

SOUTHERN INDIANA GAS AND ELECTRIC COMPANY

D/B/A

VECTREN ENERGY DELIVERY OF INDIANA, INC.

CAUSE NO. 45052

VERIFIED DIRECT TESTIMONY

OF

MATTHEW A. RICE

DIRECTOR, RESEARCH AND ENERGY TECHNOLOGIES

SPONSORING PETITIONER'S EXHIBIT NO. 5, ATTACHMENT MAR-1 (CONFIDENTIAL)

VERIFIED DIRECT TESTIMONY
OF
MATTHEW A. RICE
DIRECTOR, RESEARCH AND ENERGY TECHNOLOGIES

1 **Q. Please state your name and business address.**

2 A. My name is Matthew Rice, and my business address is One Vectren Square, Evansville,
3 Indiana 47708.

4 **Q. By whom are you employed and in what capacity?**

5 A. I am employed by Vectren Utility Holdings, Inc. ("VUHI"), the immediate parent company
6 of Southern Indiana Gas and Electric Company d/b/a Vectren Energy Delivery of
7 Indiana, Inc. ("Vectren South" or "Company"), Indiana Gas Company, Inc. d/b/a Vectren
8 Energy Delivery of Indiana, Inc. ("Vectren North") and Vectren Energy Delivery of Ohio,
9 Inc. ("VEDO"). I am the Director of Research and Energy Technologies for VUHI.

10 **Q. What is your educational background?**

11 A. I received a Bachelor of Science degree in Business Administration from the University
12 of Southern Indiana in 1999. I also received a Master of Business Administration from
13 the University of Southern Indiana in 2008.

14 **Q. What is your business experience?**

15 A. Prior to working for VUHI, I worked as a Market Research Analyst for American General
16 Finance for six years working primarily on customer segmentation, demographic
17 analysis, and site location analysis. I was hired by VUHI in 2007 as a Market Research
18 Analyst, and have been promoted to Senior Analyst, Manager of Market Research, and
19 most recently Director of Research and Energy Technologies. I have been responsible

1 for long-term energy forecasting for IRPs since 2009. Additionally, I have helped to
2 manage Vectren South's 2011, 2014, and 2016 integrated resource plans. I have
3 managed Vectren South's IRP stakeholder process since 2014. Over the last ten years,
4 I have also conducted economic analysis, primary and secondary customer research
5 (including surveying, focus groups, segmentation, and demographic analysis), customer
6 satisfaction research, housing market research, and monitored industry research.

7 **Q. Are you a member of any professional organizations?**

8 A. I am Vice President of the Energy Market Research Council ("EMRC"). The EMRC is a
9 self-perpetuating association of market research professions in the energy industry. The
10 purpose of the Council is to provide a medium for the exchange of experience, and
11 opinions, related to energy marketing research projects, applied techniques, and the
12 appraisal of problems relating thereto, among energy companies.

13 **Q. Describe your current duties and responsibilities as Director of Research and
14 Energy Technologies.**

15 A. I manage the IRP process (including the stakeholder process and compilation of the
16 report), long-term electric energy and demand forecasting, emerging energy
17 technologies research, customer research, customer satisfaction research, and
18 economic analysis.

19 **Q. Have you previously testified before the Indiana Utility Regulatory Commission
20 ("Commission")?**

21 A. No.

22 **Q. Are you sponsoring any exhibits in support of your testimony?**

23 A. Yes. I am sponsoring the following exhibit:

Exhibit	Description
<u>Petitioner’s Exhibit No. 5, Attachment MAR-1 (Confidential)</u>	Vectren South’s 2016 Integrated Resource Plan (“IRP”)

1

2 **Q. Were the exhibits identified above prepared or assembled by you or under your**
 3 **direction or supervision?**

4 A. Vectren South’s IRP process was managed under my direction or supervision, although
 5 it is important to recognize that other Vectren South employees and consultants with
 6 specific areas of expertise engaged by the Company were involved in the process of
 7 developing the IRP.

8 **Q. What is the purpose of your Direct Testimony in this proceeding?**

9 A. My testimony has three objectives. First, I will discuss Vectren South’s 2016 IRP
 10 process. Second, I will discuss the analysis and results. Third, I will discuss the
 11 Company’s subsequent IRP modeling and analysis performed to support this generation
 12 filing.

