

**FILE**

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December 10, 2007

The Honorable Alan R. Schriber  
Chairman  
Ohio Power Siting Board  
180 East Broad Street  
Columbus, OH 43215-3793

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**RE: Deposition of Richard C. Furman, Taken on  
Case No. 06-1358-EL-BGN**

Dear Chairman Schriber:

Please find enclosed a copy of the transcript for the Deposition of Richard C. Furman, taken before Maria DiPaolo Jones, a Notary Public in the State of Ohio, at the offices of Chester Willcox & Saxbe, LLP

Please do not hesitate to contact me if you have any questions.

Respectfully,

  
Nathaniel S. Orosz  
Attorney for AMP-Ohio, Inc.

NSO/acc

Enclosures

ND: 4845-5195-9554, v. 1

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1                   BEFORE THE OHIO POWER SITING BOARD

2                                   - - -

3 In the Matter of the                   :  
4 Application of American               :  
5 Municipal Power - Ohio,               :  
6 Inc. for a Certificate               :  
7 of Environmental                   : Case No. 06-1358-EL-BGN  
8 Compatibility and Public           :  
9 Need for an Electric               :  
10 Generation Station and           :  
11 Related Facilities in           :  
12 Meigs County, Ohio.           :

13                                   - - -

14                                   DEPOSITION

15 of Richard C. Furman, taken before me, Maria DiPaolo  
16 Jones, a Notary Public in and for the State of Ohio,  
17 at the offices of Chester, Willcox & Saxbe, LLP, 65  
18 East State Street, Suite 1000, Columbus, Ohio, on  
19 Tuesday, December 4, 2007, at 9:06 a.m.

20                                   - - -

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23

24

25                                   ARMSTRONG & OKEY, INC.  
26 185 South Fifth Street, Suite 101  
27 Columbus, Ohio 43215-5201  
28 (614) 224-9481 - (800) 223-9481  
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30                                   - - -

1 APPEARANCES:

2 Chester, Willcox & Saxbe, LLP  
3 By Ms. April R. Bott and  
4 Mr. John W. Bentine and  
5 Mr. Stephen C. Fitch  
6 65 East State Street, Suite 1000  
7 Columbus, Ohio 43215-4213

8 On behalf of American Municipal  
9 Power - Ohio, Inc.

10 Mr. Aaron Colangelo  
11 Natural Resources Defense Council  
12 1200 New York Avenue, NW, Suite 400  
13 Washington, DC 20005

14 and

15 Mr. Shannon Fisk  
16 Natural Resources Defense Council  
17 101 North Wacker Drive, Suite 609  
18 Chicago, Illinois 60606

19 On behalf of Intervenor Natural  
20 Resources Defense Council.

21 ALSO PRESENT:

22 Mr. Evis Couppis;  
23 Mr. Scott Kieseewetter.  
24

1 APPEARANCES VIA SPEAKERPHONE:

2 Marc Dann, Ohio Attorney General  
3 Duane W. Luckey, Senior Deputy Attorney  
4 General  
5 By Mr. William L. Wright  
6 Assistant Attorney General  
7 Public Utilities Section  
8 180 East Broad Street, 9th Floor  
9 Columbus, Ohio 43215

6 On behalf of the Ohio Power Siting Board.

7 Marc Dann, Ohio Attorney General  
8 By Ms. Margaret A. Malone  
9 Assistant Attorney General  
10 Environmental Enforcement Section  
11 30 East Broad Street, 25th Floor  
12 Columbus, Ohio 43215

11 On behalf of the Ohio Environmental  
12 Protection Agency.

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1 RICHARD C. FURMAN

2 being by me first duly sworn, as hereinafter  
3 certified, deposes and says as follows:

4 EXAMINATION

5 By Ms. Bott:

6 Q. Good morning. This is the deposition of  
7 Richard C. Furman, pursuant to a notice duces tecum.  
8 Mr. Furman, I'm going to ask you questions concerning  
9 your testimony that was filed with the Ohio Power  
10 Siting Board, the matter number is case number  
11 06-1358-EL-BGN and the caption is Application of  
12 American Municipal Power - Ohio for a Certificate of  
13 Environmental Compatibility and Public Need for the  
14 American Municipal Power Generating Station in Meigs  
15 County, Ohio. Do you understand that?

16 A. Yes.

17 Q. Just as a ground rule, you need to answer  
18 my questions out loud so that the court reporter can  
19 take your answers; is that acceptable?

20 A. Yes.

21 MS. MALONE: I can't hear the witness  
22 respond at all.

23 MS. BOTT: Okay. Peggy, we're moving the  
24 phone.

1 THE WITNESS: Is that better?

2 MS. MALONE: Has the witness just made a  
3 noise?

4 THE WITNESS: Is that better?

5 MS. MALONE: Yes, it is. Much.

6 MS. BENTINE: Peggy, Bill needs to be  
7 clued in on the number, so I've got to call him.

8 MS. MALONE: He has an e-mail that has it  
9 on it.

10 MS. BOTT: Let's go off the record.

11 (Discussion held off the record.)

12 (Mr. Wright joined by speakerphone.)

13 Q. (By Ms. Bott) Mr. Furman, my name is  
14 April Bott, I'm with the firm of Chester, Willcox &  
15 Saxbe, and we represent AMP-Ohio. With me today is  
16 Scott Kiesewetter, who is an employee of AMP-Ohio,  
17 and also John Bentine and Steve Fitch, and they are  
18 members of Chester, Willcox & Saxbe. I just wanted  
19 to introduce us.

20 I will be asking you questions. When I  
21 refer to "AMP-Ohio," I mean American Municipal Power  
22 of Ohio, Inc., you understand that; is that correct?

23 A. Yes.

24 Q. And when I reference "AMPGS," which I

1 will sometimes do, you understand that means American  
2 Municipal Power Generating Station in Meigs County;  
3 is that correct?

4 A. Yes.

5 Q. Finally, if I say "OPSB," again in  
6 shorthand usually, you'll understand that I mean the  
7 Ohio Power Siting Board; is that correct?

8 A. Yes.

9 Q. Okay. And I'm making the assumption and  
10 I guess I'll ask the question that you understand  
11 what OEC, NRDC, and Sierra Club stand for; is that  
12 correct?

13 A. What was the first one?

14 Q. OEC. Can you tell me what "OEC" stands  
15 for?

16 A. I can only guess. Ohio Environmental  
17 Council.

18 Q. Okay. So when I say "OEC," you  
19 understand that means Ohio Environmental Council.

20 A. Yes.

21 Q. I just want to make sure.

22 Can you state your full name for the  
23 record?

24 A. Richard Charles Furman.



1 Q. Mr. Furman, what's your address?

2 A. 10404 Southwest 128 Terrace, Miami,  
3 Florida 33176.

4 Q. And how long have you lived there?

5 A. Twenty-six years.

6 Q. Okay. You filed testimony in the Power  
7 Siting case, the AMP-Ohio Power Siting case on behalf  
8 of NRDC; is that correct?

9 A. Yes.

10 Q. You also filed testimony on behalf of  
11 OEC; is that correct?

12 A. Yes.

13 Q. Did you know that before this minute?

14 A. I believe -- yes, because it's on my  
15 title page.

16 Q. Okay. You've also filed testimony on  
17 behalf of Sierra Club; is that correct?

18 A. Yes.

19 Q. Who retained you to provide the testimony  
20 in this matter?

21 A. NRDC.

22 Q. When were you retained?

23 A. I'm not positive, but I would estimate  
24 around September 19th.

1 Q. Of this year, 2007?

2 A. Yes.

3 Q. Are you being compensated for your  
4 testimony?

5 A. Yes, I am.

6 Q. Could you explain the terms of the  
7 compensation?

8 A. I receive a thousand dollars per day for  
9 my consulting time.

10 Q. Is that paid for by NRDC?

11 A. Yes.

12 Q. Do you receive any compensation from the  
13 Joyce Foundation?

14 A. No, I do not.

15 Q. Do you have a contract in place with  
16 NRDC?

17 A. Yes, I do.

18 Q. Does that contract set out the terms of  
19 your testimony?

20 A. Yes, it does.

21 Q. Prior to today have you spoken with  
22 anybody at NRDC regarding your testimony?

23 A. Yes.

24 Q. Have you spoken with anybody at NRDC

1 regarding this proceeding?

2 A. Yes.

3 Q. What was the nature of those discussions?

4 A. I discussed what they were interested in  
5 having me include in my testimony, various  
6 comparisons and analysis relevant to the hearing, and  
7 we also discussed various questions that might be  
8 asked during the deposition.

9 Q. When you talk about areas of testimony,  
10 can you identify those for me?

11 A. Do you mean beyond the level of detail  
12 that I have in the table of contents?

13 Q. Well, let me ask you this question, what  
14 is your testimony in this proceeding, your filed  
15 testimony? What are the areas of testimony?

16 A. The areas of testimony are to make  
17 comparisons as to whether the proposed plant is  
18 providing the minimum environmental impact or there  
19 are other alternatives available; if it satisfies the  
20 public need in terms of minimizing the cost of future  
21 electricity to the customers; and if it provides the  
22 maximum degree possible of water conservation and  
23 meeting future environmental regulations and costs.

24 Q. Future environmental regulations?

1 A. Yes.

2 Q. How do you know -- is that not  
3 speculative at this point?

4 A. To some degree, yes.

5 Q. Okay. What are those future  
6 environmental regulations that you can testify to?

7 A. Mercury and carbon dioxide.

8 Q. Do you believe that mercury is not a  
9 regulated pollutant currently?

10 A. It is.

11 Q. Can you explain --

12 A. But the utilities are just now having to  
13 comply with those regulations.

14 Q. So it's not a future environmental  
15 regulation. It's a current environmental regulation.

16 A. Yes.

17 Q. Can you explain what those regulations  
18 are or identify them; let's start there?

19 A. There are maximum emission limits that  
20 are required depending on the type of coal-fired  
21 power plant.

22 Q. So utilities have a max standard; is that  
23 correct?

24 A. They also have -- they have a max

1 standard, there's also a maximum allowed for each  
2 state under the CAM regulations.

3 Q. CAM, what is --

4 A. That's C-A-M-R. That's an abbreviation  
5 for Clean Air Mercury Regulation.

6 Q. And what's Ohio's limit? You said there  
7 was a maximum limit in each state; what's Ohio's?

8 A. I don't know the specific in Ohio.

9 Q. Okay. When would AMPGS have to comply  
10 with CAMR, in your opinion?

11 A. They would have to comply with the  
12 emission regulation presently and have stated what  
13 their emission limit would be in their permit  
14 application.

15 Q. So their permit application meets CAMR;  
16 is that correct?

17 A. As far as the -- no, I'm not sure as far  
18 as CAMR. The problem that exists is that each state  
19 is required to meet a cap, and I haven't looked into  
20 yet how much of that cap that this particular power  
21 plant would be utilizing, and it's going to be up to  
22 the state to determine what portion of that cap gets  
23 to be used by each of the individual plants.

24 Q. I see. And Ohio, in your opinion, Ohio

1 hasn't identified the cap, how it would divide the  
2 cap.

3 A. Not to my knowledge, no.

4 Q. Okay. And in your opinion, AMPGS would  
5 receive an allocation by U.S. EPA with respect to  
6 mercury allowances?

7 A. I believe it's initially up to the  
8 states.

9 Q. Okay. So in your opinion Ohio EPA would  
10 set an allowance for AMPGS, is that correct, for  
11 mercury?

12 A. Yes.

13 Q. Okay. Does AMPGS have any other mercury  
14 standard that it must meet?

15 A. The emission limit for the plant itself  
16 under the new source performance standards.

17 Q. And what is that in EPA's draft permit  
18 for AMPGS?

19 A. I'd have to refer to my notes to give you  
20 the exact number.

21 Q. Is it your opinion that that limit is  
22 protective of human health and the environment?

23 A. I don't believe it's adequate.

24 Q. Can you explain why not?

1           A.    The standard does not take into account  
2 the consequential damages and --

3           Q.    I'm sorry, let's back up so we're clear.  
4 The standard. What are you referring to when you say  
5 "the standard"?

6           A.    The emissions standard from the stack.

7           Q.    Are you talking about the emission limit  
8 in the AMP permit?

9           A.    Yes. Yes.

10          Q.    Okay. Go ahead.

11          A.    Unfortunately, that's not the only  
12 emission source of mercury from the plant. There's  
13 also potential emissions of mercury from the fly ash,  
14 from the bottom ash, from the scrubber sludge, and  
15 those are potential contaminants to groundwater  
16 supplies, and the Clean Air Act requires that you  
17 consider consequential damages, so although the  
18 regulations allow you to take credit for the amount  
19 of mercury that gets redeposited in the fly ash and  
20 the bottom ash and in the scrubber sludge, it's  
21 presently still doing research on the amount of that  
22 mercury that then can get leached into the  
23 groundwater supply.

24          Q.    Okay. So let's go back. From an air

1 emissions perspective you believe that AMPGS will  
2 meet CAMR; is that correct?

3 MR. COLANGELO: Objection. I don't think  
4 that accurately characterizes his earlier testimony.

5 Q. Okay, let me ask it a different way. Is  
6 it your opinion that AMPGS will meet CAMR?

7 A. I don't know.

8 Q. Is it your opinion that AMPGS will meet  
9 Ohio's Clean Air Mercury Rule?

10 A. I don't know.

11 Q. Have you ever seen Ohio's Clean Air  
12 Mercury Rule?

13 A. I don't think so.

14 Q. Okay. So you did not review Ohio's Clean  
15 Air Mercury Rule before you came to this deposition;  
16 is that correct?

17 A. Correct.

18 Q. Okay. I apologize, Mr. Furman, I'm going  
19 to take you back. You said that as part of your  
20 testimony that you're giving in this proceeding you  
21 are here to talk about other alternatives; can you  
22 explain that?

23 A. Yes. That there are other alternatives  
24 that should be explored when looking at what options



1 are available for additional generation.

2 Q. Are you talking about other technologies?

3 A. Yes.

4 Q. Could you identify the technologies that  
5 you're testifying about?

6 A. Yes. One of the ones is other more  
7 efficient power plant designs, more efficient  
8 pollution control equipment, and the use of IGCC  
9 which is integrated gasification combined cycle  
10 technology.

11 Q. Your testimony does not include any  
12 opinion with respect to wind generation, does it?

13 A. No.

14 Q. Your testimony does not include any  
15 opinion with respect to renewable energy options,  
16 does it?

17 A. No.

18 Q. Your testimony doesn't include any  
19 opinions as to natural gas combined cycle generation,  
20 does it?

21 A. Yes, it does.

22 Q. Would you support a thousand megawatts of  
23 natural gas combined cycle in Ohio?

24 A. Not without doing further analysis.

1 Q. Okay. So you haven't done any analysis  
2 to determine whether or not it would be your opinion  
3 that a thousand megawatts of natural gas combined  
4 cycle in Ohio would be appropriate.

5 A. No, I haven't done enough analysis.

6 Q. Okay. I'm going to hand you what's about  
7 to be marked Furman Exhibit 1.

8 (EXHIBIT MARKED FOR IDENTIFICATION.)

9 Q. Have you seen this document before?

10 A. Yes, I believe so.

11 Q. Can you identify it?

12 A. It's a notice of deposition.

13 Q. Okay. Who is the notice of deposition  
14 for?

15 A. Myself.

16 Q. Do you understand that with this notice  
17 of deposition it's a duces tecum deposition?

18 A. Yes.

19 Q. Do you understand what that means?

20 A. No, I don't.

21 Q. Okay. Did you bring any documents with  
22 you that you relied on in forming your opinion in the  
23 testimony that you gave and presented in this matter?

24 A. Yes, I did.

1 Q. Okay. Mr. Furman, I'm going to hand you  
2 what's about to be marked Furman Exhibit 2.

3 (EXHIBIT MARKED FOR IDENTIFICATION.)

4 Q. Have you seen this document before?

5 A. Yes, I have.

6 Q. Can you identify it?

7 A. Yes. It's my written direct testimony.

8 Q. Can you identify the date on that  
9 testimony?

10 A. October 25th, 2007.

11 Q. And is that the testimony that you filed  
12 in the matter for AMPGS?

13 A. Yes.

14 Q. Mr. Furman, I'm going to have you flip to  
15 the back, after page 39 --

16 A. Yes.

17 Q. -- there's a stack of documents that are  
18 unnumbered. Are these exhibits to your direct  
19 testimony?

20 A. Yes, they are.

21 Q. Are these the only exhibits to your  
22 direct testimony?

23 A. Yes.

24 Q. And the exhibits in the back correspond

1 at the beginning of your testimony with your table of  
2 exhibits; is that correct?

3 A. Yes.

4 Q. Did you rely on any other documents in  
5 forming your opinion to provide this testimony in  
6 this AMPGS matter?

7 MR. COLANGELO: I'm sorry, could you  
8 repeat that question?

9 MS. BOTT: I'm asking if he relied on any  
10 other materials in addition to what's in this package  
11 with respect to his testimony in this matter.

12 MR. COLANGELO: Okay.

13 A. No.

14 Q. Okay. So the documents listed in your  
15 table of exhibits are the only documents you relied  
16 on in providing this testimony; is that correct?

17 A. And the documents that I reference in the  
18 text.

19 Q. Okay.

20 MR. COLANGELO: Let me just clear  
21 something up about your Exhibit 2.

22 MS. BOTT: Sure.

23 MR. COLANGELO: Can we go off the record  
24 for a second?

1 (Discussion held off the record.)

2 Q. Mr. Furman, I'm sorry, before we went off  
3 the record you had stated that the exhibits that were  
4 attached plus the documents referenced in your direct  
5 testimony are the only documents that make up the  
6 basis for your opinion; is that correct?

7 A. Yes, and I have supplied a list of all  
8 those documents and a CD containing all of those  
9 documents for the record.

10 Q. Okay. I'm going to mark what's going to  
11 be Furman Exhibit 3.

12 (EXHIBIT MARKED FOR IDENTIFICATION.)

13 Q. Mr. Furman, can you take a look at that  
14 disk? Can you identify the disk?

15 A. It says "Furman Documents OPSB."

16 Q. You referred to a disk that contained  
17 your references; is this the correct disk?

18 A. It looks like it's probably a copy of  
19 my -- it's not the one I prepared.

20 Q. Okay. I'm going to hand you what's going  
21 to be marked Furman Exhibit 4.

22 (EXHIBIT MARKED FOR IDENTIFICATION.)

23 Q. Can you take a look at this document and  
24 let me know if you've ever seen it?

1           A.    Yes, this is a list of references that I  
2 prepared which includes all the documents that I used  
3 in preparation of my testimony.

4           Q.    Okay. And to the best of your knowledge  
5 is this list of references contained on the disk  
6 that's marked Exhibit 3?

7           A.    Yes.

8           Q.    And just for point of clarification on  
9 the disk that's been marked Exhibit 3, that is not  
10 your original disk; is that correct?

11          A.    Correct.

12          Q.    Is it possible that that is the disk that  
13 your counsel has provided to AMP-Ohio?

14          A.    Quite possibly.

15          Q.    But you don't know what's on that disk;  
16 is that correct?

17          A.    Correct.

18          Q.    Okay. We were speaking earlier about  
19 your testimony here today and I asked you if you had  
20 spoken with anybody at NRDC. Have you spoken with  
21 anybody at Sierra Club regarding this proceeding?

22          A.    No, I have not.

23          Q.    Have you spoken with anybody at the Ohio  
24 Environmental Council regarding this proceeding?

1 A. No, I have not.

2 Q. Are you being compensated to promote IGCC  
3 technology?

4 A. No.

5 Q. Have you ever been compensated to promote  
6 IGCC technology?

7 A. No.

8 Q. Have you been given any documents related  
9 to AMPGS by your client?

10 A. Yes.

11 Q. Could you identify those documents?

12 A. I believe it was a notice of intent to  
13 intervene.

14 Q. Okay. Any other document?

15 A. And also a brief prepared for the Ohio  
16 EPA which also was a notice to intervene.

17 Q. A notice to intervene in this proceeding?

18 A. I believe it was both, both the Ohio  
19 Power Siting Board and then also one for the Ohio  
20 EPA.

21 Q. Can you identify the matter number of the  
22 Ohio EPA case?

23 A. No.

24 Q. Do you know if an appeal has been made by

1 your clients in an Ohio EPA matter?

2 A. I believe they have.

3 Q. Okay. Do you know when that was?

4 A. No, I don't.

5 Q. Did you receive any other documents from  
6 your clients about AMPGS?

7 A. Not that I recall.

8 Q. Have you received any documents from your  
9 clients about AMP-Ohio?

10 A. Yes. I received some public notices of  
11 their opinions in reference to the environmental  
12 aspects of the project and also the economics.

13 Q. When you say "their opinions," can you  
14 identify who the "their" is?

15 A. It was more of a press release indicating  
16 their opinions as far as the situation with emissions  
17 and future costs associated with the plant.

18 Q. So you've seen press releases that  
19 AMP-Ohio has --

20 A. Uh-huh.

21 Q. I'm sorry, let me finish the question.  
22 You've seen press releases that AMP-Ohio has issued;  
23 is that correct?

24 A. That NRDC has released.



1 Q. Okay. Have you seen any documents that  
2 AMP-Ohio has issued?

3 A. Yes.

4 Q. What would those be?

5 A. That would be the permit application for  
6 the Ohio EPA, the staff determination, and the draft  
7 permit.

8 Q. When you say "staff determination," what  
9 are you talking about?

10 A. That would be the Ohio EPA staff  
11 determination made subsequent to the permit  
12 application and prior to issuing of the draft permit.

