THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF SOUTH DAKOTA

= =

IN THE MATTER OF THE APPLICATION BY
OTTER TAIL POWER COMPANY ON BEHALF OF
BIG STONE II CO-OWNERS FOR AN ENERGY CONVERSION FACILITY PERMIT FOR THE CONSTRUCTION OF THE BIG STONE II PROJECT — EL05-022

= =

Transcript of Proceedings
Volume 3
June 28, 2006

= =

COMMISSION STAFF

JOHN SMITH
KAREN CREMER
GREG RISLOV

ORIGINAL

APPEARANCES (continued on next page)

THOMAS J. WELK and CHRISTOPHER W. MADSEN,
BOYCE, GREENFIELD, PASHBY & WELK,
Attorneys at Law, P.O. Box 5015,
Sioux Falls, South Dakota 57117,
appearing on behalf of Big Stone II;

TODD J. GUERRERO and DAVID L. SASSEVILLE,
LINDQUIST & VENNUM, Attorneys at Law,
80 South Eighth Street, 4200 IDS Center,
Minneapolis, Minnesota 55402,
appearing on behalf of Big Stone II;

PETER GLASER,
TROUTMAN SANDERS LLP, Attorneys at Law,
401 Ninth Street NW, Suite 1000,
Washington, D.C. 20004,
appearing on behalf of Big Stone II;

APPEARANCES (cont.)

ELIZABETH GOODPASTER,
Attorney at Law, Minnesota Center for Environmental Advocacy, 26 East Exchange Street #206, St. Paul, Minnesota 55101,
appearing on behalf of Minnesota Center for Environmental Advocacy, Izaak Walton League of America - Midwest Office, Minnesotans for an Energy Efficient Economy and Union of Concerned Scientists;

MICHAEL D. O'NEILL,
JOHNSON, PROVO, PETERSEN, LLP, Attorneys at Law, 332 Minnesota Street, First National Bank Building, Suite West 975, St. Paul, Minneosta 55101,
appearing on behalf of Minnesota Center for Environmental Advocacy, Izaak Walton League of America - Midwest Office, Minnesotans for an Energy Efficient Economy and Union of Concerned Scientists;

JOHN DAVIDSON JR.,
Attorney at Law, USD School of Law, 414 East Clark Street, Vermillion, South Dakota 57069,
appearing on behalf of Minnesota Center for Environmental Advocacy, Izaak Walton League of America - Midwest Office, Minnesotans for an Energy Efficient Economy and Union of Concerned Scientists;

MARY JO STUEVE,
196 East 6th Street #401, Sioux Falls, South Dakota 57104,
appearing pro se.

Reported by Carla A. Bachand, RMR, CRR

INDEX

I N D E X (cont.)

I N D E X (cont.)

WEDNESDAY, JUNE 28, 2006

MR. SMITH: Good morning, everyone. Today is Wednesday, June 27 -- 28th, excuse me. It is 8:30 in the morning and we are reconvening the hearing in EL05-002, application of Otter Tail Power and other entities for a permit to construct the Big Stone II electric generating station in Big Stone city, South Dakota. Where we left off yesterday, we were still in the midst of applicants' case-in-chief. At the close of yesterday's session, we decided that the first thing this morning we would take telephonically the testimony of David Gaige, who is one of applicants' expert witnesses. And at this point in time, I will permit applicants to proceed with their case and call Mr. Gaige.

MR. SASSEVILLE: Thank you. The applicants call David Gaige telephonically.

THE WITNESS: Yes, good morning.

MR. SASSEVILLE: Good morning, Mr. Gaige. This is David Sasseville.

THE WITNESS: Good morning.

MR. SASSEVILLE: You need to be sworn by the court reporter.

Thereupon,

CHARLES DAVID GAIGE,

called as a witness, being first duly sworn as hereinafter certified, testified as follows:

MR. SMITH: Mr. Gaige, this is John Smith, the commission's counsel, and I just want to let you know and make sure you are aware, then, that by appearing here telephonically and taking the oath, that you become subject to this state's jurisdiction in terms of the administration of that oath and the enforcement of it. Do you understand that?

THE WITNESS: Yes, I understand it.

MR. SMITH: Thank you.

DIRECT EXAMINATION

BY MR. SASSEVILLE:

Q. Could you state and spell your full name, Mr. Gaige?

A. My full name is Charles David Gaige, C-H-A-R-L-E-S, D-A-V-I-D, and the last name, Gaige, is G-A-I-G-E.

Q. Mr. Gaige, you are the senior project manager, environmental studies and permitting with Burns & McDonnell engineering company?

A. Yes, that's correct.

Q. Did you prepare or cause to be prepared prefiled direct testimony in this proceeding?

A. Yes, I did.

Q. And do you have a copy of what has been premarked as Applicants' Exhibit 22 in front of you?

A. Yes, I do.

Q. Is that the prefiled direct testimony that you either prepared or caused to be prepared?

A. Yes, it is.

Q. If I were to ask you each of the questions set forth in Applicants' Exhibit 22 this morning, would your answers be the same as set forth in the prefiled testimony?

A. Yes, they would.

MR. SASSEVILLE: At this time the applicants would offer for admission into the record Applicants' Exhibit 22.

MR. SMITH: Is there any objection?

MR. O'NEILL: No objection.

MS. STUEVE: No objection.

MR. SMITH: Hearing no objections, Applicants' Exhibit 22 is received into evidence.

EXHIBITS:

(Applicants' Exhibit No. 22 received into evidence.)

Q. (BY MR. SASSEVILLE) Thank you. We are running a little late getting the hard copies of your summary, but we do have your summary on the screen so that people can follow along, so at this time would you present your summary starting with your credentials, your experience in the profession and your educational background.

A. All right. I've been working in the field for approximately 30 years. I have a bachelor's degree in mechanical engineering and a master's degree in mechanical engineering and began my career working for a state agency doing some permit review and then I left the state to get my

master's degree and have worked in the consulting field supporting applications and environmental documents since that time. I was involved in one of the first BACT applications for a power plant in Wyoming, the Laramie River Station, and since then have filed numerous PSD applications for power plants.

Q. Thank you. Do you have a summary of your testimony, Mr. Gaige?

A. Yes. My testimony was related to the air permitting basically for this Big Stone II project and the administrative rules of South Dakota included about 10 regulations that are applicable to the emissions resulting from the Big Stone II Unit. Nine major preconstruction permits of this type or for this type of facility as this PSD, or prevention of significant deterioration permit, and it's administered by the South Dakota Department of Environment and Natural Resources. These are federal regulations, but it's been delegated to the states for enforcement and because the emissions of the sulfur dioxide and nitrogen oxide, SO2 and NOX are going to be reduced from Unit I, the net emission increase resulting from Unit II will be below the threshold emission rate requiring PSD review. So those two pollutants are exempted from further review under that program.

The pollutants that were reviewed under this permit application included the particulate matter less than 10 microns, PM 10, the carbon monoxide or CO, volatile organic

compounds, VOC, sulphuric acid mist, referred to as SAM or SAM and fluoride. The Best Available Control Technology or BACT, which is required under the PSD program, was determined for these pollutants. And the BACT basically establishes emission controls for coal-fired boilers themselves, also for the cooling towers, the diesel engines used for fire protection and emergency generation, and also the material handling system.

Dispersion modeling was also performed as part of the permit application. The purpose of that is to predict the potential ambient concentrations of the air pollutants, and this effort determined that the proposed plant would comply with the national ambient air quality standards, the PSD increments, both class one and class two areas, and met the requirements for impact air quality related values. Other permits and approvals will include the operating permit, which is not required until the plant begins operation, the acid rain rules, and the Clean Air Mercury Rule.

And that concludes my summary.

MR. SASSEVILLE: Thank you, Mr. Gaige. At this time we will tender Mr. Gaige for cross-examination.

MR. SMITH: MCEA, you may proceed.

MR. O'NEILL: No questions of this witness.

MR. SMITH: Ms. Stueve?

CROSS-EXAMINATION

BY MS. STUEVE:

Q. Good morning, Mr. Gaige.

A. Good morning.

Q. And thank you for your testimony and I'm glad you could do it via phone and not have to do the travel.

A. As am I.

Q. Have you testified previously in power plant permitting cases? It appears you did, you mentioned briefly you are involved in one of the first BACT, B-A-C-T?

A. Yes. And yes, I have testified previously.

Q. And which ones in particular?

A. In the Wisconsin public service application for the Westin IV unit.

Q. Any other ones?

A. No.

Q. Okay, and was the Wisconsin one permitted, the Westin IV?

A. Yes.

Q. On what grounds?

MR. SASSEVILLE: Object to the form and for lack of foundation.

MR. SMITH: What do you mean by "grounds"? Can you just specify with a little more clarity what you mean?

MS. STUEVE: I will pass on that one.

MR. SMITH: No, it's okay. You can ask the question if you can just --

Q. (BY MS. STUEVE) Was it permitted on the grounds of Wisconsin permitting guidelines, for example? Was it reviewed according to?

A. The application was reviewed by the state and a permit was issued. It was also challenged and reviewed. So I would say yes, that it has been issued as the application was in compliance with the state rules and regulations.

Q. It sounds like you just said it was challenged and reviewed, so does that mean it's under review at this time?

A. No.

Q. Okay, thank you. And is your testimony on emissions in this case limited to the BACT analysis?

A. No.

Q. Okay. And are you familiar with other types of analysis of power plant emissions aside from the BACT?

A. I guess I'm unclear as to what you're asking.

Q. Are there any other ways to analyze emissions versus the BACT?

A. I'm sure there are other ways to analyze it. My testimony is related to how this project's -- how this project is proposed to comply with the regulations.

Q. And so you chose to do the BACT in particular as an analysis of these emissions for this project?

A. The BACT is a regulatory requirement under the PSD program, so we were -- I was looking at that as a review and

expansion of how this project is complying with the regulatory requirements.

Q. Okay. Would you agree with me that there are other types of analyses?

MR. SASSEVILLE: Could you explain what you mean by "analyses," Ms. Stueve?

MS. STUEVE: On how to analyze emissions to meet the requirements.

MR. SASSEVILLE: For purposes of a permitting proceeding like this one?

MS. STUEVE: Exactly, thank you.

A. Are you asking are there other ways other than the Best Available Control Technology determination?

Q. (BY MS. STUEVE) Yes.

A. I guess the answer, my answer would be no, the PSD requirements are pretty clear that they do require a Best Available Control Technology.

Q. Okay, thank you. Getting to your direct testimony on page 4, let me see what exhibit number we have here.

MR. SASSEVILLE: 22.

Q. (BY MS. STUEVE) We have Exhibit 22, page 4, on line 11.

A. Okay.

Q. And you state that SO2 and N-O-X, NOX, are not regulated because the net increase is de minimis; is that your

testimony today?

A. Well, I don't believe the statement says that they are not regulated. What we indicated there is that those two pollutants, the net increase in emission is below de minimis, so they are not subject to review under the BACT program.

Q. And would that make a difference with the type of coal that would be used, for example, the SO2?

A. The SO2 emissions are dependent on the amount of sulphur input to the unit, so I guess the answer to that would be yes, it is dependent on the coal.

Q. And in particular, would Montana coal have a higher sulphur content than -- which was used according to Otter Tail Power as an interim measure recently with the coal shortage?

A. I really don't have the information to answer that question. I'm not sure what the sulphur content of Montana coal would be.

Q. Okay, thank you. I did hear you say, though, there is a difference in SO2 content dependent on the coal used.

A. Yes, that's true.

Q. Are SO2 and NOX regulated by state law in any way, South Dakota state law?

A. Yes.

Q. And how?

A. There is new source performance standards for -- that new units need to comply with that restrict the emissions of

both SO2 and NOX.

Q. Okay. Are SO2 and NOX regulated by the federal government in any way?

A. The federal rules establish the new source performance standards for this type of unit and those rules are the rules that are enforced by the state. Does that answer that question?

Q. Yes, thank you. Can you describe the specifics of monitoring under these rules?

MR. SASSEVILLE: I'll object to the form, that's fairly broad. Could you narrow it, Ms. Stueve?

Q. (BY MS. STUEVE) Can you describe the specifics of monitoring that you may be familiar with in the state of South Dakota via either state or federal regulations for the new source, is it new source performance standards?

A. Well, I believe I can. The information I have, there is a lot of different ways to do monitoring and it's typically what is required in the permit is then what is put into place. So I'm not sure if I could describe exactly what is going to be applied to Big Stone II at this point, but I could describe monitoring in general.

Q. Okay. So it's dependent on a case-by-case basis?

A. Yes, it's dependent on working that out, I guess, with the state regulatory agency on what they want to see for demonstration of compliance with the emission limits.

Q. So it seems you are saying that that would be something between this project and the South Dakota DENR to work out.

A. The monitoring requirements to demonstrate compliance with the emission limits is a part of the permit that's issued by the state.

Q. Okay, thank you. Is the same true of lead?

A. Yes, lead emissions are regulated under the PSD program and the state agency does have a responsibility to establish an emission limit and a demonstration of compliance with that.

Q. And is the monitoring the same?

MR. SASSEVILLE: The same as what?

Q. (BY MS. STUEVE) Is the monitoring the same as what you explained it would be based on the permitting with the DENR, the state agency?

A. The state agency would be responsible for establishing what would be required for monitoring, yes.

Q. Thank you. Let's look again at Exhibit 22, page 5 and on lines 10 and 11, you use the phrase "specific application."

A. Yes.

Q. Can you define that term, please?

A. The Best Available Control Technology, which is what is being discussed at that page, is a case-by-case determination. In other words, one plant, coal-fired power

plant you might determine the control technology appropriate for that, it may not be appropriate for a different coal-fired power plant. So what we are referring to there when we say "specific application" is in this specific case with this particular plant burning this particular coal and all of the other parameters associated with that.

Q. Thank you. So a case-by-case basis, all right. Do you agree that the guidance of the EPA is nonbinding?

MR. SASSEVILLE: I'll object to the form of the question to the extent it calls for a legal conclusion and for lack of foundation.

MR. SMITH: I'm going to let you go ahead and ask it. Are you able to answer that, Mr. Gaige, to address that issue as the relationship between EPA and the state?

A. Well, I think there's a lot of guidance and information coming from EPA that is binding. In this particular relationship to BACT, there is a documentation or guidance, I guess, from EPA referred to as the top down approach to a BACT determination and that has been ruled fairly recently to be nonbinding.

Q. (BY MS. STUEVE) Okay, thank you. What control technologies did you identify for analysis in this project?

A. Well, the control technologies that were discussed in the BACT were -- they are pollutant specific. The particulate or PM 10 emissions, we reviewed both electrostatic

precipitators and fabric filters. For the -- the othe pollutants are somewhat dependent on what pollution controls are being put in for the major pollutants and then also combustion controls for CO and VOC is the primary technology that was reviewed.

Q. By VOC do you mean volatile organic pollutants?

A. Yes, volatile organic compounds is the VOC.

Q. Thank you. Again on your exhibit, Mr. Gaige, on page 7, line 9 it states that critical to this determination is the identification of the project. Is the, quote, unquote, identification of the project a classification or characterization of the project?

A. Oh, it's both.

Q. And is this the same as, quote, unquote, defining the design of the source?

A. It's a little bit more than that.

Q. How so, please?

A. It's not just the design of the source, but also includes the fuel quality and in many cases the water quality.

Q. Okay, so there's variables?

A. Yes.

Q. Thank you. Fuel quality, water quality?

A. Correct.

Q. Any other variables that come to mind?

A. There are some related to fugitive dust emissions, but

it gets fairly -- it gets into a lot of things about silt content and things like that.

Q. Thank you. And how did you identify or define this project in particular?

A. I'm not sure I know what you're asking.

Q. Well, for example, you identified -- you said defining the design of the source is kind of more than that. How did you identify or define this project as far as identifying it as a source or what you would look at, for example?

MR. SASSEVILLE: I'll object to the form of the question. If you understand, Mr. Gaige, go ahead and answer, but I didn't understand it and I would ask Ms. Stueve to rephrase it.

Q. (BY MS. STUEVE) I'm not a BACT specialist so I apologize, Mr. Gaige. This is confusing to say the least.

A. That's okay. I think the best way I can answer that is that there was a design information, if you will, related to this is proposed as a supercritical coal-fired boiler and a coal supply was identified as a design coal and the water resource was defined for the project, so all of that information went into this case-by-case determination.

Q. Thank you, that helps.

A. Okay.

Q. Me, anyway. Under the federal rules, what leeway does a state have in defining the design of the source?

A. That's a little bit difficult to answer in that these federal rules are not very definitive and we go more by policy and interpretation of those rules, and the interpretations of those rules and the guidance documents that have been developed by EPA indicate that the state does not have the leeway to change the design of the source.

Q. I'm going to rephrase back to make sure I heard it right. This is complicated, you are right. Did I hear you say we go more by -- or first of all, federal rules are not very definitive. We go more by policy, interpretation of those rules.

A. Yes.

Q. And then you ended with state -- but state does not have leeway, would you call it, to -- what was the end of your --

A. Yes, there's some specific guidance that indicates that the -- for example, or one example that's presented that's very similar to this case is that a source is proposed to produce electricity and if it's a, for example, a coal-fired source the state does not have the leeway to come back and say that a gas-fired source would be BACT. That would be changing the design of the project and that leeway is just not part of the regulatory responsibility of the state.

Q. Okay, thank you. To your knowledge, has there been prior BACT analysis of coal-fired power plants?

MR. SASSEVILLE: Could you be more specific by a state or with respect to a particular project?

MS. STUEVE: In South Dakota, for example.

A. In South Dakota I don't know.

Q. (BY MS. STUEVE) In the one you worked on in Wisconsin.

A. Yes.

Q. So that would be the Wisconsin one or were there more than one?

A. This was the Westin IV, the fourth unit at a plant.

Q. Westin IV. Are you familiar with any BACT analyses of coal-fired plants done in Minnesota?

A. I don't believe so.

Q. To your knowledge, in BACT analysis, does South Dakota, quote, unquote, engage in a broader analysis as allowed by federal law?

A. I am not aware of that.

Q. Does South Dakota consider alternative production processes?

A. I would not be aware of that.

Q. Does South Dakota include inherently lower polluting processes in BACT analysis?

A. I can't speak to specifically what South Dakota does. I know that that is -- lower polluting processes is part of the BACT analysis that should be reviewed.

Q. That should be reviewed. Did you say previously that BACT analysis does not apply to the IGCC or it can't be switched over once it's been done for a coal-fired analysis?

MR. SASSEVILLE: Ms. Stueve, you said did he say he previously, where would he have said that?

MS. STUEVE: Previously a few minutes ago.

A. Could you rephrase that question?

Q. (BY MS. STUEVE) Okay. We were talking a few minutes ago, to your knowledge has there been prior BACT analysis of coal-fired power plants and we were talking about the federal rules and what leeway does a state have in defining the design of the source. And I scribbled a note here, you mentioned something that once done for a coal-fired analysis, it doesn't -- it does not necessarily apply to the IGCC.

A. I don't recall mentioning IGCC at all.

Q. Okay. Maybe I wrote my acronyms down wrong. There's too many.

A. Okay.

Q. Forgive me for that. On page 12, let's go back to your exhibit, please, it's Exhibit 22, page 8, lines 11 through 12.

A. Okay.

Q. You state one of the best ways to identify available control technologies is to review previous BACT determinations for similar sources.

A. Correct.

Q. Did you review -- for the record, did you review prior BACT decisions?

A. Yes, we did.

Q. Okay, yes. And generally what did you learn in your review?

A. Let me elaborate a little bit on that question. The EPA or Environmental Protection Agency, does maintain this database of the previous BACT determinations, and it's referred to as this RACP-BACT-LAER clearinghouse, and that is a very searchable database, so we did review that for similar facilities, specifically for coal-fired electrical generation facilities, and with that information is provided on a large number of other determinations what technology was used and what emission limits were established. We were looking specifically for the coal-fired power plant control options for particulate control and learned from that that most other facilities were using either fabric filters or electrostatic precipitators.

Q. Okay, thank you. Did you review prior South Dakota BACT decisions?

A. I'm sure that we did. They would be included in that RACP-BACT-LAER clearinghouse that EPA maintains.

Q. Can you give the plant name?

A. Well, it's -- the ones that would get the closest

scrutiny in that review would be the ones that are more recent and have the most stringent control or results for that plant. I don't believe that there is any other coal-fired power plants in South Dakota other than Big Stone I and it was not subject to PSD.

Q. So to the best of your knowledge, any South Dakota plant that would be included in this EPA database with all those acronyms would probably be the Big Stone I, to the best of your knowledge?

MR. SASSEVILLE: I think that misstates his testimony.

A. To the best of my knowledge, there would be no other BACT determinations from South Dakota for similar facilities, i.e., for coal-fired power plants.

Q. (BY MS. STUEVE) Okay, thank you. Is the scope of analysis using this identification of the project that we talked about earlier, defining the design of the source, consistent with past South Dakota practice?

A. I don't believe I can answer that. I could give a guess as to what I would think.

MR. SASSEVILLE: I don't want you to guess, Mr. Gaige.

A. Okay. My assumption is that the South Dakota agency would be following EPA guidelines, since it is a delegated program and that they would look at previous applications.

Q. (BY MS. STUEVE) Thank you. Did you review the BACT analysis for the Elm Road Generating Station in Wisconsin?

A. Yes, I did.

Q. Could you compare this with that analysis, this analysis for this project with that one?

A. I could, not right now without having both of them here to compare. Each analysis is on a case-by-case basis and one example is that both -- I believe both SO2 and NOX were part of the BACT determination for that unit, where they're not for this unit so there would be a lot of differences.

Q. Okay. A lot of differences, but I can appreciate without having the cases side by side you are unable to answer specifically at this time.

A. Right, okay.

Q. Is that correct?

A. Yes, that's correct.

Q. Okay. Thank you. But there are differences you said.

A. Yes.

Q. And the one you did mention had to do with the NOX.

A. Yes.

Q. And just so I'm clear on it, the difference with the NOX, could you repeat that?

A. The Elm Road unit, as I recall, was subject to review under the PSD program or BACT determination for both sulphur dioxide and NOX, whereas the Big Stone II unit has been exempted from review for those two pollutants.

Q. Thank you. That clears it up greatly for me. Several

recent BACT analysis in other jurisdictions have addressed IGCC. Have you in your work incorporated IGCC into BACT analysis for a coal-fired power plant?

A. No, I have not.

Q. Have you reviewed BACT analysis incorporating IGCC?

A. Yes.

Q. And which ones, please?

A. I believe the one that I reviewed was Prairie States.

Q. In which state would that be?

A. Illinois.

Q. Prairie States in Illinois? Have you reviewed a New Mexico BACT analysis incorporating IGCC?

A. I recall reading portions of one for one of the plants in New Mexico, but I would not categorize that I guess as reviewing it.

Q. So it sounds like you are familiar with it, you did not review it?

A. Correct.

Q. Thank you.

MR. SASSEVILLE: I'm sorry to interrupt, Ms. Stueve, but I'm not sure where this is going. We are wandering down some path across country on IGCC. This is not an IGCC project and I would object to the line of questioning on relevance grounds.

MR. SMITH: Well, let's see where it goes and if it

becomes way out there, then I'll step in, how's that?

MR. SASSEVILLE: That's fine, New Mexico is pretty far out there, though.

MR. SMITH: I think I know where she's heading with this and I think he's already maybe provided an answer that deals with this, but let's let her explore what this is and then we'll deal with it if it gets too far afield.

MS. STUEVE: And we can go quickly with a yes or no on these. So I will mention a few more states, maybe just one more state.

Q. (BY MS. STUEVE) Have you reviewed West Virginia BACT analyses incorporating IGCC?

A. No, I haven't.

Q. Okay, thank you. And other jurisdictions have not included IGCC clearly. Have you reviewed any BACT analysis from Wyoming, Montana or Kentucky?

A. Yes.

Q. Okay, all three, Wyoming, Montana and Kentucky?

A. I have briefly reviewed some BACT information from those states. I don't recall any of those dealing with IGCC.

Q. All right, we will get back to South Dakota. So for the BACT analyses in this case, what were the specific parameters of quote, unquote, the source?

A. It was defined as a supercritical pulverized coal unit.

Q. Okay. That's the specific parameters, right?

A. That's part of them. The design coal was also defined and I don't recall exactly what that was at this point.

Q. And in this specific BACT analyses, what range of alternatives were considered? For example, was natural gas considered?

A. The range of alternatives that were reviewed were the alternatives to control the emissions from that defined plant.

Q. From the defined plant meaning the coal plant?

A. Yes.

Q. So in this BACT analysis, a range of alternatives to be considered were not considered, meaning other sources such as natural gas, IGCC, wind, wind/gas combination or nuclear.

A. That's correct.

Q. Okay. Thank you. And for your BACT analysis, how do you define, quote, unquote, commercially available?

A. That's typically defined as a process that can be purchased with a guarantee from a manufacturer and has been demonstrated in practice.

Q. Demonstrated, so in that definition, what allowance -- excuse me -- so in that definition, what allowance do you make for commercial practicability or impracticability?

MR. SASSEVILLE: Object to the form, it's vague. If you understand, you can answer.

A. Well, there's a couple of criteria that are used to

review. One is the feasibility of the application of that technology to the source and the second criteria is that same technology commercially available. I think that your question just now was more related to that first part of that, is that application of that technology feasible to this particular source.

Q. (BY MS. STUEVE) Exactly.

A. And there's certainly a lot of parameters that go into that in review of this particular source, is there -- in its application to the source, is it appropriate. There's just a lot of parameters that would go into that.

Q. I can appreciate that and I'm sure I do not understand all of that. You state on page 8, back on your testimony, Exhibit 22, page 8.

A. Okay.

Q. Lines 15 through 16, that, quote, control equipment on pulverized coal units has been limited to few types.

A. Correct.

Q. What is impact of this limitation on BACT analysis?

MR. SASSEVILLE: Object to the form of that question. That is definitely vague.

MR. SMITH: Sustained.

A. I'm not sure I understand. Should I answer the question?

MR. SASSEVILLE: No.

MR. SMITH: No, we'll let her ask it again if she can.

Q. (BY MS. STUEVE) Could you agree with me that control equipment on pulverized coal units has been limited to few types?

A. That's still a very broad question. There's a lot of different pollutants out of a coal-fired power plant that are subject to BACT review in different situations and there are a range of control alternatives for each pollutant that we typically talk about. The RACP-BACT-LAER clearinghouse information certainly provides a good guidance as to what has been determined in previous reviews as the best for that particular application, so it's a good starting place, if you will, to look at what control technology might be appropriate for this installation.

Q. Thank you. I see reading here again on your testimony 8, line 15, you are referring to -- I had quoted this and you are referring to the RACP-BACT-LAER clearinghouse.

A. Correct.

Q. As saying that control equipment on pulverized coal units has been limited to few types. Thank you. On page 9, Exhibit 22, you testify that -- do I have the line -- yes, line 9, page 8, line 9, test for SAM and FI, SAM and FI, will also be done if requested by the DENR, I'm assuming that's the South Dakota DENR. Is this customary in your experience?

A. The FI is actually FL, it's fluoride emissions.

Q. Thank you.

A. And yes, it's customary. Where emission limits are established, the state has an obligation of the permit, it needs to define how compliance with that emission limit will be established and that is the monitoring or sampling or testing program.

Q. And what is the purpose of baseline testing?

A. I hate to say that -- I don't want to qualify that as -- it's kind of a broad question, but the baseline testing in general would be you test it at a baseline point and then you make a change and test it at a changed point.

Q. Again on page 9, staying on page 9, you testified that -- let me look for the line -- oh, here we go, line 21, page 9.

A. Okay.

Q. The actual emissions will be significantly lower than historic emission rates. Can you define "significantly lower"?

A. I cannot give you a specific number, or I would have in the testimony. "Significantly" certainly means measurably.

Q. Measurably. Do you mean historic emission rates of Big Stone I, for example?

A. In this particular case, what we are talking about is the emissions of SO2 and NOX, and what has been asked for in this case is that we establish a limit at the facility for the combined emissions of Big Stone I and Big Stone II, and that is

the intention of this comment and the intention, as I understand it, of the operators, that the units after Big Stone II is installed, the actual emissions will be lower than what the historic emissions have been from Big Stone I.

Q. Thank you. I believe I'm to the last set of a question with maybe a follow-up. Your testimony about monitoring is vague, that various measures, your testimony about monitoring is vague, in my mind. And maybe it's because I'm not the expert here, but it says that various measures, quote, unquote, will be monitored and reported to the agency periodically, and I'm assuming you mean the DENR when you say agency, correct?

A. Correct.

Q. Okay, so what is typical?

A. The monitoring requirement is typically dependent on the pollutant that we are talking about and dependent on what the emission limit is that's established by the state. For particulate, for example, the mass emission rate for particulate is usually established in the permit, but that is very difficult to measure on a continuous basis, so mass emissions are typically done with an annual or semiannual stack test and combined with an opacity monitor, which gives an indication of particulate emissions.

Q. Have you made recommendations regarding monitoring and reporting previously?

A. Yes.

Q. And those recommendations are?

A. There are some suggestions for Big Stone II monitoring and reporting that were included in the permit application. It would probably be best to review that application before I respond.