13 **I. Vectren South’s 2016 IRP Process**

14 **Q. Please describe how Vectren South approached its 2016 IRP.**

15 A. The 2016 IRP included Vectren South’s most detailed planning analysis. The Company
 16 worked with several industry experts to conduct technical modeling, including Itron
 17 (energy and demand forecast), Burns and McDonnell (technology assessment, scenario
 18 optimization modeling and portfolio development), Integral Analytics (Energy Efficiency
 19 (“EE”) cost modeling), and Pace Global (“Pace”) (scenario development, probabilistic
 20 modeling, and risk analysis). A copy of Vectren South’s 2016 IRP is attached to my
 21 testimony as Petitioner’s Exhibit No. 5, Attachment MAR-1 (Confidential).

1 **Q. What process did Vectren South use in developing the 2016 IRP?**

2 A. First, Vectren South identified its IRP objectives, including reliability, cost, flexibility, risk,
3 environment, balance, and economic impact. As described in more detail in Vectren
4 South witness Gary Vicinus' testimony, Vectren South worked with Pace Global to
5 identify metrics to best address the Company's objectives.

6 Second, Vectren South developed a base case scenario. The base case includes
7 forecasts for energy and demand, coal prices, natural gas prices, carbon prices, and
8 capital costs for new generation. The base case scenario is a consensus forecast
9 representing the Company's view of the most likely future state of the forecasted data.

10 Third, Vectren South worked with Pace Global and IRP stakeholders to identify key
11 uncertainties, which were incorporated into scenario (alternate future states)
12 development. The IRP analysis is conducted at a point in time using the best
13 information available. Since no one knows with certainty what the future holds, it is an
14 industry best practice to conduct scenario analysis to better understand modeling
15 outcomes for alternate future states. These scenarios help identify competing portfolios
16 that perform well if the future turns out to be different than what was forecasted.

17 Fourth, Vectren South engaged Burns and McDonnell to screen supply side resources
18 for optimization modeling based on investment costs, operation, and maintenance costs,
19 fuel costs, and emissions costs. The Company considered 36 different generation
20 resources for modeling, including multiple natural gas, coal, wind, and solar generation
21 options, as well as battery storage. Low cost resources were kept and included in
22 subsequent scenario optimization modeling. This screening process helps to eliminate
23 generation resources whose cost (or other factors) renders them very unlikely to survive
24 the modeling were they to be included. For example, Vectren South would have

1 screened out nuclear generation in this analysis—a generation resource that the
2 Company is very unlikely to pursue because of its cost. Energy efficiency (“EE”) and
3 demand response (“DR”) did not undergo this screening process and were included in
4 subsequent optimization modeling. As discussed by Vectren South witness Harris,
5 Vectren South worked with Integral Analytics to provide cost projections for EE
6 resources to be included in the optimization modeling to compete with supply side
7 resources on a consistent and comparable basis.

8 Fifth, Vectren South worked with Burns and McDonnell to develop fifteen portfolios for
9 inclusion in the risk analysis. A portfolio is a mix of supply and demand side resources to
10 meet customer load over a 20 year time horizon.

11 Sixth, the fifteen portfolios which represented a wide range of portfolio mixes to serve
12 Vectren South customers were sent to Pace Global for the risk analysis. The risk
13 analysis included two parts: 1) probabilistic modeling (stochastic modeling) was
14 performed to test all fifteen portfolios over two hundred possible simulated scenarios
15 (iterations), and 2) evaluation of the fifteen portfolios using a balanced scorecard
16 approach. As Vectren South witness Vicinus explains, a balanced scorecard is a good
17 way to evaluate portfolios when there are multiple objectives. Vectren South selected
18 reliability, cost, flexibility, risk, environment, balance, and economic impact as objectives
19 for its 2016 IRP. Probabilistic modeling was used to capture several measures on the
20 balanced score card, including but not limited to Net Present Value, standard deviation,
21 and market purchases for the study period.

22 **Q. What forecasts did Vectren South use in its 2016 IRP?**

23 A. Vectren South used the energy and demand forecast prepared by Itron. For natural gas,
24 coal, and carbon prices, the Company developed a consensus forecast based on inputs

1 from industry sources. The forecast for natural gas and coal was derived by averaging
2 the forecasts from Ventyx, Wood Mackenzie, EVA, and PIRA. For carbon, forecasts from
3 PIRA, Wood Mackenzie, and Pace Global were averaged. Pace Global also provided
4 capital cost curves for a range of generation technologies, using as the starting point the
5 overnight capital costs prepared by Burns & McDonnell in their technology assessment.
6 Cost curves for renewables and energy storage options declined over time. Pace Global
7 then used the consensus base case assumptions provided by Vectren South to model
8 on-peak and off-peak power prices in the MISO region using the AURORAxmp power
9 dispatch model.

