

**BEFORE
THE PUBLIC UTILITIES COMMISSION OF OHIO**

In the Matter of the Application of Duke Energy Ohio, Inc., for an Increase in Electric Distribution Rates.	) ) )	Case No. 17-0032-EL-AIR
In the Matter of the application of Duke Energy Ohio, Inc., for Tariff Approval.	) )	Case No. 17-0033-EL-ATA
In the Matter of the Application of Duke Energy Ohio, Inc. for Approval to Change Accounting Methods.	) )	Case No. 17-0034-EL-AAM
In the Matter of the Application of Duke Energy Ohio, Inc. for Approval to Modify Rider PSR.	) ) )	Case No. 17-0872-EL-RDR
In the Matter of the Application of Duke Energy Ohio, Inc. for Approval to Amend Rider PSR.	) ) )	Case No. 17-0873-EL-ATA
In the Matter of the Application of Duke Energy Ohio, Inc. for Approval to Change Accounting Methods.	) ) )	Case No. 17-0874-EL-AAM
In the Matter of the Application of Duke Energy Ohio, Inc. for Authority to Establish a Standard Service Offer Pursuant to Section 4928.143, Revised Code, in the Form of an Electric Security Plan, Accounting Modifications and Tariffs for Generation Service.	) ) ) ) ) ) ) ) )	Case No. 17-1263-EL-SSO
In the Matter of the Application of Duke Energy Ohio, Inc. for Authority to Amend Its Certified Supplier Tariff, P.U.C.O. No. 20.	) ) ) )	Case No. 17-1264-EL-ATA
In the Matter of the Application of Duke Energy Ohio, Inc. for Authority to Defer Vegetation Management Costs.	) ) )	Case No. 17-1265-EL-AAM

In the Matter of the Application of Duke)	
Energy Ohio, Inc. to Establish Minimum)	
Reliability Performance Standards	)	Case No. 16-1602-EL-ESS
Pursuant to Chapter 4901:1-10, Ohio)	
Administrative Code.)	

**REVISED
PUBLIC VERSION**

**DIRECT TESTIMONY
OF
JAMES F. WILSON**

On Behalf of
The Office of the Ohio Consumers' Counsel
65 East State Street, 7th Floor
Columbus, Ohio 43215

July 19, 2018

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PUCO Case No. 17-0032-EL-AIR, et al.

1 **I. INTRODUCTION**

2

3 ***Q1. PLEASE STATE YOUR NAME, POSITION AND BUSINESS ADDRESS.***

4 ***A1.*** My name is James F. Wilson. I am an economist and principal of Wilson Energy
5 Economics. My business address is 4800 Hampden Lane Suite 200, Bethesda,
6 MD 20814.

7

8 ***Q2. PLEASE DESCRIBE YOUR EXPERIENCE AND QUALIFICATIONS.***

9 ***A2.*** I have over thirty years of consulting experience to the electric power and natural
10 gas industries. Many of my past assignments have focused on the economic and
11 policy issues arising from the introduction of competition into these industries,
12 including restructuring policies, market design, and market power. Other
13 engagements have included contract litigation and damages; pipeline rate cases;
14 forecasting and market assessment; evaluating allegations of market
15 manipulation; probabilistic modeling of utility planning problems; and a wide
16 range of other issues arising in these industries. I also spent five years in Russia
17 in the early 1990s advising on the reform, restructuring, and development of the
18 Russian electricity and natural gas industries for the World Bank and other
19 clients. I have submitted affidavits and presented testimony in proceedings of the
20 Federal Energy Regulatory Commission, state regulatory agencies, and a U.S.
21 district court.

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1 I have been involved in electricity restructuring and wholesale market design for
2 over twenty years in PJM, New England, Ontario, California, Russia, and other
3 regions. With regard to the PJM system, I have been involved in a broad range of
4 market design, planning, load forecasting, and capacity market issues over the
5 past several years. I hold a B.A. in Mathematics from Oberlin College and an
6 M.S. in Engineering-Economic Systems from Stanford University. My
7 curriculum vitae, summarizing my experience and listing past testimony, is
8 Attachment JFW-1 attached hereto.

9

10 ***Q3. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE PUBLIC UTILITIES***
11 ***COMMISSION OF OHIO (“PUCO”)?***

12 ***A3.*** Yes. I testified in Case No. 14-1693-EL-RDR (the application of Ohio Power
13 Company for approval to enter into an Affiliate Power Purchase Agreement);
14 Case No. 14-1297-EL-SSO (the application of Ohio Edison Company, The
15 Cleveland Electric Illuminating Company and The Toledo Edison Company for
16 approval of an Electric Security Plan); Case No. 14-841-EL-SSO (the application
17 of Duke Energy Ohio for approval of an Electric Security Plan); Case No. 13-
18 2385-EL-SSO (the application of Ohio Power Company for approval of an
19 Electric Security Plan); Case No. 12-426-EL-SSO (the application of The Dayton
20 Power and Light Company for approval of a Market Rate Offer); Case No. 12-
21 1230-EL-SSO (the application of Ohio Edison Company, The Cleveland Electric
22 Illuminating Company, and The Toledo Edison Company for approval of an

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1 Electric Security Plan); and Case No. 09-906-EL-SSO (the application of Ohio
2 Edison Company, The Cleveland Electric Illuminating Company, and The Toledo
3 Edison Company for approval of a Market Rate Offer).

4

5 ***Q4. WHAT IS THE PURPOSE AND SCOPE OF YOUR TESTIMONY?***

6 ***A4.*** In these proceedings Duke Energy Ohio, Inc. (“Duke Ohio,” “Utility”) seeks an
7 order from the PUCO that would, among other things, establish the initial tariff
8 amounts, and procedures for updating the amounts, applicable to Duke Ohio’s
9 existing Price Stabilization Rider (“Rider PSR”). Duke Ohio seeks to collect
10 from customers, through Rider PSR, the costs (net of market revenues) associated
11 with its contractual arrangement (“OVEC Agreement”)¹ with the Ohio Valley
12 Electric Corporation (“OVEC”). In a Stipulation and Recommendation filed
13 April 13, 2018 (“Settlement”), the signatory parties propose to accept Rider PSR
14 with certain changes, to flow through OVEC net costs incurred from January 1,
15 2018 through May 31, 2025. Testimony in support of the Settlement was filed
16 June 6, 2018.

17

18 My assignment was to review Duke Ohio’s application, the Settlement,
19 supporting testimony, workpapers and discovery in this proceeding; to review
20 Duke Ohio’s estimate of the potential cost to customers of Rider PSR and provide

¹ Amended and Restated Inter-Company Power Agreement (“ICPA”), available at
<http://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=12594881>.

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1 an alternative estimate; to evaluate other alleged benefits of Rider PSR; and to
2 draw conclusions with regard to whether the proposed treatment of OVEC costs
3 benefits ratepayers and is consistent with important regulatory principles, under
4 the PUCO's three-prong test for evaluating settlements.

5

6 ***Q5. HOW DOES THE PUCO EVALUATE PROPOSED ARRANGEMENTS***
7 ***SUCH AS RIDER PSR?***

8 ***A5.*** In a February 2015 order on a similar rider proposal by AEP Ohio,² the PUCO
9 stated that a proposal to recover generation costs through such a rider would have
10 to address, at a minimum, the following factors, which the PUCO would consider
11 in deciding whether to approve it (AEP Order, p. 25):

- 12 i. financial need of the generating plant;
- 13 ii. necessity of the generating facility, in light of future
14 reliability concerns, including supply diversity;
- 15 iii. description of how the generating plant is compliant with
16 all pertinent environmental regulations and its plan for
17 compliance with pending environmental regulations; and
- 18 iv. the impact that a closure of the generating plant would have
19 on electric prices and the resulting effect on economic
20 development within the state.

² Opinion and Order in Case No. 13-2385-EL-SSO, February 2015 ("AEP Order").

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1 The AEP Order further required that a proposal for cost recovery through an
2 arrangement such as Rider PSR must include the following (pp. 25-26):

- 3 v. provide for rigorous Commission oversight of the rider,
4 including a proposed process for a periodic substantive
5 review and audit;
- 6 vi. commit to full information sharing with the Commission
7 and its Staff;
- 8 vii. include an alternative plan to allocate the rider's financial
9 risk between both the Company and its ratepayers; and
- 10 viii. include a severability provision that recognizes that all
11 other provisions of an Electric Security Plan would
12 continue, if the rider is invalidated, in whole or in part at
13 any point, by a court of competent jurisdiction.

14

15 ***Q6. WHICH OF THESE FACTORS WILL YOUR TESTIMONY ADDRESS?***

16 ***A6.*** My testimony primarily addresses the potential cost to customers of the proposed
17 arrangement and claims about benefits. My testimony also addresses the required
18 alternative plan to allocate the rider's financial risk between Duke Ohio and its
19 customers (# vii).

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1 ***Q7. THE PUCO WILL APPROVE A SETTLEMENT WHEN IT (1) IS THE***
2 ***PRODUCT OF SERIOUS BARGAINING AMONG CAPABLE,***
3 ***KNOWLEDGEABLE PARTIES; (2) DOES NOT VIOLATE ANY***
4 ***IMPORTANT REGULATORY PRINCIPLE OR PRACTICE; AND, (3) AS A***
5 ***PACKAGE, BENEFITS RATEPAYERS AND THE PUBLIC INTEREST.***
6 ***WHICH OF THESE CONSIDERATIONS WILL YOUR TESTIMONY***
7 ***ADDRESS?***

8 ***A7.*** My testimony primarily addresses whether the Rider PSR element of the
9 Settlement is in the ratepayers' interest, and whether the proposed arrangement
10 violates any important regulatory principle.

11

12 **II. SUMMARY AND RECOMMENDATIONS**

13

14 ***Q8. PLEASE DESCRIBE THE OVEC ASSETS.***

15 ***A8.*** OVEC (together with a wholly-owned subsidiary) owns a transmission system
16 and two coal-fired power plants: the 1,086 MW Kyger Creek Plant at Cheshire,
17 Ohio, and the 1,304 MW Clifty Creek Plant located near Madison, Indiana.³ Both
18 plants began operation in 1955.

19

³ OVEC Annual Report – 2016 p. 1, available at
<https://www.ovec.com/FinancialStatements/AnnualReport-2016-Signed.pdf>.

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1 ***Q9. PLEASE DESCRIBE DUKE OHIO'S RELATIONSHIP WITH OVEC.***

2 ***A9.*** Under the OVEC Agreement, Duke Ohio, as a "Sponsoring Company," is entitled
3 to a share (9.0 percent) of the capacity and energy provided by the OVEC plants,
4 and is also allocated this same portion of OVEC fixed and variable costs. In
5 addition, Duke Ohio owns 9.0 percent of OVEC's stock.⁴

6
7 ***Q10. PLEASE EXPLAIN HOW DUKE OHIO PROPOSES TO CONNECT THE***
8 ***OVEC ENTITLEMENT TO RIDER PSR.***

9 ***A10.*** Duke Ohio seeks to collect from customers, on a non-bypassable basis through
10 Rider PSR, its portion of the OVEC costs, net of the net revenues earned from its
11 share of the OVEC output sold into the wholesale markets administered by PJM
12 Interconnection, L.L.C. ("PJM"). Thus, Rider PSR could increase or decrease
13 customer bills, depending upon whether the OVEC costs turn out to be greater or
14 less than the associated market revenues.

15
16 Duke Ohio originally proposed to recover OVEC net costs through Rider PSR for
17 the period April 1, 2017 through June 30, 2040, to align with the end of the
18 contractual commitment under the OVEC Agreement. However, under the
19 Settlement the request was changed to only recover costs incurred from January 1,
20 2018 through May 31, 2025 ("Settlement Period").

⁴ OVEC Annual Report – 2016 p. 1.

