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September 14, 2015

Ms. Betty McCauley, Secretary  
Public Utilities Commission of Ohio  
Docketing Division, 11th Floor  
180 E. Broad St.  
Columbus, OH 43215

Re: Case No. 14-1297-EL-SSO

Dear Ms. McCauley:

Attached please find an Errata Sheet for filing in the above-referenced docket pertaining to the testimony of Companies' witness Evans in both clean and redline formats. This Errata Sheet makes specific changes to both the public and confidential supplemental testimony of this witness. If you have any questions or concerns please feel free to contact me.

Very truly yours,



N. Trevor Alexander

1                                   A.     **THE CLEAN POWER PLAN**

2     **Q.     WHAT IS THE CLEAN POWER PLAN?**

3     A.     The Clean Power Plan (“CPP”) proposes to regulate CO<sub>2</sub> emissions under Section 111(d)  
4           of the Clean Air Act. The U.S. EPA estimates that the CPP will reduce national power  
5           sector emissions 32% below 2005 levels in 2030. The CPP requires states to develop  
6           plans to meet CO<sub>2</sub> emission rate standards.

7     **Q.     HOW DID U.S. EPA DEVELOP EACH STATE’S CO<sub>2</sub> AVERAGE EMISSIONS**  
8           **RATE STANDARD?**

9     A.     The Clean Air Act requires U.S. EPA to define the Best System of Emission Reductions  
10           (“BSER”) to develop emission performance standards. U.S. EPA defined BSER as a  
11           combination of measures available to states which it refers to as “Building Blocks.” In  
12           assessing each state’s options for reducing emissions from the state’s 2012 fossil  
13           emission rate, U.S. EPA used assumptions for each of three Building Blocks:

- 14           •     Building Block #1: Improved coal plant heat rates to increase unit efficiency;
- 15           •     Building Block #2: Redispatch/fuel switching based on a glide path increasing to  
16                 a maximum of 75% of net summer capacity for NGCC units; and
- 17           •     Building Block #3: Redispatch/Fuel switching as a result of increased renewable  
18                 energy, based on incremental generation above 2012 levels stemming from an  
19                 assessment of regional technical potential;<sup>1</sup>

20           The Building Blocks are used to calculate uniform national emission rates for affected  
21           electric generating units, and those uniform rates are used to derive state goals. While  
22           energy efficiency is not directly built into the derivation of the BSER target, it may be

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<sup>1</sup> Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units (hereinafter “CPP Final Rule”), available at:  
<http://www.epa.gov/airquality/cpp/cpp-final-rule.pdf>

1 used as a compliance mechanism. U.S. EPA developed a final BSER 2030 target CO<sub>2</sub>  
2 emission rate for Ohio of 1,190 lb/MWh.

3 The final 111(d) rule<sup>2</sup> allows states to choose between a rate-based approach to  
4 compliance, whereby the average emission rate of a state must be less than or equal to the  
5 BSER target developed for that particular state, and a mass-based approach. EPA  
6 produced modeling of its proposed 111(d) rule, which reflected a rate-based approach,  
7 and I examined EPA's modeling of the proposed rule's rate-based approach in my  
8 Supplemental Testimony filed May 4, 2015. EPA also has produced modeling of the  
9 final 111(d) rule's rate-based approach. Examining the EPA's modeling of the final  
10 rule's rate-based approach is instructive in assessing differences between the proposed  
11 111(d) rule and the final 111(d) rule.

12 **Q. HOW WILL OHIO COMPLY WITH THE CPP?**

13 A. Under the CPP, each state has flexibility in determining how it will comply. Indeed, the  
14 CPP's final form could be affected by litigation concerning the plan's legality. Ohio may  
15 wait to see what the final litigated form of the CPP will be before determining what form  
16 a final state compliance plan would take.

17 **Q. CAN SAMMIS HELP OHIO MEET THE REQUIREMENTS OF THE CPP?**

18 A. Yes. Sammis is a valuable asset for Ohio's compliance with the CPP, through the term of  
19 the Economic Stability Program and beyond, according to U.S. EPA's modeling.

