MC GINNIS & ASSOCIATES, INC.
COLUMBUS, OHIO   (614) 431-1344

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 1              BEFORE THE PUBLIC UTILITIES COMMISSION
                          STATE OF OHIO
 2                           - - -
        In the Matter of the Application)
 3      of The Cincinnati Gas & Electric)
        Company for Approval of its      )   Case No. 99-1658-EL-ETP
 4      Electric Transition Plan and     )
        for Authorization to Collect     )
 5      Transition Revenues.             )
        In the Matter of the Application)
 6      of The Cincinnati Gas & Electric)
        Company for Approval of Tariff   )   Case No. 99-1659-EL-ATA
 7      Changes Required to Implement    )
        Retail Electric Competition.     )
 8      In the Matter of the Application)
        of The Cincinnati Gas & Electric)   Case No. 99-1660-EL-ATA
 9      Company for Approval of its New )
        Tariffs.                         )
10      In the Matter of the Application)
        of The Cincinnati Gas & Electric)
11      Company for Authority to Modify )   Case No. 99-1661-EL-ATA
        Current Accounting Procedures to)
12      Defer Costs Incurred Arising     )
        From the Implementation of its   )
13      Electric Transition Plan.        )
        In the Matter of the Application)
14      of The Cincinnati Gas & Electric)
        Company for Authority to Modify )   Case No. 99-1662-EL-AAM
15      Current Accounting Procedures to)
        Defer Transition Costs and       )
16      Continue to Defer the Unrecovered)
        Balance of Regulatory Assets.    )
17      In the Matter of the Application)
        of The Cincinnati Gas & Electric)
18      Company for Approval to Transfer)   Case No. 99-1663-EL-AAM
        Its Generating Assets to an      )
19      Exempt Wholesale Generator.      )
                                 - - -
20              Deposition of Randall J. Falkenberg, a witness herein,
        called by the Cincinnati Gas and Electric Company for
21      examination under the statute, taken before us, Candace M.
        Hammond, Registered Professional Reporter, and Rose Marie
22      Prater, Registered Professional Reporter, and Notaries Public in
        and for the State of Ohio, pursuant to notice and stipulations
23      of counsel hereinafter set forth, at the offices of The
        Cincinnati Gas and Electric Company, 221 East Fourth Street,
24      25th Floor, Cincinnati, Ohio, on Friday, May 26, 2000, beginning
        at 1:39 o'clock p.m. and concluding on the same day.
25                               - - -
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*   DEPONET AFFILIATE   *   CERTIFIED MIN-U-SCRIPT PUBLISHER   *

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10   - - -

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1   S T I P U L A T I O N S

2   - - -

3   It is stipulated by and among counsel for the

4   respective parties herein that the deposition of Randall J.

5   Falkenberg, a witness herein, called by the Cincinnati Gas and

6   Electric Company for examination under the statute, may be taken

7   at this time and reduced to writing in stenotype by the

8   Notaries, whose notes may thereafter be transcribed out of the

9   presence of the witness; that proof of the official character

10   and qualification of the Notaries is waived; that the witness

11   may sign the transcript of his deposition before a Notary other

12   than the Notaries taking his deposition; said deposition to have

13   the same force and effect as though the witness had signed the

14   transcript of his deposition before the Notaries taking it.

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1   I N D E X

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3   WITNESS   PAGE

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        Examination by Mr. Dortch   6
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    EXHIBIT   MARKED
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8   Excerpt from Kyoto protocol

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1   RANDALL J. FALKENBERG

2   of lawful age, being by me first duly placed under oath, as

3   prescribed by law, was examined and testified as follows:

4   EXAMINATION

5   BY MR. DORTCH.

6   Q.   Mr. Falkenberg, would you state your name on the

7   record?

8   A.   Randall J. Falkenberg.

9   Q.   And are you the same Randall J. Falkenberg who filed

10   direct prefiled testimony in the case of the application of CG&E

11   for approval of its transition plan?

12   A.   Yes.

13   Q.   Sir, I have asked, through your attorney, for

14   workpapers, documents, revealing data inputs, outputs,

15   assumptions and also in your case the results of any

16   benchmarking studies and things that came -- the things that go

17   along with doing those. Did you bring those with you?

18   MR. BOEHM: Yeah, we did. I think this is everything.

19   This is the electronic part of it. This is most of it, right,

20   Randy?

21   THE WITNESS: That is a disk that contains the

22   supporting -- most of the supporting worksheets in electronic

23   form, that contains the computer model I used that contains just

24   about everything I can think of that I thought was pertinent.

25   And then the paper stuff there is various documents that at one

1   point or another I relied upon.

2   MR. BOEHM: Is this the West Penn decision you quote

3   from with respect to Mr. Pifer's testimony?

4   THE WITNESS: Yes.

5   MR. BOEHM: Okay. I have, by the way -- Do you guys

6   have this? Did you ask for it? This is the testimony that he

7   cited in Pennsylvania when he criticizes Pifer's testimony.

8   MR. DORTCH: This is the reference to the West Penn

9   order?

10   THE WITNESS: That's contained in there.

11   MR. BOEHM: I think it's on the net, if you don't have

12   the full --

13   MR. DORTCH: We have it.

14   BY MR. DORTCH:

15   Q.   Mr. Falkenberg, you are appearing on behalf of AK

16   Steel today?

17   A.   Yes.

18   Q.   Do you -- How long have you been doing work for AK

19   Steel? I notice back in 1989 you had testified for Armco; so I

20   was just curious.

21   A.   Well, I don't know if Armco and AK are the same

22   company. I think that they are, but I'm not sure of that. But

23   certainly I did work for Armco back in '89. I think that was

24   the first case that I did for Armco. Though, Armco could have

25   been a member of some of the industrial groups that I

1   represented.

2   Q.   Do you have a contract with AK Steel or --

3   A.   I don't know. That's a legal question.

4   Q.   Okay. I assume there's no written document?

5   A.   Not that I'm aware of.

6   Q.   AK Steel is compensating you for your testimony, I

7   assume?

8   A.   Yes.

9   Q.   Well, if there's no written document, then it doesn't

10   matter whether it's you personally or RFI Associates. Is that

11   the name of your new company?

12   A.   RFI Consulting, Inc.

13   Q.   Just -- And I won't dwell on this stuff but just a

14   little bit of background stuff. Have you -- You've given me a

15   list that contains the publications for which you are

16   responsible. Have you ever published in the stranded cost or

17   modeling areas?

18   A.   Yes.

19   Q.   Could you identify those publications?

20   A.   Actually, I think I can give you a copy of it.

21   (Handed.)

22   Q.   What you've handed me, sir, is PUCO and Market

23   Dominance reprinted 1995, Market Utilities, Fortnightly?

24   A.   Yes.

25   Q.   Any other publications in either stranded costs or

1   modeling areas?

2   A.   No.

3   Q.   Do you have any works in progress or -- yeah, works in

4   progress or publications underway at this time?

5   A.   No.

6   Q.   Briefly, could you outline your education for me?

7   A.   Yes, I have a Bachelor's degree -- of Science degree

8   in physics from Indiana University and a Master of Science in

9   physics from the University of Minnesota.

10   Q.   I noted your specialty was nuclear theory.

11   A.   Yes.

12   Q.   You also describe coursework in engineering economics.

13   Could you explain that to me, how many courses, what were they?

14   A.   I took a course, one course in engineering economics

15   when I was at the University of Minnesota and basically it was

16   really sort of classical, at present value cost benefit analysis

17   type of thing.

18   Q.   You also said -- so there's one course in engineering

19   economics. Any other economics courses?

20   A.   I took a course in econometrics at the University of

21   Indiana also.

22   Q.   I don't know what that is. What is econometrics?

23   A.   Econometrics is the modeling of generally economic

24   data, but it can be applied to a lot of different fields through

25   regression analysis.

1   Q.   Okay. And that was one course?

2   A.   Yes.

3   Q.   You have no degree or anything in economics?

4   A.   No.

5   Q.   You also described advance study in power system

6   reliability analysis. What is that a reference to?

7   A.   I took a course some years ago at the -- I think it

8   was called the Center for Professional Advancement. It was a

9   short course, three days or a week, something like that, which

10   was taught by Roy Billington of the University of Toronto, I

11   believe, and another fellow from the University of Texas, Dee

12   something or other. I can't remember his last name, but these

13   are two respected people in the field of power system analysis

14   systems and it, of course, dealt with how -- with how to do

15   power system reliability. Dee Patton was the name, I believe.

16   Q.   Have you completed any coursework in finance?

17   A.   No.

18   Q.   Can you name any corporate finance textbooks that you

19   would deem authoritative?

20   A.   No.

21   Q.   Again, I don't mean to dwell on these things, but

22   you've got what I would describe as considerable experience

23   in -- testimonial experience in stranded cost analysis. And I

24   was a little confused by the way you had laid this out; so I

25   want to go through the cases and you tell me if there's -- if

1   you can, if there's anything that I omitted, or should be added

2   or deleted, if I've got it wrong.

3   I have you as having testified in eleven cases, having

4   done stranded cost analysis and testified in eleven different

5   cases and, for what they're worth, I have Pennsylvania, PECO,

6   Pennsylvania Power and Light, Metropolitan Edison, Pennsylvania

7   Electric Company, West Penn Power Company, Duquesne, in Arkansas

8   and I don't have a utility name there, I'll get that from you in

9   a minute, Maine, Bangor Hydro, Connecticut, Connecticut Light

10   and Power and United Illuminating Company, West Virginia

11   Allegheny Power, and AEP. And I don't know if that's easy to

12   follow or not, but have I omitted anything? Do I have the cases

13   right?

14   A.   Well, just for clarification, the Met Ed and Penn Elec

15   were really one case.

16   Q.   Met Ed and Penn Electric were one case?

17   A.   Yeah, they're both operating units of GPU. There was

18   actually two PECO cases. There was the PECO securitization

19   case, which was really the first stranded cost case which I

20   testified in, which occurred around January, first quarter of

21   1997, I believe, and then there was the PECO restructuring case,

22   which occurred a few months later. In both cases, stranded

23   costs were litigated.

24   Q.   What was the name of the utility that was at issue in

25   Arkansas?

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1   A.   Well, there were two cases I testified in Arkansas,

2 one was an Entergy Arkansas, Inc., a general rate case where

3 stranded costs were not really litigated, but they were sort of

4 an issue, and then there was a generic proceeding in Arkansas

5 where all of the utilities were participating in which stranded

6 costs were, once again, calculated really for illustrative

7 purposes, not for purposes of determination of stranded costs.

8   Q.   So that really wasn't a litigated case, if that's fair

9 to say?

10   A.   Well, it was a litigated case, but it was a generic

11 investigation with all the utilities. It was certainly unusual,

12 I can put it that way.

13   Q.   Anything else that should be added to that list that

14 you can think of? I'm sorry, I know you did give this to me.

15   A.   It's in my resume, but it sounds good so far.

16   Q.   Looking between the two that -- I was not certain that

17 I understood; so I thought I'd better ask.

18   In all those cases that you presented testimony, have

19 you ever used anything but the CUMULUS model as the basis for

20 your testimony?

21   A.   Yes.

22   Q.   Okay. Could you tell me when?

23   A.   Well, in the PECO securitization case, I just did a

24 spreadsheet analysis. And in a number of the cases I believe

25 that I probably took the results that were presented by a

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1   company witness and maybe modified it or corrected it or

2   adjusted it in addition to using the CUMULUS model. For

3   example, like I did in this case with the Pifer study.

4   Q.   No, I understood. But in any of those -- in each of

5   those cases, the CUMULUS model was the foundation for your

6   testimony?

7   A.   Yes.

8   Q.   Is that -- Does that include the securitization case

9   in PECO?

10   A.   No.

11   Q.   That was just a spreadsheet analysis?

12   A.   Yes.

13   Q.   So CUMULUS then was applicable to the remaining --

14   A.   Yes.

15   Q.   -- cases we've identified?

16   Now, I've read your testimony, and I just want to go

17   through a few things that I want to make certain I understand

18   your opinions do not relate to, and if I -- if you disagree with

19   me, just say so.

20   You're not offering any opinions regarding consumer

21   education, for example?

22   A.   No.

23   Q.   The independent transmission plan submitted by the

24   company?

25   A.   No.

1   Q.   Employee assistance?

2   A.   No.

3   Q.   Operational support plan?

4   A.   No.

5   Q.   Corporate separation?

6   A.   No.

7   Q.   Shopping credit?

8   A.   No.

9   Q.   Unbundling?

10   A.   No.

11   Q.   So the only subject of your testimony is -- well, the

12   valuation of stranded costs and the market price of electricity?

13   A.   Yes.

14   Q.   Are you preparing any additional testimony --

15   A.   No.

16   Q.   -- for use in this case? Have you been asked to

17   prepare any additional analysis?