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1 ***Q11. DID DUKE OHIO PROVIDE A FORECAST OF FUTURE OVEC COSTS,***
2 ***REVENUES, AND NET COST TO CUSTOMERS?***

3 ***A11.*** Yes. Duke Ohio submitted testimony by Mr. Judah L. Rose of ICF, which
4 provided economic forecasts for the OVEC plants. On June 6, 2018, Duke Ohio
5 submitted supplemental testimony by Mr. Rose, which provides economic
6 forecasts for the OVEC plants under updated market assumptions and the time
7 period contemplated in the Settlement. The Rose Supplemental Testimony
8 contains forecasts of revenues, costs and net costs for the OVEC plants for the
9 Settlement Period (“ICF Analysis”). The updated OVEC economic forecast is
10 substantially different from Mr. Rose’s original analysis.

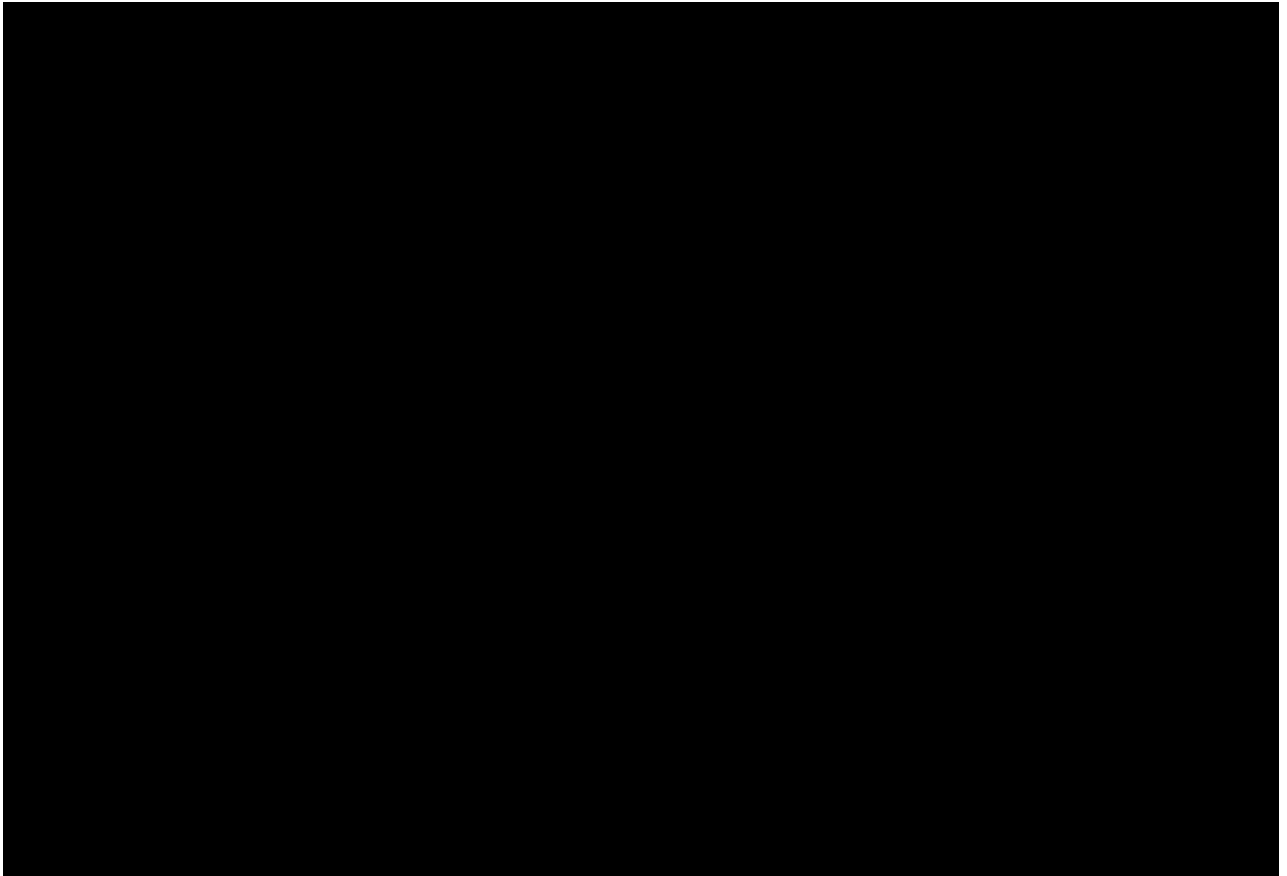
11

12 ***Q12. PLEASE SUMMARIZE ICF’S ECONOMIC FORECAST FOR THE OVEC***
13 ***PLANTS.***

14 ***A12.*** According to the ICF Analysis, OVEC’s costs will exceed its revenues by over
15 ██████████ in each of the first four years (2018, 2019, 2020 and 2021). From
16 January 1, 2018 through May 31, 2025 inclusive, OVEC’s cost will exceed its
17 revenue by ██████████, or ██████████ on a present value basis (response to

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1 OCC-POD-02-008 Highly Conf Supp Att. B). The annual net costs according to
2 the ICF Analysis are shown in Exhibit JFW-1.



3
4 ***Q13. WHAT NET COST OF THE OVEC ENTITLEMENT WOULD DUKE***
5 ***OHIO'S CUSTOMERS PAY THROUGH RIDER PSR, ACCORDING TO THE***
6 ***ICF ANALYSIS?***
7 ***A13.*** Duke Ohio's contractual commitment is for nine percent of the OVEC cost and
8 revenue, which comes to \$93 million, or \$77 million on a present value basis over
9 the Settlement Period (Rose Supplemental Testimony, Exhibits 2, 41; response to

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1 OCC-POD-02-008 Highly Conf Supp Att. B). Duke Ohio proposes to collect this
2 net cost from customers through Rider PSR.

3
4 Over 2018 to 2021, the net cost would be [REDACTED] or [REDACTED] each year. Under
5 the assumptions used in the ICF Analysis, Rider PSR would result in a [REDACTED]
6 [REDACTED], although [REDACTED] after 2021.

7
8 ***Q14. PLEASE SUMMARIZE YOUR ASSESSMENT OF THE NET COST***
9 ***ESTIMATE REPRESENTED BY THE ICF ANALYSIS.***

10 ***A14.*** The forecast of OVEC cost and revenue shown in the ICF Analysis is somewhat
11 optimistic but within a reasonable range for the 2018 to 2021 period. After 2021
12 it forecasts that prices will move in a manner favorable to the plants' economics,
13 resulting in [REDACTED]. I
14 consider this questionable. For these older coal plants, I consider it more likely
15 that the economics will worsen rather than improve after 2021.

16
17 ***Q15. HAVE YOU PREPARED AN ALTERNATIVE ESTIMATE OF THE NET***
18 ***COST TO CUSTOMERS OF RIDER PSR?***

19 ***A15.*** Yes, I have prepared an alternative estimate based on a very simple assumption
20 and calculation. Assuming that the economic outcomes forecasted for 2018 to
21 2021 do not improve (or worsen) after 2021 (that is, the average outcome over
22 2018 to 2021 is used for the subsequent years), OVEC's net cost would be [REDACTED]

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1 [REDACTED], of which Duke Ohio's share would be \$119 million (\$95 million on a
2 present value basis). As I will discuss, I consider this a more likely outcome for
3 these plants. Table 1 compares this result to the forecast from the ICF Analysis.
4

Table 1: Duke Ohio's Share of OVEC Net Margins								
	2018	2019	2020	2021	2022	2023	2024	2025
ICF Analysis	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Wilson Alternative Estimate	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Note: 2025 is January to May.								

5
6 ***Q16. DOES DUKE OHIO CLAIM THERE ARE BENEFITS FROM RIDER PSR?***
7 ***A16.*** Yes. Duke Ohio witness William Don Wathen Jr. claims that the arrangement
8 will function as an option or a hedge that serves to mitigate price volatility. He
9 also suggests (Wathen Direct, p. 14) that closure of the OVEC plants could reduce
10 fuel diversity.

11
12 ***Q17. PLEASE SUMMARIZE YOUR CONCLUSIONS REGARDING THE***
13 ***POTENTIAL BENEFIT OF RIDER PSR AS A HEDGE AGAINST THE***
14 ***VOLATILITY OF FUTURE MARKET PRICES.***

15 ***A17.*** Customers under the proposed Standard Service Offer will be served under one-
16 to three-year full requirements contracts established through periodic auctions,
17 and, therefore, would not be exposed to substantial market price volatility.

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1 Customers choosing competitive retail electric service would select among the
2 available offerings according to their preferences and could choose offerings that
3 hedge prices and provide greater stability to the extent that is desired. For such
4 customers, Rider PSR could potentially move contrary to, or in the same direction
5 as, the market-based prices they pay at any time. This is because Rider PSR
6 would be updated on a quarterly basis, so the net OVEC cost incurred in one
7 quarter would appear in customers' bills the next quarter.

8

9 In any case, the OVEC entitlement corresponds to about five percent of Duke
10 Ohio's customer load, and generation cost is about half the customers' bill, so to
11 the extent Rider PSR affects the volatility of the rates customers pay, it would
12 have a very modest impact.

13

14 I conclude that the potential for Rider PSR to act as a hedge of volatile market
15 prices or contribute to price stability is doubtful (due to the time lag).

16 Additionally, if it does act as a hedge, its impact on the total bills customers pay
17 will be insignificant in magnitude.

18

19 ***Q18. PLEASE COMMENT ON WITNESS WATHEN'S STATEMENTS ABOUT***
20 ***FUEL DIVERSITY.***

21 ***A18.*** Mr. Wathen's suggestion that supporting the OVEC generation would contribute
22 to fuel diversity is incorrect; coal remains a larger source of generation in PJM

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1 than natural gas, the most likely replacement fuel. In any case, he acknowledges
2 (Wathen Direct, p. 11) that whether cost recovery through Rider PSR is approved
3 or not will not directly affect the financial condition of the plants.

4

5 ***Q19. DID DUKE OHIO PROPOSE AN ALTERNATIVE PLAN TO ALLOCATE***
6 ***RIDER PSR'S FINANCIAL RISK BETWEEN THE COMPANY AND ITS***
7 ***RATEPAYERS, AS REQUIRED BY THE PUCO?***

8 ***A19.*** No. Duke Ohio asserts that it addressed this requirement, but it did not include
9 provisions that allocate any significant portion of the financial risk to the Utility.

10

11 ***Q20. PLEASE SUMMARIZE YOUR CONCLUSIONS REGARDING THE***
12 ***PROPOSED TREATMENT OF OVEC COSTS.***

13 ***A20.*** I conclude that the requested collection of OVEC costs through Rider PSR is
14 contrary to the ratepayers' interests. Rider PSR would impose onto customers the
15 net cost and risk associated with Duke Ohio's contractual relationship with
16 OVEC. This net cost could be considerable; according to ICF Analysis, \$77
17 million in present value over the period of the Settlement, and it will likely be
18 more. Any impact of the arrangement on price stability would be insignificant
19 compared to the expected net cost, and risk of even higher cost to customers.

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1 I also conclude that the proposed Rider PSR arrangement violates important
2 regulatory principles, in that it subsidizes uneconomic generation, and imposes all
3 the risk of the uneconomic generation on parties that cannot manage the risk.

4

5 ***Q21. HOW IS THE REMAINDER OF YOUR TESTIMONY ORGANIZED?***

6 ***A21.*** The next section of my testimony discusses the forecasted OVEC economic
7 outcomes based on the ICF Analysis, and my alternative estimate. In Section IV
8 I evaluate the claim that Rider PSR would serve as a hedge and contribute to
9 customer price stability. The final section of my testimony presents my
10 recommendation for treatment of the OVEC costs.

11

12 **III. ESTIMATED COST TO CUSTOMERS OF RIDER PSR**

13

14 ***Q22. PLEASE DESCRIBE THE ICF ANALYSIS.***

15 ***A22.*** The ICF Analysis provides economic forecasts for the OVEC plants, including
16 costs, market revenues, and “net margins,” for the Settlement Period of January 1,
17 2018 to May 31, 2025. The net margin is the plants’ forecasted earnings from
18 energy, ancillary services, and capacity sales into the PJM markets, net of the cost
19 of those sales, and net of the plants’ demand charges to cover fixed costs.

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1 **Q23. WHAT NET MARGINS DO THE OVEC PLANTS REALIZE, BASED ON**
2 **THE ICF ANALYSIS?**

3 **A23.** The annual net margins according to the ICF Analysis were shown in Exhibit
4 JFW-1 above. The net margins show [REDACTED] per year
5 during 2018 to 2021, and [REDACTED] after 2021.

