. Just need -- usually, you don't have to bring anybody in. When we do our installations, which are temporary, because these are month-long trials, the plant personnel will drill the hole, and put in a fixture there for us. Then all we do is insert the lance. These are under negative pressure, typically, the vast majority of plants, so you poke a hole in there and gas gets sucked in, air gets sucked in and not coming out, so you can do it while the plant is operating if you have to.

Q. Have all your installations been temporary. Is that correct?

A. Our installations, yes. As I mentioned, there isn't a plant currently doing it. Plants will not do it of their own volition, unfortunately. They are not in it to -- as long as they can spew stuff out the stack, they will. At least, that's the history of mercury.

MS. BASSI CONTINUES:

Q. Forgive me if I'm jumping ahead, but would the installation for a permanent -- would a permanent installation be different from a temporary installation?

A. 90 percent of it would not be. There are

a couple plants where you have to do a little bit more than simply sorbent injection. You may want to modify various pieces of equipment to improve the performance or lower the costs, but in a temporary month-long test, it doesn't usually justify the cost to do that.

MR. BONEBRAKE CONTINUES:

Q. I think you mentioned that there's an excessive supply of carbon. Is that true?

A. Yes.

Q. Would your expectation be that, if there is increased demand for carbon due to regulatory developments that that excess will disappear?

A. There's so much that I would not, unless you see in national 80 or 90 percent cap in the near future, I would not expect to see it disappear quickly, nor, for example, at one of the three large carbon producers in this country. They have plans to increase their own capacity, but again, they want to make sure that there's demand out for it. It's a financial decision. They don't want to have excess capacity and make those investments and not have any demand to support them.

Q. Will CAMR require, approximately, 70 percent reduction nationwide by 2018?

A. No. It says that on the books, but you have to understand where CAMR came from. According to the Government Accountability Office, the GAO study, and this inspector general for the EPA, the origin cap the 2010 cap of only about a 20 percent reduction, and then 2018 of 69 percent, those were not bottom-up regulations, but according to those internal reports, government investigations, those were top-down, that the EPA workers were told that -- to come up with a standard, for example, of 34 tons nationwide for 2010, and that number came from, again, top-down. What's been call co-benefits here is kind of a misnomer. It's really what is accidently. I call it accidental mercury reduction. It's what mercury are we getting out with zero cost without even trying in a scrubber, and basically, those numbers came from, and the CAMR numbers came from an analysis. It was a guess by the EPA, if we install CAIR, if we install NOx control and scrubbers for S02 and NOx, how much additional mercury accidentally are we going to be getting out nationwide, and that's where those numbers come from, according to the General Accountability Office and inspector general reports, so I don't anticipate. They kind of had a baseline, if we do not require a power plant to go out

of its way and spend one dollar intentionally trying to reduce mercury, what would the timetable be? So under CAMR, we don't anticipate much activated carbon injection because that's another reason why they went to a cap and trade. There's nothing wrong with cap and trade, if the cap is high, but if the cap is very low, like 20 percent, you are going to put some scrubbers in. They are going to be getting 90-plus percent control. Then you are going to have a bunch of plants in Illinois that don't have scrubbers, for example. How do we make sure that they comply, and get a 20 percent reduction? Well, we have to allow them to purchase the allocations, the mercury reductions that are made in the east with these scrubbers that are being installed, so you won't necessarily have any mercury reductions within Illinois, but you will have a lot in Pennsylvania where all these scrubbers are going in or other places, so you needed a way to transfer those mercury reductions, so that every plant would meet the reductions.

Q. I didn't ask you about phase one reduction and I didn't ask about CAIR co-benefits and I didn't ask about reductions in Illinois. My question was, as of 2018, does U.S. EPA say in its CAMR cap will result in reductions of, approximately, 70 percent nationwide?

A. Yes. My answer -- I thought when we read the question, do you anticipate carbon sales in 2018. You were talking about capacity and that sort of thing. Under CAMR, we don't anticipate much mercury control, specifically, for mercury, which would be carbon injection.

MADAM HEARING OFFICER: Could we take a break.

(Discussion was held off the record.)

MR. NELSON: "Will CAMR require 69 percent from where we are today?" I think that's the way it's designed.

MR. BONEBRAKE CONTINUES:

Q. Is it true, Mr. Nelson, that, in light of CAMR and various state efforts, that you expect an increase in the use of carbon for mercury control in the next decade or so?

A. I think I have already answered that. No I do not, under CAMR, do not expect much sales of carbon for mercury control.

Q. You had also mentioned I believe that, if ACI is installed, that trade labor is, typically, not involved, but that's not true if ACI is installed in connection, either with a change to an ESP, or an

addition of a bag house. Is that correct?

A. If you had an ESP -- I think I answered that -- yes. There was quite a bit of trade labor involved, if you do hardware installations in conjunction with ACI.

Q. Is it also true that, if it's necessary to install ACI, to also install duct work, that the duct work is, typically, done by trade labor?

A. I'm not aware of any demonstrations where they installed duct work in a simple retrofit, but if you did construct duct work, then you would need a trade labor, yes.

MADAM HEARING OFFICER: Can we move on to Question No. 8.

MR. NELSON: What is your definition of "cost effectiveness"? I think that's a relative term. It simply denotes benefits, either total benefits or one type of benefits, divided by cost. Benefits divided by cost would be cost effectiveness.