Q. Again, I can appreciate that. And when you say the permit application, you mean the PSD in South Dakota?

A. Yes.

Q. Okay, and -- you may not be privy to that. I was going to say, is that currently underway, do you know?

A. Yes, I know that the state agency, the South Dakota DENR has issued a draft permit that's out for public review at this time.

Q. Okay, so it's under review, okay, thank you. Is there anything in particular that you would recommend that you do recall you putting in there?

A. There are recommended testing procedures from EPA, for example, method five is used for particulate testing, and those EPA-approved methods I'm sure are the basis for the recommendation.

MS. STUEVE: Thank you. And I do so appreciate your patience with my questions and for joining us here. That's the end of my questions.

MR. SMITH: Thank you. Does staff have any questions?

MS. CREMER: Staff does not have any questions. Thank you.

MR. SMITH: Does the -- do the commissioners have any questions of Mr. Gaige?

VICE-CHAIR JOHNSON: I do not.

COMMISSIONER HANSON: No.

MR. SMITH: Does the applicant have any redirect?

MR. SASSEVILLE: I have about 58 redirect -- just kidding.

MR. SMITH: Do they involve New Mexico? (Laughter)

CHAIRMAN SAHR: Could I ask one thing. Could you put up the first page of the presentation, the summary presentation please? If I had a hard copy I wouldn't make you do this but I wanted to look at one thing that was on one of the bullet points to see if I have an additional question. Thank you very much. I remembered it correctly and I do not have an additional question. Thank you.

MR. SASSEVILLE: And I have no redirect.

MR. SMITH: You are excused, Mr. Gaige, which means we will be hanging up on you. Thank you very much.

THE WITNESS: Thank you. Bye-bye.

MR. SASSEVILLE: At this time the applicants call Hoa Nguyen.

Thereupon,

HOA NGUYEN,

called as a witness, being first duly sworn as hereinafter certified, testified as follows:

DIRECT EXAMINATION

BY MR. SASSEVILLE:

Q. Good morning, Mr. Nguyen.

A. Good morning.

Q. Would you state your name for the record and spell it, please?

A. My name is Hoa Nguyen, the first name is spelled H-O-A, and the last name is Nguyen, N like in Nancy, G-U-Y-E-N. In case you may have misspelled it, the same last name, the same person just won the South Dakota lottery a couple weeks ago.

Q. So you will be retiring soon?

A. Unfortunately, he is related to me about -- we have the same ancestor about 5,000 years ago.

Q. Mr. Nguyen, you are the power supply coordinator for Montana-Dakota Utilities?

A. Yes, I am.

Q. Did you prepare or cause to be prepared prefiled written testimony in this proceeding?

A. Yes, I did.

Q. Do you have in front of you Applicants' Exhibits 11 and 48?

A. Yes, I do.

Q. And is Applicants' Exhibit 11 your prefiled direct testimony?

A. Yes.

Q. And Applicants' Exhibit 48 is your prefiled rebuttal testimony?

A. Yes.

Q. Do you have any corrections or revisions to either of these exhibits?

A. No, I don't have any corrections.

Q. If I were to ask you each of the questions set forth in these exhibits today, would your answers be the same?

A. Yes, they would.

MR. SASSEVILLE: Applicants offer into admission Exhibits 11 and 48.

MR. SMITH: Any objections?

MS. GOODPASTER: No objection.

MS. STUEVE: No objection.

MR. SMITH: Applicants' Exhibits 11 and 48 are received into evidence.

EXHIBITS:

(Applicants' Exhibit Nos. 11 and 48 received into evidence.)

Q. (BY MR. SASSEVILLE) Mr. Nguyen, did you prepare a summary of your testimony for the commission?

A. Yes, I do, I did.

Q. Would you present it for them at this time, starting with your qualifications?

A. Yes, as power supply coordinator for the company, I am involved with most of the resource planning studies and other studies relating to generation, production costing, and I also represent the company in various MAPP, Mid-Continent Area Power Pool, Midwest Reliability council -- Organization, which is MRO, and the North American Electric Reliability Council or NERC.

For my education background, I graduated in 1970, only a short while ago, only 36 years, as an electrical engineer from the Vietnam National Institute of Technology. In 1972 I obtained a master of science in electrical engineering from the University of Saigon and from '72 to '75 I was working on my doctorate of engineering program and until '75 I did not have a chance to complete it because I had to leave the country to seek political asylum in the United States, and at this point I am glad that my wife, I wanted her to be here to witness the regulatory procedure of the freedom of this country and she's here. When in the United States, I also obtained a master of business administration from the University of North Dakota in 1995 and in 1998 I also obtained another master's degree in public administration, that's my educational background.

For professional experience, after graduating from college, I taught at two universities, first as a physics

instructor, a professor, assistant professor of electrical engineering. Since 1975 I started with Montana-Dakota Utilities, a wonderful company, in Bismarck, North Dakota, the coldest point in the world, and started as a staff engineer and progressive to senior staff in 1984 and in 1997 I became what I am now, a power supply coordinator.

Q. Are you a registered professional engineer in the United States?

A. Yes, I am a registered professional engineer in North Dakota.

Q. Would you mind continuing past the overview with the substance of your summary, please?

A. Yes. The first is that our integrated resource planning process and our process is an extensive process that covers four areas, the one is the load forecasting that we use the result as a basis for the resource plans, for sales, for budgeting purpose and et cetera. We look at the demand side by the demand-side analysis. We look at the supply side and we integrate them, the demand side and supply side, in the integration process. And our IRP process is helped with input from a broad-base advisory group, we call it IRP public advisory group or PAG, and they help us to review the assumptions and the results of our IRPs.

The load forecast we use an end use, end use model and develop a long-range 20-year forecast for integrated system.

Our integrated system consists of our service territories in Montana, North Dakota and South Dakota. I mentioned South Dakota last because it's alphabetical order, it's not because South Dakota is less. And we project that our energy to grow 1.3 percent for ten years and the peak demand grow at a comparable rate of one percent annually for ten years.

Next I'd like to talk about the need for -- our need for Big Stone II. Based on existing needs and our forecast, we will be deficit 101 megawatt in 2011 and 134 in 2016 and that deficit would go to 164 in 2021, assuming normal weather and the minimum level of capacity obligation as required by MAPP. And those deficits are caused largely and mainly because we have the purchase power contract with Basin Electric for our AVS II. It will expire in October of this year, 2006, so we are going to lose 66.4 megawatt of base load as of November 1st of 2006.

Also from there we have increased demand, demand for electricity for our customer, both energy and peak demand. Big Stone's share will be the best cost resource option for us. I'd like to kind of emphasize, and this is not -- we determined this plan based on the least cost principle, but we also consider other factors. The other factors include that a base load plant has lower cost of volatility gas prices and most stable fuel price to supply the natural gas. It provides a long-term value for our customers and the best cost also take

into account the opportunity that we can participate in a base load plant with a large economy of scales and the best cost also take into other factors such as the company or our customers will not have to rely on the fluctuating market, MISO market, for energy.

We also consider the opportunity for or the potential for having off-peak energy when our customers don't use their energy, we can sell it to the market and at the present time the reason for that particular off-peak system sale is at the present time we have -- with North Dakota where 60 percent of our energy, our load is sold, we have a sharing mechanism in the state of North Dakota whereby 85 percent of the margin, the benefit that we have reaped from those off-system, off-peak system sales, will be sent back or will be for our customers. The company as an incentive, the company is able to, is allowed to keep 15 percent of the margin. So the off-system sale is one of the factors considered in the best cost.

Another factor in the best cost that we looked at is that opportunity for our system to be able to accommodate some economic development, if that opportunity comes, those are the plans. And when formulating the best cost, we also like to -- we also consider or took into account the consumers. For example, we do have some wind in that and wind, our previous studies showed that wind was not the least cost for our resource, for our system. So we put all those, are those the

best cost.

I'd like to talk about the current programs and plans for our demand-side management or DSM programs and renewables. Currently we have a peak shaving two and a half megawatt programs and we have planned, in fact we are implementing starting in 2006 six and a half megawatt of DSM and conservation measures for the period of 2006 and 2010, which would result in a saving of 38,000 megawatt hours.

For renewables, currently we have a power purchase agreement with a wind developer in South -- that plant in South Dakota, 31.5 megawatt of wind. And we also have a commitment to develop or purchase or acquire 30 megawatt of renewable power generation by 2015. I also would like to address that -- to make a small assessment to the 1200 megawatt of wind alternatives for propose or suggested, whatever the word that's correct by intervenors, is that assuming that we have an 800 to 1200 megawatt of wind and we make an analogy, we will own 19.3 percent of Big Stone, that will translate into 154 or 232 megawatt of wind from that plant, okay, it seems that, okay, that 154 to 230 translates into 36 to 51 percent of our total system peak for our integrated system in 2011.

36 percent, I'll take the lower number, 36 percent of wind as of our total peak demand is our minimum load, and that minimum -- and for operationwise, we need to maintain a minimum -- must run units for the coal-fired unit at night so

that to be ready for the next day when the consumers are using more energy. So at night at current now we are maintaining around 160 megawatt. If the wind -- another 160 megawatt of wind come in, we would have two options and none of that is desirable.

The first option is to take down our -- because wind is nondispatchable, we take wind and take down our must run units, that's perfectly okay, it's taken down. The only problem is that the next day when we ask for energy, then the operator, the plant operator will say I will need from somewhere, depending on the plan, somewhere from four to ten hours to bring this up, we don't have the energy for it, and it will be -- our system will be falling apart. I was talking about reliability and operating stability problems, in particular with MDU.

The second option is we don't take wind, we shut it down. Oh, that's fine for the developer, we pay, we still have to pay. And if we pay that, if we take it down, see, and that's another -- then if we take it, another option is that we dump it onto the MISO system and MISO system has in place the calculation of a location all marginal pricing mechanism that calculates the price of the energy that we generate and put it on MISO system based on the location, based on the transmission capability, et cetera.

And the problem is that when we dump it, no one is

liking it, so it will cause what we call negative locational marginal pricing, negative LMP. What it means is pay MISO to generate to supply the energy and that would cost about $4 million, four to $6 million a year. So that plan would not, in particular that 800 to 1200 megawatt wind alternative would not work for us for MDU in particular, and in general I believe that in general criteria we would want to see that limit maximum would be around 15 to 20 percent range. I think that that concludes my summary.

MR. SASSEVILLE: Thank you. At this time Mr. Nguyen is available for cross-examination.

MR. SMITH: Would it be possible for us to take just an extremely short break? I have a FERC intervention I have got to file and I've got to get this -- could we do that, at least let me run that down there? Just take a five-minute break before we begin cross-examination.

CHAIRMAN SAHR: That makes sense.

(Whereupon, the hearing was in recess at 9:40 a.m., and subsequently reconvened at 9:48 a.m. and the following proceedings were had and entered of record:)

MR. SMITH: If we could, could we be seated, please. The hearing is reconvened following a short recess, and we were about to begin joint intervenors' cross-examination of Mr. Hoa Nguyen. Is that how you say it?

THE WITNESS: Yes.

MR. SMITH: Please proceed.

CROSS-EXAMINATION

BY MS. GOODPASTER:

Q. Thank you, Mr. Smith. Good morning, Mr. Nguyen.

A. Good morning.

Q. I want to just first make sure that I understood one of the things you stated in your summary. You were discussing off-system sales opportunities in your discussion of best cost analysis; is that correct?

A. Yes, as part of those factors.

Q. Sure. And did you say whether those off-system sales are off-peak sales?

A. Yes.

Q. You did, okay. So you are talking about off-peak sales. Does MDU have a projection of the revenues from that off-system sales?

A. At this point, we don't have it yet because the MISO market is still too new for us. It has been there for about a year or so, so we don't have the long-term projection.

Q. So at this point you don't know whether you would be able to sell those -- make those off-system sales at a profit or not?

A. We do know that we can sell, but we don't have a firm number.

Q. Okay. Are you familiar, Mr. Nguyen, with the

responses to joint intervenor interrogatories and requests for production of documents to MDU in this proceeding?

A. I have read most of them.

Q. Okay. Are you familiar with that when intervenors asked MDU, in fact all the co-owners, what specific study or evidence supports the statement that studies point to a shortfall in -- a potential shortfall of base load generating capacity among the co-owners by 2011; do you remember that question being asked?

A. No, I don't.

Q. Would you have reason to disagree with me if I represented to you the Interrogatory 14 of intervenors' first amended set of interrogatories asked, what specific study or evidence supports the statement that studies point to a shortfall, potential shortfall of base load generating capacity among the co-owners by 2011?

MR. SASSEVILLE: Ms. Goodpaster, it might work best to refresh his memory by showing him the document.

MS. GOODPASTER: Sure.

Q. (BY MS. GOODPASTER) Mr. Nguyen, I have it marked at the beginning of that interrogatory, but the first page of that document contains the title of the document, the responses to the first set. Interrogatory 14.

A. Yes.

Q. Does that refresh your recollection?

A. Yes.

Q. And in response to that discovery request, is it true that MDU stated that it had demonstrated in its 2003 IRP and 2005 IRPs the need for base load capacity beginning in 2007?

A. Yes.

Q. Are combustion turbines, natural-gas-fired combustion turbines meant to serve peak or base load demands?

A. Combustion turbines are made to serve peak demand.

Q. And the MDU 2003 IRP selected peaking capacity, then, didn't it?

MR. SASSEVILLE: For which year, Ms. Goodpaster?

Q. (BY MS. GOODPASTER) It was the 2003 IRP. Our understanding is that there were no base load units selected in the 2003 IRP; is that correct? It was only combustion turbines.

MR. SASSEVILLE: And my question is for which year are you talking about the selection?

MS. GOODPASTER: The 2003 IRP was for a defined set of years, so for any of those years.

A. It is true that the analysis showed that for our 2003 IRP, the analysis, the computer did not select base load capacities. It shows that we would, as I talk in my summary, that we would need to replace AVS II purchase capacity shows we need to -- the analysis showed that we -- turbine, two turbines would be needed to replace AVS and other turbines throughout

the study period.

Q. (BY MS. GOODPASTER) When you say "turbines," are you saying combustion turbines?

A. Yes, combustion turbines, but that comes, after that, as I said in my summary, we -- because that reliance completely on turbines, on combustion turbines or natural gas is putting all our customers' need and requirement and economic for the state, for our service territory into the fluctuation of the volatility of the natural gas price and also on uncertainty of the availability of the natural gas price, of natural gas.

So that's why that when we make the decision that is the policy decision based on the result of that IRP, the 2003 IRP is correct, showing that the least cost is made on natural gas, but we make the decision based on that IRP and that is policy decision based on that's why I referred to in my summary as the best cost and we use the IRP, 2003 IRP to make that decision.

Q. Thank you, Mr. Nguyen. And we established prior to discussing the IRP in detail here that combustion turbines are meant to serve peak load as -- peak demand as opposed to base load demand.

A. Yes.

Q. So you wouldn't have been proposing combustion turbines at a capacity factor similar to a base load plant; is that correct? The combustion turbines that were selected out

of the 2003 IRP.

A. Rephrase that.

Q. Sure. The 2003 -- I'll backtrack. Earlier you stated that a combustion turbine is meant to serve peak demand, not base load demand, and so the 2003 IRP selected combustion turbines and from that and your prior answer, wouldn't that mean that you selected those turbines, the combustion turbines to serve peak demand as opposed to base load demand?

MR. SASSEVILLE: I'll object to the form of the question. I believe --

MR. SMITH: Did you understand the question, Mr. Nguyen? I think all she's asking is in the 2003 study, it had a selection of gas turbines and was the purpose of that to provide peaking capacity?

A. That's correct, based on the assumption in that 2003 IRP, yes.

Q. (BY MS. GOODPASTER) For the 2005 IRP, did you run any model comparing Big Stone II with any other resource options?

A. For the 2005 IRP, since the decision is to go to the base load versus the combustion turbine, we do run the analysis to compare Big Stone II and other base load alternatives. In fact one of our alternative is that the next best alternative is the lignite 21 project in North Dakota.

Q. Excuse me, Mr. Nguyen, I wanted to be sure that you understood that I asked whether you had done any modeling of

Big Stone II compared to resource alternatives as opposed to, for example, a qualitative analysis.

A. I guess that my -- from my point of view, I don't understand the word "modeling" that you do. The modeling for me is that is the mathematical process, whatever, to express the characteristics of some form and from that, for an engineer, I'm hired to make the decision and to make recommendation, not just to feed in the number of computers and to say, this is the computer say, so I don't understand the word "model" that you quite say.

Q. I could clarify. In the 2003 IRP, didn't MDU run the EGEAS model?

A. That's correct.

Q. Did you run the EGEAS model for the 2005 IRP, including an examination of the Big Stone II project as it compared to alternatives?

A. No, I did not.

Q. I'd like to refer to your -- actually, before I take you to your testimony, I wanted to clarify one further discovery response from MDU and this was one that it was indicated that you were the person who supplied the answer so you might recall. Do you recall providing answers to joint intervenors' sixth set of requests for interrogatories and requests for production of documents that was a fairly recent set, on April 5th, 2006 set of interrogatories and requests for

production of documents in this proceeding?

A. So many of them, I may not remember all the dates and specific.

Q. Sure. If I represented to you that we asked in that sixth set served on April 5th, Interrogatory 38, where we asked you to refer to Montana's 2 -- Montana-Dakota's 2003 IRP and wanted to know -- we asked you, has Montana-Dakota's need changed in any way between the preparation of the 2003 IRP and the finalization of the 2005 IRP. Do you remember us asking you that question?

A. Yes.

Q. And do you recall that your answers -- your answer to that question was Montana-Dakota's demand needs have not significantly changed, however, the operating environment and the energy market have changed. Do you recall that response?

A. Yes.

Q. And so we just had a discussion about the 2003 IRP selecting peaking units and the most recent decision to invest in a base load unit, but it's correct, though, that you said that the nature of the needs of the company and the customers have not changed between 2003 and 2005.

A. That's correct.

Q. Now, I do want to go to your testimony, Exhibit 48, page 3, lines 11 to 19.

A. Is it the rebuttal?

Q. Yes, Exhibit 48 I believe is your rebuttal. Have you found that page?

A. Yes.

Q. At page 11 and continuing to the bottom of the page --

MR. SASSEVILLE: Page 11 or page 3?

MS. GOODPASTER: Page 3, line 11, I'm sorry, I misspoke.

Q. (BY MS. GOODPASTER) At line 11 continuing down the page, you are discussing MDU's recent contract or commitment to a wind power plant; is that correct?

A. Yes.

Q. What economic analyses did MDU perform when it was evaluating whether to purchase that wind capacity and energy to be constructed in South Dakota?

A. That wind capacity is -- we signed a contract first to start with is that it is we purchased the energy and capacity from that wind farm because of the PURPA requirement. I don't remember the acronym, what it is, and we do run those, the studies, incorporate that into our costing model to determine the best price that we can negotiate, so it is the production costing model, PROSYM, P-R-O-S-Y-M.

Q. I just want to make sure I understand, Mr. Nguyen, it was MDU's perspective that it had to purchase the output of that wind facility under PURPA?

A. Yes.

Q. And so was there no -- the economic analyses that would have been done were not to evaluate whether to purchase it, it would be what price to pay.

A. That's correct.

Q. Thank you. In that same paragraph on page 3, lines 16 through 19, you state that Montana-Dakota expects to comply with the Montana statute by purchasing or installing up to an additional 30 megawatts of renewable power generation by 2015; is that correct?

A. That's correct.

Q. When you state -- I want to understand the words you use here -- in line 18, you say, purchasing or installing up to an additional 30 megawatts of renewable power, does that mean any number, 32 megawatts or less?

MR. SASSEVILLE: 30 megawatts or less, right?

MS. GOODPASTER: What did I say?

A. I think that we --

Q. (BY MS. GOODPASTER) I meant 30.

A. We mean that we are going to -- because we don't know if it is 30 megawatt is the right number, so probably what we mean -- I mean is that approximately 30 megawatt.

Q. But it could be less than 30 megawatts.

A. It could be less, yes.

Q. Was this 30-megawatt increment included in what you provided to Mr. Morlock, who testified yesterday, where he

represented that the total amount that the co-owners will be investing in wind is an amount of 800 megawatts by 2015 to 2020? Were you here yesterday when Mr. Morlock testified?

A. Yes.

Q. Did you hear that testimony? Don't worry, I'm not going to go that long. But he stated yesterday that he took information from each of the co-owners to get to the 800 megawatts number, and so -- do you recall him stating that?

A. Yes.

Q. And so what I'm wondering is whether this 30 megawatts of additional renewables was part of what you provided to Mr. Morlock for him to calculate that 800 megawatts.

A. Yes, it was.

Q. At line 19 on page 3 again, you state that this 30 megawatts may be wind or other approved renewable power sources, correct?

A. Yes.

Q. So providing that number to Mr. Morlock of 30 megawatts would not have been saying that this is 30 megawatts of wind that MDU intend to add, it may be wind but it may be other things, correct?

A. Yes.

Q. And it may be 30 megawatts or it may be less, correct?

A. Yes.

Q. If you could turn to page 4 of Exhibit 48, lines 8

through 17.

A. Yes.

Q. You are talking about the amount of wind that the MDU system could reliably accommodate; is that correct?

A. Yes.

Q. And what studies has MDU performed to determine the amount of wind that could be integrated into its system?

A. Study, depending on how you define study, but what I just presented in my summary is one cursory study that we did on the minimum load versus the minimum -- the capacity, that was one of the study. And if the amount is somewhat like about 20 percent that doesn't fit, then I would have to ask for my transmission planner to model it and run the transmission study, which we did not do. But if you ask for any study, that study is the form of performing some calculations to make the result, the study that I just presented.

Q. So that helps me understand. You mentioned then that there was no transmission study done for MDU's system, a study in the sense of the kind of study you would ask your transmission planners to do, any kind of dispatch analysis or other transmission study.

A. That's correct.

Q. Turning to page 5 of Exhibit 48 and lines 11 through 12, it's true, isn't it -- it states there that studies suggest the Schlissel and Sommer agree on page 10 of the May 26

testimony that for system operating considerations, a maximum ratio of installed nameplate wind capacity system peak would be in the 15 to 20 percent range; is that correct?

A. Yes.

Q. What studies, I realize there are different ways of interpreting the word "studies" and we can try to clarify that, but what studies suggest a maximum ratio of installed nameplate wind capacity to system peak would be in the 5 to 20 percent range? You're referring to studies there, so I assume you had something specific in mind.

A. As Mr. Morlock said, I also read the Xcel, the statement based on the Xcel IRP study.

Q. And so it's from that study that you conclude that the ratio of wind capacity at system peak would be in the 5 to 20 percent range?

A. Yes.

MR. SASSEVILLE: 15 to 20 percent?

A. 15 to 20 percent range.

MR. SASSEVILLE: We will go with 5.

MS. GOODPASTER: A typo.

Q. (BY MS. GOODPASTER) Could you tell me where in Mr. Schlissel and Ms. Sommer's May 26th testimony that you refer to in that statement that they agree that this is a maximum ratio of wind to peak demand levels? You state that Schlissel and Sommer agree. Do you have access to their testimony?

A. I can't --

MR. SASSEVILLE: The reference in his testimony is to page 10 so if you have your witness's testimony, we can look at it.

MS. GOODPASTER: I have a copy here.

MR. SASSEVILLE: The record should reflect the witness has been shown a copy of Schlissel's prefiled direct testimony; is that correct, Ms. Goodpaster?

MS. GOODPASTER: Yes.

Q. (BY MS. GOODPASTER) Could you look at page 10 on the document that I just showed you and point to where Schlissel and Sommer agree that the ratio of -- maximum ratio of installed wind capacity at the system peak is in the 15 to 20 percent range?

A. Okay. Moreover, studies and actual operating experience has shown that fairly high penetration of wind generation can be integrated to the electricity system up to 20 percent of system peak demand or more without having adverse impacts on the reliability or stability of electric grid. The 20 percent is the suggested recommendation.

Q. But let me clarify, Mr. Nguyen. The passage you just read said 15 to 20 percent or more; is that correct?

A. That's correct.

Q. So Mr. Schlissel and Ms. Sommer did not state that the maximum would be 15 to 20 percent, did they?

MR. SASSEVILLE: I'll represent the document speaks for itself and that his testimony was that that was his interpretation of their testimony.

MR. SMITH: Do I need to rule on anything?

MR. SASSEVILLE: Only if you want to, Mr. Smith.

MR. SMITH: Okay, I won't.

Q. (BY MS. GOODPASTER) Turning to page 6, lines 3 to 15 of your rebuttal testimony, Exhibit 48, you discussed this somewhat in your summary as well, talking about currently locational marginal prices in MISO during low load hours are negative; is that correct?

A. That's correct.

Q. Wouldn't adding another base load resource that has to be kept running at minimum levels when loads are low just make matters worse, MDU would have to sell at a loss with the addition of a base load unit?

A. My calculation that I was included the Big Stone in there.

Q. I'm sorry, which calculation?

A. Let me ask you, can you rephrase your question?

Q. Sure. We agreed that there are negative locational marginal prices in MISO during low load hours at present.

A. Okay.

Q. And if in the future MDU were to add another base load resource and that base load resource would be kept running at

minimum levels even when loads are low, wouldn't MDU be having to sell that to MISO at the negative prices, essentially selling at a loss?

MR. SASSEVILLE: Excuse me, and your assumption was with the wind at what level?

Q. (BY MS. GOODPASTER) I'm not assuming wind. I'm assuming current negative locational marginal prices and then the addition of a base load resource like Big Stone II, that does have to be kept at minimum levels during those times when locational marginal prices are negative.

A. With the minimum load for Big Stone II were added, that with all our must-run units would be at the minimum with the Big Stone II.

Q. So MDU would have to inject power or energy into the MISO market at a loss but it wouldn't be very much, is what you're saying?

A. With or without, I'm not sure -- with or without wind?

Q. Without.

A. Why we have to -- I don't know, we don't inject. With Big Stone II, our minimum load would match with the minimum capacity with Big Stone II, so we don't have to inject any energy into the MISO market.

Q. So it's only if you were adding wind instead of Big Stone II that you would have to inject energy into the MISO market?

A. Yes.

Q. We started out this conversation talking about off-system sales as a component of your best cost analysis and you stated to me that your assumption is that those off-system sales are going to take place in off-peak times, and my understanding is that we have just talked about the fact that in off-peak times or low-load levels, locational marginal prices in MISO are negative. So I'm trying to understand why the off-system sales and off-peak at negative marginal prices is a positive opportunity for MDU.

MR. SASSEVILLE: I'll object to the form of the question. I think it misstates his testimony.

MS. GOODPASTER: I believe that earlier Mr. Nguyen stated that the benefit that they were anticipating, MDU was anticipating or one of the benefits that MDU anticipates is that it could make off-system sales with Big Stone II in off-peak periods. He's also stated that in MISO the locational marginal prices at low load levels or not off-peak times are negative and I'm trying to understand how those two statements that he made are consistent. Why is selling surplus energy into the MISO market at negative marginal prices an opportunity?

MR. SASSEVILLE: And I'll renew my objection because I don't think he said that the off-system, off-peak sales will be sold at negative prices or at a loss. I think in fact his

testimony was the opposite. He said he believes they would be sold at a profit.

Q. (BY MS. GOODPASTER) Mr. Nguyen, are off-peak times -- aren't minimum load levels coinciding with a negative locational marginal price?

A. They may, but you are talking about two different things.

Q. Okay.

A. Off-system sales is when we have to sell them, when we have a buyer. Someone needs it. And you are talking about the wind generate a negative when we have wind. I don't think that any company would look in the sky and wait for the wind to blow to buy the energy from us. They are two different things, two different occasions, two different needs from the market.

Q. And in the most recent discussion we are having, I'm not talking about wind power, I'm talking about Big Stone II and a base load resource and so at some point you are stating that you are going to have surplus energy to offer at off-peak times.

A. Yes.

Q. And you are also stating that it would be a subset of the off-peak times where locational marginal prices are positive?

A. I said that, correct, but you missed that when no one wants it, there is no market for it. Only when we use the

system without any buyer, we force our energy inadvertently into the system. But off-peak sale, when we have a seller and a buyer, that's agreement to use the transmission system, the payment is from the other, the buyer.

Q. So you don't -- you are not -- do you know that you are going to be able to make surplus sales at this point?

A. From our historical record, we will, and I believe that the decision that we make that we believe that we will make the margin for our customers to benefit our customers.

Q. Mr. Nguyen, is there any analysis supporting MDU's belief that there will be an opportunity for -- that there will be surplus sales made from the Big Stone II?

MR. SASSEVILLE: Other than the analysis he just referred to?

MS. GOODPASTER: Other than what he just stated, some quantitative economic analysis.

A. I know there was some, but I'm not involved in those decisions. I cannot tell how the analysis and how deep they are.

Q. (BY MS. GOODPASTER) Mr. Nguyen, do you know who is responsible for those analyses so that I could follow up at a future date?

A. My vice-president is responsible for the decision for that.

Q. Is that Andrea Stomberg?

A. Yes, Andrea.

MS. GOODPASTER: That concludes my questions, thank you, Mr. Nguyen.

MR. SMITH: Ms. Stueve, do you have any questions of Mr. Nguyen?

MS. STUEVE: Yes, I do.

