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2 Duke Energy
By Ms. Jeanne Kingery
3 139 East Fourth Street, 1303-Main
Cincinnati, Ohio 45202

4
On behalf of the Applicant.

5
Bruce J. Weston, Ohio Consumers' Counsel
6 By Mr. Edmund "Tad" Berger (via speakerphone)
Assistant Consumers' Counsel
7 10 West Broad Street, Suite 1800
Columbus, Ohio 43215-3485.

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On behalf of the Residential Ratepayers
9 of Duke Energy Ohio.

10 Carpenter, Lipps & Leland, LLP
By Ms. Kimberly W. Bojko (via speakerphone)
11 280 North High Street, Suite 1300
Columbus, Ohio 43215

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On behalf of the Ohio Manufacturers'
13 Association.

14 Carpenter, Lipps & Leland, LLP
By Ms. Rebecca L. Hussey (via speakerphone)
15 280 North High Street, Suite 1300
Columbus, Ohio 43215

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On behalf of The Kroger Company.

17
FirstEnergy Solutions Corp.
18 By Mr. Scott J. Casto (via speakerphone)
76 South Main Street
19 Akron, Ohio 44308

20 On behalf of FirstEnergy Solutions Corp.

21 Mike DeWine, Ohio Attorney General
By Mr. Steven Beeler (via speakerphone)
22 Assistant Attorney General
Public Utilities
23 180 East Broad Street, 6th floor
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24
On behalf of the Staff of the Public
25 Utilities Commission.

1 APPEARANCES: (Continued)

2 Ohio Partners for Affordable Energy
3 By Ms. Colleen L. Mooney (via speakerphone)
4 231 West Lima Street
5 Findlay, Ohio 45840

6 On behalf of Ohio Partners for Affordable
7 Energy.

8 Mr. Douglas E. Hart (via speakerphone)
9 441 Vine Street, Suite 4192
10 Cincinnati, Ohio 45202

11 On behalf of the Greater Cincinnati
12 Health Council.

13 ALSO PRESENT:

14 Mr. William Don Wathen Jr., Duke.
15 Mr. Jim Wilson, OCC (via speakerphone).
16 Ms. Tammy Turkenton, PUCO (via speakerphone).

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9	ZHANG OCC DEPOSITION EXHIBIT	IDENTIFIED
10	1 Compilation exhibit containing	52
11	OEG-DR-01-001; IGS-POD-01-003;	
12	OCC-POD-09-063; OCC-INT-16-414;	
13	OCC-INT-16-415; OCC-INT-16-416;	
14	OCC-INT-16-417; OCC-INT-16-418;	
15	OCC-INT-16-419; OCC-INT-16-420;	
16	OCC-INT-16-421; OCC-INT-16-422;	
17	OCC-INT-16-423; OCC-INT-16-424	
18	(Confidential)	
19	- - -	
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1 Wednesday Afternoon Session,
2 October 1, 2014.

3 - - -

4 MR. BERGER: Good afternoon. My name is
5 Edmund Berger. We're here for the deposition of Ben
6 Zhang. At this point in time I would ask the parties
7 to give their appearance. I'm Edmund Berger with the
8 Office of the Ohio Consumers' Counsel, 10 West Broad
9 Street, Suite 1800, Columbus, Ohio 43215.

10 MS. KINGERY: This is Jeanne Kingery on
11 behalf of Duke Energy Ohio, Cincinnati, Ohio, let me
12 see, 139 East --

13 MR. WATHEN: Fourth.

14 MS. KINGERY: -- Fourth Street,
15 Cincinnati, Ohio.

16 MR. BERGER: Why don't we proceed to the
17 other people on the phone. Steve?

18 MR. BEELER: On behalf of the staff of
19 the Public Utilities Commission of Ohio, Steve Beeler
20 with the office of Attorney General Mike DeWine, 180
21 East Broad Street, Columbus, Ohio 43215. Also on the
22 phone from staff is Tammy Turkenton.

23 MR. BERGER: Scott?

24 MR. CASTO: Scott Casto with FirstEnergy
25 Solutions, 76 South Main Street, Akron, Ohio 44326.

ARMSTRONG & OKEY, INC., Columbus, Ohio (614) 224-9481

1 MR. BERGER: Doug?

2 MR. HART: On behalf of the Greater
3 Cincinnati Health Council, Douglas E. Hart, 441 Vine
4 Street, Suite 4192, Cincinnati, Ohio 45202.

5 MR. BERGER: Colleen?

6 MR. CASTO: My apologies, I gave the
7 wrong zip code. This is Scott. It's 44380.

8 MR. BERGER: Colleen?

9 MS. MOONEY: Yes. On behalf of Ohio
10 Partners for Affordable Energy, I'm Colleen Mooney,
11 231 West Lima Street, Findlay, Ohio 45840.

12 MR. BERGER: And Kim?

13 MS. BOJKO: Thank you. On behalf of the
14 Ohio Manufacturers' Association, Kimberly W. Bojko
15 with Carpenter, Lipps & Leland, 280 North High, Suite
16 1300, Columbus, Ohio 43215.

17 MR. BERGER: Thank you. I think that
18 concludes the appearances.

19 Why don't we swear Mr. Zhang at this
20 time, Carolyn.

21 - - -

22 BEN ZHANG

23 being first duly sworn, as prescribed by law, was
24 examined and testified as follows:

25 CROSS-EXAMINATION

ARMSTRONG & OKEY, INC., Columbus, Ohio (614) 224-9481

1 By Mr. Berger:

2 Q. Good afternoon, Mr. Zhang. My name is
3 Tad Berger, I'm with the office of the Ohio
4 Consumers' Counsel, and I will be asking you some
5 questions. Would you please state your name and
6 business address for the record.

7 A. Sure. My name is Ben Zhang. I'm at 139
8 East Fourth and Main, Cincinnati.

9 Q. And what is your position with Duke
10 Energy?

11 A. I'm the vice president of commercial
12 analytics.

13 Q. Is that where -- with which -- which Duke
14 subsidiary is that?

15 A. That's with the Midwest Commercial
16 Generation, but right now you can also say Duke Ohio.

17 Q. So do I understand you're here to testify
18 on behalf of Duke Ohio today, is that what you're
19 saying?

20 A. Yes, I think so.

21 Q. Okay. And you say your title was vice
22 president of analytics, commercial analytics?

23 A. That's correct.

24 Q. Would you please provide me with a
25 description of the responsibilities of that position?

1 A. Sure. I manage four functional areas.
2 One is the commercial modeling which deals with all
3 the models, also the pricing and structuring which
4 does evaluations and deal pricing, also market
5 fundamentals which look at the market trends, and
6 also operational analytics which does a form of
7 evaluations and also analysis of unit performances.