MR. FORCADE CONTINUES:

Q. Do you have a particular value? Eight dollars per benefit, or whatever it is, that would constitute something being cost effective. Describe something as being cost effective.

A. For example, where the cap-and-trade program, an allocation is going to be per ounce of mercury emitted, so you have dollars per ounce of mercury emitted. We frequently use dollar per pound of mercury removed and the same thing divided -- times 16. That varies from site to site, and it varies with the degree of removal, how much mercury is in the coal, but if you assume a market in allocations, the market will be in cost effectiveness units, or dollars per ounce of mercury removed.

Q. I'm saying do you have a specific value where you say, "At this value or below, the technology is cost effective"?

A. "Cost effective" again, is a relative term. You have to go to what is your next -- you can compare two alternatives and say which is the more cost effective. You can't say one thing is cost effective and another thing is not because it's all relative to what the alternative is. You mentioned that this comes from my testimony. If you can point that out, I can be more specific as to where I used that term and what I meant in that particular use.

MADAM HEARING OFFICER: Question No. 9: "What is your definition of "economically feasible"?

I think that depends on context. Again, it matters what your next best alternative is. I would, just generally, consider something economically feasible if it doesn't put the entire operation at risk financially.

MADAM HEARING OFFICER: Question No. 10.

MR. NELSON: "Please explain your statement on page two of your testimony that the cost and results for sorbent injection technologies vary, depending on the type of coal burned, and the existing equipment at the plant. This is where you would imagine that each utility is going to try and minimize the costs of meeting the regulation at each individual plant, so you have to do a very plant- or boiler-specific analysis. That will vary, for example, between plants primarily based on the coal burned and the pollution equipment. For example, the coal is burned. At least, with sorbent injection -- well, any technology that we add to a plant to control mercury for sub-bituminous coals and northern lignites, sorbent injection of halogenated injection, so far, has proven to be very, very cost effective, and is probably the low cost technology currently at most of these plants. The bituminous plants, because the flue gas, contains a lot

more chemicals. Bituminous coal is a more complex garbage that's being burned. We tend to have to inject more sorbent to get a similar removal rate. Illinois is very fortunate in that the vast majority of your existing fleet is burning these sub-bituminous coals. With respect to the existing pollution equipment control equipment at the plant, for example, if you're one of the lucky plants that have fabric filters existing today, you can get by with very, very little sorbent because that helps the mass transfer. You don't have to purchase and use as much sorbent. If you have a wet scrubber, for example, you're already, or can, with a little bit of modification, get very high mercury removal if you have bituminous coal. If you have a spray dryer, fabric filter, as on some sub-bituminous coals, again, adding a very, very little bit amount of halogenated sorbent can give you high removal rates, so it is going to vary somewhat plant to plant as to what we call native removal, or accidental removal at the plant already is, and then how much sorbent if you're using sorbent injection, you would have to purchase and use to get a particular degree of control.

MR. FORCADE CONTINUES:

Q. I believe earlier you had mentioned that

it could be measured in terms of dollars spent per either ounce or pound of mercury. Can you give us dollar ranges that would apply to sub-bituminous plants so we can put upper and lower bounds on that?

A. For sub-bituminous plants with just cold side ESP's, which is the dominant configuration in the state of Illinois, based on those 30-day, full-scale runs that we and others have done in the DOE programs, for 90 percent mercury removal, you're probably talking in the order of $5,000 to $10,000 per pound of mercury removed. If you go to 75 percent, the lower bound, you could be talking anywhere from $3,000 to $5,000 per pound of mercury removed and you would divide that by 16 to get per ounce removed. Now, at some other plants, it might be significantly higher. For example, bituminous plants that have high SO3, which I think we will get into, you would have more sorbent requirements, and you might be on the order of $20,000 to $25,000 per pound of mercury removed. If you have lower mercury in the coal, then, for a given amount of sorbent, you are going to get less mercury out, so you would have relatively higher costs, but you would have less mercury to get out, so it varies from plant to plant.

MR. BONEBRAKE CONTINUES:

Q. I think you confined that answer to cold side ESP units. For hot side ESP units, what's the corresponding dollar amount, Mr. Nelson?

A. You have I believe three hot side units here in Illinois, one of which is going to switch, for other reasons, to a fabric filter, so we are talking particularly about Will County No. 3 and Waukegan Unit No. 7. We are going to do one of these DOE 30-day demonstrations at Will County early next year. So far, we have only demonstrated -- my company has demonstrated on two hot side units, Cliff Side Unit, and the Buck Station of Duke Energy. The Buck demonstration was a 30-day demonstration. Cliff Side was a shorter-term testing. Now, those two were done with bituminous coal, which I said requires more sorbent. Now, the technical analysis that Dr. Staudt did assumed the Toxicon arrangement for those two units where you actually build a fabric filter and you can inject less sorbent, but you have higher capital costs, and that's with the assumption is in his cost calculations in his analysis. My company believes that we're going to be able to have significantly lower costs than that because we are dealing with sub-bituminous coals in our demonstrations here. We haven't actually shown that, yet. That still

remains to be seen. We will know a lot more in about nine months, but I would expect -- my expectation is, based on all the other demonstrations, is that we will probably be, for 75 percent control at those units, for example, at Buck, we got -- 70 percent control at injection rate of 10 pounds per unit ACF. This was one of those situations where we could have done even better if we had invested a little bit in some hardware modifications, but because it was only a temporary test, we didn't do that, but I would estimate that we will be probably in the 10 to -- say 8,000 to 10,000 per pound of mercury removed. Some of it is going to depend on how much mercury is in the coal on those particular units, on those two units, and also, whether they are going to continue to sell their fly ash. They sell fly ash, a significant amount of fly ash, out of the Waukegan Unit.