CROSS-EXAMINATION

BY MS. STUEVE:

Q. Good morning, Mr. Nguyen. Welcome.

A. Morning.

Q. It sounded from your cursory summary that you are familiar or participate in MAPP, M-A-P-P?

A. Yes.

Q. What does the acronym stand for again?

A. Mid-Continent Area Power Pool.

Q. Are you familiar with the geographic area MAPP covers?

A. Yes. I think that the map was given by Mr. Koegel in his summary yesterday.

MS. STUEVE: Could counsel, pull that map up, please.

Q. (BY MS. STUEVE) We heard a lot from various co-owners coming and presenting the case for need, need for a base load generation; would you agree?

A. Yes.

Q. Yes, and you're presenting MDU has a need for base load generation also.

A. Yes.

Q. Yes. Okay. Do you have any idea what the estimated need is projected to be for the MAPP area?

MR. SASSEVILLE: For which year, Ms. Stueve?

MS. STUEVE: For 2020.

A. I'll speak it from the Montana-Dakota's point of view rather than from MAPP.

Q. (BY MS. STUEVE) Okay.

A. MAPP is an organization whereby -- it's a power pool, it's not a company.

Q. Right.

A. So each individual member, like Montana-Dakota Utilities, is responsible for itself. So MAPP, in my view, is that MAPP has nothing to do with determining the need for MAPP or not. But that's as far as I can tell.

Q. Right. And you can't speak as far as the need for multiple utilities within MAPP as far as what the projected number for need would be by 2020. That's beyond your scope.

A. That's correct.

Q. Okay. Thank you. So up on the board there, that would be the MAPP area, correct?

A. That's correct.

Q. Are you familiar with the project area of Big Stone II?

A. I know the location of Big Stone II.

MS. STUEVE: Okay. Could counsel please pull up the draft EIS map, Exhibit 53, page 2-62? Did counsel bring 13 copies of the draft EIS?

MR. WELK: No, it's in the record. Everybody has got copies.

MS. STUEVE: Do we have a copy to give the witness?

MR. SMITH: I got one, Chris.

MR. SASSEVILLE: I'm going to object to this line of questioning based on foundation, first of all, and relevance. We went through this yesterday and it led to a pretty tight dead end, so I'm curious what relevance this is.

MR. SMITH: Can you give us just a little explanation of what you are trying to show here, Ms. Stueve?

MS. STUEVE: For example, within the defined MAPP area, if there's a need of, say, 6,300 megawatts in the area, MAPP area by 2020, for example, to meet that would we need 8,000 megawatts of new generation? And would that concur or would that lead to the fact that we would have 1,700 megawatts of line loss? Meaning how do we disperse between the project area where this base load generation comes from to the broader area where the need is in the area by 2020?

MR. SASSEVILLE: Then I'll object based on foundation because there's no indication this witness has the knowledge to answer that question.

MR. SMITH: I think the other thing is if I recall,

and maybe you will still have a question on this, but I think Mr. Nguyen just testified that in the MAPP region, it's each individual utility's responsibility to meet its minimum resource requirements by itself. That is its responsibility. Was that your testimony?

A. Yes.

MR. SMITH: With that said, do you still have a question regarding this?

MS. STUEVE: I do not.

MR. SMITH: If you do, go ahead. I'm not trying to dissuade you, but I think he already kind of answered your question by stating that the MAPP resource requirements are company specific, it's their own internal responsibility to meet those. Is that your testimony? Is that what you said?

A. Yes, that's correct.

Q. (BY MS. STUEVE) You are saying you can meet your base load with the Big Stone project II?

A. Say the question, what year are you talking about?

Q. Your projected base load need.

A. In my direct testimony, with Big Stone II, our needs would be satisfied through 2013 and starting after that we'll have to look for a new resource addition.

MS. STUEVE: Thank you.

MR. SMITH: Staff? Is that all you had?

MS. STUEVE: Yes. No further questions.

MR. SMITH: Staff?

MS. CREMER: Staff has no questions, thank you.

MR. SMITH: Commissioners, do you have questions of Mr. Nguyen?

VICE-CHAIR JOHNSON: Actually I don't, thanks.

CHAIRMAN SAHR: I do not.

MR. SMITH: Redirect?

MR. SASSEVILLE: Thank you, Mr. Smith.

REDIRECT EXAMINATION

BY MR. SASSEVILLE:

Q. I have just a few. Mr. Nguyen, you were asked a few questions by Ms. Goodpaster about locational marginal pricing. Do you recall those questions? The questions related to off-system off-peak sales, and she interjected into the line of questioning the concept of locational marginal pricing and the possibility of selling excess energy at a loss. Do you recall that?

A. Yes.

Q. Could you explain the idea of must-run resources?

A. A must-run resource is that for -- I would have to go back to the characteristic of a generating plant. I'll make an example, like Big Stone II at 600 megawatt, it's not a matter of bringing up 600 megawatt and running it. It go to steps, like the first step, in order to keep it running at we call idle, just like the car running idle, it is the minimum load so

that it can be ready to be up and down and each of those -- each of those would be -- the 600 megawatt would have several blocks of where it is dispatched accordingly and they have different price in this block. But let's talk about minimum load. Big Stone for our share I estimate that we would have 40 megawatt out of 160 as the minimum load that must run.

Q. And what is the level of your must-run resources at this point relative to load?

A. Including Big Stone II, we would be about at the minimum load at about 36 percent, about 36 to 40 percent of our total system peak in 2011.

Q. And what would happen if you added to that minimum level wind generation?

A. As I testified in my summary, we have several options. One is that if we take the wind, we can bring down the must-run unit and that first option is that the next day we will not have those must-run units to be back up to serve our customer when the wind stops blowing. Second, we can just pay for the wind and just don't take it, stop the wind generation. The third one is that we can dump the wind into the MISO market with no buyers, no one need it and pay for the negative LMP.

Q. It's negative for what reason, is it because there's no taker, no buyer on the market and there's an adverse impact on the transmission system?

A. Yes, that's correct.

Q. And that's what you meant when you explained that by putting this energy into the market, you would sustain a loss or pay a penalty, correct?

A. Not only we have to sustain a loss, but we have to pay and we lose another thing and have to pay in addition to the purchase price that we have to pay for nothing.

Q. Let me ask about your must-run resources. Will Big Stone II be your least cost must-run resource?

A. Yes, it will be.

Q. And was the testimony that you gave in your summary based upon the assumption that Big Stone II would be on line and your least cost must-run resource?

A. Yes, that's correct.

Q. And within your calculations, your analyses about the effect of wind, was there room to accommodate a certain amount of wind generation without incurring these locational marginal pricing penalties?

A. We estimate that as a normal system we can accommodate approximately 10 percent of the wind capacity.

Q. And based on the recommendation of Mr. Schlissel and Ms. Sommer, would that amount be exceeded?

A. Yes.

Q. Now, we talked about a different subject that sounds like it's related and that is off-peak off-system sales of energy. Do you recall that?

A. Yes.

Q. And explain who will benefit as between shareholders and customers or consumers of MDU from the revenues derived from those off-peak off-system sales.

A. In North Dakota now where we have what they call margin sharing mechanism whereby the customers reap 85 percent of the margin, of the benefits, the shareholder is allowed only 15 percent of the benefit.

MR. SASSEVILLE: Thank you.

MR. SMITH: Does that conclude redirect?

MR. SASSEVILLE: Yes, sir.

MR. SMITH: Do you have any recross in response to that?

MS. GOODPASTER: Just one question, Mr. Smith.

RECROSS-EXAMINATION

BY MS. GOODPASTER:

Q. In response to Mr. Sasseville, his redirect, you were clarifying that it's with Big Stone II that MDU would be at a minimum load level, 36 percent of the time; do I understand that testimony?

A. Yes.

Q. And then your further conclusion is adding wind to that scenario which already includes Big Stone II; is that correct?

A. Adding wind how much?

Q. Well, let me be more clear. You stated in talking to Mr. Sasseville that MDU's concern would be adding wind and the impact that that would have on the 36 percent number; isn't that correct?

A. Yes.

Q. So that tells me that you are concerned if you added Big Stone II and added a Schlissel/Sommer, for example, amount of wind, that that would cause a problem.

A. That's correct.

Q. And you are aware that joint intervenors and Mr. Schlissel and Ms. Sommer are not recommending that Big Stone II be built and add any amount of -- any particular amount of wind.

A. Can you say that again?

Q. Sure. Do you agree with me that joint intervenors and Mr. Schlissel and Ms. Sommer are not taking a position that Big Stone II be built and to that add any amount of any particular amount of wind?

A. That's correct. In my cursory analysis, I did not take into account that Mr. Schlissel and Ms. Sommer also recommended in conjunction with the wind the IGCC, I think the combined cycle gas turbine; is that correct?

Q. Mr. Nguyen, I think that Mr. Schlissel and Ms. Sommer's testimony is providing a variation perhaps on the Burns & McDonnell analysis that was assuming wind and gas.

A. And my cursory analysis doesn't take into account that gas part capacity also.

MS. GOODPASTER: Okay, thank you.

MR. SASSEVILLE: I have nothing further.

MS. STUEVE: I have been able to formulate a more general question I do believe, one.

MR. SMITH: Go ahead.

RECROSS-EXAMINATION

BY MS. STUEVE:

Q. Has MDU in particular looked at the pros and cons to meeting need locally versus choosing a more distant central station?

MR. SASSEVILLE: I'll object. Could you be more specific when you say meeting need locally versus choosing a more distant central station?

MS. STUEVE: Meaning closer to MDU, centrality of MDU, for example, of your base.

MR. SASSEVILLE: Your question assumes that it's located somewhere other than in the center of their service territory. I believe the testimony has been that it is in the center of their service territory.

Q. (BY MS. STUEVE) Big Stone II is in the center of your service territory?

A. No, I don't think so, but it is the best location for us. We are looking at a closer place, that's the Lignite

Vision 21 project.

Q. Pardpm? The --

A. Lignite Vision 21 project, which will be a lignite coal-fired plant at 175 megawatt and if built, it would be built near Headinger, North Dakota, but it is our next best.

Q. Okay.

A. So we look at other alternatives.

MS. STUEVE: Thank you.

MR. SMITH: Now any redirect?

MR. SASSEVILLE: No.

EXAMINATION

BY VICE-CHAIR JOHNSON:

Q. I have a question in response to redirect from Mr. Sasseville. Mr. Nguyen, I think in your testimony you mentioned that of the must-run resources Big Stone II would be the lowest cost; is that correct?

A. I would say one of the lowest cost. I don't have the number in front of me to say one way or another because Big Stone II cost is still -- are still working on, we don't have the final costs of Big Stone, that's why I cannot say it definitely. I kind of misspoke that way.

Q. Okay. In your direct testimony, you mentioned that MDU has 366 megawatts of coal-fired steam units. Are any of those supercritical pulverized coal units?

A. I'm not sure about that. I am not a power plant

expert.

VICE-CHAIR JOHNSON: Thank you very much.

MR. SASSEVILLE: No redirect.

MR. SMITH: Thank you, you may step down. I've had a request that we take a short break from counsel. Are the commissioners amenable to that? It's a quarter to 11:00. How long do you want to take? Ten minutes, 15 minutes? Shall we say ten and then assume we'll really be back? Why don't we take a ten-minute break.

(Whereupon, hearing was in recess at 10:45 a.m. and subsequently reconvened at 11:00 a.m., and the following proceedings were had and entered of record:)

MR. SMITH: We're back on the record following our morning recess. Applicants, you may proceed with your next witness.

MR. SASSEVILLE: Thank you, Mr. Smith. The applicants call Robert Davis.

Thereupon,

ROBERT DAVIS,

called as a witness, being first duly sworn as hereinafter certified, testified as follows:

DIRECT EXAMINATION

BY MR. SASSEVILLE:

Q. Good morning, Mr. Davis.

A. Good morning.

Q. Would you state your name and spell it for the record, please?

A. Robert L. Davis, R-O-B-E-R-T, L. D-A-V-I-S.

Q. You are senior director with R.W. Beck, Inc.?

A. That's correct.

Q. What is R.W. Beck, Inc.?

A. R.W. Beck is a nationally-recognized engineering consulting firm headquartered in Seattle, Washington.

Q. What was R.W. Beck Inc.'s role in this proceeding?

A. We were retained by Central Minnesota Municipal Power Agency to review a load forecast and to review the generation expansion planning analysis.

Q. Have you prepared or caused to be prepared rebuttal prefiled testimony in this case?

A. I have.

Q. And what was the purpose of your preparation of that rebuttal testimony?

A. It was to review the evaluations that have been performed by CMMPA and to provide an updated or revised analysis to investigate resource expansion and need for CMMPA.

Q. Were you in charge of or did you supervise the work that was done in that regard?

A. I did.

Q. Is that work reflected in Exhibit 47?

A. It is.

Q. And that's in front of you?

A. Correct.

Q. Do you have any corrections, revisions or changes to any part of Exhibit 47 which, for the record, includes Exhibits A, B and C?

A. I have one substantive change to Exhibit C of Exhibit 47.

Q. Could you first identify the page that the change is on?

A. It's on page ES-2. It is the first bulleted item on that page, ES-2 is in the second page of the executive summary.

Q. Which is Exhibit C to Exhibit 47?

A. Yes. That first bulleted item, last sentence should read, this amount of wind capacity is approximately equal to the incremental need necessary to satisfy the renewable energy objective of the Big Stone II members for 2012.

Q. Are there any other changes, revisions or corrections?

A. No. Nothing substantive.

Q. Mr. Davis, if I were to ask each of questions set forth in Exhibit 47 this morning, would your answers be the same?

A. They would.

MR. SASSEVILLE: At this time applicants offer into admission Exhibit 47.

MR. O'NEILL: No objection.

MS. STUEVE: No objection.

MS. CREMER: No objection.

MR. SMITH: Applicants' Exhibit 47 is received into evidence.

EXHIBITS:

(Applicants' Exhibit No. 47 received into evidence.)

Q. (BY MR. SASSEVILLE) Mr. Davis, could you provide first a quick summary of your credentials, your educational, employment and professional experience and then present your written summary for the commission?

A. Sure. I hold a bachelor of science degree from the University of Florida, Gainsville, Florida where I studied essentially an interdisciplinary study of alternative energy technologies and engineering mathematics. After that I was hired by Gainsville Regional Utilities where I was responsible for analyzing and managing and directing their demand-side management programs. Joined R.W. Beck in 1990 where since that point in time I have been running numerous resource planning evaluations, financial evaluations, market studies, et cetera.

I would like to follow up, too, that I've got testimony experience in several cases before the State of Florida, State of Texas, State of South Carolina and affidavit filing before FERC. These issues that were covered in those filings relate to integrated resource planning, certificate of need, demand-side needs assessments and market power related

issues.

Turning to a summary of the evaluation I did for CMMPA, we performed a load forecast and resource expansion analysis for the members specifically of CMMPA that were participating in the Big Stone Unit II project as well as the City of Willmar. What we found based upon our evaluation of a load forecast which was performed as an econometric load forecast, that net energy for load and peak demand for these entities were projected to grow at approximately 1.5 percent over the next 20 years. Reserve margins for these entities were anticipated to fall below 10 percent by 2011 when the Big Stone II Unit were not available.

With regard to the resource plan and the results of the analysis we performed, the resource expansion analysis directly addressed renewable energy and DSM resources as part of the evaluation. The least cost plan that came out of this analysis was that CMMPA should add 30 megawatts to the Big Stone II Unit in 2011 plus an additional 10 megawatts of wind by 2011. Additional base load capacity additions beginning in 2019 and continuing every two years thereafter were also found to be coal-type resources. Additional DSM beyond those levels required to meet the conservation improvement requirements of the State of Minnesota were not found to be cost effective. That's a brief summary of my testimony.

MR. SASSEVILLE: Thank you. Mr. Davis is now

available for cross-examination.

MR. SMITH: Please proceed, intervenors.

MR. O'NEILL: Thank you, Mr. Smith.

CROSS-EXAMINATOIN

BY MR. O'NEILL:

Q. Good morning, Mr. Davis.

A. Morning.

Q. Mr. Davis, was R.W. Beck commissioned to do a study on behalf of CMMPA in 2006?

A. Yes.

Q. And as I understand it, they had committed to BS II in 2005.

A. That is my understanding.

Q. Do you think it may have been more prudent for them to have commissioned you prior to their commitment to the Big Stone II?

MR. SASSEVILLE: Object, it's argumentative.

MR. SMITH: Overruled.

A. It is my understanding that CMMPA did hire R.W. Beck to perform evaluations related to the Big Stone II asset. The analysis that we did here was merely a more refined analysis, which I guess could be described as more analytically defensible.

Q. (BY MR. O'NEILL) Okay. Looking at the DSM programs that were discussed, did we read your information correctly in

which we understood that there was a 28 cent per kilowatt hour or the average of the BS II CMMPA members, the DSM programs that they are currently offering, is that what the cost to the DSM programs were as you evaluated them?

A. Yes. Not all of the members have that information available, nor are these members required to file that level of information with the State of Minnesota. Based upon the members who do have information available on both program cost and energy savings, we estimated that to be the average cost of DSM programs for the CMMPA members.

Q. In coming up with that figure, we understand that you didn't consider DSM programs other than those that had already been offered by the CMMPA members; is that true?

A. That's correct.

Q. All right. What were the DSM programs that you were using as you understood in coming up with that figure?

A. It included a combination of programs related to appliance rebates, compact fluorescent lighting rebates, as well as load management programs.

Q. As it relates to the load management programs, what percentage of the cost was related to the load management programs?

A. We are looking here at merely the incremental program costs that are reported by the members on a year-to-year basis.

Q. So do you have an ability to quantify out of the DSM

programs you had what amount of cost was attributable to the load management programs?

A. Not at this podium at this time, no.

Q. A percentage, I'm not looking for an exact figure, but some type of your best estimate that we could use to understand its relation to the other DSM programs?

A. Forced to guess, I would say somewhere in the neighborhood of a third.

Q. Okay. In hearing your background and your testimony, you had described a wide array of energy-related planning services that you and your company provide; is that true?

A. Correct.

Q. Do you currently advise clients regarding CO2 regulatory costs?

A. Personally, no.

Q. How about your company?

A. Yes.

Q. And can you tell us what, if anything, your company does provide to its clients in regard to CO2 regulatory costs?

MR. SASSEVILLE: I'll object, this is beyond the scope of his rebuttal testimony.

MR. SMITH: Do you have a response?

MR. O'NEILL: Beyond the scope of his rebuttal testimony, I believe that it's related to the issue of the effectiveness of alternatives that have been -- the cost

effectiveness that have been raised in his testimony.

MR. SMITH: I'll let him answer.

A. Could you restate the question, please?

Q. (BY MR. O'NEILL) Sure. Can you tell me what R.W. Beck currently advises its clients in regard to CO2 regulatory costs?

MR. SASSEVILLE: I'll object also for lack of foundation. He's made the leap that Mr. Davis knows what his company does for all of its clients in this particular area.

MR. O'NEILL: I'm asking for his personal knowledge.

MR. SMITH: If you don't know, you don't have to feel uncomfortable about just saying you don't know if you don't know.

A. I could at least say that we recommend to clients that the price for CO2 at this point in time is speculative. When we do offer up a price, we tend to rely upon, either for an evaluation or to just offer insight for clients, we rely upon information that has currently been published from others in the industry, including bills that have been put forth. Most of our numbers are somewhere in the neighborhood of about five dollars a ton.

Q. (BY MR. O'NEILL) How about the wind production credit, did you use a wind production credit number in the generation, expansion analysis you performed for CMMPA in this case?

A. We assumed that all the assets that we were modeling here were to be owned or part owned by CMMPA and since CMMPA is a publicly-owned entity, even if there was a tax credit in this case, they would not be able to take advantage of it.

MR. O'NEILL: Very good. Thank you. That's all the questions I have.

MR. SMITH: Ms. Stueve?

MS. STUEVE: No questions.

MR. SMITH: Staff?

MS. CREMER: Staff has no questions, thank you.

MR. SMITH: Commissioner questions?

COMMISSIONER HANSON: No.

VICE-CHAIR JOHNSON: No.

MR. SMITH: Redirect?

MR. SASSEVILLE: I have no redirect, thank you.

MR. SMITH: You may step down, Mr. Davis. Thank you. Are you prepared with your next witness?

MR. SASSEVILLE: Yes, we are. We are going to swap out lawyers here if you don't mind.

MR. SMITH: That's fine.

MR. SASSEVILLE: While we are waiting I'd like to introduce Mr. Peter Glaser, who will be the attorney for the applicants who will be conducting the examination and introducing witnesses Daniel Klein and Thomas Hewson. This is Mr. Glaser to my left.

MR. SMITH: Thank you. Welcome, Mr. Glaser. Do you need a second to get organized there?

MR. GLASER: I'm well-organized, ready to go. I even have the right glasses with me, which is the most important thing. I am Peter Glaser. We have Daniel Klein as our next witness.

VICE-CHAIR JOHNSON: Mr. Glaser, if I can interrupt, try to keep the microphone as close to your mouth as possible. We have had some people on the Internet ask us to speak up.

MR. GLASER: That sounds good?

Thereupon,

DANIEL KLEIN,

called as a witness, being first duly sworn as hereinafter certified, testified as follows:

DIRECT EXAMINATION

BY MR. GLASER:

Q. Mr. Klein, can you please state your name for the record and spell it, please?

A. My name is Daniel E. Klein, D-A-N-I-E-L, middle initial E, last name is spelled K-L-E-I-N.

Q. And do you have in front of you a document entitled prefiled rebuttal testimony of Daniel E. Klein, dated June 9th, 2006 and premarked as Applicants' Exhibit 31?

A. Yes, I do.

Q. And was that exhibit prepared by you or under your

supervision?

A. Yes, it was.

Q. And as you are under oath today, if I asked you the questions that are contained in this exhibit, would you provide the answers that are set forth?

A. Yes, I would.

MR. GLASER: And I guess at this point we should tender the -- tender the exhibit and move for admission of the exhibit.

MR. SMITH: Is he going to have any corrections at all?

MR. GLASER: No.

MR. SMITH: The exhibit has been offered into evidence. Is there an objection?

MS. GOODPASTER: No objection.

MR. SMITH: Applicants' Exhibit 31 is received into evidence.

EXHIBITS:

(Applicants' Exhibit No. 31 received into evidence.)

Q. (BY MR. GLASER) Mr. Klein, do you have a summary prepared of the Exhibit 31?

A. Yes, I do.

Q. And at this point I would ask you to provide that summary and also providing a summary of your background and credentials.

A. Okay. Thank you. I'm currently president of Twenty-First Strategies, an energy and environmental consulting firm. I have 30 years plus of consulting experience in this area, working for government agencies, electric power companies, industry association, NGOs and others. The first 20 years of that experience was with a company now called ICF Consulting, at various points in time referred to as ICF, Inc. or ICF Resources. In 1995 I founded Twenty-First Strategies to do similar type work but with a personally saner lifestyle.

Educationally, I have a bachelor's degree in -- a bachelor of science degree in urban studies and systems analysis from MIT and I have an MBA from the Stanford graduate school of business. My testimony today concerns the concept of risk in planning electric generation resources. Some in this proceeding have spoken already about potential future greenhouse gas regulation, but my testimony tries to point out that there are also significant risks that would result from not constructing Big Stone II station and instead relying upon other forms of electric generation.

A decision not to construct Big Stone II would likely lead to increased reliance on electric generation fueled with natural gas. In most parts of the U.S., including the MAPP region, natural gas combined cycle plants have dominated recent capacity additions. Large scale additions of new nuclear capacity or hydropower are unlikely at this time. Doing

nothing would effectively be a decision to buy more off the grid, which on the margin is mostly gas fired.

A renewable resources and wind power could substitute for some of the generation that Big Stone II could produce but because these resources are intermittent and not dispatchable, they make only a limited contribution to meeting capacity needs. These intermittent resources require backup capabilities such as natural gas before most of the capacity could be considered dependable.

Natural gas prices are quite volatile, they react dramatically to events locally and around the world. Coal prices, on the other hand, are based much more on domestic mining and transportation costs and they are generally far less volatile than oil or gas prices. Because of this, regions that have more coal-fired power in their generation mix tend to have more stable power rates. And as I'll discuss in a minute, higher fuel prices and price volatility are linked to adverse health impacts.

Price spreads between fuels have been increasing. The chart on the left here, the chart on the left shows average delivered fuel prices for utilities since 1973. Oil and gas prices, the two lines in the middle of that left-hand graph, have fluctuated greatly and in recent years have been climbing again. But while oil and gas prices have soared, coal prices have been much more restrained. Since the 1980s, coal prices

have generally trended downward as efficiency gains have continued to reduce costs on this cost-based commodity.

Because of these trends, the forecasted price differential between coal and natural gas has been widening, weakening natural gas's ability to be a competitive long-run fuel for power generation.

On this slide, the chart on the right looks at forecasts of fuel prices made by the U.S. Energy Information Administration over recent years. Each unit along the bottom line indicates another year of forecasting, starting with the forecast that EIA made in 1998 and continuing up to this year's annual energy outlook 2000. What's plotted on this chart is EIA's forecast of fuel prices delivered to electric utilities in the year 2020. The bottom line for coal shows that over the last eight years, price forecasts have been at close to rock solid as you can see.

Gas prices in the middle show that in each and every year since EIA started forecasting for 2020, the outlook for gas prices has been higher and higher.

My testimony also examined the volatility of energy prices as seen in historical fuel prices, data from the energy futures markets and longer term energy price forecasts. Each of these data sets confirms the greater volatility of natural gas prices and therefore its greater price risk relative to coal. This particular chart graphs prices for natural gas

futures. For the gas contracts that ended in May 2006, future prices over the trading period, which goes back to 2003, have fluctuated over a huge range, from less than $4 a million BTU to more than $10 a million BTU.

This volatility in natural gas prices creates price risks for electricity generators. Let's assume for the sake of illustration that if instead of coal at Big Stone II, 600 megawatts of natural gas combined cycle was built. Each change in gas prices of only one penny per million BTU would change annual costs by about $300,000, and if natural gas priced futures are uncertain by a dollar a million BTU or more, which as we have seen happens often, then total costs for a gas alternative could vary by tens of millions of dollars annually.

Higher fuel prices mean higher costs for generating power and higher rates for the customers. For South Dakota consumers, income that's diverted into higher power bills is no longer available to meet other household uses. With less household income, other activities must be curtailed, including some that would have promoted better health and safety. This in turn leads to a greater chance of premature death. There is a close measurable relationship between household income and health.

Some have described this effect as wealthier and healthier. I'm not saying this wealthier and healthier effect is a good thing, I'm not saying it's the way things should be,

it just is. It's been well documented over decades of research around the world, while we know that impoverished countries have shorter life spans than developed nations, this effect can also be seen within prosperous nations such as the U.S.

This chart uses data and projections from the U.S. Census Bureau. It plots the average life expectancy of newborns in each state against that state's average household income. On this chart, each single dot represents a state, how far to the right it is indicates the average household income and how far up it is represents the average life span. The upward trend among the dots, that is, among the states, is clear. Even in the prosperous U.S., higher household income is correlated with longer life expectancy.

For the population to be served by Big Stone II, two additional factors exacerbate this sensitivity to fuel prices and volatility, suggesting that the potential impacts on health, safety and longevity would be greater than what national averages would suggest. First, for most of the counties to be served by Big Stone II, there is a household income that is lower than the national average. Lower-income families already must spend a greater percentage of their household earnings to cover energy-related expenditures. Further, lower-income families are more at risk than higher-income families when income is reduced. As such, they get hit twice, they incur higher health and mortality risk when

higher power costs reduce the remaining household income.

The second factor is that households in South Dakota and other states in the west north central have higher than average consumption of natural gas and petroleum in the remaining household energy uses. This is probably largely related to higher winter heating needs. So if natural gas is also used instead of coal at Big Stone II, overall fuel supply diversity is reduced. Households would then be hit twice, once in the direct consumption of fuel and again in their use of natural-gas-fueled electricity. Hence, using coal such as Big Stone II would not only be less volatile as a power generation source, but would also help to moderate price spikes in other parts of the family's energy budget.

That's my introductory statement, I thank you for your attention.

MR. GLASER: The witness is available for cross-examination.

MR. SMITH: Joint intervenors, are you prepared to start?

MS. GOODPASTER: More or less.

MR. SMITH: Please proceed.

CROSS-EXAMINATION

BY MS. GOODPASTER:

Q. Thank you, Mr. Smith and good morning, Mr. Klein.

A. Good morning.

Q. Turning to your testimony, Exhibit 31, I'm just looking at the table of contents to begin with, just so that you understand how I'm categorizing different parts of the testimony. The second -- Roman II on your table of contents, have you gotten to that page? Alternatively, you could turn to page 7 and get the same information.

A. This is in the exhibits?

Q. It's the prefiled testimony, your rebuttal testimony is marked as Exhibit 31.

A. Okay.

Q. So I was looking at the table of contents for your testimony.

A. And you're looking at page 7 now?

Q. Sure, we can look at page 7. Roman No. 11, Section No. 2 is titled volatility of fossil fuel prices, do you see that?

A. Yes, I do.

Q. This section of your testimony is analyzing volatility of energy prices of fossil fuel energy prices; is that correct?

A. Yes, it is.

Q. And the comparison is between coal, natural gas and petroleum?

A. Yes, it is.

Q. Are you familiar or have you read any of the parties', specifically joint intervenors' testimony, in this proceeding?

A. I have read it, yes.

Q. Isn't it true that joint intervenors and in fact no other party to this proceeding is proposing that 600 megawatts of natural gas be substituted for Big Stone II?