18   A.   No.

19   Q.   Are you doing so?

20   A.   No.

21   Q.   As I understand your testimony, you and Dr. Pifer are

22   in agreement that DCF forecasting is the appropriate means of

23   quantifying stranded costs; is that correct?

24   A.   Yes.

25   Q.   Have you ever done stranded cost analysis using any

1   other methodology?

2   A.   Not really. In the Maine case, the focus was only on

3   the next year or so, and so I don't recall that we really did a

4   stranded cost calculation in the conventional sense. It was

5   more of a comparison of market prices to certain contracts that

6   they had, but the principles are pretty much the same.

7   Q.   I assume you're aware -- Strike that.

8   Again, from my review of your testimony, I understand

9   that there are two things that are important here. Again, if

10   I'm wrong, you correct me if I'm misstating it. One's the model

11   that is used, and second is the assumptions that underlie the

12   analysis; is that fair?

13   A.   No, I don't think that's an accurate reading of my

14   testimony. I think I said that probably the models aren't

15   terribly important. It's the assumptions that are more

16   important.

17   Q.   I'm going to ask you some questions about modeling

18   mostly because I don't have a clue how this stuff works. Do I

19   understand correctly that there are essentially two types of

20   models -- from your testimony, again, is what I'm working from

21   -- what you've referred to as a probabilistic model and then a

22   simulation model, or I think you refer to GE-MAPS, anyway, as a

23   Monte Carlo simulation?

24   A.   Well, just to be clear, all models generally are

25   simulation models. Probabilistic models differ from

1   deterministic models in that one attempts to take into account

2   things like random outages of generators. Now, the model that I

3   use is what's known as a convolution technique model, which uses

4   an analytical solution to actually perform a calculation of

5   market prices, taking into account outages and that sort of

6   thing.

7   A deterministic model would not do that. A Monte

8   Carlo technique is a means of doing a probabilistic calculation,

9   but it's an approximation technique as opposed to an exact

10   technique.

11   Q.   Now, do I understand, then, that we've introduced

12   three models or three types of models?

13   A.   Well, I would say that there's really two types of

14   models, there's the deterministic and the probabilistic. Within

15   the realm of probabilistic, there are different avenues or

16   different approaches that are designed to simulate the system,

17   one being the Monte Carlo approach, the other being the

18   convolution approach.

19   Q.   Yours is the latter and GE-MAPS is the former?

20   A.   GE-MAPS is a Monte Carlo.

21   Q.   Are you aware of other models that function similar to

22   GE-MAPS?

23   A.   I'm aware of a lot of other models. Monte Carlo is

24   not that widely used. I don't know that there are very many

25   other models that actually use the Monte Carlo technique.

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1   Q.   Do you know of any?

2   A.   Well, I use the Monte Carlo technique for pump storage

3   when I modeled that. I have no problem with Monte Carlo,

4   per se. It's a question of application.

5   Q.   What about ENPRO and PRO-SIM, are those similar to

6   GE-MAPS or are those more akin to CUMULUS?

7   A.   No, I don't recall which technique those models used.

8   I've certainly been involved in cases where those were used, and

9   I just don't honestly recall if those were Monte Carlo or what

10 technique is used.

11   Q.   What's it mean to be a chronological Monte Carlo

12 model?

13   A.   What you try to do in a chronological model is take

14 into account how the system develops starting at a particular

15 point in time going forward and the advantage of Monte Carlo for

16 that type of a situation is that you can attempt to capture

17 dynamic relationships that occur across time.

18   Q.   Dynamic relationships between what?

19   A.   Well, for example, the dispatchers decide on Friday

20 that they're going to check on certain generators over the

21 weekend and then they bring them back up on Monday. The spin

22 reserve is sort of a dynamic consideration because it's based on

23 the scheduling -- the scheduling of units.

24   Q.   Could you explain to me how your model operates?

25   A.   How long you got?

1   (Laughter.)

2   Q.   That is very fair.

3   A.   I've provided a user's manual to the model and

4   documentation, if that will help. That's in the material I

5   provided.

6   Q.   It's in the material you provided in the binder you

7   presented today?

8   A.   Yes.

9   Q.   Thank you. I'm sure that will help me, and since I

10   haven't examined it, but it's there, I won't ask you a whole lot

11   of questions about it.

12   Are you aware of models that are comparable to yours?

13   A.   Yes.

14   Q.   And could you list some of those models?

15   A.   Well, there's PROMOD and Pro Screen, there's EGEAS, I

16   think, the PROPHET model, P-r-o-p-h-e-t.

17   Q.   I'm sorry, sir, I didn't catch that spelling?

18   A.   PROPHET, P-r-o-p-h-e-t. I believe that the EPRI

19   utility planning model -- UPM is similar, the ICF-IPM model is

20   somewhat similar, it's more simplified. I think that the model

21   I use is probably pretty much in the mainstream.

22   Q.   Now, as I understand, you authored the model you use?

23   A.   Yes.

24   Q.   When did you do so? Usually -- I understand there may

25   have been changes, but when did you first write that?

1   A.   Actually, I believe that around 1979 or 1980 I got a

2   personal computer and I sort of developed an interest in putting

3   a production cost model on a personal computer, and it really

4   evolved over that -- it's really evolved ever since.

5   Q.   Is it still evolving today?

6   A.   I haven't changed the model very much in the last year

7   or two.

8   Q.   Over the course of time, obviously, it implies you

9   have changed the model. Why have you done so?

10   A.   Generally the model has changed to respond to

11 differences in the utility industry that I was trying to model.

12 Fifteen years ago we were looking at things like whether or not

13 nuclear power plants should be built or canceled, that sort of

14 thing; so the total production cost of a utility was the

15 variable of most interest.

16   In the last five years, of course, restructuring has

17 become a lot more important, and so computing marginal costs is

18 a lot more important.

19   Q.   So in the past five years you've made changes in your

20 model in order to compute marginal costs?

21   A.   It always computed them, but the major thing that I

22 did was develop a technique to compute the revenue that each

23 power plant would receive in a competitive market and that

24 technique is described in the Public Utilities Fortnightly

25 article that I've provided.

1   Q.   Now, as I understand in my very limited knowledge of

2   modeling generally, MAPS is a chronological model that models on

3   bihourly periods; is that consistent with your understanding?

4   A.   Yes.

5   Q.   What time period does your CUMULUS model utilize?

6   A.   Well, it can really utilize any time period I want it

7   to look at. I generally model the system into two periods.

8   I'll model it into a peak period and an off-peak period, and I

9   will look at load duration curves that model the load in every

10   single hour of the year during those periods. I could break it

11   into more periods. I've seldom found it to be of any advantage.

12   Q.   So you typically use 8,760 periods?

13   A.   8,760 hours that are broken into a peak period, which

14   is the summer months, and off-peak period, which is the rest of

15   the year.

16   Q.   Just -- You use that for your modeling period. What

17   kind of outputs do you get; is that for an hourly period or some

18   other period?

19   A.   The outputs are for the seasons, whether I model --

20   whether it's the summer peak period or the rest of the year.

21   Q.   Okay. Now, I'm curious about your -- the basis of

22   your knowledge of GE-MAPS. And since this could invite the same

23   kind of response as "How long do I have?" I mean, what do you

24   do -- Have you ever taken it out, kicked the tires, test drove

25   the thing, figured out what's going on with it?

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1   A.   Well, no, actually I've never driven it. I have read

2   about it a lot in Dr. Pifer's testimony or other witnesses for

3   PHB Hagler Bailly; so I've read about it. Also, during one of

4   the PECO cases, and perhaps two of the PECO cases, I don't

5   recall, I guess it was only one, I went to the offices of PHB at

6   that time and spent a fair amount of time talking to the person

7   who ran the model and looking over the inputs and outputs and

8   the user's manual and basically studying the model, learning how

9   it works.

10   Q.   How long were you there studying the model?

11   A.   I'd say I was probably there at least an afternoon.

12   Q.   Since you've never taken it out and driven it, I take

13   it you've never tested it against other models?

14   A.   Well, I actually have done some runs that -- with my

15   CUMULUS model attempting to replicate some of the results of the

16   GE-MAPS model. You know, in that process, I was able to find

17   that there were some mistakes that were in the model in the PECO

18   securitization case.

19   For example, the way the system had been set up and

20   the witness for PECO did admit that they had problems with the

21   way they determined the optimal capacity expansion mix. So

22   generally it's been by trying to replicate the results of MAPS

23   using the CUMULUS model or, in some cases, just spreadsheets and

24   that sort of thing.

25   Q.   Well, if I -- I don't want to misstate your testimony,

1   but if I understand what you just said, the answer to my

2   question was, no, you've not tested the GE-MAPS model but you

3   have tested your model against GE-MAPS -- the results of

4   GE-MAPS; is that --

5   A.   Well, I don't know. This reminds me of the question

6   that Bill Russell was asked about how he thought -- you know, he

7   was watching a Kareem Jabar, and he said "How do you think you

8   would have done against him?" And he said, "Son, you have that

9   question backwards."

10   (Laughter.)

11   Q.   I'm not trying to suggest that Wilt Chamberlain would

12   slam dunk over you, but is what I was saying correct, you've

13   tested the results of your --

14   A.   I've tested the results of MAPS against common sense,

15   against spreadsheets and against my model.

16   Q.   You said a CUMULUS -- the outputs of CUMULUS are on a

17   seasonal basis. How do you define "season"?

18   A.   Generally what I've done is I would look at the loads

19   in a particular region and try to figure out what would be the

20   logical period for the summer peak period. And generally what

21   I'm doing is I'm avoiding maintenance during that time of the

22   year in the model.

23   So it's really done by an inspection of the load data,

24   and then once I've done that, I like to see that the marginal

25   costs are equalized across the two seasons so that I don't, for

1   example, have a period in the off-peak months when I have

2   maintenance that drives the market prices higher than it would

3   be in the on-peak months in the summer, at least not

4   substantially higher. It wouldn't bother me if they were

5   reasonably close, but if off-peak is higher than I think, then I

6   would have too narrow of an off-peak period and too wide of an

7   on-peak period.

8   Q.   So when we're talking about seasons, you're basically

9   taking the peak period?

10   A.   Yes.

11   Q.   And for different areas of the country, that would be

12   different time frames, but at least here in good old Cincinnati,

13   Ohio, it's, say, June through August?

14   A.   Yeah, I think it -- that's in the data, but it's

15   something like the highest 100 days of the year, in that summer

16   period. So it may be June 7th through September 15th or

17   something of that sort, but that's in the data.

18   Q.   I'm sorry, could you say that again? And I know it's

19   in the data, but I haven't reviewed it. It's the highest 100

20   hours in the year?

21   A.   Highest 100 days. And I'm not saying that 100 is the

22   number, maybe it's 88 or something, but it's finding that window

23   when the loads are the highest.

24   Q.   Now, do you consider other seasons, or is it basically

25   three months, 100 days, whatever, of peak and nine months of

1   off-peak?

2   A.   That's what I did. I haven't generally found it

3   necessary to do any more than that.

4   Q.   We talked -- or talked briefly about comparing GE-MAPS

5   and your model. In your testimony and in specific you cite an

6   Exhibit RJF-6?

7   A.   Yes.

8   Q.   In your testimony, you discuss testing CUMULUS against

9   other models and, I'm sorry, I don't -- I neglected to write

10 down the page reference, but then you refer to your Exhibit 6

11 and state that the results are -- of those tests are contained

12 therein.

13   A.   I have the exhibit.

14   Q.   You have the exhibit. As I went through the items on

15 Exhibit 6, at least to me as a layman, it looked to me like you

16 have tested your model or compared your model in some fashion to

17 other models for purposes of market price simulation or stranded

18 cost analysis on four occasions. Is that correct?

19   A.   I'm sorry, you're saying it was benchmarked for

20 purposes of stranded cost on four occasions?

21   Q.   Well, yeah, I was trying to figure out when you had

22 tested -- benchmarked your model, to use your term, against

23 another model in a case that involved market price simulation,

24 stranded cost quantifications, the issues that you are

25 testifying as to in this case?

1   A.   Yes.

2   Q.   Okay. And when I did that, it looked to me as though

3   you've identified four -- four different proceedings in which

4   you have done this sort of comparison?

5   A.   Well, of course --

6   Q.   And I don't mean to keep this a mystery or anything.

7   What I assumed, and you can correct me if I'm wrong, was that

8   the 1995 Pennsylvania proceeding, you said not applicable,

9   Market Price Simulation; 1997 PECO Energy, PJM Pool Market

10   Prices; '97 West Penn Power, ECAR Market Energy Prices; and 1999

11   United Illuminating, and you pulled out NEPOOL Hourly Lambda

12   Market Prices.

13   So at least in my effort to try to sort out what was

14   going on, I came up with those four. Is that accurate? Are

15   those the four different times that you have attempted to

16   benchmark your model against someone else's model in this kind

17   of case?

18   A.   Well, actually, I've done another case recently where

19   I benchmarked a model against another model that's not listed

20   here.

21   Q.   Okay. Well, if you would like to add to Exhibit 6,

22   please do.