13 Q. Draft permit for the power plant?

14 A. Yes.

15 Q. What draft permit for the power plant has  
16 been issued?

17 A. The one on the Ohio EPA website.

18 Q. Was that a multimedia permit draft that  
19 was issued; do you know?

20 A. What do you mean by "multimedia"?

21 Q. It was water? Landfill? Air?  
22 Generation? We can take them one by one, or  
23 "multimedia" meaning all of the above. Was it a  
24 multimedia permit draft?

1 A. Air permit.

2 Q. You also stated that you had seen a  
3 permit application; what are you referring to?

4 A. AMP-Ohio is required to submit a permit  
5 application prior to being issued a draft permit.

6 Q. Are you talking about an air permit?

7 A. Yes.

8 Q. So you've seen the air permit application  
9 for AMP-Ohio.

10 A. Yes.

11 Q. And when you speak of a staff  
12 determination, you're talking about a staff  
13 determination associated with an air permit; is that  
14 correct?

15 A. Yes.

16 Q. Have you seen any other documents that  
17 have been created by AMP-Ohio or for AMP-Ohio?

18 A. I believe a news release indicating that  
19 they were intending to use the Powerspan SO2 control  
20 technology.

21 Q. Okay. Anything else?

22 A. Not that I recall right now.

23 Q. Regarding the news release on Powerspan,  
24 are you familiar with Powerspan?

1           A.    Yes, I am.

2           Q.    Can you explain what you know about  
3 Powerspan?

4           A.    Powerspan is a company located in  
5 Portsmouth, New Hampshire, that is developing new  
6 pollution control technology. They have several  
7 processes that they're developing; the one that  
8 AMP-Ohio is considering is the ECO -- E-C-O -- -SO<sub>2</sub>  
9 process which is claimed to be a more efficient and  
10 perhaps less costly method of removing SO<sub>2</sub> from the  
11 flue gas than conventional flue gas desulfurization  
12 processes. And they're at the initial stages of  
13 development of a CO<sub>2</sub> removal process which is called  
14 ECO -- E-C-O -- -CO<sub>2</sub> process.

15          Q.    Let's talk about ECO-SO<sub>2</sub> technology for a  
16 minute. You stated that -- you made the statement  
17 about conventional FGD technology; can you explain  
18 what you mean by that?

19          A.    That limestone scrubbing of the flue gas  
20 to react with the SO<sub>2</sub> to create gypsum which is  
21 either disposed of as a waste material or made into  
22 wallboard.

23          Q.    Do you believe that a limestone FGD is  
24 commercially viable?

1 A. Yes.

2 Q. Do you believe that a limestone FGD  
3 removes SO<sub>2</sub>?

4 A. Yes.

5 Q. Do you know what type of rate of  
6 reduction limestone FGDs get?

7 A. It can be designed for various levels of  
8 emission removal from about 95 to 99 percent.

9 Q. You don't believe that or is it your  
10 opinion that the ECO<sub>2</sub> or -- excuse me. The ECO-SO<sub>2</sub>  
11 technology from Powerspan is conventional scrubbing  
12 technology; is that correct?

13 A. It's not commercially available yet.

14 Q. Is it conventional FGD technology?

15 A. No, it is not.

16 Q. Why not?

17 A. It's a different process.

18 Q. Explain that.

19 A. It's a process that uses ammonia which is  
20 reacted with the SO<sub>2</sub> to generate a fertilizer  
21 by-product which is then hopefully commercially sold.

22 Q. So there's a different reagent, it's an  
23 ammonia reagent; is that correct?

24 A. Uh-huh, yes.

1 Q. Rather than a limestone reagent --

2 A. Yes.

3 Q. -- correct? Are there any other  
4 differences in the technology besides the reagent?

5 A. Yes, you need to use different equipment  
6 also.

7 Q. Such as?

8 A. They have a process for oxidizing the  
9 sulfur products to SO<sub>2</sub> and also it integrates in a  
10 wet electrostatic precipitator.

11 Q. So a wet ESP is part of the design of  
12 ECO-SO<sub>2</sub> technology?

13 A. I believe so.

14 Q. Do you know?

15 A. I'm pretty sure.

16 Q. Have you ever looked at a flow diagram of  
17 the ECO-SO<sub>2</sub> technology?

18 A. Yes.

19 Q. Where did you get that?

20 A. From Powerspan's website.

21 Q. Have you ever spoken to anybody at  
22 Powerspan?

23 A. Yes.

24 Q. Who have you spoken to?

1 A. I don't remember her name.

2 Q. How long ago would have it been?

3 A. Three weeks ago.

4 Q. Do you know her position?

5 A. No; I'm not sure.

6 Q. Do you know if she was an engineer?

7 A. No, I do not.

8 Q. Did you ask her any engineering  
9 questions?

10 A. Yes.

11 Q. Could she answer the engineering  
12 questions?

13 A. Yes.

14 Q. What did she tell you?

15 A. She confirmed for me my engineering  
16 description of how the process worked and what the  
17 plans were for future development.

18 Q. Of ECO-SO2 technology; is that correct?

19 A. Of both.

20 Q. Both. What does "both" mean?

21 A. SO2 and CO2.

22 Q. Okay. And you say that she confirmed  
23 your engineering analysis; is that correct?

24 A. My engineering description of the

1 process.

2 Q. Is your engineering description of the  
3 process in writing?

4 A. No.

5 Q. What is your engineering description of  
6 the process?

7 A. What I've previously described to you.

8 Q. Okay. Why do you believe the Powerspan  
9 ECO-SO2 technology is not commercially viable?

10 A. It hasn't been demonstrated at commercial  
11 scale.

12 Q. What's commercial scale?

13 A. For this particular plant it would be  
14 960 megawatts.

15 Q. So you do not believe that this  
16 technology would be commercially viable for this  
17 plant unless it was demonstrated previously at  
18 960 megawatts; is that correct?

19 A. No.

20 Q. Okay. Explain that to me.

21 A. If the minimum size of the largest module  
22 was such that it could be duplicated, then it would  
23 have been demonstrated at a commercial scale. So as  
24 of now they have demonstrated the technology at

1 50 megawatts. If they wanted to use multiples of  
2 those 50 megawatts to build up to 960 megawatts, then  
3 the technology would have been demonstrated at  
4 commercial scale; however, that would not be  
5 cost-effective.

6           Therefore, the next step is to  
7 demonstrate the technology at 200 to 300 megawatts,  
8 which I believe is in their development plan, and  
9 then if they wanted to use multiple modules of 200 to  
10 300 megawatts to build up to the 960 megawatts that  
11 are needed for AMP-Ohio, then it would be  
12 commercially available.

13           Q.    So it's your opinion that a scale-up from  
14 50 megawatts to the 200- to 300-megawatt range for  
15 Powerspan ECO-SO2 technology is commercially viable;  
16 is that correct?

17           A.    I'm sorry, could you rephrase that?

18           Q.    You talked about a demonstration project  
19 of 50 megawatts; is that correct?

20           A.    Yes.

21           Q.    And you talked about a scale-up of that  
22 technology to 200 to 300 megawatts; is that correct?

23           A.    Uh-huh, yes.

24           Q.    In your opinion, is that scale-up doable



1 from a technology perspective?

2           A.    You're asking -- I cannot predict the  
3 future. That's certainly the next step, to prove the  
4 scale-up and the viability of the technology. No one  
5 can predict what associated scale-up problems might  
6 be incurred.

7           Q.    What type of engineer are you?

8           A.    Chemical engineer.

9           Q.    Have you built any power plants?

10          A.    I've been involved in the construction of  
11 power plants.

12          Q.    Have you designed any power plants?

13          A.    The initial feasibility and conceptual  
14 design, yes.

15          Q.    What plant?

16          A.    The Brayton Point power plant in New  
17 England, the conversion from it being a oil-fired  
18 power plant to being a coal-fired power plant. And  
19 the Florida Power and Light 400-megawatt Sanford  
20 plant being converted from oil to coal-oil mixture.

21          Q.    Were those new plant designs?

22          A.    No, they were conversions of plants.

23          Q.    Conversions of existing plants; is that  
24 correct?

1 A. Yes.

2 Q. Did the conversions of these plants  
3 include new boilers?

4 A. No, they did not. Modifications to the  
5 boilers.

6 Q. Were you the primary engineer on those  
7 projects, let's start with Brayton?

8 A. No.

9 Q. Were you the primary engineer at Sanford?

10 A. No.

11 Q. Did you sign as a PE at Brayton?

12 A. No.

13 Q. Did you sign as a PE at Sanford?

14 A. No.

15 Q. Have you ever signed a power plant design  
16 document?

17 A. No.

18 Q. Have you ever designed any pollution  
19 control equipment for a power plant?

20 A. No.

21 Q. Have you ever seen the engineering  
22 designs for Powerspan ECO-SO2 technology?

23 THE WITNESS: Could you repeat that  
24 question?

1 (Question read.)

2 A. Could you be more specific as far as what  
3 you consider an engineering design? My concern is  
4 that to see a flow diagram showing the different  
5 process streams is one level of design which is shown  
6 on their website. To see a detailed process flow  
7 sheet where all conditions of temperature, pressure,  
8 and flow rates are specified is a much more detailed  
9 design document. Which of those would you determine  
10 as an engineering document?

11 Q. Let's talk about them both. Have you  
12 seen as you've described the first one, the process  
13 diagram, have you seen a process diagram for ECO2?

14 A. Yes.

15 Q. Or excuse me, ECO-SO2 technology.

16 A. Yes.

17 Q. And that came from Powerspan's website;  
18 is that correct?

19 A. Yes.

20 Q. Have you seen any other process diagrams  
21 related to Powerspan technology besides what's on  
22 their website?

23 A. Yes, I believe I was sent some documents  
24 from Powerspan.

1           Q.    Were those documents part of the basis  
2 for your opinion and part of your testimony in this  
3 matter?

4           THE WITNESS: I'm sorry, can you repeat  
5 that question?

6           (Question read.)

7           MR. COLANGELO: I'll just object to the  
8 form, it's a compound question.

9           A.    My reason for hesitating is I did  
10 initially prepare the document with information on  
11 Powerspan. At the request of NRDC, since they felt  
12 it was more relevant in the Ohio EPA hearing, I  
13 excluded it from this hearing and included it in the  
14 Ohio EPA hearing document.

15          Q.    Why is it not relevant in this matter?

16          A.    Because there is no commitment presently  
17 in the permit to use Powerspan. It's only a press  
18 release at this point.

19          Q.    But you stated you were talking -- your  
20 testimony has to do with technologies, and let me  
21 make sure I get this correct, power plant  
22 technologies and efficient control equipment; is that  
23 correct?

24          A.    Yes.

1           Q.    You don't believe Powerspan is control  
2 equipment; is that correct?

3           A.    It is, but there are other control  
4 equipment which are also relevant. In other words,  
5 the emissions standards that AMP-Ohio has requested  
6 is at the very low end of the scale of what  
7 conventional control equipment can obtain. So by  
8 using more efficient power plant designs and more  
9 efficient control equipment, lower levels of  
10 emissions can be obtained.

11          Q.    I understand that, but that didn't answer  
12 my question. My question --

13          A.    Powerspan is only one of the possible  
14 control options which can be incorporated.

15          Q.    So you agree that Powerspan is a control  
16 option; is that correct?

17          A.    Yes.

18          Q.    But you consider it irrelevant; is that  
19 correct?

20          A.    Not irrelevant, but perhaps not pertinent  
21 to this particular hearing.

22          Q.    Why?

23          A.    Because it wasn't specified in the needs  
24 determination as the control option.

1           Q.   Neither was IGCC but you're testifying to  
2   that; is that not correct?

3           A.   Yes, and I guess I would have liked to  
4   have seen an analysis of IGCC and I would have liked  
5   to have seen an analysis of Powerspan in addition to  
6   more efficient conventional pollution control  
7   equipment.

8           Q.   But you didn't prepare any analysis of  
9   Powerspan; is that correct?

10          A.   Not in this testimony.

11          Q.   Have you prepared any analysis of  
12   Powerspan?

13          A.   Yes.

14               MS. BOTT:  We'd like that.

15               MR. COLANGELO:  Sure.

16               MS. BOTT:  Okay.

17          Q.   Let's go back to the documents that you  
18   have regarding Powerspan.  Can you identify those  
19   documents?

20          A.   Yes, they're identified in my testimony  
21   to the Ohio EPA.

22          Q.   Have you presented us with your testimony  
23   to Ohio EPA?

24          A.   No.

1 MS. BOTT: May we have a copy of your  
2 testimony to --

3 MR. COLANGELO: Yeah, our document  
4 production is due on Wednesday and that will be part  
5 of our production. We already let you know that was  
6 coming.

7 MS. BOTT: I understand that.

8 Q. Your testimony to Ohio EPA does not serve  
9 as the basis for your testimony in this matter; is  
10 that correct?

11 A. This was prepared first.

12 Q. And your document list which is Exhibit 4  
13 which you relied on in preparing your materials is  
14 complete; is that correct?

15 A. For this hearing document, yes.

16 Q. Okay. I'm going to ask you to turn in I  
17 believe it's Exhibit 2 to RCF-1. Can you identify  
18 that document?

19 A. This is a copy of my résumé.

20 Q. Is it up to date?

21 A. Yes, it is.

22 Q. As of what date?

23 A. As of October 25th, 2007.

24 Q. And if I look down through and I think on

1 page 2 I see that you did a master's thesis on  
2 "Technical and Economic Evaluation of Coal  
3 Gasification Processes"; is that correct?

4 A. Yes.

5 Q. And that was 35 years ago?

6 A. That's correct.

7 Q. Okay. Did this thesis include any  
8 evaluation for power generation gasification?

9 A. No, it did not.

10 Q. Okay. I see also here it looks like  
11 prior to grad school you worked for Southern  
12 California Edison; is that correct?

13 A. Yes.

14 Q. And you worked there for eight months; is  
15 that right?

16 A. Yes.

17 Q. Were you the lead engineer at Southern  
18 California Edison?

19 A. No, I was not.

20 Q. Okay. Did you design any plants while  
21 you were at Southern California?

22 A. No, I did not.

23 Q. Did you procure any fuel while you were  
24 at Southern California?



1 A. No, I did not.

2 Q. Did you install any control equipment?

3 A. Yes.

4 Q. What would that be?

5 A. Equipment to control nitrogen oxides by  
6 making use of two-stage combustion.

7 Q. What equipment did you install?

8 A. We installed overfire air ducts and  
9 adjustments to the burners to accomplish two-stage  
10 combustion for nitrogen oxides removal or reduction.

11 Q. Do you believe that overfire is an  
12 acceptable technology for NOx reduction?

13 A. It's the first step in controlling  
14 nitrogen oxides.

15 Q. What would be the other steps?

16 A. Improved burner design, control of excess  
17 air, SCR which is selective catalytic reduction.

18 Q. Any others?

19 A. Nonselective reduction, SNCR.

20 Q. Would you do SNCR and SCR in the same  
21 plant?

22 A. No.

23 Q. Okay. Have you taken any courses in  
24 power plant design?

1 A. No.

2 Q. Have you taken any courses in power plant  
3 emission control technology?

4 A. Yes.

5 Q. When was that?

6 A. That was when I was at MIT.

7 Q. Have you taken any since you were at MIT?

8 A. No.

9 Q. And you left MIT when; remind me? 1972  
10 you graduated; is that correct?

11 A. Uh-huh.

12 Q. After grad school you worked for a  
13 company, let me ask the question, who was next? Who  
14 did you work for next?

15 A. Walden Research Division of ABCOR.

16 Q. What's ABCOR?

17 A. ABCOR was the parent company made up of  
18 both air and water pollution control companies.

19 Q. They were vendors?

20 A. No, they were consultants doing work on  
21 pollution control equipment for air pollution and  
22 water pollution and also doing testing work on power  
23 plant incinerators for emission controls.

24 Q. Environmental consulting; is that

1 correct?

2 A. Yes.

3 Q. Then what's next on your job experience?

4 A. The Center for Energy Policy.

5 Q. And what is that?

6 A. That was a nonprofit organization which  
7 did multidisciplinary studies on the technical and  
8 economic feasibility of various energy issues. I  
9 worked on the power plant conversion for the Brayton  
10 Point power plant, fuel pricing for fuels, and energy  
11 conservation as it related to space heating in New  
12 England.

13 Q. New England Electric owns Brayton Point;  
14 is that correct?

15 A. Yeah.

16 Q. Or did at the time.

17 A. Did.

18 Q. Did you work for New England Electric?

19 A. No. I worked for the Center for Energy  
20 Policy which coordinated the first engineering study  
21 for the conversion of that power plant.

22 Q. Were you retained by New England Energy?

23 A. No, but I worked very closely with them,  
24 with their engineers.

1           Q.   Who were you retained by, and by "you"  
2 I'm assuming the Center for Energy Policy was  
3 retained by somebody; is that correct?

4           A.   They had probably a number of grants.

5           Q.   Okay. So this was done pursuant to a  
6 grant, not at the request or as your client New  
7 England Energy; is that correct?

8           A.   I don't know what the relationship was  
9 between New England Electric and the Center for  
10 Energy Policy. The situation was that they were  
11 imminent to get a conversion order to convert that  
12 plant because of the lack of supply of oil to fuel  
13 that plant, and what we did is we organized the  
14 various interested parties, EPA, the business  
15 community, the environmentalists, and the utility to  
16 come up with a compromise on what would be the most  
17 effective way to convert that plant and also minimize  
18 emissions. We were able to successfully do that  
19 which was the largest power plant in New England and  
20 the first conversion of a power plant from oil to  
21 coal.

22           Q.   So the conversion was done from oil to  
23 coal; is that correct?

24           A.   Yes.

1 Q. Okay. You stated that --

2 A. And this might indicate to you the level  
3 of experience that somebody maintains even though  
4 they don't take additional courses, you learn through  
5 experience, and by working on projects like this you  
6 learn to stay up to date on the technology and what  
7 is most advanced as far as conversion of boilers,  
8 boiler design, and pollution control equipment.

9 Q. Up to date as of 1977.

10 A. Right.

11 Q. Okay. You stated that there was a lack  
12 of oil to supply the plant; is that correct?

13 A. Yes.

14 Q. Why was that?

15 A. This was, if you look at the date, this  
16 was starting in September of '75 so the first oil  
17 embargo was in '73, so at that time the urgent need  
18 was to get off of our dependency on oil because our  
19 supply was being cut off. So there was a certain  
20 degree of urgency at having to convert to an  
21 alternative fuel to keep the lights on.

22 Q. Okay. Did you share that concern about  
23 the reliance on foreign sources of liquid fuel?

24 A. Yes.

1           Q.    Do you still share a concern about  
2 reliance on foreign sources of liquid fuel?

3           A.    Yes.

4           Q.    Would that include natural gas fuel?

5           A.    To a much lesser degree because the large  
6 majority of natural gas is domestically produced.

7           Q.    Do you know what the percentage is?

8           A.    Not exactly; 85, 90 percent.

9           Q.    Do you know the percentage of oil that's  
10 domestically produced?

11          A.    No, I don't.

12          Q.    Did Brayton actually convert from oil to  
13 coal?

14          A.    Yes.

15          Q.    Are they still a coal plant at Brayton?

16          A.    Yes.

17          Q.    Next it appears you went to Florida Power  
18 and Light; is that correct?

19          A.    Yes.

20          Q.    That was in Miami.

21          A.    Yes.

22          Q.    Okay. And it appears that you were  
23 involved in another coal conversion program there; is  
24 that correct?

1           A.    Yes.

2           Q.    Can you explain that project?

3           A.    Yes.  Again, similar situation except  
4 this was after the second oil embargo in '78.  Again,  
5 the supply of oil was being cut off to the country,  
6 and Florida Power and Light was at that time the  
7 largest oil-burning utility in the country.  They  
8 were facing mandatory conversion orders and were  
9 looking for alternatives on how they could more  
10 effectively convert their plants.

11                   One of the options that we looked at was  
12 converting to a coal-oil mixture.  My responsibility  
13 was heading up the analysis group which looked at the  
14 various technical and economic options that we had  
15 for converting to coal, either going to all coal,  
16 100 percent coal, or going to a mixture of -- a  
17 coal-oil mixture.

18                   And in order to demonstrate the  
19 technology we actually converted a 400-megawatt unit  
20 from oil to coal-oil mixture.  And I was in charge of  
21 other analysis and looking at other technologies such  
22 as coal water slurries, coal liquefaction, fluidized  
23 bed combustion, gasification, and worked on the  
24 project advisory group at that time that eventually

1 provided funding for the first IGCC unit which was  
2 the Cool Water Plant in California.

3 Q. So that we're clear, throughout your  
4 testimony when you talk about IGCC, you're talking  
5 about IGCC for power plants; is that correct?

6 A. Yes.

7 Q. Okay. Will you make sure that you  
8 clarify if you're not talking about IGCC for a power  
9 plant throughout your testimony? Is that okay?

10 A. Are you considering -- do you want that  
11 definition to be so narrow as to only include the  
12 generation of power and no other products?

13 Q. Yes.

14 A. Okay. Because the conventional  
15 definition is not that narrow.

16 Q. Okay. What would you consider an IGCC  
17 power plant?

18 A. There are a number of IGCC units  
19 operating in Italy in refineries, they produce  
20 electricity, but they also produce other products  
21 like hydrogen for the refinery. So the total IGCC  
22 unit is there, is contained within the refinery, but  
23 in addition to that they're producing other products  
24 from the gasification product.



1           Q.    Okay.  But those types of IGCCs are not  
2   generating power for sale for power supply; is that  
3   correct?

4           A.    I don't know whether there's  
5   outside-the-fence sales or not.  There may very well  
6   be.

7           Q.    For clarification points, as we go  
8   through the testimony I think it would be helpful if  
9   you could identify, when you talk about IGCC, is it a  
10  collocated IGCC with another process or is it  
11  primarily and only for power supply.  Is that --

12          A.    Sure.

13          Q.    -- acceptable?

14          A.    Yes.

15          Q.    Okay.  Back to Florida Power and Light.  
16  What type of boilers or what type of technology did  
17  Florida Power and Light use at the plant you were  
18  working on?  You talked about a conversion of a  
19  400-megawatt unit from coal --

20          A.    Yes.

21          Q.    -- to oil-coal.  What type of unit was  
22  that?

23          A.    It was an oil unit.

24          Q.    Okay.  Is that different technology than

1 a coal unit?