6
7 On a cumulative basis, the negative net margin reaches [REDACTED] by May 31,
8 2025. On a present value basis (discounting at a [REDACTED] percent rate) the cumulative
9 cost is [REDACTED].

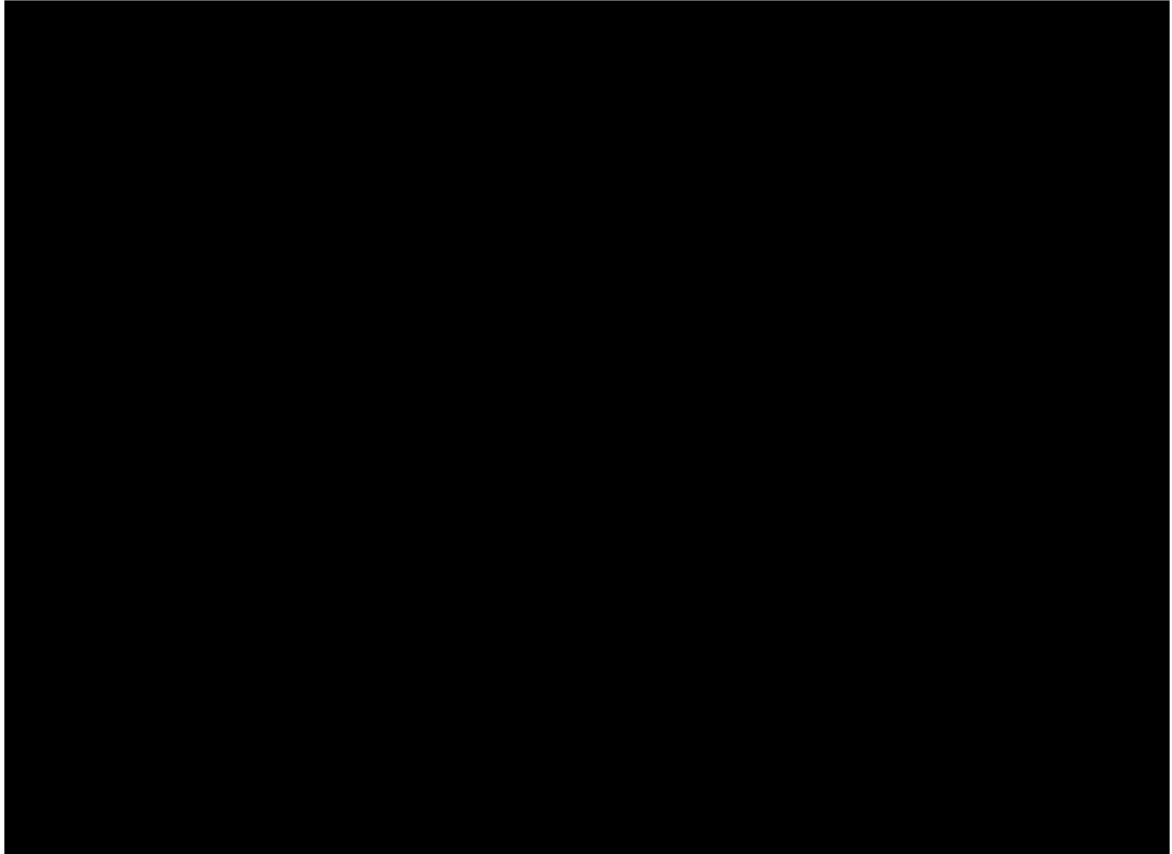
10

11 **Q24. WHAT ARE THE KEY ASSUMPTIONS IN THE ICF ANALYSIS?**

12 **A24.** The key assumptions are the energy and capacity prices earned by the plants, and
13 the cost of the coal burned by the plants. These assumptions determine how often
14 the plants run, and what they earn when they run. There are of course many other
15 assumptions, but these are the key ones that make a large difference in the results.

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1



2 ***Q25. PLEASE PRESENT THE ENERGY, CAPACITY AND COAL PRICE***

3 ***ASSUMPTIONS FROM THE ICF ANALYSIS.***

4 ***A25.*** These assumptions are illustrated in Exhibit JFW-2. The ICF Analysis forecasts
5 that energy and coal prices will [REDACTED] over 2018 to 2021, but then after
6 2021, energy and capacity prices [REDACTED] while coal prices [REDACTED]

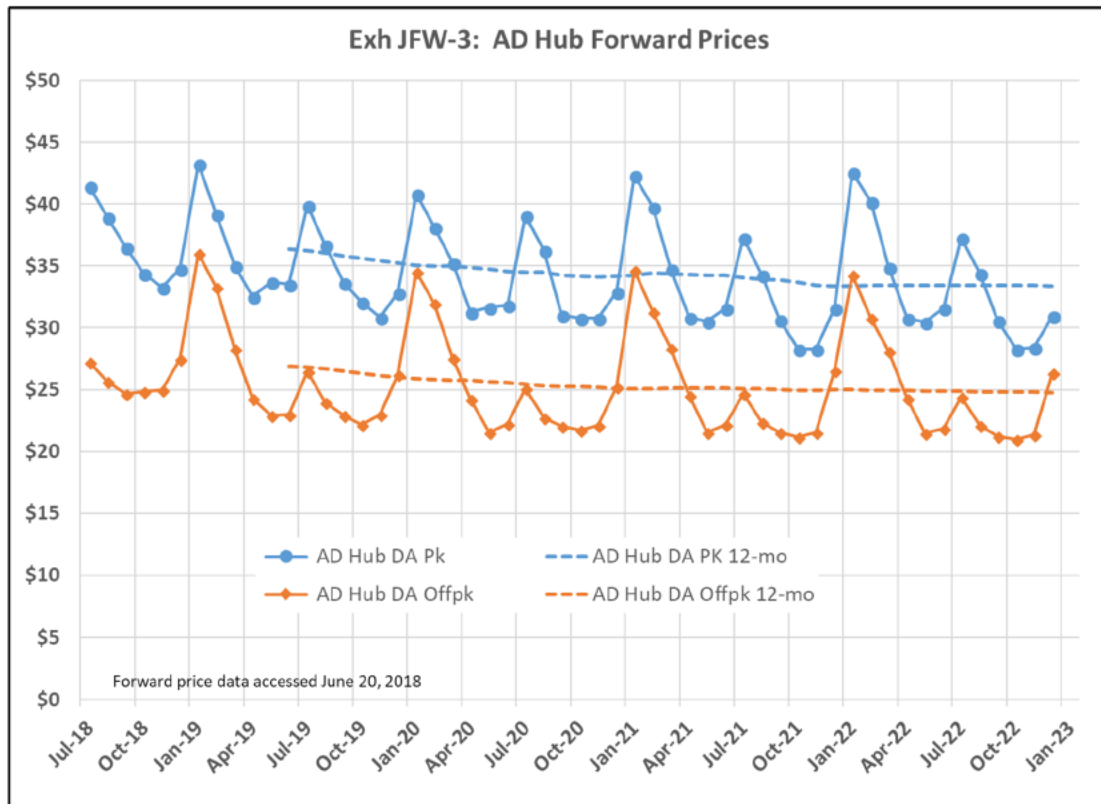
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1 ***Q26. HOW DOES THIS ENERGY PRICE FORECAST COMPARE TO RECENT***
2 ***FORWARD PRICES?***

3 ***A26.*** The energy price forecast in the ICF Analysis is reasonably consistent with
4 forward prices at this time. Exhibit JFW-3 shows recent forward prices for the
5 AEP-Dayton Hub (“AD Hub”), from CME Group; the OVEC plants earn prices
6 somewhat below AD Hub prices. The OVEC “realized price” from the ICF
7 Analysis falls between the peak and off-peak forward prices for AD Hub.
8 However, the ICF Analysis has prices [REDACTED], while forward prices
9 suggest the opposite.

10

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1 **Q27. WHY DO ENERGY PRICES [REDACTED] IN THE ICF ANALYSIS?**

2 **A27.** Mr. Rose provides several reasons why his analysis shows energy prices [REDACTED]
3 from 2016 to 2018 (Rose Supplemental Testimony, p. 56), including a return to
4 normal weather and higher natural gas prices. As to the [REDACTED], he
5 forecasts lower reserve margins due to load growth and retirements in excess of
6 new entry (Rose Supplemental Testimony, p. 10). He also notes potential new
7 regulations, inflation, and increasing new plant construction costs.

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1 ***Q28. WHY DO CAPACITY PRICES [REDACTED] IN THE ICF ANALYSIS?***

2 ***A28.*** Mr. Rose provides several reasons why he believes capacity prices will [REDACTED]
3 including (again) lower reserve margins due to load growth and retirements in
4 excess of new entry and higher new plant construction costs. He also asserts that
5 the RPM penalty rate is too low and will be raised, and that PJM will implement
6 new mitigation of “buy-side market power.” Rose Supplemental Testimony, pp.
7 65-66.

8

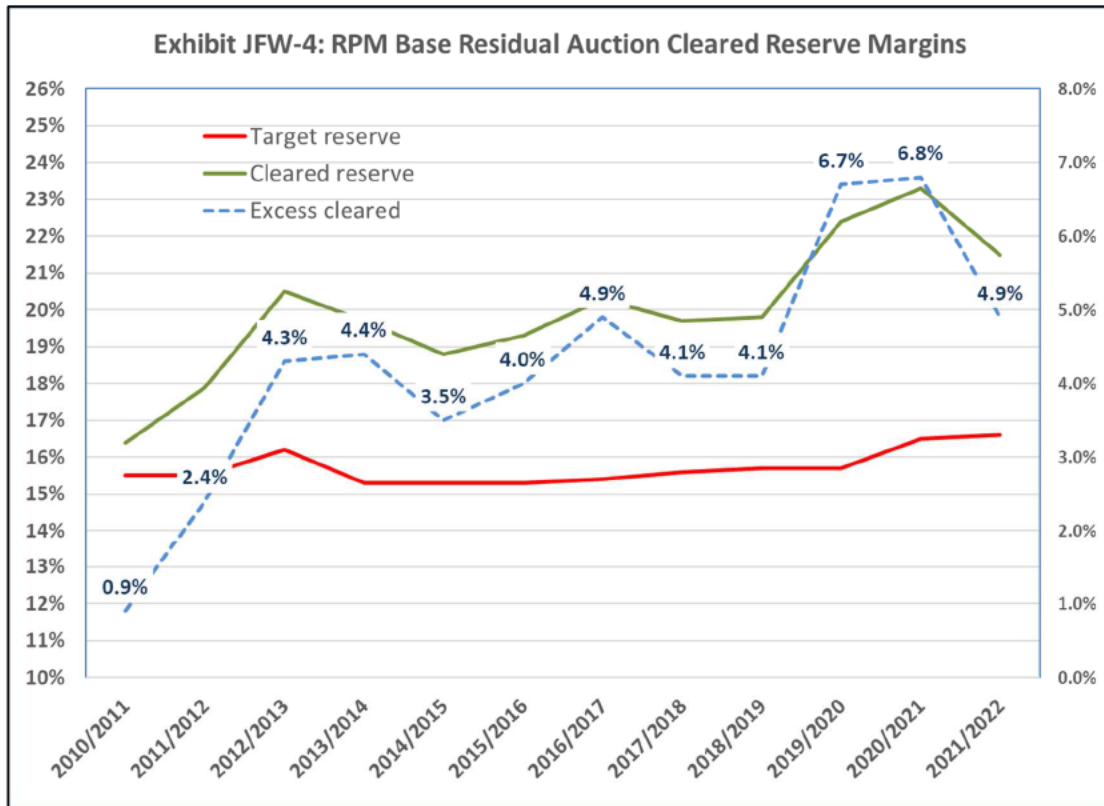
9 ***Q29. PLEASE PRESENT AND DISCUSS RECENT PJM RESERVE MARGINS.***

10 ***A29.*** Exhibit JFW-4 presents PJM’s target installed reserve margins, used for planning
11 purposes and in the Reliability Pricing Model (“RPM”) capacity market, and the
12 actual reserve margins cleared in the RPM base residual auctions. The targets
13 have generally been close to 16 percent, while the cleared quantities have been
14 greater than the targets by four percent or more in each of the last seven delivery
15 years, and in nine of the last ten. The lowest excess in the last ten delivery years
16 was 3.5 percent in 2014-15.