A. That's my understanding now. When I read the testimony, there were several pages devoted to looking at various alternatives of natural gas and/or wind, and I understand now from reading the surrebuttal that that was described as simply an examination and not a recommendation. I'm not clear what the recommendation is and I'm not aware of any recommendations by which this base load need could be met without using oil or gas in lieu of coal. So my testimony looked at what is typical, what is dominant practice in the United States where excess capacity is, and it's by and large for most of the country a given that if you don't have coal, natural gas is going to be on the margin.

Q. Okay. So your assumption is, for your comments in this proceeding is that the point of reference is replacing Big Stone II with 600 megawatts of natural gas?

A. Could you rephrase that? I'm not quite clear what your question was.

Q. My question is whether your testimony and your comments regarding Big Stone II assume that the alternative to 600 megawatts of Big Stone II is 600 megawatts of natural gas.

A. It was not that specific. My testimony was that if

you don't have Big Stone II, the capacity and generation is going to be made up from somewhere and on the margin, that's going to include substantial amounts of natural gas and perhaps petroleum.

Q. But not necessarily 600 megawatts?

A. I did not make a specific thing. I used 600 megawatts just for illustration to show what the price impact would be of uncertainty in natural gas prices, where one penny a million BTU is $300,000 a year.

Q. Going to your summary that you just presented, if you could look at page 3 of your summary, you presented two charts, this is continuing in the topic of relative volatility of fossil fuel prices, correct?

A. Yes.

Q. In these historical and forecasted fuel prices in these two charts, did you include transport costs of coal in the costs for coal, the lowest line with squares on it on the graphs?

A. Yes, these data sources both are from the U.S. Energy Information Administration. The historical data is the U.S. average for what is reported by electric utilities for delivered fuel costs, so they include transport costs to the respective plants. For the forecast, that comes out of their modelings as reported in their annual energy outlook, and again it's defined as the fossil fuel prices delivered to electricity

generators.

Q. I don't know if you were -- you probably just came in yesterday and may not have been here to hear testimony or seen the record where some of the co-owners have stated that their rail transport costs are I think one of them said four times the average. Are you aware of that?

A. I'm not aware of the testimony, I'm not sure what four times the average means, four times their own average?

Q. I believe it would be something similar to your national U.S. average that you are talking about here.

MR. GLASER: I'm going to have to object to this witness testifying about testimony that he was not here for and that you are now summarizing.

MR. SMITH: I think I'll sustain it. And can you get at it a different way?

MS. GOODPASTER: I can move on.

Q. (BY MS. GOODPASTER) On page 6 of your summary, the wealthier is healthier slide, do you know what the statistical correlation or R value of the life expectancy and average household income is for this data?

A. I have not done that calculation and to my knowledge, these numbers have not been put together before. They are all by the U.S. Census Bureau, both the projections and the historic data.

Q. So you haven't -- you said you haven't done a

statistical analysis of the correlation, so you can't tell me whether this is a statistically significant relationship here?

A. I did not do that analysis. I don't want to be in a position of saying if you got $5,000 more, you are going to live -- it's subject to a lot of misinterpretation. The broad pattern to me was visually clear. I suspect strongly if we did the R values, they would prove to be statistically significant.

Q. I'd like to turn to -- have you turn to page 30 of your rebuttal testimony, Exhibit 31, page 30, line 8. You are referencing there a 2002 report that you prepared?

A. That's correct.

Q. And that report is titled mortality reductions from use of low-cost coal-fueled power and analytical framework, correct?

A. That's correct. To be precise, I was lead author of that report but I did have a co-author.

Q. Yes, and I did notice that, thank you. Has this report been published in any academic journals?

A. The report was peer reviewed and it's available -- it's been made freely available on the Internet.

Q. But it's not been published in any peer-review journals?

A. No, but as I said, it was peer reviewed prior to publication or prior to being made available. The peer reviewers are considered national names in their respective

fields. There's James Hammitt, who is associate professor of economics and decision sciences at the Harvard School of Public Health and Detlof von Winterfeldt is associate dean for faculty affairs and research at the School of Policy Planning and Development at the University of Southern California.

Q. You do reference in this same paragraph, line 17 of page 30, a Web site where your report can be downloaded.

A. That's correct.

Q. And that Web site is Center for Energy and Economic Development or CEED, correct?

A. That's correct. The report can also be downloaded on a few other Web sites, too, but this seems to have the best download speed.

Q. Okay. Would you agree that that organization, that organization being CEED, describes itself as a nonprofit group dedicated to protecting the viability of coal-based electricity?

A. I know that the group is comprised of a number of members. I don't know if that's its specific mission statement or not.

Q. So you haven't seen that statement on the Web site that you reference?

A. Not that I recall.

Q. Do you have any reason to disagree with me if I represented to you that the Web site for CEED describes that

organization as a nonprofit group dedicated to protecting the viability of coal-based electricity?

MR. GLASER: I object on the grounds of relevance. I'm not sure what the relevance is to any of his testimony that this particular group decided to put his report on their Web site, among other groups that have put the report on their Web site.

MS. GOODPASTER: Actually, I think it is going to be clearly relevant in a moment.

MR. SMITH: I guess in addition to the relevance, I guess if he hasn't seen it, that was my only issue, how can he agree or disagree? He has no basis for -- at least the implication is that if he disagrees, that somehow means it's on there.

MS. GOODPASTER: How about I go to my next question.

MR. SMITH: Please.

Q. (BY MS. GOODPASTER) I did download your study from the CEED Web site. And you note in a footnote on the first page of that study that the sponsoring organizations of the study include the following, CEED, which is the Web site we just discussed, the organization Web site we just discussed, the Association of American Railroads, the Edison Electric Institute, the National Mining Association, the National Rural Electric Cooperative Association, and the National Black Chamber of Commerce. Is that a correct --

A. That's correct.

Q. -- list of the sponsors of your study?

A. Yes, it is.

Q. So are you familiar with your client CEED, the mission or the description of that organization, that they hold themselves out as a nonprofit group dedicated to protecting the viability of coal-based electricity?

MR. GLASER: I have to object to the characterization of CEED as Mr. Klein's client. I don't think there's any evidence that that's what that is.

Q. (BY MS. GOODPASTER) Could you clarify for me what a sponsor of a study is? Isn't that an entity which either commissions or compensates you for preparing a study?

A. I was commissioned by CEED and the other sponsors you mentioned there to prepare a study that looked into this. They stated to me that their belief was that an objective analysis of this particular issue would be supportive of their opinion. To do so, I recruited as a co-author one of the country's leading academics in decision sciences and we also brought on as peer reviewers two other nationally-recognized people in this field.

Q. When I reviewed the study, page 9 of the study, it wasn't included as an exhibit to your testimony, but I assume you are generally familiar with your own study, and an assumption of the study appears to be, correct me if I'm wrong,

that one would replace all coal with a higher cost alternative, doesn't it?

A. The study as a framework tried to examine what would be the health and mortality impacts of not having coal in our electric system, and to use that, it used as proxies some of the other analyses that were prepared in the late nineties and early 2000s under KYOTO Protocol, initial caps on both, which looked at substantial reductions in greenhouse gas emissions. Most of those studies in turn achieved those reductions by substantial use of other forms of meeting electric needs than coal, either switches to natural gas, conservation, renewables and the like. It is also the case that these alternatives in the modeling had a higher cost than what we have now, which is what one would expect.

Q. And that was the assumption of your study and just -- you said that the assumption is what would happen if all coal in the electric system were removed, correct? It was replaced with something else.

A. That was one of the steps we did to derive a national cost by which we could then begin to develop these mortality factors to find the relationship between electricity cost and human life.

Q. I'm going to try to get the quote from the study here just to make sure I get it correct here. Would you agree with me that at page 9 you state that if coal use for power

generation could be replaced by lower cost alternatives, that would increase income and/or decrease unemployment, then our methodology would subsequently indicate positive associated benefits for health and mortality. Does that sound like an accurate statement from your study?

A. Absolutely. It would be I think an improper characterization to describe my study as saying coal leads to longer life by virtue of its cost. The correct statement would be use of lower cost resources leads to longer life and to the extent those lower cost resources happen to be coal, then you can make the connection. That statement was put in very specifically to let one know that if a situation should reverse, if some miracle technology should occur or if gas prices should fall to one-tenth of what they are, use of coal instead of this new lower cost option would have negative effects, and you should switch to the lower cost resource.

Q. I appreciate your clarifying that because when you read the title of the study, that doesn't come out. The title of the study is mortality reductions from use of low-cost coal fuel power, so I wanted to be clear that we are understanding what your analysis is.

A. It wasn't confusing to me and I put the word "low-cost" before "coal" specifically for that purpose.

Q. Okay, thank you. Does the study that we have just been talking about, did you subtract from any benefits you

found, health benefits you found associated with increased use of coal or even -- let me back up. Your study attempts to quantify health or mortality benefits associated with low cost coal as compared with a higher-cost alternative.

A. My original 2002 study attempted to quantify that, yes.

Q. Yes. And you didn't subtract from any of those benefits that you were quantifying the health impact costs from burning coal such as premature death from respiratory illnesses, asthma, mercury deposition in fish causing high mercury blood levels in women of childbearing age, coal mining deaths, any of those quantifiable measures?

MR. GLASER: I object to that question. Counsel, you are testifying now about issues that you have with the burning of coal that I don't think this witness has testified to.

MR. SMITH: I will agree you did a little bit of testifying but I think he gets the general point and I'm going to let him answer in the general sense of did you quantify the other side of the coin, which are health effects that might be associated with coal as a resource.

A. No, and as I recall in that report, I specified why we didn't. I'm not an epidemiologist, I can't speak for other professional studies on this any more than any other nonqualified person would be. The purpose of this report was to show that there are tradeoffs. That seesaw cartoon I had on

my slide was to indicate that, that there are no simple slam-dunk easy choices that are universally right. Our good intentions on the environment often carry a cost and those costs in turn can have negative effects and that was the purpose of this report.

Q. (BY MS. GOODPASTER) So you don't know how the balance comes out in the end when you measure, you have both sides of the seesaw occupied?

MR. GLASER: I object. That's an awfully general question. Are we talking about Big Stone now or are we talking about nationally, what are we talking about?

MS. GOODPASTER: I'm talking about his study.

MR. SMITH: Overruled.

A. Our purpose in doing that report was to develop the methodology and document the sources and the methods so that anyone who wanted to could make that tradeoff.

Q. (BY MS. GOODPASTER) Is it your understanding that the Big Stone co-owners have used your analysis in this proceeding to add additional analysis that is also part of the tradeoff?

A. I'm not sure I understand your question.

Q. It appears that your -- what you have stated here is that you have provided part of what you feel is the appropriate analysis that should be undertaken and the seesaw cartoon that you referred to, and so you looked at health impacts, mortality impacts associated with not burning coal and burning something

higher cost instead. And you have also said that you have not looked at the health impact costs because you are not qualified to do so, so the health impact costs that I was listing before about respiratory illnesses and mercury and things. And I'm wondering if you know whether the Big Stone co-owners have attempted to quantify those health impacts to use your analysis in the framework you suggest.

A. I don't know what the Big Stone owners have done in trying to quantify health impacts.

Q. I'm going to turn to the study again and I did not reprint copies of it just because it's lengthy and he did say where it could be found on the Web. But as I was reading it, we do share your concern that appears to be expressed that high electric bills affect, can affect poorer populations. I think we agree that that is a concern.

A. Yes.

Q. When I was looking at the study, page 21, there's a table, table 5, where you are summarizing the results of your study, the relative cost allocation, the estimated deaths induced by per $1 billion in regulatory costs. Do you remember that table in your study?

A. Not precisely.

Q. Do you remember a table that shows a total of 147 deaths induced per $1 billion in regulatory costs?

A. Is there on that table the inverse, how many dollars

per induced death?

MR. GLASER: Would it be helpful to show the witness --

MS. GOODPASTER: I can show it to you, sure. It's the one where it divides the costs between different demographic groups, it starts with white males, white females, black males, black females, other males, other females.

A. I'm certain that table is in there, but the details of it were four years ago. If I could see it, I could speak to it. I won't peek at your question.

Q. (BY MS. GOODPASTER) I have notes jotted on there but you will hear about what my notes are in a second. Do you remember that one?

A. I am covering up the right-hand column with my thumb, for the record. Yes, I remember this table.

Q. Would it be possible for me -- you can keep it.

A. The table she's describing is one of the steps in the methodology that after looking at the increased cost of not having coal, after looking at the electricity usage pattern by income bracket and after looking at mortality statistics by different gender, race and age groups, the methodology put it all together into a bottom line. The most useful case is what we call proportional-to-electricity use, that is, if higher costs are equally distributed to households --

Q. Excuse me, I haven't asked you a question about that

table yet.

A. I thought you asked me what the table was.

Q. I generally wanted to refer you to that table and ask you a question about it.

A. Okay.

Q. Is it correct that it contains total numbers for a number of deaths according to demographic population, white males, white females, black males, black females?

A. Yes, it does.

Q. And it was -- this whole line of questioning is stemming from our shared concern about high electric bills and the effect that that may have on poorer populations. I was noticing in this table that more than 50 percent of the deaths that are forecast are in the white male group and I was wondering whether you're stating that that is the poorest demographic population. Is that consistent with being the poorest demographic group in the U.S.?

A. No, not at all. There are more whites than nonwhites in the United States.

Q. Uh-huh.

A. So even if vulnerability per person were exactly the same, you would expect more whites, more deaths out of the total to be white, simply because of larger numbers.

Q. We are talking about white males?

A. White males have shorter life spans on average than

females. And the demographics also show that there is a greater sensitivity among white males to lower income than it is for females.

Q. The other thing that I wanted to talk with you about is your correlation that you draw between poor populations and high residential electric rates or high electric rates and the relative health of those populations. If you could just bare with me for a second, let me get my notes. Would you agree with me that the states with the highest residential electric rates according to the Energy Information Administration are Hawaii, New York, Vermont and Maine?

A. That sounds reasonable. I would have thought California might be in there, but you have probably hit some of the high states.

Q. Would your expectation be that the health profiles for those states would be below average or -- well, would be above average because their electricity rates are so high?

A. Your question is whether because they're higher electricity rates in New York, are more people dying than, say, in a low electricity state?

Q. Yeah.

A. I think that's cutting across many layers of assumptions that aren't supportable. You have to look first at the overall income. New York may have high electricity rates but they also have a much higher income than, say, Arkansas, so

that's going to be a dominant effect. The analyses that are developed here show the effect of a change in rates. It doesn't try to show if you have this electricity rate, you are going to live X number of years. It's going to say if higher costs reduce remaining household income by a certain amount, then health and mortality risks go up. So a state may be quite wealthy and may have very high electricity rates, but that still puts their household income above a poorer state with low rates.

Q. So the fact that -- Hawaii, New York, Vermont and Maine have the highest electricity rates but if I represented to you that they are all below average for years of potential life lost as quantified by U.S. government CDC reports, that that doesn't change your analysis that you have provided to us?

A. Electricity costs are but one of hundreds of household costs.

Q. And so in --

A. So pulling that out in isolation I think renders the question false.

Q. And so the converse also wouldn't change your perspective of Kentucky, Tennessee, West Virginia having low electric rates and heavy coal usage in each of those states but above average years of potential life lost in each of those states?

A. Again, I don't think you can make that extrapolation

from this. The proper use of the information I developed in these reports is to say if there is a change in electricity costs, that in turn changes household income, what is the effect of that change. So it's looking at the change from the status quo, it's not trying to predict what the life expectancy of the status quo is.

Q. And we established early on in this conversation, I believe, that if an alternative were lower cost than coal, it would not be your position that coal is reducing -- that the alternative would be providing greater benefits in scope of health and mortality.

A. The health and mortality benefits accrue to the low cost resources. To the extent that's not coal, it's something else. If coal is the lowest cost resource, then that's the resource to which the benefits accrue.

MS. GOODPASTER: Thank you very much.

MR. SMITH: Ms. Stueve?

MS. STUEVE: I have no questions. Intervenors covered everything and I appreciate your testimony in coming here today.

MR. SMITH: Staff, do you have any questions?

MS. CREMER: Staff has no questions, thank you.

MR. SMITH: Redirect, Mr. Glaser? Pardon me, I'm sorry, I'm sorry. (Laughter) Anyhow, Commissioner Johnson.

VICE-CHAIR JOHNSON: I do not. I will accept your

apology, though.

MR. SMITH: That's my job. Commissioner Hanson?

COMMISSIONER HANSON: Neither do I, sir.

MR. SMITH: Thank you. Now Mr. Glaser.

REDIRECT EXAMINATION

BY MR. GLASER:

Q. Mr. Klein, at the beginning of the cross-examination, you, in response to a question from Ms. Goodpaster, you expressed some uncertainty regarding what the intervenors in this case were proposing in terms of alternatives to Big Stone II. Could you just explain how that -- what your uncertainty is and what role that uncertainty may have played in the analysis that you provided in your testimony?

A. My uncertainty I think started with the reading of their testimony, which looked at a number of different alternatives, several pages actually of combinations of wind and gas. I don't recall seeing any specific proposals that could have replaced the generation and capacity without some form of fossil fuels.

As to the role it played in my testimony, it did not in that respect. I looked and said, if you don't have Big Stone II, what do you have, and in absence of the specific proposal on that, I said, what sorts of things do happen. Well, could you go to nuclear? Well, perhaps in the future we might be moving back toward there but we are not there yet.

Large-scale hydro is not a factor. Renewables are intermittent and can only make a limited contribution toward meeting capacity needs. And doing nothing means you are buying off the grid.

So you are either going to buy off the grid, which is mostly gas on the margin or you are going to build your own gas or gas in combination with something else. But in any event, it is highly likely that if you don't have coal at Big Stone II, you are going to be using more gas.

Q. Then there was a great deal of discussion about the study that you did with Mr. Keeney. Was that -- was that study prepared specifically for this case that we are here at today?

A. No, that study began in 2001 and was published in late 2002.

Q. And is that study the only basis for the conclusion that you made regarding the I think what you called the wealthier is healthier effect?

A. Those findings have been around for decades across countries, across states, across every demographic you can imagine. Groups like the World Health Organization and World Resources Institute point to these types of studies, indicating that the number one killer on the planet is poverty. That is perhaps less applicable in a prosperous nation like the U.S. but there are still discernable effects relating mortality and life expectancy to income.

Q. And lastly, there was some discussion regarding the correlation between electric rates and health effects regarding higher income states with higher rates, lower income states with lower rates and how that played into your analysis. Overall, what would your conclusion be with respect to a state with below-average income such as South Dakota, which has relatively low electric rates, what would your conclusion be in terms of the effect of increasing electric rates in South Dakota?

A. Well, when we look at household income, average household income across states, we see a span of tens of thousands of dollars between the poorest states and the wealthiest states, so changes in electric bills are fairly modest in terms of the average household income, which is why I was stating that I didn't think the high state, high rate comparison was a valid one.

Within any individual state at any starting point, I think it is very much the case that changes in the income on the margin, either by virtue of higher or lower electric bills or by any other change in living costs, has an effect and in lower income states, of which South Dakota unfortunately is one, these effects are pronounced, for two reasons. Electricity use in households is not proportional to income. Lower income households are going to use a higher percentage of their income on energy, and these are the very same households

that are most vulnerable to the health effects of changes in income.

MR. GLASER: Thank you, I have no more questions.

MR. SMITH: Thank you. Any follow-up cross to that?

MS. GOODPASTER: No.

MR. SMITH: Thank you, you are excused. I appreciate it. We are now going to recess for lunch, if that's okay.

VICE-CHAIR JOHNSON: Another reminder to those on the Internet, our lunch is 75 minutes so that would put us back at 1:25.

(Whereupon, the hearing was in recess at 12:08 p.m., and subsequently reconvened at 1:30 p.m., and the following proceedings were had and entered of record:)

VICE-CHAIR JOHNSON: Mr. Smith, Commissioner Hanson will be along in just a few moments but did want us to get started.

MR. SMITH: We shall, then. This is our new system for making sure we turn on the Internet is to put it under my mike so I have to. Are we ready?

We are back on the record following our noon recess. We are in the middle of the applicants' direct case. Commissioner Hanson is going to be a little bit late, he had a problem and so in the interim while he is -- while we are waiting for him to arrive, applicants, did you have a couple of housekeeping measures that you wanted to deal with in the

interim?

MR. WELK: Yes, Mr. Smith. First of all, I have talked to counsel during the recess break and during my opening statement I made a couple of comments about some documents, the number of documents that were produced by the applicants in this case and also the number of pages of prefiled testimony and exhibits, and as we all know what I say in opening statement is not evidence.

So I would ask the counsel for the parties and Ms. Stueve to stipulate that through the course of the discovery of this proceeding, the applicants have made available either through electronic means or in hard copies over 47,000 pages of documents and there have been filed by the applicants over 2,000 pages of prefiled testimony and exhibits. So I would ask for a stipulation on that.

MR. O'NEILL: We would so stipulate.

MS. STUEVE: Yes.

MS. CREMER: I find it hard to believe there's only that many pages. I think you better count again, but yes, I would stipulate there's at least that many.

MR. WELK: Another matter relates to the exhibits and I just wanted to have the record clear on this. There were a number of prefiled testimony exhibits that had sub exhibits appended to them, for example, John Lee I moved for the admission of Exhibit 36, which would have been his direct but

there were actually sub exhibits 36-A through 36-J -- or excuse me, 36-L and I am assuming that when the exhibit when it was received, all of the sub exhibits appended to the prefiled testimony were also deemed admitted.

MR. SMITH: It has been my understanding since the beginning of this hearing that that is the case. If it's not the case, I would appreciate it if the parties would make that known now because then we will handle that, but that's been my assumption from the outset.

MR. WELK: Hearing no objections. The other thing that's a housekeeping matter, through the course of the proceeding the applicants' witnesses, I believe all of them have made PowerPoint presentations to the commissioners and the parties present, and I know the people on the Internet cannot see those and so for the benefit of the record in this, we would like to reserve, beginning at Applicants' Exhibit 92, all of the PowerPoint presentations that have been made and I would ask those that have been handed out, if you will keep those and then we will put those into the record and then tell you what the numbers are and if you do not have a copy of somebody's PowerPoint presentation, then we will provide you with a copy. So we will reserve from 92 until the exclusion of all the PowerPoint presentations.

And I will have that done so we'll have that available in the morning. So please keep those if you want and then

we'll give you the numbers in the morning and then let me know if you don't have a copy of some particular witness. Some of them didn't have copies that we handed out and we know that we didn't did do that, but we will try to make sure that everybody who is here does have a copy of all the PowerPoint presentations.

That concludes the housekeeping matters.

MR. SMITH: Are you going to move the admission of those in the morning?

MR. WELK: Yes, once we get them marked so I can refer to exhibit numbers I will do that.

MR. SMITH: I have a housekeeping matter of my own and that's an announcement and again it's an announcement that involves work, so it's bad. But that announcement is that tomorrow morning unfortunately, we move into 413, which is next door, because the appropriations committee, which pays our bills, has requested to use this room and so we will oblige that request and leave. So we're going to move next door. It's going to be significantly probably more crowded in there, but that's the way it is.

As fate would have it, we scheduled the public input session for that day without realizing this was going to be the case. Actually, I think we did know it but we didn't think about it. So regrettably, we're going to be in a smaller quarters than we would like to be. But I just want everybody

to know that tonight, we've left all our stuff in here, beginning at the close of business today, we're all going to have to either move it next door or move it all the way out and bring it back in in the morning.

I apologize for that. And for the public on the Internet, the public input portion of the hearing tomorrow is scheduled at least to be in Room 413 at 7 p.m. in the state capitol building. If we possibly can and the appropriations committee adjourns its business, we will attempt to move back in here, which is a much nicer facility but for now that's where the proceeding is noticed.

MR. WELK: Mr. Smith, one other item on an exhibit. Mr. Lancaster from GRE, I moved for the admission of his prefiled direct but not his rebuttal. His rebuttal is Exhibit 39, this is one of the witnesses that was not cross-examined and so to make the record complete, I would move for the admission of Exhibit 39, which is the prefiled rebuttal of Richard R. Lancaster.

MR. SMITH: Is there an objection to Mr. Lancaster's rebuttal coming in?

MR. O'NEILL: No.

MS. STUEVE: No.

MR. SMITH: Exhibit -- Applicants' Exhibit 39 is received into evidence.

EXHIBITS:

(Applicants' Exhibit No. 39 received into evidence.)

VICE-CHAIR JOHNSON: Mr. Smith, I would just add two other notes. First off, sometimes I wonder if anybody is ever listening out there on the Internet and our staff did mention to us in the last two days we have had more than 50 comments of phone calls come to the office about the Internet, about us maybe not turning it on or about technical difficulties, so to me that's quite a bit of evidence that people are out there interested in this proceeding and that we are broadcasting out there on the Internet.

And secondly I would just note a note of thanks to the staff that's been keeping us well watered up here in Room 412. The commission staff has been doing a good job of that and we so often forget to thank Tina and Carol and the others for their help. If you are listening, thank you very much.

MR. SMITH: Well, do you want to wait longer for Commissioner Hanson? Shall we wait a few minutes?

VICE-CHAIR JOHNSON: I did what I could with announcments, Mr. Smith.

CHAIRMAN SAHR: I could give a thank you speech.

VICE-CHAIR JOHNSON: Gary was very explicit that we should begin when we are ready.

MR. SMITH: Under our statutes, the administrative procedures act here, commissioner, a majority of the body can hear the case, in fact I can hear it as a hearing examiner and

they are required to fill in the gaps by reading the record and so I'll note for the record that Commissioner Hanson is not here at this time and then if one of you would be so kind as to remind me when he shows up, I want to note that, too, so we will know the portion he is required to read by law. With that, applicants why don't you begin with your next witness.

MR. GLASER: Thank you. Our next witness is Thomas Hewson.

Thereupon,

THOMAS HEWSON,

called as a witness, being first duly sworn as hereinafter certified, testified as follows:

DIRECT EXAMINATION

BY MR. GLASER:

Q. Mr. Hewson, could you state your name for the record and spell it also, please?

A. I'm Thomas A. Hewson, Jr., and Hewson is spelled H-E-W-S-O-N.

Q. And Mr. Hewson, do you have a copy of a document marked Applicants' Exhibit 30, prefiled rebuttal testimony of Thomas A. Hewson, Jr., dated June 9th, 2006 in front of you?

A. I do.

Q. And do you also have a copy of a document marked Applicants' Exhibit 52, prefiled rebuttal testimony of Thomas A. Hewson, Jr., dated June 16th, 2006?

A. I do.

Q. And were these documents prepared by you or under your supervision?

A. They were.

Q. And if I asked you the questions that are set forth in these document today now that you are under oath, would you give me the same answers?

A. I would with two corrections.

Q. Yeah, that was my next question. Do you have corrections to make to the documents?

A. I do. They are both on Exhibit 30 on page 17. On line 11 of page 17, it says, similarly, the orange squares that might also support the Synapse high case are based upon the Jeffers bill, a bill that was not even reported out of committee. In looking at the document and looking at my screen, I couldn't really tell the colors very well, but in looking at the Synapse report, those dealing with the Jeffers bill are tan, not orange. So I would say the tan squares as opposed to the orange squares.

In the footnote on footnote number 8, which is on the bottom of the page, I talk about the bill that Senators McCain and Lieberman introduced in 2005. One is that senators -- it's McCain with C as opposed to a D, which is a typo. The second is in the last line where it says in 2005 they introduced S-826 which provides the same emission reductions as SA-2028. I have

come to understand it's Senate Amendment, so it would be SA-826. Originally S-1131 -- 1151, excuse me. So if you just inject an A, it would be Senate Amendment 826.

MR. SMITH: I note for the record Commissioner Hanson has rejoined the hearing.

Q. (BY MR. GLASER) Mr. Hewson, do you have a -- at this point I should offer Exhibits 30 and 52 into evidence.

MR. O'NEILL: No objection.

MR. SMITH: Ms. Stueve?

MS. STUEVE: No objection.

MR. SMITH: Hearing no objection from staff, Exhibits 30 and 52 are received in evidence.

EXHIBITS:

(Applicants' Exhibit Nos. 30 and 52 received into evidence.)

Q. (BY MR. GLASER) And Mr. Hewson, you have a summary of your testimony prepared?

A. Yes, I do.

Q. And I just wanted to note for the record that -- have we passed this out?

MR. SASSEVILLE: Yes, we have.

Q. (BY MR. GLASER) The summary as it is on the screen now where it says summary, Applicants' Exhibit 30 and 52, that's correct. I think that we made a typographical error on the document that was handed out, some of same say Applicants'

Exhibit 22 in the printed version. I think we've tried to correct that to indicate that it's Applicants' Exhibit 30 and 52 instead of 22.

With that, Mr. Hewson, I would ask that you give a summary of your testimony and starting with a statement of some of your background and qualifications.

A. My name is Thomas A. Hewson, Jr. I'm a principal at Energy Ventures Analysis, which is located in Arlington, Virginia. In 1976, over 30 years ago, I graduated from Princeton University with a degree in civil engineering. Since then I have been involved in energy environmental consulting, first as a project manager at Energy Environmental Analysis from 1976 to 1981, and since 1981 I was one of the people who helped cofound Energy Ventures Analysis. At Energy Ventures Analysis, I direct the environmental studies, I'm responsible for the firm's emissions forecasts and industrial compliance studies. I also do a lot of integrated modeling of the electric utility industry.