23   A.   Well, I don't really want to add to it. It was the

24   FirstEnergy case. Since that was settled, I didn't file that.

25   Q.   So you didn't testify, but you compared your --

1   A.   Yes.

2   Q.   Are we comparing models or are we comparing outputs?

3   A.   Well, what you're trying to do is compare the results

4 of the models. In some cases I've benchmarked against actual

5 data, of course.

6   Q.   Comparing the results of the models -- And in

7 FirstEnergy what model were you comparing yours to?

8   A.   The IPM model.

9   Q.   And you said you've also, on occasion, benchmarked

10 your model against -- I'm sorry, what was the term, actual data?

11   A.   Actual data, yes.

12   Q.   What were those occasions, and what's the distinction

13 between the two?

14   A.   Well, for example, in the PECO Energy case, I

15 benchmarked the model against the results of three other models

16 for a 15- or 20-year forecast for market prices, and actually,

17 there was also actual data there. I don't have it listed,

18 but when it's actual data, it would normally pick out one

19 variable.

20   For example, the average market price in a given

21 market, that's what I did in NEPOOL. I benchmarked it against

22 the NEPOOL hourly Lambda in the Connecticut hourly case. What I

23 attempted to do was use data as representative of the actual for

24 the historic period and see to it that the model replicated what

25 actually happened.

1   So on the one hand, you're comparing a 20-year

2   forecast to models where you have comparable assumptions to see

3   if the models are prepared accurate. In the other case, you're

4   trying to replicate an actual circumstance and see if you can

5   replicate a year of history.

6   Q.   Again, looking at Exhibit 6, I just -- I see three

7   instances that you've listed where actual data has -- you have

8   tried to benchmark actual data against your model?

9   A.   Well, that's correct. Of course, you're ignoring the

10   many prior benchmarks and so on.

11   Q.   And I'm not trying to ignore anything. I'm just

12   trying to focus on the market price simulation stranded cost

13   kind of case.

14   A.   Right. There was a historic data back in 1989 West

15   Penn, for example.

16   Q.   I'm not certain what that means.

17   A.   There was a reliability analysis that was a question

18   of how many days per year tie lines would have to be relied

19   upon, if I recall it correctly. We had some historic data on

20   that.

21   Q.   What do you do to benchmark these models against each

22   other and against actual data since, trust me, I don't

23   understand how this works?

24   A.   Well, I think if you sort of take the big picture,

25   what I try to present in my testimony, there really aren't that

1   many variables that are that significant and -- in this kind of

2   analysis. And what I generally try to do is try to figure out,

3   in looking at somebody else's model, what the three or four

4   driving variables are and utilize those in my model and see how

5   close the answers come.

6   In the United Illuminating case, for example, the

7   Public Service Commission just actually specified a number of

8   variables, and it was fairly limited, and told myself and

9   Dr. Reed, I believe it was, to go perform runs and we did that

10   and compared the results.

11   Q.   I did look at that. And in Maine, was it Maine? I'm

12   sorry, Maine or Connecticut?

13   A.   Connecticut.

14   Q.   I'm sorry, in Connecticut, what variables were you

15   told to include?

16   A.   I believe it was the reserve margins in NEPOOL, fuel

17   price forecast, capacity cost and L&M costs for new generators,

18   and I think that was it.

19   Q.   Does this -- Are these four items assumptions or

20   inputs that you would normally include in your modeling efforts?

21   A.   Yes, absolutely.

22   Q.   What other source of assumptions or inputs would you

23   include in your modeling efforts that you didn't have to include

24   in that instance in Connecticut?

25   A.   Well, there's a lot of inputs, the most critical of

1   which being the real fixed rate charge, I suppose.

2   Q.   And that was ignored in Connecticut?

3   A.   No, but the Commission told us to utilize what we had

4   been using unless we found it necessary to modify it for some

5   reason, in order to be consistent with the data that they had

6   proposed to change.

7   Q.   I see. So you might almost view it as a means of

8   testing your real fixed charge rate against, was it, Dr. Reed's

9   real fixed charge rate, and granted, there were other things

10   that might have differed from the two?

11   A.   Not really, those were the two items that were

12   different between the two of us, but I don't think they were

13   that different, I guess. In the first place, I don't know that

14   that mattered. Now, there are many, many other variables,

15   forced outage rates, unit capacities, unit heat rates, load

16   data, load shapes. I have a long list of them in my testimony.

17   Q.   Which variables do you consider to be important

18   variables?

19   A.   Well, I think that the most important are the fuel

20   prices that go into the model. I think that's probably the most

21   important input.

22   Q.   Fuel prices probably the most important?

23   A.   Yes.

24   Q.   Sort of in descending order, if you will, from the

25   fuel price, what would be the next most important?

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1   A.   Well, the next one would be the assumptions related to

2 market entry price and those would be cost in performance of new

3 combined cycle and combustion turbine generators.

4   Q.   And after that?

5   A.   The third one would be market structure assumptions,

6 primarily reserve margin assumptions.

7   Q.   And after that?

8   A.   Well, after that, there's a big drop off in terms of

9 importance, but -- and after that you almost get into what I

10 would call commodity data, there's so much of it, forced outage

11 rates, heat rates, that sort of thing. It's the data for the

12 existing fleet of generators, and then beyond that would be load

13 data.

14   Q.   Just so that I understand the difference, what's the

15 difference between existing fleet rate data and load data?

16   A.   Existing fleet of generators, that's all the

17 generators that are already out there today such as CG&E's

18 generators, other existing generating units. The load data is

19 the customer side of the equation. That's how much they use,

20 when they use it.

21   Now, there's other, you know, transmission data that

22 may be important in specific situations where you have load

23 pockets or transmission constraints, that sort of thing. For a

24 long-term forecast in ECAR, I'm not persuaded it's terribly

25 important.

1   Q.   And why is that information not important for purposes

2   of ECAR?

3   A.   Well, first of all, I think the evidence I've seen in

4   this and other proceedings is that there just isn't that much

5   difference in market prices according to location, at least

6   based on models such as MAPS and the models that were used in

7   the FirstEnergy case, for example.

8   Q.   Now, when you say there's not that much difference on

9   prices based on location, are we referring within ECAR?

10   A.   Within ECAR.

11   Q.   Okay. Would transmission data then, into and out of

12 ECAR, be important?

13   A.   I think it becomes less important than a lot of other

14 things because I have modeling imports and exports of power from

15 other regions; so we're at least accounting for the impact on

16 the energy balance. And in the long-run forecast, I think that

17 it's safe to assume that to the extent that transmission

18 limitations or whatever exists, that investment will be made to

19 equalize prices when there are substantial differences.

20   Q.   Prices between what when there are -- between --

21   A.   Well, either markets or regions within a market.

22   Q.   How do you model the imports and exports between the

23 various regions?

24   A.   The data is obtained from the NERC, and it shows the

25 imports and exports for each region on the total kilowatt-hour

1   basis, and I basically annualize that.

2   Q.   How do you annualize that?

3   A.   Divide it by the number of hours in the year.

4   Q.   Okay. So does this just give you a net figure?

5   A.   Yes.

6   Q.   Just so I'm -- I'm making sure I understand. If I

7   have 100 going out over the course of a year and 90 coming back

8   in over the course of a year, you take the figure ten and divide

9   it by 8,760 hours and you come up with whatever that math is?

10   A.   That's right.

11   Q.   Is that right?

12   A.   Yeah, that's really about all you can do. There

13   really isn't any other data that's available in most cases.

14   Q.   Mr. Falkenberg, does your volume of import and export

15   data change over the course of time?

16   A.   It changes from year to year.

17   Q.   In your model it changes from year to year. How is

18   that accounted for in the model? Do you -- Again, understand, I

19   don't understand how these work. Do you -- For example, take a

20   look at the NERC data you said that this came from and just

21   input it?

22   A.   It's added or subtracted from the load.

23   Q.   I'm certain I don't understand that.

24   A.   Well, in other words -- let's say that I just was, for

25   example, saying that there was ten megawatt hours -- ten

1   megawatts per hour during the year 2001 and that that was an

2   import, then I would reduce the load in each hour by ten

3   megawatts.

4   Q.   How do you get each year's number? Do you adjust from

5   the base data that you get from NERC, or do you just accept that

6   data as it is and plug that in?

7   A.   I net the imports and the exports, and I divide it by

8   8,760 and plug it in. There's a workpaper on it.

9   Q.   In the materials?

10   A.   On the disk, yeah.

11   Q.   Again, to go back to my real simple example, if the

12   NERC data shows 100 going to PJM and 90 coming from PJM to ECAR,

13   you take a ten, you divide it by 8,760, representing the hours,

14   and you have whatever the math is and that's the figure you use

15   to demonstrate the imports and exports?

16   A.   That's right. And bear in mind, typically it's not

17   more than a percent or something over the total demand.

18   MR. DORTCH: Can I have a second, Dave.

19   MR. BOEHM: Sure.

20   (Recess taken.)

21   BY MR. DORTCH:

22   Q.   Mr. Falkenberg, is your level -- before the break, we

23   were talking about imports and exports. Is your level of net

24   ECAR imports and exports fixed after 2008?

25   A.   Yes.

1   Q.   What point in time is it fixed, then?

2   A.   It's fixed at the level, I believe, of the last year

3   of data that NERC provides.

4   Q.   Can I ask you to turn to -- you've done so -- RJF-7,

5   which is Exhibit 7 to your testimony?

6   A.   Yes.

7   Q.   You provide us with the input sources to the CUMULUS

8   model. Are there any other inputs other than these, I don't

9   know what they are, nine, ten, 12 numbers, items listed here?

10   A.   Well, the other inputs are the most -- I mean, these

11 are the 9 percent of them, of the inputs. Of course, the 1

12 percent that's not listed is the most important, but that's the

13 cost and performance of merchants' plants.

14   Q.   And where do you get your data for the cost and

15 performance of merchant plants?

16   A.   It's basically a judgment call on my part, but I base

17 that on looking at what other experts are projecting. I've

18 looked at the Gas Turbine World Data -- the Gas Turbine World

19 Handbook, excuse me, for the last several years. I've got a

20 regression analysis that I've done that's included in my

21 workpapers. I've looked at historic statistics for various

22 plants. I've visited plants; so it's really a judgment tempered

23 by a lot of inputs on the source data.

24   Q.   Now, you said cost and performance of merchant plants,

25 and I think I understand what that means. That's non-utility

1   plants, isn't it?

2   A.   Nonregulated power plants.

3   Q.   Nonregulated power plants?

4   A.   Yes.

5   Q.   How do you -- Strike that.

6   You get your information for the cost performance of

7   merchants looking at other experts, the -- What was it, Gas

8   Turbine World, Gas World?

9   A.   Gas Turbine World Handbook.

10   Q.   Is it necessary to make subjective decisions in order

11   to create that last 1 percent of input data?

12   A.   Yes.

13   Q.   As I go through your CUMULUS model input sources, I

14   notice that there are, for example, 1999 data for load forecast,

15   1995 data for hourly loads, and I was just curious why the

16   timing differentials?

17   A.   In general, what I've done is I've gotten the most

18   recent data that is available. For example, I used the '99 NERC

19   load forecast and the 1994 to 1998, which is a five-year average

20   for availability factors.

21   The '95 load data was actually something where I took

22   the load shapes from 20 or 30 different utilities in ECAR and

23   added them all together. And in running my model and varying

24   load shapes and that sort of thing over many, many years, I

25   found that load shapes aren't terribly important; so I don't

1   update that item.

2   The only other cases where '95 data was used was heat

3   rates. I think that, again, is the most recent data available.

4   It's always the most recent data available unless in this one

5   case where it didn't seem to me to make any difference.

6   Q.   Now, I understand that these are the sources of the

7   data. I now understand the timing difference. Do you make any

8   adjustments to these data as you're putting them into your

9   system or do you take them as they come in?

10   A.   I make adjustments to them.

11   Q.   Okay. Can you tell me what items you adjust and how

12   they are adjusted?

13   A.   Well, starting with the 8,760 hourly loads, what I

14   found was that, for example, on the weekends when we go from

15   daylight savings time -- or, from not having daylight savings

16   time to having daylight savings time, we have a zero in the 2:00

17   a.m. for load.

18   Q.   You have a zero hour I see?

19   A.   I got rid of that. So that was one thing. With

20   respect to load forecasts, I don't really making any changes to

21   that. I have a workpaper that shows how that's developed, how

22   that data is used to develop the load forecast using the model.

23   Unit availability data, I don't believe I really

24   adjust anything from the NERC data unit capacities. I will

25   occasionally adjust those if there is some additional data that

1   I have that suggests that there was an uprate or a de-rate or

2   something of that sort.

3   Unit heat rates, I will generally use those unless, in

4   looking at them, I see that there's some serious question as to

5   the quality of the data. In which case, I've made a few

6   changes, I believe, in the data file where I've made an

7   adjustment to it, and I've generally in the input data files,

8   which I've provided you, I believe I've indicated those

9   instances, if there are any. I don't remember specifically in

10   ECAR whether I did that. In general, I find a few out of

11   several hundred generators.