17

18 The excess cleared capacity reflects a very conservative sloped capacity demand
19 curve used in RPM and very conservative (that is, high) estimates of the cost of
20 new entry (“Net CONE”). The excess results from the market’s eagerness to
21 build new capacity in PJM, especially new combined cycle units supplied by the
22 growing Marcellus/Utica natural gas supply region, and also renewable resources,

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1 whose costs have been declining. The excess capacity has been maintained
2 despite many plant retirements over the past several years.

3

4 ***Q30. PLEASE DESCRIBE THE ICF ANALYSIS ASSUMPTION REGARDING***
5 ***PJM RESERVE MARGINS.***

6 ***A30.*** The model used in the ICF Analysis assumes capacity commitments will equal the
7 PJM target reserve margins after 2021 (Rose Supplemental Testimony, p. 62;
8 response to OCC-POD-02-008 Highly Conf Att. A). Thus, the ICF Analysis
9 assumes PJM reserve margins much lower than have been in place in recent years.

10

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1 ***Q31. WHAT IMPACT WOULD MUCH LOWER RESERVE MARGINS HAVE ON***
2 ***ENERGY AND CAPACITY PRICES?***

3 ***A31.*** Clearing a much lower amount of capacity would result in much higher capacity
4 prices, due to the RPM sloped demand curve. Clearing a much lower amount of
5 capacity would also tend to result in much higher energy prices. With less
6 reserves, shortage and near-shortage conditions should occur much more often,
7 and these circumstances generally lead to higher energy prices.

8
9 ***Q32. HOW WOULD THE MARKET LIKELY REACT TO A TREND OF LOWER***
10 ***RESERVE MARGINS, AND RESULTING HIGHER CAPACITY AND***
11 ***ENERGY PRICES?***

12 ***A32.*** The market has demonstrated a high degree of comfort with the level of capacity
13 and energy prices seen over the past several years. There has been substantial
14 new entry at these prices, suggesting that new entrants consider these prices
15 sufficiently compensatory. If energy and/or capacity prices were to trend upward,
16 we can expect even more aggressive new entry, which would prevent such price
17 increases from proceeding very far.

18
19 In addition, it should be noted that capacity and energy revenues are substitutes;
20 capacity prices must rise when energy prices are low, and capacity prices are
21 expected to fall when energy prices are high. That is, capacity prices are
22 supposed to provide the “missing money,” in addition to energy and ancillary

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1 services earnings, needed to attract and retain sufficient resources. Accordingly,
2 it is illogical to forecast that energy and capacity prices will both rise
3 concurrently, and it is not likely to happen without a substantial change in market
4 conditions.

5

6 ***Q33. PLEASE COMMENT ON THE ASSUMPTION USED IN THE ICF***
7 ***ANALYSIS THAT PJM RESERVE MARGINS WILL EQUAL THE TARGET***
8 ***LEVELS AFTER 2021-22.***

9 ***A33.*** This does not seem at all likely to occur. The RPM demand curve and its
10 parameters are currently under review, and PJM does not recommend any
11 substantial change to them.⁵ The market is comfortable with the capacity prices
12 provided by recent RPM results that show excess cleared capacity. It is much
13 more likely that the excess capacity will continue.

14

15 ***Q34. PLEASE COMMENT ON MR. ROSE'S ASSERTION THAT THE RPM***
16 ***PENALTY RATE IS TOO LOW, AND THAT THIS WILL BE CHANGED***
17 ***AND WILL RAISE CAPACITY PRICES.***

18 ***A34.*** This is wrong and apparently results from his misinterpretation of a document he
19 found in a PJM stakeholder process. Mr. Rose can cite no evidence that PJM or

⁵ PJM Market Implementation Committee Special Session June 22, 2018, Item 4, *Quadrennial Review Matrix* (showing Column A, PJM's recommendations, including maintaining the combustion turbine as the reference resource and no changes to the demand curve shape), available at <http://www.pjm.com/-/media/committees-groups/committees/mic/20180622-special/20180622-item-04-quadrennial-review-matrix.ashx>.

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1 its market monitor considers the RPM penalty rate too low, or that a process is
2 underway with the goal of raising the penalty rate.⁶ While a stakeholder process
3 currently underway focused on a different parameter may result in changes to the
4 RPM penalty rate,⁷ stakeholders are split on whether the penalty rate should
5 change, and if changed, whether it should increase or decrease. PJM's proposal is
6 to maintain the "status quo."

7
8 In any case, even if the penalty rate increases, the potential impact on capacity
9 prices is unclear – there could be little or no impact. The theory Mr. Rose cites
10 for the impact of the penalty rate on RPM offer and clearing prices has not been
11 reflected in recent auction results, for reasons discussed by PJM's market monitor
12 in his analysis of the 2017 RPM base residual auction.⁸

13
14 Furthermore, Mr. Rose's assertion that the RPM penalty rate is too low is
15 inconsistent with his assumption that RPM reserve margins will equal target
16 levels. If that were to happen, there would likely be many more Performance

⁶ Response to data request OCC-POD-04-028.

⁷ See, for instance, PJM Market Implementation Committee Special Session June 19, 2018, *Balancing Ratio Matrix Draft Options Package - Post Meeting* (showing PJM's Package A calls for Status Quo for the Capacity Performance Non-Performance Assessment Charge Rate), available at <http://www.pjm.com/-/media/committees-groups/committees/mic/20180619-special-balancing-ratio/20180619-balancing-ratio-matrix-draft-options-package-post-meeting.ashx>.

⁸ Monitoring Analytics, *Analysis of the 2020/2021 RPM Base Residual Auction*, November 17, 2017, pp. 40-45 (discussing that offers are generally well below Net CONE times the Balancing Ratio, and providing several reasons why competitive offers may be below that level), available at http://www.monitoringanalytics.com/reports/Reports/2017/IMM_Analysis_of_the_20202021_RPM_BRA_20171117.pdf.

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1 Assessment Hours, and the alleged flaw in the penalty formula would be
2 eliminated.

3

4 ***Q35. PLEASE COMMENT ON MR. ROSE'S ASSERTION THAT PJM PLANS TO***
5 ***IMPLEMENT NEW "BUY-SIDE MARKET POWER" MITIGATION AND***
6 ***THIS WILL RAISE CAPACITY PRICES.***

7 ***A35.*** Mr. Rose again misrepresents stakeholder processes and FERC proceedings in
8 which he does not participate. The PJM filing to which he cites makes no claim
9 that PJM's proposal is intended to mitigate exercise of market power. It remains
10 unclear what, if anything, will come out of that proceeding, and what, if any,
11 impact it may have on capacity prices.

12

13 ***Q36. PLEASE COMMENT ON THE FORECAST OF FUTURE OVEC***
14 ***GENERATION IN THE ICF ANALYSIS.***

15 ***A36.*** The ICF Analysis has plant utilization rates [REDACTED] from year to year
16 over the entire period (ICF Analysis, Exhibit 31). This seems doubtful, given that
17 these plants are quite old and use a fuel that is high in carbon emissions.
18 However, this forecast is consistent with the assumptions that have energy prices
19 [REDACTED] while coal prices [REDACTED]

1 ***Q37. PLEASE SUMMARIZE YOUR ASSESSMENT OF THE OVEC NET***
2 ***MARGINS REPRESENTED BY THE ICF ANALYSIS.***

9

10 ***Q38. NOW PLEASE PRESENT YOUR ALTERNATIVE ESTIMATE OF THE***

11 ***OVEC NET MARGINS.***

25

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1 ***Q39. THE ICF ANALYSIS ALSO SHOWS THE OVEC PLANT NET MARGINS***
2 ***WITH “SUNK COSTS” EXCLUDED. FIRST, HOW SHOULD THIS***
3 ***ANALYSIS BE INTERPRETED?***

4 ***A39.*** The “sunk costs” are those costs associated with past actions (primarily
5 investments) that must be incurred even if the plants discontinue operation. The
6 remaining costs, when these sunk costs are removed, are the “going forward
7 costs” that would only be incurred if the plants continue operation.
8
9 To ask whether the plants are economic and should continue operation, or instead
10 should be shut down, it is appropriate to focus on the going forward costs and
11 ignore the sunk costs that would be unaffected by ceasing operation. If going
12 forward revenues exceed going forward costs, the plants are economic and should
13 continue operation (of course, a complete analysis should consider all costs and
14 benefits, including externalities such as carbon emissions). If going forward costs
15 exceed potential future net revenues, the plants are uneconomic.

16

17 ***Q40. WHAT ARE THE OVEC PLANT NET MARGINS, BASED ON GOING***
18 ***FORWARD COSTS, ACCORDING TO THE ICF ANALYSIS?***

19 ***A40.*** The ICF Analysis has the net margins, on a going forward basis, [REDACTED]
20 [REDACTED]. Over the

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1 period from January 1, 2018 through May 31, 2025, the present value of the going
2 forward net margins is zero (Rose Supplemental Testimony, Exh. 1).

3

4 ***Q41. WHAT ARE THE OVEC PLANT NET MARGINS, UNDER YOUR***
5 ***ALTERNATIVE ASSUMPTION ABOUT 2022 THROUGH 2025?***

6 ***A41.*** Under my alternative analysis that applies the outcomes from 2018 to 2021 to the
7 years after 2021, the cumulative going forward net margin over the period would
8 be a loss of [REDACTED], or [REDACTED] million on a present value basis. Again, Duke
9 Ohio's share of this loss is nine percent, or [REDACTED] million.

10

11 ***Q42. ACCORDING TO THE ICF ANALYSIS, THE OVEC PLANTS' GOING***
12 ***FORWARD COSTS [REDACTED] THEIR MARKET REVENUES OVER THE***
13 ***NEXT SEVERAL YEARS. DOES THIS SUGGEST THAT THE OVEC***
14 ***PLANTS MAY NO LONGER BE ECONOMIC TO OPERATE?***

15 ***A42.*** Yes. This analysis does call into question whether the OVEC plants are
16 economic, and suggests that perhaps the plants (or some units) should instead be
17 retired.

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IV. POTENTIAL IMPACT OF RIDER PSR ON THE STABILITY OF CUSTOMERS' RATES

Q43. YOU NOTED THAT WITNESS WATHEN SUGGESTS CUSTOMERS ARE EXPOSED TO PRICE VOLATILITY, AND THAT RIDER PSR WOULD PROVIDE A HEDGE AGAINST MARKET VOLATILITY. DID DUKE OHIO PROVIDE ANY ANALYSIS OF CUSTOMERS' EXPOSURE TO PRICE VOLATILITY?

A43. No. Witness Rose discusses price volatility, and asserts that power prices have exhibited, and will continue to exhibit, "very significant annual volatility." Rose Supplemental Testimony p. 67. To support this claim, he presents the high-low range of energy prices. However, this is not a standard measure of volatility, and it is not something customers care about – customers pay monthly bills that reflect average costs over the period. Furthermore, customers may pay prices that were set months or years in advance.

Q44. DID DUKE OHIO PROVIDE ANY EXAMPLES OR ESTIMATES OF THE POTENTIAL IMPACT OF RIDER PSR ON THE STABILITY OF CUSTOMERS' RATES OR THE VOLATILITY OF THEIR BILLS?

A44. No.

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1 ***Q45. HAS DUKE OHIO PERFORMED ANY ANALYSIS ILLUSTRATING HOW***
2 ***RIDER PSR COULD PROVIDE CUSTOMERS WITH VALUE AS A***
3 ***HEDGE?***

4 ***A45.*** No.