As far as this particular project and what I was asked to do, my scope of work is focused in three areas. One was I was asked to evaluate the testimony of Mr. Schlissel and Ms. Sommer regarding the carbon regulation risk. Second, I was asked to evaluate the use of monetary externalities offered by Dr. Denney. Then finally, I was asked to evaluate the Schlissel and Sommer conclusion that whether it was reasonable

to assume that a wind production tax credit would be extended before it expires at the end of 2007.

As far as a summary of what I found. First as far as carbon regulation risk, carbon compliance costs are highly dependent upon what type of legislation may be adopted, its severity in terms of the emissions reductions it tries to achieve, the timing of carbon regulation and the framework in terms of how it goes about achieving those reductions.

In testimony by Schlissel and Sommer, they suggest that projecting carbon risk is very significant and should be valued at long-term levelized cost, a midpoint of $19.10 per ton of CO2 with a range from a low off $7.80 to a high of $30.50.

In my evaluation, I believe that it's likely that these carbon compliance costs for planning should be -- or are likely far less than these values and in my opinion, I believe it should be set at less than $7 a ton of CO2. There's a few reasons for that, one of which is when we look at Minnesota where they do have a CO2 value for carbon dioxide risk, they use a planning risk of now 35 cents to $3.64 for in-state plants. It has no value for out of state plants and so when the applicant did their application, from what I understand, they used zero dollars as required in the Minnesota methodology, but they also looked at a range of 35 cents to $3.64 to determine whether or not, given that range, it would

lead to a different outcome.

The second is looking at -- we are looking at federal legislation. The state legislature here in South Dakota has been pretty explicit in terms of what they believe about carbon dioxide and have passed resolutions that say that they do not want to have mandated CO2 emission reductions. Taking them at their word, it would mean that likely if we do have carbon dioxide regulation here in South Dakota, it's likely to come from federal legislation and not state legislation.

Trying to look at the way the debate has gone, there is a debate concerning what is the concerns about the cost to the U.S. economy, and those have been voiced most recently in the Senate resolutions. When we look at what state region has done as sort of an indicator of what might occur, there is a grouped called the Regional Greenhouse Gas Initiative, which is a group of states primarily in the Northeast. They adopted a CO2 regulation, as part of that CO2 regulation, they came up and did their own analyses that estimated a cost of about one to three dollars per ton as being their estimate in terms of compliance cost. So evidently in terms of what they believe and when they adopted the proposed rule that is still yet to be adopted by each of the individual states, they are looking at the one- to three-dollar-a-ton range.

Finally in terms of what's happening in the congressional arena, in my testimony I talk about several

bills, but probably the most significant one that I've seen was an effort by Bingaman last year in which they tried to build upon a group called National Center for Energy Policy that was a bipartisan group that was trying to find a mid ground in terms of what could likely be adopted.

This Bingaman bill followed those recommendations and tried to address the issue of U.S. economy impact by setting a cap onto carbon dioxide prices and safety valve prices. These safety valve prices are set in year 2010 at $6.36 and escalate over time.

And so when we look at what Minnesota has done in terms of how they handle carbon dioxide risk in their externality approach, the way RGGI has handled it in terms of the Northeast adopting a cap and trade program and what Senator Bingaman has done in the Senate, I think we find that there's more reasons to believe that a reasonable judgment for planning would be at a value less than $7 a ton of CO2.

Outside the carbon dioxide risk, I was asked to evaluate the environmental externalities. Dr. Denney has suggested monetary environmental externalities should be applied to quantify an environmental impact. Currently most states that I'm aware of do not use monetary environmental externalities in their resource decisions and I am aware that your friends to the north in North Dakota have actually passed legislation that prohibits the use of environmental

externalities in their decisions.

I leave it to the commission to decide, interpret the rules of what are calculated impacts and whether a monetary environmental externality is the way to do it or some other method. However, it would be somewhat unusual I think to apply an environmental externality without going through a rule-making process. Environmental externality damage calculations are indeed controversial and site specific and it is my opinion that most would likely not apply to South Dakota given your environment, given you're in compliance with ambient air quality standards. A lot of issues that may be present in other states may not be present here in South Dakota.

The final issue was about the production tax credit, which is a very important element when you look at wind resource costs. Schlissel and Sommer in their testimony have said that it's reasonable to assume that this tax credit gets extended before it expires in 2007. Unfortunately, when we look at the production tax credit history, which has been extended four times, three times after it expired, I don't hold out much hope that that will be necessarily the case. In fact it may be more prudent to assume that it will -- that it will likely be expired before it gets extended.

The longer-range question is will Congress see the need to continue. One of the reasons of course that a production tax credit was adopted by Congress was to promote

wind production. American Wind Energy Association has suggested that wind has become cost competitive with other conventional sources of power. Then second is we also have some of the question is does it need to be -- what sort of values are needed in order to promote its use, if it's a competitive option.

Second, is a lot of states, indeed currently 23 states in the nation have adopted renewable portfolio standards. Those renewable portfolio standards have set aside a portion of their market that must be met by qualifying renewable resources, of which wind is one, and overall now we have about 250 terawatt hours, which is as you are generally familiar is 250 million megawatt hours that has been set aside by these states for renewable energy.

So the question is, in terms of promoting, do we need to promote beyond that level? Then finally, obviously the production tax credit is being financed coming out of tax revenues and the question is, as wind grows and becomes a more popular resource, whether these dollars are going to come so great that eventually it will be too much in terms of from a budgetary impact.

So overall, I think eventually it may be extended, but I do not believe that it will necessarily be extended for the long term and so when we look at wind in terms of future resources, it will probably be more prudent to assume that it's

more likely, in my opinion, to be not necessarily a long-range production tax credit availability for, you know, plants that come on line in the range of the 2011 time frame. I think that sort of summarizes my testimony.

MR. GLASER: The witness is available for cross-examination.

MR. SMITH: Please proceed.

CROSS-EXAMINATION

BY MR. O'NEILL:

Q. Thank you, Mr. Smith. Good afternoon, Mr. Hewson.

A. Good afternoon.

Q. Mr. Hewson, can you tell us your definition of the term "externality"?

A. Environmental -- as in an environmental externality?

Q. Yes.

A. Environmental externalities are normally defined as a damage or a cost that is not captured in the production cost.

Q. Thank you. On page 6 of your testimony, Applicants' Exhibit No. 30, if you can go to that page and focus on lines 9 through 12. Are you there?

A. I just wanted to read it.

Q. Sure, go ahead. I was going to tell you to do that.

A. Thanks. Yes.

Q. To paraphrase, it appears here you are critical of Mr. Schlissel and Ms. Sommer 's criticism of the Minnesota

commission's externality value that they attribute to CO2; is that true?

A. I believe the way to phrase it is that I was critical that they didn't recognize the value in that in Minnesota if you were to put a resource, that is the value that one attributes to carbon risk that has been approved by the Public Utility Commission.

Q. Now, in your work, you do forecasting for other environmental emissions besides CO2; is that true?

A. That's correct.

Q. And one of those would be SO2; is that true?

A. Indeed.

Q. And NOX; is that also true?

A. Yes.

Q. And were you to do forecasting for clients today, would you use the 1997 numbers for your forecasting of 2006 and forward legislation?

A. In the case of making a resource decision, I would try to apply the rules that are in place first.

Q. And if the rules that are in place have 1997 values associated with them, would you try and look at something more current to try and estimate what future legislation would be on an environmental emission?

A. Well, if I was in Minnesota, I would say that the Public Utility Commission was fairly explicit in terms of what

they asked applicants to do in making their resource decisions. In fact I believe in looking at the decision, that they looked at five different approaches that could be adopted in trying to look at carbon risk and what they adopted was the damage approach.

Q. And it was a 1997 order; is that true?

A. That's correct.

Q. And it was an externality value that they ascribed to it as opposed to one that can be internalized in the production; is that true?

A. Yes, they assigned a value of range values that is supposed to be escalated which is now escalated to 35 cents to 3.64 per ton.

Q. On page 14 of your testimony, you do acknowledge, and I'm focusing on page 14, lines six through eight, that CO2 regulation is a material risk that should be quantified; is that true?

A. I believe that CO2 is a material risk.

Q. Moving on, are SO2 and NOX costs static?

A. In terms of when you say static, are you saying the market value for SO2 and NOX?

Q. Yes.

A. No, they fluctuate. There is a market just like the stock market goes up, down.

Q. In your testimony, you state that the Minnesota

externality value should be used rather than the California CO2 adder. What is the basis of your testimony in that regard, Mr. Hewson?

A. Could you direct me to where I say that they need to -- they should apply it?

Q. I wish I could, but my ghost writer did not for me. Do you remember testifying in that regard?

A. I believe that the testimony that you refer to deals with my discussion about Dr. Denney, which she was trying to look at damage or environmental externality values and I was suggesting that the California approach was not a damage approach.

Q. Why is that, is that because the damage approach is not measuring regulatory risk?

A. It was simply that if Dr. Denney was trying to do environmental externalitites and do environmental damage, that to apply a value in California that was not based upon environmental damage did not achieve her objective.

Q. Okay. Would you recommend $7 as a planning number, $7 a ton for CO2 regulatory cost as a planning number going forward?

A. I think my conclusion was less than $7.

Q. And what number would you recommend going forward and over what time period?

A. I believe that -- of course my rebuttal testimony

dealt with trying to look at $19.10 per ton and trying to look at whether that was a reasonable number or not. If you are asking me for my opinion and what if Otter Tail was a client of mine, what I would use, is that the question?

Q. It is.

A. Right now in terms of our projections, we use $6 a ton beginning in year 2013 in constant 2006 dollars, as will be coming out in the next few weeks. Last year we were at $5.50.

MR. O'NEILL: That's all the questions I have.

MR. SMITH: Thank you. Ms. Stueve, do you have questions?

MS. STUEVE: I have no questions.

MR. SMITH: Ms. Cremer. Staff, do you have questions?

CROSS-EXAMINATION

BY MS. CREMER:

Q. Good afternoon. Could you look at Exhibit 30, page 34? Then I'll just have you quickly read lines like 20 through 24 so when I ask you the question.

A. Line 20 to 24?

Q. Right.

A. Let me get my context here.

Q. I can relate.

A. Starting on line 20 to 24 --

Q. I can just ask the question. Okay?

A. Okay.

Q. I wanted you to read it. Basically aren't you saying that Big Stone II will have emission controls that will remove oxidized mercury from the coal?

A. The wet FTD will remove the oxidized mercury portion, yes.

Q. And then you also say that oxidized mercury is the type of mercury that deposits locally.

A. That's what we have been finding, yes.

Q. Then you go on to conclude that the -- that the only Big Stone II's mercury emissions will consist of elemental mercury that does not deposit locally.

A. That's correct.

Q. So then I have two questions about that. Are you saying that all of the oxidized mercury will be removed at Big Stone II?

A. In the tests that have been done by EPA as far as where we have been doing a lot of testing to try to figure this out, we have been finding that almost all the oxidized mercury is removed in a wet FGD scrubber.

Q. So almost all?

A. Right, I mean obviously we are dealing with concentrations so small that we are probably under the ability to detect.

Q. And so -- have you discussed that with the Big Stone II application or like Mr. Graumann?

A. No.

Q. Do you know what the relative portions of -- proportions of oxidized and elemental mercury in the coal used at Big Stone II are?

A. This would be a subbituminous coal.

Q. Yes.

A. First of all, the amount that goes up the stack is highly dependent in the chemistry of the plant and has a lot to do with the coal, whether they do additives, whether they do blending, and so it's hard to overgeneralize. But if I had to say a general rule of thumb, that roughly three-quarters of subbituminous coals, when burned before it gets into the control equipment, would come up -- we have been finding is more elemental mercury and 25 percent is oxidized or thereabouts. It's going from memory, I'm sure I could get a lot more significant digits if that's important. They do vary based upon the individual projects where we have done testing.

MS. CREMER: That's all I have, thank you.

MR. SMITH: Commissioner questions.

COMMISSIONER HANSON: Not from me.

EXAMINATION

BY CHAIRMAN SAHR:

Q. I do have one and I wanted to make sure I understood. Staff had asked you a question about the mercury and you stated that based on testing or some type of experience, that the

oxidized mercury removed by the wet scrubbers would be to the point of almost being not able to -- such a small quantity as to be difficult to measure; is that correct?

A. That's what we have been finding.

Q. Just to make sure I completely understand this, is there any other mercury that is leaving the plant otherwise because of the process of burning coal or any of these other processes? Am I missing something or is that the total answer to the question?

A. Normally when we talk about mercury and mercury emissions, we track three different types of mercury that are produced from the burning of coal. There's particulate mercury, that that's associated often with ash, which is often removed by your particulate control equipment. If your particulate control equipment is 99.9 percent, generally we are removing most all, practically all the particulate mercury. We also have oxidized mercury, which is mostly has been oxidized in something like a mercuric chloride. These tend to be water soluble forms of mercury and that's why when we put a wet FGD, since they are water soluble, they get caught in the scrubber and they are removed.

Elemental mercury is fairly stable and it goes up the stack and is not necessarily removed by particulate control equipment. There's some that is removed because as it cools down, it can absorb on particulate equipment. Particulate, the

ash. But generally speaking, that's the mercury that's being primarily emitted from plants that are scrubbed with advanced particulate control equipment such as being proposed here at Big Stone. It would be in that form.

Q. So the first two categories are primarily being taken care of through, whether it's particulate control or else scrubbing.

A. Scrubber.

CHAIRMAN SAHR: I may have a follow-up question, but I need to reflect on that for a minute. Thanks.

EXAMINATION

BY VICE-CHAIR JOHNSON:

Q. Mr. Hewson, you noted that if you had a client that asked you what you would estimate regulatory control costs for carbon, what that should be, I think you said $6 per ton beginning in 2013; is that right?

A. That's what we do for our forecasts, yes.

Q. You said last year you were forecasting $5.50 per ton beginning in 2013; is that right?

A. That's correct.

Q. Anything in particular cause a revision in the estimates, the forecast you are providing to your clients?

A. Maybe just to be an even number. It's always fun, you can imagine my partners and I always get together and we talk about what the future is and what the values are going to be.

It's always a fun, lively debate. But yes, we figured this year $6 would probably be closer to what we would use or what we are using.

VICE-CHAIR JOHNSON: Thank you, and I do appreciate the difficulties in seeing into the future. I can't decide whether my son will be an all star basketball or football player by 2013. Thanks.

EXAMINATION

BY CHAIRMAN SAHR:

Q. Back to the question about mercury, with the elemental mercury, so talk a little bit more about that. What happens with elemental mercury? What are the side effects, problems, so on and so forth? What should we as commissioners be concerned or not be concerned about that?

A. Elemental mercury when it goes up the stack comes up as part of the mercury reservoir that we have. It can go long distances, stay up there for years, until it gets -- somehow it needs to be converted eventually into a form that will either be absorbed onto water particles and come down in the rain or get something like ozone to make it into an oxidized form, make it heavier and drop. So generally speaking, as far as -- you were asking about the health effects; is that correct?

Q. Yes.

A. First of all, I'd like to say that I'm not a health expert. But I do know the following, is that mercury when it

comes down has to -- the forms that we are concerned about in the public health sector has more to do with methyl mercury, so the mercury that comes down is not the form that we are concerned about. It has to get converted from mercury into methyl mercury and so it gets a lot into lake chemistry and I am also not a lake chemistry -- or chemist. However, you do need some anaerobic activity in order to change the mercury into methyl mercury. Then you have to have methyl mercury absorbed by a fish and then those fish have to -- generally speaking, big fish eat little fish and it gets accumulated in the fish tissue. So the concerns that we have in terms of you look at EPA and what they are regulating is the concern is dealing with primarily mercury exposure from eating fish and the concerns about how those concentrations change with time.

Q. When evaluating the -- I am going to use some probably ridiculously off base lay terms, but basically when this elemental mercury goes up, goes up in the atmosphere, what's the drop zone, what's the footprint? Are we talking does this travel hundreds of miles, tens of miles, does it go with the prevailing winds, so on and so forth?

A. Its goes with the prevailing wind, it can be up there for years, and so one of the challenges in terms of mercury deposition modeling is, as you can imagine, something that stays up there for a long period of time is we are less than accurate in terms of being able to figure out or do source

attribution associated with the mercury that comes down. However, we feel fairly confident in terms of what's coming down here in South Dakota didn't start here in South Dakota. It could be from China, it could be from that reservoir. There's obviously -- as you might remember, mercury is a natural occurring element and so when we have volcanoes and all that, that also emits large amounts of mercury, so a lot of mercury is also naturally occurring.

Q. That was going to be my next question. What are the likely sources of elemental mercury? And maybe you just answered that.

A. Well, in the earth's crust we have mercury and so it is a natural occurring element and so whenever -- it can be released in an event, normally like heating things up, it can be volatilized, we can release it there. So there are lots of -- then when it comes down, it can also then immediately get evaporated up and so it can come down, up and never turn into methyl mercury immediately either. We do have sources in terms of that we contribute. Keep in mind these fluorescent bulbs have mercury in them in terms of mercury switches. We use mercury in terms of our dental fillings. We use it in thermometers. Those little switches we used to see in those sneakers if you are an all star used to be mercury switches. We use mercury for a lot of different industrial uses and so sometimes when we then dispose of that, that also gets into the

environment and sometimes gets released.

Q. And you somewhat touched on this, if we are looking at the Upper Midwest and we are looking at the sources of elemental mercury that come down from the atmosphere, can you peg or is that 90 percent from coal plants, five percent from volcanoes, any idea of how these things break out or any estimates on that?

A. Let me make a suggestion. I know of a report that was done by EPA that attempted to do what you are asking. I was not the author of it, I was not a producer of it, but it was based upon modeling that was being done in trying to answer your very question. I would be surprised, given that the U.S., say U.S. coal-fired power plants were emitting roughly around 45 tons, we have -- our national or international reservoir of that is far, far, far greater and that 45 tons represents an extremely small percentage of the total. It would be probably hard to say that that coal plant, you know, where it ended up. But I will offer and I would be more than glad to supply the report that did do attributes and I would believe that it will show that as far as here in South Dakota, there is -- it will be a monitoring point and then that monitoring point, based upon their models, which are not always perfect, they could give you an idea of how much comes from China, how much comes from Europe, how much comes from the U.S. and whether it's coal or not. Those are types of things that the model output is.

Q. And I think I know the answer to this, but is there any cost effective way to deal with the -- or to reduce or limit or eliminate the elemental mercury that is emitted by a coal-fired plant?

A. Currently obviously we have a lot of very promising things in terms of research. We are spending a lot of research money in order to figure out how to do it better. Some of the areas that we have been working on is activated carbon injection in terms of injecting carbon in order to absorb the mercury, elemental mercury, and we are finding that we can remove amounts there. We also are doing coal blending in terms of trying to take western bituminous coals and the Powder River Basin subbituminous coals. What happens is the reason why you have -- our theory currently is that the reason why you have so much elemental mercury with subbituminous coals is we don't have a lot of halides in the coal, in the subbituminous coals to interact with mercury and make it oxidized mercury that can be removed.

What we have been doing is we have been blending bituminous coals that have high halide contents with those that don't and what we are finding is when we do that, we actually are producing more oxidized mercury forms that can be removed and so we have some very promising results in that as well. We are trying to do the same thing with perhaps without having to use bituminous coals in terms of doing additives. It's been

mixed. We have also been trying methods in order to cool down the flue gas stream because, as you can imagine, if we get it down cool enough, the mercury will absorb onto the particulates, the ash. We haven't had a lot of success that way as yet. But we are probably pursuing, that I am familiar with, maybe three or four different approaches in order to address the elemental mercury issue in particular and there's some very promising research and initial demonstration results where we have been getting a large portion of it.

Q. Would this type of technology, and this may be getting pretty far out there hypothetically, but would this be the type of technology that you believe could possibly be used to retrofit plants that are already existing or will be built in the next decade?

A. Obviously when we look at the Clean Air Mercury Rule, which we call CAMR, which is the federal rule that deals with mercury emissions, the belief was that in 2018 we would have technologies that could easily be retrofitted that would be cost effective and demonstrated at the time in order to reduce the mercury. Most of those, the optimism now focuses around the activated carbon injection systems, where we can inject activated carbon, in fact that's where we are doing it in terms of existing power plants and retro -- putting in carbon injection systems into existing coal-fired boilers and if we do it where they have a lot of ESP, surplus ESP capability, they

have been able to do it without doing upgrades in their particulate control equipment.

We have also been trying to do it in terms of injecting it after the flue gas because one of the issues with activated carbon injection, when we get carbon in the ash, it makes it less salable and we do sell a lot of our ash in the U.S. for roadbed material and cement. And if we have too much activated carbon, we are no longer able to meet the specifications. So what we are trying is we are also doing an attempt at later in ESP or as a separate add on, putting in carbon injection after the particulate control equipment and then putting specific polishing filters for activated carbon. And that's called Toxicon (sp) is the scheme and Copak (sp) is another name and those seem to be some that we are spending money in looking at.

Q. So it sounds like there's a lot of interest in looking at possibly situations when the technology becomes more proven and more cost effective at looking at retrofitting coal plants.

A. Oh, yes, there's -- we are pursuing all sorts of wonderful ideas and may most of them turn out to be good.

Q. Will this facility have an ESP?

A. I would have to defer to the applicants. I do not remember off the top of my head.

Q. And then -- I'm sorry. Mr. Glaser.

MR. GLASER: Would it be helpful --

A. We could probably have someone in the room that can answer that.

MR. GUERRERO: Introduce yourself and pull up a chair.

MR. ROLFES: I'm Mark Rolfes, the project manager.

MR. SMITH: You are still under oath.

MR. ROLFES: This unit will have a fabric filter, will not have an ESP.

CHAIRMAN SAHR: Thank you.

Q. (BY CHAIRMAN SAHR) And I appreciate you indulging my questions here. Back to kind of a very lay question. I think a lot of the members of the public probably have heard discussions that you have the acid rain, you have the fish in the lake getting high levels of mercury and possible health concerns to humans and other animals who might end up eating those fish, and excuse me if I'm explaining that way too simply, but what do you think about those concerns and -- let me ask it that way. What do you think about those sort of concerns?

A. I think it was because of those concerns we ended up with the Clean Air Mercury Rule and that is an attempt to start to address those concerns.

Q. If we are looking at that average fish out there in the average lake somewhere in the United States, is the link pretty definite that that is because of acid rain? I know there's naturally occurring mercury and so on and so forth.

How strong is the link between coal-fired plants and increased mercury levels in fish?

A. Let me answer your question --

Q. Please feel free to take the liberty to rephrase and restructure the question.

A. First of all, as far as mercury is concerned, our first step was to pick on the big guys. The largest single source of mercury was not the coal-fired plants, it was incinerators and so the first thing we did was we went after them. Second thing we did was we went after number two on the list, which was the medical incinerators and we went after them. And EPA has adopted very strict rules in trying to reduce emissions of mercury from those sources. Those sources are a lot easier to reduce because the concentrations of mercury in the flue gases are much, much higher from what you have in burning something which is truly in parts per billion range in the coal and trace elements and trying to reduce something in a coal-fired plant.

However, coal plants were the number three on the list and so I think what EPA has done is after they went after number one and number two, they went after number three and that's what we see happening today in the Clean Air Mercury Rule. The hope is obviously in doing a two phase approach, is we are also doing a lot of scrubbers, FGD scrubbers in terms of what we are trying to achieve for fine particulates in

particular, and that -- because we are putting on scrubbers, we are going to get a lot of mercury reductions and that will give us time in order to develop these technologies that we are all working fast and furiously on and everyone has a -- has the next greatest idea, that that will give us an opportunity in order to develop them to a point where they are going to be a lot -- we hope to be a lot cheaper, a lot higher performing than what we see today.

CHAIRMAN SAHR: Thank you.

EXAMINATION

BY COMMISSIONER HANSON:

Q. Previous questions and your answers prompted just some questions by me, if I may. When you were talking about the different industrial uses of mercury, certainly mercury is used in a lot of daily operations such as even with immunizations. However, that's not to imply that mercury -- even though mercury is very useful, it's still a very serious element that has to be measured extremely carefully when dealing with citizens' health. I don't want to editorialize, but I'm sure you didn't mean to infer that when you were --

A. No, definitely we try to be very careful with uses of mercury or the industry -- I shouldn't say we -- the industry is often very careful. Obviously it does, as you mention, have lots of uses, even in agricultural use in terms of as a fungicide.

Q. Are those different types of mercuries that are used in those areas?

A. Different types of mercury?

Q. When you talk about the mercury in its different forms, it's used in different forms as it is applied.

A. Mercury, as far as the element, does end up in various different types of compounds that are used in various applications, as well as the elemental mercury form.

Q. In South Dakota we have lakes and streams that have degradation from mercury and there are warnings for eating fish in five different counties presently. I think my main concern with Big Stone II is whether or not the project will in fact increase or potentially increase degradation of our streams and waterways and perhaps have adverse health effects from that standpoint. Testifying within your capabilities, is it your belief that this project that is proposed as it is proposed would create greater degradation to the citizens?

A. Based upon what we know about mercury, I would say no, that what will happen is that we are going to be removing or the applicant would remove almost all the particulate and oxidized portions of the mercury that would be the type that would not transport as well and would be left with primary elemental mercury, what does get emitted from the plant, which will transport long distances. So I think in terms of when you talk about South Dakota lakes and degradation, I would say that

based upon what I know of the science today, that it's unlikely.

Q. I appreciate your answer and appreciate knowing that. Knowing -- again, if this is outside your scope, just for my own curiosity, knowing the tremendous number of coal plants that are being built in China, and you happened to mention that, are we at more risk from the coal plants being built in China than we are from coal plants being built in South Dakota?

A. I would say based upon the EPA modeling results, that's probably what I would conclude.

COMMISSIONER HANSON: Thank you.

MR. SMITH: After that, and I'll ask your opinion on this, Mr. Glaser, it occurs to me that perhaps we ought to give the cross-examiners a shot at resuming so that when you go back to redirect, we are not out of whack. Is that okay?

MR. GLASER: That's fine with us.

MR. SMITH: That way you will be better able to foreclose out of sequence questioning.

MR. GLASER: That's fine.

CHAIRMAN SAHR: I have a comment and another question.

EXAMINATION

BY CHAIRMAN SAHR:

Q. General counsel was nice enough to point out I may have made a reference to acid rain, which would be SO2 and NOX derived, not dealing with mercury. So I appreciate him

clarifying that for me and my apologies to my high school chemistry instructor for not paying attention enough during that class. Although I did get an A.

A. Good for you.

Q. The other question I wanted to ask is we are talking about retrofitting Big Stone I here. Just jog and refresh my memory, with that situation is are we looking with mercury, are we looking at an overall reduction do you think in terms of it because of the retrofitting in dealing with Big Stone I as well or does that not apply to mercury or how does that work with bringing both plants through the same best technology available today?

A. It's my understanding in reading the material at Big Stone II that at Big Stone II the plan is to put Unit Number I's flue gases through the scrubber at -- that will be built as part of this construction. I think that's my understanding. Based upon that understanding, I would say that the net effect will be is that it would reduce the amount of mercury coming out of Big Stone I because now you are going to be capturing a lot of the oxidized mercury in a higher proportion than what you had done previously. And I assume that it will also go through the particulate filter also that is being built associated with Big Stone II and if that is the correct understanding, that should also improve the mercury reductions above and beyond what is already occurring at Big Stone I now.

So a higher proportion of it would be removed.

Q. You may not be able to answer this. I appreciate that explanation. Are we looking at we add I and II together, is that going to be less than I when it comes to mercury or do you not have the basis to form that sort of conclusion or evaluation? Behind you they are pointing at somebody in the back of the room.

A. Maybe I should -- I know that they have -- that they have said it will be less, but maybe yes, maybe we can hear someone who has done the calculation.

MR. ROLFES: Mark Rolfes, project manager. Just to clarify a couple things, the existing Big Stone I has what's referred to as an advanced hybrid particulate collector, which is a form of a fabric filter, so the unit already has a fabric filter, but it does not have the scrubber. So by the construction of Big Stone II, we will be adding the scrubber so we will be removing the water soluble mercury.

Now, the project has committed in total mercury emissions that there will be no increase with the addition of the second unit, and as I hopefully indicated when I was testifying, that because of the CAMR rules and our expectations, we expect the mercury emissions to go down in that point, but we are guaranteeing and will be in our air permit that the mercury emissions will not increase from what the current emissions from what Unit I is today.

CHAIRMAN SAHR: Thank you, and that was my understanding not about the setup on the plant, thank you for clarifying that, but on the overall levels of mercury and I appreciate that. Thank you. I have no further questions.

MR. SMITH: Any last commissioner questions? I think what I would like to do is because of the way this has gone, if you have additional cross that has been stimulated by commissioner questions, to do that so that when we go back to Mr. Glaser on redirect, he's got the benefit of all of the cross-examination that may be opened up by that. Is that fair?

MR. O'NEILL: That's fair.

MR. SMITH: Why don't we go to you guys and we will go around the table with the various responding parties here.

