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VIA ELECTRONIC FILING

Ms. A. Shonta Dunston, Chief Clerk
North Carolina Utilities Commission
4325 Mail Service Center
Raleigh, North Carolina 27699-4300

RE: Duke Energy Progress, LLC's Rebuttal Testimony
Docket No. E-2, Sub 1272

Dear Ms. Dunston:

Please find enclosed Duke Energy Progress, LLC's Rebuttal Testimony of John D. Swez and John A. Verderame in the above-referenced proceeding.

If you have any questions, please do not hesitate to contact me. Thank you for your assistance with this matter.

Sincerely,

Jack E. Jirak

Enclosure

cc: Parties of Record

STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH

DOCKET NO. E-2, SUB 1272

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

In the Matter of	)	
Application of Duke Energy Progress, LLC	)	**REBUTTAL TESTIMONY OF**
Pursuant to G.S. 62-133.2 and NCUC Rule	)	**JOHN D. SWEZ AND**
R8-55 Relating to Fuel and Fuel-Related	)	**JOHN A. VERDERAME FOR**
Charge Adjustments for Electric Utilities	)	**DUKE ENERGY PROGRESS, LLC**

I. INTRODUCTION AND PURPOSE

Q. MR. SWEZ, PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is John D. Swez. My business address is 526 South Church Street, Charlotte, North Carolina 28202.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed as Managing Director, Trading and Dispatch, by Duke Energy Carolinas, LLC ("DEC"), a utility affiliate of Duke Energy Progress, LLC ("Duke Energy Progress," "DEP," or the "Company"). In that capacity, I lead the organization responsible for Power Trading on behalf of Duke Energy Corporation's ("Duke Energy") regulated utilities in the Carolinas, Florida, Indiana, Ohio, and Kentucky, as well as, generation dispatch on behalf of Duke Energy's regulated utilities in Indiana, Ohio, and Kentucky. In addition, I oversee Duke Energy's Meteorology group.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.

A. I received a Bachelor of Science degree in Mechanical Engineering from Purdue University in 1992. I received a Master of Business Administration degree from the University of Indianapolis in 1995. I joined PSI Energy, Inc. in 1992 and have held various engineering positions with the Company or its affiliates in the generation dispatch or power trading departments. In 2003, I assumed the position of Manager, Real-Time Operations. On January 1, 2006, I became the Director of Generation Dispatch and Operations, with responsibility for (i) generating dispatch; (ii) unit commitment; (iii) 24-hour real-time operations; and (iv) plant communications related to short-term generating maintenance planning for Duke

Energy's regulated utilities in Indiana, Ohio, and Kentucky. During the period 2010-2017, I also managed the DEC Generation Dispatch function. I assumed my current role on November 1, 2019. Finally, I am a registered Professional Engineer licensed in the States of North Carolina and Indiana.

Q. HAVE YOU PREVIOUSLY TESTIFIED OR SUBMITTED TESTIMONY BEFORE THE NORTH CAROLINA UTILITIES COMMISSION?

A. No

Q. MR. VERDERAME, PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is John A. Verderame. My business address is 526 South Church Street, Charlotte, North Carolina 28202.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed as Vice President, Fuels & Systems Optimization for Duke Energy. In that capacity, I lead the organization responsible for the purchase and delivery of coal, natural gas, fuel oil, and reagents to Duke Energy's regulated generation fleet, including DEC and DEP. In addition, I manage the fleet's power trading, system optimization, energy supply analytics, and contract administration functions.

Q. DID YOU PREVIOUSLY FILE DIRECT TESTIMONY IN SUPPORT OF THE COMPANY'S APPLICATION IN THIS DOCKET?

A. Yes.

Q. WHAT IS THE PURPOSE OF THIS REBUTTAL TESTIMONY?

A. The purpose of this rebuttal testimony is to respond to the testimony of Ms. Devi Glick filed on behalf of Sierra Club and to explain why the Commission

should reject Witness Glick's proposal to disallow a portion of DEP's costs from this proceeding. This rebuttal testimony is submitted jointly with Mr. Swez and the answers should be considered the joint answers of Mr. Swez and myself.