12   The fuel costs, they're -- generally the problem is

13   not one of questionable data so much as sometimes missing data.

14   I may have to input field prices for certain generators. I

15   think I explained that in the testimony. Capacity, once again,

16   generally try to use what data is most recent. Fuel prices,

17   generally it's developed from the EIA forecast and that's where

18   it's shown in the workpapers.

19   I don't believe there's much other information that

20   really requires any adjustment. I mean, interpretation of it is

21   not always straightforward. I have workpapers that show that.

22   Generally I try not to adjust data.

23   Q.   If you do make adjustments to the data, do I

24   understand that you have made some sort of record of the

25   adjustment? Does that record show why the adjustment was made

1   or just that the adjustment was made?

2   A.   It will generally show what the adjustment was and why

3   the adjustment was made. Like I say, I didn't believe it, but

4   generally it explains why it was. Most times it's because there

5   would be a zero entered for heat rate or something.

6   Q.   I meant to ask you, to back up a minute, I meant to

7   ask a question about your efforts to benchmark your model

8   against historical data. When you do that, is it -- is there

9   something fundamentally different about the comparison to

10   models -- what I'm thinking, anyway, when you have historical

11   data, does that dictate the assumptions that you're going to

12   plug in in a way that forecasting doesn't allow?

13   A.   Yes. To a certain degree, it does. For example, you

14   know the actual peak demands and you know the actual energy.

15   You might know the actual amount of nuclear generation or NUG

16   generation. Certain of the inputs you have accessible to you

17   actual data.

18   Q.   Now, does that include data for the three -- three or

19   four -- three, I think you said, criteria that really seem to

20   drive differences in models?

21   A.   Interestingly enough, when you're dealing with

22   historic data, those items turn out not to be very important.

23   Q.   I'm never going to understand this. Why don't you

24   tell me why they're not important.

25   A.   Well, the reason is normally what I'm projecting.

1   When I'm comparing the two would be the nonfirm economy energy

2   price; so there's no real capacity component of that.

3   Q.   Can you say that again? I'm sorry, nonfirm --

4   A.   Economy energy price, it's what's called the Lambda.

5   And when you're looking at Lambda, there is no capacity

6   component. It's -- which is the part that's really important

7   for long-term forecast.

8   And when you're looking at historic data here,

9   modeling the units that are out there, you're not modeling the

10 merchant plants that might be built and that sort of thing.

11   For forecasts, it's the merchant plants that

12 ultimately determine the price in the market. For what's

13 happened historically, you're modeling the dispatch of the

14 generators.

15   Q.   I notice that you state at Page 52 of your testimony

16 that CUMULUS is licensed to other consultants. Who are those

17 other consultants and when were those licenses issued?

18   A.   Well, I licensed it to Hayet Power Systems Consulting.

19   Q.   Could you spell Hayet?

20   A.   H-a-y-e-t.

21   Q.   Thank you. And I --

22   A.   And I believe he sublicensed it to a company called

23 Boston Pacific Corporation.

24   Q.   Do you know when that license was -- well, your

25 license to Hayet was granted -- when you licensed it to Hayet?

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1   A.   I think it was summer of '98.

2   Q.   Do you know what sort of applications Hayet Power

3   Systems Consulting is performing with the model?

4   A.   Well, that was really intended so that Hayet could

5   work for Boston Pacific on a plant valuation study.

6   Q.   Boston Pacific is a utility, it's a --

7   A.   It's a consulting firm.

8   Q.   Is it a one-time kind of thing?

9   A.   Well, Hayet's license really is ongoing. It's

10 basically an agreement that Mr. Hayet and I have. With Boston

11 Pacific, it was a one time.

12   Q.   So I understand, Hayet licensed the product so that it

13 could perform a valuation study for Boston Pacific, but that was

14 a one-time thing. Mr. Hayet has a license though that he can

15 use it for other purposes if he would like?

16   A.   Yes, and he has.

17   Q.   He has. Do you know what else he has used it for?

18   A.   There was a project involving projection market prices

19 for a client in southeast.

20   Q.   I didn't think to ask, but I assume that for that, for

21 both Boston Pacific and for this southeast, these are electric

22 market prices?

23   A.   Yes.

24   Q.   I would assume so, but I wasn't certain. Licensed to

25 anybody else?

1   A.   Well, you know, I think that at one time when I first

2   started being required to produce the model in litigation, I

3   used to send utilities license agreements sort of like

4   Microsoft's.

5   Q.   Yeah. None of them ever compensated you for their use

6   of it?

7   A.   No.

8   Q.   I assume Mr. Hayet is compensating you for his use of

9   your --

10   A.   Yes. The -- There was another utility actually that

11 licensed an earlier version of the model back in around the

12 early 1990s. It was a company called Fayetteville Public Works

13 Commission. And that was actually licensed to a consultant of

14 theirs.

15   Q.   Do you know if they're still utilizing the model for

16 any purpose?

17   A.   I don't know. I haven't talked to them in a number of

18 years.

19   Q.   Mr. Falkenberg, with respect to Exhibit 7, again, this

20 is something I just didn't understand perhaps. I looked at your

21 model input sources, and I didn't see a discount rate. Is that

22 something that you have to include in your model? Is that an

23 input to your model?

24   A.   Actually, the model can use a discount rate as an

25 input. I don't typically use it in this part of the model. I

1   use a discount rate to calculate the discounted cash flow for

2   stranded costs. That can be done in the model, but I don't

3   typically do that.

4   Q.   I think I understand. I just, again, excuse my

5   ignorance of modeling here, but I assume you put everything in

6   and got out a result. That's not how it works. You put in

7   things, get out numbers, then you have to do other things with

8   them; is that what it is?

9   A.   Right. What you have to do -- Life is never simple.

10   You take the outputs of the model, get them into Excell and

11   do -- then do things with discount rates.

12   Q.   Does your model, or then if not your model, do you

13   take into account things like life extensions and, if you do,

14   how does that show up?

15   A.   The model certainly could. It could show up -- For

16   example, if the model takes into account retirement dates, I

17   have set it up so that I'll retire generators 50 years after

18   they were installed. Now, I could vary that. I could tell a

19   certain unit was going to run longer. It's an input. It's not

20   an automatic process.

21   Q.   Okay. But your underlying assumption begins with the

22   idea that 50 years -- if I built a power plant today, 50 years

23   from now that one would retire?

24   A.   Yes.

25   Q.   How about decommissioning costs, do you account for

1   that in your modeling in any way?

2   A.   No.

3   Q.   Environmental costs?

4   A.   Just so it will absolutely clear.

5   Q.   And if you -- Yeah, please correct me if I fail to

6   understand what happens.

7   A.   In the calculation of stranded costs.

8   Q.   This is your Exhibit 8a?

9   A.   Yes, I think I've taken into account some of those,

10 but in the CUMULUS model, those are not required inputs.

11   Q.   Okay. So you then have to exercise judgment in some

12 fashion after running the model to take into account some of

13 these other things?

14   A.   Well, I actually use the figures that were in

15 Dr. Pifer's exhibits; so there wasn't a lot of judgment involved

16 except to deciding whether he was right about a particular item.

17   Q.   Okay. Well, can you go through Exhibit 8a with me and

18 tell me what numbers are yours and what numbers are Dr. Pifer's?

19   A.   Certainly. Okay. NPV revenues, that's my number;

20 fuel is my number; taxes other than income is from Pifer; O&M

21 and A&G was from Pifer, but I did make a small adjustment to it.

22 Decommissioning was from Pifer; tax depreciation was Pifer; SO2

23 was Pifer; NOx was Pifer; and total deductions, that's the sum

24 of the above. Taxable income is calculated, income taxes is

25 calculated. Capital additions number is from Pifer; inventory

1   changes is from Pifer and the rest are calculated from the

2   above.

3   Q.   You said -- Did you make any adjustments -- I'm sorry.

4   You told me you adjusted O&M and A&G?

5   A.   Right.

6   Q.   Did you make any adjustments to SO2 or NOx costs?

7   A.   No, I don't think I did.

8   Q.   Okay. Is there a difference between the generation

9   levels you assumed and the generation levels assumed by

10 Dr. Pifer?

11   A.   And that's why the fuel is different; that's why O&M

12 and A&G are different because I attempt to take into account the

13 differences in our levels of generation.

14   Q.   How -- Your levels of generation are higher than

15 Dr. Pifer's, correct?

16   A.   Yes.

17   Q.   Would increase in -- generation increase the cost of

18 SO2 and NOx?

19   A.   Well, that's possible. I haven't thought of that. I

20 would have to look at that and see how he calculated those.

21   Q.   I had the question about you were -- You listed unit

22 availability among your data inputs, and I believe you told me

23 how you dealt with maintenance.

24   A.   Yes.

25   Q.   You try to avoid maintenance during the summer peak

1   periods. How do you deal with forced outages?

2   A.   Well, that really goes back to the first set of

3   questions we asked. That's what the probabilistic modeling is

4   intended to take into account.

5   Q.   Okay. How does that work?

6   A.   Well, I use what's called the method of moments or

7   method of cumulants or basically what you do is you represent

8   the -- what's called the remaining load curve, which is the load

9   duration curve faced by all generating units after an individual

10 generator has been dispatched.

11   Using a normal distribution or using a series of

12 normal distributions in a power series and the coefficients of

13 those normal distributions are what they call the moments. And

14 essentially what it allows you to do is replace a lot of heavy

15 number crunching with just adding and subtracting in certain

16 statistics that you calculate from the forced outages rate from

17 the generators.

18   Q.   Do you randomly simulate generation outages?

19   A.   No, I simulate random generator outages. If I

20 randomly did anything, I would probably get in a lot of trouble.

21   Q.   So that I've got it right, you simulate random

22 generation outages?

23   A.   Yes.

24   Q.   And how do you do that?

25   A.   Basically what you're trying to do is you're starting

1   with a load duration curve and you're saying, well, if I start

2   with a load duration curve that represents the customer's load,

3   then I've got the first generator and the dispatch orders.

4   Either that generator is there or he is not. If he is there,

5   then you would subtract a certain amount of load from the load

6   duration curve because that's the amount of load served by that

7   generator. If is he not there, then you have to face the entire

8   load duration curve.

9   So what you do is you take that load duration curve

10   and you multiply the entire load duration curve times the forced

11   outage rate of the generator and you add that one to minus the

12   forced outage rate times the load duration curve where that

13   generator has been dispatched and add those two together

14   through -- this is the technique known as convolution, which is

15   approximated or dealt with the method of moments or cumulants.

16   Basically that is described in the user's manual.

17   Q.   I'm sorry, I -- and I appreciate it if it's in the

18   user's manual and I'm -- I'm going to get this information

19   elsewhere, I apologize, but did I understand you to just say

20   that you described once what it means, but that the -- what is

21   it, moments of CUMULUS --

22   A.   Yeah.

23   Q.   -- replaces that as a calculation?

24   A.   It's a means of calculating the convolution.

25   Q.   Okay. I'm -- I'm not certain what that means. Could

1   you explain to me? Is it -- Is it a mathematical formula to --

2   to get that response, or is it something that you can substitute

3   for the math that you would need to do?

4   A.   Basically when you do the convolution method, you

5   have -- you set up what's known as a reversible logarithm where

6   the results of one calculation depends on the results of all

7   your prior calculations that becomes a very complex calculation.

8   Actually, in earlier versions of the model, that's what I used.

9   That takes a long time to compute.

10   The method of moments actually is an approximation to

11   that, which is extremely accurate and much faster. That was

12   described in a series of IEEE publications that I believe are

13   referenced in the user's manual. I believe I included those

14   publications with the user's manual.

15   Q.   How does the model decide specifically when during a

16   year a forced outage takes place and how long the outage will

17   last?

18   A.   What the model does is it assumes that there's equal

19   probability and it should be the case. In other words, if it's

20   a forced outage, it could happen at any time during the year,

21   and there is no time during the year that is any more likely

22   than any other time for a forced outage to happen.

23   So what the model does is it computes the probability

24   of that outage occurring in any given hour, and I use that in

25   the development of the market prices. And this is in contrast,

1   for example, to the way MAPS works where it assumed that it

2   occurs at a specific point in time pretty much at random.

3   Q.   Again, just so -- I'm trying to get this. Is the

4   probability of anything happening pretty much equal in any --

5   every hour?

6   A.   Of course.

7   Q.   So is there probability one in 8,760 for any given

8   year, or I mean, if it's a 10 percent outage rate, for example,

9   would it be 870 out of 8,760 -- I got it wrong.

10   A.   Well, no.

11   Q.   Would it be 876 hours out of 8,760 hours?

12   A.   Well, that -- that could happen on average, but what

13   the real answer is is that if you have, let's say, a 10 percent

14   forced outage rate in any given hour, you have the 10 percent

15   chance of the unit not being available that hour. You have a 90

16   percent chance of it being available.