CROSS-EXAMINATION

BY MR. O'NEILL:

Q. Mr. Hewson, are you familiar with whether Minnesota has an externality number for mercury?

A. It is my understanding it does not.

Q. So would I be correct, then, if I stated that the 1997 PUC order does not assign an externality value for mercury?

A. That's my understanding.

Q. Would you therefore say that mercury allowance pricing is zero for today?

MR. GLASER: I'm going to have to interpose an objection because I think we are now beyond the scope of all of

the previous discussions, since the previous cross-examination, I think counsel is going off on something that's just completely different now. I don't know how that -- what these questions relate to any of the comments that we had from the commissioners.

MR. O'NEILL: I can sure tell you.

MR. SMITH: Please do.

MR. O'NEILL: We were discussing mercury and we were discussing the problems associated with mercury and during my questioning, I was talking about and Mr. Hewson was talking about the association of the Minnesota PUC order as it related to mercury and as it related to CO2.

MR. SMITH: Overrule the objection and let's get as full of exposure of the facts as we can.

A. Can you repeat the question? I apologize.

Q. (BY MR. O'NEILL) Sure, no problem, you have been on the stand a long time. Would you therefore say that mercury allowance pricing is zero today? Would you advise your clients that mercury allowance pricing is zero today?

A. When you say advising, is this an existing plant you are talking about?

Q. What they should plan for.

A. I would say that if -- you mean Big Stone II in particular?

Q. Yes.

A. I would say that if I was in Big Stone II, I would plan to see how I could meet my cap that would be assigned to me under the state rules and if I needed to buy allowances, if I had emissions, but I understand they are not going to, if they are able to achieve that cap, there would be no additional -- there would be no additional production cost.

Q. If they are not able to meet the cap, what should they expect for allowance pricing?

A. If they are unable to achieve the emission allocation, then they would need to buy emission allowances on the open market.

Q. Do you know what that is today or what are you recommending clients it will be tomorrow?

A. First of all, the value is going to change. Right now what we are doing in mercury that makes it a challenge is that states are going through and deciding whether or not they are going to participate in a national trading program, and so the value of mercury in a national trading program will be very dependent upon those states that are participating. Since we are not going to know who they all are until September, I must admit that I've been holding off until we get a definitive listing. Then I will take my supply curves for each of those states and determine what would be the marginal cost for the people who could overcomply, what would be their cost and therefore what would be logical to assume in terms of what a

range of prices may be.

Q. Is zero a possibility?

A. I don't believe that in a national trading program, I would not expect to see zero.

MR. O'NEILL: Thank you, that's all the questions I have.

MR. SMITH: Ms. Stueve, you didn't have any original cross. Has anything been stimulated by the commissioners?

MS. STUEVE: Yes, and I appreciate the questions and the answers.

CROSS-EXAMINATION

BY MS. STUEVE:

Q. Mr. Hewson, good afternoon.

A. Good afternoon.

Q. And you talked about an EPA report, a study on followed, and I think you used the word utility attributable.

A. That's correct.

Q. What year was that report?

A. Since I wasn't involved, I must admit I will plead that I do not remember what the month and year was.

Q. Okay. Are you familiar with the most recent EPA report from the Office of Inspector General just released May 15th this year, 2006?

A. Could you be more specific? EPA sends lots of reports out.

Q. It is Stueve Exhibit -- there should be a copy of it there. Let me see -- Stueve Exhibit 1-E.

A. The answer is no, I have not reviewed this report.

Q. So what you were talking about when you mentioned study and fallout on utility attributable mercury did not come from this one?

A. No. Hot spots are indeed an issue that we are debating.

Q. Thank you. So obviously you can't answer questions from this if -- no?

A. I'm sorry, without reviewing the report, I can offer no opinion about the report.

MS. STUEVE: All right. I will waive any more questions. I would ask counsel and intervenors and staff if I might move for judicial notice of Stueve Exhibit 1-E. Would there be any objections?

MR. SMITH: I'm sorry, I was still trying to find my copy of it here.

MS. STUEVE: I apologize, they were not passed out. That would be labeled Stueve Exhibit 1-E.

MR. GLASER: Could I ask a point of clarification for myself in terms of procedure? We don't necessarily have a problem with this, but is the notion that it is a government report, it was produced by the government and therefore we will let it in for the fact that it's a government report and it

should be in the record. On that basis, I don't think we are going to have a problem.

MR. SMITH: I personally believe it's judicially noticeable by us and no matter -- I'll certainly entertain any objections, but I think we can notice this.

MR. GLASER: We have no problem.

MR. SMITH: Stueve Exhibit 1-E is received on judicial notice.

EXHIBITS:

(Stueve Exhibit No. 1-E received into evidence.)

MS. STUEVE: Thank you. No further questions.

MR. SMITH: Staff.

CROSS-EXAMINATION

BY MS. CREMER:

Q. I believe you said that BSII will emit particulate matter; is that right?

A. I would think that's in the application in terms of the amount that they are projecting would be emitted.

Q. Okay.

A. Or it should be.

Q. My question is, how does that deposit, locally or globally?

A. Can you --

Q. The right side of my brain here is telling me. Let me see if I can get it over here to the left side. I don't think

I can. For some particulate mercury will be emitted; would you agree with that?

A. I would say that I would expect that the particulate mercury would be removed in the same percentage as the particulates in terms of them going up the stack, so yes, I would say that -- I would suspect it would be the same percentage.

Q. Okay.

MR. GLASER: If I could ask a clarifying question because I'm confused. The question started with particulate matter and then you said particulate mercury and that's two different things here and I want to make sure we are talking about the right thing.

MS. CREMER: Yeah, I'm reading her handwriting and it all looks the same to me.

MR. GLASER: It's particulate mercury is what your question was about.

MS. CREMER: Yes. I'll try this again and we'll try to work it out if we are talking matter or mercury.

Q. (BY MS. CREMER) You said some mercury will be deposited locally. No, you didn't say that. Will be emitted as particulate matter.

A. There are three different types, I was talking about mercury comes up in three different forms. There's a particulate mercury, oxidized mercury and elemental mercury.

Q. So some particulate will be emitted.

A. Are you talking about particulate matter? You are talking about the PM, particulate matter, PM 10?

Q. Particulate mercury.

A. Particulate mercury. My statement was that I believe that it would be removed in the same percentage as what particulates are being removed in that the mercury is being absorbed onto the particulate matter, it also can be within the ash.

Q. So then concentrating on what's left, that proportion that you said that would go, there's a very little, but you said like 99 percent.

A. With a baghouse, we are removing -- maybe I should get Mr. Rolfes up here, what percentage, 99 point how many nines, something like 99.95 or 99.98.

Q. Right, I'm not using it for that -- for percentage matters. The way -- what I'm trying to get at here is some particulate mercury will be emitted.

A. In theory, if we remove 99.9 whatever it is percent, we would say that would leave point zero something percent, point oh something percent and that matter could contain particulate mercury.

Q. Okay, and so all I want to know is how does it deposit, locally or globally?

A. That point 00, it's now an extremely small amount, if

it's on large particles, tend to precipitate out quicker, so if it's associated with an ash particle, that stuff is not removed, and maybe I should get the percentage that is removed, that small miniscule amount remaining would probably I would suspect would be more locally than not.

MS. CREMER: That's really all I needed. Thank you.

MR. SMITH: Mr. Glaser, after a long hiatus, which I'm sure you thoroughly enjoyed, do you want to proceed to your redirect or do you need a break before that?

MR. GLASER: No, I think I can think of some questions.

MR. SMITH: Thank you.

REDIRECT EXAMINATION

BY MR. GLASER:

Q. You testified earlier on cross-examination to the Minnesota Public Utilities Commission having established certain environmental externality values. Do you recall that?

A. I do.

Q. And I think you said, correct me if I'm wrong, that you felt that it was reasonable for the applicants to have considered those values in looking at potential carbon risk for Big Stone II; is that correct?

A. That's correct.

Q. Did you, in your testimony, also look at other ways of measuring potential carbon risk?

A. I did.

Q. And why, if you could just summarize for us, why it is that you felt that the fact that Minnesota had established externality values at 35 cents to $3.50 using a damage methodology, it was nevertheless reasonable for the applicants to use those values in measuring carbon risk in this proceeding.

A. Measuring carbon risks, one approach, as you might remember my testimony, I mentioned lots of different ways people are addressing the carbon issue. One way to do it is by assigning, like Minnesota, taking a damage value. Of the five different approaches, they did look at cost compliance and regulatory risk and elected to do damage cost, so I thought it was appropriate for the applicants, in that there are indeed -- several of the applicants are from Minnesota, to at least look at those numbers in their resource evaluation to see whether or not at those values, even though they do not apply to Big Stone II in the Minnesota order, but nevertheless to sort of look at whether or not they would have changed the selection of the technology, which they did not.

Q. And I believe you also testified with respect to the fact that Minnesota Public Utilities Commission had not established environmental cost values for mercury; do you recall that?

A. That's my understanding, yes.

Q. But nevertheless, I believe you also testified that it was appropriate for entities in the position of the Big Stone II co-owners to assess the possibility of future mercury regulation compliance costs; is that true also?

A. I think when we talked about mercury in my testimony, it was we were deferring to Dr. Denney and using it as an environmental externality, and my issue with mercury was that if the applicant does not have emissions, if emissions do not grow and there is no incremental emissions of mercury, then it would likely be no incremental damage occurring and so the environment would be zero.

Q. But you also, in responding to questions on Mr. O'Neill's latest round of cross, mentioned that at least there was a possibility out there that the applicant would need in the future to go out into the market and purchase mercury allowances to meet the EPA at least potentially phase two Clean Air Mercury Rule requirements; is that correct?

A. Right, if they don't -- if they can't reduce their emissions to the allowable level, what they have in their allocations, they would be in essence forced to purchase allowances from some other source that is overcomplying with their limit.

Q. And do you know whether or not the applicants, in analyzing the potential of Big Stone costs, in fact did look at potential mercury allowance prices or would that be somebody

else that might have done that for the applicants?

A. I am not familiar with how they handled mercury in their evaluation.

MR. GLASER: Thank you very much. That's all that I have.

MR. O'NEILL: No further questions.

MS. STUEVE: No further questions.

MR. SMITH: You are excused. Thank you.

A. Thank you very much.

MR. SMITH: Does that conclude the -- other than the cleanup housekeeping matters we discussed, does that conclude the applicants' case-in-chief?

MR. WELK: Yes, it does, Mr. Smith. We have checked, we have no more live bodies, so to speak, as witnesses. If my math is correct, we are going to reserve Nos. 92 through 114 for the summaries for the 23 witnesses that testified. Excuse me, through 115, it was through 115 and so I would like to reserve Exhibit 116 for the insertion of Mr. Lancaster's affidavit. It's in transit, he's literally out of the country, will be sending an affidavit in. So for purposes of the record, I'd like to reserve 116 for his affidavit, which remember he didn't testify and the exhibits went in and just to button that up, he's affirming that testimony.

Also I think this Exhibit 25, which was Kiah Harris's direct, was admitted, he was live, but the court reporter

didn't have 25 admitted, but we want to make sure that that was admitted. He was the engineer that testified live. I thought we had it.

MR. SASSEVILLE: You told me that you had already received it and then we checked and the court reporter didn't have it logged in. Based on that --

MR. SMITH: I showed it on my list as having been admitted in connection with the stipulated list, if you will recall.

MR. WELK: He was one of those that was in play whether he was coming or not so there may be some confusion and in an abundance of caution, we will reoffer it right now.

MR. SMITH: I do show it having been offered and admitted as part of the original stipulation, but if there's no objection, we'll just receive it into evidence at this point.

EXHIBITS:

(Applicants' Exhibit No. 25 received into evidence.)

MR. WELK: We now have the exhibits of 92 through 115 for the PowerPoint summaries. I will give those to the court reporter and if people will tell us which ones they don't have, we'll get copies for you. I believe with that, the applicant would rest its case-in-chief.

MR. SMITH: Are you moving those in now?

MR. WELK: Yes. We will go ahead and do that. These are -- I'll read these into the record for people for their

numbers if you want and then catch up with me. Applicants' Exhibit 92 is the PowerPoint summary of Ward Uggerud. Applicants' Exhibit 93 is the PowerPoint summary of Mark Rolfes. Applicants' Exhibit 94 is the PowerPoint presentation of Terry Graumann. Applicants' Exhibit 95 is Ray Wahle. Applicants' Exhibit 96 is from Mike McDowell. Applicants' Exhibit 97 is Jerry Tielke. Applicants' Exhibit 98 is Stephen Thompson. Applicants 99 is John Knofczynski. I apologize, John, for your name that I can't pronounce it. Applicants' 100 is John Lee. Applicants' 101 is Andrew Skoglund. Applicants' 102 is Randall Stuefen. Applicants' 103 is Robert Brautovich. Exhibit 104 of the applicant is Jeffrey Grieg. Applicants' 105 is Stephen Gosoroski. Applicants' 106 is Kiah Harris. Peter Koegel's summary presentation PowerPoint is 107. Bryan Morlock is 108. Stan Selander is 109. Larry Anderson is Exhibit 110. David Gaige, Exhibit 111. Hoa Nguyen is Exhibit 112. Robert Davis 113, Daniel Klein 114, and Thomas Hewson 115. Those are all the PowerPoint presentations. I would move for the admission of those exhibits.

MR. SMITH: Is there an objection?

MR. O'NEILL: No objection.

MS. STUEVE: No objection.

MR. SMITH: Applicants' Exhibit Nos. 92 through 115 are received into evidence.

EXHIBITS:

(Applicants' Exhibit Nos. 92 through 115 received into evidence.)

MR. WELK: With that, we will rest our case-in-chief.

MR. GLASER: I have one housekeeping matter. Mr. Hewson, in response I think to Commissioner Sahr, indicated that there was an EPA report that might answer some questions and I guess our question is should we be submitting that for the record, supplying a citation, or what's your pleasure in terms of handling that?

MR. SMITH: I guess you can do either one. I guess it would be nice to at least have it identified with enough specificity so we can find it.

MS. CREMER: Is that that eight volume report?

MR. GLASER: Is that that eight volume report? No.

MR. HEWSON: No, it's not that eight volume report.

MS. STUEVE: Actually, in Stueve Exhibit 1-E, is that what just got received, it actually -- that report is --

MR. SMITH: Is referenced in there?

MS. STUEVE: This is the report that comes because of the report he was referring to.

MR. GLASER: We don't -- I would like to ask Mr. Hewson that before we agree to that. I think probably the best thing for us to do would be to provide a Web citation to the report. We can do that as soon as Mr. Hewson gets back to his office or calls his office or something to that effect.

MR. SMITH: You are perfectly welcome if you want to to use our office facilities downstairs and if you want to pull it up, if it's not a humongous document, to pull it up, print it and if it's an official EPA report, I would just request that we enter it into the record on judicial notice and we will be done with it. My suggestion is it's now 3 o'clock and that we are in a logical break point and that we take a break and think about what we want to do for the rest of the day, whether we want to be done for the day or whether we want to forge ahead and begin with. . .

VICE-CHAIR JOHNSON: Mr. Smith, I would suggest that we continue, no insult meant to the Pierre Chamber of Commerce, but I suspect people here don't necessarily need that much more recreation time in Pierre and I'd like to stay on track or ahead as opposed to have us fall behind.

MR. SMITH: What I thought, we have been at this quite a while now and if we take 15 minutes or so so we can all think about what should happen next, I think that's beneficial for everybody.

VICE-CHAIR JOHNSON: Did we decide late yesterday that Ms. Stueve would go next and if we did and if she is ready, would there be any reason to depart from that? It just seems to me that we may want to decide before break because somebody might be able to use that break for preparation time.

MR. SMITH: Ms. Stueve, do you mind going next? That

would probably be honestly the -- as logical an order as any.

MS. STUEVE: I would not mind.

MR. SMITH: Okay, why don't we do that, then, and how long would you like in order to prepare yourself?

MS. STUEVE: Even 15 minutes.

MR. SMITH: Do you want 15 minutes? It's about exactly 3 o'clock so we will be in recess until a quarter after 3:00.

(Whereupon, the hearing was in recess at 3:00 p.m., and subsequently reconvened at 3:23 p.m., and the following proceedings were had and entered of record:)

MR. SMITH: The hearing is reconvened following our afternoon recess. Excuse me, the hearing is reconvened following our afternoon recess, and at this time Ms. Mary Jo Stueve, an intervenor in the case, she will present her direct case. Ms. Stueve, please take the witness stand. Ms. Stueve is appearing pro se.

Thereupon,

MARY JO STUEVE,

called as a witness, being first duly sworn as hereinafter certified, testified as follows:

MS. STUEVE: Good afternoon. This is my direct testimony filed May 19th before the South Dakota Public Utilities Commission in case number EL05-022. I prepared myself what is contained herein and I do have two minor

corrections.

MR. SMITH: Please point those out to us.

MS. STUEVE: Stueve Exhibit 1 in the direct prefiled testimony, line 10.

MR. SMITH: What page are we on?

MS. STUEVE: We are on page one, line 10, and 9,000 could be crossed out and current numbers midway year here are 7,791. And on page two of Stueve Exhibit 1 prefiled direct testimony, line four, we can now put in grandmother of four comma versus three.

MR. SMITH: Congratulations.

MS. STUEVE: Rebecca Jo, after her grandmother, I believe.

MR. SMITH: Is that all?

MS. STUEVE: Those are all the corrections.

MR. SMITH: Do you, Ms. Stueve, want to do as the other witnesses for the applicant have done and spend some time in presenting a summary at least of your -- of what's contained in your Exhibit Stueve 1 for the commission and the other parties?

MS. STUEVE: Yes. Yes, thank you. Well, first off, my name is Mary Jo Stueve, a new resident of South Dakota, quite recent actually. I am located at 196 East Sixth Street in Sioux Falls. I also maintain a home at 518 St. Joseph Avenue in Graceville, Minnesota and have agricultural land, Big

Stone and Traverse County. I'm currently employed by Clean Water Action as state coordinator. And Clean Water Action has a long history of supporting citizen efforts nationwide to protect water resources, promote sound solid waste management, push for agricultural policies that strengthen communities and work for transition to clean renewable energy.

My educational background includes a master of arts, 2004, in international policy studies with a certificate in nonproliferation from the Monterey Institute of International Studies. I also have a master of public affairs from the University of Minnesota's Hubert H. Humphrey Institute of Public Affairs and a bachelor of arts in sociology and Latin American studies from the University of Minnesota Morris.

My work history includes 24 years on a family farm raising four children. It also includes more than 24 years volunteering in civic engagement affairs, working with rural communities, youth groups, mentoring and role modeling. Most recently I was an AmeriCorps VISTA, Volunteer in Service to America before I joined on with Clean Water Action. So I have a concern and I have worked tirelessly over the course of my life to understand and improve socioeconomic living conditions, inequalities, housing and health conditions for families in communities in both rural and urban settings in the United States as well as outside our borders in Mexico and Cuba.

When I went back to school to acquire two master's

degrees, it included studying and researching extensively with colleagues around the world. The Humphrey Institute and at the Monterey Institute, mid career professionals such as lawyers and government officials, NGO, program officers, personnel and representatives in U.S. military officers, among others, were ones I studied with on issues related to governance, accountability and leadership for the common good.

My studies, my life, and Big Stone County being my homeland led me to a decision to participate, in particular to preserve and protect quality of life, health and social and economic well-being as an interested person, according to 49-41B-17, SDCL.

In summary, my concerns mainly consist with the health impacts on human population with regards to mercury, and I appreciate the consideration being given this serious matter. The purpose and summary of this testimony is to produce and submit to the commission's official docket file for the public record my objections regarding granting a permit and to document sources supporting such. It's my belief, as I state here in my testimony on page 3-19, that mercury poses unacceptable risk to our children, our health, our environment, our future.

Throughout my testimony I list different articles from science journals, medical groups, such as the study from the Mount Sinai School of Medicine in New York entitled Public

Health and Economic Consequences of Methyl Mercury Toxicity to the Developing Brain, the findings of the Center For Children's Health and the Environment at Mount Sinai School of Medicine.

I also cite a review of that report titled Mercury Exposure Linked to Loss of IQ and Billions in Societyal Costs. In addition, the 1997 Mercury Study Report to Congress, an American Nurse article and other health care groups that are suing the EPA to prevent future mercury exposure. A report called Staying Ahead of the Feds, Epa Proposes Cap and Trade to Cut Back on Mercury Emissions But Many States Think They Have a Quicker, Better Solution. That was a report by Larry Morandi, State Legislatures, June 2005, 31, 6, Research Library, page 14.

Other reports are cited throughout. And I appreciate being able to present testimony for consideration in the decision being made. Thank you.

MR. SMITH: Ms. Stueve, at this point in time, then, did you want to offer your direct testimony, including the attached exhibits, into evidence?

MS. STUEVE: I would.

MR. SMITH: Are there objections from the parties?

MR. SASSEVILLE: No objections.

MR. SMITH: Your Exhibit A, which is your direct testimony, and the exhibits thereto, are admitted into evidence.

EXHIBITS:

(Stueve Exhibit A received into evidence.)

MR. SMITH: I'm going to bring up one other matter since you are on the stand and that is your exhibit that you have used in a couple of testimonies here and that is you have shown to witnesses but I don't believe it has been offered or received into evidence and that is your Exhibit 1-D, which is a PowerPoint presentation that appears on its face to have been prepared by Otter Tail. And I guess at this point in time you are pro se so I'm going to help you along a little bit here. In order to lay a foundation for that, you may wish to inquire whether there is someone here in attendance from Otter Tail who is familiar with that document that you could call as a witness to lay a foundation for what that is and to then seek to admit it into evidence. Would you like to do that?

MS. STUEVE: Yes.

MR. SMITH: I just want to inquire, Mr. Rolfes, Mr. Uggerud, is there anybody here who is familiar with that document that I'm talking about and that's that report to the commission at the coal meeting? Is there anybody here that could address that so that she could --

MR. SASSEVILLE: Mr. Smith, I think we are referring to the Update on Rail Issues at Otter Tail Power Company dated April 21, 2006. We will stipulate to the admissibility.

MR. SMITH: You will, okay.

CHAIRMAN SAHR: I was going to say it's probably a business record unless someone can show otherwise.

MR. SMITH: I think it might be on our Web site. So it's probably a public record. Thank you very much.

MR. SASSEVILLE: You're welcome.

EXHIBITS:

(Stueve Exhibit No. 1-D received into evidence.)

MR. SMITH: With that do you want to tender yourself for any cross-examination?

MS. STUEVE: I will tender myself for any cross-examination, I think.

CHAIRMAN SAHR: It sounds almost painful.

MS. STUEVE: It sounds dubious.

MR. SMITH: Believe me, I've been a witness in some big cases and it can be painful.

VICE-CHAIR JOHNSON: Nothing like intimidating the witness, Mr. Smith.

MS. STUEVE: I might add am I not the first woman to be sitting in this seat in these proceedings?

MR. SMITH: That could be. As Tom Welk knows, I was one of the expert witnesses in the ETSI Pipeline antitrust case, so I know what it feels like. Do the applicants have any cross-examination of Ms. Stueve?

MR. SASSEVILLE: Not at this time.

MR. SMITH: Do joint intervenors have

cross-examination?

MS. GOODPASTER: Just one question.

CROSS-EXAMINATION

BY MS. GOODPASTER:

Q. Ms. Stueve, throughout these proceedings you have been very involved in the discussions and have sought a lot of information from the applicant witnesses and I understand from your testimony that your concerns are rooted in your interest in agricultural land across the border, your residence here in state and your concerns about mercury and would it be fair to guess that your concerns might relate to the four grandchildren you have?

A. Yeah, at the forefront.

Q. I'd like to ask you whether, in raising the questions you have today and on previous days, whether you feel like this proposed power plant is in the public interest or is -- you are still concerned about the environmental impact it may have?

A. I remain concerned about the environmental impact it might have. My concerns have not been fully answered as far as the application as it stands as a proposed project and as it stands, it has not alleviated my concerns, especially with regards to the mercury issue. Border land out there, Grant and Roberts, Big Stone, Lac qui Parle, the lake that speaks French, I don't, it's my homeland. My dad and my grandpa built a cabin on Big Stone Lake and I had nine siblings and many cousins and

my dad still lives on Big Stone Lake and he likes to catch fish just like his grandpa did before him and say, hey, providing a meal on the table, kids and grandkids, and I can't feed those nice big walleyes to my young daughter that was expecting. It's a concern.

MS. GOODPASTER: Thank you, Ms. Stueve.

MR. SMITH: I'm looking over there for Ms. Stueve. Ms. Cremer, does staff have any cross-examination of Ms. Stueve?

MS. CREMER: No, we do not. Thank you.

MR. SMITH: Do you have any cross in -- well, I guess --

COMMISSIONER HANSON: No, I don't.

MR. SMITH: Do commissioners have any questions?

CHAIRMAN SAHR: I guess I just have a comment and I'm sure it goes for all three of us. I want to say thank you for appearing and I think most people at the table probably are getting paid right now and maybe you are partly through your job, I don't know, maybe you aren't, but we know it's certainly not necessarily the easiest thing to do to sit through a week long hearing and preparing, so thank you for coming to town.

MS. STUEVE: Thank you. I can comment to that. My life as a mother and farmed for 24 years prepared me well to work double, triple shifts, you know, twenty-four seven, so when I leave here, no, it's a whole other shift because I can

work electronically and I cover the state of South Dakota, actually, Clean Water Action. So I am going to sleep well when this ends, believe me.

MR. SASSEVILLE: For what it's worth, the applicants do appreciate, too, your involvement and the contribution to this proceeding and we are hopeful that we have tried our best to alleviate the concerns that you have expressed.

EXAMINATION

BY VICE-CHAIR JOHNSON:

Q. Ms. Stueve, I will echo everybody's sentiment that it's good to have you here and thank you for your participation. You spoke eloquently about your concerns about mercury. I wanted to get your take on the applicants' commitment to reduce mercury levels to or below the emission levels of Big Stone I today for both plants in the future. What are your thoughts?

A. And my thoughts, I will have to be the first to admit I would not have had any thoughts if you would have asked me this time last year. It's been a learning curve for me. My one concern I have, when the applicants talk about equal emissions to current at 2004, is that Big Stone Plant Unit I came in at a time when there was literally not any awareness of health concerns with mercury and it was what is called grandfathered in, and so in light of that, when we are looking at the Clean Air Mercury Rule, in light what we know about

mercury, what the new emission budgets will be for South Dakota, for the U.S. as a whole in light of these health concerns, it bothers me that we are looking at increments down to, what, 44 pounds by 2018 and so 189 pounds is a lot higher than 44 pounds. And I realize steps need to be taken incrementally. This was a long time in coming and yet the 189 just does seem -- seems a long way from the eventual, what is it, I can't even think of the number I said.

Q. Ms. Stueve --

A. By 2018.

Q. Ms. Stueve, it's my understanding that in 2018 the cap of 44 pounds would apply whether there are one or two power plants in South Dakota. Is that your understanding as well? And I do understand you are an expert in this issue only when compared to me.

A. South Dakota state budget, it's my understanding that at 2010 it goes down to 144 pounds and by 2018 I believe it's lowered even to 58 pounds.

Q. That's right, thank you. My last question would be I was struck by some of your direct testimony, some of your opening statement about concern for people who don't have a lot, particularly in housing and nutrition, education for those folks, I am paraphrasing your comments, because I share many of those concerns. What was your reaction on a personal level to the testimony of Mr. Klein, what I will call the healthier --

wealthier is healthier testimony? Any thoughts about what the effect that lower -- low power -- the low energy costs have toward lower income folks?

A. Oh, yes. I found his presentation engaging. I had lots of questions, even with the South Dakota employment average I noticed in his projections, I believe it was around 38,000 in his testimony, and I'm thinking out in that area of northeast South Dakota and the Big Stone, Lac qui Parle, Roberts and Grant, many people live on between $10,000 and $28,000 a year, and so yes, there's an issue. And yet what are we going to do? What do we want to trade off? What do we want to trade off? And before a decision gets made, we have to know the full story. We have to know the full story. Oftentimes people welcome something, for example, a coal power plant coming in because of the jobs promised and we do need jobs out there, and yet what's the risk? What are we weighing? And we don't know that.

VICE-CHAIR JOHNSON: Thank you very much, Ms. Stueve. That's all I have.

MR. SMITH: Other commissioner comments, questions? Ms. Stueve, then, in response to that rigorous cross-examination, do you have any redirect testimony that you would like to -- any last things you would like to say?

MS. STUEVE: I would like to -- is -- Mr. Nguyen, I would like to mimic the comment he made earlier, the

appreciation I have for being in a place where the public can participate in such a decision as this.

MR. SMITH: Thank you. If that concludes your testimony, then you are excused.

MS. STUEVE: That concludes my testimony.

MR. SMITH: I will make an announcement related to the public comment, which kind of follows up on what you just said. I think we have secured the use of 412 for that, assuming -- I don't know whether a few people or a lot will come. But I think we will be able to have it here. Since we noticed it for 413, which is right next door, we will post a placard which directs people in here rather than in there. That said, we are still stuck in room 413 tomorrow for the parties' hearing, the actual formal part of the hearing. We will still have to move this evening or this afternoon when we are done. I regret that.

Okay, the order of parties' presentations discussed yesterday, we had discussed, because of the problems with one of your witnesses who had some personal issues and the ability of the various parties then to be able to be ready for that, I think we had concluded that we would begin to proceed at least with staff's case-in-chief despite the fact that that's an unusual order for things and does my understanding reflect reality, staff? As I understand it, you want to at least take witness Madden's examination today.