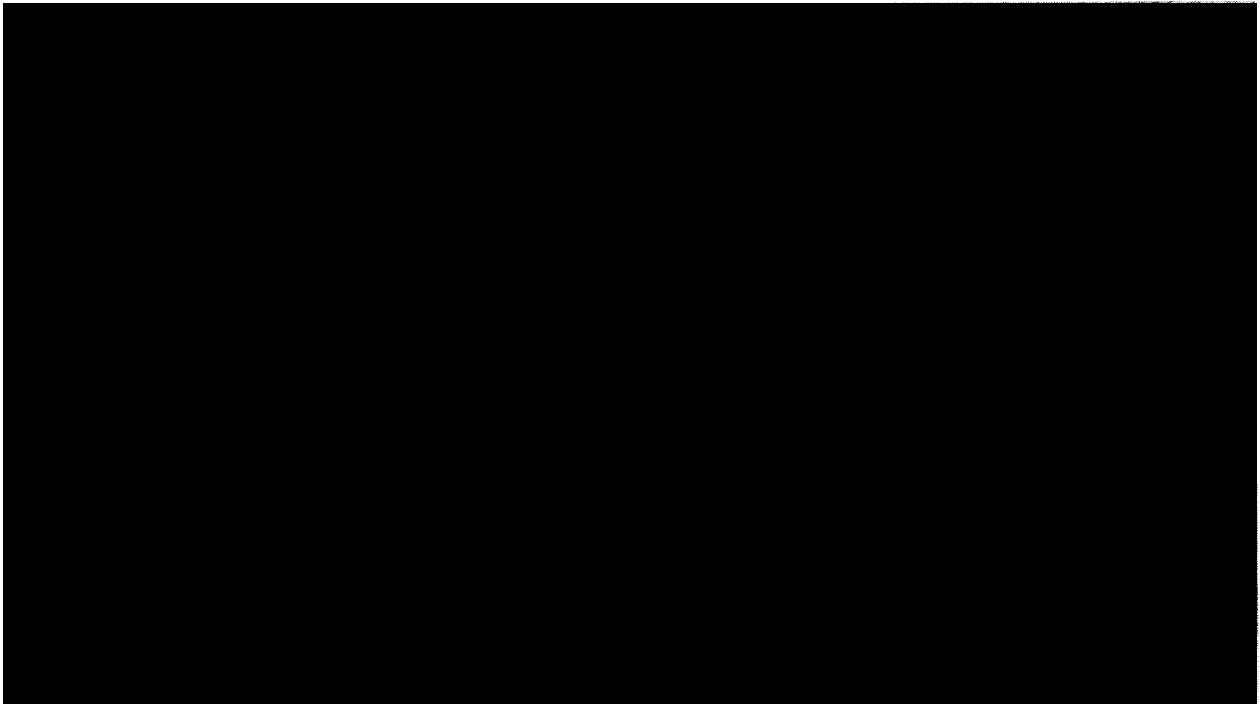
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21 **CPP?**

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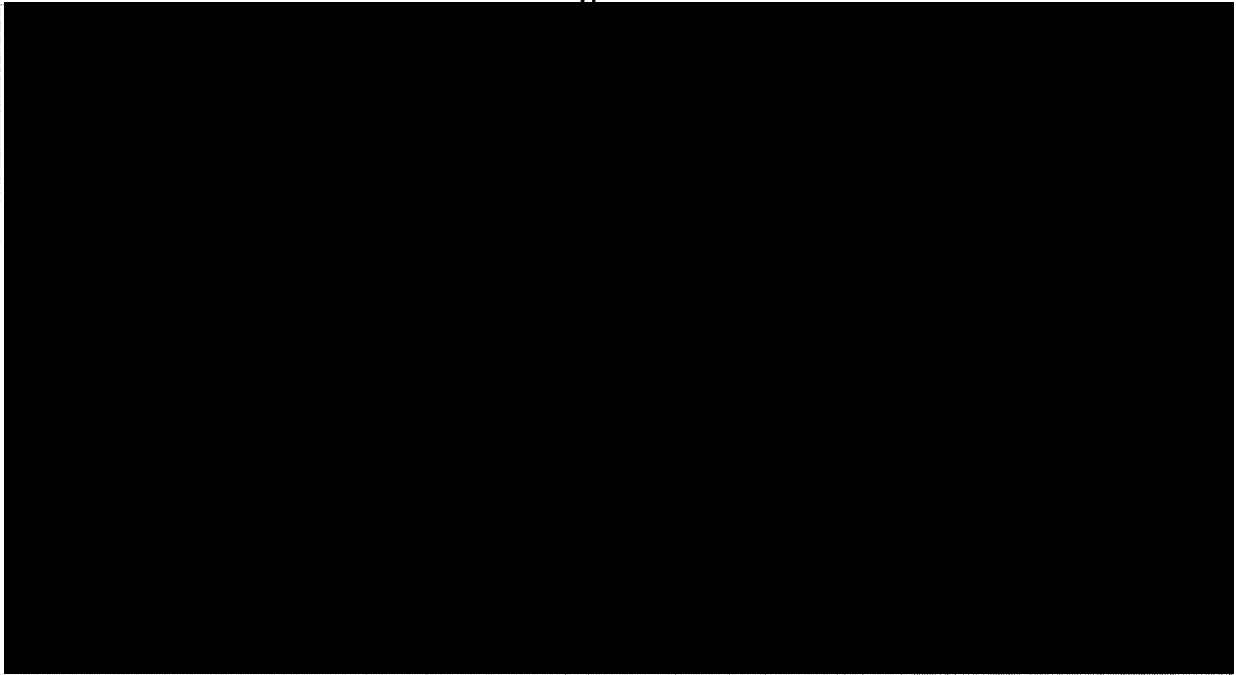
<sup>2</sup> The 111(d) rule becomes final 60 days after publication in the Federal Register.