2 A. Yes.

3 Q. Can you explain the difference?

4 A. Yes. Because of the ash in the coal you  
5 have to design the boiler differently. The ash will  
6 build up, you'll have both fly ash and bottom ash  
7 which you'll have to deal with in the boiler,  
8 therefore, the design characteristics are different.  
9 You have to make accommodations to be able to handle  
10 that ash. Some of those accommodations are to put in  
11 soot blowers which blow the ash away. Other  
12 accommodations are wider spacing between heat  
13 transfer tubes so you don't clog the spaces in  
14 between the tubes with ash.

15 There's also different combustion  
16 characteristics between the two fuels in terms of the  
17 radiant and convective heat transfer characteristics.  
18 So a unit designed for oil is significantly different  
19 than a boiler designed for coal.

20 Q. They're both boilers, let's start there;  
21 is that correct?

22 A. Yes.

23 Q. Okay. So when that conversion was done,  
24 did Florida Power and Light actually change out

1   boilers?

2           A.   No, they did not.

3           Q.   They modified an existing boiler; is that  
4   correct?

5           A.   Yes.

6           Q.   What type of fuel were they using?  What  
7   type of coal did they convert to?

8           A.   It was an eastern bituminous coal.

9           Q.   Do you know where it came from?

10          A.   No, I don't remember.

11          Q.   Okay.  What about Brayton Point, what  
12   type of coal were they using?

13          A.   That probably also was an eastern  
14   bituminous.

15          Q.   Do you know what type of eastern  
16   bituminous?

17          A.   No.

18          Q.   When did you leave Florida Power and  
19   Light?

20          A.   July of '81.

21          Q.   Have you worked for a power company in a  
22   power plant since July of '81?

23          A.   No, I have not.  Since leaving Florida  
24   Power and Light I started my own consulting business.

1 Q. Okay. Are you a licensed professional  
2 engineer?

3 A. No.

4 Q. Have you ever worked for a power company  
5 in Ohio?

6 A. No, I have not.

7 Q. Is this your first trip to Ohio?

8 A. No.

9 Q. Okay. Have you ever worked for a power  
10 company in the midwest?

11 A. No.

12 Q. Have you ever prepared any health studies  
13 related to power generation?

14 A. Can you explain what you mean by  
15 "prepared"? I guess my question is if I read a  
16 document and I reference that document, is that  
17 called preparing a health document?

18 Q. Let me clarify it. Have you written any  
19 health studies related to power plant generation?

20 A. No.

21 Q. Have you authored any papers about health  
22 studies related to power generation?

23 A. No.

24 Q. Okay. Have you ever heard of the global

1 warming petition project?

2 A. No.

3 Q. So you're not a signatory to the global  
4 warming petition project?

5 A. No.

6 Q. Have you ever testified in front of a  
7 power siting commission or state power siting board  
8 or entity before?

9 A. Yes.

10 Q. Can you identify where and when? We'll  
11 go through them one by one.

12 A. Okay. In Texas before the hearing on the  
13 Oak Grove proposed unit.

14 Q. Okay. What type of unit was that?

15 A. That was a lignite-fired power plant.

16 Q. IGCC?

17 A. No; PC.

18 Q. What year was that?

19 A. Either 2005 or 2006.

20 Q. Okay.

21 A. Before the Florida Public Service  
22 Commission for Florida Power and Light's proposed  
23 Glades power plant.

24 Q. What year was that?

1           A.    That was this year; 2007.

2           Q.    What type of unit was Glade or what type  
3 of project was Glade?

4           A.    Pulverized coal.

5                   And before the Georgia Public Service  
6 Commission, and that was for a resource planning  
7 docket in which they were indicating what future  
8 generation options they were considering.

9           Q.    So there was no proposed project in that  
10 Georgia testimony?

11          A.    No.

12          Q.    Okay. What year was that?

13          A.    That was 2006 or '7.

14          Q.    Okay. Have you ever testified in Florida  
15 in addition to Glade?

16          A.    Before what type of entity?

17          Q.    In front of a power siting or anything --  
18 let's back up. Are there any other testimonies that  
19 you've presented related to a power generation  
20 project?

21          A.    Yes.

22          Q.    Let's limit it to the last five years.  
23 Can we do that?

24          A.    Okay.

1 Q. Where else?

2 A. In St. Lucie County, Florida, before a  
3 proposed pulverized coal-fired power plant by Florida  
4 Power and Light before the county commission.

5 Q. What project was that?

6 A. That was the St. Lucie power plant.

7 Q. And what year was that?

8 A. That was 2005 or '6.

9 Q. Were you compensated for that testimony?

10 A. No, I was not.

11 Q. In what capacity did you testify? Did  
12 you have a client?

13 A. As a private concerned citizen.

14 Q. Okay. Let's back up to in Georgia, were  
15 you paid for your testimony?

16 A. No, I was not.

17 Q. In what capacity did you testify there?

18 A. As a technical expert on alternatives.

19 Q. For whom were you a technical expert?

20 A. Southern Alliance for Clean Energy.

21 Q. Anybody else?

22 A. No.

23 Q. Let's talk about Texas at Oak Grove.

24 Were you compensated for your testimony?

1 A. Yes.

2 Q. By whom?

3 A. I don't remember.

4 Q. Was it an environmental group?

5 A. Yes. SEED, S-E-E-D.

6 Q. It's okay. If you can't remember the  
7 acronym, that's fine.

8 A. Okay.

9 Q. Anybody else that were your clients in  
10 that proceeding?

11 A. Public citizen.

12 Q. Back to the Glade project, were you  
13 compensated for that testimony?

14 A. Yes.

15 Q. By whom?

16 A. NRDC and Earthjustice and/or Sierra Club.

17 Q. I stopped you at St. Lucie County. Is  
18 there any other in the past five years, any other  
19 testimony you've given against power generation  
20 projects?

21 A. Yes, the Taylor Energy Center.

22 Q. Where is that?

23 A. In Florida. Also pulverized coal.

24 Q. When was that?



1 A. 2005 or '6.

2 Q. Whose project was that?

3 A. That was a group of municipalities.

4 Q. Were you paid for that testimony?

5 A. I don't recall.

6 Q. Did you have a client with respect to  
7 that matter?

8 A. I know there were a group of public  
9 citizens that were involved and also NRDC.

10 Q. Okay. Any others?

11 A. Not that I can recall.

12 Q. Did you testify in any proceedings  
13 regarding Tampa Electric?

14 A. No, I did not.

15 Q. Do you know anything about Tampa  
16 Electric's projects?

17 A. Yes, I do.

18 Q. Can you explain what you know about Tampa  
19 Electric's projects?

20 A. I have visited the plant several times,  
21 met with the plant manager and other of their  
22 engineers to learn as much as I could about their  
23 operation.

24 Q. I'm sorry, can I stop you?

1 MR. COLANGELO: Could you let him finish  
2 his answer, please.

3 MS. BOTT: I'm just trying to determine  
4 what plant.

5 MR. COLANGELO: I think you should let  
6 him finish his answer and then ask any follow-up  
7 questions.

8 MS. BOTT: Sure.

9 A. The Tampa Polk --

10 Q. Thank you for the clarification.

11 A. -- unit, the IGCC unit. Basically to  
12 learn as much as I could about the technology, the  
13 current status, any operating problems, problems that  
14 they had originally and have overcome, and what their  
15 opinions were on future generation options.

16 Q. Okay. Do they have, to the best of your  
17 knowledge, any future generation options?

18 A. Yes. As I've indicated in my testimony,  
19 they would like to build their next unit as a  
20 630-megawatt IGCC unit and originally proposed that  
21 before the Florida Public Service Commission, but  
22 before the Public Service Commission had a chance to  
23 rule on their application they decided to remove  
24 their petition and gave the explanation that I've

1 quoted in my testimony which in summary states that  
 2 because of the uncertainties associated with future  
 3 CO2 regulations and the potential costs involved,  
 4 they've decided to delay the construction of that  
 5 plant and will no longer build that plant to satisfy  
 6 their 2013 generation option or needs.

7 They also say in that quote which is  
 8 included in my testimony that they still believe that  
 9 IGCC is the best coal option.

10 Q. Have you spoken with anybody at Tampa  
 11 Electric since that announcement was made?

12 A. Yes.

13 Q. Who did you speak to?

14 A. Chuck Hinson.

15 Q. When was that?

16 A. That was the day after their  
 17 announcement.

18 Q. Did that discussion form the basis of  
 19 your testimony in this matter?

20 A. No. He basically reiterated the quote  
 21 that I have in my testimony.

22 Q. Okay. I don't want to mischaracterize  
 23 your testimony, but did I hear you say Polk's got an  
 24 existing IGCC? Is that correct?

1 A. Yes.

2 Q. Okay. Can you tell me the size of that  
3 plant?

4 A. About 300 megawatts.

5 Q. Do they capture carbon dioxide?

6 A. No, they do not.

7 Q. Have they ever?

8 A. No.

9 Q. You mentioned one of the reasons stated  
10 by Tampa Electric is the future CO2 regulations; is  
11 that correct?

12 A. I'm sorry, can you repeat that?

13 Q. You mentioned one of the reasons that  
14 Tampa Electric gave for postponing the IGCC is future  
15 CO2 regulations; is that correct?

16 A. Right, the uncertainty associated with  
17 what would be required and, therefore, what the  
18 associated costs, and they felt that the risk of  
19 going ahead at this time without knowing what the  
20 regulations will be would be unnecessarily risky for  
21 both their ratepayers and their stockholders.

22 Q. Are there any current CO2 regulations in  
23 place in Ohio?

24 A. Not that I know of.

1 Q. Are there any current regulations in  
2 place regarding CO2 nationally?

3 A. Nationally? No, although EPA has been  
4 told to do so by the Supreme Court.

5 Q. Okay. Let's just clarify. EPA has been  
6 told by the Supreme Court to write regulations for  
7 CO2; is that correct?

8 A. Yes.

9 Q. For all sources of emissions of CO2?

10 A. I don't know.

11 Q. Okay. Has Congress acted with respect to  
12 CO2?

13 A. There are a number of proposed bills.

14 Q. But no current statutes; is that correct?

15 A. Correct.

16 Q. Has the Ohio General Assembly acted with  
17 respect to CO2?

18 A. I don't know.

19 Q. You mentioned ratepayers. Do you know  
20 anything about rate recovery for IGCC in Florida?

21 A. Yes.

22 Q. Can you explain what you know about rate  
23 recovery for IGCC in Florida?

24 A. Legislation was passed to allow them

1 quicker capital cost recovery on IGCC units.

2 Q. Okay. Was that before or after the Tampa  
3 decision in October?

4 A. That was before.

5 Q. To the best of your knowledge is the  
6 Taylor Energy project going forward?

7 A. No, it is not.

8 Q. Is the Glade project going forward?

9 A. No, it is not.

10 Q. Have you seen any studies about rate  
11 forecasts for Florida taxpayers and homeowners?

12 A. Future rate studies or present?

13 Q. Present rate studies, let's say in the  
14 last six months, have you seen any rate studies  
15 related to Florida homeowners and rates in Florida  
16 for electric?

17 A. I have, but I don't recall the exact  
18 numbers.

19 Q. Okay. Did they form the basis of any  
20 opinions that you've testified to in this matter?

21 A. No.

22 Q. Mr. Furman, we've been at it for about an  
23 hour and a half. Do you need a break?

24 A. I don't.

1 THE WITNESS: Do you?

2 MR. COLANGELO: I'm fine.

3 Q. I just wanted to make sure. Let me know  
4 if you do.

5 A. Thank you for asking.

6 Q. Sure.

7 I'd asked you earlier about operations of  
8 power plants and I asked you about operating a PC,  
9 but have you ever operated an IGCC plant?

10 A. No.

11 Q. Have you ever managed the design of an  
12 IGCC plant?

13 A. No.

14 Q. Have you ever negotiated any contracts  
15 for a power generation station?

16 A. No.

17 Q. Have you ever operated a natural gas  
18 combined cycle unit?

19 A. No.

20 Q. Have you ever operated a wind farm?

21 A. No.

22 Q. How about a hydroelectric facility --

23 A. No.

24 Q. -- have you ever operated one?

1 A. No.

2 Q. Have you ever negotiated or were  
3 responsible for fuel contracts at a power plant?

4 A. No.

5 Q. What about negotiated or been responsible  
6 for petcoke, petroleum coke?

7 A. No.

8 Q. Have you ever done any cost projections  
9 related to fuels at a power plant?

10 A. Yes.

11 Q. Can you identify those?

12 A. Yes. In any of these analysis that we do  
13 we have to include cost projections for fuels, so  
14 whenever you're looking at alternatives, whether it  
15 be pulverized coal versus natural gas combined cycle,  
16 when you look at alternatives, you have to put in  
17 projections of future fuel costs.

18 Q. Okay. Can you point me in your testimony  
19 to that analysis in this case?

20 A. The one that I did or the one that other  
21 people that I referenced used?

22 Q. Let's start with the one that you did.

23 A. Okay.

24 Q. Did you do a coal projection or a cost



1 projection for fuels in this case?

2 A. Yes.

3 Q. Okay. Can you point me to that?

4 A. It would be Exhibit RCF-8.

5 Q. Okay. Can you identify this exhibit for  
6 us?

7 A. Yes. It's Cost of Electricity Comparison  
8 Chart for Florida.

9 Q. Let me stop you. Where is the part about  
10 Ohio?

11 A. There is no Ohio in here.

12 Q. I'm sorry, then let me clarify. I asked  
13 you if you did a cost projection study for fuel  
14 related to this plant; have you done so?

15 A. Oh, for this plant.

16 Q. AMPGS. Have you done so?

17 A. A fuel cost projection for the AMP-Ohio  
18 plant?

19 Q. Correct.

20 A. No, I have not.

21 Q. Okay. Can you identify the types of  
22 fuels that AMP-Ohio would be using for this plant?

23 A. They have only indicated very broadly  
24 that they will be using a range of coals which only

1 excludes lignite, so they will be using eastern  
2 bituminous and subbituminous and various combinations  
3 thereof.

4 Q. Would you consider yourself an expert in  
5 projecting coal prices?

6 A. No.

7 Q. How about petroleum coke prices, are you  
8 an expert in forecasting petroleum coke prices?

9 A. No.

10 Q. Okay.

11 A. I might make a comment on that, is I  
12 think anyone who claims to be an expert on projecting  
13 prices is not really an expert because all the  
14 projections in the past have been wrong.

15 Q. Is that just fuel or could that be power  
16 supply costs as well?

17 A. On fuel.

18 Q. Okay. Are you an expert in power supply  
19 cost projections?

20 A. Cost projections or cost analysis?

21 Q. Let's start with cost projections.

22 A. Cost projections, no.

23 Q. Okay. Then go to the obvious cost  
24 analysis.

1 A. Yes.

2 Q. You consider yourself an expert in cost  
3 analysis.

4 A. Yes.

5 Q. Can you explain to me the educational  
6 background that you've developed this expertise?

7 A. Yes. Having to do analyses for various  
8 electric utilities on technology options requires  
9 both the technical and economic analysis of both  
10 which includes capital costs, operating costs, and  
11 maintenance costs for these units.

12 Q. Are you an economist?

13 A. No, I'm not.

14 Q. Let's use, then, for example RCF-8. Did  
15 you prepare this table?

16 MR. COLANGELO: For the record, this is  
17 Furman Exhibit 2?

18 MS. BOTT: It's part of Furman Exhibit 2,  
19 correct. It's an attachment to.

20 MR. COLANGELO: I just wanted the record  
21 to . . .

22 MS. BOTT: Sure. Absolutely.

23 A. Yes, I prepared this exhibit.

24 Q. Are you to it?

1 A. Yes.

2 Q. What's the source of the numbers used in  
3 this exhibit?

4 A. They're stated in the text.

5 Q. Okay.

6 A. The capital, operating and maintenance  
7 costs came from the Department of Energy, National  
8 Energy Technology Laboratory presentation made on  
9 October 4th, 2006.

10 Q. So you didn't create those figures, you  
11 adopted them from this document; is that correct?

12 A. Yes.

13 Q. Okay. And when you talk about capital,  
14 O&M and all nonfuel costs, can you point in the graph  
15 to where those are? Is that all encompassed in the  
16 nonfuel costs?

17 A. Yes, it is.

18 Q. Okay.

19 A. And then to determine the component --  
20 the top part of the chart, the fuel component, you  
21 need to know the efficiencies of the various power  
22 plant options, and that was obtained from an EPA  
23 report entitled "Environmental Footprints and Costs  
24 of Coal-Based IGCC and PC Technologies" dated July

1 2006.

2 Q. Okay.

3 A. And then the third component besides  
4 efficiency in determining fuel costs is what the  
5 delivered fuel cost is to the power plant on a  
6 dollars per million Btu basis, and that was derived  
7 from two sources, one was the Department of Energy,  
8 Energy Information Administration delivered fuel cost  
9 to electric utilities in Florida, and then, to be  
10 more site specific, I was also able to obtain the  
11 actual delivered petcoke prices to Tampa Electric to  
12 their IGCC unit.

13 Q. Okay.

14 A. And that confirmed the DOE numbers.

15 Q. Then I'm going to ask you to flip back to  
16 that exhibit.

17 A. Yes.

18 Q. Okay. What heat rates were used to  
19 develop these numbers?

20 A. I'd have to refer back to the EPA final  
21 report that had heat rates.

22 Q. Okay.

23 A. But the heat rate for that subcritical  
24 unit was lower than the heat rate for the AMP unit.

1           Q.    What subcritical unit are you talking  
2 about? You said "the heat rate for that subcritical  
3 unit."

4           A.    The one listed on the chart. If you go  
5 to the EPA document, the heat rate, which is an  
6 indication of the efficiency of the plant, is much  
7 better for what the EPA considers the standard  
8 subcritical unit than what is being proposed for  
9 AMP-Ohio, so the AMP-Ohio unit would by EPA's  
10 standard be considered much less efficient than their  
11 standard subcritical unit.

12          Q.    Did EPA say that?

13          A.    By looking at the numbers that they show  
14 what a subcritical should be able to obtain you can  
15 infer that.

16          Q.    Okay. Do you have a chart that infers  
17 that?

18          A.    Yes. Further in my testimony I talk  
19 about the efficiency.

20          Q.    Okay. But there's no chart that  
21 demonstrates that; is that correct? There's no chart  
22 specific to electric cost comparisons for AMPGS  
23 related to heat rate.

24          A.    There's an inference in the fact that it

1 will require 20 percent more fuel.

2 Q. Okay. Let's look back at the chart. So  
3 just so that I'm clear, this chart demonstrates a  
4 generic analysis of plants, not specific plants.  
5 There are no plants identified in this analysis.

6 A. Correct.

7 Q. When was this chart used by you in the  
8 past?

9 A. I used this in my prior testimonies in  
10 the state of Florida.

11 Q. Would that be for the Glade project?

12 A. Yes.

13 Q. For the Taylor project?

14 A. Yes.

15 Q. You see a capacity factor on this chart  
16 of PC capacity factor of 85 percent; is that correct?

17 A. Yes.

18 Q. Would you agree that that's a typical  
19 capacity factor for a PC plant?

20 A. Yes. That was the number that was being  
21 used by the Department of Energy for their analysis  
22 and so since I was using their data, I wanted to  
23 state what the input assumptions were.

24 Q. Okay. But let me go back to then the

1 question I asked you which was is that a typical PC  
2 capacity factor for a pulverized coal unit?

3 A. Probably in the range of a -- for a new  
4 PC plant, probably in the range of 85 to 90 percent.

5 Q. You've never seen capacity factors for a  
6 PC plant over 90 percent?

7 A. Yes; it's possible.

8 Q. Have you seen it in commercial operation?

9 A. I've seen data that's presented above  
10 90 percent for PC plants.

11 Q. Okay. What --

12 A. Certain specific plants. I don't  
13 remember their names right now, but yes, I have seen  
14 where certain plants can obtain over 90 percent.

15 Q. Okay. What about IGCC? The capacity  
16 factor is 80 percent, would you agree that's the  
17 typical capacity factor for an IGCC?

18 A. I think also that one would be more  
19 typically now, again, raising that about 5 percent  
20 the same as the PC, to in the 85 to 90 percent  
21 capacity factor depending on what assumptions go into  
22 that.

23 Q. Have you seen that type of capacity  
24 factor above 80 percent in commercial operation at an



1 IGCC?

2 A. Yes, depending on your definition.

3 Q. Explain to me your definition.

4 A. Okay. An IGCC unit has a big advantage  
5 over a pulverized coal plant in that it can use  
6 multiple fuels. A PC plant can only burn pulverized  
7 coal and usually only burn the specific type of coal  
8 that the boiler has been designed for.

9 However, an IGCC unit can, in addition to  
10 burning coal, can also use natural gas and diesel  
11 fuel, therefore, if there is any maintenance problems  
12 associated with a portion of the power plant, the  
13 gasifier, which generates the clean fuel, then you  
14 also have the option of running on your stand-by fuel  
15 which let's take as an example natural gas.

16 So the Tampa Electric unit, as an  
17 example, has been able to demonstrate a 95 percent  
18 availability factor during their peak season, during  
19 their summer months, when they require load the most  
20 by making use of both their gasification system and  
21 their backup fuel of natural gas.

22 So in that regard it has an advantage of  
23 perhaps even getting to availability factors that are  
24 higher than a PC plant. Ninety-five would be a

1 stretch for most PC plants as far as availability.