5
6 ***Q46. WOULD RIDER PSR TEND TO SERVE AS A HEDGE AND STABILIZE***
7 ***THE RATES OF CUSTOMERS SERVED UNDER THE STANDARD***
8 ***SERVICE OFFER (“SSO”)?***

9 ***A46.*** No, it would not have this effect to any appreciable extent. SSO customers will
10 be served by one- to three-year full requirements contracts resulting from
11 competitive auctions. As a result of this process, the rates SSO customers will
12 pay will be established through blending the results of multiple auctions held
13 months or years in advance of delivery. The rate resulting from each auction will
14 tend to reflect forward prices at the time of the auction plus a markup. Forward
15 prices for delivery periods several months or a few years out tend to be fairly
16 stable. Consequently, the rates paid by SSO customers will tend to be fairly
17 stable over time. This has been seen in the auctions held over the past several
18 years to serve various Ohio utilities' SSO customers.

19
20 By contrast, the OVEC net cost will reflect potentially relatively volatile PJM
21 market revenues, netted from relatively stable OVEC plant costs. The OVEC
22 output would presumably be offered into the PJM day-ahead and real-time energy

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1 markets. Unlike forward prices for delivery periods months or years in advance,
2 such market prices can reflect extreme weather, unexpected plant outages, and
3 various other unanticipated circumstances, as has occurred over the past year.
4 Rider PSR amounts will potentially reflect this volatility, although they will be
5 cumulated over a quarterly period. Consequently, Rider PSR would add a
6 relatively volatile component to the SSO customers' rates that otherwise do not
7 include any such volatile components.

8
9 In addition, the Rider PSR amounts will be lagged at least one quarter
10 (essentially, one season), because Rider PSR will be calculated quarterly.⁹ As a
11 result, the PSR amounts to be collected from customers in one quarter will tend to
12 be positive [negative] when PJM market prices were lower [higher] than expected
13 in a *prior* quarter, which would generally occur due to the peculiar weather and
14 other conditions of that season. Thus, as SSO customers' rates change from year
15 to year reflecting movements in forward prices, the changes in the relatively
16 volatile quarterly PSR amounts are perhaps about as likely to move the same
17 direction as the opposite direction to SSO rates, and will move four times per
18 year. It cannot be assumed, therefore, that the PSR will tend to hedge or stabilize
19 SSO customers' rates.

⁹ Wathen Second Supplemental Testimony, p. 20.

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1 Regardless of how the Rider PSR component might move relative to the SSO
2 customers' supply cost, the impact on the customers' bill will be very small.
3 Duke Ohio's entitlement under the OVEC Agreement corresponds to only about
4 ■ percent of Duke Ohio's customers' total load. Rider PSR can be understood
5 to, in effect, re-price a small fraction of each customer's total supply cost. In
6 addition, generation supply is only about half of the customers' bill. So however
7 the Rider PSR amounts move over time relative to the rest of the customer's bill,
8 the effect on the bill will be very small.

9

10 ***Q47. FOR CUSTOMERS WHO ARE SUPPLIED BY COMPETITIVE RETAIL***
11 ***SUPPLIERS, WOULD RIDER PSR TEND TO STABILIZE THEIR RATES?***

12 ***A47.*** Customers who are instead served by competitive retail electric suppliers may be
13 exposed to market price fluctuations, or may pay fairly stable rates, depending
14 upon the choices they make that reflect their preferences. The potential impact of
15 Rider PSR on the trajectory of such customers' rates would also depend on the
16 extent to which the OVEC net costs in one quarter are uncorrelated or anti-
17 correlated with the costs at which the customer will be supplied in the following
18 quarter, when the OVEC net costs will be collected through Rider PSR. To the
19 extent Rider PSR amounts might be uncorrelated with market price fluctuations
20 and tend to stabilize some customers' bills, they would do so primarily for those
21 customers who have by their choices indicated a preference for market-based
22 prices rather than stable prices. Again, Rider PSR would be lagged at least one

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1 quarter, and corresponds to only about five percent of the Duke Ohio load.
2 Consequently, to the extent Rider PSR would provide some shopping customers
3 some price stability despite the lag, the impact would be very small.

4

5 **V. CONCLUSIONS REGARDING THE TREATMENT OF THE OVEC**
6 **ENTITLEMENT**

7

8 ***Q48. DOES THE SETTLEMENT INCLUDE AN ALTERNATIVE PLAN TO***
9 ***ALLOCATE RIDER PSR'S FINANCIAL RISK BETWEEN THE COMPANY***
10 ***AND ITS CUSTOMERS, AS REQUIRED BY THE COMMISSION?***

11 ***A48.*** No. Witness Wathen proposed (Wathen Direct, p. 9) that PJM Capacity
12 Performance penalties and bonuses be included in Rider PSR, suggesting that this
13 aligned the interests of customers and the Utility and allocated financial risk. This
14 provision would not appreciably affect the allocation of financial risk, because
15 such assessments are likely to be rare and very small compared to the OVEC cost.
16 In any case, under the Settlement, Capacity Performance assessments are
17 excluded from Rider PSR.

18

19 Witness Amy B. Spiller suggests (Spiller Direct, p. 11) that the Settlement has
20 provisions that “protect the public interest,” noting provisions pertaining to forced
21 outages, prudence reviews, and carrying charges, in addition to the treatment of
22 Capacity Performance assessments. None of these provisions affect the

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1 fundamental structure of Rider PSR under which the OVEC net cost is passed
2 through 100 percent to customers.

3

4 ***Q49. PLEASE STATE YOUR CONCLUSIONS REGARDING THE REQUEST TO***
5 ***COLLECT OVEC-RELATED COSTS FROM CUSTOMERS THROUGH***
6 ***RIDER PSR.***

7 ***A49.*** I conclude that the request to collect OVEC-related costs from customers through
8 Rider PSR is contrary to the customers' interests. Furthermore, Rider PSR
9 violates an important regulatory principle by subsidizing uneconomic generation
10 and imposing onto customers the net cost and risk associated with Duke Ohio's
11 contractual relationship with OVEC. This net cost could be considerable;
12 according to ICF Analysis, \$77 million in present value over the period of the
13 Settlement, and it could be much more. Any impact of the arrangement on price
14 stability would be insignificant compared to the expected net cost, and risk of
15 even higher cost to customers.

16

17 ***Q50. DOES THIS COMPLETE YOUR PRE-FILED TESTIMONY?***

18 ***A50.*** Yes it does. However, I understand that I may be asked to update or supplement
19 my testimony based on new information that may become available.

CERTIFICATE OF SERVICE

I hereby certify that a true copy of the foregoing *Direct Testimony of James F. Wilson, REVISED PUBLIC VERSION, on Behalf of the Office of the Ohio Consumers' Counsel* was served via electronic transmission this 19th day of July 2018 upon the parties below.

/s/ William J. Michael
William J. Michael
Assistant Consumers' Counsel

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SUMMARY

James F. Wilson is an economist with over 30 years of consulting experience, primarily in the electric power and natural gas industries. Many of his assignments have pertained to the economic and policy issues arising from the interplay of competition and regulation in these industries, including restructuring policies, market design, market analysis and market power. Other recent engagements have involved resource adequacy and capacity markets, contract litigation and damages, forecasting and market evaluation, pipeline rate cases and evaluating allegations of market manipulation. Mr. Wilson has been involved in electricity restructuring and wholesale market design for over twenty years in California, PJM, New England, Russia and other regions. He also spent five years in Russia in the early 1990s advising on the reform, restructuring and development of the Russian electricity and natural gas industries.

Mr. Wilson has submitted affidavits and testified in Federal Energy Regulatory Commission and state regulatory proceedings. His papers have appeared in the *Energy Journal*, *Electricity Journal*, *Public Utilities Fortnightly* and other publications, and he often presents at industry conferences.

Prior to founding Wilson Energy Economics, Mr. Wilson was a Principal at LECG, LLC. He has also worked for ICF Resources, Decision Focus Inc., and as an independent consultant.

EDUCATION

MS, Engineering-Economic Systems, Stanford University, 1982
BA, Mathematics, Oberlin College, 1977

RECENT ENGAGEMENTS

- Evaluated the potential impact of an electricity generation operating reserve demand curve on a wholesale electricity market with a capacity construct.
- Developed wholesale capacity market enhancements to accommodate seasonal resources and resource adequacy requirements.
- Evaluation of wholesale electricity market design enhancements to accommodate state initiatives to promote state environmental and other policy objectives.
- Evaluation of proposals for natural gas distribution system expansions.
- Various consulting assignments on wholesale electric capacity market design issues in PJM, New England, the Midwest, Texas, and California.
- Cost-benefit analysis of a new natural gas pipeline.
- Evaluation of the impacts of demand response on electric generation capacity mix and emissions.
- Panelist on a FERC technical conference on capacity markets.
- Affidavit on the potential for market power over natural gas storage.
- Executive briefing on wind integration and linkages to short-term and longer-term resource adequacy approaches.

- Affidavit on the impact of a centralized capacity market on the potential benefits of participation in a Regional Transmission Organization (RTO).
- Participated in a panel teleseminar on resource adequacy policy and modeling.
- Affidavit on opt-out rules for centralized capacity markets.
- Affidavits on minimum offer price rules for RTO centralized capacity markets.
- Evaluated electric utility avoided cost in a tax dispute.
- Advised on pricing approaches for RTO backstop short-term capacity procurement.
- Affidavit evaluating the potential impact on reliability of demand response products limited in the number or duration of calls.
- Evaluated changing patterns of natural gas production and pipeline flows, developed approaches for pipeline tolls and cost recovery.
- Evaluated an electricity peak load forecasting methodology and forecast; evaluated regional transmission needs for resource adequacy.
- Participated on a panel teleseminar on natural gas price forecasting.
- Affidavit evaluating a shortage pricing mechanism and recommending changes.
- Testimony in support of proposed changes to a forward capacity market mechanism.
- Reviewed and critiqued an analysis of the economic impacts of restrictions on oil and gas development.
- Advised on the development of metrics for evaluating the performance of Regional Transmission Organizations and their markets.
- Prepared affidavit on the efficiency benefits of excess capacity sales in readjustment auctions for installed capacity.
- Prepared affidavit on the potential impacts of long lead time and multiple uncertainties on clearing prices in an auction for standard offer electric generation service.

EARLIER PROFESSIONAL EXPERIENCE

LECG, LCC, Washington, DC 1998–2009.

Principal

- Reviewed and commented on an analysis of the target installed capacity reserve margin for the Mid Atlantic region; recommended improvements to the analysis and assumptions.
- Evaluated an electric generating capacity mechanism and the price levels to support adequate capacity; recommended changes to improve efficiency.
- Analyzed and critiqued the methodology and assumptions used in preparation of a long run electricity peak load forecast.
- Evaluated results of an electric generating capacity incentive mechanism and critiqued the mechanism's design; prepared a detailed report. Evaluated the impacts of the mechanism's flaws on prices and costs and prepared testimony in support of a formal complaint.
- Analyzed impacts and potential damages of natural gas migration from a storage field.
- Evaluated allegations of manipulation of natural gas prices and assessed the potential impacts of natural gas trading strategies.
- Prepared affidavit evaluating a pipeline's application for market-based rates for interruptible transportation and the potential for market power.
- Prepared testimony on natural gas industry contracting practices and damages in a contract dispute.
- Prepared affidavits on design issues for an electric generating capacity mechanism for an eastern US regional transmission organization; participated in extensive settlement discussions.
- Prepared testimony on the appropriateness of zonal rates for a natural gas pipeline.
- Evaluated market power issues raised by a possible gas-electric merger.
- Prepared testimony on whether rates for a pipeline extension should be rolled-in or incremental under Federal Energy Regulatory Commission ("FERC") policy.