1 A. According to the modeling, the operation of Sammis, combined with investment in the  
2 other building blocks, represents Ohio's least-cost strategy for complying with the CPP.  
3 U.S. EPA modeling projects [BEGIN CONFIDENTIAL] [REDACTED] [END CONFIDENTIAL]  
4 GW of coal in Ohio to retire, but that does not include Sammis. As I mentioned in my  
5 discussion of the proposed CPP, this is no surprise, since Sammis is well-controlled,  
6 allowing it to take advantage of lower cost coal in near proximity to the Plant,  
7 minimizing transportation costs relative to other coal plants. For the same reason, the  
8 U.S. EPA modeling envisions Sammis remaining a competitive resource [BEGIN  
9 CONFIDENTIAL] [REDACTED]  
10 [REDACTED]


11 **Figure 1**



1

**Figure 2**

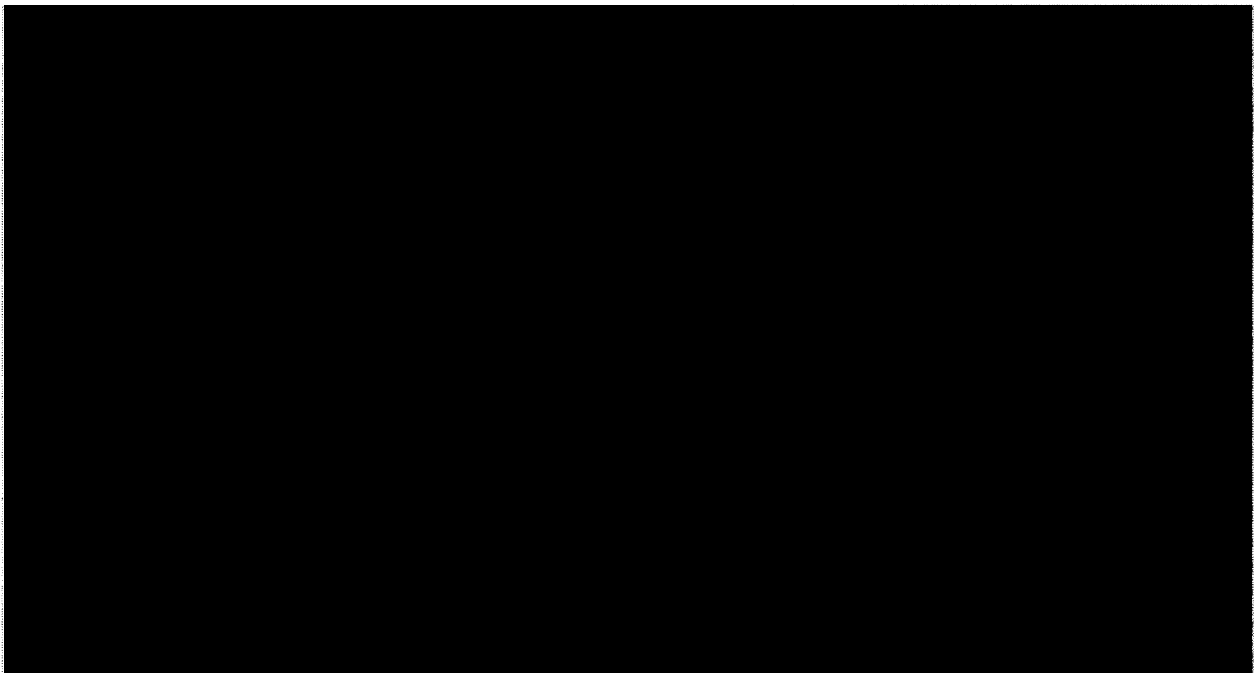
2

3 [END CONFIDENTIAL] Focusing on Ohio plants in the U.S. EPA model for the year  
4 2030, the Sammis units are competitive resources that are dispatched [BEGIN  
5 CONFIDENTIAL] 

6

**Figure 3**

7

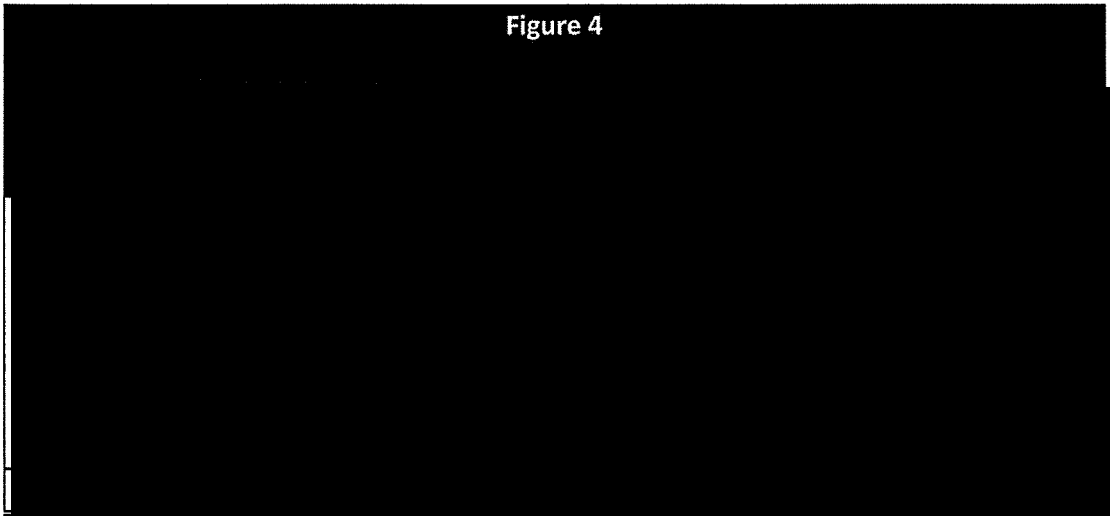


8

1 [END CONFIDENTIAL] The U.S. EPA modeling's vision of Sammis remaining a  
2 competitive resource is also reflected by the fact that EPA modeling projects the Sammis  
3 plant will operate at [BEGIN CONFIDENTIAL] [REDACTED]