DR. GIRARD CONTINUES:

Q. What were the costs observed at the studies that were run?

A. On the coal sides with bituminous coal?

Q. I think we are talking about the hot sides.

A. The hot sides with bituminous coal. At 70

percent, 10 pounds per million ACF, the particular mercury on their coal -- I am going to have to get back to you on a particular calculation, but my guess is $25,000 or $30,000 per pound mercury removed. But again, that was bituminous hot side, which is going to be more expensive than sub-bituminous.

MR. BONEBRAKE CONTINUES:

Q. The $8,000 to $15,000 per pound number that you gave us, does that assume no requirement to add a bag filter.

A. That's correct. This is just simple injection of sorbents. Dr. Staudt did the costs if you put in a fabric filter. You consume much, much less sorbent if you have a fabric filter, but you do have the capital cost of the fabric filter.

Q. I think you said, Mr. Nelson, that the only tests studies on the hot side ESP's that your company has performed, both have involved units that are burning bituminous, as opposed to sub-bituminous coal?

A. Right.

MADAM HEARING OFFICER: I think we have answered 10-A, as well, have we not? I think we are ready for Question No. 11.

MR. ZABEL CONTINUES:

Q. I had a follow-up. I'm not sure I could follow all your numbers, Mr. Nelson. Is it, on a per pound or per ounce of mercury removed, less expensive at a given percentage removal, I guess, the higher the mercury content in the coal?

A. Yes, because let me explain the way sorbent injection works. If you inject -- it's a constant removal rate kind of technology. If we have 10 molecules of mercury, say it's a high mercury coal, and we get 90 percent out, we get nine of them out, and that's the denominator, cost for a certain amount of carbon divided by how much you get out, mercury removed. If you have a low mercury coal to start with, and you only have five there, and you get 90 percent, you are getting four and a half, so the denominator -- you get less removed for a given cost. Now, if you -- let's say we inject one pound or X pounds per million per cubic feet of gas, and let's say we get 50 percent of the mercury out. If we inject 2X, we get that 50 percent with the first X and get 50 percent of the 50 percent we didn't get out the first time, so you get 75 percent, 50 plus 25. If you inject 3X, you get 50, plus 25, plus 12 and a half with that third X, so there's a bit of declining returns to increased sorbent, so it,

generally, costs a little more to get to higher removal rate levels.

Q. So all things being equal -- and I understand that all things are never equal -- I would be better off burning a high mercury content coal than a low mercury content coal?

A. In terms of cost effectiveness, yes. In terms of -- however, in terms of getting 90 percent out, to be honest, it's not going to matter. We will get 90 percent out with so many X pounds if you have high mercury or low mercury, but frankly, I believe that most power plants in Illinois are going to end up meeting the .008 pounds of mercury per gigawatt hour standard because since most are sub-bituminous, if you look at what the actual mercury levels are, typically, in sub-bituminous coal, that will be a slightly easier standard.

Q. Looking at your example of the 10 and five molecules, actually get 90 percent and have an entire molecule of mercury left on the 10. I would have only half left on the five. So I would have higher mercury emissions with a higher mercury input to the control device, even though I'm meeting 90 percent. Is that correct?

A. That's true. If you are meeting 90 percent on both, so you have to be careful about how the standard is written, and actually what the standard is, definitely.

MADAM HEARING OFFICER: Question No. 11.

MR. NELSON: "Is the St. Clair Power Plant you discussed on page three of your testimony similar in operations to the coal-fired electric generating utilities currently operating in Illinois?" I would say yes. It's very similar to many of those because it burns sub-bituminous coal primarily. They mixed in, as many Illinois plants do, or at least, some Illinois plants do, they mixed, on average, about 15 percent bituminous and 85 percent sub-bituminous burning concurrently, so the coal is very similar. The configuration with just a cold side ESP and no scrubber is similar to the majority of plants in Illinois.

MR. HARRINGTON CONTINUES:

Q. Let me start. We touched on some of the same questions, but maybe this is the appropriate place to explore this a little bit.

MADAM HEARING OFFICER: As long as you help me remember which one of these questions are.

MR. HARRINGTON CONTINUES:

Q. We will deal with the other tests, too, but since this was brought up at this point, you know the term "SCA"?

A. Certainly.

Q. Can you explain it?

A. "Specific Collection Area" is a measurement, a relative measurement, of the square feet of plate collection area in an electrostatic precipitator to the quantity of gas flow through the ESP, so it's a relative measure of the size of an ESP physically.

Q. So the more SCA, specific collecting area, the larger the ESP as a more removal you would expect it to achieve. Is that correct?

A. In general, yes. We might want to talk about this -- you have a number of questions on this later.

Q. I can postpone these questions, until then, but maybe just for the record, what's the size of the SCA in the Detroit study?