Q. PLEASE PROVIDE YOUR GENERAL RESPONSE TO THE TESTIMONY OF SIERRA CLUB WITNESS DEVI GLICK.

A. Fundamentally, the analysis presented by the Sierra Club is inaccurate and relies on incorrect assumptions and flawed analytical approaches. As was the case in the most recent DEC fuel proceeding, Witness Glick has engaged in a "paper" exercise that is divorced from the real world operational realities that ground the Company's commitment and dispatch decisions and ensure reliability and low cost for the customers. Some of the most egregious errors reflected in Witness Glick's testimony are outlined below:

1. Witness Glick's analysis fails to recognize the fact that DEP unit commitment seeks to minimize production costs to serve a given amount of customer demand within reliability constraints;
2. Witness Glick's analysis unreasonably assumes that the Company has an unlimited amount of generation available at the lambda price;
3. Witness Glick's analysis improperly equates the lambda data to the total compensation of a generating unit, much like the analysis that one would make for generators in a Regional Transmission Organization ("RTO") as opposed to the more appropriate calculations for entities outside of an RTO like DEP;

4. Witness Glick's analysis fails to recognize additional physical costs of a generator that are required in order to produce energy, such as startup and no-load costs;
5. Witness Glick's analysis fails to recognize the need to run units for reliability, operating reserves, or unit testing;
6. Witness Glick's analysis selectively and improperly uses averaged data over a longer period, such as a month, in order to draw certain conclusions; and
7. Witness Glick's analysis incorrectly implies that fixed costs should be included in unit commitment and dispatch decision, which would potentially result in uneconomic unit commitment and dispatch outcomes.

Witness Glick's testimony is flawed because it is fundamentally a hindsight-based based analysis that assumes perfect knowledge regarding actual system conditions. Ignoring well-established Commission precedent and prior instances in both rate cases and fuel cases in which the Commission has rejected Sierra Club recommendations, Witness Glick utterly fails to identify specific decisions and actions of the Company that were imprudent given the facts and circumstances known at the time decisions were made and also fails to identify a set of alternative decisions that could have been made while still ensuring reliability for customers.

Finally, our testimony will rebut the Sierra Club testimony concerning how DEP coal units costs compare to all coal units nationally.

Q. WITNESS GLICK RECOMMENDS THAT THE COMMISSION DISALLOW $1.4 MILLION IN EXCESS FUEL COSTS INCURRED AS A RESULT OF ALLEGEDLY IMPRUDENT COMMITMENT DECISIONS. PLEASE RESPOND.

A. We disagree that the Company's commitment and dispatch practices were imprudent in any way. DEP commits the Company's generating units on an economic basis after consideration of specific operational constraints. In fact, as will be discussed further below, decommitment of the generating units in question in the manner suggested by Witness Glick would have been imprudent and would have caused detrimental effects to the reliability of the bulk electric system.

II. GENERAL RECOMMENDATIONS

Q. WHAT IS THE PURPOSE OF THIS PROCEEDING?

A. The purpose of this proceeding is to obtain Commission approval of the Company's proposed fuel rates pursuant to N.C. Gen. Stat. § 62-133.2 and Commission Rule R8-55 based on the Company's operations during the test period for this proceeding.

Q. PLEASE RESPOND TO THE ASSERTION OF WITNESS GLICK THAT DEP'S FUEL APPLICATION IS "INSUFFICIENT AND [DOES] NOT MEET THE FILING REQUIREMENTS FOR THIS PROCEEDING OUTLINED IN COMMISSION RULE R8-55(E)."

A. We categorically reject the assertion that DEP has provided insufficient information or that the application fails to confirm with applicable law.

Q. HAS THE COMPANY PROVIDED SUFFICIENT INFORMATION IN THIS PROCEEDING TO ESTABLISH ITS TEST PERIOD FUEL AND FUEL-RELATED COSTS WERE REASONABLE AND PRUDENTLY INCURRED, INCLUDING THAT INFORMATION THAT IS REQUIRED UNDER THE APPLICABLE STATUTE AND COMMISSION RULE?

A. Yes, the content and structure of the Company's application in this proceeding conforms to all applicable legal requirements and is substantially identical to that of all recent fuel rider applications, none of which have been found to be deficient by the Public Staff or the Commission. The Company's application conformed in all respects with the requirements outlined in Commission Rule R8-55, including the specific information required to be included in a fuel rider application under Rule R8-55(e). Compliance with the Commission's clear and objective information requirements is the appropriate standard for evaluating the sufficiency of the Company's application. Additionally, the Company has responded to extensive discovery requests from other parties, including multiple sets of data requests submitted by the Sierra Club.

Q. DID SIERRA CLUB'S WITNESS IN THE 2021 FUEL PROCEEDING FOR DEC AND THE 2020 FUEL PROCEEDINGS FOR DEC AND DEP ALSO CRITICIZE THE AMOUNT OF INFORMATION PROVIDED BY DEC AND DEP, RESPECTIVELY?