8 Q. And do I understand that you're the
9 individual who developed the original -- or, the
10 model that you've used for pricing and -- the
11 dispatch model that was used in this proceeding to
12 determine the cost, the net cost benefit of the OVEC
13 units over the term of the ESP as well as into the
14 future?

15 A. That is correct. I'm the architect of
16 the commercial business model which also is referred
17 to as the "CBM."

18 Q. And how long have you worked for Duke,
19 Mr. Zhang?

20 A. Fifteen years.

21 Q. Did I hear you pronounce your name
22 "Zhang"?

23 A. That's correct. "Z" as in zebra, yeah,
24 Zhang.

25 Q. Okay. And over that time, working with

1 Duke --

2 MS. HUSSEY: Rebecca Hussey.

3 Q. -- you developed this business model with
4 the assistance of other individuals?

5 A. That's right. We had a team. I am the
6 architect, but we have a team of individuals, yes.

7 MS. KINGERY: Excuse me, Tad. I just
8 wanted to note that Rebecca Hussey just joined.

9 MR. BERGER: Okay.

10 MS. KINGERY: Becky, do you want to --

11 MR. BERGER: Good afternoon, Rebecca.

12 MS. KINGERY: Do you want to make an
13 appearance on the record?

14 MS. HUSSEY: Sure. My apologies for the
15 interruption. On behalf of The Kroger Company,
16 Rebecca L. Hussey from Carpenter, Lipps & Leland, 280
17 North High Street, Suite 1300, Columbus, Ohio 43215.
18 Thank you.

19 MR. BERGER: Thank you, Rebecca.

20 Q. (By Mr. Berger) Mr. Zhang, you -- you're
21 the architect of this model. When did you initially
22 develop the model?

23 A. I started in 2000. It took two years to
24 build, the validation took six months, maybe longer.
25 It went into production in 2002. Afterwards, there

1 were a series of upgrades and modifications based on
2 the market and all the other changes that was
3 necessary.

4 Q. Over the time of operation of the
5 commercial business model that you were the principal
6 architect of, have you performed comparisons between
7 projected performance versus actual performance under
8 the model?

9 A. Yes, we have.

10 Q. How often do you do that comparison?

11 A. There are a number of comparisons done
12 depending on the request from commercial and the
13 risk, but the standard required test was performed on
14 a quarterly basis, that was designed by Global Risk
15 Management as a requirement to test the model. But,
16 on a daily basis, depending on the situation, we
17 frequently check on things on our own.

18 Q. And do you compare the performance of
19 your model to the performance of other models in the
20 industry?

21 A. Yes. Initial validations were done by
22 external parties. They did use external models for
23 comparison purpose. And we, on a continual basis,
24 also look at how our model perform, of course with
25 regard to validation of that. So we have a benchmark

1 as to how our model value things versus how other
2 parties, for example, banks, how their model -- we
3 don't have their model, but we can see the results of
4 their model based on transactions. We validate the
5 model and compare the model that way.

6 Q. And how far into the future does the
7 model provide Duke with projections of its -- of its
8 revenues and costs and output?

9 A. The model function doesn't have a
10 limitation as to how many years you can go. All
11 depending on the availability of the inputs. So our
12 data production covers a five-year time window.

13 Q. And when you do -- when you look at how
14 the model performed in the past, how far back do you
15 typically go? Do you go back the five years that you
16 provided projections for?

17 A. We typically look at the most recent
18 because that's the most relevant.

19 Q. When you say "the most recent," can you
20 indicate what you mean by that?

21 A. Sure.

22 Q. Do you look at --

23 A. Sure.

24 Q. Okay.

25 A. Yeah. We conduct model runs on a daily

1 basis. So on a quarter-by-quarter basis we look back
2 for the quarter and try to compare how the model
3 faired if we knew all the information that has
4 already transpired on the market and see how the
5 model performs.

6 Q. So you look back over the previous
7 quarter. Do you look back over the five years ago in
8 some instances or do you tend to just look over the
9 previous quarter?

10 A. Can you clarify what do you mean compare
11 the five year? You mean you compare today's
12 realization with forecasts that were done five years
13 ago? Or you are comparing, for example, my
14 projection for the next five years a month ago with
15 what they are today? So which one is that?

16 Q. No. I'm talking about the first one
17 where you look, well, what did we project five years
18 into the past for what's happening today and how does
19 it compare to what actually happened today.

20 A. First of all, sir, you can do that
21 comparison, but that's largely meaningless. The
22 example I would give you is if someone projected the
23 stock prices of IBM five years ago today, you want to
24 see what today's price of IBM stock prices was, that
25 means nothing. If anyone can do the comparison and

1 get really good results, then nobody would be sitting
2 here.

3 (Laughter.)

4 Q. Okay. So the primary purpose of doing a
5 retrospective analysis is what?

6 A. To see how the model fairs if you know a
7 reasonable set of inputs and the market information
8 on the operation side transpires as they are. For
9 example, if the market price you use \$30, the
10 realized prices are also pretty close to \$30, and
11 your model give a projection that's pretty close, in
12 the neighborhood of, you know, plus/minus certain
13 percentages of the realized, that means the model
14 works well. That's the purpose of the testing. It's
15 not how well we test the magic of the market, but,
16 rather, how the model works if the inputs were
17 reasonable.

18 Q. So what you're measuring is how well the
19 model adapts to changing conditions in the
20 marketplace, changing weather conditions, changing
21 price for a particular commodity, and things of that
22 nature?

23 A. Yeah, you can say that. I think that's a
24 pretty reasonable way of saying it, yes.

25 Q. Okay. And you've testified before,

1 Mr. Zhang, in proceedings before the Public Utilities
2 Commission of Ohio; is that correct?

3 A. That's correct.

4 Q. You were deposed in the Duke capacity
5 case, correct?

6 A. That's correct, yeah.

7 Q. Were there any other proceedings where
8 you testified?

9 A. No.

10 Q. And you're familiar with what
11 Mr. Dougherty prepared for purposes of preparing
12 discovery responses in this proceeding? Are you
13 familiar with that?