MS. CREMER: Yes, that would be true.

MR. SMITH: Are you ready to proceed at this time?

MS. CREMER: We are, thank you.

MR. SMITH: Call your first witness.

MS. CREMER: He's ready to go fishing.

Thereupon,

MICHAEL K. MADDEN,

called as a witness, being first duly sworn as hereinafter certified, testified as follows:

DIRECT EXAMINATION

BY MS. CREMER:

Q. Would you state your name and address for the record, please?

A. Yeah, Michael K. Madden, I live at 63 Langden Road, Buffalo, Wyoming.

Q. Would you summarize your educational background for us, please?

A. Yeah, I have a bachelor's degree in economics and math from South Dakota State and I have a doctorate from Iowa State University in economics and statistics.

Q. Thank you. And what is your employment history?

A. I've been a college professor most of my life at the University of Wyoming, at South Dakota State University, at the University of South Dakota, and at National American University I was an administrator, I was dean of graduate studies. During

all that time, I was doing consulting work similar to this.

Q. And you were employed by the commission to consult with staff on this case; is that right?

A. I was.

Q. Can you tell us in a general way what approach you used to gather the materials that you used to produce the study in order to file prefiled testimony today and then also to testify?

A. Yeah, I wanted to use historical analogy I guess mostly and that is to compare what happened to these various sectors that I studied in 1970 to 1975 when they built Big Stone I. And because the wage -- or the employment impact is about a 37.6 percent bump in Big Stone II, it is 36.5 in Big Stone I, it turned out to be an ideal historical analogy.

Q. Okay, thank you. And as a part of your review of this or your analysis of this matter, did you review SDCL, South Dakota Codified Law 49-41B?

A. I did.

Q. And then did you also review Administrative Rules of South Dakota 20:10:22, which were the siting rules?

A. Yes, I did.

Q. And in front of you are some exhibits. They are directly in front of you.

A. Up here?

Q. Yes. Those have been marked for identification

purposes. Do you have Exhibit 1?

A. Yes, I do.

Q. Can you tell us what that is?

A. That's the document that I prepared. It must be several copies, however.

Q. I believe it's your prefiled testimony and then the study is attached with it.

A. Oh, yes, because I did attach the study with my prefiled testimony, that's right.

Q. Even though you told me you are perfect and don't, but I'll ask you anyway, do you have any additions or deletions or corrections?

A. No, I don't.

Q. And if I asked you those same questions today that appear in your testimony, would your answers be the same?

A. Yes, they would.

MS. CREMER: I would offer Exhibit 1.

MR. SMITH: Is there objection?

MR. MADSEN: Applicant has no objection.

MS. STUEVE: No.

MR. SMITH: Joint intervenors? Staff's Exhibit 1 is admitted into evidence.

EXHIBITS:

(Staff Exhibit No. 1 received into evidence.)

Q. (BY MS. CREMER) Would you please summarize your

prefiled testimony and then the attached study?

A. Yeah. Basically what I found, I went through all of these sectors here, health, agriculture, manufacturing, housing, wholesale and retail trade, and found that among them, the sectors that will be positively impacted economically is leisure travel, the health industry will, the retail industry will be positively impacted. There won't be any significant impacts on agriculture and manufacturing and wholesale trade. And there will be potentially negative impacts in the housing industry that can be mitigated to one degree or another by the owner.

Q. And what sort of mitigation do you recommend that they --

A. Well, the critical thing, because housing is a fixed asset or fixed in supply, the critical thing is to disburse the manpower away from the towns that are right next to the project, and you can do that with salary differentials to encourage people to live in Watertown or somewhere else. The owner could supply bus transportation as another incentive. Of course another important one would be to negotiate contracts with motels, and there's an ample number of motels up in that area, to house as many people as possible in motels.

Q. I think you are referring to table two in your testimony when you talk about the positive impacts on travel and health and agriculture; is that right?

A. Yes.

Q. Could you expand just a little bit what the positive impact on travel and that would be?

A. Yeah, most all of the positively affected sectors will be positively affected through revenue enhancements. Some retail sectors will go up in volume by up to 40 to 45 percent. They will also have increases in labor costs and these labor costs is a ballpark estimate. There's going to be probably a 15 percent increase in real wages and overall 15 percent growth in employment, but since labor costs is a subset of the total amount of cost that these retail outlets have, the net effect is clearly positive.

And the health industry, basically it's positive through a revenue impact. There's lots of excess capacity in the health industry up there I noticed on my visit up there. So it's probably going to help that industry a lot.

Q. They have asked that you move a little closer to the mike.

A. Sure.

Q. Does that summarize your study, then?

A. Yeah, I think this -- the thing I want to iterate is that I guess from a policy standpoint, what I'd recommend is that whatever could be done to keep these temporary workers as much out of the rental market as possible will be a benefit that will really accrue over a long period of time to that

community. I live out in Wyoming and I see what's happened in some of the areas there and when I talk about a negative impact on the rental housing market in that area, I'm talking up to, could easily be $300 a month or $400, which is $4,000, and what that does is displace people that are your normal tenants that will be forced to move somewhere else and whether or not they come back is another question.

But I've been listening for two days around here talking about externalities and this is an externality. The people that are going to be displaced by these inflated rents for a couple, three years, you know, they are not a party to this transaction at all, but they are the ones that's going to be paying the price. When I looked at it, I took a visit of the area and I could see there's really nothing but good coming from it except for that one issue I think needs to be addressed, and with higher gas prices, you know, it's going to be even worse because if a person has a 100-mile round trip commute, at 20 miles per gallon, that's five gallons of gasoline at $3 a gallon, that's $15 a day to go to work. Say they pair up with each other, so you got two people riding in a car, it's about $8 a piece, so that's a dollar an hour as a break even point for a person to live in Watertown as opposed to Big Stone City or Milbank. If gasoline is $4 an hour by the time you start turning dirt up there, a dollar an hour adjustment in salary isn't going to be enough to compensate

people and they will want to camp right next to the gate probably.

MS. CREMER: Thank you. That's all staff has for this witness.

MR. SMITH: Applicants, cross-examination.

MR. MADSEN: Applicants have no cross-examination for Dr. Madden, thank you.

MR. SMITH: Joint intervenors.

MS. GOODPASTER: Joint intervenors have no questions.

MR. SMITH: Ms. Stueve, do you have any questions?

MS. STUEVE: I do have one question.

CROSS-EXAMINATION

BY MS. STUEVE:

Q. Because you talked about the housing or it sounds like your assessment was everything else turned out positive. You looked at it historically; is that correct? So are you able to give an opinion on projecting into the future, for example, on housing or economic development around the lake?

A. You mean after the facility is built?

Q. Absolutely.

A. Well, from the standpoint -- what I looked at is economic impacts, you know, and assuming that the environmental impacts are going to be acceptable, the economic impacts will not be really significant after it's built. I think their employment numbers are 35 to 45 people is all it takes to run

that -- additional people is all it takes to run it. And there's a cheese company up there I interviewed that are hiring 50 people, I don't know, about the same time. So it's not a big -- it's not a big economic impact. It's just kind of in line with what you would expect.

Q. So follow up to that, that sounds like with the assumption that the environmental impacts would be acceptable, for example, if it wasn't a mercury laden lake where we might lose --

A. That's right.

Q. -- land value along the lake.

A. I did not take into any consideration the possibility of an environmental degradation that would destroy, you know, the lake. I made the assumption that these commissioners wouldn't approve of a system that would do that.

MS. STUEVE: Thank you. No further questions.

MR. SMITH: Commissioner questions.

EXAMINATION

BY VICE-CHAIR JOHNSON:

Q. I'm flying a little blind here, Dr. Madden. I'm trying to find the local review committee report. I think it would have come in in February or March of this year. I'm having a hard time pulling it up. Have you reviewed that local review committee report?

A. Yes, I have.

Q. Did you find that any of the recommendations of the local review committee didn't make sense, given what you learned historically from the effects of Big Stone I?

A. I think, I'm not sure, I think that was the committee that suggested maybe involvement of the South Dakota Housing Authority to subsidize rents or something, and clearly I'm not a policymaker, but I don't think the housing authority should be burdened with a cost that was not caused by -- or I should say that is caused by economic events that are easily identified. There's an externality there that can easily be taken care of.

The other thing, I think that document also addressed the possibility of a rent control commission and I didn't bring that up as a possible solution in my study because I just don't think that -- South Dakota isn't used to that and if you were going to do that, you would have to have a rent control commission established and as of yesterday almost because as soon as the word gets out, there's going to be that kind of activity, the horse is already out of the barn, so to speak. So yeah, I did read it and I know that they say that there could be a housing shortage, but I think maybe in their enthusiasm or something they really kind of downplayed the magnitude of what -- I mean, maybe they have never been to places like I have where rents get so out of hand, and of course they wouldn't get out of hand if it was a long run

phenomenon, but knowing there's only two years or three years of window here, you are not going to see new apartment houses being built. If it was a 25-year window, you would. But with that short of time, the only response that that market can accommodate is an increase in rents, and like I say, they may not have ever seen that, but I have.

Q. Thank you, Dr. Madden. I thought your report did a good job of not just looking at the effects of Big Stone I while construction was going on but also in the couple of years that followed, what happened with employment numbers --

A. How it goes back.

Q. -- what happened to population, absolutely. Is there a hangover effect of a community, of a four-county area, after everybody moves in and then they leave, the population obviously decreased after the construction workers left, but do raw numbers tell the whole story? Did you pick up any feeling as to any hangover?

A. Well, it's kind of maybe similar to somebody having a good job where maybe he makes $150,000 a year and the job is over in two years and you have to tighten your belt up and get back to a $40,000 a year budget. And that's kind of what they went through. I talked to a lot of old timers up there that remember -- well, they really weren't old timers, they weren't much older than me, but that were around when Big Stone I was built, and they said it was a going Suzie, so to speak, during

that thing, but it really slowed down when they left. But the other thing that -- it seemed like there was a gain there that they never really went back to the level that -- it wasn't a snapshot of 1971 and then in 1976 we are right back to '71. There was a gain there. I didn't go into any detail of why that might have happened.

VICE-CHAIR JOHNSON: Thanks. That's all I have, Mr. Smith.

MR. SMITH: Commissioner Hanson, do you have any questions?

COMMISSIONER HANSON: No, thank you.

EXAMINATION

BY MR. SMITH:

Q. I have one question here and it's general and maybe staff's counsel can bring it up, but the relatively few numbers of people that will remain on as the permanent work force there, there will be other positive economic benefits, will there not, following the construction of this project, such as local and county property taxes, materials purchases and the like? Those will continue to have a positive impact, will they not, out into the future?

A. Oh, yes. It definitely will. I didn't look at the fiscal, the fiscal impacts, but I'm sure there's going to be -- it did before with Big Stone I, it changed the whole structure of the local government and it shows.

MR. SMITH: Thank you. Does staff have any redirect?

MS. CREMER: I do not, thank you.

MR. SMITH: I think we are done and I think you can be excused.

THE WITNESS: Thank you very much.

MR. SMITH: Staff, please call your next witness.

MS. CREMER: Staff, would you call Dr. Denney.

Thereupon,

OLYESA DENNEY,

called as a witness, being first duly sworn as hereinafter certified, testified as follows:

DIRECT EXAMINATION

BY MS. CREMER:

Q. Would you state your name and address for the record, please?

A. My name is Olesya Denney, O-L-E-S-Y-A, D-E-N-N-E-Y, and my address is 6110 Cheshire, C-H-E-S-H-I-R-E, Lane North, Plymouth, Minnesota.

Q. Could you summarize your educational background for us?

A. I have a Ph.D. in economics from Oregon State University. I also have a master's of science from Oregon State University also in economics, and I have a bachelor's degree in economics from a university in Russia.

Q. And would you tell us your work history?

A. While in Russia, I spent six years doing academic research in the field of natural and environmental economics at a research institute. I also taught a course of natural and environmental resource economics at a university in Russia. I have five years of regulatory experience here in the U.S., mostly in telecommunications area, working first at AT&T in Denver and then for QSI Consulting, which is my current employer, and I am employed by QSI Consulting as a senior consultant.

Q. You were employed by the commission to consult with staff on this matter; is that right?

A. Yes.

Q. And can you tell us in a general way what you reviewed or analyzed in order to file prefiled testimony and testify today?

A. I reviewed the materials of the case, which included the application, all the prefiled direct, rebuttal, surrebuttal testimony by all the parties, discovery responses that I was able to obtain, the transcript of the prehearing -- of the public hearing in Milbank in September 2005, the applicable portions of the South Dakota Codified Law and Administrative Rules that relate to the facility siting, various material by the EPA, the Environmental Protection Agency, and academic literature. I'm probably missing some category here. And of course one of the important things was the materials related to

the PSD, prevention of significant deterioration, permit, which the applicants applied for and the Department of Environment and Natural Resources of South Dakota issued a draft permit and statement of basis.

Q. Did you submit any data requests to any of the parties?

A. Yes.

Q. And were those responded to in a timely fashion?

A. Yes.

Q. And in front of you there are exhibits that have been marked for identification purposes and if you would look at Exhibit 2, could you tell us what that is?

A. Exhibit 2 is my direct testimony.

Q. Did that have attachments with it?

A. Yes, it should have two attachments, A and B. 2-A is my CV or my resume and 2-B is my quantitative analysis, which was actually an Excel file printed out in PDF here.

Q. Do you have any additions or deletions or corrections to that testimony?

A. Yes, I have three corrections to this exhibit and its attachments.

Q. And could you tell us what those are, please?

A. Yes, the first correction is on page 35, and it's footnote 94.

Q. What is that correction?

A. The second line says "willingness to pay all electricity," it should say "willingness to pay for electricity." The second correction is on page 39, and it's in table 6B, so there was no line numbers there. The second line of the title of the table has the word "literature," this word should be corrected to say "California PUC." The third correction is in Exhibit 2-B on page three and it is the same table, the second line the title has the word "literature," it should say "California PUC." It was a typo. California PUC means California Public Utilities Commission.

Q. So with that correction, if I were to ask you those same questions today, would your answers be the same?

A. Yes.

Q. I would -- let me do -- let's cover Exhibit 3. Do you have that in your hand?

A. Yes.

Q. Could you tell us what that is?

A. Exhibit 3 is my surrebuttal testimony.

Q. Do you have any additions or corrections to that?

A. No.

Q. So if I were to ask you the same questions that are asked in that exhibit, would your answers be the same?

A. Yes.

MS. CREMER: Staff would offer Exhibits 2 with attachments A and B, and Exhibit 3.

MR. SMITH: Is there objection from other parties?

MR. GLASER: No objection.

MS. STUEVE: No objection.

MR. O'NEILL: No objection.

MR. SMITH: Staff's Exhibits 2, including sub exhibits A and B, and 3 are received into evidence.

EXHIBITS:

(Staff Exhibit Nos. 2, 2-A, 2-B and 3 received into evidence.)

Q. (BY MS. CREMER) Thank you. Dr. Denney, would you summarize your prefiled and surrebuttal testimony for us?

A. Yes. The purpose of my testimony was to evaluate the application in the context of South Dakota facilities siting rules, specifically the rules contained in the sections of the codified law and administrative rules. The relevant chapter of the codified law lists two groups of criteria for evaluation of the application. The first group is technical grounds on which the application can be denied. They include deliberate misstatements and failure to file application in the required format and content.

The second group of criteria requirements are concerning the impact of the facility, that the facility will comply with all the applicable laws and rules, whether the facility will pose a threat of serious injury to the environment, socioeconomic conditions, health, safety and

welfare of the inhabitants and whether the facility will interfere with the orderly development of the region.

Regarding the first group of the requirements, the technical grounds on which the application can be denied, my analysis showed that the applicants generally met these conditions. Regarding the second group of compliance with the rules, not a threat of serious injury to the environment or welfare of the inhabitants and orderly development with the region, I found that the applicants intend to comply with all the applicable rules and that the facility will bring positive economic impacts to the state of South Dakota.

The remaining criterion from the second group, the environmental impacts is the main negative effect of the facility, specifically its air emissions. Though Big Stone II will cause an increase in the emissions of a number of pollutants, it will not violate the existing federal or state standards concerning pollution. And note that these standards are set in order to avoid serious injury to public health and welfare.

However, Big Stone II will emit significant amounts of carbon dioxide, which is currently not regulated by federal or state laws and carbon dioxide is known to be associated with global warming. In order to help the commission understand the magnitude of adverse effects from the project's air emissions, I conducted a cost benefit analysis. I calculated the

environmental effects in monetary terms and compared them to the positive economic effects that were already quantified by the applicants.

The main challenge to such cost benefit analysis of course is to choose appropriate, meaning objective and impartial monetary values for the damages associated with unit pollutions, damages that often are referred to as externality values. I adopted the externality values from a survey of academic literature conducted by the EPA, the U.S. Environmental Protection Agency. The key feature of these externality values is that they are expressed as a range rather than point estimates, and expressing them as a range is a more reasonable approach than point estimates because it just reflects the significant degree of uncertainty associated with monetizing these damages.

For example, the EPA survey reports that their widest range is associated with carbon dioxide emissions and the values are between $1.50 and $51 per ton of carbon dioxide emissions. And this result is not surprising that the widest ranges is associated with carbon dioxide rather than other pollutants because it is much harder to predict and estimate in dollar terms the future effects of the global warming compared to, say, the effects of other pollutants where we can actually like today observe the negative effects, which are typically health effects to people, effects to the property.

My cost benefit analysis showed that the net effect of the Big Stone II project, the difference between the positive economic impact and the negative environmental impacts lies within the wide range between negative net loss and positive net gain values. The net losses occur if we adopt the carbon dioxide values from a proportion of the EPA range. In other words, this cost benefit analysis does not provide conclusive evidence on whether the net effect of the project will be positive or negative and this inconclusive result is driven mainly by the uncertainty associated with trying to attach dollar values to the carbon dioxide emissions.

As I explained in my testimony, the research on the monetary impacts of the carbon dioxide externalities is still in its early stage and the main difficulty is our incomplete information about this process and the specifics of global warming. Because of this uncertainty and incomplete knowledge, I recommend the commission should be more conservative if it decides to consider the externality approach in evaluation of this application and decision making. And when I say more conservative, I mean using the externality values from the lower portion of the EPA, from the range reported in the EPA survey.

One example of a value that would fall in the lower portion of the EPA survey would be the values adopted by the Minnesota PUC that were mentioned previously in this hearing,

which is, it's a range up to $3.64. So if we use that value in my analysis, the net benefits of the project are positive.

Therefore, based on my review of the application, the benefits derived from the Big Stone project and the reasonable assumptions about the carbon dioxide emissions, I recommend that this commission approves the application, and that concludes my summary. Thank you.

Q. So based on that, do you have any conditions -- excuse me. Do you have any other conditions that you would place? If the commission were to approve this permit, are there any other conditions they should place on that, in your opinion?

A. Yes. First I recommended the application be approved conditional or subject to the condition that all applicable permits are issued. Second, I mentioned in my direct testimony that I support the recommendations made by the local review committee and the draft Environmental Impact Statement. Third, I recommend that the applicants submit implementation plan to -- a plan to implement the recommendations of the local review committee, to which they agreed. And third, and this is a new recommendation that is not in my testimony, I recommend that in the event the commission approves the application, the applicants submit to the commission periodic updates on the course of the project and that they should start from the date when the application is approved and until the plant is full operational and past the testing stage.

And these periodic updates should have information on the course of the construction, the status of land acquisition, the environmental activities, the status of their permits and any significant changes to the design of the project that have been made. This last recommendation was modeled after the recommendation made in the Wisconsin, case of the Wisconsin Public Service Commission regarding the application of a coal plant called Westin IV unit and it has been mentioned before. And I believe my counsel is going to or has distributed that, a copy of that final decision with the exact wording that we were looking at to the parties and the commission.

MS. CREMER: I did not give it to the commission, I did give it to the parties. It was just -- I can give that to the commission. It's found in the Westin IV order and the company has agreed to provide that periodic update and it was just kind of what staff was looking at. Thank you, Dr. Denney, that is all the staff has.

MR. SMITH: Applicants, do you have cross-examination of Ms. Denney?

MR. GLASER: Yes, we do.

CROSS-EXAMINATION

BY MR. GLASER:

Q. Dr. Denney, let me just start by saying that we appreciate what I personally consider to be a very cogent summary of your analysis. I found it to be very well-reasoned

and we particularly appreciated the last part. As I understand it, your view was that staff in fact does recommend issuance of the permit to the applicants; is that correct?

A. Yes.

Q. And --

A. Based on the information that we heard up to this point.

Q. Fair enough. And you mentioned some conditions. To your knowledge, have the applicants agreed to those conditions? I guess I should put in an exception to the one you mentioned at the end that you were just forwarding or putting forth today, but aside from that one, to your knowledge, have the applicants agreed to these conditions?

A. I believe they agreed to the conditions regarding the recommendations of the local review committee and the draft EIS. I'm not sure whether they reviewed the conditional issues of the application conditioned on the fact that all the permits are issued.

Q. We can cover that elsewhere, that's fine. Let me just ask you just a couple of questions initially about your background here. Just looking at I guess it's 2-A, which is your resume, in the context of a regulatory proceeding, have you previously analyzed the proposed operation of a coal-fired power plant prior to this case?

A. No.

Q. And it just appears just looking through the resume there, that your regulatory commission work appears to be primarily telecommunications work; is that a correct assessment?

A. Yes.

Q. Well, let me ask you about the externality issue which you talked about in your summary and particularly the issue of I guess what we are calling monetized externality values. And let's start with table three on page 25 of your first round of testimony, which is Exhibit 2. Do you have that in front of you now?

A. Yes, I do.

Q. That table is entitled Big Stone II annual emissions and externality values used to calculate Big Stone II's environmental impact. Let's just explore the concepts here. Let's look at the line marked CO, which is carbon monoxide, and there is a low value of $700 and a high value of $2900 in 1999 dollars. So if I'm reading this chart correctly, what this tells us is that for each ton of carbon monoxide emitted by Big Stone II, there is a cost created in terms of an environmental impact which is valued in dollar terms or monetized in a range of $700 per ton to $2900 per ton in 1999 dollars; is that accurate?

A. Yes.

Q. Okay. And that would be obviously the same for the

other values that are mentioned here, PM 10, VOC, lead, et cetera, correct?

A. Yes.

Q. Then if we could just turn to page 33, table four of the same testimony.

A. I'm there.

Q. And that is entitled Big Stone II annual environmental impact estimates. And so looking again at the line for CO or carbon monoxide, we have again a low, a high and also an average. And am I correct in reading this that if we take the dollar per ton figure that you just gave us for CO2 environmental impacts and multiply it by the amount or the tons of emissions from Big Stone II of carbon monoxide, the result would be the numbers that we see here on this table, the 2.56 million to 10.60 million?

A. Yes, with a small nuance. I am also converting 1999 dollars to 2005 dollars.

Q. But the point here is that what this table is depicting is that on an annual basis, Big Stone II will create a dollar impact, an environmental damage measured in dollars here for carbon monoxide of 2.5 to $10 million a year.

A. Yes.

Q. And you say -- let's just go back to page 22 of the same exhibit. Looking at the question asked on line four, and the question is, did the applicants calculate the environmental

effects to assess demonstrated or suspected hazards to human plant and animal communities as required by ARSD 20:10:22:13, and your answer is no, they did not. And reading down to the bottom on line 18, you say, therefore, staff performed its own calculation of the environmental effects; do you see that?

A. Yes.

Q. And I think you know where I'm going with this. There was some testimony from Mr. Hewson and testimony to which you responded to about whether or not there's a threshold question here about whether or not this statute -- I'm sorry, the regulation, when it says calculate environmental effects, whether that statute contemplates that those environmental effects will be rendered into monetized externality values in dollar per ton; is that correct? Is there that threshold question here?

A. I didn't hear your last -- I didn't understand your comment with the threshold. Can you simplify the question?

Q. Yeah. You testify in your second round of testimony, to save time, I won't make you go there, that you agree with Mr. Hewson, that you would leave it to the commission to read this regulation and determine in fact whether or not doing a monetized calculation of environmental impacts is something that this regulation requires; do you recall that?

A. Yes.

Q. And so my only question here is so you recognize that

the commission here has to make its own decision in terms of what this regulation says and whether this monetized approach is really the way to go in terms of interpreting this regulation; is that correct?

A. Yes, definitely, it's up to the commission to decide, but I think even if this is not a requirement, I still believe my analysis provides a useful insight as an economist because, for example, the statute, the codified law says that there should be no serious threat of injury and for me as an economist, the word serious is not defined well, so economists do measure everything in dollars and you in a sense have to pay for everything, so if your benefits are more than your cost, then the purchase is justified and that's the approach I'm taking here.

Q. Right, and I think at some point in your testimony you call it a useful tool; do you recall that?

A. Something of that, yes.

Q. Sure, because you have -- we have environmental effects on one side, we have economic benefits on the other side. It's easy to put a dollar figure on the economic benefits and using monetized values, you can compare apples to apples as it were; is that right?

A. Yes.

Q. But do you know, and maybe you know this because I honestly don't know the answer to this question, has this

commission in the past utilized monetized externality values for any purpose, do you know?

MS. CREMER: I would only interject that, if you know the answer. This is the first time we have ever hired her as a consultant, so I doubt she has the history of the commission.

MR. GLASER: That's fine.

A. Yes, that would be my answer, I do not know.

Q. (BY MR. GLASER) I have read through all of the testimony here with interest to try to figure out how many states in fact do use a monetized approach when evaluating environmental impacts, and I didn't see in your testimony a list of states that do this. Do you have a list of states in mind that when they are required to look at environmental facts, environmental effects, in fact try to put a dollar per ton value on those effects?

A. I know some states, but I did not make a survey because I think it's really beyond my point. I'm not trying to offer or start a rule making proceeding, I'm just trying to use a tool and really what prompted me to do this is the economic analysis, the multiplier analysis that the applicants conducted, so when you see they conducted -- you conducted -- estimated the economic impacts, that was also not part of the requirements, it seemed logical to try to estimate the costs in a similar fashion.

Q. Sure. I guess my only question is are you familiar

with whether or not your recommendation to use monetized externality values gets into an issue that has been considered by other states about whether to use monetized externality values and whether you know the results of any of those potential -- any of those deliberations?

A. I disagree with that characterization of my testimony because I do not recommend to use externalities. Just because I used this approach just like I used an Excel file doesn't mean I endorse it for the commission to use Excel software or externalities as a tool everywhere. I'm just trying to provide useful evidence.

Q. That's fair enough. But let me just button this down. I don't want to go on too much on this. Are you familiar that in fact North Dakota forbids its commission from using environmental externality values in resource planning?

A. I'm familiar based on hearsay, which is the testimony of one of the applicants.

Q. Well, I think it would be worthwhile at this point, then, to in fact pull out the statute.

MS. CREMER: I'm not real sure of what the relevance of North Dakota not allowing this, as our jurisdiction ends at the border. Why do I care?

MR. GLASER: Well, you care because there is a recommendation here or at least an approach that to use monetized externality values, I think it's relevant for the

commission to understand that other states have looked at doing the same and have decided not to do so.

MS. CREMER: So I guess -- but my objection I guess would lie solely to relevance.

MR. SMITH: Yeah, I think -- can I just ask a question of you, Mr. Glaser?

MR. GLASER: Certainly.

MR. SMITH: Is that for Ms. Denney here to answer I guess would be my question? Or is that something that we argue about in oral argument and/or briefing as to which policy, given what I've heard here today, and I wasn't aware that our legislature's pronouncements via legislative resolutions on global warming plus North Dakota plus some other things, are those strictly -- are you asking her for her advice vis-a-vis policy, I guess?

MR. GLASER: Oh, Mr. Smith, I'm perfectly willing to move on at this point. The only point I was trying to make here is that this issue of monetized externalities is something that other states have looked at. Mr. Hewson testified that there was only a very small minority of states that want to wade into this and I was trying to test the witness's knowledge of that background. That's fine.

Q. (BY MR. GLASER) Let's then go back to page 33, if we could.

A. I'm there.

Q. And again on table three, we see mercury externality estimates per ton of emissions. Do you see that?

MS. CREMER: Do you mean table three or four? You said table three on page 33.

MR. GLASER: Yeah, let's go to table three, excuse me, on page 25. Thank you for the correction.

A. I'm there.

Q. (BY MR. GLASER) And one of the externality values that we have depicted on this table is for mercury; do you see that?

A. Yes, I do.

Q. And I take it from reading the testimony, that if in fact Big Stone II does not result in a net increase in emissions as compared with current operations at Big Stone I, you would agree with me that there would be no mercury externality value in this case.

A. Only partially. There are two factors here. First, from reading your rebuttal, surrebuttal testimony, the very last round, I understood that you did not come into the cap during the first three years of operation, so there may be emissions higher than the existing levels and the way you explain it is you need time to test the new control technology.

Second, I recall that there is now a new rule that requires the state of South Dakota to reduce the mercury emissions, meaning that Big Stone plant I and II will have to

reduce its mercury emissions even further. So assuming that this project does not go through, Big Stone II, Big Stone I would likely have to reduce emissions. And the applicants testified, I think it was Mr. Graumann, that there is this certain uncertainty about this new mercury emission control technologies. So my point is that the more you start with a certain level of mercury that you need to remove and that mercury depends on the amount of coal that you are processing, so the fact that you have a Big Stone II means that you have more coal, more mercury to remove. So there is this -- there is I guess a more complex causality relationship, that if you do not build Big Stone II, it is possible that you might be able to reduce emissions of the existing Big Stone unit to a lower level more successfully.