2 Q. Okay. Without the cofiring on another  
3 fuel, if we're just talking about petcoke or coal,  
4 can an IGCC reach a reliability or capacity factor of  
5 over 80 percent commercially?

6 A. Yes, I believe that the guarantees that  
7 the equipment suppliers are now supplying is more in  
8 the range of 85 percent availability factor and with  
9 a spare gasifier above 90 percent.

10 Q. Adding a spare gasifier would be  
11 additional capital costs; is that correct?

12 A. Yes.

13 Q. You talk about guarantees and equipment  
14 suppliers, you're talking about prospective plants,  
15 is that correct? I'm talking about commercial  
16 operation. Are there any commercially operating  
17 IGCCs that can consistently keep a capacity factor  
18 over 80 percent without cofiring on another fuel?

19 A. Yes, actually the plants in Italy have  
20 demonstrated that and I cited the reference to that  
21 in my testimony, that the IGCC units in Italy have  
22 maintained between 90 and 94 percent availability  
23 without a spare gasifier.

24 Q. Are you talking about Nuon?

1 A. No.

2 Q. Okay.

3 A. I'm talking about the four units that are  
4 in Italy.

5 Q. Okay. Now we'll go back to IGCC. Did  
6 they generate power at that plant in Italy?

7 A. Yes.

8 Q. Is that --

9 A. About all of them.

10 Q. Is that their primary purpose?

11 A. Yes. In addition they make additional  
12 by-products.

13 Q. Are there any U.S. IGCCs that have a  
14 reliability or capacity factor of over 80 percent  
15 currently in operation?

16 A. I'm not sure of the current numbers for  
17 the IGCC units that are operating in the States  
18 because they don't really represent the current  
19 technology. Those units are between 10 to 11 years  
20 old and, therefore, it probably isn't a fair  
21 comparison to compare the design of those units or  
22 the availability of those units, which were initial  
23 demonstration units, to the design of a new PC plant.  
24 It would be a fairer comparison to compare the

1 availability of a new IGCC versus a new PC plant.

2 Q. Let me ask this question: Have you ever  
3 negotiated a guarantee from a vendor for a piece of  
4 equipment like an IGCC plant?

5 A. No.

6 Q. Have you ever negotiated or signed a  
7 warranty wrap with a vendor for an IGCC plant?

8 A. No.

9 Q. Can you present to me a warranty or a  
10 guarantee on an IGCC plant that is over 85 percent?

11 A. The equipment suppliers have made public  
12 statements to that effect.

13 Q. Let me ask your opinion, then. In your  
14 opinion, if you were making a 3 billion dollar  
15 decision on a plant, would you rely on a vendor's  
16 public statement on guarantee alone?

17 A. No, I would -- to minimize my risk I  
18 would rely upon my backup fuel.

19 Q. Okay. So you would never run an IGCC  
20 without a backup fuel.

21 A. Either a backup fuel or a spare gasifier.

22 Q. Okay. So we've already established --

23 A. If I wanted to maintain above 85 percent  
24 availability.

1 Q. Okay. And we've already established a  
2 spare gasifier would have additional capital costs,  
3 let's talk about additional fuel costs. Would you  
4 agree that cofiring another fuel would add fuel costs  
5 annually?

6 A. Probably.

7 Q. And would you agree that natural gas  
8 prices have spiked significantly in the past five  
9 years?

10 A. Yes.

11 Q. Have you done any projections on the  
12 increased spike of natural gas costs going forward,  
13 prospective projections?

14 A. No.

15 Q. Okay. When we were talking about your  
16 expertise and I think that's where we started with  
17 the IGCC discussion, I didn't ask you, do you  
18 consider yourself an expert in the science of global  
19 warming?

20 A. No.

21 Q. Do you consider yourself an expert in the  
22 impacts of global warming?

23 A. No.

24 Q. Have you done any studies on the impacts

1 of global warming in Meigs County?

2 A. No.

3 Q. Have you done any studies on the impacts  
4 of global warming in Ohio?

5 A. No.

6 Q. How about the impacts of global warming  
7 in West Virginia?

8 A. No.

9 Q. How about the impacts of global warming  
10 in Pennsylvania?

11 A. No.

12 Q. Okay. Have you done any studies on the  
13 impacts of global warming in the United States at  
14 all?

15 A. Have I done the studies myself?

16 Q. Have you prepared the studies; yes.

17 A. No.

18 Q. Okay. We talked earlier about the  
19 technologies that you were discussing, what I didn't  
20 ask you is your opinions on these technologies.  
21 Let's talk about wind technology. Is it your opinion  
22 you could baseload a thousand megawatts of wind?

23 A. I don't think you can baseload wind.

24 Q. At all?

1           A.    Depends on the wind resource.

2           Q.    Do you think Ohio has the wind resource  
3 to baseload wind power generation?

4           A.    I don't know.

5           Q.    Have you done any studies on wind --

6           A.    No.

7           Q.    -- I'm sorry, in Ohio? Let me finish.

8           A.    No.

9           Q.    Okay. Are you presenting in this  
10 testimony any opinions with respect to energy  
11 conservation or energy efficiency to fulfill a  
12 thousand megawatts of baseload need for AMP-Ohio?

13          A.    No, I'm not.

14          Q.    Have you done any energy efficiency or  
15 conservation studies in Ohio?

16          A.    No.

17          Q.    Are you presenting opinions with respect  
18 to natural gas's ability through a natural gas  
19 combined cycle unit to satisfy a thousand megawatts  
20 of need for AMP-Ohio? Have you done any studies?

21          A.    There is in one of my charts an  
22 indication of what the costs would be, a generic  
23 study, not specifically for Ohio.

24          Q.    Or for AMP-Ohio.

1 A. Correct.

2 Q. Okay. So in your opinion would you  
3 recommend a thousand megawatt natural gas combined  
4 cycle unit for AMP-Ohio?

5 A. I would -- not without first doing an  
6 analysis of that option.

7 Q. Which you have not done to date.

8 A. Correct.

9 Q. Okay. Are you presenting any opinions  
10 with respect to AMP-Ohio's compliance with Ohio  
11 Revised Code 3704?

12 A. I don't know what that is.

13 Q. So are you providing any opinion as to  
14 compliance with 3704?

15 MR. COLANGELO: Objection; asked and  
16 answered.

17 MS. BOTT: Okay.

18 Q. You're not familiar with the Revised Code  
19 3704 in Ohio?

20 A. Not by that number, no.

21 Q. Okay.

22 A. I may be familiar with it in another  
23 context.

24 Q. What context?



1           A.    Since I don't know what that number  
2 refers to, I couldn't answer that.

3           Q.    Are you alleging that AMP-Ohio is not in  
4 compliance with the requirements pursuant to Ohio  
5 Revised Code 3734?

6           A.    Again, I don't know.

7           Q.    Are you alleging that AMP-Ohio or AMPGS  
8 will not comply with the requirements of Ohio Revised  
9 Code 6111?

10          A.    Don't know.

11          Q.    You don't know what it is or you don't  
12 know whether you're --

13          A.    Don't know what it is.

14          Q.    So you don't know whether you're alleging  
15 compliance or noncompliance.

16          A.    Correct.

17          Q.    Are you alleging that AMP-Ohio is not  
18 complying with the requirements of Ohio Revised Code  
19 4906 with respect to this plant?

20          A.    I may be able to make it easier for you,  
21 I don't know any regulations by code number, so if  
22 you're going to give me a code number, I'm not going  
23 to be able to answer the question.

24          Q.    Okay. Have you reviewed the Ohio Revised

1 Code at all with respect to this testimony?

2 A. I've compared the emissions that are  
3 proposed in the draft permit with similar pulverized  
4 coal plants and similar IGCC plants to come to the  
5 conclusion that there are less environmentally  
6 damaging options that should be evaluated which  
7 includes more efficient pollution control equipment,  
8 more efficient power plant designs, the use of  
9 technologies such as IGCC which will generate far  
10 lower emissions.

11 Q. Okay. In that evaluation did you review  
12 the Ohio Revised Code at all?

13 MR. COLANGELO: Objection. He's not a  
14 lawyer, he may not know exactly what you're referring  
15 to.

16 MS. BOTT: He's testifying as to  
17 compliance with law, he needs to be able to do so.

18 A. I'm not familiar with that regulation.

19 Q. Okay. Regulation meaning Ohio law in  
20 general? I'm asking you have you looked at Ohio law  
21 at all with respect to your testimony?

22 A. Not being a lawyer I cannot testify as  
23 far as --

24 Q. You can't testify whether or not you've

1 looked at Ohio law? I'm not asking you to interpret  
2 the law. I'm asking you have you physically looked  
3 at Ohio law.

4 A. No, I have not.

5 Q. Okay. You talk about compared emissions.  
6 Can you explain to me how you get an air permit in  
7 Ohio?

8 A. You apply -- you submit a permit  
9 application to the Ohio EPA.

10 Q. And what does that application need to  
11 include?

12 A. Whether you're complying with the new  
13 source performance standards, and that's the primary  
14 area that my testimony is addressing.

15 Q. So your testimony addresses NSPS  
16 standards, new source performance standards?

17 A. Yes.

18 Q. Specifically what NSPS does your  
19 testimony identify or address?

20 A. Sulfur dioxide, nitrogen oxides  
21 particulate, mercury, CO, VOC.

22 Q. Okay. Is it your opinion that if  
23 AMP-Ohio meets the NSPS for SO<sub>2</sub>, NO<sub>x</sub>, PM, CO, and  
24 VOC, they should receive a permit?

1           A.    No, they also have to meet BACT  
2 requirement.

3           Q.    Do you have an opinion of whether or not  
4 AMP-Ohio's draft air permit meets NSPS for SO2, NOx,  
5 PM, CO, or VOC?

6                   MR. COLANGELO:  Objection; compound.

7                   MS. BOTT:  Okay.

8           Q.    Do you have an opinion of whether or not  
9 AMP-Ohio's -- the draft permit for AMP-Ohio meets the  
10 NSPS for SO2?

11          A.    I don't know.

12          Q.    Can you identify whether or not there's  
13 an NSPS for SO2 for electric generating units?

14          A.    Yes, there is.

15          Q.    What is it?

16          A.    I'd have to refer to the documents.

17          Q.    What documents in particular would you  
18 refer to?

19          A.    The draft permit or the state standard.

20          Q.    Okay.

21          A.    I mean, the national standard, the NSPS  
22 for that particular design of unit.

23          Q.    Okay.  Is it your opinion that the draft  
24 air permit for the AMP-Ohio plant complies with the

1 NSPS for NOx?

2 A. Don't know.

3 Q. Is it your opinion that the AMP-Ohio  
4 draft permit complies with the NSPS for PM?

5 A. Don't know.

6 Q. Is it your opinion that the draft permit  
7 for AMP-Ohio/AMPGS complies with the NSPS for CO?

8 A. Don't know.

9 Q. Is it your opinion that the draft permit  
10 for the AMP-Ohio/AMPGS project complies with the NSPS  
11 for VOC?

12 A. Don't know.

13 Q. Is it your opinion that Ohio EPA can  
14 issue a permit without compliance with the NSPS?

15 A. I don't believe it can.

16 Q. Okay. Is it your opinion that the draft  
17 permit for AMPGS complies with the NSPS for CO2?

18 A. I don't believe there is an NSPS for CO2.

19 Q. Is it your opinion that the draft air  
20 permit complies with NSPS for mercury?

21 A. I don't know.

22 Q. You mentioned in addition to compliance  
23 with NSPS standards that the permit must also meet  
24 BACT; is that correct?

1 A. Yes.

2 Q. Can you define BACT so we're all clear?

3 A. BACT is best available control  
4 technology.

5 Q. And why is that a requirement?

6 A. That was included in the Clean Air Act  
7 amendments and is a requirement so that as technology  
8 develops and we're able to get more efficient  
9 equipment into commercial operation, that new sources  
10 will incorporate these new designs and be able to  
11 reduce the amount of emission that they're emitting.  
12 I do not believe that AMP-Ohio analysis of BACT was  
13 done properly and included the alternatives that they  
14 should have considered.

15 Q. Can you be more specific?

16 A. In my testimony Exhibit --

17 MS. BENTINE: Just a moment.

18 (Discussion held off the record.)

19 Q. I'm sorry.

20 A. Exhibit RCF-15 shows the AMP-Ohio  
21 emission levels that are being proposed versus the  
22 emission levels proposed for two comparable plants in  
23 Florida, the FPL Glades unit and the Taylor Energy  
24 Center that I've also been involved in.

1                   And what this chart shows is  
2 significantly lower emission levels for all four of  
3 those pollutants, NOx, SOx, particulate, and mercury,  
4 than what AMPS is providing. This is more the type  
5 of analysis that AMP-Ohio should have included in  
6 their comparison to advance the state of the art of  
7 emission controls to incorporate more efficient  
8 pollution control equipment.

9                   This is a conventional pulverized coal  
10 plant, one using -- both of them using a range of  
11 coals, bituminous coals, subbituminous coals, and  
12 able to control emissions to a much greater degree  
13 than what's being proposed for the AMP-Ohio.

14               Q.    Did you create this chart?

15               A.    Yes, I did.

16               Q.    And we've already established, have we  
17 not, that the Glades project is not going forward?

18               A.    That's correct.

19               Q.    And we've already established, have we  
20 not, that the Taylor project is not going forward?

21               A.    Yes.

22               Q.    Okay. Do you know when AMP-Ohio  
23 submitted its BACT analysis?

24               A.    No, I don't.

1 Q. Do you know if Ohio -- AMP-Ohio submitted  
2 a BACT analysis?

3 A. Yes, I believe it was part of their  
4 permit application.

5 Q. Okay. Do you know when the BACT analysis  
6 for Glade or Taylor were submitted?

7 A. I could look it up; I have all those  
8 documents. Actually, it's right down here at the  
9 bottom of the sheet.

10 Q. Okay.

11 A. So your staff -- no, I'm sorry, that's  
12 from the staff determination. But you'll see the  
13 Florida Power and Light was December 2006 and the  
14 Taylor was May 2007. So if you can tell me when the  
15 BACT analysis was submitted for AMP-Ohio, then we can  
16 tell whether it's before or after. But it's within  
17 the same time frame I believe.

18 Q. Okay. Well, let me ask this question,  
19 then, is it your opinion if a BACT analysis is  
20 submitted and then someone else proposes an  
21 application, the application that's already submitted  
22 has a duty to update every time someone else files an  
23 application?

24 A. I don't know what the requirements are.



1           Q.    But is it your opinion that there's an  
2 ongoing obligation to continue to identify other  
3 applications? And let me be clear, Florida Power and  
4 Light Glade is an application, correct?

5           A.    Correct.

6           Q.    Not a permit.

7                   Taylor Center is an application, correct?

8           A.    Correct.

9           Q.    Not a permit, correct?

10          A.    Correct.

11          Q.    Okay. So is it your opinion that  
12 AMP-Ohio has an ongoing obligation to identify  
13 sources every time a new application is submitted  
14 that postdates AMP-Ohio's submittal?

15          A.    I'm not sure it postdates it.

16          Q.    Okay. But if it does, would that be your  
17 opinion?

18          A.    This is meant to show an example of what  
19 other utilities feel is technically feasible for  
20 their plants, and within the same time frame, to show  
21 that other utilities burning the same type of coal,  
22 same size plants, can get much more significant  
23 reductions in those four pollutants.

24          Q.    Okay. Do you --

1           A.   Whether it's a requirement to do by law,  
2 I don't know, but certainly this demonstrates to me  
3 that other utilities think the technology is at such  
4 a state that they can get to much lower emission  
5 levels.

6           Q.   Okay. And can you identify the specific  
7 types of fuel blends that were used by Taylor?

8           A.   Taylor was going to use eastern  
9 bituminous or subbituminous coal.

10          Q.   But within those ranges of subbituminous  
11 and eastern bituminous what types of eastern  
12 bituminous coal were being used?

13          A.   Without referencing that document I  
14 wouldn't be able to tell you.

15          Q.   Would that make a difference, in your  
16 opinion, as to these emission limit numbers?

17          A.   As long as they're using a -- I assume  
18 the subbituminous coal is Powder River Basin which is  
19 the same coal that AMP-Ohio would be using, so I  
20 would assume that if they're using the same coal from  
21 the same source and the same size power plant, that  
22 there's no reason that AMP-Ohio can't meet that same  
23 standard.

24          Q.   What's the size of the Glades project?

1           A.    I believe it was 480 megawatts.

2           Q.    What's the size of AMP-Ohio's proposed  
3 project?

4           A.    Two 480-megawatt units.

5           Q.    What's the size of Taylor Energy?

6           A.    480 megawatts.

7                   I'm sorry, did you say, the first one was  
8 Glades?

9           Q.    Glades.

10          A.    Glades was 1,960. Two units, 1,960  
11 megawatts total.

12          Q.    Okay.

13          A.    And Taylor was I believe one unit,  
14 480 megawatts.

15          Q.    Okay. According to the footnote, and I  
16 just want to make sure we're clear, these are not the  
17 numbers in AMP-Ohio's permit application; is that  
18 correct? These are the numbers in Ohio EPA's draft  
19 permit; is that correct?

20          A.    Yes.

21          Q.    Have you asked Ohio EPA if they  
22 considered BACT in their process?

23          A.    Have I asked? No.

24          Q.    Has your client asked?

1           A.    I believe they have.

2           Q.    How do you believe that they have? Can  
3 you explain your knowledge?

4           A.    I believe in their motion and brief they  
5 state that they don't believe that it's meeting the  
6 BACT criteria.

7           Q.    The motion and brief to Power Siting or  
8 Ohio EPA?

9           A.    I think both. I'm not sure, you know,  
10 where I read it, but I think it's in both.

11          Q.    But you don't have any knowledge of any  
12 communication between your client and Ohio EPA; is  
13 that correct? Beyond what you've just identified.

14          A.    Beyond the brief.

15          Q.    Okay.

16          A.    No.

17          Q.    Okay. Would it surprise you to know that  
18 Ohio EPA -- or, let me ask the question a different  
19 way.

20                Is it your opinion that Ohio EPA would  
21 conduct a BACT study prior to issuing a draft permit?

22          A.    No, it wouldn't surprise me.

23          Q.    Have you reviewed AMP-Ohio's BACT study?

24          A.    Yes.

1 Q. Can you identify the comparable projects  
2 in AMP-Ohio's BACT study?

3 A. No, not without referring to the  
4 document.

5 Q. What document?

6 A. Their, I believe it's chapter 5 or volume  
7 5 BACT analysis.

8 Q. Did you rely on AMP-Ohio's BACT analysis  
9 when developing your testimony in this matter?

10 A. I looked at it to confirm the emission  
11 rates.

12 MS. BOTT: Does it make sense to take a  
13 short break? I'm sorry, Mr. Furman, we've been at it  
14 for a bit. I thought the court reporter might need a  
15 break.

16 MR. COLANGELO: I need a break.

17 (Recess taken.)

18 Q. When we took a short break, we were  
19 talking about BACT.

20 A. Yes.

21 Q. And you had mentioned, well, let me not  
22 put words in your mouth. What was your position on  
23 AMP-Ohio's project in BACT?

24 A. I didn't feel like it met the

1 requirements of BACT and had presented other plant  
2 comparisons that I thought were fairer comparisons  
3 than what had been used in the BACT analysis that  
4 AMP-Ohio had supplied and showed that in my Exhibit  
5 15 to try and indicate that using the same technology  
6 and more efficient pollution control equipment with  
7 the same coal that our utilities are indicating you  
8 can get to much lower levels of emissions.

9 Q. Okay.

10 A. And that's, in essence, what I believe  
11 BACT is trying to do, to encourage utilities to use  
12 the more efficient technology and latest developments  
13 to try to improve environmental quality.

14 Q. You're pretty familiar with the Glades  
15 project; is that correct?

16 A. Yes.

17 Q. When you talk about more efficient  
18 control equipment, let's talk about NOx. What's the  
19 type of control equipment that Florida Power and  
20 Light proposed for NOx?

21 A. That was SCR.

22 Q. What's the type of control equipment that  
23 AMP-Ohio has proposed for AMPGS for NOx?

24 A. SCR.

1 Q. Okay. What's the difference in the  
2 control equipment in your opinion, then, between  
3 these two projects?

4 A. Probably the more efficient equipment is  
5 larger and costs more money.

6 Q. So it's a question of a vendor selection;  
7 is that correct?

8 A. Yeah, and negotiation.

9 Q. Okay. But SCR is the correct control  
10 equipment, in your mind, to control NOx; is that  
11 correct?

12 A. Yes.

13 Q. Okay.

14 A. For the application with a pulverized  
15 coal plant to get to those types of emission levels.

16 Q. Okay.

17 A. It's not the right choice if you want to  
18 get lower NOx emissions.

19 Q. Do you know whether or not Glades had  
20 contracts in place with vendors for SCR equipment  
21 prior to the permit application?

22 A. I can only assume, knowing the project  
23 manager, that he had indication from the suppliers  
24 that they could meet those standards.

1 Q. Okay. Taylor. Do you know what control  
2 equipment was used for NOx at Taylor?

3 A. SCR.

4 Q. Any difference between the SCR proposed  
5 for AMP-Ohio and Taylor?

6 A. Not that I know of.

7 Q. Are there different types of SCR?

8 A. There are different vendors.

9 Q. Okay. But the technology's the same.

10 A. Pretty much the same.

11 Q. Okay. SO2, then, let's talk about SO2,  
12 Florida Power and Light. Can you describe the SO2  
13 control technology that Florida Power and Light was  
14 using at Glades?

15 A. That was going to be limestone flue gas  
16 desulfurization producing wallboard.

17 Q. So I understand wallboard, you mean  
18 gypsum?

19 A. Yes.

20 Q. Okay. What about at Taylor Energy  
21 Center?

22 A. Taylor they hadn't decided what they were  
23 going to do, whether they were going to manufacture  
24 wallboard or just landfill the gypsum sludge, but



1 that was also going to be flue gas desulfurization.