14 A. I think I know -- I know the source --
15 excuse me -- I'm sorry. I think I know the source of
16 his information which is coming from CBM, but I was
17 not involved in the preparation of his -- the
18 process, nor have I seen the information that he
19 prepared.

20 Q. Okay. Were you provided with the notice
21 of deposition in this case?

22 A. A notice? Yeah, I was --

23 Q. Yeah.

24 A. -- given notice, I believe, last week.

25 MS. KINGERY: I'm going to object to the

1 lack of clarity here. I don't know that the witness
2 understood what you meant by "the notice," Tad, if
3 you want to clarify that.

4 Q. Yes. There was a written notice that the
5 Office of the Ohio Consumers' Counsel sent to Duke
6 Energy Ohio. Did you ever see that written notice?

7 A. No, I did not.

8 Q. Okay. So you're not aware of the things
9 that the Office of the Ohio Consumers' Counsel, and
10 I'll just be using "OCC" for short, asked for
11 witnesses to be made available to testify about in
12 this case?

13 A. I haven't seen anything like that.

14 Q. Okay. And I have a -- I don't think I
15 provided that notice to Carolyn, but that notice
16 included estimates made by Duke Energy Ohio regarding
17 the economic value of its share of the capacity and
18 energy from OVEC to its retail customers for the
19 duration of Duke Energy Ohio's entitlement, including
20 persons familiar with the assumptions, calculations,
21 and workpapers underlying such estimates. Would you
22 be a person who could address that economic value of
23 the OVEC entitlement?

24 A. No. I wasn't involved in any
25 calculations or analysis.

1 Q. Okay. Well --

2 A. However, I want to say that, you know, my
3 team, once again I have a large team that are working
4 for me, they may have been requested to provide the
5 information from the CBM by other parties, which I'm
6 not aware of.

7 Q. Okay. Well, would you agree with me that
8 your -- that your CBM, your commercial business
9 model, effectively provides an economic valuation of
10 Duke's generation into the future; would you agree
11 with that?

12 A. I would say that's half right. The model
13 only produces the revenues, projected costs effective
14 with the margins, but it does not handle anything
15 with tax issues, with depreciation, discount rate,
16 and other market factors. So it's only partially
17 true.

18 Q. Okay. The things that are excluded from
19 the model, such as taxes and depreciation and things
20 of that nature that go to the economic or to the tax
21 bottom line, anyhow, were they selectively excluded
22 for any particular reason?

23 A. No --

24 MS. KINGERY: Object. I'm -- I'm not
25 sure whether you mean just in this particular model

1 run or you mean from the model in general.

2 MR. BERGER: I mean from the model in
3 general, Jeanne.

4 A. Oh. The model in general, we don't have
5 that in there. This is optimization model that
6 produces the positions of the commodities and the
7 revenue and costs so that we can manage the assets.
8 It's not a financial or accounting model.

9 Q. Right. And so, as I understand it, what
10 you're trying to determine is what margins can be
11 realized from the generation during the projected --
12 during the modeling period; isn't that correct?

13 A. That's correct, yes.

14 Q. So I'm assuming that you don't have to
15 worry about taxes and depreciation in your model
16 because all you're trying to do is determine a net
17 cash flow; would that be correct?

18 A. Once again, I'm not sure the net cash
19 flow -- once again, that may be partially true
20 because net cash flow deals with a lot of other
21 accounting concepts which I'm not an expert of. So
22 only talk about the revenue and costs, the
23 market-based costs. So, once again, you may be
24 right, but I'm not an accounting expert, so cash
25 flow --

1 Q. Okay.

2 A. -- has their own definitions.

3 Q. Okay. I'll use the term "margin" because
4 you seem much more comfortable with the term
5 "margin" --

6 A. Yeah.

7 Q. -- than with "net cash flow."

8 In terms of assessing the margin, your
9 model looks at numerous variables. Would you agree
10 with that?

11 A. That's correct.

12 Q. Now, I'm going to ask the court reporter
13 to hand to you an exhibit that I'm not asking to be
14 identified for the record at this time, but it
15 consists of, I believe it's pages numbered 1 to 48.

16 A. Okay.

17 Q. And the reason I'm not -- the reason,
18 Mr. Zhang, that I'm not marking it at this time is
19 because all of the documentation in that exhibit has
20 been marked confidential in this proceeding and we're
21 gonna -- I want to ask you generally about some of
22 the background information from the exhibit, but I
23 don't want to ask you about the specific numbers
24 during this portion of the deposition which is public
25 in nature. And then, later on, we'll go to a

1 confidential record where I may ask you about some
2 specific numbers. Okay?

3 MS. KINGERY: Tad, this is Jeanne. I
4 just want to clarify on the confidentiality.
5 Certainly the numbers, as you've identified, but also
6 I believe that we consider the precise nature of the
7 inputs and outputs also to be confidential.

8 MR. BERGER: Okay. Jeanne, feel free to
9 advise me if I'm asking a question --

10 MS. KINGERY: I will try to do --

11 MR. BERGER: -- that raises a concern.

12 MS. KINGERY: Okay. I will try to do
13 that, as will Mr. Zhang.

14 MR. BERGER: Okay. And we did seem to
15 have a problem with this question during
16 Mr. Dougherty's deposition. I think there was one
17 matter, I started to mention a number and Amy quickly
18 reminded me. So, Mr. Zhang, please refrain from,
19 during this portion of the deposition, from
20 mentioning any numbers, and if your counsel indicates
21 a concern over confidentiality, I would hold off
22 until she's had that resolved, okay?

23 THE WITNESS: Will do. Yeah.

24 Q. (By Mr. Berger) So in this exhibit, which
25 we'll later mark, would you turn to page 5 of that

1 exhibit that I've marked which is the company's
2 response to IGS-POD-01-003, which has earlier been
3 identified in this proceeding as OEG-DR-01-001 as
4 well.

5 The first page of that is Mr. Dougherty's
6 analysis, many of the numbers -- the source
7 information he asserted came from your team, so
8 that's primarily why we're here is to talk about this
9 exhibit and the workpapers that follow which are
10 pages 2 to 19 of that document. Do you see that in
11 front of you?