Q. Well, let's break down the two thoughts. So the first point is there could be a three-year window where there could be an increase in mercury emissions; is that right?

A. Yes.

Q. And then we know that there's going to be a mercury budget for South Dakota; is that right?

A. Yes.

Q. Okay, and so that budget is going to apply, in other words, South Dakota will be assigned a mercury budget, whether or not Big Stone II is ever built.

A. Correct.

Q. So if Big Stone II is built, then South Dakota nevertheless has to comply with that budget.

A. Yes.

Q. If Big Stone II is not built, South Dakota still has to comply with that budget.

A. Yes, or when I was saying yes, or buy more allowances.

Q. Or buy more allowances. Buying more allowances, we wouldn't call that an externality, that would be an actual cost experienced by Big Stone II they would have to meet, correct?

A. Correct.

Q. Do you know whether or not that cost has been considered by the Big Stone II applicants in their economic models?

A. I believe it was considered, but it's somewhat not related to this issue.

Q. Let's look at in particular the values for carbon monoxide, CO, and PM 10, particulate matter. Both carbon monoxide and PM 10, we would call those criteria air pollutants; you are familiar with that term?

A. Yes.

Q. And criteria pollutants are regulated under, we have had some testimony about this, the NAAQS system, N-A-A-Q-S system; is that correct?

A. Yes.

Q. And that stands for the National Ambient Air Quality

Standards; is that right?

A. Yes.

Q. And I think it would be helpful to spend a few minutes exploring this system so the record is clear on this. Under the NAAQS system -- well, to start, the NAAQS system is a system that is legislated under the federal Clean Air Act; is that right?

A. It is my understanding.

Q. And so under the NAAQS system, the way this works is that EPA sets air quality standards for certain air pollutants which we call the criteria pollutants; is that right?

A. Yes, that is my understanding.

Q. And these NAAQS, these ambient air quality standards, are designed to protect public health with an adequate margin of safety and with no consideration given to the cost of complying with these air quality standards; is that your understanding?

A. Yes.

Q. And the NAAQS are set based on a process that involves public rule making and comment; is that right?

A. That is my understanding, but you are going slightly beyond my expertise here.

Q. Do you know that in establishing these air quality standards that EPA receives the input of something called the Clean Air Science Advisory Committee comprised of scientists?

A. No, I do not know about the names of participants in this process.

Q. Okay. But in any event, these air quality standards, what they do is they set levels for these criteria pollutants in the air below which the air is considered to be safe with a regional -- with a reasonable margin of safety, above which the air is considered to be unsafe; is that depicted okay?

MS. CREMER: I'm just going to ask, you know, if this is something you guys want as testimony, maybe you should call a witness. This really isn't her area of expertise and so you appear to be doing the testifying and just getting her to agree. To an extent that's fine, but if this is something that you want as evidence, I believe you should put it in your case as opposed to mine.

MR. GLASER: I think the witness knows where this is going. The witness has testified that we have monetized externality values for criteria pollutants of carbon monoxide, particulate matter and lead. That indicates that those pollutants, under the monetization, are causing health or welfare impacts and that's why she is saying that those pollutants should have monetized values and we add those to the one side of the equation of environmental impacts. And I'm absolutely certain the witness knows where this is going in terms of in fact there are no such impacts under the system of air quality regulation that we have today. I think this is

fair game.

MS. CREMER: Then I guess --

MR. SMITH: I'm going to overrule the objection. Please proceed.

A. What was the question?

Q. (BY MR. GLASER) Let me think of another one. Do you know whether or not the NAAQS are required to be reviewed every five years?

A. No, I don't know about specific time periods.

Q. Do you know that based on the standards, states are required to determine areas of the state that are either in attainment with those standards and areas that are not in attainment with those standards?

A. I know that attainment and nonattainment areas are determined. I'm not sure who is required to do that.

Q. Okay. And so if an area of a state does not comply with these air quality values, then that area of the state is designated a nonattainment area, correct?

A. Yes.

Q. And are you aware whether or not an individual state, if it believes that the air quality standards are not stringent enough, whether that state can set more stringent standards on its own than EPA has set?

A. Yes, I'm aware of that.

Q. States can do that?

A. Yes, they can do that.

Q. Okay. So in theory anyway, under this system, if, as the applicants have testified here, that carbon monoxide and PM 10 emissions at Big Stone II do not cause any areas of South Dakota to be in nonattainment of the air quality standards for those substances, there should be no environmental impacts regarding those substances in South Dakota; is that correct?

A. No, I do not agree with this position, and let me explain. First, I did address it in my testimony and I provided a quotation from the order by the Minnesota PUC, that same order regarding the externality values that the applicants like to refer to, that also the order -- the Minnesota order said that there is no evidence that this National Air Ambient Quality Standards are set at levels that assume zero cost, and that's why they continue having nonzero positive externality values for these pollutants, though Minnesota is now in an attainment area for them.

Second, there is a limited degree, I guess, of knowledge in the way the standards are updated. It's not a continuous process from the new discovery to regulatory approval. And third, if you look at the standards, they are set as averages for -- some of them are annual, others are 24-hour and an average means that the actual levels of concentration of pollutants may be higher or lower within that interval. The standard may still be met though there was a

time period where the concentration was higher than was considered to be a standard. And because many of these pollutants are causing health effects such as all kinds of asthma attacks and so on, which have almost instantaneous effect as far as I understand, if the air quality is low, a person with this sensitive respiratory system will suffer from that. So just because an average in a year, a standard is met, doesn't mean that a specific person will not still have adverse effects.

Q. Okay. Well, if I could, let me just break down some of that answer there. If you could look at your second round of testimony, Exhibit 3 on page 13, and you mentioned in the answer that you just gave that you thought that Minnesota, Minnesota, for instance, the commission had determined that there might still be health effects occurring even if the NAAQS are being met, correct?

A. Yes.

Q. And you are referring to this indented paragraph here on page 13; do you see that?

A. Yes.

Q. And according to the Minnesota PUC, it says, however -- and this is -- what you are quoting from here I take it, footnote 27, this is their order as of 1997?

A. Yes.

Q. According to the Minnesota Public Utilities

Commission, EPA has not been able to keep the NAAQS updated, they do not reflect the latest scientific knowledge, and then it says, based on the record established in this matter, it is clear that the NAAQS currently are not necessarily set at no-cost levels. I guess the difficulty I'm having with the response that you gave is whether there is a record here in this case that there are in fact health effects occurring in South Dakota because of the view that the NAAQS are not set at an appropriate level, that EPA is not doing its job, it's not keeping up with the science. I don't see that record here. Does that record exist?

A. Your question had several parts, so I cannot answer yes or no. It had too many to follow.

Q. Have you presented in your testimony any analysis of health effects actually occurring in the state of South Dakota because the NAAQS are not sufficiently protective of human health the way they are designed to be?

A. No, I did not present this analysis because clearly I'm not an expert. But I did note in my first, in my direct testimony that my calculations of the environmental impact are pessimistic, meaning they are maybe overstating the results, overstating the impacts, and in my rebuttal testimony, I also noted that, again, that this is -- I am just taking the most straightforward approach. I do agree that if you have an attainment area, that the effects of the air pollutant are

likely to be lower than when you look at nonattainment area, but that in -- the bottom line here is that these numerical analysis regarding the criteria pollutants, pollutants for which there is a standard, does not really affect the net outcome of my analysis. I am conducting kind of a pessimistic path scenario, which is in essence not favoring the applicants, but I'm showing that even under this scenario, I still believe that there are positive impacts.

Q. And I appreciate that, and believe me, I understand that a lot of people, you know, criticize EPA and don't think that EPA is doing its job correctly. But let me just close the loop on this and then I can move on. Just two follow-up questions just to make sure things are clear. You mentioned, you know, that the NAAQS are set on averages, for instance, annual and there could be effects occurring on some other basis. But do you know that in fact that EPA does have authority to set NAAQS on, for instance, daily ambient concentrations of pollutants in the air and in fact has done that?

A. I do not know whether they have the authority, but one of the previous applicants, your witnesses today testified, as far as I understand, that there is some difficulty measuring some of this pollutants, I think it was particulate matter, so I imagine the standards are set at the more -- not on a daily basis but, say, on an annual basis because of that difficulty

of monitoring, so there is this regulatory cost of monitoring things.

Q. But if I were to ask you whether you know whether or not EPA's current standards for particulates are both set on there's a separate standard for an annual -- there's both a separate annual standard and a separate 24-hour standard, would you know that?

A. I actually have a table, I thought you may ask. And it depends on the pollutant. Some of them are set only on an annual basis, I believe, let me look at it. For example, nitrogen dioxide is only -- listed only as annual. Lead is listed only as quarterly average. Carbon monoxide is listed only as eight hour and one hour, so it depends.

Q. Right. But EPA in fact could set a daily standard if it wanted to, if it felt that -- if there was a health effect being experienced on a daily basis, that's the only thing I'm trying to tie down here.

MS. CREMER: So are you asking that does she know that or you are asking her to speculate could they do that?

MR. GLASER: Just whether she knows. I'm really not trying to have an argument here, I'm just trying to understand how the air quality regulatory system in the country in South Dakota works.

A. My answer is I do not know because I don't know whether there are some technical difficulties or economic

difficulties in monitoring and enforcing that more frequent standard.

Q. (BY MR. GLASER) But in any event, I think as you told me, if it were felt in South Dakota that the EPA standards in fact were not protecting the health, South Dakota, the DENR could step in and issue more stringent regulations; that's correct, isn't it?

MS. CREMER: I'm not sure that's a correct statement of South Dakota law, that they can set a more stringent measure.

MR. GLASER: Okay, that's fair.

Q. (BY MR. GLASER) Your testimony referred to the possibility that there could be long-range transport of certain pollutants; do you recall that?

A. Yes.

Q. And in your surrebuttal testimony, you refer to, you single out particulate matter as pollutants that could transport long range.

A. Yes, that information was based on what I read on the EPA Web site.

Q. And the relevance of this to this case is that even if the NAAQS are being met in South Dakota, in fact there could be transport of these pollutants outside of South Dakota, causing an effect outside of South Dakota; is that right?

A. Yes.

Q. What about carbon monoxide, did you have any information about whether that was one of the pollutants that could be transported out of state?

A. I believe it is typically not transported long distances. I don't know about middle distances. I did not rebutt that part of Mr. Hewson's testimony.

Q. And then on particulate matter, that was the one that you mentioned. And you referred to PM 10 and PM 10, as I understand it, is particulate matter that has an aerodynamic diameter of less than 10 microns; is that right?

A. Yes.

Q. And within the PM 10 category, there's also something called PM fine or PM 2.5; you are aware of that?

A. Yes.

Q. And then particulate matter that is larger than PM 2.5 but less than PM 10 is sometimes called coarse particulate matter; is that right?

A. I do not know that terminology.

Q. Okay. Do you know whether or not it is, when EPA refers to particulate matter that is transported hundreds or thousands of miles, whether they are referring to fine particulate matter, coarse particulate matter?

A. They are referring to fine particulate matter.

Q. Are you familiar with something called the Clean Air Interstate Rule or CAIR rule recently promulgated by the

Environmental Protection Agency?

A. I know that that rule -- I know about the existence of this rule. I cannot speak intelligently on the specifics of this rule.

Q. But just in general the purpose of that rule is to address long-range transport of fine particulate matter that results from emissions of sulphur dioxide and nitrogen oxide from electric utilities; is that right?

A. I cannot answer this question because you are going further than my knowledge.

Q. Okay, do you know, just being generally aware of the CAIR rule, do you know whether or not the rule applies to the whole country?

A. No, I believe it does not apply to South Dakota.

Q. Okay. That's fine. Let's move on, then, to what I think will be my last topic, and that is the CO2 externality values and if we could just go back to your table three, again on page 25.

A. I'm there.

Q. And you refer there to, and you testified about this earlier, to two possible ways that you looked at at monetizing a CO2 value. One was a literature survey and the other is the California PUC adder. Do you see that?

A. Yes, I do.

Q. And the literature survey is something that you

described as an EPA literature survey.

A. Yes, it's a survey made by the EPA and published on their Web site.

Q. Do you have that Web site material with you?

A. I'm hesitant to answer because I have a link, it's in my Exhibit B. I don't have the Web site with me.

Q. Without trying to unduly prolong these proceedings, I'd like to show you the document, we can just talk about that.

A. Okay.

Q. We are actually going to hand out two documents at the same time to save time. Perhaps we won't need the second document, but I just want to explore the first document.

MS. CREMER: Are you intending to offer these?

MR. GLASER: Well, I will be offering the first document.

MS. CREMER: The first one to you is which one?

MR. GLASER: The first document is entitled Marginal Damage Estimates For Air Pollutants and if we never get to the second document, then we can just throw that document away.

Q. (BY MR. GLASER) The document --

EXHIBITS:

(Applicants' Exhibit No. 117 marked for identification.)

Q. (BY MR. GLASER) And my question on Exhibit 116, is this the document that you are referring to, the literature

survey from EPA?

A. Yes.

MR. SMITH: Excuse me, did we not label that 117?

MR. GLASER: 117, I'm sorry, 117.

MR. WELK: We reserved 116.

MR. SMITH: Sorry to interrupt.

MR. GLASER: Thank you.

Q. (BY MR. GLASER) And it says on the first page there at the top, it says source, Federal Purchasing Categories Ranked by Upstream Environmental Burden; do you see that? It's an October 1998 analysis performed under contract to the Office of Pollution Prevention and Toxics, U.S. EPA.

A. Yes, I do see that.

Q. So this document that we are looking at and on which you cited in your testimony, is your understanding that it was written by this firm in 1998 under a contract to EPA?

A. I mean, this is the source that's listed, yes, that is my understanding. But it seems to be it has been approved by the EPA in a sense. That's why I'm referring to it as the EPA survey.

Q. Yeah, that is actually what I was going to ask you, because I actually spent some time trying to figure out what purpose this document, for what purpose this document is used by EPA and I'm not sure that I did figure that out and I'm wondering if you know that, this document was written in 1998,

it is, you are right, it's still on their Web site, but I wonder if you could just give us some background on how this document is used by EPA.

A. I cannot give you this background. I don't work for the EPA.

Q. Well, let's just quickly turn over to -- I didn't get page numbers on mine, buts it the fourth page. I see a table down towards the bottom, table 3-2, damage values for carbon dioxide emissions, 1996 dollars per ton, and I see the 1.5 to 51. That's where you got the numbers that you included in your analysis?

A. Yes.

Q. And then again, the source that is listed for this table for the $1.5 to $51 indicates that it's Leach '97, then it gives a cite, it's an article entitled "A systems approach to material flows in sustainable cities: A case study of paper." I'm wondering if you ever -- obviously I have handed out what I think is the Leach paper in any event, but I'm wondering if you went back as far as the Leach paper to see how that analysis was done of how they came up with a one dollar to $51 a ton.

A. No, I didn't go there because being outside academics now it's really hard to get ahold of academic publications.

Q. Right. Well, and speaking of which, even on this document 117, it says that Leach in turn adopted data from a

literature review by Hormandinger in 1995 entitled "Fuel cells in technology and medicine." We couldn't find that one and I guess I ought to close the loop here and find out whether you found that one yourself.

A. No.

MR. GLASER: The Leach paper that I've handed out, let's go ahead and mark this.

EXHIBITS:

(Applicants' Exhibit No. 118 marked for identification.)

Q. (BY MR. GLASER) Okay, the Leach paper, Exhibit 118, on page 711 I see the chart, figure four, and it's got CO2 externality values and that indicates that the source for those values is the Hormandinger paper and in fact going over to page 720 in the back, there's an actual citation for Hormandinger. Do you see that on page 720?

A. Just a moment.

Q. Yeah, please, I don't mean to rush you through this, take your time.

A. Yes, I do see that.

Q. And so the citation of Hormandinger indicates that it is an unpublished master's thesis from the University of London. Do you see that? So you haven't actually reviewed obviously the Hormandinger paper, I think I asked you that; is that right?

A. No, I haven't reviewed it. Yes, you have asked me that.

Q. Thank you for both answers. I'm getting a little older now and have some problems remembering. So I guess if I asked you, you know, how this $1 to $51 number, this CO2 number was developed, what the assumptions were, what the background was, what they looked at, how that all came about, you would not be able to answer that; is that right?

A. Well, I will not be able to answer that, but just note that just because it is a master's thesis, the paper says here that Mr. Hormandinger conducted a survey of literature and that assumes that literature was most likely published and it was more than one source. So it doesn't matter that that was in a master's thesis that wasn't published because he did a survey of literature, which is probably not a publishable paper, but it does not undermine its value in a sense.

Q. Right. I understand that. It's a very wide range, the $51 number obviously produces a very large dollar externality value, even looking at the midpoint of the range of one to 51 produces a very large dollar value in this case and I'd like to ask some questions about what the basis of that range is, how it was developed, assumptions, et cetera, but we don't have that on the record; is that right?

A. Yes.

MR. GLASER: That's all the questions I have and with

that, I would like to move admission of 117 and 118.

MR. SMITH: Is there objection?

MS. CREMER: Relevance, but I'm willing to go -- you can put it in.

MR. SMITH: Applicants 117 and 118 are received.

EXHIBITS:

(Applicants' Exhibit Nos. 117 and 118 received into evidence.)

MR. SMITH: Does that conclude applicants' cross-examination?

MR. GLASER: Yes, it does.

MR. SMITH: Then can I ask everybody if they want to plow ahead or do people need a short break?

MR. O'NEILL: I'll be short.

MR. SMITH: Why don't you go ahead, joint intervenors.

CROSS-EXAMINATION

BY MR. O'NEILL:

Q. Good afternoon, Dr. Denney.

A. Good afternoon.

Q. Dr. Denney, in talking about your background, could you just provide us a little bit of the regulatory utility related experience that you have and what review you did and what state proceedings you looked at?

A. As I explained before, this is my first nontelecommunications case. I filed testimony in a case with

the Michigan Public Service Commission, which was a union unbundled network elements case, which was related to shared and common cost of SBC, the local telephone company there. But as working for QSI Consulting, I also support witnesses and I actually keep track of the cases because there has been so many and I have counted approximately 20 cases, and when I say support witnesses, I do the analysis, I draft testimony, I go to hearings, I help with the cross.

Q. And in those 20 proceedings, some of them related to the electric utility regulation area?

A. No, except for this one.

Q. Okay. But for this proceeding, you reviewed other electric utility testimony and analysis?

A. Can you please clarify what you mean by other electric utility testimonies?

Q. That's as good as I can get for you. In your review, did you look at testimony or any presentations on electric utility related issues that were before public utility commission bodies?

A. Yes, I did some review and probably the most relevant was the Westin IV case in Wisconsin.

Q. Okay. Can you tell me -- we have heard other witnesses testify regarding this, what an externality cost is.

A. An externality cost is costs that are not borne by the person or entity that causes the cost.

Q. And how about a regulatory cost?

A. A regulatory cost in the context of this case, because there is no such official definition I guess in economic textbooks, is the cost that the producer, like the applicants, would actually bear because of the regulation imposed on them.

Q. Okay. And what I understand you did in this case was analyze the economic benefits versus the environmental regulatory costs that arose in this case; is that true?

A. No, this is not true. I did not look at the regulatory cost.

Q. I'm sorry, could you state that, your answer again, what you did?

A. You asked me whether I looked at the regulatory costs, I believe, and that is not correct.

Q. Sure, can you tell me what you did, though?

A. I looked at externalities, at effects that are not borne by the applicants and I tried to compare them to the, in a sense, positive externalities, which are the economic impacts of this project.

Q. Did you attempt to quantify the net economic impact of Big Stone II by comparing the externalities arising from air emissions of the plant to the economic development benefits projected as stated by Mr. Stuefen for the applicants?

A. Yes.

Q. Did you hear Mr. Stuefen testify in this case?

A. Yes.

Q. Did you hear him testify that the 50 percent induced spending number that he used, that his use of that figure or how he arrived at that figure was arbitrary?

A. Yes, I did hear it, but it's not -- it's not biasing because what I really need, but I didn't get it from the applicants, is the total economic impact, not just the state of South Dakota, because as I explained, externalities do not have geographic limitations, they are not limited to South Dakota.

MR. O'NEILL: All right, thank you. That's all the questions I have.

MS. CREMER: Ms. Stueve.

MS. STUEVE: Yes.

CROSS-EXAMINATION

BY MS. STUEVE:

Q. Good afternoon, Dr. Denney. I'm glad you're here.

A. Good afternoon.

Q. I'm looking at your direct testimony, which would be Exhibit -- I don't have the exhibit number.

A. Two.

Q. Thank you. On page 22 and line 16, 17 and 18, you say the responses to this interrogatory, and the line above tells what the interrogatory is, it's staff asks the applicant a follow-up interrogatory to provide the required calculation of environmental effects. So you say, the responses to this

interrogatory are not expected before the filing date of this testimony, therefore, staff performed its own calculation of the environmental effects. Have you since received an answer to the interrogatory?

A. Yes, and it did not contain the calculations.

Q. And could you repeat for me again your definition of externality?

A. It is costs not borne by the entity that causes the cost.

Q. So could we say we have an externality cost in this sense?

A. In relation to?

Q. In relation to staff performing its own calculation, the environmental effects, rather than the applicant.

A. I may be not understanding this, but isn't it correct that the applicants in a sense finance, allocate funds to the commission to hire a consultant?

MS. CREMER: I'm not sure, what is your question?

MR. SMITH: I think the answer to that is no because the applicants pay all our bills for this.

A. Yes, and I'm paid, too.

MR. WELK: As a direct cost, not an externality.

MS. STUEVE: All right, I'm not an economist. Thank you.

Q. (BY MS. STUEVE) I would go to page -- it's the direct

testimony, but it's one of the appendices, page two.

A. Do you mean Exhibit B?

Q. Exhibit A, page two, yes. I was looking at your academic publications. Could you explain a little bit on some of these related publications that deal with environment and did any of these publications that you did deal with any externalities analysis?

A. I'm reviewing the publications to provide a complete answer. First these are all publications related to my academic work. Second, all of them relate to externalities. That's the answer.

Q. I appreciate that. And that's the only question, comments I have. I like the mix of the economics and the environment.

MR. SMITH: Staff, do you have any redirect? Oh, commission, I'm sorry, pardon me.

EXAMINATION

BY VICE-CHAIR JOHNSON:

Q. Thank you, Ms. Denney. I was curious about the source of -- I'm sorry, I have the loudest vibrate cell phone in the history of the world, my apologies. The document, I believe it's Applicants' 117, Marginal Damage Estimates for Air Pollutants.

A. Yes.

Q. This was the document that you used to set the EPA

literature review.

A. Yes.

Q. This document is from 1998 and the source that it refers to, the Leach study, is from 1996. Were there any concerns on your part about using literature that was so dated?

A. Yes, of course I would prefer a more current source, but this was the most recent source published on the EPA Web site and I thought that if I use something that is published by the EPA rather than by academic literature, I will get less objections from the regulators. But I did look for more recent sources and I think the most recent source that is a really good, complete survey of the current literature, it's a 2005 paper by Richard Tol, T-O-L, who is a professor at the University of Hamberg at Carnegie-Mellon University and he surveyed over 100 studies of the externalities for carbon dioxide only, which I think is really the issue in this case. And he in essence reaffirmed my position because he shows there is a really wide range between really small numbers to very large numbers, but then there's a cluster of estimates for the carbon dioxide and they all lie within I think a five, around five dollars, which is a value which is close to the Minnesota PUC and the value that -- under which you will get positive net impacts of the Big Stone if you do a sensitivity analysis of my calculation. To summarize, the new literature does not change the -- the interval published by the EPA, the numbers are

different but still it's wide, but the most frequent, I guess, estimates lie within the lower portion of that range.

Q. And as you can imagine, having such a broad range, $1 to $51 does make it difficult to provide any guidance to regulators. The report you mentioned by Mr. Tol --

A. Yes.

Q. -- does staff intend to offer that as an exhibit?

A. I didn't really mean to. I didn't really mention it. It's an academic peer review publication in the journal called Energy Policy, I believe, let me double check. Yes, it's Energy Policy, Volume 33, 2005.

Q. And you said that -- again --

A. I may provide it if you want, if my counsel doesn't object.

MS. CREMER: If you would like that, we can certainly provide that, late filed.

VICE-CHAIR JOHNSON: I think it would be helpful. I would certainly read it. Not that I can't track it down on my own, but if it's part of the record.

MS. CREMER: We can put that in.

VICE-CHAIR JOHNSON: Thank you very much.

Q. (BY VICE-CHAIR JOHNSON) I want to make sure that I've heard you right. That paper by Mr. Tol also showed a large spread --

A. Yes.

Q. -- of academic literature, estimates for CO costs in academic literature, but most or majority or a large number of literature, the estimtates were clustered around the $5 per ton range?

A. Yes, he kind of graphed it as a distribution function, you know what I mean, and it does show that the majority of studies show somewhat low values and I think $5 is kind of the peak of that, the most frequent observation in his graph.

VICE-CHAIR JOHNSON: Thank you very much. Mr. Smith, that's all I have.

MR. SMITH: Other commissioner questions.

COMMISSIONER HANSON: No, thank you.

CHAIRMAN SAHR: No, thank you.

MR. SMITH: Ms. Cremer, does staff have redirect?

REDIRECT EXAMINATION

BY MS. CREMER:

Q. Just to make sure that people understand your background, and I believe I understood it, you do have quite a bit of background in externality studies, right?

A. Yes.

Q. And can you just expand on what that is in case there's a question of your background?

A. Well, basically I specialized in this area for my bachelor's and for my master's thesis. I spent six years doing research on this, as I mentioned, in the Academic Institute in

Russia, and we did a lot of -- there are some theoretical things that you do, but you also do a lot of actual applied work and that was the years when the Soviet Union was still a farming economy, so what we did was our institute was involved in planning of what's called industrial complexes. For example, there is this region in Siberia where you have coal, you have coal-fired energy, electrical plants, you have industries that use that energy and so they plan it as a whole and our group was responsible for what is called the environmental model of that, a big model trying to account for the externalities associated with that development. So that would be probably the most relevant example.

MS. CREMER: Thank you, that's all I have.

MR. SMITH: Are we done?

MR. GLASER: I have nothing.

MR. SMITH: You are excused.

MS. STUEVE: I have a brief follow-up, very brief, if I may.

MR. SMITH: Yes.

MS. STUEVE: This is Mary Jo Stueve.

RECROSS-EXAMINATION

BY MS. STUEVE:

Q. The commissioner brought it up when he was asking about most recent publications and I'm just curious because your work on this project, you weigh negative environmental

im -- negative environmental effects to positive economic effects to come to a decision or a recommendation; is that correct?

A. Yes.

Q. So out of curiosity, I know I've read some recent publications within the past year or so where the reverse now can be true, there's some studies showing that ones will look at, for example, energy, what would be the positive environmental effects of not going with coal versus going with something that's more environmentally friendly and then weigh the economic effects. Is that possible?

A. Well, it is possible, but this case is application for a coal-fired facility, so that was my focus of study. I could not evaluate alternatives because that would be outside the application. I didn't have that information really to do that.

MS. STUEVE: Thank you.

MR. SMITH: Thank you, Ms. Denney. You are excused. Doctor, pardon me. Does that conclude staff's case?

MS. CREMER: Yes, it does.

MR. SMITH: At this point in time, with the stipulation that we had at the close yesterday.

MS. CREMER: Right.

MR. SMITH: If anything else occurs that is materially different from what the prefiled says, that you would be able to respond to that.

MS. CREMER: Right. At this point Dr. Denney's recommendation stands, having heard half the matter.

MR. SMITH: That's an encouraging thought.

VICE-CHAIR JOHNSON: Staff is still clearly not pleased with the order of testimony.

MR. SMITH: But your heroism is appreciated. I'm assuming that it's now 25 to 6:00, 5:35, that we ought to conclude for the day and commence to move our materials over to room 413. With that, the hearing -- we are going to go into recess until 8:30 in the morning tomorrow and we will be in room 413 tomorrow. Thank you, everyone.

(Whereupon, the proceedings were in recess at 5:35 p.m.)

C E R T I F I C A T E

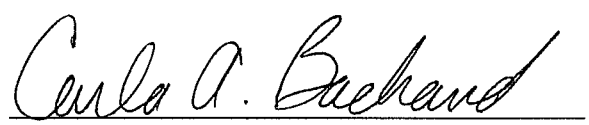
STATE OF SOUTH DAKOTA)
) ss.
COUNTY OF HUGHES)

I, Carla A. Bachand, RMR, CRR, Freelance Court Reporter for the State of South Dakota, residing in Pierre, South Dakota, do hereby certify:

That I was duly authorized to and did report the testimony and evidence in the above-entitled cause;

I further certify that the foregoing pages of this transcript represents a true and accurate transcription of my stenotype notes.

IN WITNESS WHEREOF, I have hereunto set my hand on this the 28th day of June 2006.



Carla A. Bachand, RMR, CRR
Freelance Court Reporter
Notary Public, State of South Dakota
Residing in Pierre, South Dakota.

My commission expires: June 10, 2012.

G

N

T

V

W