4 [REDACTED]  
5 [REDACTED]  
6 [REDACTED]

Figure 4



7 [END CONFIDENTIAL] As the capacity factor percentages in Figure 4 demonstrate,  
8 U.S. EPA assumes Sammis will be running continuously throughout the Economic  
9 Stability Program and beyond. Also, as illustrated by the economic dispatch curves in  
10 Figures 1 through 3, the assumption in U.S. EPA modeling that Sammis remains a  
11 competitive resource signifies that U.S. EPA envisions Sammis as a plant that will be  
12 relied upon to run continuously, and that it will provide power that is less expensive than  
13 power from other generating plants.

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<sup>3</sup> EPA Rate Based Trading IPM Model Outputs, available at:  
[http://www.epa.gov/airmarkets/documents/ipm/Rate\\_Based.zip](http://www.epa.gov/airmarkets/documents/ipm/Rate_Based.zip)

1 **Q. WHAT IMPACT WOULD THE RETIREMENT OF DAVIS-BESSE HAVE ON**  
2 **CARBON EMISSIONS IN OHIO?**

3 A. Carbon emissions in Ohio likely would increase if Davis-Besse is retired. The  
4 Companies project that Davis-Besse will average approximately [BEGIN  
5 CONFIDENTIAL] [REDACTED] [END CONFIDENTIAL] million megawatt hours (“MWhs”) of  
6 energy output between 2017 and 2030. If Davis-Besse is retired, these lost MWhs would  
7 likely be replaced by over [BEGIN CONFIDENTIAL] [REDACTED] [END CONFIDENTIAL]  
8 MW of natural gas-fired generation (assuming a 75% capacity factor).<sup>4</sup> However,  
9 replacing Davis-Besse with this new natural gas combined-cycle (“NGCC”) capacity  
10 would increase Ohio’s CO<sub>2</sub> emissions. According to the U.S. EPA, a large, modern  
11 NGCC facility should be able to maintain CO<sub>2</sub> emissions rates of 800 lb/MWh over its  
12 life.<sup>5</sup> As a result, the new NGCC generation would result in an incremental [BEGIN  
13 CONFIDENTIAL] [REDACTED] [END CONFIDENTIAL] million tons of CO<sub>2</sub> emissions per year  
14 in Ohio.

15 In addition, nuclear uprates will create Emission Reduction Credits (“ERCs”) under the  
16 CPP. ERCs provide Davis-Besse with an additional source of revenue. If Davis-Besse  
17 retired, there would be no uprates, no ERCs and no additional source of revenue to  
18 benefit customers through the Economic Stability Program.

19 **Q. WHAT OTHER BENEFITS OF THE CPP MIGHT ACCRUE TO OHIO BY**  
20 **PRESERVING SAMMIS AND DAVIS-BESSE?**

21 A. Ohio is a net importer of electricity, and its reliance on imports from other states has been  
22 growing recently because U.S. EPA mandates and economic factors have caused a

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<sup>4</sup> See CPP Final Rule, p. 688.

<sup>5</sup> CPP Final Rule, pp. 644-45.

1 number of Ohio coal units to retire. Because Ohio is a net importer of electricity,  
2 reliability in Ohio is vulnerable to decisions made by other states when implementing  
3 their CPP compliance plans. In particular, states such as Pennsylvania and West Virginia  
4 that are net exporters could achieve compliance, in part, by reducing their total generation  
5 and eliminating these exports. Indeed, according to the U.S. EPA modeling for the CPP,  
6 reliable baseload generation will be further reduced in those states from which Ohio  
7 currently imports electricity. When that reduction is coupled with the U.S. EPA's  
8 modeled reduction in Ohio baseload generation, Ohio would have reduced access to  
9 electricity generated by the most reliable sources. Because of that, reliable baseload  
10 plants in Ohio that are modeled to survive CPP – like Sammis and Davis Besse – will  
11 play an increased role in ensuring grid reliability and stability for Ohio. Preserving plants  
12 that are modeled to survive the CPP is in the interests of Ohio.

**A. THE CLEAN POWER PLAN**

**Q. WHAT IS THE CLEAN POWER PLAN?**

A. The Clean Power Plan (“CPP”) proposes to regulate CO<sub>2</sub> emissions under Section 111(d) of the Clean Air Act. The U.S. EPA estimates that the CPP will reduce national power sector emissions ~~30~~32% below 2005 levels in 2030. The CPP requires states to develop plans to meet ~~state-specific CO<sub>2</sub> state-average~~ emission rate standards.