10 **Q. Were the forecasts used by Vectren South reasonable?**

11 A. Yes. The Final Director's report found "Vectren's consideration of multiple fuel price
12 forecasts is very commendable and appropriate..."¹

13 **Q. Did Vectren South develop scenarios for its 2016 IRP?**

14 A. Yes. As Vectren South witness Vicinus will describe more fully Vectren South worked
15 closely with Pace Global in selecting its scenarios. A total of five scenarios plus the base
16 case were constructed from these three market drivers (high regulation scenario, low
17 regulation scenario, high technology scenario, high economy scenario, and low economy
18 scenario). In addition, a seventh scenario was developed by Vectren South that is equal
19 to the base case in all ways except that this scenario adds 100 megawatts ("MWs") of
20 load beginning in 2024.

21 **Q. How did Vectren South develop the portfolios modeled in its 2016 IRP?**

¹ Final Director's Report for the 2016 Integrated Resource Plans, Dr. Bradley Borum, Nov. 2, 2017, Section 4.1. Vectren's Fuel and Commodity Price Analysis for the 2016 IRP, p. 35.

1 A. Burns and McDonnell began by creating the business as usual (“BAU”) portfolio, which
2 was largely the same as Vectren South’s current generation mix, as the Company
3 needed to understand the cost of continuing to operate existing units. Next Burns and
4 McDonnell ran optimization software, called Strategist, to produce seven computer
5 generated portfolios, one for each of the seven scenarios described above. The model
6 optimizes portfolios based on net present value over a twenty year time frame. This
7 deterministic modeling allowed Vectren South to see what resources would be selected
8 over a wide range of possible futures. Additionally, Vectren South gathered stakeholder
9 feedback from a workshop conducted on July 22, 2016, and worked with Burns and
10 McDonnell to incorporate their feedback into two stakeholder portfolios. These two
11 portfolios were heavily weighted with renewable and EE resources. Finally, Vectren
12 South worked with Burns and McDonnell to create five additional portfolios (three
13 balanced portfolios with some coal generation) and two that incorporated larger
14 percentages of gas generation, renewables generation and EE.

15 **Q. Did you incorporate stakeholder input into the process?**

16 A. Yes. Vectren South incorporated stakeholder input prior to and during the 2016 IRP
17 analysis. Continuous improvement of the resource planning analysis was integral to
18 Vectren South’s 2016 IRP, and it is consistent with the Director’s expectations. The final
19 Director’s Report recognized that all utilities have made “...significant improvements in
20 all aspects of their IRPs” and noted in particular that “utilities have all made a concerted
21 effort to broaden stakeholder participation.” See p. 6. The Director’s Report goes on to
22 state that “[A]ll of the utilities have offered unprecedented transparency and candor. It is
23 gratifying that the top management of each utility, top staff and subject matter experts
24 have all been made available to facilitate the collegial stakeholder process.”

25 **Q. Please describe how the Company incorporated stakeholder input.**

1 A. First, Vectren South incorporated stakeholder feedback on its own 2014 IRP as well as
2 comments on other Indiana energy utility IRPs in 2014 and 2015 IRPs and made the
3 following eight improvement commitments into its 2016 IRP: the Company 1)
4 constructed scenarios (possible future states) with coordinated data inputs with a well-
5 reasoned narrative; 2) conducted a probabilistic risk analysis to explore the outer bounds
6 of probability; 3) modeled future utility sponsored energy efficiency as a resource (not
7 built into the load forecast); 4) evaluated if retirement made sense for any of the
8 Company's existing coal generating units within the 20 year time frame under each
9 scenario; 5) considered renewable options in the analysis; 6) actively monitored
10 Combined Heat and Power ("CHP") developments and included CHP as a resource
11 option; 7) considered conversion and repower of coal units to gas; and 8) updated the
12 IRP document format to be more readable.

13 Second, Vectren South jointly participated in an IRP stakeholder education session with
14 all other Indiana investor owned utilities in February 2016 to help stakeholders gain a
15 better understanding of the general resource planning process.

16 Third, the Company also scheduled and conducted three public stakeholder meetings in
17 Evansville, Indiana in April, July, and November of 2016 to discuss its resource planning
18 process. Vectren South responded to stakeholder requests for an additional meeting
19 and added a stakeholder DSM modeling information session to the schedule. This
20 meeting was held in October of 2016. Each of these meetings was an opportunity for
21 stakeholders to voice questions/concerns and make suggestions on the IRP analysis.
22 During these meetings, Vectren South executives, including the chief executive officer
23 ("CEO"), actively participated and answered questions/responded to comments raised
24 by stakeholders.