2 Q. Limestone flue gas?

3 A. Yes.

4 Q. What's different about AMP-Ohio's  
5 proposed control technology for SO<sub>2</sub>?

6 A. Obviously, they're proposing a less  
7 efficient flue gas desulfurization system.

8 Q. Well, how many are there? How many types  
9 of flue gas desulfurization systems are there?

10 A. There are a number of vendors, but  
11 obviously they're looking at a much less efficient  
12 flue gas desulfurization system that would allow that  
13 much of a difference in emission levels.

14 Q. Okay. Is FGD technology the same, as we  
15 talked about for SCR, the technology's the same but  
16 the vendors are different, is it the same with FGDs?  
17 Is the technology the same?

18 A. The basic technology is the same, yes.

19 Q. Okay. So are you proposing any  
20 additional control equipment at AMPGS for SO<sub>2</sub>  
21 control?

22 A. More efficient. If it's decided to go  
23 with pulverized coal and you can live with that high  
24 an emission level, then I'd recommend more efficient

1 FGD.

2 Q. At what percentage control?

3 A. It depends on the input sulfur level.

4 Q. So you acknowledge there's a difference  
5 in the input sulfur level; what does that come from?

6 A. That comes from the coal that you use.

7 Q. So there's a variation in a back-end SO<sub>2</sub>  
8 emission depending on the type of coal that's left;  
9 is that correct?

10 A. Yes.

11 Q. Okay.

12 A. To some degree.

13 Q. You believe that only one type of coal  
14 should be used at power plants?

15 A. No.

16 Q. So you agree that there should be the  
17 availability of a variety of fuels used?

18 A. Yes.

19 Q. Coals used.

20 A. (Witness nods head.)

21 Q. I'm sorry, I didn't say "coals," I said  
22 "fuels," so let me clarify that.

23 A. Yes, it would be advisable.

24 Q. Okay. And why is that?

1           A.    The availability and flexibility of  
2 supply options.

3           Q.    Okay.  So you wouldn't recommend just, in  
4 your opinion, you wouldn't recommend only using  
5 Powder River Basin coal, is that correct, at a power  
6 plant?

7           A.    You may if you had the right contracts in  
8 place.

9           Q.    Okay.  But would you recommend that be  
10 your only fuel option?

11          A.    Probably not.

12          Q.    We've already talked about Powerspan.  Do  
13 you have any comments with respect to when you talk  
14 about the scrubbers, you're talking about limestone  
15 FGDS, is it your opinion that the difference in the  
16 rate is caused by the difference between the  
17 Powerspan ammonia FGD versus the limestone FGD?

18          A.    No.  No, I believe in the permit  
19 application they were probably specifying a limit  
20 that could be met by the limestone.

21          Q.    Okay.  Do you know what an emission, a  
22 short-term emission limit from Powerspan would be?

23          A.    I don't have that number with me.

24          Q.    But you have it somewhere?

1 A. Yes.

2 Q. Where did that come from?

3 A. From the 50-megawatt demonstration plant.  
4 They have an emission level and also an efficiency.

5 Q. Okay. Let's just assume this emission  
6 limit for SO<sub>2</sub> at the 50-megawatt demonstration, would  
7 you say that that limit can be applied to a thousand  
8 megawatt plant like AMPGS?

9 A. Probably not.

10 Q. Why not?

11 A. It hasn't demonstrated the commercial  
12 capability at that size.

13 Q. Okay.

14 A. So there's going to need to be one or  
15 more steps in scale-up necessary before I believe a  
16 utility would want to risk using that control  
17 technology.

18 Q. Let's go, then, to particulate. What  
19 type of control equipment is Glades using to control  
20 particulate?

21 A. Baghouse and wet ESP which is the same as  
22 AMP-Ohio is using, and there you see fairly close  
23 emission level.

24 Q. Is that the same control equipment at

1 Taylor as well --

2 A. Yes.

3 Q. -- for particulate? Okay.

4 These figures are all based on pounds per  
5 MMBtu; is that correct?

6 A. Except the mercury.

7 Q. And we'll get to that; I apologize.

8 Thank you.

9 What's the averaging time for each of  
10 these numbers?

11 A. I tried to use the same averaging time  
12 for each power plant. I'd have to go back to my  
13 notes, but I believe this was annual average.

14 Q. Can you recall -- first of all, do you  
15 have your notes with you today?

16 A. Yes.

17 Q. Okay. Were your notes the basis and did  
18 they help you establish an opinion to which you're  
19 testifying in this matter?

20 A. No, it was the actual reference  
21 documents, not the notes.

22 Q. Okay. And you don't have the actual  
23 reference documents with you here today.

24 A. They're on the CD.

1           Q.    Okay.  So the reference documents  
2 themselves gave you the averaging times; is that  
3 correct?

4           A.    Oh, yes.

5           Q.    Okay.

6           A.    Yes.

7           Q.    And did you do any conversions or apples  
8 to apples, for instance, were there any cases where  
9 the Glades permit only had a 30-day average where  
10 AMP-Ohio had a 3-hour average?

11          A.    I don't believe I had to do that.

12          Q.    Mercury.  Let's talk about mercury.  What  
13 control equipment is Glades using to control mercury?

14          A.    Glades was actually proposing using  
15 activated carbon injection, and that was not proposed  
16 in AMP-Ohio, yet a number of new PC units are  
17 proposing to use that as BACT.

18          Q.    What about Taylor?

19          A.    Taylor, I don't believe they had  
20 specified if they were going to use . . .

21          Q.    Is it your opinion, is it the  
22 responsibility of the regulatory agency, in this case  
23 Ohio EPA, to require a type of control equipment as  
24 part of BACT?

1           A.    I don't know.

2           Q.    You don't know if it's your opinion?  I'm  
3 asking your opinion.  Is it your --

4           A.    I just don't know.  I just don't know if  
5 it's a requirement for them to specify a pollution  
6 control type of equipment or not.

7           Q.    Okay.

8           A.    I know within the analysis for BACT they  
9 go through an analysis of what each of the systems  
10 will do.

11          Q.    If AMP-Ohio had ACI as part of its  
12 control technologies for mercury control, would you  
13 believe it was meeting BACT?

14          A.    No.

15          Q.    Why not?

16          A.    Because I believe the use of IGCC would  
17 give significantly lower emission levels as indicated  
18 in Exhibit 14.

19          Q.    But if that's the case, then you wouldn't  
20 believe the Glades project has BACT either; is that  
21 correct?

22          A.    Correct.

23          Q.    Or the Taylor Energy Center has BACT; is  
24 that correct?

1           A.    Correct.

2           Q.    So this comparison chart, you don't agree  
3 that any of these plants have BACT.

4           A.    I believe that there are better  
5 controls -- it demonstrates that there are better  
6 controls if you're going to narrow your focus to just  
7 PC plants, but if you believe as I do that IGCC  
8 should be considered as BACT, then you can get even  
9 better emission numbers.

10          Q.    Okay. Is it a requirement of BACT to  
11 compare IGCC to a PC plant?

12          A.    I believe it is.

13          Q.    Do you know whether or not U.S. EPA  
14 shares your belief?

15          A.    I guess that's going to be left up to the  
16 courts.

17          Q.    Do you know if any courts have ruled on  
18 this issue already?

19          A.    That's outside of my area of expertise.

20          Q.    With respect to mercury and ACI, is there  
21 any other control equipment that Glades is utilizing  
22 or that Taylor is utilizing to control mercury?

23          A.    No.

24          Q.    Okay. Do you believe they get any



1 cobenefit control from any other control equipment?

2 A. Yes.

3 Q. What would those be?

4 A. Fly ash removal and scrubbers.

5 Q. Okay. Fly ash removal in what  
6 technology?

7 A. Just the amount of mercury that gets  
8 trapped in the fly ash that gets deposited from the  
9 baghouse.

10 Q. So the baghouse would be a control, a  
11 cobenefit control technology as well?

12 A. Yeah.

13 Q. Okay, sorry.

14 Do you know if AMP-Ohio has proposed a  
15 baghouse?

16 A. Yes, they have.

17 Q. Do you know, well, we talked about it's  
18 correct that AMP-Ohio has also proposed a scrubber.

19 A. Yes.

20 Q. Okay. And AMP-Ohio has also proposed a  
21 wet ESP?

22 A. Yes.

23 Q. We talked about fuel flexibility or fuel  
24 issues that would impact emission limits for SO<sub>2</sub>,

1 would that be the case for mercury as well?

2 A. Yes.

3 Q. Can you explain that?

4 A. Different coals have different mercury  
5 concentrations and also different forms of mercury in  
6 the coal. Depending upon how much mercury is in the  
7 coal and what form that mercury is in will determine  
8 how much cobenefit you get or how much mercury will  
9 be removed with AFI.

10 Q. AFI or ACI? I'm sorry.

11 A. ACI.

12 Q. Thank you.

13 Let's talk about the fuel types. What  
14 type of coal would get the best removal through ACI  
15 and the host of other control technologies where  
16 could you get the highest percentage of removal?  
17 What type of coal?

18 A. Coal that has mercury primarily in the  
19 oxidized state, not the elemental state.

20 Q. For instance, what type of coal would  
21 that be?

22 A. I'd have to look up that data.

23 Q. Is it an eastern coal? Do you know?

24 A. It varies.

1           Q.    Okay.  Would you make the same  
2   recommendation with respect to mercury that you did  
3   with SO<sub>2</sub>, though, that a project wouldn't have just  
4   one type of fuel, one type of coal, for mercury  
5   purposes?

6           A.    Can you rephrase that?

7           Q.    Yeah.  I apologize, that was a long  
8   question.  We talked about SO<sub>2</sub>, you talked about not  
9   having just one type of coal even though there may be  
10  a type of coal that has lower sulfur content, so I  
11  guess my question is the same, although you can't  
12  recall which types of coal have the lowest mercury  
13  content, would you recommend -- let's just assume one  
14  type has lower mercury content and gets better  
15  control, would you recommend that AMP-Ohio only use  
16  that type of coal?

17          A.    They're going to have to use the type of  
18  coal that allows them to get down to the new source  
19  performance standard so whether they do that with one  
20  source of coal or multiple sources of coal, that's an  
21  economic decision on their part.

22          Q.    Okay.

23          A.    Which kind of brings into perspective the  
24  real problem with pulverized coal plants.  Now you're

1 having to design your plant and your fuel supply  
2 based on SO2 emissions, based on mercury, where you  
3 get mercury, where you get the coal, and you've got  
4 so many variables to try and juggle it's an  
5 inflexible situation.

6           Whereas with gasification it gives you  
7 much more flexibility as far as choosing a wide range  
8 of coals, different types of coals, because the  
9 mercury content and the sulfur content don't matter.  
10 They're going to be removed prior to combustion of  
11 the same gas that's produced.

12           So it gives you much more flexibility in  
13 those types of decisions and gives you better control  
14 of the economics of the plant as we go forward  
15 because of uncertainties in fuel supply and  
16 availability. So for all of those reasons it makes  
17 IGCC look better.

18           Q. We'll chat about IGCC here in a moment,  
19 but is there a perfect coal for all pollutants? If  
20 you look at the criteria of pollutants, NOx, SO2,  
21 particulate, and also then the noncriteria pollutant  
22 mercury, is there a perfect coal or is there a best  
23 coal to use?

24           A. No.

1           Q.    Okay.  Do you understand the difference  
2 or do you know what a merchant plant is?

3           A.    Yes.

4           Q.    Can you explain your opinion or your --

5           A.    A merchant plant is a plant that's built  
6 by a third party, not a municipality, not a regulated  
7 electric utility, that then sells that electricity  
8 usually under contract to other entities,  
9 municipalities or regulated utilities.  So they're in  
10 the business of generating and selling electricity.

11          Q.    Is Taylor a merchant plant?

12          A.    No, I don't believe so.  It would be a  
13 jointly-owned municipal much like AMP-Ohio.

14          Q.    Okay.  And you would agree that AMP-Ohio  
15 is not a merchant plant.

16          A.    Right.

17          Q.    Well, excuse me, AMPGS is not a merchant  
18 plant.

19                   What about the Glades project for Florida  
20 Power and Light?

21          A.    Regulated.

22          Q.    So a merchant plant is selling power to a  
23 third party; is that correct?

24          A.    I believe so.

1 Q. To another utility.

2 A. Or a company.

3 Q. So they're in the power supply business;  
4 is that correct?

5 A. Uh-huh.

6 Q. Okay. We talked earlier about the size  
7 of the units that AMP-Ohio is proposing. Do you know  
8 whether or not there are any commercial PC plants at  
9 the 480-megawatt range in operation today in the  
10 U.S.?

11 A. I'm sure there are.

12 Q. Have you ever seen a feasibility study  
13 that Beck did for AMP-Ohio related to AMPGS?

14 A. What was MPGS?

15 Q. For AMP-Ohio. Have you seen a  
16 feasibility study that was done for AMP-Ohio for the  
17 AMPGS project?

18 A. By Beck.

19 Q. By Beck.

20 A. No.

21 Q. Have you seen any feasibility studies  
22 done for AMP-Ohio?

23 A. No.

24 Q. Do you know how many engineers AMP-Ohio

1 has?

2 A. No, I do not.

3 Q. Do you know how many engineers sit on  
4 AMP-Ohio's board?

5 A. No, I do not.

6 Q. Do you know how many of the board members  
7 generate electric power?

8 A. No, I do not.

9 Q. Do you know how many outside power  
10 consultants AMP-Ohio has?

11 A. No, I do not.

12 Q. Do you think AMP-Ohio made a mistake  
13 choosing pulverized coal over wind for a thousand  
14 megawatts of generation?

15 A. Having not -- not being an expert on wind  
16 and not looking at the resource availability, I don't  
17 feel qualified to comment.

18 Q. Okay. But you do know that you can't  
19 baseload wind; is that correct?

20 A. Uh-huh.

21 Q. Okay. Do you think AMP-Ohio made a  
22 mistake choosing PC technology over IGCC?

23 A. Yes.

24 Q. Do you think that was an obvious mistake?

1           A.    What do you mean by "obvious"?

2           Q.    Do you think that it was a clear choice  
3 to choose IGCC or should be a clear choice to choose  
4 IGCC over PC technology?

5           A.    I certainly think it should be a  
6 technology that should be thoroughly evaluated and  
7 under most situations that I have looked at have  
8 found that the IGCC would be more technically and  
9 economically feasible.

10          Q.    Is it your opinion that AMP-Ohio failed  
11 to thoroughly evaluate IGCC?

12          A.    Not having seen the engineering reports I  
13 don't know whether they did or did not thoroughly  
14 evaluate it.

15          Q.    Okay. Do you believe that AMP-Ohio is  
16 opposed to IGCC as a technology?

17          A.    I don't have anything to indicate that.

18          Q.    Do you know anything about AMP-Ohio's  
19 consideration of IGCC at AMPGS or any project?

20          A.    No, I do not.

21          Q.    With respect to IGCC technology at power  
22 plants do you believe that CO2 capture is  
23 commercially viable right now?

24          A.    At IGCC plants?



1 Q. Yeah, at a power plant.

2 A. Yes.

3 Q. Okay. Are you familiar with the MIT  
4 study?

5 A. Yes, I am.

6 Q. Did they draw the same conclusion that  
7 you did?

8 A. I don't believe they did.

9 Q. Why would you deviate from the MIT study,  
10 then?

11 A. I would -- I don't believe that they have  
12 as much expertise on IGCC as other industry experts.

13 Q. Let me just ask you to clarify, and I  
14 apologize, I hope I didn't interrupt you, so that  
15 we're referencing the same MIT study, it's a 2007  
16 interdisciplinary MIT study called "The Future Of  
17 Coal" that you reference in your reference material;  
18 is that correct?

19 A. Yes.

20 Q. Just for clarification.

21 So it's your opinion that the right  
22 experts were not part of this study with respect to  
23 IGCC; is that correct?

24 A. Could you indicate which comment you

1 think comes to that conclusion?

2 Q. Well, globally I think that you, my  
3 question was in your opinion do you reach the same  
4 conclusion or does the MIT study reach the same  
5 conclusion that you do that right now CO2 capture is  
6 available at an IGCC for power, a power plant IGCC?

7 A. I think what they indicate is that, and  
8 which is true, is that there is not CO2 capture being  
9 done at an IGCC plant.

10 Q. So it hasn't been -- I'm sorry.

11 A. All right.

12 Q. Sure.

13 A. That doesn't mean it can't be done or  
14 that the technology isn't commercially available.

15 Q. Okay. So the distinction in your mind is  
16 what?

17 A. Is that the CO2 capture is being done on  
18 a coal gasification plant which makes the same syngas  
19 that is then fed into the IGCC plant. So the unit  
20 operation that we're talking about is gasification  
21 with CO2 capture and then the fuel goes on to a  
22 combined cycle unit; that whole technology has been  
23 demonstrated at commercial scale. That's not to say  
24 there can't be improvements made.

1 Q. Okay.

2 A. And that's not to say that there isn't  
3 technology and I think the MIT report wants to state  
4 they don't want to close any doors to future  
5 development, future research and development options,  
6 so they don't want to pick a winner as to which will  
7 be more successful, CO2 capture from PC plants or CO2  
8 capture from IGCC plants, but what their report  
9 indicates, that using present technology the cost is  
10 significantly lower for CO2 capture from an IGCC  
11 plant rather than a PC plant.

12 Q. Projected costs though, correct?

13 A. The costs are projected, and this is a  
14 fault of their study. The problem is they're  
15 projecting the costs of CO2 capture from a much more  
16 immature technology for pulverized coal units as  
17 opposed to a much more mature technology for CO2  
18 capture from gasification that's already being done  
19 on a commercial basis.

20 Q. Okay. So the costs -- I'm sorry.

21 A. So they have to make projections starting  
22 from two different reference points, one early on in  
23 development and one commercially available.

24 Q. Okay. So the costs, then, that are the

1 basis for the MIT study that we're discussing for  
2 IGCC with carbon capture are current costs from  
3 demonstrated carbon capture projects?

4 A. Yes. That technology is commercially  
5 available.

6 Q. Well, that's a different question. The  
7 cost numbers, are they based on currently operating  
8 IGCC power plants with carbon capture --

9 A. There are no IGCC with carbon capture.

10 Q. Okay.

11 A. There's gasification plants with carbon  
12 capture.

13 Q. Okay. So there are projected costs for  
14 both, both IGCC and pulverized coal.

15 A. (Witness nods head.)

16 Q. Okay. I'm sorry, is that a "yes"?

17 A. Yes, they're projected costs from a  
18 different basis.

19 Q. Okay.

20 A. What I'm saying is the reliability on  
21 that basis leaves into question the conclusions.

22 Q. You mentioned that the MIT study doesn't  
23 want to pick a winner with respect to carbon dioxide  
24 control equipment. Pick a winner between what

1 technologies?

2           A.    They don't know what technology may be  
3 capable of capturing CO2 from pulverized coal plants  
4 or IGCC plants that may come along in the laboratory  
5 and get developed so they don't want to rule out a  
6 possibility that might exist. That's fine if you  
7 don't have an answer that you need to have in the  
8 near term.

9           Q.    Okay.

10          A.    If you have ample time to search out all  
11 the options before you pick one, that's a good  
12 approach to have, but the present global warming  
13 situation is such that we may not have that time, we  
14 may need to pick a technology and go with the best  
15 that we have right now in order to control CO2  
16 emissions so we don't have climate disaster.

17          Q.    So you disagree with MIT. You believe  
18 there is a clear choice right now?

19          A.    As far as if I had to build a plant and  
20 it had to have CO2 capture on it, I would build an  
21 IGCC plant.

22          Q.    What would require --

23          A.    And I think the results of their study  
24 and the DOE study indicate the same thing, that if

1 you had to build a plant today and you were required  
2 to have CO2 capture, the cost would be significantly  
3 less for the IGCC plant, and that's the situation  
4 that AMP-Ohio is in.

5           If they feel that they have to build a  
6 plant now, then both studies indicate that the less  
7 expensive plant will be the IGCC plant because that  
8 can capture CO2 less expensively, and the only thing  
9 you need in addition to that is a belief that CO2  
10 regulation is imminent, and I choose to believe that  
11 it is.

12           Q.    So you believe AMP-Ohio has a requirement  
13 to control CO2 right now.

14           A.    It will have a requirement.

15           Q.    But --

16           A.    It's imminent.

17           Q.    But today does it have a requirement to  
18 control CO2?

19           A.    No, but I think it's the responsibility  
20 of the utility to look to the future and look to the  
21 interests of their ratepayers and not be burdened  
22 with a technology that they know is going to have  
23 exorbitant additional costs in the future.

24           Q.    Without required CO2 capture equipment

1 what do the DOE and MIT studies say about cost?

2 A. The MIT study indicated it was 5 percent  
3 more expensive for the cost of electricity to go with  
4 IGCC.

5 Q. What about DOE?

6 A. DOE, I think their number was slightly  
7 higher.

8 Q. Okay. When you say that it's your belief  
9 that CO2 regulation is imminent -- let me make sure,  
10 was that your statement? Is that correct?

11 A. Yes.

12 Q. -- what would that regulation be?

13 A. I guess I would, rather than trying to  
14 project I would indicate what states are doing on  
15 their own in lieu of there being federal regulations.  
16 The states of Montana, Washington, and California  
17 have set limits on CO2 from power generation at  
18 50 percent of what a pulverized coal plant will emit  
19 or, in some cases, have stated the CO2 emissions of  
20 an equivalent natural gas combined cycle plant. So  
21 that would be, you know, an indication of what might  
22 be -- what other states at least think is possible --

23 Q. Okay.

24 A. -- in requiring.

1 Q. What's the time frame for the 50 percent?

2 The 50 percent is a reduction of 50 percent?

3 A. Right. It's stated differently in  
4 different state regulations/legislation. California  
5 requires that no power plant can be built that has  
6 CO2 emissions higher than a natural gas combined  
7 cycle unit.