12 A. Yes.

13 MS. KINGERY: And I'd just like to note
14 an objection here that Mr. Zhang has already
15 indicated that he has not seen any of Mr. Dougherty's
16 work on this proceeding, just for the record.

17 MR. BERGER: That's fine. We're not
18 asking him to testify to Mr. Dougherty's work or
19 Mr. Dougherty's -- but I think Mr. -- Mr. Dougherty
20 clearly referred many questions or said that he
21 couldn't answer the questions that he had obtained
22 from the information from you, Mr. Zhang, and that's
23 why we asked you to be here.

24 THE WITNESS: Sure.

25 Q. Now, does any of the information on this

1 exhibit, by the way, look familiar to you?

2 A. Once again, I, on a daily basis, I look
3 at the financial information and the commodity
4 position information from time to time, even though
5 not specifically to OVEC, but I have some
6 familiarities with the information for the front
7 years, but not exactly the numbers showing here, but
8 I have a general sense of the range of the numbers.

9 Q. Now, when your model does -- outputs
10 information, can it output it by generation unit?

11 A. Yes.

12 Q. Okay. So it's reasonable for
13 Mr. Dougherty to obtain this information from your
14 units, from your team, with respect to, for example,
15 the revenue information, the generation volumes, and
16 things of that nature.

17 A. Uh-huh.

18 THE COURT REPORTER: Is that a "yes"?

19 THE WITNESS: Yes.

20 Q. And the costs as well; is that correct?

21 A. Yes.

22 Q. Okay. And are you familiar with the
23 installed capacity, what that means?

24 A. Yes, I know what it means, but I am not
25 the right person to talk about anything related to

1 capacity. There will be someone else. I will be
2 talking with you about the generation volume
3 projection, revenue, and energy side.

4 Q. Right. Mr. Jennings will speak to me
5 about the ICAP and the UCAP; is that right?

6 A. That's right.

7 Q. And the forecasted pricing after 2019; is
8 that right?

9 A. That's correct.

10 Q. Okay. So you're here primarily to talk
11 about how you came up with the generation volumes and
12 the revenues and costs that underlie this exhibit.
13 Would that be fair?

14 A. That's fair.

15 MS. KINGERY: Tad, did you really mean to
16 include costs there, or were you referring back to
17 Mr. Dougherty's statements on cost sourcing?

18 MR. BERGER: Yes. Well, in terms of --
19 yes, I think, Jeanne, in terms of energy costs, I
20 think I was -- I will be sending those questions to
21 Mr. Jennings. In terms of demand costs, I didn't
22 think that Mr. Jennings was particularly familiar
23 with them, and I'm not sure exactly, other than
24 coming from OVEC, what cost numbers were assumed in
25 the model. So I will be asking Mr. Zhang some

1 questions to determine where the demand cost numbers
2 come from.

3 MS. KINGERY: Okay. Just clarifying.

4 MR. BERGER: Okay.

5 Q. Mr. Zhang, in terms of projecting, let's
6 talk for a moment about where you have -- where
7 generation volumes is indicated on this exhibit. Do
8 you know how -- if you turn to pages -- the following
9 page, I believe, has a title at the bottom or an
10 indication of 2014 5-by-7 megawatt hours. Do you see
11 that?

12 A. Yes.

13 Q. And do you see here how there are monthly
14 volumes calculated for both the OVEC units, if you
15 look at the first -- for both Clifty Creek and Kyger
16 Creek. Do you see that?

17 A. Yes.

18 Q. And it has on-peak and off-peak?

19 A. Yes.

20 Q. Did your team provide this information to
21 Mr. Dougherty?

22 A. Yes, I believe so.

23 Q. Okay. And do you know how the monthly
24 generation figures were calculated? Were these based
25 upon hourly figures and just summed?

1 A. That's correct. It's based on an
2 optimization that was done on a scenario-by-scenario,
3 hour-by-hour basis. The model dispatches the units.
4 Then it would simply sum up the on-peak hours and
5 off-peak hours to come up with the numbers. Of
6 course, this is the averages across all the
7 scenarios, or we call this "the expected volumes,"
8 but they do come from an hourly granularity.

9 Q. Okay. And are you the individual who
10 runs the model or would you say there's an individual
11 who actually runs the model?

12 A. Yeah. There -- actually, there's no --
13 not a particular individual. This is a pretty much
14 defined process that was done on a daily basis which
15 we call "the end-of-day production run." There were
16 scheduled individuals that, together with IT, they
17 were running this model every day. Not one
18 particular individual and not me personally.

19 Q. Okay. And would you say this is the most
20 granular data available? Obviously, the monthly
21 figures are not the most granular data available.
22 Would you agree with that?

23 A. Yes, I do.

24 Q. Okay. And how is off-peak and on-peak
25 defined in the model?

1 A. The off-peak hours, on-peak hours are
2 based on the FERC definition of on-peak and off-peak.
3 Off-peak defined by Monday through Friday, the eight
4 hours off-peak, we call the 5-by-8, then we have the
5 24-by-2 which is the Saturday and Sunday; those are
6 the off-peak hours. And the 16 hours, Monday through
7 Friday, those are the on-peak hours except for
8 holidays.

9 Q. Okay. And is there a particular modeling
10 software that is the backbone of your model?

11 A. No. Everything is built in house; is
12 built based on the most rudimentary level. So there
13 was no software that we were using. It's all built
14 in house. Of course, the theory and the mathematics
15 are from standard papers and books. We did not
16 invent anything there.

17 Q. Okay. So when you use the term "Monte
18 Carlo simulation," that's what you're describing
19 there as the theory behind the model basically.

20 A. Yes. Statistical theory, yes.

21 Q. Okay. All right. So pages -- and then
22 if you go to page -- so pages 6 through 9 are the
23 output figures through 2018. And then if you look at
24 page 10 and following, you have the revenue figures.
25 Were those revenues figures also produced by your

1 model?

2 A. That is correct.

3 Q. And that's pages 10 through 14 of the
4 exhibit.

5 A. That's correct.

6 Q. Thank you.

7 And the revenues shown there, is that --
8 do you know if that's both energy revenue and
9 capacity revenue or is that just energy revenue?

10 A. That I would have to check because CBM
11 only produces the energy revenue. I am assuming this
12 is -- you know what, I don't want to assume anything,
13 so I have to check.

14 Q. Okay. Is this -- is it normal for you to
15 print out monthly and annual information in this
16 format that Mr. Dougherty has in here?