1 **Q. What effort was made by Vectren South to consider stakeholder input received at**
2 **the Company-specific meetings?**

3 A. Vectren South held two workshops as part of these meetings designed to solicit input
4 from stakeholders that was incorporated into the IRP planning process. The first
5 workshop was designed to gather direct stakeholder input on future uncertainties, which
6 were included in scenario development.

7 The second workshop solicited direct input from stakeholders on portfolio development.
8 Stakeholders were provided the opportunity to design portfolios that was evaluated
9 through Vectren South's modeling process. The stakeholders developed two
10 stakeholder portfolios—a mix of generation resources—that were modeled. Those
11 portfolios are identified as Portfolios I and J in the Company's IRP. See Petitioner's
12 Exhibit No. 5, Attachment MAR-1, pp. 212-213.

13 Third, the Company afforded stakeholders time to make presentations to Vectren South
14 and other stakeholders in the July meeting to express their points of view.

15 **Q. Please explain Vectren South's efforts to keep stakeholders informed about its**
16 **IRP process.**

17 A. The Company undertook multiple initiatives to make stakeholders aware that meetings
18 were taking place by sending invites to those known to be interested, printing
19 announcements on all customer bills, and posting on its website. Additionally all
20 materials were posted to www.vectren.com/irp, and Vectren South maintained e-mail
21 communication throughout the process via irp@vectren.com. Stakeholder presentations
22 were most often posted on the Company's website a week in advance, and following
23 each meeting, summaries were posted for all to review, typically within two weeks. All of

1 these materials, including the education session are still on the Company's website
2 today.

3 **II. Vectren South's 2016 IRP Analysis and Results**

4 **Q. What analyses did the Company use to determine the preferred portfolio?**

5 A. The bulk of the analysis to identify the preferred portfolio was the scenario optimization
6 modeling performed by Burns and McDonnell and the risk analysis, which included
7 probabilistic risk modeling and the balanced scorecard performed by Pace.

8 **Q. What were the results of the scenario optimization modeling?**

9 A. As noted above, Vectren South tested a wide range of possible future states. While
10 there were some variations in least cost portfolios depending on the scenario, an F-class
11 .05 Fired CCGT was always selected to replace all existing coal fired generation by
12 2024. Various amounts of energy efficiency and renewables were also selected in
13 several instances.

14 **Q. What mix of resources were identified as having the lowest net present value
15 ("NPV") in the base case consensus scenario in the 2016 IRP?**

16 A. The mix of resources producing the lowest NPV in the base case retired all coal fired
17 units and replaced those resources with gas-fired generation. Specifically, an F-class
18 .05 CCGT was selected, along with an F-class Simple Cycle Gas Turbine ("SCGT") in
19 2024. Between 2033 and 2036, 36 MWs of solar was selected.

20 **Q. Was any EE selected in this resource mix?**

21 A. No. EE was not selected as part of the mix of resources that produced the lowest cost
22 NPV in the base case.

1 **Q. Is Vectren South seeking approval to pursue a resource mix that replaces all coal**
2 **units with gas generation and 36 MWs of solar?**

3 A. No. Consistent with direction from the Commission, Vectren South's IRP planning
4 process sought to evaluate how different portfolios performed under a range of potential
5 future market conditions. While the base case represents our best guess about what the
6 future will hold, the future likely will vary from one or more of the assumptions. The risk
7 modeling Pace performed for Vectren South enabled us to test several portfolios (mix of
8 resources) and select one that minimizes risk if the future turns out differently from the
9 base scenario.

10 **Q. Please describe the risk analysis.**

11 A. Vectren South Witness Vicinus will describe the risk analysis in more detail. All fifteen
12 portfolios were included in probabilistic risk modeling to test the portfolios in 200 possible
13 simulated scenarios (iterations). Quantitative results from these modeling runs, along
14 with some qualitative measures were included in the balanced scorecard. The balanced
15 scorecard was a visual representation of the risks associated with each portfolio that
16 Vectren South, its customers, stakeholders, investors, and community faced. This
17 allowed the Company to rank portfolios to select the preferred portfolio and
18 communicate results to stakeholders.