8 Q. Okay.

9 A. Since a coal unit produces twice as much  
10 CO2 emissions as a natural gas combined cycle unit,  
11 then you would have to control 50 percent of the CO2  
12 emissions from the pulverized coal plant --

13 Q. Starting when?

14 A. -- in order to meet the California  
15 requirement.

16 Q. I'm sorry, I keep interrupting.

17 A. That's okay.

18 Q. Starting when?

19 A. I believe it's immediately.

20 Q. What about Washington? Let's talk about  
21 Washington.

22 A. Washington I believe is the 50 percent.

23 Q. Okay. And is that immediately as well?

24 A. I'm not sure.



1 Q. Okay. Do you know when AMP-Ohio made its  
2 technology selection? Do you know what year it was?

3 A. No, I don't.

4 Q. Do you understand the term "parasitic  
5 load"?

6 A. Yes.

7 Q. Can you explain that to make sure we're  
8 on the same page?

9 A. Yeah. A power plant like AMP-Ohio might  
10 actually be producing, for each 480-megawatt unit may  
11 produce 550 megawatts, but in order to run the  
12 various equipment within the plant it requires  
13 electricity, that amount of electricity may be 70  
14 megawatts. If we subtract the 70 -- the 70 megawatts  
15 would be considered the parasitic load, that needs to  
16 be subtracted from the 550 gross generation to come  
17 out with the 480 which they indicate as the net  
18 generation.

19 Q. Okay. I'm going to -- this may help us,  
20 I'm going to hand you what's going to be marked  
21 Furman Exhibit 5.

22 (EXHIBIT MARKED FOR IDENTIFICATION.)

23 Q. Mr. Furman, have you seen this document  
24 before?

1 A. Yes.

2 Q. Can you identify it?

3 A. It's done by Julie Klara of the NETL, it  
4 was a presentation that she gave to the Gasification  
5 Technology Conference October 4th, 2006.

6 Q. Is it one of the documents that was  
7 included in your reference document?

8 A. Yes, it is.

9 Q. If you'd flip the page.

10 A. Yes.

11 Q. When we're talking about a parasitic  
12 load, if you look across the -- first of all, can you  
13 identify what this slide is?

14 A. It's IGCC Performance Comparison for the  
15 three different gasification processes and indicates  
16 what the differences are in megawatt output  
17 efficiency cost of electricity.

18 Q. Just for sake of comparison so it makes  
19 it easier, let's just focus on GE since it's first.

20 A. Yes.

21 Q. Can you walk me through the scenario we  
22 just talked about with parasitic load? Let's talk  
23 about without CO2 capture.

24 A. Without CO2 capture there's 769 megawatts

1 of gross power. The auxiliary power is 125  
2 megawatts.

3 Q. Let me stop you. What would the aux  
4 power be? What would that be?

5 A. The auxiliary power to run all of the  
6 auxiliary equipment. The major load in a  
7 gasification system is the oxygen separation system,  
8 the compressors for that.

9 Q. So it's the power needed for the IGCC or  
10 the gasification process?

11 A. And also the combined cycle power plant.

12 Q. Okay.

13 A. The auxiliary power for that.

14 Q. Okay.

15 A. So it's all of the auxiliary power.  
16 Giving you a net power of 644 megawatts.

17 Q. Okay. And then if we would look at this  
18 next column, what's the difference between these two  
19 columns?

20 A. CO2 capture?

21 Q. Okay. But same equipment, correct?  
22 We're looking, make sure we're looking at the same  
23 thing, GE Energy, second column?

24 A. Yes, the second column, GE Energy CO2

1 Capture, if we add the equipment necessary to capture  
2 the CO2, which is a multistep process of first  
3 shifting the syngas to produce primarily hydrogen  
4 which will be the fuel for the combined cycle unit  
5 and removing the CO2 by increasing the size of the  
6 acid gas removal system, then we come up with the  
7 auxiliary power to run that auxiliary equipment of --  
8 for the total plant of 178 megawatts.

9 Q. Okay. And then --

10 A. And then the net power is 563, so we've  
11 decreased the net power output from the power plant.

12 Q. By about 200 megawatts; is that correct?

13 A. No; a hundred and -- from which?

14 Q. With the CO2 capture.

15 A. It looks like 121 megawatts. From 563 to  
16 644?

17 Q. Oh, for the carbon. I'm sorry, I  
18 asked -- you answered a different question. The  
19 difference between IGCC plant with carbon capture and  
20 without, the difference is what, that's what you were  
21 just answering; is that correct?

22 A. Right. What were you asking?

23 Q. I'm sorry, I was asking from gross power  
24 with a carbon capture plant, if you start out at a

1 gross number of 741 and you go down to a net power of  
2 563, that's approximately a 200-megawatt reduction;  
3 is that correct? I can't do math. It's about 180.

4 A. 178. That's the definition of auxiliary  
5 power.

6 Q. Would include the carbon capture  
7 equipment.

8 A. Yes.

9 Q. Okay. All right, we're on the same page.  
10 Would you agree with these numbers?

11 A. Yes.

12 Q. So there's a significant reduction in  
13 megawatt capacity of an IGCC with or without carbon  
14 capture from --

15 A. Right. Which is even more dramatic if  
16 you go to a PC plant. The auxiliary power is much  
17 greater for CO2 capture with a PC plant.

18 Q. But without a CO2 capture, is the  
19 auxiliary power greater than an IGCC?

20 A. The auxiliary power is probably greater.  
21 The more important number is the overall cycle  
22 efficiency which is the 38.6 number for an IGCC plant  
23 as compared with a 31 percent for the AMP-Ohio.

24 Q. So let's just for apples-to-apples

1 comparison, if we have gross power megawatts at 769  
2 at a pulverized coal plant, you're stating it would  
3 take more aux power to run a pulverized coal plant  
4 than it would to run an IGCC?

5 A. No. No, it would probably take more  
6 auxiliary power to run an IGCC.

7 Q. Okay. Significantly? Slightly?

8 A. I'd have to look at the numbers.

9 Q. Have you done an analysis yourself?

10 A. Yeah.

11 Q. Have you --

12 A. I've looked at other people's analysis  
13 like this to know that the auxiliary power is usually  
14 slightly more for the IGCC, but that's not the  
15 important issue because there are other efficiencies  
16 and inefficiencies in the power generation cycle so  
17 you don't want to look at an individual component's  
18 efficiency, you want to look at the total cycle from  
19 coal in to electricity out.

20 Q. Okay.

21 A. And when you do that, the IGCC is coming  
22 up with a higher efficiency than the AMP-Ohio plant.

23 Q. But it also has increased costs without  
24 CO2 capture; is that right? You had stated earlier

1 the costs.

2 A. Yes, the cost of an IGCC, according to  
3 the MIT study, is 5 percent higher than the cost of  
4 electricity.

5 Q. Have you done any independent study on  
6 the cost differential between IGCC and PC?

7 A. No.

8 Q. Okay. When you were talking earlier  
9 about the MIT study and that they didn't want to pick  
10 either IGCC or PC technology for CO2 capture, do you  
11 know if they considered Powerspan's ECO2 technology  
12 for CO2 removal?

13 A. I didn't see anything in their report  
14 which referred to it.

15 Q. Is it your opinion that Powerspan, the  
16 Powerspan ECO2 technology can be used to control CO2  
17 from a power plant?

18 A. Yes, it can. It can, but it's extremely  
19 early in the development of that process. It's only  
20 been done at the laboratory scale.

21 Q. Have you found a fatal flaw in ECO2  
22 technology?

23 A. No.

24 Q. We talked earlier about your evaluation

1 of process flow diagrams for ECO-SO2 technology.  
 2 Have you seen process flow diagrams for ECO2 --  
 3 excuse me, that was for SO2, it was ECO for SO2  
 4 technology. Have you seen ECO2 for CO2 technology  
 5 process flow diagrams for Powerspan?

6 A. Yes.

7 Q. Where did you see those?

8 A. I received that from Powerspan and I  
 9 believe it was their latest paper that was presented  
 10 at an environmental conference.

11 Q. Have you seen any engineering design for  
 12 Powerspan CO2 technology?

13 A. No.

14 Q. Do you believe it's a mistake for  
 15 AMP-Ohio to consider Powerspan CO2 technology for  
 16 AMPGS?

17 A. The development of that technology should  
 18 take considerably more time than what's available  
 19 before the AMP-Ohio unit needs to be on line.

20 Q. How many years do you think that  
 21 technology should be considered?

22 A. It's very difficult to predict.

23 Q. Do you think it's possible the CO2  
 24 technology from Powerspan will be commercially viable



1 in five years?

2 A. No.

3 Q. Why not?

4 A. Because it has to go through a number of  
5 scale-up steps. First, it's been tested in the  
6 laboratory, and those test results are very  
7 encouraging and hopefully that will develop to  
8 commercial status because we certainly need a control  
9 technology for all the existing power plants, coal  
10 power plants that are in existence, so I very much  
11 hope that that technology does develop and am hopeful  
12 that it will.

13 But I'm also a realist enough to realize  
14 that it takes a long time for a technology to go from  
15 the laboratory scale to large commercial operation.  
16 And that would probably take anywhere on the order of  
17 between 10 and 15 years to go through the steps of a  
18 pilot plant which might be 1 megawatt, a small-scale  
19 demonstration plant which might be 50 megawatts, then  
20 a more commercial-size demonstration plant which may  
21 be 200, 250 megawatts, and then finally something  
22 that's large enough to be used on a 480-megawatt  
23 unit.

24 Each of those steps could be five years,

1 could very well be five years. So the hope is there  
2 that it will develop, but to count on that and to see  
3 how many -- my business has been new energy  
4 technology and seeing how it develops -- to see how  
5 many of these technologies fall by the wayside  
6 because problems were encountered that weren't  
7 anticipated makes me realize that we can't count on  
8 this technology.

9 I want to encourage it. I want to  
10 encourage its development and funding as quickly as  
11 possible, but to count on it would be unrealistic.

12 Q. Okay. And you do believe you can count  
13 on -- it's your opinion that you can count on carbon  
14 dioxide capture at an IGCC power plant.

15 A. Only because I can take you to a plant  
16 that's doing it today and has been doing it since  
17 2000. I can take you to the North Dakota synfuels  
18 plant where in 2000 they added a CO2 capture system  
19 to a gasification plant and I can let you talk to the  
20 plant manager, you can see how successful this  
21 process was, so successful that that plant manager is  
22 now in the process of building a second plant.

23 And the CO2 is being captured, it's being  
24 pipelined 200 miles away to be used in enhanced load

1 recovery.

2 Q. But, to clarify, the North Dakota plant  
3 that you reference is not a power plant.

4 A. It doesn't have to be. The technology is  
5 demonstrated. If I tell you -- it's like the fuel in  
6 your car. The fuel in your car doesn't care which  
7 refinery it came from, all it cares about is the fact  
8 that it's gasoline and it has a certain octane  
9 rating. Well, that's the same thing with a  
10 gasification plant.

11 It's producing the same syngas, carbon  
12 monoxide and hydrogen, that's used in a combined  
13 cycle plant. That combined cycle plant doesn't care  
14 where that CO2 and hydrogen came from. It came from  
15 a gasification process.

16 So the fact that we're removing the CO2  
17 and we're using that syngas for another purpose  
18 doesn't mean that the technology for CO2 capture  
19 isn't demonstrated someplace, it's demonstrated there  
20 and at other plants, and we're demonstrating it at a  
21 million tons a year. That's commercial scale.  
22 That's something that somebody could then take the  
23 risk and say okay, an AMP-Ohio plant that's 960  
24 megawatts could put that technology on.

1 Q. But you --

2 A. There are suppliers that would guarantee  
3 that CO2 capture, that's when it's commercially  
4 available.

5 Q. Okay. Well, let's start there. You said  
6 AMP-Ohio could take a risk. You believe that IGCC at  
7 the AMPGS project would be a risk, correct?

8 A. I think it's far less of a risk than them  
9 putting in a PC plant and risking the additional cost  
10 of CO2 capture on that PC plant.

11 Q. And you also said that you have or there  
12 are suppliers that will guarantee the CO2 capture  
13 equipment for a power plant; is that correct?

14 A. Yes.

15 Q. But we talked about that earlier and you  
16 didn't have a contract to share with me or guarantee  
17 to share with me; is that correct?

18 A. That was you had talked about  
19 availability of an IGCC plant.

20 Q. Okay. Then let's go back to it. Have  
21 you presented any materials regarding a guarantee of  
22 a vendor of an IGCC plant for carbon capture  
23 equipment?

24 A. No, but you can get one.

1           Q.    How do you know you can get one?  Have  
2  you negotiated any IGCC guarantees?

3           A.    No, I have not.

4           Q.    Okay.  Back to my original question,  
5  then, we're on the same page that the North Dakota  
6  project is not a power plant; is that correct?

7           A.    Correct.

8           Q.    So power supply rates to customers are  
9  not an issue for North Dakota, are they?  The North  
10 Dakota IGCC plant isn't providing power to customers.

11          A.    It's a North Dakota gasification plant.

12          Q.    I'm sorry.  Excuse me.  The North Dakota  
13 gasification plant is not providing power to end  
14 customers, is it?

15          A.    No, it's not.

16          Q.    So there's no concern by this North  
17 Dakota gasification project about rate recovery or  
18 rates to consumers; is that correct?

19          A.    Correct.  But the parent company is a  
20 utility that owns that gasification and they own an  
21 adjacent lignite power plant and when I asked the  
22 plant manager "If you had to build a power plant  
23 today, you've got experience with both, you've got a  
24 conventional lignite pulverized coal plant and

1 adjacent to it you've got a gasification plant that  
2 makes synthetic natural gas, if you had to build a  
3 power plant today, what kind of power plant would you  
4 build since you have experience with both  
5 technologies?" And the quote was "I would definitely  
6 build the IGCC plant."

7 Q. Has he provided any testimony in this  
8 case?

9 A. No, he has not.

10 Q. Have you provided an affidavit where he  
11 said that?

12 A. An affidavit? No.

13 Q. Okay. Has that company -- first of all,  
14 can you identify that company for me?

15 A. Yeah, it's -- the fellow's name is Al  
16 Lukes and he was chief operating officer for the  
17 Great Plains Synfuels Plant, which is its official  
18 name, and it's owned by -- the name of the power  
19 utility escapes me right now.

20 Q. Okay. But have they proposed an IGCC  
21 plant this year?

22 A. They're working with General Electric on  
23 the design of an IGCC plant for Powder River Basin  
24 coal.

1           Q.    Have they announced or filed an  
2 application for an IGCC plant?

3           A.    They have announced that they're working  
4 with GE on it.

5           Q.    But no application's been filed?

6           A.    Not to my knowledge.

7           Q.    Okay. Do you know the reliability of the  
8 power supply from that plant in North Dakota?

9           A.    It's not a power supply. It's  
10 gasification.

11          Q.    So there's no power supplied at all?  
12 They're not generating any power at that plant.

13          A.    No.

14          Q.    Okay.

15               MR. COLANGELO: Whenever you get to a  
16 good spot, I'd like to take another quick break.

17               THE WITNESS: Me too.

18               MS. BOTT: Sure. Well then, let's just  
19 do it right now.

20               MR. COLANGELO: Let's go off the record.

21               (Recess taken.)

22          Q.    We were in the midst of a discussion of  
23 the Dakota gasification project.

24          A.    Yes.

1           Q.    And you had mentioned that -- let me make  
2   sure I understand this.  Where does the CO2 capture  
3   occur in that process?

4           A.    After the gasification step you produce  
5   what's called a syngas.  That syngas contains  
6   primarily carbon monoxide, CO, hydrogen, carbon  
7   dioxide, and the pollutants, the mercury, some  
8   particulates, H2S, the sulfur, and what's typically  
9   done is you'll have an acid gas removal step which  
10  will remove the hydrogen sulfide and produce  
11  elemental sulfur.  So you're producing a useful  
12  by-product that can be sold rather than a gypsum  
13  waste material.

14               And since you have -- you have some CO2  
15  there, but you also have CO, so in order to capture  
16  more of the carbon, you go through what's called a  
17  water gas shift reaction which is to react the carbon  
18  monoxide with water to produce more hydrogen and more  
19  CO2, so then you have a product stream that consists  
20  of just hydrogen and CO2.

21           Q.    Okay.

22           A.    You then do a removal step to remove that  
23  CO2.  So the CO2, it's captured, it's put in a  
24  pipeline and it gets used for enhanced oil recovery



1 and the hydrogen gets used in the combined cycle  
2 power plant.

3           So all of those steps in that process all  
4 the way through to producing the CO2 are all being  
5 done at the gasification plant, so that production of  
6 syngas and removal of CO2 is being done to produce a  
7 million tons per year of CO2 from coal.

8           Q.    Okay.

9           A.    And the hydrogen and the CO then goes on  
10 for further processing where we would have used it in  
11 the combined cycle power plant as a fuel, they do  
12 additional processing and produce pipeline quality  
13 gas, so they're supplementing the natural gas that's  
14 produced domestically with synthetic natural gas,  
15 SNG, and so that's a way of taking coal and producing  
16 a substitute for natural gas.

17          Q.    Okay.

18          A.    They've been doing that since 1984 at  
19 that plant.

20          Q.    So the additional step that that plant  
21 doesn't have, then, is the hydrogen-rich synfuel to a  
22 steam turbine, right?

23          A.    Right. So that same fuel they have could  
24 go to a combined cycle unit, it just doesn't --

1 they're just not producing that product, they're not.  
2 producing electricity, they were designed to produce  
3 synthetic natural gas.

4 Q. Is it your opinion that this  
5 hydrogen-rich synfuel won't cause any trouble with  
6 the steam turbines?

7 A. It's not steam turbines.

8 Q. Excuse me. The gas turbines.

9 A. The gas turbines. Yes, that's a whole  
10 other area, but General Electric has indicated in  
11 their papers they actually have a fleet of gas  
12 turbine that runs on various amounts of hydrogen-rich  
13 gas so that's already being done, that's not to say  
14 that more of that needs to be perfected, but that's  
15 not on the critical path.

16 Q. So there's one vendor that you know of  
17 that --

18 A. And Siemens. Siemens also.

19 Q. Okay.

20 A. They have experience with -- and that's  
21 what they do at a lot of these refineries because  
22 they are producing a hydrogen-rich gas. The hydrogen  
23 is needed in the refining process in order to upgrade  
24 the crude oil to a lighter product, and so they very

1 often in the refinery have a hydrogen-rich gas which  
2 they have to use to generate their own power and they  
3 already do it in their combined cycle units.

4 Q. But a typical combined cycle unit for  
5 power would not be the type of unit that could take  
6 this high hydrogen synfuel; is that correct?

7 A. You might need some retrofitting. In  
8 other words, you might be able to take some existing  
9 combined cycle natural gas units and retrofit those  
10 for the hydrogen-rich gas.

11 Q. But you are aware there are some problems  
12 associated with the hydrogen-rich gas in the  
13 turbines.

14 A. Yes.

15 Q. Okay.

16 A. And both GE and Siemens feel that those  
17 are all solvable problems because of their past  
18 experience with hydrogen.

19 Q. Okay. But, again, we don't have in front  
20 of us here today any document guaranteeing that from  
21 GE or Siemens, do we?

22 A. No.

23 Q. And you're not in possession of any  
24 document that would provide such a guarantee.

1           A.    No.  Their papers all indicate that that  
2   does not seem to be a major technical hurdle to  
3   overcome, that their past experience indicates that  
4   with modifications it should be attainable.

5           Q.    Okay.  Have you done any air quality  
6   modeling for the AMPGS project?

7           A.    No.

8           Q.    Neither class 1 nor class 2?

9           A.    No.

10          Q.    Have you done any cumulative impacts  
11   analysis with respect to criteria pollutants at  
12   AMPGS?

13          A.    No.

14          Q.    What about any pollutants, any -- excuse  
15   me, cumulative impacts, environmental impact  
16   statements?

17          A.    No.

18          Q.    Okay.  Or analyses?

19          A.    No.

20          Q.    I apologize if I repeated this question,  
21   and remind me if I did, but are you testifying or is  
22   it your opinion that AMP-Ohio should select IGCC  
23   technology for AMPGS?

24          A.    I'm suggesting that from my analysis

1 which is a, granted, a preliminary analysis of  
2 alternatives, that it ought to be an option that  
3 should be investigated more thoroughly.

4 Q. But again, you don't know the level of  
5 detail to which AMP-Ohio has investigated IGCC,  
6 right?

7 A. Right. I have not been privy to that  
8 analysis.

9 Q. Do you know whether your client, NRDC,  
10 would support a thousand megawatt IGCC in Ohio?

11 A. If it had carbon capture in it, I believe  
12 they would.

13 Q. What about if it didn't have carbon  
14 capture equipment?

15 A. If it didn't, I don't believe they would  
16 support it.

17 Q. Do you believe that your client Sierra  
18 Club would support a thousand megawatt IGCC in Ohio?

19 A. I don't think they would support any coal  
20 plant.

21 Q. Okay. So it's your opinion that Sierra  
22 Club has a zero tolerance policy for coal plants?

23 A. That's my understanding.

24 Q. Okay. What about Ohio Environmental

1 Council, would they support a thousand megawatt IGCC  
2 in Ohio?

3 A. I have had no contact with them so I have  
4 no basis for knowing.

5 Q. Do you know if your client NRDC has  
6 opposed to IGCC plants in the past?

7 A. I don't know.

8 Q. Is it your opinion that coal has any role  
9 at all in power generation going forward?

10 A. Yes.

11 Q. Do you believe it's your clients  
12 position, NRDC's position, that coal has a role in  
13 power generation going forward?