- Prepared an expert report on damages in a natural gas contract dispute.
- Prepared testimony regarding the incentive impacts of a ratemaking method for natural gas pipelines.
- Prepared testimony evaluating natural gas procurement incentive mechanisms.
- Analyzed the need for and value of additional natural gas storage in the southwestern US.
- Evaluated market issues in the restructured Russian electric power market, including the need to introduce financial transmission rights, and policies for evaluating mergers.
- Affidavit on market conditions in western US natural gas markets and the potential for a new merchant gas storage facility to exercise market power.
- Testimony on the advantages of a system of firm, tradable natural gas transmission and storage rights, and the performance of a market structure based on such policies.
- Testimony on the potential benefits of new independent natural gas storage and policies for providing transmission access to storage users.
- Testimony on the causes of California natural gas price increases during 2000-2001 and the possible exercise of market power to raise natural gas prices at the California border.
- Advised a major US utility with regard to the Federal Energy Regulatory Commission's proposed Standard Market Design and its potential impacts on the company.
- Reviewed and critiqued draft legislation and detailed market rules for reforming the Russian electricity industry, for a major investor in the sector.
- Analyzed the causes of high prices in California wholesale electric markets during 2000 and developed recommendations, including alternatives for price mitigation. Testimony on price mitigation measures.
- Summarized and critiqued wholesale and retail restructuring and competition policies for electric power and natural gas in select US states, for a Pacific Rim government contemplating energy reforms.
- Presented testimony regarding divestiture of hydroelectric generation assets, potential market power issues, and mitigation approaches to the California Public Utilities Commission.
- Reviewed the reasonableness of an electric utility's wholesale power purchases and sales in a restructured power market during a period of high prices.
- Presented an expert report on failure to perform and liquidated damages in a natural gas contract dispute.
- Presented a workshop on Market Monitoring to a group of electric utilities in the process of forming an RTO.
- Authored a report on the screening approaches used by market monitors for assessing exercise of market power, material impacts of conduct, and workable competition.
- Developed recommendations for mitigating locational market power, as part of a package of congestion management reforms.
- Provided analysis in support of a transmission owner involved in a contract dispute with generators providing services related to local grid reliability.
- Authored a report on the role of regional transmission organizations in market monitoring.
- Prepared market power analyses in support of electric generators' applications to FERC for market-based rates for energy and ancillary services.
- Analyzed western electricity markets and the potential market power of a large producer under various asset acquisition or divestiture strategies.
- Testified before a state commission regarding the potential benefits of retail electric competition and issues that must be addressed to implement it.
- Prepared a market power analysis in support of an acquisition of generating capacity in the New England market.
- Advised a California utility regarding reform strategies for the California natural gas industry, addressing market power issues and policy options for providing system balancing services.

ICF RESOURCES, INC., Fairfax, VA, 1997–1998.

Project Manager

- Reviewed, critiqued and submitted testimony on a New Jersey electric utility's restructuring proposal, as part of a management audit for the state regulatory commission.
- Assisted a group of US utilities in developing a proposal to form a regional Independent System Operator (ISO).
- Researched and reported on the emergence of Independent System Operators and their role in reliability, for the Department of Energy.
- Provided analytical support to the Secretary of Energy's Task Force on Electric System Reliability on various topics, including ISOs. Wrote white papers on the potential role of markets in ensuring reliability.
- Recommended near-term strategies for addressing the potential stranded costs of non-utility generator contracts for an eastern utility; analyzed and evaluated the potential benefits of various contract modifications, including buyout and buydown options; designed a reverse auction approach to stimulating competition in the renegotiation process.
- Designed an auction process for divestiture of a Northeastern electric utility's generation assets and entitlements (power purchase agreements).
- Participated in several projects involving analysis of regional power markets and valuation of existing or proposed generation assets.

IRIS MARKET ENVIRONMENT PROJECT, 1994–1996.

Project Director, Moscow, Russia

Established and led a policy analysis group advising the Russian Federal Energy Commission and Ministry of Economy on economic policies for the electric power, natural gas, oil pipeline, telecommunications, and rail transport industries (*the Program on Natural Monopolies*, a project of the IRIS Center of the University of Maryland Department of Economics, funded by USAID):

- Advised on industry reforms and the establishment of federal regulatory institutions.
- Advised the Russian Federal Energy Commission on electricity restructuring, development of a competitive wholesale market for electric power, tariff improvements, and other issues of electric power and natural gas industry reform.
- Developed policy conditions for the IMF's \$10 billion Extended Funding Facility.
- Performed industry diagnostic analyses with detailed policy recommendations for electric power (1994), natural gas, rail transport and telecommunications (1995), oil transport (1996).

Independent Consultant stationed in Moscow, Russia, 1991–1996

Projects for the WORLD BANK, 1992-1996:

- Bank Strategy for the Russian Electricity Sector. Developed a policy paper outlining current industry problems and necessary policies, and recommending World Bank strategy.
- Russian Electric Power Industry Restructuring. Participated in work to develop recommendations to the Russian Government on electric power industry restructuring.
- Russian Electric Power Sector Update. Led project to review developments in sector restructuring, regulation, demand, supply, tariffs, and investment.
- Russian Coal Industry Restructuring. Analyzed Russian and export coal markets and developed forecasts of future demand for Russian coal.
- World Bank/IEA Electricity Options Study for the G-7. Analyzed mid- and long-term electric power demand and efficiency prospects and developed forecasts.
- Russian Energy Pricing and Taxation. Developed recommendations for liberalizing energy markets, eliminating subsidies and restructuring tariffs for all energy resources.

Other consulting assignments in Russia, 1991–1994:

- Advised on projects pertaining to Russian energy policy and the transition to a market economy in the energy industries, for the Institute for Energy Research of the Russian Academy of Sciences.
- Presented seminars on the structure, economics, planning, and regulation of the energy and electric power industries in the US, for various Russian clients.

DECISION FOCUS INC., Mountain View, CA, 1983–1992

Senior Associate, 1985-1992.

- For the Electric Power Research Institute, led projects to develop decision-analytic methodologies and models for evaluating long term fuel and electric power contracting and procurement strategies. Applied the methodologies and models in numerous case studies, and presented several workshops and training sessions on the approaches.
- Analyzed long-term and short-term natural gas supply decisions for a large California gas distribution company following gas industry unbundling and restructuring.
- Analyzed long term coal and rail alternatives for a midwest electric utility.
- Evaluated bulk power purchase alternatives and strategies for a New Jersey electric utility.
- Performed a financial and economic analysis of a proposed hydroelectric project.
- For a natural gas pipeline company serving the Northeastern US, forecasted long-term natural gas supply and transportation volumes. Developed a forecasting system for staff use.
- Analyzed potential benefits of diversification of suppliers for a natural gas pipeline company.
- Evaluated uranium contracting strategies for an electric utility.
- Analyzed telecommunications services markets under deregulation, developed and implemented a pricing strategy model. Evaluated potential responses of residential and business customers to changes in the client's and competitors' telecommunications services and prices.
- Analyzed coal contract terms and supplier diversification strategies for an eastern electric utility.
- Analyzed oil and natural gas contracting strategies for an electric utility.

TESTIMONY AND AFFIDAVITS

In the Matter of the Application of DTE Gas Company for Approval of a Gas Cost Recovery Plan, 5-year Forecast and Monthly GCR Factor for the 12 Months ending March 31, 2019, Michigan Public Service Commission Case No. U-18412, Direct Testimony on behalf of Michigan Environmental Council, June 7, 2018.

Constellation Mystic Power, L.L.C., FERC Docket No. ER18-1639-000 (Mystic Cost of Service Agreement), Affidavit in Support of the Comments of New England States Committee on Electricity, June 6, 2018.

New England Power Generators Association, Complainant v. ISO New England Inc. Respondent, FERC Docket No. EL18-154-000 (re: capacity offer price of Mystic power plant), Affidavit in Support of the Protest of New England States Committee on Electricity, June 6, 2018.

PJM Interconnection, L.L.C., FERC Docket No. ER18-1314 (Capacity repricing or MOPR-Ex), Affidavit in Support of the Protests of DC-MD-NJ Consumer Coalition, Joint Consumer Advocates, and Clean Energy Advocates, May 7, 2018; reply affidavit, June 15, 2018.

In the Matter of the Application of DTE Electric Company for Authority to Implement a Power Supply Cost Recovery Plan in its Rate Schedules for 2018 Metered Jurisdictional Sales of Electricity, Michigan Public Service Commission Case No. U-18403, Direct Testimony on behalf of Michigan Environmental Council and Sierra Club, April 20, 2018.

Virginia Electric and Power Company's Integrated Resource Plan filing, Virginia State Corporation Commission Case No. PUE-2017-00051, Direct Testimony on behalf of Environmental Respondents, August 11, 2017; testimony at hearings September 26, 2017.

Ohio House of Representatives Public Utilities Committee hearing on House Bill 178 (Zero Emission Nuclear Resource legislation), Opponent Testimony on Behalf of Natural Resources Defense Council, May 15, 2017.

In the Matter of the Application of Atlantic Coast Pipeline, Federal Energy Regulatory Commission Docket No. CP15-554, Evaluating Market Need for the Atlantic Coast Pipeline, Attachment 2 to the comments of Shenandoah Valley Network *et al*, April 6, 2017.

In the Matter of the Application of DTE Electric Company for Authority to Implement a Power Supply Cost Recovery Plan in its Rate Schedules for 2017 Metered Jurisdictional Sales of Electricity, Michigan Public Service Commission Case No. U-18143, Direct Testimony on behalf of Michigan Environmental Council and Sierra Club, March 22, 2017.

In the Matter of the Petition of Washington Gas Light Company for Approval of Revised Tariff Provisions to Facilitate Access to Natural Gas in the Company's Maryland Franchise Area That Are Currently Without Natural Gas Service, Maryland Public Service Commission Case No. 9433, Direct Testimony on Behalf of the Mid-Atlantic Propane Gas Association and the Mid-Atlantic Petroleum Distributors Association, Inc., March 1, 2017; testimony at hearings, May 1, 2017.

In the Matter of Integrated Resource Plans and Related 2016 REPS Compliance Plans, North Carolina Utilities Commission Docket No. E-11 Sub 147, Review and Evaluation of the Peak Load Forecasts and Reserve Margin Determinations for the Duke Energy Carolinas and Duke Energy Progress 2016 Integrated Resource Plans, Attachments A and B to the comments of the Natural Resources Defense Council, Southern Alliance for Clean Energy, and the Sierra Club, February 17, 2017.

In the Matter of the Tariff Revisions Designated TA285-4 filed by ENSTAR Natural Gas Company, a Division of SEMCO Energy, Inc., Regulatory Commission of Alaska Case No. U-16-066, Testimony on Behalf of Matanuska Electric Association, Inc., February 7, 2017, testimony at hearings, June 21, 2017.

PJM Interconnection, L.L.C., FERC Docket No. ER17-367 (seasonal capacity), Prepared Testimony on Behalf of Advanced Energy Management Alliance, Environmental Law & Policy Center, Natural Resources Defense Council, Rockland Electric Company and Sierra Club, December 8, 2016; Declaration in support of Protest of Response to Deficiency Letter, February 13, 2017.

Natural Resources Defense Council, Sierra Club, and Union of Concerned Scientists v. Federal Energy Regulatory Commission, U.S. District Court of Appeals for the D.C. Circuit Case No. 16-1236 (Capacity Performance), Declaration, September 23, 2016.

Mountaineer Gas Company Infrastructure Replacement and Expansion Program Filing for 2016, West Virginia Public Service Commission Case No. 15-1256-G-390P, and Mountaineer Gas Company Infrastructure Replacement and Expansion Program Filing for 2017, West Virginia Public Service Commission Case No. 16-0922-G-390P, Direct Testimony on behalf of the West Virginia Propane Gas Association, September 9, 2016.

Application of Chesapeake Utilities Corporation for a General Increase in its Natural Gas Rates and for Approval of Certain Other Changes to its Natural Gas Tariff, Delaware P.S.C. Docket No. 15-1734, Direct Testimony on behalf of the Delaware Association Of Alternative Energy Providers, Inc., August 24, 2016.

Virginia Electric and Power Company's Integrated Resource Plan filing, Virginia State Corporation Commission Case No. PUE-2016-00049, Direct Testimony on behalf of Environmental Respondents, August 17, 2016; testimony at hearings October 5, 2016.

In the Matter of the Application of DTE Electric Company for Authority to Implement a Power Supply Cost Recovery Plan in its Rate Schedules for 2016 Metered Jurisdictional Sales of Electricity, Michigan Public Service Commission Case No. U-17920, Direct Testimony on behalf of Michigan Environmental Council and Sierra Club, March 14, 2016.

In the Matter of the Application Seeking Approval of Ohio Power Company's Proposal to Enter into an Affiliate Power Purchase Agreement for Inclusion in the Power Purchase Agreement Rider, Public Utilities Commission of Ohio Case No. 14-1693-EL-RDR: Direct Testimony on Behalf of the Office of

the Ohio Consumers' Counsel, September 11, 2015; deposition, September 30, 2015; supplemental deposition, October 16, 2015; testimony at hearings, October 21, 2015; supplemental testimony December 28, 2015; second supplemental deposition, December 30, 2015; testimony at hearings January 8, 2016.