19 **Q. Please describe the portfolios that were included in the risk analysis.**

20 A. Vectren South included a wide range of portfolios for inclusion in the risk analysis. As
21 mentioned above, Vectren South included: a business as usual portfolio (continue all
22 coal except Warrick 4); all seven computer generated portfolios; the two stakeholder-
23 developed portfolios; and five balanced energy portfolios, which included a mix of gas,
24 coal (FB Culley 3 included in three of five portfolios), energy efficiency, and renewable
25 resources.

1 **Q. Did certain portfolios turn out to have lower risks of being adversely impacted by**
2 **many different potential future states?**

3 A. Yes. Other Vectren South witnesses have noted the importance to the Company of
4 seeking to diversify its generation resources. Pace's risk analysis demonstrated that a
5 diversified mix of generation resources, including gas, coal, renewables and EE
6 minimized the risk to customers if the future turns out to be different from the base
7 scenario. Among these diversified portfolios, Vectren South selected one as its
8 preferred portfolio.

9 **Q. Please provide a description of the preferred portfolio and why it ranks the best**
10 **on the balanced scorecard.**

11 A. The preferred portfolio is diversified: keeping FB Culley 3 (a coal unit) operating, building
12 a combined cycle gas turbine, and introducing solar and continuing to offer energy
13 efficiency. It is among the lower cost portfolios (within 4% of the lowest cost portfolio).
14 For comparison, the renewable dominated portfolios were more than 20% above the
15 lowest cost portfolio on average over the planning period.

16 The preferred portfolio performed best overall, viewed across multiple measures on the
17 balanced scorecard. See Petitioner's Exhibit 5, Attachment MAR-1, p. 233. As a general
18 rule, the portfolios that included some coal had a lower risk than the portfolios that were
19 heavily gas dominated and much better than the portfolios that relied primarily on
20 renewables.

21 For environmental compliance, the preferred portfolio achieves an approximately 60%
22 reduction in carbon by 2024 based on 2005 levels. Starting in 2019, the portfolio
23 integrates solar and includes energy efficiency/demand response resources through
24 2036.

1 In addition, this portfolio provides low-cost peaking capacity through supplemental duct-
2 firing that enhances opportunities for economic development and wholesale sales, which
3 can lower customer bills. The portfolio avoids reliance on a single fuel and provides a
4 more balanced mix of coal, gas, EE, and renewables. A duct-fired plant would allow for
5 back up of further variable renewable resources in the long term.

6 It is also among the best portfolios in terms of limiting the negative economic impact
7 from job losses and reductions in local tax base. The recommended portfolio reduces
8 dependence on coal-fired generation over time and provides flexibility to adapt to
9 changes in technology.

10 **III. IRP Modeling Updates**

11 **Q. Has Vectren South updated its IRP modeling for this filing?**

12 A. Yes. Vectren South had Burns and McDonnell update the optimization model for the
13 base case scenario used in the 2016 IRP.

14 **Q. Why was the base case scenario updated?**

15 A. There were two drivers for the updates. First, a few of the inputs that caused questions
16 and raised concerns by stakeholders, some of which were echoed in the final Directors'
17 Report, were updated to address those concerns. Second, Vectren South concluded
18 that other assumptions needed to be refreshed with more current information. I describe
19 those updates below. IRP modeling always represents a point in time, and assumptions
20 will change as time passes.

21 **Q. Please describe the changes that were made to the base case scenario.**

22 A. Several market price updates were included in the updated base case. Vectren South
23 updated coal and gas price forecasts using the same four vendors as the 2016 IRP
24 (EVA, Ventyx, Wood Mac., and PIRA). Current forecasts are projecting coal and gas

1 prices below the assumptions incorporated into the 2016 IRP. The lower fuel prices also
2 impact wholesale power prices (because electricity is less expensive to produce), so
3 Pace Global updated MISO power prices using AURORAxmp power dispatch model.
4 Market capacity prices were also updated using the latest ABB capacity price forecast
5 for MISO Zone 6.