A. St. Clair had a large electrostatic precipitator. It had I believe six fields in it. Two of them were not energized, were not used, so as

designed, if it was operating as designed, it would have a selective collection area of I believe 700 square feet per thousand actual cubic feet of gas flow, so the number of 700 is kind of the number to remember. As I mentioned, only two-thirds of it was operating during the month of testing, and so it had an effective SCA of about 470. Now, 470 is still relatively high. It would probably be about 70th percentile is my guesstimate, if you look nationwide, so it was still larger than average, in terms of the physical size of the ESP.

Q. I will reserve my questions on the rest of these and asked if that's appropriate.

MADAM HEARING OFFICER: That's fine.

DR. GIRARD CONTINUES:

Q. Can I just follow up real quickly. In your answer to Question No. 11, when you say that the St. Clair power plant is similar in operations to plants in Illinois, you are just making a general statement, aren't you?

A. Yes. There are plants that are totally different.

Q. So you have not prepared a checklist, a spreadsheet, and gone down it, and compared this plant to plants in Illinois on very specific architect or

engineering or other features?

A. Actually, I have done that now. When I got those configuration data, that's what I did, so I can say -- like I said, this pertains to the mode or there are more plants that are very similar to St. Clair than any other plant. It is very similar, but there are some that are totally different.

Q. So it's still a general statement?

A. Yes. It's a general statement.

MR. FORCADE CONTINUES:

Q. When you say it's similar, are you talking about being configurationally similar? It has cold side ESP or are you talking similar, in terms of the size of the output of the facility, the square foot of the bag house, or electrostatic precipitator? How are you --

A. From a mercury control standpoint, as I mentioned, the important things are the coal that's burned and the configuration of existing equipment, and in those two categories, it is similar to many plants in Illinois.

Q. I'm sorry. Perhaps my question wasn't framed correctly. Do you mean it was similar in that it had a cold side ESP or do you mean it was similar in that the size of the cold side ESP was similar to the

one you were evaluating? Configurationally, they might have been the same plant, but if one had a very large ESP and the other a very small, would that have made a difference?

A. Not in terms of mercury removal. I mean, it makes a difference of potentially in particulate control, but in terms of mercury removal, it's similar in the type of coal that's burned to many plants, and it's similar, in terms of existing air pollution control configurations that are important for mercury.

Q. Would I be correct that the mercury is actually removed in the particulate matter of the ESP after it adheres to an activated carbon?

A. The sorbent is removed. The mercury is actually captured, predominantly, in the duct work on the way, but then you have to get the sorbent out of the gas stream, and that's taken out in the particulate control device.

Q. So if the particulate control device were less effective, would you not have higher mercury emissions?

A. No. 99.X percent of the particulate is taken out in whatever device you get, so the degree -- there's side issue that we will get to in some of the

other questions with respect to the SCA of -- are there balance of plan issues? But with respect to mercury control, the performance of the ESP, with respect to mercury control, really has no effect.

MADAM HEARING OFFICER: Question No. 12.

MR. NELSON: "How much do your companies various control systems as described in your testimony cost? Would factors weigh into the cost of the systems?" There's two costs, as the testimony points out. One is in the capital cost of the equipment and as Mr. Forter mentioned, the cost of a sorbent injection system for particulate boiler, assuming a 100 percent redundancy, so you, basically, have two feeders, in case there's problems with one. You switch over to the second one. Really, all it is is a silo with some feeders, a blower, a pipe going to the duct work and then some lances, which are just, basically, pipes sticking into the duct blowing into the duct work. That's the capital usually involved. That will vary -- the cost of the units that we have bid on is $350,000 to half a million dollars, and then there are costs with installing them and according to the plant, that might be another couple hundred thousand dollars, so your cost

is half a million, to three quarters of a million dollars per plant. And it can be a little less now on smaller units, but that's pretty basic. It's also depending on the plant, two to four dollars in capital cost per kilowatt of power capacity, so you are talking two, to four. The larger units would have the two and the smaller units would have the four. Again, you are just dividing by a larger or smaller denominator. Now, in relative terms, a wet scrubber would maybe be $200 per kilowatt, so you are talking 50 to 100 times more than the capital cost of activated carbon injection. For, basically, the cost of one medium-sized wet scrubber in Illinois, you could outfit 50 plants, 50 boilers. For the majority of the boilers, could be supplied with activated carbon injection. Then you have operating costs. Operating costs in activated carbon injection if it's simple activated carbon injection into an ESP, it's really just the cost of the carbon. For a halogenated activated carbon today, delivered price cost would be roughly a dollar a pound, so the question asks for those costs.

MADAM HEARING OFFICER: Question No. 13.

MR. NELSON: "In your testimony on

page three, you state the quantity of the sorbent you need to inject into a sub-bituminous plant is directly proportional to the mercury removal to be achieved. What factors go into determining the amount of sorbent necessary?" I would like to elaborate on my "directly proportional." What I meant there is, the more sorbent you inject, the more mercury you remove. It's very simple. Scientifically, actually the relationship is inversely proportional to the amount of mercury remaining in the gas. In other words, in my explanation, if you double the mercury -- let me restate this and state it another way. If you plot the amount of mercury remaining logarithmically on the Y axis versus sorbent on the X axis, you get a straight line, and we see this time and time again, plant and plant again, particularly for ESP's. You have a second phenomenon with a fabric filter where you have time on the fabric filter, so that's a little more complicated, but to answer the question, "Explicitly, what factors go in to determing the quantity necessary?" As I mentioned, it's primarily the coal that you're burning and consequently, the chemistry of the flue gas that's generated and the existing pollution control equipment. Do you have a fabric filter? Do you have a hot side

ESP? Cold side ESP? Do you have SO3 injection? Do you have -- what temperature is the gas? Those kind of considerations.