14 A. Yes, I believe so.

15 Q. Do you support AMP-Ohio's position to  
16 provide reliable power to its customers?

17 A. Yes.

18 Q. Do you support AMP-Ohio's position to  
19 provide cost-effective power to its customers and  
20 members?

21 A. Yes.

22 Q. Do you know who AMP-Ohio's members are?

23 A. No.

24 Q. Do you think your clients support, and

1 clients I mean collectively NRDC, Sierra Club, OEC,  
2 do they support AMP-Ohio's mission to provide  
3 reliable power to its customer?

4 A. Yes, I believe so.

5 Q. Do you think they support, "they" being  
6 NRDC, Sierra Club, and OEC, do they support  
7 AMP-Ohio's mission to provide cost-effective power to  
8 its members?

9 A. Yes.

10 Q. Okay. I want to talk to you, then, just  
11 a few minutes about your exhibits if you don't mind.  
12 I have, and I apologize again, I'm working from a  
13 not-marked copy, but I believe they're exactly the  
14 same, so let me start there. Can we confirm --

15 A. Sure.

16 Q. -- the only difference between the  
17 testimony filed with the intervention pleading and  
18 the testimony filed yesterday with respect to the  
19 exhibits only is that the exhibits filed yesterday  
20 are numbered; is that correct?

21 A. Yes. And in color.

22 Q. Okay. Of these, and let me get our list  
23 here, of these exhibits can you identify how many  
24 exhibits there are?

1           A.    Thirty-two.

2           Q.    Of these 32 exhibits can you, or have you  
3 already done it, can you go through and tell me how  
4 many of them you created? Actually, you know what,  
5 Mr. Furman, let's just walk through them, maybe it  
6 would be easier that way.

7           A.    Okay. I did 1. Two is a composite of  
8 two slides from this presentation.

9           Q.    Hold on just a minute with respect to 2.  
10 Did you alter 2 in any --

11          A.    No.

12          Q.    By 2, RCF-2?

13          A.    No. I added "Volume of Exhaust Gas  
14 Clean-Up" and "Volume of Syngas Clean-Up," and I  
15 added "160X" and "X," and probably in the title  
16 "Combustion versus Gasification." So those top three  
17 lines I added.

18          Q.    No other alterations of this document?

19          A.    No.

20          Q.    Okay. No. 3, Exhibit 3. Excuse me, RCF,  
21 let's call these RCF-3.

22          A.    RCF-3 is directly from the Eastman  
23 reference.

24          Q.    Okay. Can you explain to me what the



1 Eastman reference is?

2 A. Okay. Eastman is a chemical company and  
3 they have been operating gasification plants for over  
4 20 years have announced that they'll be building two  
5 additional plants, one in Texas and one in Louisiana,  
6 and this is a diagram in their presentation  
7 describing what IGCC is, the various steps in the  
8 process.

9 Q. Okay. Where did you get this document?

10 A. It's listed in the references as --

11 Q. By "references," are you looking at  
12 Exhibit 4, just to be clear?

13 A. Yes.

14 Q. Okay.

15 A. No. 17, "Eastman Gasification Overview"  
16 by Eastman Gasification Services Company, March  
17 22nd, 2005, page 15.

18 Q. Where did you get the document?

19 A. I think originally from Eastman's  
20 website.

21 Q. Okay. To the best of your knowledge,  
22 does Eastman generate power?

23 A. No, they do not.

24 Q. Let's then go to RCF-4. Did you create

1 this document?

2 A. No, I did not.

3 Q. Have you altered this document in any  
4 way?

5 A. Yes, I have.

6 Q. Can you explain how you've altered it?

7 A. There's an additional process -- when you  
8 see the shift reactor, you see three streams coming  
9 off of that shift reactor, there was a fourth stream  
10 which was going to synthetic liquid fuels and NRDC  
11 asked me to remove that because they do not support  
12 the production of synthetic liquid fuels because of  
13 its added emissions of CO2.

14 Q. Do you agree with that position?

15 A. I certainly have a concern about it and  
16 having not analyzed the CO2 emissions directly myself  
17 am not sure how detrimental that is.

18 Q. Can you explain where you got this  
19 document?

20 A. Yes. I attended this conference and this  
21 paper was attended at this conference listed down  
22 below.

23 Q. And Milton Hernandez, according to this,  
24 is an employee of Shell; is that correct?

1           A.    Yes.

2           Q.    Does Shell have an interest in coal  
3 gasification?

4           A.    Yes.

5           Q.    Why?

6           A.    They have a number of -- they are an OEM  
7 for their own gasification system.

8           Q.    I'm sorry, OEM?

9           A.    Original equipment manufacturer --

10          Q.    Thanks.

11          A.    Sorry.

12          Q.    That's okay.

13          A.    -- for their own gasification system.

14          Q.    Do they sell gasification products to  
15 others? Are they a vendor of gasification products?

16          A.    Of the gasification system and some  
17 downstream processing.

18          Q.    Okay. Let's go to RCF-5. Did you create  
19 this document?

20          A.    No, I did not. This is from the MIT coal  
21 study listed down below. And I received a copy of  
22 this document on the internet and then received my  
23 own copy from MIT when I met with the project group.

24          Q.    The GE that's identified on this table,

1 is that General Electric?

2 A. Yes.

3 Q. Do they have an interest in coal  
4 gasification?

5 A. Yes.

6 Q. Do they sell gasification products?

7 A. Yes.

8 Q. What about GTC, do they have an interest  
9 in coal gasification?

10 A. They are an industry organization that  
11 promotes the use of gasification, yes.

12 Q. Let's go on, then, to RCF-6. Did you  
13 create this document?

14 A. No, I did not.

15 Q. Where --

16 A. It's directly from the DOE report as  
17 listed.

18 Q. Did you alter it in any way?

19 A. No.

20 Q. RCF-7, did you create this document?

21 A. No, I did not.

22 Q. Okay.

23 A. The reference is listed down below, and I  
24 added one reference -- the sentence starting with

1 "Median costs used for environmental and health  
2 damages."

3 Q. Okay. Can you show what you added to the  
4 table? Let's start there. What did you add to the  
5 table?

6 A. I didn't add anything to the table.

7 Q. So where did this table come from?

8 A. This table came from the Clean Air Task  
9 Force comments to the Michigan Department of  
10 Environmental Quality in response to Michigan's fact  
11 sheet requesting that utilities consider IGCC.

12 Q. Who created the document, then?

13 A. The Clean Air Task Force.

14 Q. Okay. So the table wasn't created in its  
15 entirety by the Clean Air Task Force and then, you  
16 said you added --

17 A. Actually, I think that addition was just  
18 because it was probably cut off the bottom of their  
19 table when I made a copy.

20 Q. So you haven't created any new data in  
21 this document at all.

22 A. No.

23 Q. Okay. How did you get this document?

24 A. From the Clean Air Task Force.

1 Q. Okay.

2 A. I asked them if they had any information  
3 on the environmental costs associated with the  
4 emissions from power plants, and they supplied me  
5 with this.

6 Q. Have you confirmed the numbers that the  
7 Clean Air Task Force uses in this table?

8 A. No, but since it came from the United  
9 Nations, I think it's probably a fairly reliable  
10 source.

11 Q. But you didn't confirm that it came from  
12 the United Nations.

13 A. No, I did not.

14 Q. Okay. Let's go to RCF-8 which we've  
15 already spent some time on. Did you create this  
16 document?

17 A. Yes.

18 Q. When was it created?

19 A. 2005-2006.

20 Q. Let's go to RCF-9. Did you create this  
21 document?

22 A. No.

23 Q. Did you alter this document in any way?

24 A. Just to add the title on top.

1 Q. Okay. And what's the title?

2 A. "Proposed 500-megawatt IGCC Plant Using  
3 Petcoke with CO2 Capture and Enhanced Oil Recovery at  
4 the BP Carson Refinery."

5 Q. Where did you get this document?

6 A. This was from a publication called Gas  
7 Turbine World.

8 Q. Do you know the timing for this plant?

9 A. I believe it's 2011 or '12.

10 Q. I'm looking over the diagram --

11 A. It would be listed probably in a  
12 subsequent table.

13 Q. So it's not on this document, the time  
14 frame.

15 A. The time frame of where the diagram came  
16 from or when the plant is going on line?

17 Q. When the plant is going on line.

18 A. No.

19 Q. Okay. Has this plant been permitted?

20 A. I don't know.

21 Q. Can you tell me what the parasitic costs  
22 for the carbon capture and enhanced oil recovery are  
23 at this plant?

24 A. Probably that DOE study that we discussed

1 before would probably be the best reference that's  
2 available to date.

3 Q. Okay. But you don't have direct numbers  
4 about this plant --

5 A. No.

6 Q. -- and their parasitic costs.

7 A. No.

8 Q. Okay. Do you know how much energy from  
9 this refinery will be sold to the power supply or to  
10 the grid, the power grid?

11 A. I don't know how much will be used within  
12 the refinery itself and how much will be sold to the  
13 grid.

14 Q. Okay. Let's go on, then, to RCF-10. Did  
15 you create this document?

16 A. No, I did not.

17 Q. Did you alter the document in any way?

18 A. No.

19 Q. Do you know -- excuse me. The age of  
20 this document is 2006; is that correct?

21 A. Yes.

22 Q. Okay. Where did you get the document?

23 A. From the Gasification Technology Council  
24 website which conducted this workshop.



1           Q.    Explain to me in your opinion what  
2   "Values represent technology capability, not permit  
3   levels," what does that mean to you?  See it at the  
4   top there?

5           A.    Uh-huh.

6           Q.    Okay.

7           A.    This is EPRI's assessment of what they  
8   think the technology is presently capable of doing as  
9   opposed to the actual numbers that are available from  
10  permit applications or permits that have been  
11  granted.

12          Q.    Okay.

13          A.    There are different bases that you can  
14  use, so this would be the basis of what EPRI thinks  
15  it's technologically capable of generating as far as  
16  emissions.

17          Q.    Why wouldn't those numbers be the same?

18          A.    I guess because of what -- we had a very  
19  long discussion of different people's opinions of  
20  what BACT is, and what it is varies among people.

21          Q.    So this --

22          A.    Different opinions of what they think  
23  technology is capable of and what level of cost or  
24  risk the utility is willing to bear versus what

1 burden they feel they want to put on the environment.

2 Q. So you don't believe this is an EPRI BACT  
3 study. Is there any indication this is an EPRI BACT  
4 study?

5 A. There's no indication as to which way  
6 they're leaning, no.

7 Q. Okay. Fair enough.

8 RCF-11, did you create this document?

9 A. No, I did not.

10 Q. Did you alter it in any way?

11 A. No.

12 Q. Can you tell me where you got it?

13 A. I got it from the Florida Public Service  
14 Commission website in which they have filed testimony  
15 for the Tampa Electric Company application for a  
16 needs determination.

17 Q. Up at the top it identifies bituminous  
18 coal. Can you identify the types of bituminous coal  
19 that were used to establish this chart?

20 A. Its source down below the table says the  
21 environmental footprints and costs, so we'd have to  
22 go to that document.

23 Q. Okay. But there's nothing in this  
24 document that you relied on that identifies the type

1 of bituminous coal, is there?

2 A. Nothing that I relied upon.

3 Q. Well, for instance, can you say that this  
4 is a eastern Appalachian coal or central Appalachian  
5 coal that was used to form these numbers?

6 A. No. Not without checking the reference,  
7 the EPA document.

8 Q. Okay. RCF-12. Did you create this  
9 document?

10 A. No, I did not.

11 Q. Did you alter it in any way?

12 A. No. Just the title at the top.

13 Q. Okay. Where did you receive this  
14 document?

15 A. From John Thompson at the Clean Air Task  
16 Force.

17 Q. Let's just run across the top. Can you  
18 tell me, has the Global Energy project been built?

19 A. No, it has not been built. I'm not sure  
20 if they've started construction or not.

21 Q. Do you know if it's still on the drawing  
22 board to start construction?

23 A. I don't know.

24 Q. What about Kentucky Pioneer Energy, has

1 it been built?

2 A. I don't know.

3 Q. Do you know if that project's moving  
4 forward?

5 A. I don't know.

6 Q. What about Wisconsin Electric Elm Grove  
7 Project, has that project been built?

8 A. No, it has not.

9 Q. Do you know if it's still being planned  
10 to be built?

11 A. I don't think there are plans for it.

12 Q. ERORA Cash Creek, do you know if that  
13 project's been built?

14 A. That one I believe has gone now from the  
15 application stage to the draft permit stage.

16 Q. Okay. Next, Southern Illinois Clean  
17 Energy Complex in Illinois, has that project been  
18 built?

19 A. No, and I don't know the current status.

20 Q. What about ERORA's Taylorville project?

21 A. That has gone from a draft permit to a  
22 final permit.

23 Q. How about, and I apologize --

24 A. Nueces.

1 Q. -- Nueces? Thank you.

2 A. Nueces, other than it filed for a permit,  
3 I don't know if it's gone to the next stage yet.

4 Q. Next one is Energy Northwest?

5 A. I don't know the current status on that  
6 one.

7 Q. AEP - Ohio?

8 A. I think that -- let's see. They are  
9 probably still awaiting approval from the Supreme  
10 Court on whether the PUC can allow them cost  
11 recovery, but I'm not sure.

12 Q. Have you seen any air permit applications  
13 for the AEP project?

14 A. I believe I have, but I didn't rely on  
15 that. I relied on the numbers presented in this  
16 table.

17 Q. By "AEP project" I was referring only to  
18 the Ohio project, is that --

19 A. Right.

20 Q. Okay, we're on the same page.

21 What about AEP - West Virginia?

22 A. I'm not sure of the current status on  
23 that one.

24 Q. Do you know the current status on --

1 A. Mesaba.

2 Q. -- Mesaba?

3 A. I think that's also tied up in permitting  
4 and regulations.

5 Q. Okay. Do you know the status on Duke  
6 Edwardsport?

7 A. I believe I saw something recently where  
8 they just got permission to go ahead. I'm not sure,  
9 though.

10 Q. Okay.

11 A. There's too many of these to try to keep  
12 track of.

13 Q. Did you go back and check and verify that  
14 these numbers were all correct?

15 A. Some of them I did, particularly the  
16 Taylorville one which I used for a later exhibit.

17 Q. And any of the others?

18 A. Nueces, I think I may have gone back with  
19 the AEP, Duke Edwardsport.

20 Q. Okay.

21 A. Yes, that's probably the ones I looked  
22 at.

23 Q. And you can verify that those were all  
24 correct?

1           A.    Yes.

2           Q.    Okay.

3           A.    Some may have changed in going from the  
4 application to the actual permit. There were some  
5 adjustments both up and down to some of these  
6 numbers.

7           Q.    Okay. And we've already I believe talked  
8 a little bit about RCF-13, but did you create this  
9 document?

10          A.    I added the AMPGS column to this table  
11 originally submitted by John Thompson so that we  
12 would have a comparison between the AMPGS emission  
13 rates and the various IGCC emission rates that are in  
14 permit applications.

15          Q.    What permits were used for these various  
16 IGCCs to come up with these numbers?

17          A.    The prior table.

18          Q.    Okay. So the IGCCs in RCF-12, is that  
19 what you're talking about?

20          A.    Yes.

21          Q.    Okay. So you didn't create anything with  
22 respect to the IGCC --

23          A.    No.

24          Q.    -- okay, materials.

1 I'm sorry, where did you say you got this  
2 document?

3 A. From John Thompson, down at the bottom.

4 Q. And John Thompson works for the Clean  
5 Air --

6 A. Task Force.

7 Q. -- Task Force. Thank you.

8 Do you know whether or not the Clean Air  
9 Task Force is being funded by the Joyce Foundation to  
10 support IGCC?

11 A. I don't know that other than the same  
12 question was asked to me in the FPL proceedings.

13 Q. Okay.

14 A. And I answered the question at that time  
15 that I didn't know, and that's the only other  
16 reference I have.

17 Q. So as of this date you don't have any  
18 other information on that issue.

19 A. No.

20 Q. And FLP, are you talking about the Glades  
21 proceeding?

22 A. Right, for FPL.

23 Q. FPL, I'm sorry.

24 Okay, next document is RCF-14. Did you



1 create this document?

2 A. Yes, I did.

3 Q. Is the Taylorville IGCC project that's  
4 referenced here, is it a 960-megawatt plant?

5 A. No. I believe it's 630 megawatts.

6 Q. So they're not the same size; is that  
7 correct? Taylorville and AMPGS are not the same  
8 size; is that correct?

9 A. Correct. But in order to make a fair  
10 comparison I scaled up, as I indicate in the text,  
11 the emission numbers to equal sizes, the  
12 960 megawatts.

13 Q. But this is just an emission comparison,  
14 you're not scaling up costs, you haven't provided any  
15 cost --

16 A. No.

17 Q. -- numbers, correct?

18 A. No.

19 Q. Okay. Or any other pollutants, water  
20 discharges, anything like that; is that correct?

21 A. No.

22 Q. With respect to RCF- --

23 MS. BOTT: Give me just a moment.

24 Q. So, Mr. Furman, one more question on

1 RCF-14. Do you know what capacity factors were used  
2 to develop the numbers for emissions from  
3 Taylorville?

4 A. Not without referring to the reference  
5 document.

6 Q. And the reference document being the  
7 application itself?

8 A. Yes.

9 Q. Okay. RCF-15, did you create this  
10 document?

11 A. Yes, I did.

12 Q. And we've spoken in some detail about  
13 this one.

14 A. Yes.

15 Q. Down at the bottom it says "RCFurman  
16 10/2/07." Is that the date you created this  
17 document?

18 A. Yes. And --

19 Q. I'm sorry?

20 A. No, it was just giving me a reference  
21 point for the previous date I had given you of  
22 September 19th when I started working, so that's  
23 consistent with that.

24 Q. Okay.

1 A. Just checking myself.

2 Q. All righty. That's okay.

3 RCF-16, did you create this document?

4 A. No, I did not.

5 Q. Where did you get it?

6 A. I got this from Gary Stiegel, a person in  
7 charge of gasification technology development for the  
8 Department of Energy from a presentation that he had  
9 given previously.

10 Q. Have you altered this document in any  
11 way?

12 A. No.

13 Q. If you look at the top of it, it says  
14 "Wabash River." Can you identify that project?

15 A. That's the one shown in the top picture,  
16 it's the retrofit of an existing power plant to  
17 become an IGCC unit. And the bottom picture is the  
18 Tampa Electric which was a grassroots new power  
19 plant.

20 Q. Did you do any independent verification  
21 of the availability factors that were achieved that  
22 are identified on this page?

23 A. Yes, actually that availability number  
24 was also confirmed by the plant manager and -- well.

1 Q. For which plant? I'm sorry; for both?

2 A. For the Tampa Electric.

3 Q. Start with Wabash. Have you  
4 independently confirmed the 77 percent availability?

5 A. No, I have not.

6 Q. Now let's go back to Tampa. You have  
7 independently confirmed the 90 percent availability?

8 A. Yes.

9 Q. And that was through conversation with,  
10 I'm sorry?

11 A. The plant manager.

12 Q. At Tampa Electric.

13 A. Yes. And his charts that he presented at  
14 public tours which is included in my reference  
15 documents.

16 Q. And what year did they achieve that  
17 90 percent availability?

18 A. I don't know.

19 Q. Was that an annual availability number;  
20 do you know?

21 A. I believe all availabilities are on an  
22 annual basis.

23 Q. And if you recall, we talked earlier  
24 about cofiring on other fuels. To achieve that

1 90 percent availability did this plant have to cofire  
2 natural gas as we talked about earlier?

3 A. No. Actually, if you look at the double  
4 asterisk and then you refer down to the bottom as to  
5 what they're talking about, it says the Gasification  
6 Power Block. What they're talking about, I believe,  
7 is that the IGCC plant consists of two components as  
8 I tried to differentiate the gasification portion  
9 from using the fuel that's generated in the power  
10 generation portion.

11 Well, what happened early on, the  
12 particular combined cycle unit, the GE FA units that  
13 were supplied had a defect in it and they threw some  
14 blades; that caused for major outage in the power  
15 plant. No fault of the gasification system. This  
16 same defect occurred in natural gas combined cycle  
17 plants.

18 What various people have tried to do is  
19 say that the lack of reliability in an IGCC unit is  
20 demonstrated by the reduction in availability at the  
21 Tampa Electric plant where it really had nothing to  
22 do with the new portion of the technology, the  
23 gasification portion of the plant, but because the  
24 gas turbine was down they couldn't be generating

1 electricity.

2                   That's implying something that really  
3 isn't true, it's implying that the lack of  
4 reliability is due to the gasification portion of the  
5 plant. So what they're saying is they achieved  
6 90 percent availability on the gasification portion  
7 of the plant.

8           Q.   Not on the power portion.

9           A.   Not on the power portion.

10          Q.   Okay.

11          A.   And that's how they've tried, and I  
12 believe it's presented in that reference document,  
13 it's excluding the problem that they had with all gas  
14 turbines, whether it be natural gas or gasifier  
15 supplied syngas, don't penalize the new technology  
16 for a failure of the old technology.

17          Q.   Okay.

18          A.   Because all GE 7F turbines had that  
19 problem.

20          Q.   Even ones at natural gas combined cycle  
21 plants?

22          A.   Yes. That was a major flaw.

23          Q.   So the 90 percent availability is not on  
24 the power side, it's on the gasification side.

1           A.    Right. That's what I believe they're  
2 saying here, and we can confirm that by going to the  
3 more detailed information in that reference.

4           Q.    Okay. And then back to the question  
5 about whether or not they were cofiring. Do you know  
6 whether they were cofiring with natural gas or --

7           A.    No, because separately in that document  
8 you'll see where they state that they receive -- they  
9 achieved 95 percent availability during peak season  
10 with the stand-by fuel.