17   Q.   Okay. So with a 10 percent chance in every hour, do

18   essentially you reduce whatever you have to reduce by 10 percent

19   to approximate the fact that that unit might not be available

20   during that hour?

21   A.   That would be a way of approximating it. That

22   wouldn't be exact because, in other words, that's what's known

23   as the deration method, where if, for example, you had a 100

24   megawatt unit with 10 percent forced outage rate, what you could

25   do is you could say, well, I'll just assume I have a 90 megawatt

1   unit every hour. That's wrong. That's an approximation.

2   It's not terrible, but that's wrong. The proper way

3   to do it is to assume 10 percent of the time you have no

4   generation and 90 percent of the time you have 100 megawatts and

5   that's what I do.

6   Q.   At Page 64 of your testimony, you talked about

7   adjusting generation outputs between you and Dr. Pifer. Could

8   you explain to me what you were referring to there?

9   A.   Well, this was the O&M and the A&G. The -- In my

10   modeling I showed the generators running more, producing more

11   energy than Dr. Pifer did, and so what I do was I adjusted

12   the -- out the O&M cost upwards to account for that. Basically

13   I assumed that half of the O&M and A&G was a variable cost and

14   the other half was a fixed cost.

15   Q.   What was that based -- that assumption based on or was

16   it a "split the baby" call?

17   A.   Well, you know, that's something we were talking

18   about, cost of service, during Baron's deposition. That's sort

19   of a cost of service type assumption. Generally in cost of

20   service study it's assumed that 50 percent of the maintenance

21   cost is variable. I think it's generous way I did it because

22   some of the A&G, for example, I don't think would vary at all,

23   but I have to treat it as if it would.

24   Q.   I want to thank you for your Power Modeling 101 help

25   you've given me here.

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1   A.   I used to go and train utilities on stuff; so it's

2   been awhile.

3   Q.   I want to move on to the three -- actually, at least

4   in this -- in your testimony, as I understand it, you've decided

5   there are four factors that really drive the differences between

6   you and Dr. Pifer; is that correct?

7   A.   Yes.

8   Q.   Okay. I want to talk about those four factors. As I

9   understood your testimony earlier, the most important difference

10 between you gentlemen is your fuel inputs?

11   A.   Well, I have not quantified which of these factors are

12 more important than others in this particular case, but I guess

13 conceptually those are clearly the most important.

14   Q.   Now, you're very critical of Mr. Speyer for the

15 analysis or the means that he has selected for creating a fuel

16 input. I'm not certain that I understand that criticism. Could

17 you explain to me what exactly is the problem with what

18 Mr. Speyer has done?

19   A.   Well, I think the problem is basically that he's

20 adopted a rather subjective approach to simply averaging

21 different forecasts, which he selects whatever criteria he

22 decides to use at the time and then he calls it a consensus

23 forecast.

24   Q.   So it's the fact that it's subjective that's --

25   A.   Subjective as to what forecasts he wants to include,

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1   and he doesn't always include the same forecasts from one year

2   to the next.

3   Q.   So it's his selection of a forecast that's the

4   problem?

5   A.   I have a problem with that, yes.

6   Q.   Don't you select a forecast?

7   A.   Yes. I've always selected or generally always

8   selected the same one.

9   Q.   And why is that?

10   A.   Well, I think EIA is the best.

11   Q.   What does EIA stand for?

12   A.   Energy Information Administration.

13   Q.   Is that a government entity or is that --

14   A.   It's part of the Department of Energy.

15   Q.   Why do you think EIA is the best?

16   A.   Well, let me put it a different way. I think that EIA

17   is certainly well recognized. They're certainly credible.

18   They're readily available, and they have, I think, been

19   consistent with a good forecast. I would take back the

20   characterization as being the best because I don't know that

21   anybody can ever prove any one forecast as the best.

22   Q.   Isn't it true that energy forecasts have been

23   notoriously difficult and -- well, notoriously volatile; is that

24   correct?

25   A.   Forecasting fuels is difficult, yes.

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1   Q.   In your testimony you point out that the Pennsylvania

2   Utilities Commission found DRI to be a credible forecast. Do

3   you recall that?

4   A.   Yes.

5   Q.   Do you find DRI to be a credible forecast?

6   A.   I don't have any problems with DRI. I will tell you

7   that, in my experience, I definitely recall a period of time

8   where a lot of people were using what they said were DRI

9   forecasts, but they seem to be quite different. I think

10 everything is a matter of how it's applied.

11   Q.   But you don't have a problem with DRI?

12   A.   No.

13   Q.   By the criteria that you gave me for EIA, does DRI

14 satisfy the criteria of being recognizable, credible, available

15 and consistently -- I'm sorry, I forgot what you said,

16 consistently good, I think, or consistently -- I'm sorry, I

17 forgot.

18   A.   Independent, I guess, would be another thing. EIA and

19 DRI would be forecasts that were prepared independent of

20 consideration of any impact on any particular proceeding or

21 whatever.

22   Q.   Okay. Well, it's impossible to select a fuel forecast

23 for market price search or market purposes, stranded cost

24 analysis and not have it not recognized that that's the purpose

25 you're selecting the fuel price forecast for, isn't it?

1   A.   I'm lost by your question.

2   Q.   That wasn't a very artful question. You use EIA?

3   A.   Yes.

4   Q.   And you selected EIA to perform your cost analyses?

5   You knew you were going to perform a cost analysis; is that

6   right?

7   A.   Yes.

8   Q.   So -- What about some of the other forecasts

9   Dr. Speyer selected, WEFA, it's the Wharton Economic something,

10   is that a credible forecast?

11   A.   I don't have any problems with it.

12   Q.   What was the last one, GRI?

13   A.   I think.

14   Q.   Credible forecast?

15   A.   I think GRI has historically been one of the lowest

16   forecasts. GRI is an organization that, as I understand it,

17   does have some role of promoting the use of natural gas, and so

18   it's been subject to some criticism, but they're willing to

19   project the load prices.

20   Q.   Do you believe it to be a credible forecast?

21   A.   I haven't reviewed that forecast.

22   Q.   But you're suspicious of GRI, even though you have not

23   reviewed it in any event?

24   A.   I'm a little suspicious of GRI.

25   Q.   Okay. Did you consider using DRI or any other

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1   forecast in your analysis in this case?

2   A.   No. You know, the problem is I've used EIA for so

3   long, if I use anybody else, I have to answer questions about

4   why I switched.

5   Q.   Okay. Well, did you consider using DRI because it had

6   expressly received the approval of the Pennsylvania Public

7   Commission, for example?

8   A.   No. It would be necessary to license it. It's a

9   fairly complicated, expensive process to go through. I've

10 always been satisfied with EIA.

11   Q.   Do you know if EIA forecasts tend to be high or low?

12   A.   I don't know what the criterion would be. It seems to

13 be to me they've been pretty good the last few years. They've

14 predicted -- they generally predicted higher natural gas prices

15 and that's what we're seeing.

16   Q.   Generally -- Well, what I really want to is know

17 EIA -- Strike that.

18   You said that GRI historically has been known to be

19 somewhat lower than other forecasts?

20   A.   I think I said that was one of the criticisms I've

21 heard about it.

22   Q.   Okay. Have you heard any criticisms of EIA for being

23 higher than other forecasts?

24   A.   Generally, from other witnesses in proceedings such as

25 this.

1   Q.   So your answer is yes?

2   A.   Well, the one that comes to mind was a witness in the

3   FirstEnergy case who was also in the PPL case, Scott Jones.

4   Q.   Do you know how EIA relates to actual experience?

5   A.   I haven't performed that analysis.

6   Q.   Do you know of anyone who has?

7   A.   I don't know of anyone who has actually tracked any

8   forecasts for any source and seen how they've done.

9   Q.   So not just EIA, but, in fact, anybody?

10   A.   I don't know that DRI or anybody has had that done.

11   Q.   Did you compare Mr. Speyer's consensus forecast, what

12   he terms a consensus forecast in this case, to any other natural

13   gas forecasts other than EIA?

14   A.   It's my recollection that he -- I think I've compared

15   it to what he did in other cases, and I think he's actually had

16   to increase his natural gas prices.

17   Q.   He is higher in this case than he has been in the

18   past?

19   A.   I believe he is, yes.

20   Q.   Let me ask my question again, though. Did you compare

21   Dr. Speyer's forecast in this case, his consensus forecast, to

22   any other forecast other than EIA?

23   A.   No.

24   Q.   Now, you've acknowledged that there are several

25   forecasts that at least you don't have problems with. Are they

1   all credible?

2   A.   I don't have -- Yeah, I guess so.

3   Q.   What do you do when you've got a number of forecasts

4   and they're all credible? Is there any way to account for that?

5   A.   I would run the model several times with each

6   forecast.

7   Q.   And have you done so?

8   A.   No.

9   Q.   So you have not run your model with any gas forecast

10   other than EIA; is that accurate?

11   A.   That's correct, yes.

12   Q.   For purposes of this case?

13   A.   That's correct, yes.

14   Q.   I asked you if you knew of anybody who ever tested

15   EIA's projections against historical data. I can't remember if

16   you -- I think you said no. Have you ever done so?

17   A.   No.

18   Q.   Did you ever attempt to analyze the various forecasts

19   against historical data to determine who -- which forecast was

20   most accurate?

21   A.   No.

22   Q.   I understand EIA -- Strike that.

23   The second criticism, Mr. Falkenberg, that you have of

24   Dr. Pifer's analysis is the market structure. As I understand

25   it, this -- this is one of those tough issues for a layman here

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1   to understand. It's a reserve requirement versus no reserve

2   requirement assumptions, as near as I can tell, and I don't

3   understand the difference. Can you tell me what we're talking

4   about here in layman's terms?

5   A.   Well, I think in simplest terms, it's a question of

6   whether your lights are going to stay on or not after

7   restructuring starts. The problem is that the power system has

8   to have a certain amount of reserve capacity in order to

9   reliably serve customer load.

10   Certain reliability councils and power markets have

11   taken into account of this fact by requiring that load-serving

12   entities have reserve margins, that they have a reserve margin

13   over and above the load that they're serving. So the threshold

14   question is whether or not, as ECAR develops, load-serving

15   entities are going to only acquire enough capacity in order to

16   serve the loads that they've got in their contract or whether or

17   not they're going to actually require reserve capacity so that

18   they reliably serve those customers. In my view, they're going

19   to do that. And in Dr. Pifer's view, they will not.

20   Q.   Mr. Pifer -- or, Mr. Falkenberg, you said certain

21   liability councils have taken into account this issue by

22   requiring reserve margins. That implies, of course, that

23   certain reliability councils don't require.

24   A.   At present, some do not.

25   Q.   Okay. Which ones do not?

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1   A.   Well, first of all, I believe that SERC doesn't have a

2   specific requirement, but it does have a requirement that there

3   be reliability maintained by the members. At present, ECAR

4   doesn't have a reserve margin requirement, but ECAR has had

5   historically a requirement of maintaining a certain level of

6   dependence on supplemental capacity resources, which it has

7   expected its members to maintain.

8   Q.   Okay.

9   A.   I think the WSCC does have one. I think that PJM has

10 one, I believe that NEPOOL has one. I believe that New York

11 Power Pool has one. I believe that ERCOT -- I would have to

12 check on ERCOT, I don't recall.

13   Q.   What about California?

14   A.   That's part of WSCC.

15   Q.   It does have?

16   A.   Historically WSCC has had a reserve margin

17 requirement. Now, having told you what reliability councils

18 have required in the past, I will state that as we're moving

19 into competition in various areas, that this is something that's

20 in a state of flux. Some competitive markets have been set up

21 that have that. Others aren't far enough along yet to know what

22 will be developed, and ECAR will be an example of that.

23   Q.   Of the -- Have the lights gone out in those

24 competitive markets that haven't required a reserve margin?

25   A.   Well, we had some very expensive power in ECAR, for

1   example, during price spikes. And it's not necessarily a case

2   that there's going to be a requirement or there's -- that it's

3   going to specify this. What could well happen is that the price

4   spikes that occur are going to occur because load-serving

5   entities are going to get very nervous once they get close to

6   the reserve margin limits.

7   In my modeling, it isn't a requirement that the

8   regional council or ISO or whoever actually set up a

9   requirement. It's only a requirement that load-serving entities

10 desire to provide reliable service. I think the only other

11 examples Dr. Pifer always cites are Australia and New Zealand.

12 I don't think they're good examples because they have had

13 tremendous excess capacity in those areas, and it really has not

14 been sufficient time to see how that all will play out when

15 there's actually a need for capacity.

16   Q.   I'm still curious as to what exactly this is. Are we

17 talking about 15 percent more power plant that what you might

18 otherwise anticipate needing, is that what a reserve margin is?

19   A.   Well, I would sort of look at it the other way. I

20 would say Dr. Pifer is probably assuming about 10 percent less

21 than anybody in their right mind would think is needed.