Indicated Market Participants v. PJM Interconnection, L.L.C., FERC Docket No. EL15-88 (Capacity Performance transition auctions), Affidavit on behalf of the Joint Consumer Representatives and Interested State Commissions, August 17, 2015.

ISO New England Inc. and New England Power Pool Participants Committee, FERC Docket No. ER15-2208 (Winter Reliability Program), Testimony on Behalf of the New England States Committee on Electricity, August 5, 2015.

Joint Consumer Representatives v. PJM Interconnection, L.L.C., FERC Docket No. EL15-83 (load forecast for capacity auctions), Affidavit in Support of the Motion to Intervene and Comments of the Public Power Association of New Jersey, July 20, 2015.

In the Matter of the Tariff Revisions Filed by ENSTAR Natural Gas Company, a Division of SEMCO Energy, Inc., Regulatory Commission of Alaska Case No. U-14-111, Testimony on Behalf of Matanuska Electric Association, Inc., May 13, 2015.

In the Matter of the Application of Ohio Edison Company et al for Authority to Provide for a Standard Service Offer Pursuant to R.C. 4928.143 in the Form of an Electric Security Plan, Public Utilities Commission of Ohio Case No. 14-1297-EL-SSO: Direct Testimony on Behalf of the Office of the Ohio Consumers' Counsel and Northeast Ohio Public Energy Council, December 22, 2014; deposition, February 10, 2015; supplemental testimony May 11, 2015; second deposition May 26, 2015; testimony at hearings, October 2, 2015; second supplemental testimony December 30, 2015; third deposition January 8, 2016; testimony at hearings January 19, 2016; rehearing direct testimony June 22, 2016; fourth deposition July 5, 2016; testimony at hearings July 14, 2016.

PJM Interconnection, L.L.C., FERC Docket No. ER14-2940 (RPM Triennial Review), Affidavit in Support of the Protest of the PJM Load Group, October 16, 2014.

In the Matter of the Application of Duke Energy Ohio for Authority to Establish a Standard Service Offer in the Form of an Electric Security Plan, Public Utilities Commission of Ohio Case No. 14-841-EL-SSO: Direct Testimony on Behalf of the Office of the Ohio Consumers' Counsel, September 26, 2014; deposition, October 6, 2014; testimony at hearings, November 5, 2014.

In the Matter of the Application of Ohio Power Company for Authority to Establish a Standard Service Offer in the Form of an Electric Security Plan, Public Utilities Commission of Ohio Case No. 13-2385-EL-SSO: Direct Testimony on Behalf of the Office of the Ohio Consumers' Counsel, May 6, 2014; deposition, May 29, 2014; testimony at hearings, June 16, 2014.

PJM Interconnection, L.L.C., FERC Docket No. ER14-504 (clearing of Demand Response in RPM), Affidavit in Support of the Protest of the Joint Consumer Advocates and Public Interest Organizations, December 20, 2013.

New England Power Generators Association, Inc. v. ISO New England Inc., FERC Docket No. EL14-7 (administrative capacity pricing), Testimony in Support of the Protest of the New England States Committee on Electricity, November 27, 2013.

Midwest Independent Transmission System Operator, Inc., FERC Docket No. ER11-4081 (minimum offer price rule), Affidavit In Support of Brief of the Midwest TDUs, October 11, 2013.

ANR Storage Company, FERC Docket No. RP12-479 (storage market-based rates), Prepared Answering Testimony on behalf of the Joint Intervenor Group, April 2, 2013; Prepared Cross-answering Testimony, May 15, 2013; testimony at hearings, September 4, 2013.

In the Matter of the Application of The Dayton Power and Light Company for Approval of its Market Rate Offer, Public Utilities Commission of Ohio Case No. 12-426-EL-SSO: Direct Testimony on Behalf of the Office of the Ohio Consumers' Counsel, March 5, 2013; deposition, March 11, 2013.

PJM Interconnection, L.L.C., FERC Docket No. ER13-535 (minimum offer price rule), Affidavit in Support of the Protest and Comments of the Joint Consumer Advocates, December 28, 2012.

In the Matter of the Application of Ohio Edison Company, et al for Authority to Provide for a Standard Service Offer in the Form of an Electric Security Plan, Public Utilities Commission of Ohio Case No. 12-1230-EL-SSO: Direct Testimony on Behalf of the Office of the Ohio Consumers' Counsel, May 21, 2012; deposition, May 30, 2012; testimony at hearings, June 5, 2012.

PJM Interconnection, L.L.C., FERC Docket No. ER12-513 (changes to RPM), Affidavit in Support of Protest of the Joint Consumer Advocates and Demand Response Supporters, December 22, 2011.

People of the State of Illinois *ex rel.* Leon A. Greenblatt, III v Commonwealth Edison Company, Circuit Court of Cook County, Illinois, deposition, September 22, 2011; interrogatory, Feb. 22, 2011.

In the Matter of the Application of Union Electric Company for Authority to Continue the Transfer of Functional Control of Its Transmission System to the Midwest Independent Transmission System Operator, Inc., Missouri PSC Case No. EO-2011-0128, Testimony in hearings, February 9, 2012; Rebuttal Testimony and Response to Commission Questions On Behalf Of The Missouri Joint Municipal Electric Utility Commission, September 14, 2011.

PJM Interconnection, L.L.C., and PJM Power Providers Group v. PJM Interconnection, L.L.C., FERC Docket Nos. ER11-2875 and EL11-20 (minimum offer price rule), Affidavit in Support of Protest of New Jersey Division of Rate Counsel, March 4, 2011, and Affidavit in Support of Request for Rehearing and for Expedited Consideration of New Jersey Division of Rate Counsel, May 12, 2011.

PJM Interconnection, L.L.C., FERC Docket No. ER11-2288 (demand response "saturation"), Affidavit in Support of Protest and Comments of the Joint Consumer Advocates, December 23, 2010.

North American Electric Reliability Corporation, FERC Docket No. RM10-10, Comments on Proposed Reliability Standard BAL-502-RFC-02: Planning Resource Adequacy Analysis, Assessment and Documentation, December 23, 2010.

In the Matter of the Reliability Pricing Model and the 2013/2014 Delivery Year Base Residual Auction Results, Maryland Public Service Commission Administrative Docket PC 22, Comments and Responses to Questions On Behalf of Southern Maryland Electric Cooperative, October 15, 2010.

PJM Interconnection, L.L.C., FERC Docket No. ER09-1063-004 (PJM compliance filing on pricing during operating reserve shortages): Affidavit In Support of Comments and Protest of the Pennsylvania Public Utility Commission, July 30, 2010.

ISO New England, Inc. and New England Power Pool, FERC Docket No. ER10-787 (minimum offer price rules): Direct Testimony On Behalf Of The Connecticut Department of Public Utility Control, March 30, 2010; Direct Testimony in Support of First Brief of the Joint Filing Supporters, July 1, 2010; Supplemental Testimony in Support of Second Brief of the Joint Filing Supporters, September 1, 2010.

PJM Interconnection, L.L.C., FERC Docket No. ER09-412-006 (RPM incremental auctions): Affidavit In Support of Protest of Indicated Consumer Interests, January 19, 2010.

In the Matter of the Application of Ohio Edison Company, et al for Approval of a Market Rate Offer to Conduct a Competitive Bidding Process for Standard Service Offer Electric Generation Supply, Public Utilities Commission of Ohio Case No. 09-906-EL-SSO: Direct Testimony on Behalf of the Office of the Ohio Consumers' Counsel, December 7, 2009; deposition, December 10, 2009, testimony at hearings, December 22, 2009.

Application of PATH Allegheny Virginia Transmission Corporation for Certificates of Public Convenience and Necessity to Construct Facilities: 765 kV Transmission Line through Loudon, Frederick and Clarke Counties, Virginia State Corporation Commission Case No. PUE-2009-00043: Direct Testimony on Behalf of Commission Staff, December 8, 2009.

PJM Interconnection, L.L.C., FERC Docket No. ER09-412-000: Affidavit On Proposed Changes to the Reliability Pricing Model On Behalf Of RPM Load Group, January 9, 2009; Reply Affidavit, January 26, 2009.

PJM Interconnection, L.L.C., FERC Docket No. ER09-412-000: Affidavit In Support of the Protest Regarding Load Forecast To Be Used in May 2009 RPM Auction, January 9, 2009.

Maryland Public Service Commission et al v. PJM Interconnection, L.L.C., FERC Docket No. EL08-67-000: Affidavit in Support Complaint of the RPM Buyers, May 30, 2008; Supplemental Affidavit, July 28, 2008.

PJM Interconnection, L.L.C., FERC Docket No. ER08-516: Affidavit On PJM's Proposed Change to RPM Parameters on Behalf of RPM Buyers, March 6, 2008.

PJM Interconnection, L.L.C., Reliability Pricing Model Compliance Filing, FERC Docket Nos. ER05-1410 and EL05-148: Affidavit Addressing RPM Compliance Filing Issues on Behalf of the Public Power Association of New Jersey, October 15, 2007.

TXU Energy Retail Company LP v. Leprino Foods Company, Inc., US District Court for the Northern District of California, Case No. C01-20289: Testimony at trial, November 15-29, 2006; Deposition, April 7, 2006; Expert Report on Behalf of Leprino Foods Company, March 10, 2006.

Gas Transmission Northwest Corporation, Federal Energy Regulation Commission Docket No. RP06-407: Reply Affidavit, October 26, 2006; Affidavit on Behalf of the Canadian Association of Petroleum Producers, October 18, 2006.

PJM Interconnection, L.L.C., Reliability Pricing Model, FERC Docket Nos. ER05-1410 and EL05-148: Supplemental Affidavit on Technical Conference Issues, June 22, 2006; Supplemental Affidavit Addressing Paper Hearing Topics, June 2, 2006; Affidavit on Behalf of the Public Power Association of New Jersey, October 19, 2005.

Maritimes & Northeast Pipeline, L.L.C., FERC Docket No. RP04-360-000: Prepared Cross Answering Testimony, March 11, 2005; Prepared Direct and Answering Testimony on Behalf of Firm Shipper Group, February 11, 2005.

Dynegy Marketing and Trade v. Multiut Corporation, US District Court of the Northern District of Illinois, Case. No. 02 C 7446: Deposition, September 1, 2005; Expert Report in response to Defendant's counterclaims, March 21, 2005; Expert Report on damages, October 15, 2004.

Application of Pacific Gas and Electric Company, California Public Utilities Commission proceeding A.04-03-021: Prepared Testimony, Policy for Throughput-Based Backbone Rates, on behalf of Pacific Gas and Electric Company, May 21, 2004.

Gas Market Activities, California Public Utilities Commission Order Instituting Investigation I.02-11-040: Testimony at hearings, July, 2004; Prepared Testimony, Comparison of Incentives Under Gas Procurement Incentive Mechanisms, on behalf of Pacific Gas and Electric Company, December 10, 2003.

Application of Red Lake Gas Storage, L.P., FERC Docket No. CP02-420, Affidavit in support of application for market-based rates for a proposed merchant gas storage facility, March 3, 2003.

Application of Pacific Gas and Electric Company, California Public Utilities Commission proceeding A.01-10-011: Testimony at hearings, April 1-2, 2003; Rebuttal Testimony, March 24, 2003; Prepared Testimony, Performance of the Gas Accord Market Structure, on behalf of Pacific Gas and Electric Company, January 13, 2003.

Application of Wild Goose Storage, Inc., California Public Utilities Commission proceeding A.01-06-029: Testimony at hearings, November, 2001; Prepared testimony regarding policies for backbone expansion and tolls, and potential ratepayer benefits of new storage, on behalf of Pacific Gas and Electric Company, October 24, 2001.

Public Utilities Commission of the State of California v. El Paso Natural Gas Co., FERC Docket No. RP00-241: Testimony at hearings, May-June, 2001; Prepared Testimony on behalf of Pacific Gas and Electric Company, May 8, 2001.