**Q. HOW DID U.S. EPA DEVELOP EACH STATE’S CO<sub>2</sub> AVERAGE EMISSIONS RATE STANDARD?**

A. The Clean Air Act requires U.S. EPA to define the Best System of Emission Reductions (“BSER”) to develop emission performance standards. ~~In its proposal,~~ U.S. EPA defined BSER as a combination of measures available to states which it refers to as “Building Blocks.” In assessing each state’s options for reducing emissions from the state’s 2012 fossil emission rate, U.S. EPA used assumptions for each of ~~four~~three Building Blocks:

- ~~Building Block #1: An assumed 6% average savings from unit-level efficiency improvements for coal-fired units (4% through best practices, 2% from new equipment)~~Improved coal plant heat rates to increase unit efficiency;
- ~~Building Block #2: Redispatch/fuel switching, assuming combined cycle plants can run to 70% on average to displace coal-fired generation; based on a glide path increasing to a maximum of 75% of net summer capacity for NGCC units; and~~
- ~~Building Block #3: Renewable energy and nuclear, based on an assumed growth factor for renewable energy and 5.8% of existing nuclear generation; and~~
- ~~Building Block # 4: Energy efficiency potential, based on savings of up to 1.5% per year, inclusive of existing state energy efficiency program requirements~~Redispatch/Fuel switching as a result of increased renewable energy, based on incremental generation above 2012 levels stemming from an assessment of regional technical potential;<sup>1</sup>

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<sup>1</sup> Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 79 FR 34830, § VI (June 18, 2014) (hereinafter “CPP Proposed Rules~~Final~~”)

1     The proposed 111(d) rule, as modeled by U.S. EPA, reflects a rate-based approach,  
 2     whereby the average emission rate of a state must be less than or equal to the BSER target  
 3     developed for that particular state. Building Blocks are used to calculate uniform national  
 4     emission rates for affected electric generating units, and those uniform rates are used to  
 5     derive state goals. While energy efficiency is not directly built into the derivation of the  
 6     BSER target, it may be used as a compliance mechanism. U.S. EPA developed a final  
 7     BSER 2030 target CO<sub>2</sub> emission rate for Ohio of 1,3381,190 lb/MWh.

8     The final 111(d) rule<sup>2</sup> allows states to choose between a rate-based approach to  
 9     compliance, whereby the average emission rate of a state must be less than or equal to the  
 10     BSER target developed for that particular state, and a mass-based approach. EPA  
 11     produced modeling of its proposed 111(d) rule, which reflected a rate-based approach, and  
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 13     Supplemental Testimony filed May 4, 2015. EPA also has produced modeling of the final  
 14     111(d) rule's rate-based approach. Examining the EPA's modeling of the final rule's  
 15     rate-based approach is instructive in assessing differences between the proposed 111(d)  
 16     rule and the final 111(d) rule.

17   **Q.     HOW WILL OHIO COMPLY WITH THE CLEAN POWER PLAN<sup>CPP</sup>?**

18   A.     Ohio likely will Under the CPP, each state has flexibility in determining how it will  
 19     comply. Indeed, the CPP's final form could be affected by litigation concerning the plan's

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Rule”), available at  
<https://www.federalregister.gov/articles/2014/06/18/2014-13726/carbon-pollution-emission-guidelines-for-existing-stationary-sources-electric-utility-generating>;  
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1 legality. Ohio may wait to see what the final litigated form of the Clean Power Plan will  
 2 be, which could be affected by litigation concerning the plan's legality. CPP will be before  
 3 determining what form a final state compliance plan would take. Under the CPP as  
 4 proposed, each state has flexibility in determining how it will meet its CO<sub>2</sub> state average  
 5 emission rate standard.

6 **Q. CAN SAMMIS HELP OHIO MEET THE REQUIREMENTS OF THE PROPOSED**  
 7 **CPP?**

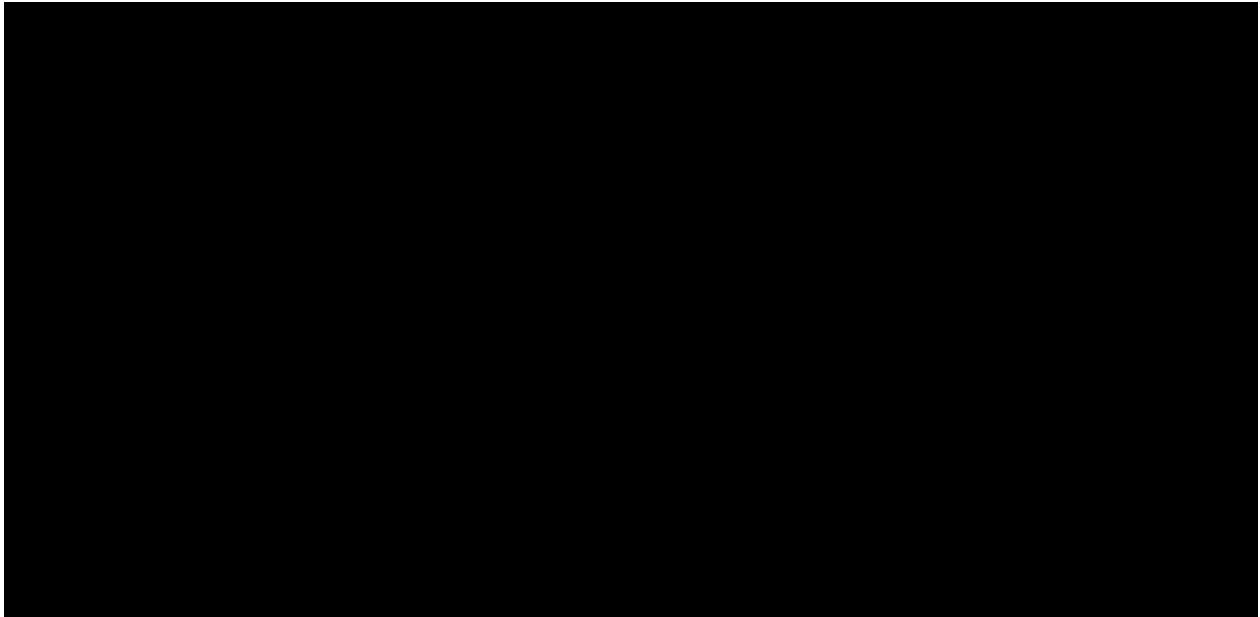
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 9 PlanCPP, through the term of the Economic Stability Program and beyond, according to  
 10 U.S. EPA's modeling for the proposed rule.