22   Q.   That's because he assumes about a 3 percent?

23   A.   That's what he ends up with is about a 3 percent. It

24 assumes that you really don't need any. His assumption is that

25 if the lights go out, tough luck.

1   Q.   Well, does he assume the lights go out or does he

2   assume that there are other options to satisfy what you've

3   termed a capacity requirement?

4   A.   Well, I believe that in his analysis of ECAR, I guess

5   it's not shown in my exhibit, but I believe if you look at some

6   of his exhibits or workpapers, you will see that there's

7   unserved energy in ECAR, which means that some of the load will

8   not be served; so somebody's lights are going out.

9   Q.   I think there were two hours modeled in his work?

10   A.   I think that's right.

11   Q.   I've forgotten the year, but it's --

12   A.   I think it's 2008.

13   Q.   So in year 2008, he assumes that there are two hours

14   that can't be met?

15   A.   That's right.

16   Q.   And once again, it's not that he is assuming this,

17   this is just the end result of everything else that he is

18   assuming. Is the concept of a reserve requirement, in your

19   estimation, essentially a regulatory concept?

20   A.   I really don't think so. It's really an engineering

21   concept more than anything.

22   Q.   Are you an engineer?

23   A.   I'm not an engineer, but I could tell you that I have

24   done enough of these reliability calculations, taught enough

25   utility people how to do them that there's no doubt in my mind

1   that that's a concept that is not just a regulatory concept.

2   MR. DORTCH: Dave, why don't we just take a moment.

3   MR. BOEHM: Okay.

4   (Recess taken.)

5   MR. DORTCH: All right. Let's get back and try to get

6   this done so we can all go home.

7   BY MR. DORTCH:

8   Q.   Mr. Falkenberg, before we took the break we were

9   discussing margins and the requirement of a margin. And as I

10   understand your testimony, some reliability councils have a

11   large margin requirement, others don't. Why, do you know?

12   A.   I think in -- with respect to reliability councils, it

13   is just sort of the way each council historically decided to

14   deal with the issue of reliability.

15   Q.   What about ECAR, does ECAR have a requirement today?

16   A.   I don't believe ECAR has a specific reserve margin

17   requirement today, no.

18   Q.   Why is it more reasonable to impose that requirement,

19   as you have, than to assume that that requirement is

20   unnecessary, as Dr. Pifer has?

21   A.   Whether or not anybody requires a supplier to have a

22   reserve margin doesn't change the fact that what customers

23   primarily are looking for from an electric service provider is

24   reliable service. Customers are going to get what they want and

25   what they want is reliable service.

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1   Q.   Well, what do you mean when you say "reliable

2 service"?

3   A.   It means that when I turn my lights on, only one day

4 in every ten years or so, I will be unable to do that due to a

5 generation outage.

6   Q.   Now, the company you're here representing has what I

7 understand is called an interruptible contract. How does that

8 operate in this -- in the -- Strike that.

9   How do interruptible contracts play a role in the

10 reserve requirement field? Do they? Let me ask you that, first

11 of all.

12   A.   Well, they do play a role. There are many, many

13 different types of interruptible tariffs, interruptible

14 contracts, and so it's not easy to come up with anything very

15 specific. But just in general, the more interruptible load that

16 the system has, the less need it has for reserve capacity.

17   Interruptible loads do provide a lot of benefits to

18 the system. They primarily provide a benefit of getting off the

19 system in order to enable the remaining customers to maintain

20 reliable service, which is something that's worth a lot to them.

21   Q.   Isn't it then the case that essentially a customer of

22 the system, such as the company you represent, has just cited

23 that the economics are such that it's cheaper or it's more

24 economically advantageous to surrender its load for that period?

25   A.   That's certainly true in the case of certain types of

1   industries. That would -- I would assume that was the case with

2   AK Steel. Certain types of industrial processes lend themselves

3   to taking interruptible service; many types do not.

4   For example, assembly lines at an automobile

5   manufacturing plant typically have a tough time with

6   interruptible load because they have to send everybody home;

7   it's very expensive to deal with. You know, hospitals can't

8   handle interruptible --

9   Q.   Sure.

10   A.   -- they have to have backup generators.

11   Q.   But some companies, at least some industries, at

12   least, are in a position to decide that it's economically

13   advantageous to surrender their demand; is that correct?

14   A.   That's correct, but another thing that's really

15   important to realize in that process is that normally the way

16   that that works through the tariff structure is that they're

17   getting forgiveness on a fairly substantial amount of their

18   demand charge for taking interruptible service.

19   They're paying a lower demand charge in every case, or

20   at least a number of the cases. And that's fundamentally

21   different than saying, well, I'll just give you a break, I just

22   won't charge you for the next hour for the power I don't sell

23   you, which I think is the way the Pifer model is.

24   Q.   Have you done any studies to determine what customers

25   want or at what price customers might be willing to relinquish

1   their load, their demands on the system?

2   A.   I haven't done any studies like that. I can tell you

3   that I've worked with a number of clients that were interested

4   in interruptible service and the one thing I heard over and over

5   again was, "Well, what we'd really like to get is an

6   interruptible rate where we get a lower demand charge and then

7   when we get to being interrupted, we'd like to have a buy

8   through and maybe we pay ten cents or 15 cents a kilowatt-hour

9   if that made sense at the time and we'd continue to take

10 service," but that's kind of what they were looking for. They

11 didn't always get it.

12   Q.   This is, of course, a deregulation structure -- or

13 deregulation proceeding. Presumably the Ohio General Assembly

14 has decided that there are benefits that go with deregulation.

15 Do you have any idea of what benefits we might anticipate from

16 deregulation?

17   A.   Well, I think that most people expect that --

18   MR. BOEHM: Excuse me. Can I ask a clarifying

19 question?

20   MR. DORTCH: That's the $64,000 question.

21   MR. BOEHM: Does that mean "we" or "you" or "us"?

22 Because the answer is different.

23 BY MR. DORTCH:

24   Q.   I mean Ohio at large, all of us, and I understand

25 there may be a different answer for AK Steel --

1   A.   Well, you know, if you're talking --

2   Q.   -- in the market.

3   A.   If you're talking about Ohio at large, I had some

4   impression on reading the legislation and understanding some of

5   the history of this as well as I do from having been involved in

6   some regulatory work in Ohio for a while that part of it was to

7   make the state attractive to industry so that -- for example,

8   Pennsylvania has got power choice, and I think there would be a

9   desire to have that be available in Ohio.

10   Generally I think that there's an expectation that in

11   the long run prices will be lower under competition than under

12   regulation because competition is more efficient in terms of

13   allocation of resources. I think that there is a growing

14   recognition that there will be probably a wider variety of

15   products and services available.

16   Q.   Okay. So long-term, anyway, we might anticipate lower

17   costs.

18   MR. BOEHM: Excuse me. Mike, that's not what he said.

19   MR. DORTCH: I'm sorry.

20   MR. BOEHM: Yeah. He said why did the legislature --

21   you asked him why did the legislature think --

22   BY MR. DORTCH:

23   Q.   I stand corrected, and I apologize. I was not

24   attempting to attribute that to you.

25   Have you considered what affect the MISO, RTO, other

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1   ISO-related structures may have on the reserve requirement that

2   you testified regarding?

3   A.   I don't think that that would have a major impact --

4   certainly an ISO could enact a reserve margin requirement, but

5   whether they do or not doesn't change my view on the amount of

6   capacity that's needed in a region.

7   You know, just so that this is real clear, just

8   because we're now changing the way in which we price

9   electricity, it doesn't change anything about the way that the

10   system really operates in a fundamental way. It doesn't change

11   anything about how reliable generators are. It doesn't change

12   much about how customers' demands are. I mean, there will be

13   incremental changes in all those areas as we evolve over time.

14   The system doesn't change. We're still going to have the same

15   electric generation system in a few years as we have now. We

16   just price the output.

17   Q.   You were also critical of Dr. Pifer's use of a real

18   fixed charge rate, and you offer corrections of that rate in

19   your testimony. I believe I asked this already, but do you

20   have -- you've not got a financial degree. What foundation do

21   you have for the opinions that you're offering there?

22   A.   Well, first of all, I think we did talk about the fact

23   that I took a course in engineering economics about 20 years

24   ago, and this is the kind of thing, of course, that you study in

25   engineering economics.

1   I also learned this kind of calculation, really, on

2   the job and then became involved in training utility company

3   personnel in performing such calculations, and I'd say there

4   probably hasn't been a year gone by that I haven't calculated

5   one of these things about a hundred times since I got into this

6   part of the business.

7   (Pause.)

8   Q.   Mr. Falkenberg, do you have any issue with the 51/49

9   debt structure -- debt equity structure that Dr. Pifer utilized

10   in his calculations?

11   A.   You know, I think I used 50/50, but I don't have a

12   problem with that.

13   Q.   Do you agree that as financial leverage of a project

14   increases, the returns demanded by equity increases?

15   A.   The returns demanded by equity holders?

16   Q.   Uh-huh.

17   A.   As leverage increases, the project returns become more

18   risky; so I would assume that the equity investors would want

19   higher returns.

20   Q.   Do you know what a flow-to-equity approach is?

21   A.   A what?

22   Q.   A flow-to-equity?

23   A.   Are you talking about cash flow to equity holders?

24   Q.   I assume cash flow to equity.

25   A.   I think that's what my calculation is.

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1   Q.   Do you know what is meant by adjusted present value?

2   A.   Well, that's something I'd have to have in context. I

3   certainly know what a present value is. I know what it is to

4   adjust something. That could cover a lot of territory.

5   Q.   Weighted cost of capital, flow to equity and adjusted

6   present value are all valuation approaches, correct?

7   A.   Valuation -- They're all parts of a valuation process,

8   I would agree with that.

9   MR. DORTCH: Dave, give me a couple of minutes.

10   MR. BOEHM: Okay.

11   (Discussion held off the record.)

12   BY MR. DORTCH:

13   Q.   Can you -- I'm sorry, Mr. Falkenberg, can you tell me

14   the difference between weighted cost of capital, flow to equity

15   and adjusted present value as valuation approaches?

16   A.   Well, as I see, the weighted cost of capital is just

17   simply a calculation of your weighted cost of capital or

18   whatever the equity rate times whatever percentage of equity in

19   the debt structure in the capital times whatever the rate is.

20   Flow to equity would be, as I understand the context

21   would say here, the calculation similar to what I've done where

22   you calculate the cash flow that the equity holders are going to

23   receive and you take the present value of it, the adjusted net

24   present value. I'm assuming that's something similar, but, you

25   know, I don't really have the context down and if it's a

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1   valuation method, I think it's similar to what I've done.

2   Q.   Do you know whether -- Do you know whether the

3   financing behind merchant power plants -- Strike that.

4   Do you know what financing mechanisms are being used

5   to build merchant power plants?

6   A.   I don't have a lot of specifics on that, and I believe

7   that if I read Mr. Blaydon's testimony correctly, he indicated

8   there isn't much publicly available data on that.

9   Q.   Do you know what balance sheet financing is?

10   A.   I believe that would be financing that shows up on the

11 balance sheet.

12   Q.   Do you know whether it's growing in importance for

13 merchant plants --

14   A.   I couldn't comment.

15   Q.   -- or being reduced in importance for merchant plants?

16   A.   I couldn't comment on that.

17   Q.   I wanted to talk to you about the carbon tax, and as I

18 understand your testimony, you're pretty much in disagreement

19 with the idea that a carbon tax would be imposed; is that fair?

20   A.   Let's say I'm more in disagreement with the idea that

21 it should be taken as a given that it would be imposed.

22   Q.   I ask you how would you determine that a carbon tax or

23 some proxy for economic costs should be included in an analysis?

24   A.   I would base it on the risk or likelihood of future

25 regulation or future requirements taking place; so I would try

1   to assess the probabilities of that and then, of course, I would

2   try to assess the likely level of the carbon tax, which in

3   economic theory ought to be based on the cost of damages

4   associated with carbon dioxide emissions.

5   Q.   Have you ever testified as to cost of damages and

6   carbon emissions?

7   A.   Yes.

8   Q.   Where?

9   A.   Minnesota.

10   Q.   Is that testimony listed in your resume?

11   A.   I believe that it is.

12   (Witness reviewing documents.)

13   Yes, 395 is a generic investigation before the

14   Minnesota Public Utilities Commission that I did of

15   environmental cost of electricity and how they should be dealt

16   with.

17   Q.   Do you recall what your recommendations were or your

18   testimony in that case? Can you summarize your testimony in

19   that case?

20   A.   Well, I believe that I testified that I generally

21   thought it was a bad idea to try to monetize the environmental

22   cost of use in planning and that if there was any consideration

23   of environmental costs, it ought to be based on the probability

24   or risk of future regulation. And it's my recollection that the

25   state law there required that the Commission develop a low and a

1   high or develop a range of environmental costs. And I believe

2   that my recommendation was that the ranges have zero on one end

3   and I think something like a dollar a ton on the other end for

4   CO2, but I do believe a fair reading of the testimony would

5   argue that I felt that it was unwise and unnecessary to include

6   those types of costs in planning.