17 A. The model produces the output. It's
18 saved on the server. The people can view this in any
19 fashion. So based on the need of the user, they can
20 print out an output in this way or other ways, yes,
21 it's readily available, but we don't print out
22 information like this on a daily basis.

23 Q. And just getting back to the generation
24 numbers, the model generates a number for every hour
25 during the period; is that right?

1 A. That's correct.

2 Q. And would you agree with me that assuming
3 these are just energy revenues, that these energy
4 revenues would reflect the hour -- I'm sorry, they
5 would reflect the volume, the megawatt hours shown on
6 pages 6 through 9, times the projected prices during
7 that -- those periods; is that correct?

8 A. No, that is not correct. Because --

9 Q. Okay.

10 A. Yeah, because the -- the model only run
11 the units when the price is high enough to make it
12 economic especially for extended time frame. So the
13 average revenue number should, in general, be
14 slightly higher than the projected prices, except for
15 situations where it's must-run situations, the unit
16 must be running because of operational constraints.

17 Q. And you have -- your model incorporates a
18 must-run assumption; is that correct?

19 MS. KINGERY: Was that confidential or
20 not?

21 THE WITNESS: A lot of people know --

22 MS. KINGERY: Okay.

23 THE WITNESS: -- what "must run" means.

24 MS. KINGERY: Okay. All right. Go
25 ahead. Just checking.

1 Q. Okay. So in terms of what you're saying,
2 the revenue numbers won't necessarily be a reflection
3 of the hourly generation volumes, on pages 6 to 9,
4 times the on-peak and off-peak price.

5 A. They are closely related, but they are
6 not the same thing.

7 Q. Okay.

8 A. Yeah, if a unit has a very low cost, then
9 the revenue number, on average, would be roughly the
10 same level of the projected prices. If the unit has
11 a high cost, then the average revenue, in general,
12 would be higher than the projected prices because of
13 the optionality of dispatching.

14 Q. Okay. So low-cost units will tend to run
15 more frequently and, therefore, the average revenue
16 will tend to reflect the operations during all
17 indicated hours. I'm just trying to translate what
18 you just said.

19 A. That is correct.

20 Q. Whereas, higher-cost units will run less
21 frequently and will, therefore, not necessarily
22 reflect the average revenue --

23 A. The projected prices.

24 Q. -- the projected prices, okay.

25 And do you utilize hourly price

1 projections or do you simply utilize price
2 projections for -- well, can you answer that
3 question: Do you utilize hourly price projections?

4 A. No, we do not. We only need the monthly
5 prices, on-peak, off-peak, that's how the market
6 transacts. There's no market transaction on an
7 hour-by-hour basis going forward. So the only
8 information available is the marketing information at
9 the monthly level. However, the model has a
10 structure that would translate the monthly level into
11 the hourly level which are consistent with the
12 monthly prices.

13 Q. Okay. So when you say it generates
14 prices on the hourly level that are consistent with
15 the monthly prices, basically what you're saying is
16 if a price is projected for a particular month,
17 that's utilized for each hour in that period; is that
18 right?

19 A. That's not right. The --

20 Q. Okay.

21 A. -- monthly price, let's say the monthly
22 price on-peak is \$30. The model would do the
23 simulation based on weather, load, economic
24 conditions, and all other things. It would produce a
25 hourly distribution which may have hourly price equal

1 to 15, 20, 30, 40, 50, 60, but, on average, the price
2 equal to exactly \$30 at the monthly level which is
3 the market.

4 So, in other words, the model replicate
5 what the real-world market is on an hour-by-hour
6 basis, but those hours would give you a price that
7 would equal to the monthly prices which are
8 transacted.

9 Q. Okay. Well, let me -- let me try and
10 clarify something there. You're saying you use a
11 load shape and a forecast that may result in
12 different prices in different hours; but, overall,
13 would you agree with me that your monthly revenues
14 from that, using that load shape, will equal your
15 projected output times -- or, will equal your
16 projected revenues?

17 A. Once again, I think "revenue" is not the
18 right term. It's projected prices. Because
19 projected revenue, once again as we just talked
20 about, do not necessarily equal to the projected
21 prices because of dispatching optionality.

22 And also, we don't use a -- or you can
23 say we have some sort of load simulation, but we do
24 not use a historical predetermined load shape. We
25 have weather simulations, we have economic situations

1 where we do translate the weather into load. So we
2 have multiple scenarios of load shapes.

3 Q. Okay. And the source of the prices that
4 you use for the forward period, what are they?

5 A. The monthly price, are you talking about
6 the monthly price inputs?

7 Q. Yes.

8 A. Okay. For the visible, what we call the
9 "visible transaction" or the "transaction time
10 window" you have the market prices which covers the
11 front two years which we call the "liquid market."
12 The back may be two, three years, which even though
13 they may not be liquid but they are market
14 transaction, we call that "visible information." So
15 all those market prices are inputs. Beyond a
16 five-year time window, we do not have market prices;
17 you have fundamental prices.

18 Q. So are you saying you use historic prices
19 to project during the five-year window?

20 A. No, we do not use historical prices; we
21 use forward prices.

22 Q. You use forward prices.

23 A. Yes.

24 Q. Just for a five-year window?

25 A. We would like to use more, but that's the

1 only visible time window for power. I was talking
2 about power. For gas there is longer.

3 Q. Okay. For power, though, you use -- you
4 project through the period that the forward prices
5 are available or five years; is that correct?

6 A. That's a typical time window, yes.

7 Q. And then, after that, you use what has
8 been referred to as "fundamental curves"; is that
9 correct?

10 A. That is correct.

11 Q. And do I understand that you -- you're
12 not involved in the development of the fundamental
13 curves; is that correct?

14 A. That is correct. I take that back. I'm
15 not personally involved, but my fundamental guy do
16 work with corporate folks to give them our opinions
17 as to a number of things, but we don't really produce
18 the curve ourselves.

19 Q. And who in -- who in your department
20 develops an opinion on fundamental curves that
21 provides that to corporate?

22 A. I think the people that are exclusively
23 responsible are people from the, we call "the Duke
24 corporate fundamentals group," but we, our
25 fundamental analysts sometimes ask to talk to them

1 about general issues about what we think about coal
2 and other things, but we do not really -- do not
3 really work with them on a regular basis.