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 14 other building blocks, represents Ohio's least-cost strategy for complying with the Clean  
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 18 is no surprise, since Sammis is well-controlled, allowing it to take advantage of lower cost  
 19 coal in near proximity to the Plant, minimizing transportation costs relative to other coal  
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 22 [REDACTED]

1

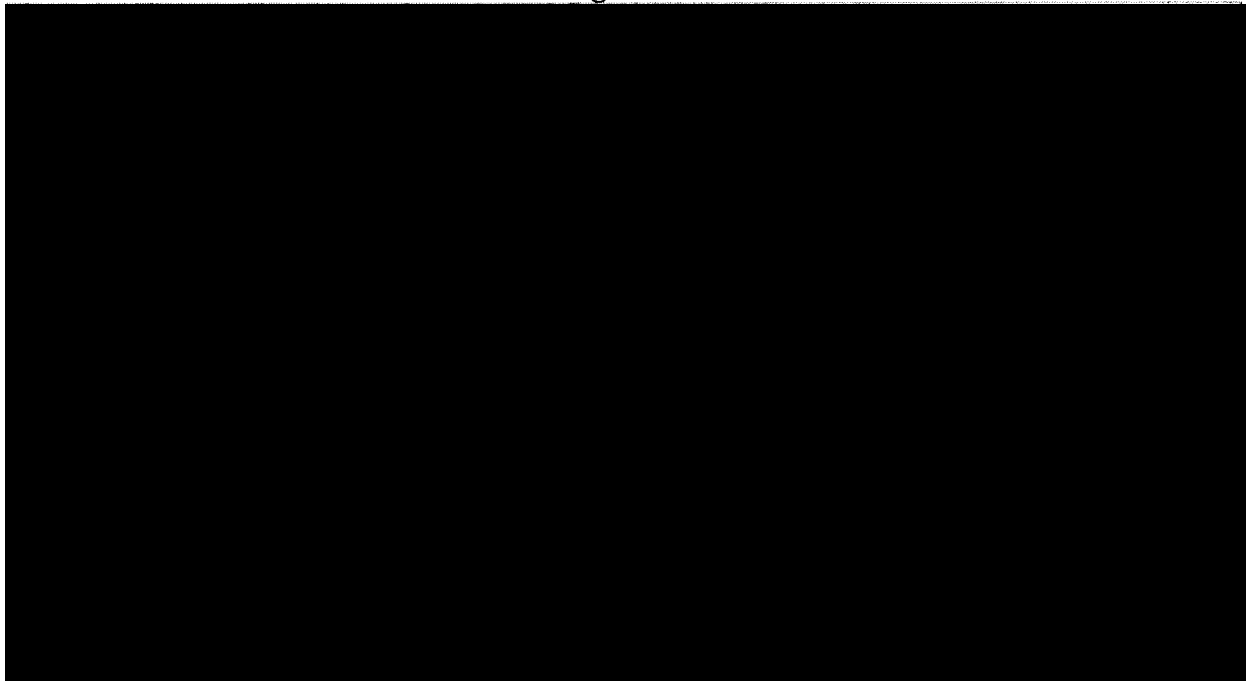
**Figure 1**



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**Figure 2**



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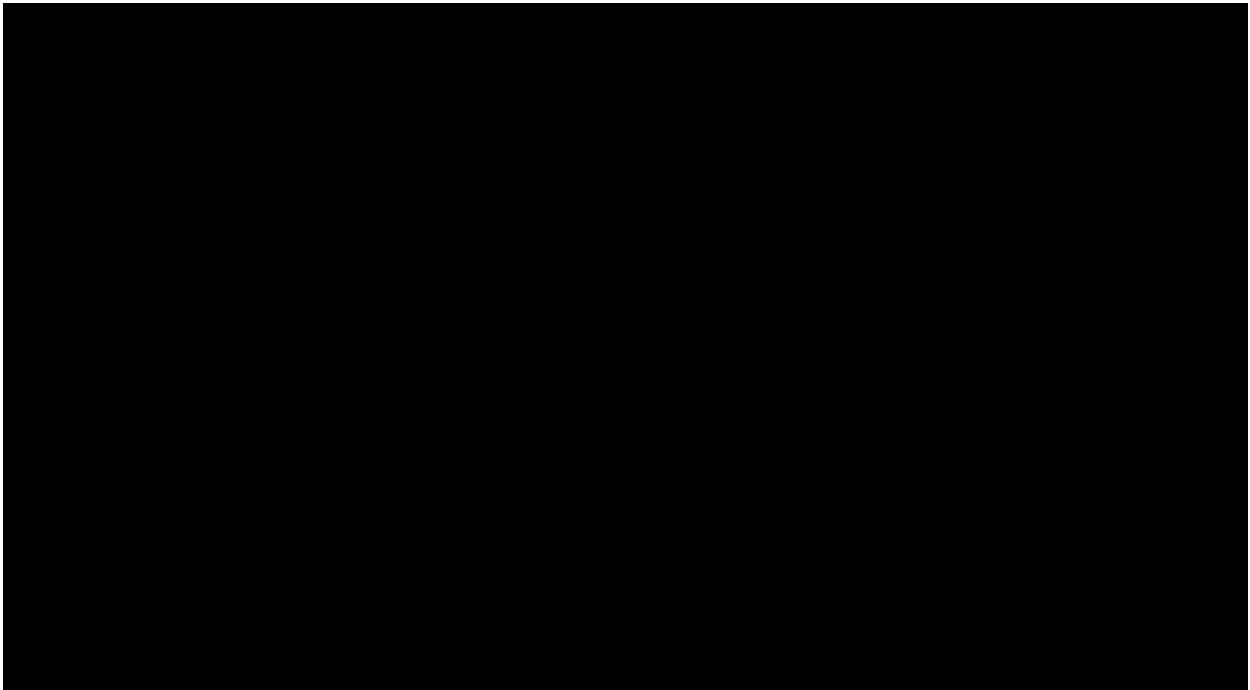
5 [END CONFIDENTIAL] Focusing on Ohio plants in the U.S. EPA model for the year

6 2030, the Sammis units are competitive resources that are dispatched [BEGIN

1 CONFIDENTIAL] [REDACTED]

2 [REDACTED]

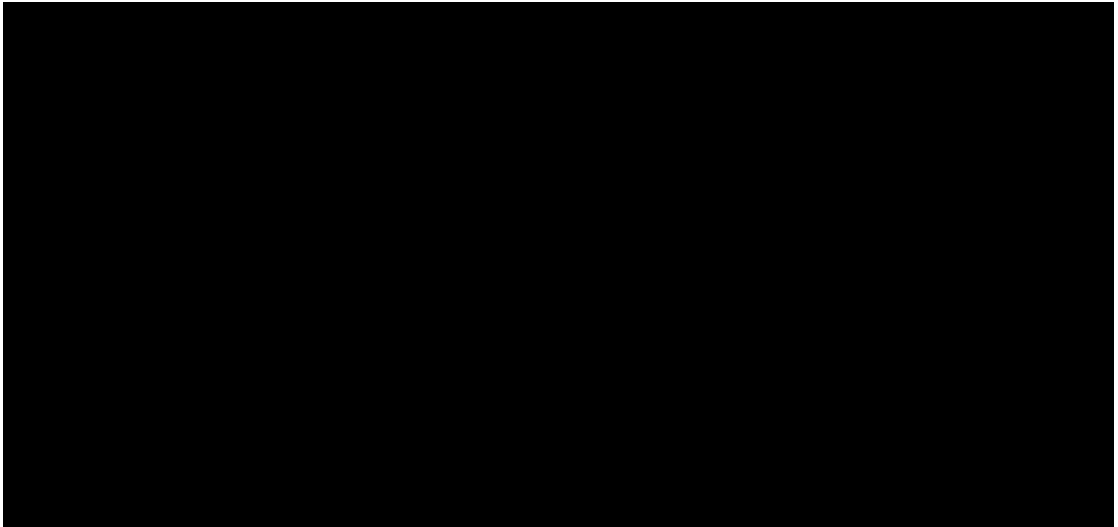
3 **Figure 3**



6 [END CONFIDENTIAL] The U.S. EPA modeling's vision of Sammis remaining a  
7 competitive resource is also reflected by the fact that EPA modeling projects the Sammis  
8 plant will operate at above an 80% capacity factor over the forecast period in the presence  