7   Q.   You cite to an EIA report in your testimony at Pages

8   41 -- I'm sorry, let me try to find that.

9   I'm sorry, Page 46.

10   A.   Yes, I'm familiar with that.

11   Q.   Is it the impacts of the Kyoto, K-y-o-t-o, protocol on

12   U.S. Energy Markets and Economic Activity, October 1998?

13   A.   Yes.

14   Q.   Now, you say that the EIA concluded that electricity

15   prices could be as much as 82 percent higher?

16   A.   I believe that's correct, yes.

17   Q.   Have you determined whether Dr. -- Have you determined

18   whether Mr. Speyer's inclusion of a $10 per ton CO2 charge is

19   more extreme or less extreme than the EIA report?

20   A.   Certainly less extreme than 82 percent.

21   Q.   What is the lowest carbon price used by EIA --

22   MR. DORTCH: Let's go ahead and mark this as an

23   exhibit. It's an exhibit out of this report.

24   MR. BOEHM: What report is that?

25   MR. DORTCH: This is the Kyoto protocol. We can mark

1   the whole thing, if you'd like.

2   MR. BOEHM: No, I just want to make sure that we have

3   that. Do you have that?

4   MR. DORTCH: Yeah, he cites it in his testimony.

5   - - -

6   Thereupon, Falkenberg Deposition Exhibit A

7   was marked for purposes of identification.

8   - - -

9   BY MR. DORTCH:

10   Q.   What's the lowest carbon price used by EIA?

11   A.   Zero. Under the reference case, if I read this

12   correctly.

13   Q.   What's the lowest price they use in a control case?

14   A.   In a control case? 67, it looks like.

15   Q.   Can you convert this to a dollar per ton of carbon

16   dioxide in 1997 dollars? Can you make that calculation?

17   A.   Well, if I'm -- I'll have to make some assumptions

18   that may not be correct, but I believe that carbon dioxide is

19   one part carbon, two parts oxygen; so there would be -- and the

20   atomic weight of oxygen is somewhat higher, if I'm not mistaken,

21   than carbon. I think carbon is 12 and oxygen is 18; so -- but

22   I'm really going from memory on this. So let's say it's three

23   to one. So it would look to me like you're talking about

24   dividing those by three, just as a rough guess.

25   Q.   You're trying to divide $67 by three as a rough guess,

1   is that --

2   A.   Yeah, that's it. Having been a long time since I took

3   my college physics.

4   MR. BOEHM: I'm impressed, that's good.

5   THE WITNESS: I may be wrong.

6   BY MR. DORTCH:

7   Q.   Well, that result was considerably larger than

8   Mr. Speyer's $10 per ton proxy?

9   A.   Well, if you divide the reference case, which is zero,

10   by whatever, it's still zero, but for the other cases, yes.

11   Q.   So assuming the imposition of a carbon price, as EIA

12   has for its reference cases, Mr. Speyer is well beneath EIA in

13   his proposed proxy or carbon tax or whatever we call this?

14   A.   Well, it's less than what EIA would assume would be

15   necessary under these controlled scenarios.

16   Q.   How much less?

17   A.   I'd say it's $10 versus 23.

18   Q.   So, well, less than half?

19   A.   Less than half.

20   Q.   What about the maximum carbon price?

21   A.   It's over 400.

22   Q.   Again, are you able to turn that into --

23   A.   Oh, I'm sorry, I read the wrong line, it's 348.

24   Q.   Oh, 348, thank you. Can you convert that value to a

25   dollar per ton of CO_2, same ballpark efforts, if you like?

1   A.   Over a hundred.

2   Q.   It's over a hundred. So that's over ten times

3   Mr. Speyer's figure?

4   A.   Hypothetically, assuming everything else was correct,

5   yes.

6   Q.   In your view, what is the outlook for environmental

7   regulation of coal throughout this decade?

8   A.   Well, you know, I think there are sort of conflicting

9   pressures. I think clearly there is some impetus to improve our

10 quality, and they're certainly concerned about greenhouse gases

11 and that sort of thing.

12   On the other hand, there has always been a great

13 desire to promote economic growth. It seems to me there's been

14 a reluctance in Congress to raise taxes. We now have budget

15 surpluses that may lead to tax reductions, make it unattractive

16 for at least taxation, for solution of coal plants.

17   The other thing with coal plants having lives that are

18 now, in some cases, approaching the end of their useful life, it

19 may well be that it's viewed that coal is a problem that will

20 take care of itself in a while and that most generation will be

21 from natural gas, which will be a much less polluting resource;

22 so maybe there would be a lot of feeling not to do anything. I

23 guess that's a long answer to say I'm not sure what Congress

24 will do.

25   Q.   Have you assumed the implementation of any NOx

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1   regulations or, for that matter, any SO2 regulations --

2   A.   I have assumed --

3   Q.   -- in the future?

4   A.   The level of NOx and SO2 that are built into

5   Dr. Pifer's analysis, which as I understand it, are based on

6   current levels of regulation.

7   Q.   So the answer to the question would be, no, you would

8   assume there would be no tightened environmental controls on NOx

9   or SO2?

10   A.   I've assumed that there will be no additional

11   controls, yes.

12   Q.   Do you know what is going on regarding the NOx, SIP

13   call and EPA's attempts to implement NOx restrictions?

14   A.   I only understand it very generally. I haven't

15   followed it very carefully.

16   Q.   Do you know it's in the courts?

17   A.   Yes.

18   Q.   Do you know that it's going to the Court of Appeals?

19   A.   I was aware of that, yes.

20   Q.   Are you aware that the Court of Appeals have upheld

21   the SIP call emission limitations?

22   A.   I don't recall that specifically. And it may be that

23   that's dealt with in Mr. Speyer's testimony. I just haven't

24   looked at it recently.

25   Q.   Are you familiar with EPA's new source review

1   litigation?

2   A.   No.

3   Q.   Have you ever heard of that before, to the best of

4   your knowledge?

5   A.   I don't recall hearing of it.

6   Q.   Have you heard that several utilities in the midwest

7   have been sued over emissions by their coal plants?

8   A.   Yes.

9   Q.   Okay. Do you know whether the two are related?

10   A.   I -- I don't know whether they're related or not. I

11   understand there is some issue related to upgrades of capacity,

12   and that's an issue that I believe some of the utilities in the

13   south have also been involved with, and there may be -- Maybe

14   that's the relationship you're talking about, I'm not sure.

15   Q.   Do you know what -- It doesn't sound like it, but I'll

16   ask. Do you know what EPA's goals or what they're demanding of

17   these utilities are in this litigation?

18   A.   I haven't reviewed any of the documents related to

19   that litigation.

20   Q.   Do you know of any regulation of mercury being

21   proposed by EPA?

22   A.   I believe I read reference to that in Mr. Speyer's

23   testimony.

24   Q.   Do you know what regulation of mercury EPA is

25   proposing?

1   A.   I don't know the specifics, no.

2   Q.   What about PM 2.5; do you know what that is?

3   A.   Yeah, that's the small particulate matter, less than

4   2.5 microns in diameter.

5   Q.   Do you understand that EPA is trying to impose PM 2.5

6   controls on the coal plants?

7   A.   I'm not aware of the specifics of that. As I would

8   say, I know from the testimony I did in Minnesota, that has been

9   an area of debate as to the health effects of that for quite

10   some time.

11   Q.   You have no way of quantifying or evaluating the

12   effects of any one of these various potential environmental

13   regulations as you sit here today?

14   A.   Well, the one thing I would say is that I don't see

15   how a $10 a ton carbon tax would have any relationship to any of

16   those items we've talked about.

17   Q.   Didn't Mr. Speyer say that the $10 a ton carbon tax

18   can serve as a proxy for these other environmental controls that

19   are being discussed in the EPA?

20   A.   Well, you can make anything you want a proxy. You

21   know, it's not really -- it seems to me there's not a direct

22   relationship at all.

23   Q.   What's your view, you think environmental regulations

24   on coal plants are going to tighten over the next 20 years?

25   A.   Well, my view is that probably not. It seems that

1   things don't happen very quickly in Congress. I think the last

2   major air quality improvement took place in the early 1990s.

3   (Pause.)

4   Q.   Mr. Falkenberg, would you turn to Page 44 of your

5   report?

6   A.   Okay.

7   Q.   Line 21, let me direct your attention to Line 21 where

8   you state "...specific reduction in energy-related emissions

9   cannot be established." What are you talking about here?

10   A.   This is a quote from the executive summary of the

11 report, but it just says that -- I think there it's talking

12 about the energy-related emissions as opposed to, say,

13 transportation.

14   Q.   I'm sorry, could you say that again? I don't think I

15 understood your response.

16   A.   I would -- I think what you're talking about, energy

17 related, that would mean -- The generation of electric power

18 would be an example of an energy-related emission; whereas,

19 automobile emissions or airplane emissions would be

20 transportation related.

21   Q.   Well, is it true that there are a number of variables

22 that you include in your modeling study, future fuel prices,

23 cost of new power plants, heat rates, others, that cannot today

24 be established with specificity?

25   A.   Well, of course, that's true. On the other hand, the

1   other items in the forecast don't require an act of Congress,

2   for example, to develop. We know that fuel prices are going to

3   develop over time based on the supply and the demand of the

4   market and -- whether Congress does anything or not.

5   But when it comes to environmental regulations, the

6   carbon tax, the federal treaty would have to be ratified by the

7   Senate. That is something that not anyone can predict, I don't

8   think.

9   I seem to recall that around in the 1970s, the SALT II

10   treaty was signed. I think it was just ratified by the Senate a

11   few weeks ago. Maybe it was the START treaty, but it was one of

12   those international treaties.

13   Q.   If you'll give me just a minute here, Mr. Falkenberg.

14   (Pause.)

15   I'm going to jump around here a little bit,

16   Mr. Falkenberg, just to get through this. Back to reserve

17   margins for a minute. Page 27 of your testimony?

18   A.   Okay.

19   Q.   You state that Dr. Pifer assumes that service

20   reliability has little or no intrinsic value?

21   A.   Yes.

22   Q.   Do you find -- Okay. Are there other ways of

23   achieving reliability other than a reserve requirement?

24   A.   Well, improving the availability of generators would

25   be one way to deal with it.

1   Q.   Can dispatchable demand help achieve reliability?

2   A.   Not really because -- Well, I mean, the answer is yes,

3   and no. Yes, it can improve the reliability for the

4   nondispatchable customers. For the dispatchable customers,

5   they're getting curtailed; so their service, per se, is not that

6   reliable.

7   Q.   But they're selecting that as a choice; isn't that the

8   assumption?

9   A.   That was the assumption built into Dr. Pifer's

10   analysis; that, for example, at 10 cents a kilowatt hour certain

11   customers would go off line voluntarily.

12   Q.   Isn't dispatchable demand and interruptible power

13   really one in the same?

14   A.   Well, no. Interruptible power is really what we're

15   dealing with now. That's what customers have historically been

16   taking, like AK Steel and like other customers on the

17   interruptible tariff. They are taking a lower quality of

18   service and getting a reduction in their price.

19   Now, Dr. Pifer is assuming that under competition,

20   those customers will be willing to change the terms and

21   conditions upon which they're receiving service and basically

22   self-curtail when the price rises to a certain level.

23   So there -- It's not really the same thing. I mean,

24   it may well be, at least in his mind, that some of the customers

25   are the same, but I don't think most of the interruptible

1   customers that I've worked with would consider these

2   arrangements very attractive.

3   Q.   Can realtime pricing be used to achieve reliability?

4   A.   I would say that it's unlikely it will have a major

5   impact on improving reliability.

6   Q.   What about financial contracts, can they be used to

7   achieve reliability or protect against volatility of price?

8   A.   Well, contracts are great in court, but they're not

9   going to keep the lights on.

10   Q.   Is the answer, no, they won't?

11   A.   Financial contracts will enable one to recover damages

12   when they have not been delivered what they've been promised but

13   they won't necessarily -- Sure, I think this experience has

14   shown in the last couple of years that there is actually going

15   to be deliveries of the physical product.

16   Q.   Can reliance on imports or reserves to neighboring

17   regions be used to achieve reliability?

18   A.   Only to a very limited degree.

19   Q.   Limited by what?

20   A.   Well, by what's available in the other regions --

21   Q.   Well, let's take ECAR.

22   A.   -- what's available to have imported.

23   Q.   Let's take ECAR. What's the reserve margin in PJM?

24   A.   PJM, I think, has a reserve requirement of around 20

25   percent.

1   Q.   What about some of the other reliability councils

2   surrounding ECAR?

3   A.   Well, I guess if your question is should ECAR not have

4   reliable reserve margins and hope that everybody else will and

5   that they'll be able to call in that power when needed, I don't

6   think that's very wise.