MADAM HEARING OFFICER: Question 14.

MR. NELSON: "Is it important to have accurate data as to the mercury content of the coal being fired?" Well, that depends on how you're choosing to comply. For example, if you're choosing the absolute standard of .008 pounds per gigawatt hour, the mercury content of the coal you don't need to measure. All you need to measure is how much is going out with a stack, and how much gigawatts of power you generate, so you don't have to meet that. If you're meeting the 90 percent standard and your 90 percent reduction standard, and the denominator is the mercury in the coal, then, yes, you have to measure the mercury in the coal. In fact, to give a good handle on this, let me consider Question No. 15, as well, because I do have -- I brought an exhibit that I think helps understand the answers to 14 and 15.

MADAM HEARING OFFICER: Go ahead and read question.

MR. NELSON: "If identical systems of coal were submitted to five different laboratories for

mercury analysis, what is the largest variation of analytical results that you would expect? Do you have any data to support that conclusion?" My answer to that is yes. There is measurement, or measurements jump around with respect to mercury, or any coal analysis, sulfur or anything in a coal. Usually, you have variation because the issue is how do you get a representative sample. How much does it jump around? When the laboratories measure these, they are measuring just milligrams of the sample, and you want to make sure that that is the same as the bulk sample, so usually you have to make a number of different measurements in order to get a representative sample. I would like to enter this as an exhibit. It would be easiest if they had these when I explained it. I think that what the questions are getting into here are kind of the accuracy of mercury measurements and how does a power plant feel confident that they are actually meeting a 90 percent reduction requirement. What I'm passing out is for the St. Clair demonstration. Over a period of 30 days, every day we were -- we took coal samples and measured the mercury in the coal. We also measured -- actually that's not what's on here. What is on here is the mercury in the fly ash, but it's a similar kind of

variability. You take a fly ash sample, and now you are measuring how much mercury is in the fly ash. Now, the fly ash contains the sorbent, which contains the mercury that we capture, so it's an independent measurement of how much mercury did we remove from the gas stream.

MADAM HEARING OFFICER: Excuse me, Mr. Nelson. Before you continue, Mr. Nelson, we have "Fly Ash Mercury Track CMM Mercury Closely." We will mark this as Exhibit 47 if there's no objection. Seeing none --

MR. BONEBRAKE: I think it's 48.

MADAM HEARING OFFICER: I did, indeed. Thank you for keeping me on track. Exhibit 48. Seeing none, it's marked as Exhibit 48. Go ahead.

(Exhibit No. 48 was admitted.)

MR. NELSON: The CMM in the title is an abbreviation for "Continuous Mercury Monitor." This is a gas phase mercury analysis. There are a number of things to kind of look at here. One is, on the X axis, you have 30 different days. That's what's on the X axis, and on the left Y axis, is the daily average gas phase mercury . Now, this is time weighted. What we are measuring is, before injection, how much mercury is in the flue gas. This is in nanograms and mercury per

normal cubic meter. The important curves are the two dark blue curves near in the middle and top of the graph. The ones with the diamonds is this time weighted gas phase mercury, and this is an average over the course of the day, so it reflects how much mercury is coming in with the coal and the variation in the mercury of the coal, and you can see, for example, in the first couple of days it was around 9,000 nanograms per cubic meter, and then about a week later it was down to six, so you can see there's a lot of variation of the mercury coming into the plant, and the coal, as much as about 40 percent lower than it was between the top and bottom. You can see kind of how that varies with the coal coming in daily.

The other kind of important one is the solid the other solid blue line that has the little crosses on it, and that refers to the X axis. That's the mercury in the fly ash that was collected. Now, there are six hoppers. We weighted them, according to the relative fly ash in the hopper, so it's a daily average hopper-weighted mercury that we're getting out of the gas line, basically, and the amount of mercury. I'm kind of proud of this particular graph. I did not anticipate a measurement to be quite as consistent as it

turned out to be, but you can see there's a second graph that we should enter into the exhibit, and this shows, over the 30 days, what the average mercury removal was on each of those.

MADAM HEARING OFFICER: We will mark this as Exhibit 49, if there's no objection, and I will give you all a chance to look at it first.

MR. NELSON: What we did in the other demonstrations that DOE, for the most part, is required is we injected a constant amount of sorbent, three pounds of sorbent per million cubic feet of gas continuously for the first 30 days, never varying. Now the plant operation varied. The coal varied, and you can see that the mercury removal varies. It varied here between the high 80's to the high 90's at any particular given time, but it averaged pretty consistently about 94 percent, so we are getting pretty much a constant amount of removal of the level of mercury that was ending up in that fly ash.

MADAM HEARING OFFICER: If there's no objection we will mark this as Exhibit 49. Seeing none, it is marked ass Exhibit 49.

(Exhibit No. 49 was admitted.)

MR. NELSON: The point I was trying to

make in answering Questions 14 and 15 is it turned out that the mercury coming back from the lab in the samples of fly ash, the solid samples tracked extremely well the amount of -- because we were getting a consistent fraction of the mercury out, the mercury that was in the flew gas. That when there was a lot of mercury in the coal, there would be a lot of mercury in the flue gas. There would be a lot of mercury we were capturing in the fly ash. When there was a low amount of mercury in the coal, there was lower mercury levels in the flue gas, and consequently, there was a lower quantity of mercury in the fly ash. So it looks like, at least, at this plant, the numbers were extremely consistent, and we were getting very good measurement of mercury, both, in the gas phase and also in the solid phases. I was very gratified to see that those two top blue curves tracked each other very well.