11          Q.    Meaning natural --

12          A.    So during their peak load demands they  
13 were able to get the 95 percent availability.

14          Q.    By cofiring with natural gas.

15          A.    Right. So if the gasifier portion is  
16 down, they use natural gas.

17          Q.    But that would spike emissions in NOx,  
18 would it not?

19          A.    Not if you have the SCR on which is what  
20 they were proposing for their new plant.

21          Q.    Have you seen any cost analysis of costs  
22 if they have to cofire with natural gas? Fuel cost  
23 analysis. Have you seen any fuel cost analysis for  
24 this project?

1           A.    The manager of the Tampa Electric plant  
2 has done an analysis, he didn't give me the analysis,  
3 but he told me the result was that it's less  
4 expensive for them to use the higher cost natural gas  
5 to supplement rather than putting in a stand-by  
6 gasifier.

7           Q.    Okay. So there is no redundancy with the  
8 gasifier at this plant, is there?

9           A.    No, and there's no proposed redundancy  
10 with their proposed new unit.

11          Q.    Let's look for just a minute at these  
12 percentage removal rates for sulfur and NOx. Would  
13 you agree with those numbers?

14          A.    Yes, but again, those are -- that's  
15 technology that was designed 15 years ago and has  
16 been operating for the last 10 to 11 years, so the  
17 numbers for current design of IGCC plants are  
18 considerably better and reflected in the permit  
19 applications.

20          Q.    But again, those are concept plants  
21 versus commercial plants, correct?

22          A.    Demonstration plants.

23          Q.    Okay. Do you know what year these  
24 numbers were from, the sulfur removal and NOx



1 reduction number percentages?

2 A. No, I don't.

3 Q. RCF-17, did you create this document?

4 A. Yes, I did.

5 Q. Can you tell me when you created it,  
6 approximately?

7 A. 2006.

8 Q. And it was created for the testimony  
9 you're giving here with respect to AMP-Ohio?

10 A. I've also used it in the Florida  
11 presentations.

12 Q. RCF-18, did you create this document?

13 A. No, I did not.

14 Q. Did you alter it in any way?

15 A. No.

16 Q. Can you tell me where you got it?

17 A. Yes. Reference No. 28. And that would  
18 be from the Gasification Technology Council website.

19 Q. So you didn't attend any seminar, this  
20 you received from a website?

21 A. Correct.

22 Q. And to be clear, this is gasification  
23 only, not IGCC for power; is that correct?

24 A. Both.

1 Q. Where do I see the power side of it?

2 A. Down on the products it says "Power 19  
3 percent."

4 Q. Okay. Is that power that's supplied to a  
5 grid or is that incidental power?

6 A. Both.

7 Q. Which projects would have been  
8 considered?

9 A. The 17 IGCC projects that are listed in a  
10 following table.

11 Q. So these tables cross-reference, and by  
12 "following table" are we talking about RCF-19?

13 A. Yes.

14 Q. Okay. And so these two tables  
15 cross-reference one another; is that correct?

16 A. Yes.

17 Q. Okay. Let's then move on to RCF-19. I  
18 apologize, Mr. Furman, I had these marked by page; is  
19 that correct? Is that consistent with yours, each  
20 page of this document's a different exhibit number?

21 A. The next one would be 19.

22 Q. Okay. So it's a one-page document; is  
23 that right?

24 A. Yes.

1 Q. Okay. Can you identify 19?

2 A. It's a list of commercially operating  
3 IGCC projects worldwide that was published in Gas  
4 Turbine World.

5 Q. Okay. And did you receive this one from  
6 a website as well?

7 A. No. I actually hired the author of this  
8 article to compile this table and then subsequent to  
9 that -- for other testimony, and then after that he  
10 published it in this format in Gas Turbine World.

11 Q. Did he create any other documents for you  
12 related to this chart?

13 A. Related to this chart? He also created  
14 the subsequent exhibits.

15 Q. Okay. But you said you had hired him to  
16 do a compilation. Is this your compilation exactly  
17 that you had hired him to do?

18 A. No. He did it on his own. I was busy  
19 preparing testimony and as part of my questions back  
20 from the Public Service Commission staff in Florida  
21 they asked me for a comprehensive list of operating  
22 IGCC plants worldwide and the subsequent tables, and  
23 I hired him to provide me with that information since  
24 he had the best experience knowing the various

1 sources of information.

2 Q. Okay. Did you verify his information  
3 that's contained in this table?

4 A. Some of it, yes.

5 Q. What part of it?

6 A. Just that I know -- am familiar with  
7 Tampa Electric and all the data provided on that  
8 line.

9 Q. Okay.

10 A. So the plants that I'm familiar with,  
11 yes.

12 Q. Any other plants you're familiar with?

13 A. The four plants listed in Italy, the Nuon  
14 plant listed at the top, Elcogas in Spain, the Nippon  
15 refinery in Japan.

16 Q. So for each one you just listed you  
17 verified the documentation used in this chart?

18 A. Yes.

19 Q. RCF-20, can you identify this document?

20 A. Proposed IGCC and gasification plants  
21 proposed in North America.

22 Q. Did you create this document?

23 A. No.

24 Q. Can you identify who did?

1           A.    Harry Jaeger, gasification editor for Gas  
2 Turbine World.

3           Q.    Was he retained by you to do this  
4 compilation?

5           A.    Yes.

6           Q.    Has it been updated since January of  
7 2007?

8           A.    No.

9           Q.    RCF-21, can you identify this document?

10          A.    That's a continuation of that prior one,  
11 as is Exhibit RCF-22.

12          Q.    Okay. And so the last update on all of  
13 these would be January of 2007, correct?

14          A.    Yes.

15          Q.    Okay. Let's go to RCF-23.

16          A.    This, again, is a proposed IGC and  
17 gasification plants outside of North America compiled  
18 at my request by Harry Jaeger, Gas Turbine World.

19          Q.    And also last updated in January of 2007?

20          A.    Yes.

21          Q.    Was Harry compensated by you for this  
22 compilation?

23          A.    Yes.

24          Q.    RCF-24. Can you identify this document?

1           A.    Yes.  Proposed carbon capture and storage  
2 power plant projects.

3           MR. COLANGELO:  I'm sorry.  Just, for the  
4 record, are you asking about RCF-24 or 25?

5           Q.    I was asking about 24.

6           A.    That's the same as 23.

7           Q.    Okay.  Okay.

8           MS. BOTT:  Thank you.

9           Q.    RCF-25, can you identify this document?

10          A.    Proposed carbon capture and storage power  
11 plant projects, Gas Turbine World.

12          Q.    Okay.

13          A.    Compiled by probably Harry Jaeger, but  
14 not funded by me.

15          Q.    Okay.  At the bottom there's a reference  
16 that says "Based on a 2006 report."  Do you know if  
17 there have been any updates since 2006?

18          A.    I do not.

19          Q.    Okay.

20          A.    No.

21          Q.    Did you verify any of this information  
22 contained in this document?

23          A.    Yes.  BP Carson, you asked the question  
24 what year would it start, I guess their first

1 indication was 2011 back then.

2 Q. Is that still the target?

3 A. I don't know.

4 Q. Okay.

5 A. The FutureGen. RWE - Germany. RWE - UK.

6 Saskatchewan Power. BP - Scotland.

7 Q. Okay. RCF-26, did you create this  
8 document?

9 A. No, I did not.

10 Q. Where did you get it?

11 A. From the Nuon utility in The Netherlands  
12 from a brochure that they supplied me with.

13 Q. When did you receive it?

14 A. I don't remember. It was included in a  
15 couple of their documents, and I'm not sure which  
16 one.

17 Q. Is this one of the reference documents  
18 you provided in Exhibit 4, your reference list?

19 A. I'm looking through the reference list to  
20 see if I included it.

21 Q. Okay.

22 A. I believe I omitted it, but I'd certainly  
23 be glad to provide that.

24 Q. Did you alter this document in any way?

1           A.    Yes.  I added the bold type which  
2 clarified some of the fuzzy type:  "Coal and  
3 Biomass," "Natural Gas," "4 by 300 Megawatts," and  
4 down at the bottom, "1200 megawatts" and "Multi-Fuel  
5 IGCC Power Plant, Coal, Natural Gas, and Biomass."

6           Q.    Do you know the status of this plant?

7           A.    Yes; I've indicated that in the text of  
8 my testimony which is, because of price increases and  
9 lead time on equipment they've announced that they  
10 will construct this plant in two phases, the combined  
11 cycle portion first and the gasification section as  
12 phase 2.

13          Q.    With their combined cycle process phase  
14 1, that would be natural gas combined cycle then; is  
15 that correct?

16          A.    Yes, that could run alone on natural gas.

17          Q.    So it's not an IGCC, it will be a natural  
18 gas combined cycle plant; is that correct?

19          A.    No.  They haven't indicated that.  It  
20 will be an IGCC unit built in two phases.

21          Q.    Okay.  It says it's a 1,200-megawatt, is  
22 that gross or net?

23          A.    I'm not sure.

24          Q.    RCF-27, did you create this document?



1           A.    The picture is from the book The New  
2   SynFuels Energy Pioneers and the heading is what I  
3   added on as clarification based on the information in  
4   the book.

5           Q.    Okay.

6           A.    And subsequent information from the plant  
7   manager.

8           Q.    Do you know, does this plant provide  
9   electric power to the power supply grid or power  
10  grid?

11          A.    Well, you see in -- yes and no.

12          Q.    Okay.

13          A.    The blue plant is the --

14          Q.    I'm sorry, I don't -- there you go,  
15  perfect. Thank you.

16          A.    The plant that has the tall stacks  
17  because it's got a lot of pollution coming out of it  
18  is the lignite PC plant, and that's the existing two  
19  440-megawatt units that was built at the same time in  
20  early-1980s as the gasification plant which produces  
21  synthetic natural gas and CO2.

22          Q.    So there's a traditional coal plant here.

23          A.    Right. The top portion.

24          Q.    And there's a distinct and different

1 gasification plant; is that correct?

2 A. Correct.

3 Q. They just happen to be sharing the same  
4 footprint?

5 A. Right.

6 Q. Okay. All right.

7 A. Okay, and here we can refresh my memory.

8 Q. Sure.

9 A. The answer to the power utility that  
10 owns, and it's also a cooperative, that owns both of  
11 these, the gasification plant and the conventional  
12 power plant, is basin Electric Power Cooperative.

13 Q. Okay. To clarify some of your earlier  
14 testimony?

15 A. Right.

16 Q. Okay. RCF-28, did you create this  
17 document?

18 A. No.

19 Q. Where did you get it?

20 A. I got it from the source listed down at  
21 the bottom which is a presentation that Al Lukes, the  
22 plant manager, presented at a symposium.

23 Q. What year was that?

24 A. I don't remember. It might have been

1 2005.

2 Q. Okay. Did you alter this document in any  
3 way?

4 A. No.

5 Q. Did you actually go to this presentation?

6 A. No, I did not.

7 Q. How did you get the document, then?

8 A. I either got it from Al Lukes or at  
9 conference proceedings.

10 Q. You're not proposing that AMP-Ohio  
11 sequester and pipeline CO2 to Canada, are you?

12 A. I'm proposing that that might be not to  
13 Canada, but perhaps to some other locations where CO2  
14 could be effectively sequestered.

15 Q. Have you evaluated the feasibility or the  
16 feasibility of a CO2 pipeline in southern Ohio?

17 A. No, I have not.

18 Q. What about northern West Virginia?

19 A. No, I haven't looked at that. I know  
20 Illinois is looking at pipeline systems to go  
21 throughout their state.

22 Q. But you haven't -- you personally have  
23 not looked at any CO2 pipeline options for Ohio.

24 A. No, I have not.

1 Q. What about sequestration options for  
2 Ohio?

3 A. I haven't looked at that either.

4 Q. Okay. RCF-29, did you create this  
5 document?

6 A. No, I did not.

7 Q. Did you alter it in any way?

8 A. No.

9 Q. Where did you get it?

10 A. From the Department of Energy, their  
11 "Fossil Energy Power Plant Desk Reference" document  
12 which compares the water usage and in this case the  
13 IGCC unit which would use 4,000 gallons per minute  
14 versus the 6,212 gallons per minute which would be  
15 used by the subcritical PC plant that is being  
16 proposed by AMP-Ohio.

17 Q. Okay. But these are generic figures, are  
18 they? Correct?

19 A. Correct.

20 Q. There's no reference to AMP-Ohio on this  
21 graph, is there?

22 A. No, other than the reference to a  
23 subcritical.

24 Q. Okay. RCF-30, did you create this

1 document?

2 A. No, I did not.

3 Q. Did you alter it in any way?

4 A. No.

5 Q. Where did you get it?

6 A. From a web search and a presentation that  
7 was made by Ron Ott, Senior Vice President of Black &  
8 Veatch.

9 Q. Okay.

10 A. Which is also the same as Exhibits 31 and  
11 32.

12 Q. With respect to RCF-31, RCF-32, let's  
13 look at all three of these documents together, did  
14 you alter any of the three of these documents?

15 A. No, I not.

16 Q. And you received them all the same way  
17 from the internet?

18 A. Yes.

19 Q. Did you verify any of the data contained  
20 in any of these documents?

21 A. Yes.

22 Q. Okay.

23 A. I was particularly concerned because at  
24 the time Florida Power and Light was claiming that

1 their Glades plant was an ultra-supercritical  
2 pulverized coal plant and I could not see where the  
3 operating conditions that they were using came  
4 anywhere near the conditions of an  
5 ultra-supercritical pulverized coal plant, so then I  
6 started looking at the differences in steam  
7 conditions and efficiencies, and these are in pretty  
8 much agreement with other documents such as the MIT  
9 study and the DOE study.

10 Q. Okay. Who is Black & Veatch?

11 A. They're an engineering firm.

12 Q. Do they work in the power industry --

13 A. Yes.

14 Q. -- to your knowledge? Okay.

15 Just a general question that we had  
16 talked about earlier with respect to air emissions  
17 issues, you had raised some concerns with respect to  
18 the potential air emissions, were there any other  
19 concerns that you have with respect to this plant  
20 other than the ones you raised earlier with respect  
21 to air emissions?

22 A. The concern is primarily one that the  
23 plant is not being, as currently designed, going to  
24 be able to provide the minimum emissions possible or

1 the minimum environmental impact that other plants  
2 and other technologies could supply. So my concern  
3 in justifying environmental compatibility; this plant  
4 is not reaching that standard.

5           The other concern is public need, public  
6 need and public interest, that the public interest  
7 really isn't being served because significant  
8 consideration has not been given to future  
9 requirements that this plant will have to meet. The  
10 plant will have a life of probably about 50 years or  
11 more.

12           Within that 50-year period there are  
13 going to be more stringent emission standards that  
14 this plant is going to have to meet. With the  
15 equipment that they're specifying it's not going to  
16 be able to meet those standards, so they're going to  
17 have to add, modify, or convert this plant, and  
18 having been involved in the conversion of power  
19 plants I realize that that's going to be an extremely  
20 costly endeavor and they're not going to be able to  
21 do it with the design of this plant.

22           It's going to mean that they're going to  
23 have to pass on those costs to the ratepayers to meet  
24 these future emission standards, and the one in

1 particular that we've emphasized quite a bit in our  
2 testimony that's probably the most important from a  
3 global perspective is the CO2 emissions, and this  
4 plant doesn't have the capability to incorporate, we  
5 don't even have a technology that's anywhere close to  
6 commercialization that we could incorporate in this  
7 plant to try to capture CO2.

8 Q. And I believe that area's been covered  
9 throughout the testimony as has all of this, but my  
10 question was with respect to air emissions, in  
11 addition to the things that you have already  
12 testified to, are there other issues with respect to  
13 any other criteria pollutants or any other pollutants  
14 that you don't believe AMP-Ohio has considered with  
15 respect to this project?

16 A. The coal utilization by-products, it's  
17 abbreviated CUB, is a great area of research that  
18 both DOE and EPA are conducting now because they're  
19 very much concerned about the toxins like mercury  
20 that can be leached out of the waste materials. This  
21 is not a concern with gasification because the waste  
22 materials are either used as by-products or are in  
23 such a form that they're far less likely to be  
24 leached into the groundwater.



1 Q. Have you evaluated AMP-Ohio's landfill  
2 application?

3 A. The specific one, no.

4 Q. Okay.

5 A. No. But any landfill other than that  
6 classified as a hazardous landfill has the potential  
7 of the material leaching into the groundwater.

8 Q. Okay.

9 A. Therefore, it poses a problem to water  
10 supplies.

11 Q. Have you --

12 A. And the reintroduction of that mercury.

13 Q. Have you permitted a landfill ever?

14 A. No.

15 Q. Have you signed as a responsible official  
16 for a --

17 A. No.

18 Q. -- landfill ever?

19 A. No.

20 Q. Have you been involved in the design of a  
21 landfill?

22 A. No, I have not. But I am concerned  
23 enough because of the massive research and  
24 development program that EPA and DOE are conducting

1 to try and quantify the magnitude of that problem  
2 that we may not even know that problem, what the  
3 magnitude is.

4 Q. And U.S. EPA has the authority to issue  
5 regulations with respect to environmental issues; is  
6 that correct?

7 A. Yes.

8 Q. Okay.

9 A. And I guess, to complete that answer, it  
10 would be also the concern about the use of water  
11 resources, that this is not the most conserving use  
12 of water resources, particularly when you look at the  
13 quantities of additional water that this plant will  
14 use versus other technology, and that's even  
15 amplified more when you look at the need to capture  
16 CO<sub>2</sub>, that you're really looking at a 200 percent  
17 increase in the amount of water if this plant is  
18 required to have a CO<sub>2</sub> capture.

19 Q. And you believe that's critical to the  
20 air permit; is that correct?

21 A. Critical to the needs determination.

22 Q. But I asked you about air --

23 A. Which must include water conservation  
24 measures.

1           Q.    I understand that.  I guess I asked you a  
2 specific question about an air permit and I'm still  
3 trying to establish that answer which is in addition  
4 to the discussion we had earlier, is there any other  
5 issue as far as emissions, BACT, or NSPS that you  
6 have concern with?

7           A.    No, I don't think so.

8           Q.    Okay.  I think we're done, if you give me  
9 just about three minutes.

10           MS. BOTT:  Peggy, are you still with us?

11           MS. MALONE:  Yes, I'm still here.

12           MS. BOTT:  If we could go off the record  
13 for a couple of minutes.

14           (Discussion held off the record.)

15           MR. COLANGELO:  Could you have the record  
16 reflect who else joined us for the latter part of the  
17 deposition?

18           MS. BOTT:  Oh, sure.  Sure.

19           MR. BENTINE:  Yes, this is Evis Couppis.

20           Q.    (By Ms. Bott) Are you aware that AMP-Ohio  
21 has filed water permits with respect to AMPGS?

22           A.    I'm not aware of that, no.

23           Q.    Have you reviewed any water --

24           A.    No.

1           Q.    -- applications, I'm sorry, with respect  
2 to AMPGS?

3           A.    No.

4           Q.    Have you reviewed AMP-Ohio's landfill  
5 permit application?

6           A.    Just skimmed over it.

7           Q.    So you have seen AMP-Ohio's landfill --

8           A.    Actually, I've seen the portion that's in  
9 the needs determination.

10          Q.    You haven't seen the --

11          A.    No.

12          Q.    -- whole application, then.

13          A.    No.

14                MS. BOTT: I think that concludes today's  
15 deposition. I want to thank you for your time and  
16 for coming to Ohio; welcome.

17                As far as the deposition transcript --

18                MR. COLANGELO: He would like to review  
19 it.

20                (Thereupon, the deposition concluded at  
21 1:46 p.m.)

22                               - - -

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1 State of Ohio :  
2 County of \_\_\_\_\_ : SS:

3 I, Richard C. Furman, do hereby certify that I  
4 have read the foregoing transcript of my deposition  
5 given on Tuesday, December 4, 2007; that together  
6 with the correction page attached hereto noting  
7 changes in form or substance, if any, it is true and  
8 correct.

9  
10 \_\_\_\_\_  
11 Richard C. Furman

12 I do hereby certify that the foregoing  
13 transcript of the deposition of Richard C. Furman was  
14 submitted to the witness for reading and signing;  
15 that after he had stated to the undersigned Notary  
16 Public that he had read and examined his deposition,  
17 he signed the same in my presence on the \_\_\_\_\_ day  
18 of \_\_\_\_\_, 2007.

19 \_\_\_\_\_  
20 Notary Public

21 My commission expires \_\_\_\_\_, \_\_\_\_\_.  
22  
23  
24

## 1 CERTIFICATE

2 State of Ohio :  
: SS:  
3 County of Franklin :

4 I, Maria DiPaolo Jones, Notary Public in and  
for the State of Ohio, duly commissioned and  
5 qualified, certify that the within named Richard C.  
Furman was by me duly sworn to testify to the whole  
6 truth in the cause aforesaid; that the testimony was  
taken down by me in stenotypy in the presence of said  
7 witness, afterwards transcribed upon a computer; that  
the foregoing is a true and correct transcript of the  
8 testimony given by said witness taken at the time and  
place in the foregoing caption specified and  
9 completed without adjournment.

10 I certify that I am not a relative, employee,  
or attorney of any of the parties hereto, or of any  
11 attorney or counsel employed by the parties, or  
financially interested in the action.

12  
13 IN WITNESS WHEREOF, I have hereunto set my  
hand and affixed my seal of office at Columbus, Ohio,  
on this 6th day of December, 2007.

14

15

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17

Maria DiPaolo Jones, Registered  
Diplomate Reporter, CRR and  
Notary Public in and for the  
State of Ohio.

18 My commission expires June 19, 2011.

19 (MDJ-3108)

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