7   We went through this whole debate in the nuclear plant

8   era where a lot of people were suggesting that, well, the

9   utilities don't need to build new capacity, they can just go to

10 the tie lines, and most utilities thought that was ridiculous.

11 The reason you have reserve -- or tie lines is so that you can

12 get by with a 15 or 20 percent reserve margin instead of 100

13 percent.

14   Q.   Do you know what a dependence on supplemental capacity

15 resource index is?

16   A.   Yes.

17   Q.   What is that?

18   A.   That's the number of days per year in a probabilistic

19 calculation that one would rely on resources other than those

20 within, for example, ECAR. It would be reliance on tie lines,

21 for example.

22   Q.   Do you know what ECAR -- Strike that.

23   Is there any relationship between DSCR, which I'll use

24 instead of the long name, dependence on supplemental capacity

25 resource, is there any relationship between DSCR and reserve

1   margin requirements?

2   A.   Absolutely. The higher the reserve margin that any

3   particular entity has, the lower its dependence on supplemental

4   capacity resources would be.

5   Q.   Have you reviewed any ECAR documents with respect to

6   reserve requirements?

7   A.   Actually, over the years, I have reviewed documents of

8   that sort.

9   Q.   Are you familiar with loss of load probability

10   calculations?

11   A.   Yes.

12   Q.   Is common criteria of loss of load probability

13   calculations one day in ten years?

14   A.   Yeah, that's correct. Although, you have to be

15   careful and make sure you're talking about the same thing, as is

16   implied by that when you do that calculation, but yes, I'm

17   familiar with that, one day in ten years is sort of thought of

18   as the industry standard.

19   Q.   Does Dr. Pifer's two hours of unserved energy equate

20   to one observation in ten years?

21   A.   Well, the way that Dr. Pifer does his analysis, that

22   would be carried forward for the next two years, and so he'd

23   have three instances in his ten years. But I'm not sure that

24   the way that Dr. Pifer has actually done the calculation, it's

25   consistent with the way the LOLP calculation would be done

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1   because what Dr. Pifer is computing is based on load shapes that

2   take into account the hourly fluctuation of load.

3   When one does a LOLP calculation, you normally take

4   the peak demand of each day, 52 weeks a year, and you go through

5   that, the probability of outages in each of those hours. So, as

6   I say, you have to be careful with how you do that, with how you

7   apply that calculation.

8   Q.   Have you examined ECAR's current reserve margin?

9   A.   As part of the analysis that I've done, I have looked

10   at these tables that show demand and supply of ECAR.

11   Q.   What is ECAR's current reserve margin?

12   A.   I think it's between 10 and 15 percent is my

13   recollection.

14   Q.   Have you examined ECAR's projected future reserve

15   margin?

16   A.   Based on the Newark ES&D data, yes, I have.

17   Q.   And what is that projected future reserve margin?

18   A.   It does show a decline, but I wouldn't necessarily

19   attribute that to a belief that there's a need for less

20   capacity. I would attribute that to some uncertainty

21   surrounding restructuring and when the new capacity will be

22   built.

23   Q.   You were critical of Dr. Speyer's consensus report,

24   but you mentioned that you've reviewed the FirstEnergy

25   proceedings. Do you know whether RDI, staff's consultant, used

1   a consensus fuel report in FirstEnergy?

2   A.   It's my recollection that in FirstEnergy, the RDI

3   forecast was based on examining other forecasts. I don't recall

4   whether they did an averaging or whatever, but it was -- I

5   believe they did call it a consensus forecast.

6   Q.   Do you recall RDI's assumption concerning reserve

7   margin in Ohio?

8   A.   I don't recall that.

9   Q.   Page 20 of your testimony you state "...the reserve

10   margin should not depart substantially from the traditional 15

11   percent target." What's the basis for 15 percent being the

12   traditional target?

13   A.   Well, historically, utilities use something in the

14   range of 15 to 20 percent. And when I say "historically," I'm

15   talking about in the 1960s and 1970s. When we got into the era

16   where utilities were having excess capacity, then it wasn't at

17   all uncommon to see utility witnesses in rate cases putting

18   forth testimony saying that, "Well, we really need 20 percent or

19   maybe it's 25 or 30 because the cost of an outage is so much

20   more than the cost of building new capacity."

21   And in recent years we've sort of seen it go the other

22   way, where utilities are now going, "Well, we don't really need

23   reserve margins anymore, we've done so well without them in the

24   last few years. With these price spikes of $5,000 a kilowatt,

25   we really don't need them," and I don't believe any of that. I

1   believe that the 15 percent is a reasonable number. I've

2   analyzed this --

3   Q.   You said it was traditional, and I'm asking you -- I

4   understand you believe it's reasonable. You've also said it was

5   traditional. I'm asking you what's the basis for the statement

6   that that is a traditional requirement?

7   A.   I did a number of prudence audits at nuclear plants.

8   As a result of doing that, I read an awful lot of documents that

9   were related to planning assumptions and reserve margins used by

10   a variety of utilities across the United States that spanned

11   from 1960 to 1980.

12   Q.   Page 13 you state that "Under perfect competition,

13   market prices will equal the," quote, "short-run marginal cost

14   but the least efficient resource required to meet load, plus an

15   added premium for service reliability." What is your basis for

16   adding this added premium?

17   A.   That's what they call a rationing cost or shortage

18   cost.

19   Q.   A rationing cost. The least efficient resource is

20   covering its cost and the profit margin is sufficient to attract

21   new entry, why isn't that enough?

22   A.   It may not be enough, just based on the cost of the

23   least-sufficient resource that may not be enough.

24   Q.   How did you determine your premium?

25   A.   That's determined by what's necessary to meet a

1   reserve margin that I specify.

2   Q.   I'm sorry, could you repeat your answer? I just

3   missed it.

4   A.   The premium would be determined based on what was

5   required in order to meet the reserve margin that I specified in

6   the model.

7   Q.   How do you do that?

8   A.   Basically I look at the profitability of a new

9   combined cycle unit, and I see how it compares to the cost of

10   the combustion turbine, and I would see to it that it is

11   sufficient to recover the additional cost of the combined cycle

12   unit over a combustion turbine. So the cost of the combustion

13   turbine essentially is the premium for reliable service in the

14   long run.

15   Q.   Do you know whether the -- I'm sorry, I'm jumping all

16   over the place. Do you know whether the United Kingdom market

17   has capacity payments?

18   A.   I don't recall whether they do or not.

19   Q.   You don't know how fixed costs are recovered in the

20   UK?

21   A.   No, I don't.

22   Q.   Are you aware that NEPOOL intends to eliminate the

23   ICAP market by 2001 or earlier?

24   A.   I'm not aware of that.

25   Q.   You don't know how they intend to recover fixed costs

1   after that, assuming that NEPOOL does eliminate the ICAP?

2   A.   I don't know what their plans are.

3   Q.   Do you know whether MISO plans to have capacity

4   payments?

5   A.   No, I don't.

6   Q.   Do you know whether the Alliance RTO intends to have

7   capacity payments?

8   A.   No.

9   Q.   I forgot to ask you earlier, what is the cost of

10   licensing CUMULUS?

11   A.   Well, it depends on the application, but I guess

12   generally what I use is $1,000 a month.

13   Q.   Is that what Mr. -- I've forgotten his name, I know it

14   began with an H.

15   A.   Hayet. And I have an arrangement where he will

16   perform services for me such as building databases, and I may

17   license him to further it on that database.

18   Q.   So there's no cash exchange?

19   A.   No.

20   Q.   I understand that in Pennsylvania, in West Virginia,

21   you assumed the new CTs would be fueled by oil rather than gas?

22   A.   Yes.

23   Q.   Why did you change this assumption?

24   A.   Why did I change it?

25   Q.   Uh-huh.

1   A.   From when to when?

2   Q.   From Pennsylvania to West Virginia -- Let me ask this

3   again. Have you changed that assumption?

4   A.   Well, in Pennsylvania and West Virginia, I assumed it

5   was oil, and currently I'm assuming gas.

6   Q.   And why have you made that change in assumptions?

7   A.   Well, I believe it's probably more likely that there's

8   going to be oil used for the pure peaking capacity, but this

9   seemed to be an assumption that created a certain amount of

10   controversy. And at the same time, we have very high oil prices

11   now; so it seemed to me that the time was ripe to model a switch

12   to gas. I'm actually modeling dual fuel view because I include

13   the cost of the storage tanks so that they can run on oil, but

14   the modeling that I did assumed natural gas in this proceeding.

15   Well, I guess just to add one more thing in that

16   dance, in Pennsylvania, of course, I believe the Commission

17   believed that oil was the more appropriate choice and that was

18   part of why I continued with that in West Virginia.

19   Q.   Why do you believe that the Commission believed oil to

20   be the more appropriate choice?

21   A.   It had to do with locational considerations. An oil

22   FRTC could be built just about anywhere, where natural gas ones

23   would have to be built near a pipeline. So you have to include

24   allowance forecasts if you're going to do that.

25   Q.   If the Pennsylvania Commission was making that

1   assumption, where would I look?

2   A.   I think it was in the order in the PECO case.

3   Q.   Thank you. Do you know what assumption EIA makes in

4   modeling for cost-operating characteristics of new capacity?

5   A.   Well, it depends on what EIA study you're talking

6   about. I don't really know what they're assuming now.

7   Q.   Their annual energy outlook, which you rely on for

8   your fuel gas price, correct?

9   A.   For all the fuel prices, yes. I don't really go into

10 a lot of the other assumptions that they use.

11   (Pause.)

12   Q.   Mr. Falkenberg, you earlier stated, and I think you

13 stated in your prefiled testimony that your model doesn't

14 require a separate capacity market, but you include one

15 nonetheless and I'm trying to decide why. I'm trying to learn

16 why specifically?

17   A.   That it doesn't require a separate --

18   Q.   Well, why in the end, I mean -- Well, strike that.

19 Strike the question, please.

20   MR. DORTCH: Dave, give us a moment, we may be done.

21   (Recess taken.)

22   MR. DORTCH: Mr. Falkenberg, I want to thank you for

23 your time, and this concludes my discovery deposition of you and

24 thank you.

25   THE WITNESS: You're welcome.

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1   MR. DORTCH: Dave, you can instruct or not.

2   MR. BOEHM: Oh, no, instruct, I'm sorry?

3   MR. DORTCH: Sign or waive.

4   MR. BOEHM: Oh, he's going to sign.

5   THE WITNESS: I'll sign.

6   - - -

7   (Signature not waived.)

8   - - -

9   (Thereupon, the deposition was concluded at

10   5:01 o'clock p.m. on Friday, May 26, 2000.)

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3   STATE OF _____,)
) SS:
4   COUNTY OF _____,)

5   Randall J. Falkenberg, having been duly placed under

6   oath, deposes and says that:

7   I have read the transcript of my deposition taken on

8   Friday, May 26, 2000, and made all necessary changes and/or

9   corrections as noted on the attached correction sheet, if any.

10

11
                         _____
                         Randall J. Falkenberg
12
                Placed under oath before me and subscribed in my
13
      presence this _____ day of _____, 20____.
14

15

16   _____
                         Notary Public

17   My Commission Expires: _____.

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1   C E R T I F I C A T E

2   - - -

3   State of Ohio,   )
) SS:
4   County of Franklin,   )

5   - - -

6   I, Candace M. Hammond, Registered Professional
     Reporter and Notary Public in and for the State of
7   Ohio, hereby certify that the foregoing is a true and
     accurate transcript of the deposition testimony, taken
8   under oath on the date hereinbefore set forth, of
                    RANDALL J. FALKENBERG
9   I further certify that I am neither attorney
     or counsel for, nor related to or employed by any of
10   the parties to the action in which the deposition was
     taken, and further that I am not a relative or employee
11   of any attorney or counsel employed in this case, nor
     am I financially interested in the action.

12

13
                         Candace M. Hammond,
14   Registered Professional
                         Reporter and Notary Public
15   in and for the State of Ohio.

16   My Commission Expires:
     September 26, 2001.
17

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19
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1   C E R T I F I C A T E

2   - - -

3   State of Ohio,   )
) SS:
4   County of Franklin,   )

5   - - -

6   I, Rose Marie Prater, Registered
     Professional Reporter and Notary Public in and for the
7   State of Ohio, hereby certify that the foregoing is a
     true and accurate transcript of the deposition
8   testimony, taken under oath on the date hereinbefore
     set forth, of
9   _RANDELL J. FALKENBERG_
           I further certify that I am neither attorney
10   or counsel for, nor related to or employed by any of
     the parties to the action in which the deposition was
11   taken, and further that I am not a relative or employee
     of any attorney or counsel employed in this case, nor
12   am I financially interested in the action.

13

14   Rose Marie Prater,
                                Registered Professional
15   Reporter and Notary Public
                                in and for the State of
16   Ohio.

17   My Commission Expires:
     September 16, 2002.
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