MR. FORCADE CONTINUES:

Q. Would it be safe to say that the test protocol for mercury content in the exhaust gas was a different test protocol than the test protocol for mercury in the fly ash?

A. Oh, yes. They are completely different instruments.

Q. For mercury content in the coal, would it be identical to mercury content in the fly ash or is it a different test protocol?

A. We use the same equipment. There's a little bit of variation because the concentrations are very different, but we use, basically, the same equipment, basically, the same method, but there are some differences.

Q. This could be one of the facilities that you identified as being part of tests for which we will receive subsequent report data?

A. Yes.

Q. And is there information on inlet or coal mercury content in those reports?

A. Yes. It similarly gives how the mercury varied in the coal. I'm not sure all 30 days, but there's 15 or 20 days, at least, in there.

DR. GIRARD: Let me just clarify, so we are going to get either copies or citations to the DOE reports where these graphs came from.

MR. NELSON: Yes. I will supply them to Illinois, and they can supply them.

MADAM HEARING OFFICER: Are we ready to move on and do you want to go to Ameren or Dynegy?

MR. NELSON: Ameren would be fine.

MADAM HEARING OFFICER: That would be my preference, too, since there's more discussion about these tests with Ameren, so let get some of these before we break for lunch.

MR. NELSON: "Please describe your personal involvement in the development of mercury control technologies, particularly the sorbents discussed in your paper and your testimony." I've been working on mercury for 10 years now, started with the incinerator mercury. I have a patent on brominated carbons for utility mercury control and have played a big part in the development of the hot side version and the concrete version. "What is your personal involvement in the development of engineering, construction and installation of pollution control equipment?" I've been the project manager at many of these demonstrations and have been involved in the design and bidding on the equipment used to inject the equipment. "Have you reviewed the Technical Support" --

MR. HARRINGTON CONTINUES:

Q. Did I understand you to say you had a patent on the brominated mercury?

A. On one particular -- yeah, there is a

patent or -- our particular product is patented. The particular, what we call B-PAC is patented.

Q. Is that different than the other products?

A. Yes, it is. Our competitors do not violate our patent, at least I hope they don't.

Q. Is your product more effective than others?

A. I think that remains to be seen. There have only been a couple large scale tests where they have kind of gone head to head, and a couple that we're aware of we do a little bit better. Let me put an asterisk. There's an All Stone technology that appears to show better performance than ours on a per pound basis.

Q. All Stone?

A. All Stone. It's largest utility company in the world, utility equipment company.

Q. Is this patent owned by your company or by you, personally?

A. The company.

Q. Do you own the company?

A. No. It's owned by shareholders. It's publicly owned. There's -- each company has their own technology, so there's -- it's not like there's one or

two patents that are particularly important, but you can't do precisely what we do.

MR. ZABEL: I couldn't hear that answer.

MR. NELSON: I'm saying that each company has their own proprietary way of doing things.

MR. HARRINGTON CONTINUES:

Q. So for example, if a rule lists several companies having technology, that's referring to proprietary technology of each of these companies?

A. Could you repeat the question?

Q. Well, the proposed rule before the Board that's based on injecting halogenated activated carbon produced by several named companies, yours being one of them. I assume you're familiar with that?

A. Yes.

Q. Now, are each of those technologies -- would you expect those to be patented?

A. Each -- I know All Stone has their patent, and we have one that's been issued. Others we're working on. Noret has patents. Every one tries to protect their particular technology to the extent that they can.

Q. Is the patent on the product or on the

process for producing the product?

A. The patents vary.

Q. In your case?

A. In our case, it covers the production and use of our particular -- of the B-PAC product, but there are many ways to skin a cat. Ours, for example, just covers bromine. Halogens, there's also iodine and chlorine, phlorene. There's other halogens that can be used.

Q. Would some of the other companies listed in the Illinois proposed rule be using these other halogens?

A. I don't know about All Stone. Noret uses bromine, but my understanding is they don't infringe our patent.

MR. FORCADE CONTINUES:

Q. If I correctly understood you, you said that you had a patent on the manufacture and use. Would a facility needing to utilize your product have to get a license from you?

A. To use our particular product, yes.

Q. Is that license covered in the cost that you were providing to us?

A. As long as they buy the product from us,

our current business strategy does not call for licensing fees.

MS. BASSI CONTINUES:

Q. I'm sorry. I believe you said that you are -- you have a patent on your product, as well as the use. In taking a look at the hardware, is the hardware universal?

A. Yeah. The hardware is extremely generic.

Q. So regardless of which company makes the halogenated ACI, it doesn't make any difference where the hardware came from. Is that correct?

A. Correct.

MR. BONEBRAKE CONTINUES:

Q. You mentioned that currently you do not charge a licensing fee. If more utilities start using your product in response to regulations, would you anticipate, Mr. Nelson, that your company would start charging?

A. No. If you buy the product from us, I don't need a licensing fee.

Q. On Question No. 3, I believe your statement in response to the similar question for Mr. Forcade's company was that you did not review the Technical Support Document prior to your testimony, but

you have done so since then?