6 Several updates were collectively made to solar and EE pricing/assumptions which
7 improved the competitiveness of these options within the optimization modeling. First,
8 Vectren South worked with Burns and McDonnell to update solar costs. While there was
9 uncertainty in the near term due to tariffs on solar modules, the cost of solar generation
10 was lowered by over 15% to approximately \$1,800 per kW in 2017 dollars. This reflects
11 forecasts showing lower prices for the cost of solar generation than were assumed in the
12 modeling for the 2016 IRP. Additionally, the MISO capacity credit for solar was updated
13 to reflect MISO's new guidance of 50%, for planning purposes, rather than the 38%
14 capacity credit incorporated into the 2016 IRP. This change effectively makes solar
15 more competitive as a capacity resource, as 50MWs out of every 100 MWs count
16 towards meeting planning reserve margin requirements with MISO, rather than 38 MWs
17 out of 100 MW. In the future MISO will provide capacity credit based on historical
18 production. Second, as discussed in Witness Rina Harris's testimony, second tier EE
19 costs were aligned with Vectren South's Market Potential study, greatly lowering the
20 costs. Third, Burns and McDonnell removed early retirement, conversion, and refuel
21 options from the coal unit decisions from the list of available resources because the
22 initial modeling adequately addressed the best timing for retirement and the viability of
23 the coal refueling options. Removing these options allowed the Strategist software to
24 better assess renewable options throughout the planning period.

1 As discussed in Witness Wayne Games' testimony, the business as usual scenario was
2 updated to reflect the need for a new scrubber at AB Brown, should the units continue to
3 run beyond 2024. This incremental cost was not included in the 2016 IRP. However,
4 certain stakeholders want to postpone retirements and incorporating this cost is
5 necessary to accurately evaluate the costs of continuing to operate the Brown units.
6 Since the 2016 IRP the joint operating agreement of Warrick 4 with Alcoa was extended
7 through 2023. This change was also reflected in the updated base case modeling,
8 which eliminated the need for a temporary capacity purchase between 2020 and 2023 to
9 meet planning reserve margin requirements.

10 **Q. Did the results of the optimization modeling materially change?**

11 A. No. The optimization still selected the F-class Fired .05 CCGT and a simple cycle gas
12 turbine to replace existing coal fired power plants. No EE was selected, and 68 MW of
13 solar generation was selected between 2034 and 2036.

14 **Q. Did Pace update the balanced scorecard used in the risk analysis?**

15 A. Yes. Based on feedback in the final Director's Report, Vectren South asked Pace to
16 address concerns related to the presentation of results using the red, yellow, green light
17 methodology, as well as related to the appropriateness of certain risk factors. As
18 described by Vectren South witness Vicinus, Pace Global applied an index scoring
19 methodology to remove the breakpoints from the analysis to address concerns about the
20 objectivity of the breakpoints. Pace also removed the Net Sales and Remote Generation
21 Risk measures used to evaluate the riskiness of portfolios. Based on concerns raised by
22 some stakeholders, these measures were removed to determine whether their inclusion
23 materially impacted the scorecard.

1 **Q. Did the results of the analysis materially change after applying the index scoring**
2 **methodology and removing the two challenged variables?**

3 A. No. Details of the updated analysis are included in Vectren South witness Gary Vicinus'
4 testimony. They continue to show that a diversified generation fleet that includes coal,
5 gas, renewables and EE offers the least risk to customers among a broad variety of
6 potential future states. One portfolio that substituted significant wind (400 MWs) in lieu
7 of continuing coal also scored well in the risk assessment. However, this portfolio
8 assumes very low economic growth in Vectren South's service territory and leaves the
9 Company with a significant capacity deficit. If Vectren South retired Culley Unit 3, as this
10 portfolio calls for in 2023, Vectren would likely need to purchase capacity from a volatile
11 capacity market or build additional generation to meet MISO planning margin
12 requirements. Another challenge with wind is that the level of capacity Vectren South
13 can rely on from the wind is heavily dependent on its location. Wind resources perform
14 better if they are located in areas with strong wind. While Vectren South removed the
15 remoteness consideration from its scorecard, analysis of a potential wind farm would
16 need to include the amount of capacity the wind farm could be accredited with by MISO.
17 A wind farm located in an area whose wind quality produces a lower capacity would
18 exacerbate the capacity deficit in this portfolio. This would leave Vectren South
19 customers exposed, particularly if economic growth occurs. Keeping Culley Unit 3
20 operating provides Vectren South additional flexibility to meet future growth.

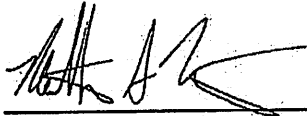
21 **IV. Conclusion**

22 **Q. Does this conclude your prepared direct testimony?**

23 A. Yes.

VERIFICATION

The undersigned, Matthew A. Rice, affirms under the penalties of perjury that the answers in the foregoing Direct Testimony in Cause No. 45052 are true to the best of his knowledge, information and belief.

A handwritten signature in black ink, appearing to read 'Matthew A. Rice', written over a horizontal line.

Matthew A. Rice