Application of Pacific Gas and Electric Company, California Public Utilities Commission proceeding A.99-09-053: Prepared testimony regarding market power consequences of divestiture of hydroelectric assets, December 5, 2000.

San Diego Gas & Electric Company, *et al*, FERC Docket No. EL00-95: Prepared testimony regarding proposed price mitigation measures on behalf of Pacific Gas and Electric Co., November 22, 2000.

Application of Harbor Cogeneration Company, FERC Docket No. ER99-1248: Affidavit in support of application for market-based rates for energy, capacity and ancillary services, December 1998.

Application of and Complaint of Residential Electric, Incorporated vs. Public Service Company of New Mexico, New Mexico Public Utility Commission Case Nos. 2867 and 2868: Testimony at hearings, November, 1998; Direct Testimony on behalf of Public Service Company of New Mexico on retail access issues, November, 1998.

Management audit of Public Service Electric and Gas' restructuring proposal for the New Jersey Board of Public Utilities: Prepared testimony on reliability and basic generation service, March 1998.

PUBLISHED ARTICLES

Forward Capacity Market CONEfusion, Electricity Journal Vol. 23 Issue 9, November 2010.

Reconsidering Resource Adequacy (Part 2): Capacity Planning for the Smart Grid, Public Utilities Fortnightly, May 2010.

Reconsidering Resource Adequacy (Part 1): Has the One-Day-in-Ten-Years Criterion Outlived Its Usefulness? Public Utilities Fortnightly, April 2010.

A Hard Look at Incentive Mechanisms for Natural Gas Procurement, with K. Costello, National Regulatory Research Institute Report No. 06-15, November 2006.

Natural Gas Procurement: A Hard Look at Incentive Mechanisms, with K. Costello, Public Utilities Fortnightly, February 2006, p. 42.

After the Gas Bubble: An Economic Evaluation of the Recent National Petroleum Council Study, with K. Costello and H. Huntington, Energy Journal Vol. 26 No. 2 (2005).

High Natural Gas Prices in California 2000-2001: Causes and Lessons, Journal of Industry, Competition and Trade, vol. 2:1/2, November 2002.

Restructuring the Electric Power Industry: Past Problems, Future Directions, Natural Resources and Environment, ABA Section of Environment, Energy and Resources, Volume 16 No. 4, Spring, 2002.

Scarcity, Market Power, Price Spikes, and Price Caps, Electricity Journal, November, 2000.

The New York ISO's Market Power Screens, Thresholds, and Mitigation: Why It Is Not A Model For Other Market Monitors, Electricity Journal, August/September 2000.

ISOs: A Grid-by-Grid Comparison, Public Utilities Fortnightly, January 1, 1998.

Economic Policy in the Natural Monopoly Industries in Russia: History and Prospects (with V. Capelik), Voprosi Ekonomiki, November 1995.

Meeting Russia's Electric Power Needs: Uncertainty, Risk and Economic Reform, Financial and Business News, April 1993.

Russian Energy Policy through the Eyes of an American Economist, Energeticheskoye Stroitelstvo, December 1992, p 2.

Fuel Contracting Under Uncertainty, with R. B. Fancher and H. A. Mueller, IEEE Transactions on Power Systems, February, 1986, p. 26-33.

OTHER ARTICLES, REPORTS AND PRESENTATIONS

Seasonal Capacity Technical Conference, Federal Energy Regulatory Commission Docket Nos. EL17-32 and EL17-36, *Pre-Conference Comments* April 11, 2018; panelist, April 24, 2018.

Panel: Demand Response, Organization of PJM States Spring Strategy Meeting, April 9, 2018.

Panel: Energy Price Formation, Organization of PJM States Spring Strategy Meeting, April 9, 2018.

Panel: Regional Reliability Standards: Requirements or Replaceable Relics? Harvard Electricity Policy Group Ninetieth Plenary Session, March 22, 2018.

Panel: Transitioning to 100% Capacity Performance: Implications to Wind, Solar, Hydro and DR; moderator; Infocast's Mid-Atlantic Power Market Summit, October 24, 2017.

Panel: PJM Market Design Proposals Addressing State Public Policy Initiatives; Organization of PJM States, Inc. Annual Meeting, Arlington, VA, October 3, 2017.

Post Technical Conference Comments, State Policies and Wholesale Markets Operated by ISO New England Inc., New York Independent System Operator, Inc., and PJM Interconnection, L.L.C., FERC Docket No. AD17-11, June 22, 2017.

Panel: How Can PJM Integrate Seasonal Resources into its Capacity Market? Organization of PJM States, Inc. Annual Meeting, Columbus Ohio, October 19, 2016.

IMAPP "Two-Tier" FCM Pricing Proposals: Description and Critique, prepared for the New England States Committee on Electricity, October 2016.

"Missing Money" Revisited: Evolution of PJM's RPM Capacity Construct, report prepared for American Public Power Association, September 2016.

Panel: PJM Grid 20/20: Focus on Public Policy Goals and Market Efficiency, August 18, 2016.

Panel: What is the PJM Load Forecast, Organization of PJM States, Inc. Annual Meeting, October 12, 2015.

PJM's "Capacity Performance" Tariff Changes: Estimated Impact on the Cost of Capacity, prepared for the American Public Power Association, October, 2015.

Panel: Capacity Performance (and Incentive) Reform, EUCI Conference on Capacity Markets: Gauging Their Real Impact on Resource Development & Reliability, August 15, 2015.

Panel on Load Forecasting, Organization of PJM States Spring Strategy Meeting, April 13, 2015.

Panelist for Session 2: Balancing Bulk Power System and Distribution System Reliability in the Eastern Interconnection, Meeting of the Eastern Interconnection States' Planning Council, December 11, 2014.

Panel: Impact of PJM Capacity Performance Proposal on Demand Response, Mid-Atlantic Distributed Resources Initiative (MADRI) Working Group Meeting #36, December 9, 2014.

Panel: Applying the Lessons Learned from Extreme Weather Events – What Changes Are Needed In PJM Markets and Obligations? Infocast PJM Market Summit, October 28, 2014.

Panel on RPM: What Changes Are Proposed This Year? Organization of PJM States, Inc. 10th Annual Meeting, Chicago Illinois, October 13-14, 2014.

Panel on centralized capacity market design going forward, Centralized Capacity Markets in Regional Transmission Organizations and Independent System Operators, Docket No. AD13-7, September 25, 2013; post-conference comments, January 8, 2014.

Economics of Planning for Resource Adequacy, NARUC Summer Meetings, Denver, Colorado, July 21, 2013.

The Increasing Need for Flexible Resources: Considerations for Forward Procurement, EUCI Conference on Fast and Flexi-Ramp Resources, Chicago, Illinois, April 23-24, 2013.

Panel on RPM Issues: Long Term Vision and Recommendations for Now, Organization of PJM States, Inc. Spring Strategy Meeting, April 3, 2013.

Comments On: The Economic Ramifications of Resource Adequacy Whitepaper, peer review of whitepaper prepared for EISPC and NARUC, March 24, 2013.

Resource Adequacy: Criteria, Constructs, Emerging Issues, Coal Finance 2013, Institute for Policy Integrity, NYU School of Law, March 19, 2013.

Panel Discussion – Alternative Models and Best Practices in Other Regions, Long-Term Resource Adequacy Summit, California Public Utilities Commission and California ISO, San Francisco, California, February 26, 2013.

Fundamental Capacity Market Design Choices: How Far Forward? How Locational? EUCI Capacity Markets Conference, October 3, 2012.

One Day in Ten Years? Economics of Resource Adequacy, Mid-America Regulatory Conference Annual Meeting, June 12, 2012.

Reliability and Economics: Separate Realities? Harvard Electricity Policy Group Sixty-Fifth Plenary Session, December 1, 2011.

National Regulatory Research Institute Teleseminar: The Economics of Resource Adequacy Planning: Should Reserve Margins Be About More Than Keeping the Lights On?, panelist, September 15, 2011.

Improving RTO-Operated Wholesale Electricity Markets: Recommendations for Market Reforms, American Public Power Association Symposium, panelist, January 13, 2011.

Shortage Pricing Issues, panelist, Organization of PJM States, Inc. Sixth Annual Meeting, October 8, 2010.

National Regulatory Research Institute Teleseminar: Forecasting Natural Gas Prices, panelist, July 28, 2010.

Comments on the NARUC-Initiated Report: Analysis of the Social, Economic and Environmental Effects of Maintaining Oil and Gas Exploration Moratoria On and Beneath Federal Lands (February 15, 2010) submitted to NARUC on June 22, 2010.

Forward Capacity Market CONEfusion, Advanced Workshop in Regulation and Competition, 29th Annual Eastern Conference of the Center for Research in Regulated Industries, Rutgers University, May 21, 2010.

One Day in Ten Years? Resource Adequacy for the Smart Grid, revised draft November 2009.

Approaches to Local Resource Adequacy, presented at Electric Utility Consultants' Smart Capacity Markets Conference, November 9, 2009.

One Day in Ten Years? Resource Adequacy for the Smarter Grid, Advanced Workshop in Regulation and Competition, 28th Annual Eastern Conference of the Center for Research in Regulated Industries, Rutgers University, May 15, 2009.

Resource Adequacy in Restructured Electricity Markets: Initial Results of PJM's Reliability Pricing Model (RPM), Advanced Workshop in Regulation and Competition, 27th Annual Eastern Conference of the Center for Research in Regulated Industries, Rutgers University, May 15, 2008.

Statement at Federal Energy Regulatory Commission technical conference, Capacity Markets in Regions with Organized Electric Markets, Docket No. AD08-4-000, May 7, 2008.

Raising the Stakes on Capacity Incentives: PJM's Reliability Pricing Model (RPM), presentation at the University of California Energy Institute's 13th Annual POWER Research Conference, Berkeley, California, March 21, 2008.

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PROFESSIONAL ASSOCIATIONS

United States Association for Energy Economics

Natural Gas Roundtable

Energy Bar Association

June 2018

Duke Energy Ohio
Case No. 17-0872-EL-RDR
OCC Fourth Set of Production of Documents
Date Received: July 14, 2017

OCC-POD-04-028

REQUEST:

Referring to p. 102, lines 9-10 of the Rose Testimony: "Once this is fixed, prices will be more stable and close to net CONE":

- a. Provide all available evidence that PJM considers the Capacity Performance penalty rate too low.
- b. Provide all available evidence that PJM intends to pursue a process to change the Capacity Performance penalty rate.
- c. Provide all available evidence that PJM's market monitor, Monitoring Analytics, considers the Capacity Performance penalty rate too low.
- d. Provide all available evidence that Monitoring Analytics intends to pursue a process to change the Capacity Performance penalty rate.
- e. Provide all available evidence that any other stakeholder intends to initiate efforts to change the Capacity Performance penalty rate.
- f. Provide any other evidence that the Capacity Performance penalty rate will be changed in the coming years.

RESPONSE: Objection. This Interrogatory is overly broad and unduly burdensome. It is further vague and confusing in its reference to "other stakeholders," an undefined term, thereby causing Duke Energy Ohio to engage in impermissible speculation and guesswork. Objecting further, this Interrogatory seeks to elicit information that is of public record and thus equally accessible to the Office of the Ohio Consumers' Counsel. This Interrogatory also runs afoul of O.A.C. 4901-1-19 as it seeks information available through pre-filed testimony. Without waiving said objection, to the extent discoverable, and in the spirit of discovery, see the FERC docket for filings related to PJM's capacity performance proposal, such filings which include, but are not limited to, FERC

Docket No. ER-15-623 and EL15-29 and 151 FERC ¶ 61,208 and related matters. See also Direct Testimony of Judah Rose, at pg. 15, footnote 8.

PERSON RESPONSIBLE: As to objection: Legal
As to response: Judah Rose

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in

Case No(s). 17-0032-EL-AIR, 17-0033-EL-ATA, 17-0034-EL-AAM, 17-0872-EL-RDR, 17-0873-EL-ATA, 1

Summary: Testimony Revised Public Testimony of James F. Wilson on Behalf of the Office of the Ohio Consumers' Counsel electronically filed by Ms. Deb J. Bingham on behalf of Michael, William J. Mr.