A. Correct.

MADAM HEARING OFFICER: So the Question 4.

MR. NELSON: "Do you agree with conclusions of Chapter 8 of the Technical Support Document therein, particularly as to what technology is required in various facilities?" Yes. I, generally, agree. I do disagree. It's my belief that it will be less expensive to inject hot side sorbents in those two particular boilers, and that they will not require a fabric filter, but that's really the only substantive technical disagreement I have. There is, in fact, a cheaper way. "Page three of your testimony refers to the St. Clair Power Plant of Detroit Edison. Were you personally involved?"

MADAM HEARING OFFICER: Before you answer these questions, Mr. Nelson, it's my understanding that this is one of the studies that -- papers that you plan to provide a report with.

MR. NELSON: Yes.

MADAM HEARING OFFICER: Is it going to be possible for us to get that report today, like, this afternoon?

MR. NELSON: If I had my office E-mail it to you, yes.

MADAM HEARING OFFICER: I'm just wondering if we had the report in hand how many of the questions would be answered by the report, itself versus -- I mean --

MR. NELSON: I don't think that would help very much.

MADAM HEARING OFFICER: Let's proceed with the questions, then.

MR. HARRINGTON: May I drop back?

MADAM HEARING OFFICER: You can drop back to yesterday, if you want.

MR. HARRINGTON: Are you familiar with Table 8.8 on page 161 of the Technical Support Document, which I believe sets forth the conclusions as to the latest technologies?

MR. KIM: What page was it again?

MR. HARRINGTON CONTINUES:

Q. 161.

A. Dealing with the fly ash?

Q. Sorry. I was referring to 8.9 on 162.

A. Yes. I have looked at that.

Q. When you said you agree with Dr. Staudt's

conclusions, do you agree with the technology set forth on that page with the exception of the hot side ESP's for each of the facilities in Illinois?

A. You could certainly use sorbent injection on all those and co-benefits for those that have scrubbers. I don't disagree with it. I think it's reasonable.

Q. Do you agree that those would achieve either 90 percent removal or the .008 per million gigawatt hours?

A. Based on what I know, I would say that the vast bulk of them certainly should. Individual plants we would have to look at, but again, I, generally, agree, yes.

Q. Do you know which individual plants we would have to look at?

A. The ones that burn sub-bituminous coal I think should have no problems. Some of the ones burning bituminous coals you can, again, you can -- it's not that will they get 90 percent or won't. It's more a question of what would be the optimum technology for that plant. You really have to look at the individual specifics of the plant.

Q. So it's your testimony that all of the

facilities burning sub-bituminous coal in Illinois could achieve 90 percent reduction of the .008 pounds per million gigawatt standard solely with sorbent injection?

A. I believe that to be the case.

Q. That, in addition to the installation of the sorbent injection system, there would be no additional capital costs for control?

A. Not necessarily. There may be at individual plants, which we can get into. For example, when you talk about the SO3 injection systems, and there may be some modifications that have to be done, but again, it's a matter of degree. You can always, for example, add a fabric filter. I don't know anticipate that necessarily for those plants, but that's I think partially addressed with the temporary technology, the TTBS, that, if, in fact -- my understanding of the purpose of that is, if, in fact, the utilities make a good faith effort to achieve high removal and install these sorbent injection systems, and if, for some reason despite their best efforts, there are particular issues at a plant, that's what that kind of safety valve is for, so I think it's certainly with that. I'm much more confident that there won't be significant costs at more than maybe one or two of these plants.

MS. BASSI CONTINUES:

Q. Does the TTBS proposal, however, in any way, modify -- I believe the earlier statement was that you believe the bulk of the plants listed here, with the exception of the hot side ESP plants, will achieve the 90 percent or the 0.008 limitations with only the ACI and the halogenated carbon?

A. Well, actually, I think the hot side may be able to emit it, too, but some of the plants have scrubbers, too, or having scrubbers planned for them that will go in, so those I would not anticipate having to install sorbent injection. For example, the Baldwin plants, those, in order to meet the timetable I believe their scrubbers planned for those plants, those timetables I'm assuming would be moved up, so that those scrubbers would be installed, and you would have the accidental removal with the wet scrubber without the sorbent injection, but you could also install sorbent injection, until the scrubber is built, as well. Did I answer your question?

Q. Yes, sir.

MR. HARRINGTON CONTINUES:

Q. Referring to the same table, do you agree with the cost numbers that are here?

A. Again, generally, I do. I think that the sorbent costs -- I think that Dr. Staudt used 85 cents or something like that, per pound where the cost would probably be a little higher in the sorbent. It would probably be -- I assumed a dollar a pound, but I mean, we are cutting shades of grass here. These costs are very low compared to NOx control or S02 control or particulate control, so I think these numbers are pretty respectable. They are not far from what I would have come up, if I had done a similar exercise.

Q. We'll come back to some of the details of is facilities later.

MR. ZABEL CONTINUES:

Q. I did want to follow up since Mr. Nelson mentioned the Baldwin plant. Would it matter whether the scrubber you referred to was a dry or wet scrubber?