4 Q. Okay. Now, you don't know when
5 Mr. Dougherty accessed the data that's shown in the
6 exhibit, do you?

7 A. No. I think Bryan Dougherty, if he uses
8 the fundamental curve for anything, it would have to
9 be the case where he requested the model run from the
10 CBM team, which isn't my team, so he would not have
11 been using the fundamental curve on his own to
12 produce any information.

13 Q. Okay. He would have asked for the
14 information from your team.

15 A. He would have -- he would have either
16 asked my team to produce the model run based on the
17 curve or he would have asked my team to ask for the
18 curve on his behalf, then make the model run. In
19 other words, the information that he prepares has to
20 be from the CBM team, using the CBM run. Just the
21 curves themselves would not be able to give him the
22 information that he needs.

23 Q. Okay. And how long does it take to do a
24 CBM run?

25 A. Depending on how many years you want to

1 run.

2 Q. Let's say through 2018, how long would it
3 take to run the model for that period of time?

4 A. So that run would take an hour and a
5 half.

6 Q. And if you wanted to run it through 2040,
7 do you know how long that would take?

8 A. Probably three, four hours.

9 Q. Okay. You don't know when Mr. Dougherty,
10 though, accessed the information or asked for a
11 "mother" [verbatim] run to develop the information on
12 this exhibit, on page 5?

13 A. He does not need to go through me,
14 personally, because --

15 Q. Okay.

16 A. -- yeah, he has access.

17 Q. So he could initiate a run himself?

18 A. That is correct.

19 Q. Okay. Now, if you look at page 15 of the
20 exhibit. And page 15 through 19, I believe, you'll
21 see on the bottom left corner it says 2014 5-by-7
22 cogs. Would you just explain what that means?

23 A. I have no idea what "cogs" means.

24 Q. Okay. Well, I think Mr. Dougherty
25 testified it means "cost of goods sold." In other

1 words, this means the -- to my understanding, it
2 means the fuel cost associated with the -- with the
3 run. You're not --

4 A. Yeah. So I am familiar with the
5 terminology "cost of goods sold," but not "cogs."

6 Q. Okay. Well, I think that's just his
7 abbreviation for it --

8 A. Yeah.

9 Q. -- or his acronym for it.

10 A. Okay.

11 Q. In terms of cost of goods sold or cost of
12 generation, I guess, would that be pretty much the
13 same thing?

14 MS. KINGERY: I'm going to object. The
15 witness just said he doesn't know what this meant.
16 You can't ask him what Bryan meant.

17 Q. All right. Well, you said you were
18 familiar with the term "cost of goods sold"; isn't
19 that right?

20 A. Yes.

21 Q. And that's an input in your model; is
22 that right?

23 A. No, that's not an input. That's an
24 output of the model.

25 Q. Okay. Is fuel cost an input of the

1 model?

2 A. That's correct, yes.

3 Q. And how does fuel cost relate to cost of
4 goods sold?

5 A. For a general unit station, the model
6 will take the fuel prices, which we call the "fuel
7 curves" and use that together with all the other cost
8 information such as variables and chemicals and all
9 the others and it calculate it on a
10 dollar-per-megawatt-hour cost. Actually, there's a
11 curve. The model will then optimize, dispatch the
12 unit based on the hour-by-hour projected prices and
13 the model will come up with a dispatching volume, the
14 revenue, and cost. So, in other words, it's not the
15 volume multiplied by the fuel cost, per se. You can
16 simplify it that way, but that's not exactly how the
17 model works.

18 So the reason, once again, I'm not the
19 person to answer this is because he may be using
20 other things. For example, for OVEC, we do not have
21 the fuel costs; rather, we just have a projected
22 number on a dollar-per-megawatt-hour basis from OVEC,
23 I believe. So --

24 Q. Right. You're saying that ultimately
25 you're charged whatever OVEC pays; is that right?

1 A. And, once again, on a projected basis, I
2 think that's what it means, but I'm not an accounting
3 expert, I don't really know how the settlement works.

4 Q. Okay. And earlier you testified about
5 how weather is a variable in determining your -- the
6 load distribution within a month -- or, the
7 generation within a month. Would you agree with
8 that?

9 A. Yes. When I say "load," I don't mean the
10 Duke Energy load. It's the PJM load. Because the
11 model uses the PJM market and a simulated PJM market
12 and come up with the hourly prices based on the
13 regional supply and regional demand of the entire PJM
14 footprint, not our load.

15 Q. Right. So your model -- your model
16 reflects all of PJM, not just -- not just Duke's
17 interest in it.

18 A. That's right.

19 Q. Not just Duke's generation.

20 A. That's right.

21 Q. And does your model include
22 carbon-emission reduction requirements in the cost of
23 goods sold? Do you know?

24 A. Our model use that as an input, that's a
25 cost factor, but I don't know what is included here

1 or not because he get the information from the CBM.

2 There might be other calculations which I'm not aware
3 of. But the model, itself, treat that as a cost
4 component.

5 Q. And how did you -- how does the model, if
6 you know, project what the carbon-reduction
7 requirements -- carbon-emission reduction
8 requirements would be in the future?

9 A. I don't think the model, the CBM, has the
10 requirement in there. If there is a reduction
11 criteria, it would have been reflected in the curves
12 which is input into the model.

13 Q. And when you say "the curves," are you
14 talking about --

15 A. The energy curve.

16 Q. -- the cost curves associated with coal?

17 A. I was talking about the energy curves,
18 energy price curves.

19 Q. Energy --

20 A. Yeah.

21 Q. The energy price curves, right?

22 A. Yes.

23 - - -

24 (CONFIDENTIAL PORTION EXCERPTED.)

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MS. KINGERY: I'm sorry to interrupt. I
just want to interject. This isn't -- still isn't
confidential, correct, this level of detail? Just
asking.

13

THE WITNESS: Yeah.

14

MR. WATHEN: That one is a little
shakier.

16

THE WITNESS: Yeah.

17

MR. WATHEN: That's a unique
characteristic of our model, I think.

19

THE WITNESS: That's right.

20

MS. KINGERY: Yeah.

21

THE WITNESS: That's right.

22

MS. KINGERY: Carolyn, can we take that
discussion and just move it into the confidential
record?