9 of the Clean Power Plan, as [BEGIN CONFIDENTIAL] [REDACTED]

10 [REDACTED]

11 [REDACTED]



1 [END CONFIDENTIAL] As the capacity factor percentages in Figure 4 demonstrate, U.S.  
 2 EPA assumes Sammis will be running continuously throughout the Economic Stability  
 3 Program and beyond. Also, as illustrated by the economic dispatch curves in Figures 1  
 4 through 3, the assumption in U.S. EPA modeling that Sammis remains a competitive  
 5 resource signifies that U.S. EPA envisions Sammis as a plant that will be relied upon to run  
 6 continuously, and that it will provide power that is less expensive than power from other  
 7 generating plants. ~~[END CONFIDENTIAL]~~

8 **Q. WHAT IMPACT WOULD THE RETIREMENT OF DAVIS-BESSE HAVE ON**  
 9 **CARBON EMISSIONS IN OHIO?**

10 A. Carbon emissions in Ohio likely would increase if Davis-Besse is retired. ~~[BEGIN~~  
 11 ~~CONFIDENTIAL]~~ The Companies project that Davis-Besse will average approximately  
 12 ~~■~~ [BEGIN CONFIDENTIAL] ~~■~~ [END CONFIDENTIAL] million megawatt hours  
 13 (“MWhs”) of energy output between 2017 and 2030. If Davis-Besse is retired, these lost  
 14 MWhs would likely be replaced by over ~~■~~ [BEGIN CONFIDENTIAL] ~~■~~ [END