A. Baldwin I believe is burning -- I assume they are going to burn the same coal, instead of switching, once they have a scrubber. Some plants switch once they get a scrubber, so if you are talking about I believe Baldwin is talking about a spray dryer fabric filter combination. Is that --

Q. Assume that for a moment. Was that part of your answer?

A. In that case, by itself, a spray dryer fabric filter, even with SCR, which I believe is also going in there, you won't get accidently 90 percent with a sub-bituminous coal. You would have to inject a very small amount of sorbent, perhaps one pound per million ACF, so you may have to add a small sorbent injection system, but you would be injecting very, very little sorbent in that case.

Q. And that would not be your answer if it was a wet scrubber, would it?

A. If it was a wet scrubber, you shouldn't even need sorbent injection.

MR. BONEBRAKE CONTINUES:

Q. Mr. Nelson, you mentioned now a couple of times that you think the hot side units at Will County and Waukegan can achieve 90 percent with ACI, as I understand it, without any other hardware being installed. Is that correct?

A. No. I think there may be some slight hardware modifications that I can't talk to, for proprietary reasons, on those hot sides. There might be a little more hardware than simply the injections system. I would also like to modify my previous comment on the wet scrubber. If you are burning sub-bituminous

coal, simply having a wet scrubber still isn't going to get it for you. I was assuming sub-bituminous coal with the scrubber case.

Q. Let me follow up on that. The dry scrubber would be used on sub-bituminous. Is that correct?

A. Typically, that's the way it works.

Q. And the average cost of a dry scrubber?

A. Is cheaper than the average cost of a wet scrubber.

Q. Stipulated, Mr. Nelson.

A. I mentioned $200, on average. $200 per kilowatt for a wet scrubber. It might be $150 for a spray dry fabric filter combination.

Q. And use a wet scrubber on sub-bituminous coal?

A. That's, typically, what's done.

Q. Once the dry scrubber is installed, and you switch to high sulfur coal, it would be improbably, would it not?

A. No. Actually, not. You can do it. You can certainly do it. In fact, you get very good mercury removal if you have --

Q. Go ahead.

A. But the issue is your S02 removal is typically higher with a combination of wet scrubber on a bituminous coal.

Q. And a dry scrubber on bituminous coal, would that be sufficient for sulfur standards, to your knowledge?

A. You are getting into an area that I'm not an expert in, but they have done a good job in increasing the performance of those, but it's still not quite up to the standards of a wet scrubber.

Q. Would it meet the CAIR requirements?

A. It would meet the CAIR requirement.

Q. Go ahead. Would it meet BACT?

A. That, I do not know.

BONEBRAKE CONTINUES:

Q. Mr. Nelson, in your response to a question I raised, I think you said you believe some additional hardware would be required at the hot side units, but you couldn't talk about it.

A. Hardware modifications. The hot side is a little more difficult situation, so there's more to consider.

Q. What hardware modifications do you have in mind?

A. Again, for proprietary reasons, I can't answer that.

Q. What proprietary considerations?

A. There are things that for use of our H-PAC product, which is the variation of B-PAC for hot sides, at some plants, you may have to make some additional modifications to either equipment or procedures, but again, I can't, for proprietary reasons, I can't get into precisely what those are and it depends on the plant. There's just a little more going on.

Q. Can you tell us what the range of costs would be expected associated with the hardware provisions that you have in mind?

A. That's a fair question. It would certainly be less than a million dollars per plant, or per boiler.

Q. When you talk about proprietary considerations, are you referring to trade secrets, Mr. Nelson?

A. Well, hopefully, they will be patented in the future, but we're going through that and that's a lengthy process. Currently, they are trade secrets.

Q. Are you in a patenting process right now?

A. Yes.

Q. And you had mentioned in connection with some earlier discussion of the hot side ESP units, a couple of studies, one at Cliff Side and another at Buck that your company had done. Aside from those two studies, are there other studies, Mr. Nelson, upon which you rely to support your view that hot side ESP units could attain the Illinois-proposed standards with the installation of only ACI, and then perhaps these additional hardware revisions that you just referred to?

A. With just ACI, those are the only two plants that I'm aware of that have shown that.

Q. Again, those plants burn a different type of coal than Will County and Waukegan, right?

A. They do, generally a more difficult coal.

MADAM HEARING OFFICER: Ready to -- Question No. 5 asks about the St. Clair plant of Detroit Edison and No. 6 wants to know if you were, personally, involved in that study.

MR. NELSON: Yes, I was. I was project manager for that project.

MADAM HEARING OFFICER: And question No. 7 asks about the size and I believe you've previously answered that.

MR. NELSON: I believe I did.

MADAM HEARING OFFICER: With that, we are ready to get into the nuts and bolts of that study, and it is now -- I have 12:30, so why don't we take an hour for lunch, and we will come back after lunch and get into the nuts and bolts on the St. Clair study.

STATE OF ILLINOIS)
COUNTY OF ST. CLAIR)SS

I, Holly A. Schmid, a Notary Public in and for the County of Williamson, DO HEREBY CERTIFY that pursuant to agreement between counsel there appeared before me on June 21, 2006, at the office of the Illinois Pollution Control Board, Springfield, Illinois, Sid Nelson and David Forter, who were first duly sworn by me to testify the whole truth of their knowledge touching upon the matter in controversy aforesaid so far as they should be examined and their examination was taken by me in shorthand and afterwards transcribed upon the typewriter and said testimony is herewith returned.

IN WITNESS WHEREOF I have hereunto set my hand and affixed my Notarial Seal this 3rd day of July, 2006.

_____

HOLLY A. SCHMID
Notary Public -- CSR
084-98-254587