25

MR. BERGER: I'm not sure I heard,

1 Jeanne, what is being said --

2 MS. KINGERY: I'm sorry.

3 MR. BERGER: -- is confidential.

4 MS. KINGERY: I'm sorry. That is
5 something that's unique about our model, so that's --
6 that particular question and answer there, talking
7 about weather, is something that really should have
8 been in the confidential. So I was just asking
9 Carolyn if we could just pick up that Q and A and
10 just put it into the confidential portion of the
11 transcript.

12 MR. BERGER: That's fine, Carolyn, you
13 can just make that confidential. I don't know if you
14 can -- I imagine you'll just have to somehow redact
15 that from this record, rather than --

16 MS. KINGERY: Yeah, however is convenient
17 for you. Just -- it's just --

18 THE COURT REPORTER: Can we go off the
19 record a second?

20 MS. KINGERY: Yes. We're going to go off
21 the record.

22 (Discussion off the record.)

23 MS. KINGERY: Yes. So, Ben, and I'm
24 just -- Tad, I'm just going to instruct Ben what to
25 do if we get into more of this.

1 If there's an answer to a question where
2 it's something that's unique to our system, our
3 model, then let us know before you answer.

4 THE WITNESS: Oh, okay.

5 MS. KINGERY: If you can.

6 THE WITNESS: All right.

7 MS. KINGERY: Okay.

8 THE WITNESS: Will do.

9 MR. BERGER: Right. And not just that
10 it's unique, Mr. Zhang, but that it's essentially a
11 trade secret is the standard here.

12 MS. KINGERY: I said "unique" only
13 because if it's unique then there's at least some --
14 we need to think about it as to whether it's a trade
15 secret. If it's something that's ordinary in
16 everybody's models, then it's not going to be a trade
17 secret.

18 MR. BERGER: Understood.

19 MS. KINGERY: Yup. Okay.

20 MR. BERGER: Just getting clarification.

21 MS. KINGERY: Yes.

22 Q. (By Mr. Berger) And, Mr. Zhang, do you
23 know what the input -- do you know what the input for
24 energy prices, what -- how they were developed for
25 the period through 2018?

1 A. I believe that's the visible part which
2 is the so-called market curves that we have from
3 inside, I think, of MCG.

4 Q. Did you say "MCV"?

5 A. MCG. I'm sorry.

6 Q. Okay.

7 A. MCG, yeah.

8 Q. What does that stand for?

9 A. Midwest Commercial Generation.

10 Q. So those are independently generated by
11 your operations; is that correct?

12 A. I wouldn't call it "independently"
13 because they are available information on the market,
14 so I guess everyone else can also have that
15 information. But the particular curve --

16 Q. So there's the visible -- there's the
17 visible information you were talking about earlier of
18 traded energy.

19 A. Yeah.

20 Q. Okay. But the pricing comes through MCG
21 is what you're saying, they get that information from
22 the visible sources in the marketplace.

23 A. That's correct, yes.

24 Q. And other than coal and gas prices,
25 natural gas prices, are there other energy sources

1 that go into your model for energy pricing?

2 A. Once again, in a general case, for other
3 units, there were cost information about SO2 and NOx.
4 Now, right now, it's very small, but in the past
5 those were significant amounts. But for OVEC, I
6 think it was all provided to us by OVEC.

7 Actually, once again I need to check. I
8 think that's -- that's true, that information is all
9 coming from them. So I don't know, once again,
10 specifically what is in there and what is not in
11 there.

12 Q. So you think energy pricing in your model
13 for OVEC may come from OVEC; you're not sure.

14 A. No; the cost. The energy pricing is all
15 coming from here.

16 Q. Okay. But the cost of fuel --

17 A. Yeah.

18 Q. -- energy cost, may come from OVEC.

19 A. Yes. Or other components of the cost.

20 Q. Other components of OVEC's costs, you're
21 saying, may also come from OVEC.

22 A. Yeah.

23 Q. Okay. But you're not sure about that.

24 A. That's correct.

25 Q. Would you agree with me that Clifty Creek

1 and Kyger Creek have very different costs of
2 operation?

3 A. I cannot have an opinion because I don't
4 know the specifics.

5 Q. Are you familiar with those plants' costs
6 of operation?

7 A. No.

8 Q. Okay. And for the period through 2018,
9 other than the visible information for energy prices
10 and energy costs, you only used -- I'm sorry, you
11 only used the visible information, you did not use
12 EVA, for example, to help develop that pricing
13 information in your model.

14 A. No, I -- once again, I have to ask you to
15 clarify. Do you mean that we were not part of the
16 team that developed the curve that we used, or do you
17 mean that we did not make a model run that used the
18 fundamental curve that was produced by EVA, which one
19 of those two?

20 Q. What I'm asking is, in terms of the
21 inputs that you used in your model run, through the
22 period for 2018, it's my understanding that you
23 relied solely on the visible information in the
24 market from MCG, and that Energy Ventures, for
25 example, didn't provide any price input or cost input

1 for that information.

2 MS. KINGERY: I'm going to object here.

3 Can you clarify what you mean by the "model runs"?

4 Which model runs?

5 MR. BERGER: Well, I'm talking

6 specifically about the data that Mr. Dougherty

7 provided us that he said came from Mr. Zhang's team,

8 and that would include the cogs pages and the revenue

9 and the output pages, generation output pages.

10 MS. KINGERY: Do you need Carolyn to

11 reread the question?

12 THE WITNESS: Yes. Can you reread it?

13 (Record read.)

14 A. You would have to be more specific on

15 that because, once again, the model run we performed

16 on a daily basis serves many purposes. So, for our

17 transaction purposes, we use market information only,

18 but the model is capable of using any curve inputs

19 for other purposes. For example, someone can come

20 with a set of curves that were produced by EVA that

21 covers the entire 25-year and ask the team to make a

22 model run, that's entirely possible, and the model

23 can do that.

24 Q. Okay. So it depends on who was asking

25 what is what you're saying.

1 A. I think depending on the specific purpose
2 of the request, they want to do the right thing, use
3 the right input.

4 Q. Okay. Mr. Zhang, can you turn to page 22
5 of the exhibit and here you'll see what's called a
6 "billable cost summary" from the Ohio Valley Electric
7 Corporation. This particular one on pages 22 and 23
8 was developed as part of OVEC's 2013 -- or, its
9 budgeting for 2014. I should say its budgeting -- a
10 budget that was developed in 2013 for the period 2015
11 to 2024. Are you familiar at all with this
12 information?