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<sup>1</sup> EPA Rate Based Trading IPM Model Outputs, available at:  
[http://www.epa.gov/airmarkets/documents/ipm/Rate\\_Based.zip](http://www.epa.gov/airmarkets/documents/ipm/Rate_Based.zip)

1 ~~CONFIDENTIAL~~ MW of natural gas-fired generation (assuming a ~~70~~75% capacity  
 2 factor).<sup>34</sup> However, replacing Davis-Besse with this new natural gas combined-cycle  
 3 (“NGCC”) capacity would increase Ohio’s CO<sub>2</sub> emissions. According to the U.S. EPA, a  
 4 large, modern NGCC facility should be able to maintain CO<sub>2</sub> emissions rates of ~~1,000~~800  
 5 lb/MWh over its life.<sup>45</sup> As a result, the new NGCC generation would result in an  
 6 incremental ~~[BEGIN CONFIDENTIAL]~~ ~~[END CONFIDENTIAL]~~ million tons of  
 7 CO<sub>2</sub> emissions per year in Ohio.

8 ~~Q. ARE THERE OTHER BENEFITS THAT DAVIS-BESSE MAY PROVIDE AS A~~  
 9 ~~RESULT OF THE CLEAN POWER PLAN?~~

10 ~~A. Yes. One possible compliance approach would be a carbon market with~~  
 11 ~~allowances issued to low and zero carbon resources. Based on Ohio’s target in the~~  
 12 ~~proposed CPP, Davis Besse could be entitled to allowances equivalent to 1,338~~  
 13 ~~pounds/MWh. Assuming a CO<sub>2</sub> price of \$10/ton,<sup>5</sup> and using the U.S. EPA’s 5.8%~~  
 14 ~~preserved nuclear ratio, Davis Besse could receive an additional \$2.9 million annually that~~  
 15 ~~would benefit customers under Rider RRS. [END CONFIDENTIAL]~~In addition, nuclear  
 16 uprates will create Emission Reduction Credits (“ERCs”) under the CPP. ERCs provide  
 17 Davis-Besse with an additional source of revenue. If Davis-Besse retired, there would be  
 18 no uprates, no ERCs and no additional source of revenue to benefit customers through the  
 19 Economic Stability Program.

<sup>34</sup> See CPP Proposed Rules, § VI Final Rule, p.C.2. 688.

<sup>4</sup> Standards of Performance for Greenhouse Gas Emissions From New Stationary Sources: Electric Utility Generating Units (Jan. 8, 2014), available at <https://www.federalregister.gov/articles/2014/01/08/2013-28668/standards-of-performance-for-greenhouse-gas-emissions-from-new-stationary-sources-electric-utility><sup>5</sup> CPP Final Rule, pp. 644-45.

<sup>5</sup> EPA projects credit prices (in 2011\$/ton) of ~~[BEGIN CONFIDENTIAL]~~ \$7.27 (2020), \$8.75 (2025), \$11.30 (2030), and increasing going forward. ~~[END CONFIDENTIAL]~~ See <http://www.epa.gov/airmarkets/powersectormodeling/docs/Option%201%20State.zip>.

1 Q. ~~IF THE CPP DOES GO INTO EFFECT IN SOME FORM, WHAT OTHER~~  
2 ~~BENEFITS OF THE CPP MIGHT ACCRUE TO OHIO BY PRESERVING~~  
3 ~~SAMMIS AND DAVIS-BESSE?~~

4 A. Ohio is a net importer of electricity, and its reliance on imports from other states has been  
5 growing recently because U.S. EPA mandates and economic factors have caused a number  
6 of Ohio coal units to retire. Because Ohio is a net importer of electricity, reliability in Ohio  
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9 could achieve compliance, in part, by reducing their total generation and eliminating these  
10 exports. Indeed, according to the U.S. EPA modeling for the CPP, ~~[BEGIN~~  
11 ~~CONFIDENTIAL]~~ reliable baseload generation will be further reduced in those states  
12 from which Ohio currently imports electricity. When that reduction is coupled with the  
13 U.S. EPA's modeled reduction in Ohio baseload generation, Ohio would have reduced  
14 access to electricity generated by the most reliable sources. Because of that, reliable  
15 baseload plants in Ohio that are modeled to survive CPP ~~—~~ like Sammis and Davis Besse  
16 ~~—~~ will play an increased role in ensuring grid reliability and stability for Ohio. Preserving  
17 plants that are modeled to survive the CPP is in the interests of Ohio.—~~[END~~  
18 ~~CONFIDENTIAL]~~

**This foregoing document was electronically filed with the Public Utilities**

**Commission of Ohio Docketing Information System on**

**9/14/2015 5:27:09 PM**

**in**

**Case No(s). 14-1297-EL-SSO**

Summary: Correspondence and Errata to Supplemental Testimony of Raymond L. Evans (Public) electronically filed by Mr. James F Lang on behalf of The Toledo Edison Company and The Cleveland Electric Illuminating Company and Ohio Edison Company