13 A. No, I'm not.

14 Q. Okay.

15 A. This is accounting information.

16 Q. Okay. You haven't seen this particular
17 document before; is that correct?

18 A. No, I have not.

19 Q. Going to page 25 of the exhibit, you'll
20 see a similar document in a slightly different
21 format. In fact, I think it's the same document
22 except it has an additional line here, an additional
23 couple lines at the top of the exhibit. Do you see
24 where it says "Estimated Delivered Power Sales from
25 OVEC Generation" and then it has an "Estimated

1 Surplus Energy Use Factor Percentage"?

2 A. I see that.

3 Q. Are you familiar with what those terms
4 mean for OVEC?

5 A. No, I do not know specifically what they
6 mean by this term "surplus energy."

7 Q. Okay. So you don't know -- you would
8 have no idea how they came up with the numbers shown
9 on that line.

10 A. No, I do not.

11 Q. You were earlier talking about formal
12 validations that your Global Risk Management
13 department underwent when you were developing your
14 model and that Global Risk Management continues to
15 participate in the validation of the model; is that
16 correct?

17 A. That is correct.

18 Q. Would you basically characterize that
19 validation as ongoing testing of the accuracy of the
20 model as a modeling tool?

21 A. I would say yes; to make sure the model
22 works properly.

23 MR. BERGER: Can we take a five-minute
24 break, Jeanne?

25 MS. KINGERY: Absolutely. Okay.

1 MR. BERGER: All right.

2 MS. KINGERY: It's currently 2:43. How
3 about 2:50?

4 MR. BERGER: Okay. Sounds good. Thank
5 you.

6 (Recess taken.)

7 MR. BERGER: Hello, Mr. Zhang. Again,
8 thank you for your time. I just have a few other
9 questions.

10 Q. (By Mr. Berger) My first question, on the
11 public record that is, my first question, again, is
12 going back to when Mr. Dougherty prepared this
13 exhibit, I think you testified that you weren't aware
14 of when that run was conducted, and he testified
15 generally that it was prepared in response to a data
16 response in this proceeding which would have been
17 sometime between June and August. Are the -- are the
18 inputs in the model updated on a daily basis or when
19 are they changed, generally speaking?

20 A. The model, once again, is run on a daily
21 basis, which we call the "production run." So the
22 information that we use changes on a daily basis.
23 I'm talking the market information.

24 Q. So new forward prices would be put into
25 the model on a daily basis; is that right?

1 A. That is correct.

2 Q. So the particular day when Mr. Dougherty
3 put in the request for the run or actually ran the
4 model himself, as he was able to do, could have had
5 an impact on the numbers that we see on page 5 of the
6 exhibit.

7 A. Once again, I don't believe he run the
8 model himself, but he made a request on the
9 particular day for a model run, yeah.

10 Q. And you don't know what day that was,
11 correct?

12 A. That is correct.

13 MR. BERGER: That's all the questions I
14 have for you on the public record, Mr. Zhang. Thank
15 you very much.

16 THE WITNESS: Thank you.

17 MR. BERGER: And I think fellow counsel
18 from other parties will now have some questions --
19 or, may have some questions for you.

20 THE WITNESS: All right. Thank you.

21 MR. BERGER: Do we want to run through
22 the list here with Steve being last.

23 Scott, do you have any questions?

24 MR. CASTO: Nothing for me, Tad. Thank
25 you.

1 MR. BERGER: Doug?

2 MR. HART: No. Thank you.

3 MR. BERGER: Colleen?

4 Sounds like Colleen's not on the line
5 anymore.

6 MS. KINGERY: Yeah, I think I heard her
7 go off.

8 MR. BERGER: Kim?

9 Sounds like Kim may not be on either.

10 And, Steve, any questions?

11 MR. BEELER: No questions, Tad.

12 MS. KINGERY: I think there was -- you
13 missed Becky.

14 MR. BERGER: Oh, I'm sorry, Becky.

15 MS. HUSSEY: That's okay. I have a
16 couple questions, but they're both for the
17 confidential record.

18 MR. BERGER: Okay. So why don't we,
19 then, move to the confidential record. We'll note
20 that one question asked on the public record that
21 we're asking to be moved to the confidential record,
22 one question and answer. And, Carolyn, as I
23 understand it, you have marked that accordingly.

24 THE COURT REPORTER: Correct.

25 MR. BERGER: Mr. Zhang, I'll ask you a

1 few questions on the confidential record. I really
2 don't have that many questions.

3 - - -

4 (CONFIDENTIAL PORTION EXCERPTED.)

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1 State of Ohio :
 2 County of _____ : SS:

3 I, Ben Zhang, do hereby certify that I have
 4 read the foregoing transcript of my deposition given
 5 on Wednesday, October 1, 2014; that together with the
 6 correction page attached hereto noting changes in
 7 form or substance, if any, it is true and correct.

6

7

 Ben Zhang

8

9 I do hereby certify that the foregoing
 10 transcript of the deposition of Ben Zhang was
 11 submitted to the witness for reading and signing;
 12 that after he had stated to the undersigned Notary
 13 Public that he had read and examined his deposition,
 14 he signed the same in my presence on the _____ day
 15 of _____, 2014.

13

14

 Notary Public

15

16 My commission expires _____, _____.

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1 CERTIFICATE

2 State of Ohio :
3 County of Franklin : SS:

4 I, Carolyn M. Burke, Notary Public in and for
5 the State of Ohio, duly commissioned and qualified,
6 certify that the within named Ben Zhang was by me
7 duly sworn to testify to the whole truth in the cause
8 aforesaid; that the testimony was taken down by me in
9 stenotypy in the presence of said witness, afterwards
transcribed upon a computer; that the foregoing is a
true and correct transcript of the testimony given by
said witness taken at the time and place in the
foregoing caption specified and completed without
adjournment.

10 I certify that I am not a relative, employee,
11 or attorney of any of the parties hereto, or of any
12 attorney or counsel employed by the parties, or
financially interested in the action.

13 IN WITNESS WHEREOF, I have hereunto set my
14 hand and affixed my seal of office at Columbus, Ohio,
on this 15th day of October, 2014.

15 _____
16 Carolyn M. Burke, Registered
17 Professional Reporter, and
Notary Public in and for the
State of Ohio.

18 My commission expires July 17, 2018.

19 - - -

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Case No(s). 14-0841-EL-SSO, 14-0842-EL-ATA

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