A. Yes. In the 2021 DEC fuel proceeding and the 2020 DEC and DEP fuel proceedings, the Sierra Club witnesses similarly criticized the level of detail of information contained in the respective fuel applications and, further, sought to impose their subjective judgement regarding the necessary contents of the Company's fuel application.

Q. WHAT WAS THE COMMISSION'S CONCLUSIONS ON THESE ISSUES IN THE 2021 DEC AND 2020 DEC AND DEP FUEL PROCEEDINGS?

A. The Commission rejected the recommendations of the Sierra Club witnesses in the 2020 DEC and DEP fuel proceeding and again, most recently, in the 2021 DEC fuel proceeding. Specifically, in the 2021 DEC fuel order, the Commission confirmed "that the sufficiency of the Company's fuel application should be evaluated based on the requirements of applicable law."[1] The Commission further noted "the scope and level of detail contained in the Company's application, testimony, exhibits, and workpapers as filed in this proceeding conforms with applicable law and is consistent with prior applications that have been deemed sufficient."[2] The Commission has now rejected similar recommendations from a Sierra Club witness in the three most recent fuel proceedings and should, for the same reasons, reject the recommendation of the Sierra Club witness in this proceeding.

Q. HOW DOES THE COMPANY RESPOND TO THE SIERRA CLUB ASSERTION THAT THE COMPANY DID NOT PROVIDE

[1] Order Approving Fuel Charge Adjustment, Docket No. E-7, Sub 1250 (August 17, 2021), at 14.
[2] *Id.* at 14.

CONTEMPORANEOUS UNIT COST INFORMATION THAT WAS PRODUCED AT THE TIME OF THE COMPANY'S DAILY UNIT-COMMITMENT DECISIONS?[3]

A. The Company did, in fact, provide contemporaneous unit cost information. Specifically, in response to Sierra Club DR 1-33b, which requested "all reports that provide the contemporaneous unit cost projections and system marginal cost projections," the Company provided a download of the Unit Cost and Priority Report by day for the period 1/1/2020-3/31/2021. Included in this material was the daily Average Energy Cost to Commit ($/MWh) for each generation unit in the Carolinas system (DEC and DEP). This material details the variable production cost of each unit by day. The data in the Unit Cost and Priority spreadsheets is an output of the GenTrader unit commitment model. The 7-day forecast sheets and the Unit Loading Report are also outputs from the GenTrader model and do not output the modeled cost information but instead show the unit commitment and dispatch plans by day by hour. Specifically, the "Unit Loading Report" is a forecast of MWh loadings of each generating unit over the next seven days as determined by each GenTrader model run, which is developed to minimize total variable production costs over the seven-day planning period and include inputs, such as unit startup costs, that are not part of an hourly marginal cost.

Q. WHAT FURTHER ASSISTANCE DID THE COMPANY OFFER SIERRA CLUB IN REGARD TO THIS ISSUE?

[3] Glick Testimony, at 27.

A. In its response to Sierra Club DR 1-33, the Company actually went so far as to offer to meet with representatives from the Sierra Club to walk through the layout of the Unit Cost and Priority spreadsheet to explain terminology and key features of the provided outputs.

Q. DID THE SIERRA CLUB TAKE THE COMPANY UP ON THIS OFFER?

A. No. The Sierra Club did not follow up or even acknowledge this offer and did not reach out to request additional information.

Q. PLEASE RESPOND TO WITNESS GLICK'S RECOMMENDATION THAT "THE COMMISSION DIRECT DEP TO CONDUCT A NEW RETIREMENT STUDY OF EACH UNIT IN THE COMPANY'S FLEET."[4]

A. Similar to Witness Glick's recommendation concerning the required contents of the fuel application, this recommendation is simply a recycled argument from the DEP fuel proceeding and one which was properly ignored by the Commission. Stated simply, there is no basis under applicable law to suggest that a fuel rider proceeding is the appropriate forum in which to consider a retirement analysis of Company generating units. In fact, Witness Glick acknowledges that a retirement analyses has been conducted in the 2020 Integrated Resource Plan ("IRP") but, inexplicably and without alleging any infirmity in the retirement analyses supplied in the IRP, insists that the same analyses be performed once again in this proceeding. This recommendation should be disregarded just as it was in the DEP fuel proceeding.

[4] Glick Testimony, at 43.

III. UNIT COMMITMENT AND DISPATCH

Q. PLEASE PROVIDE A GENERAL DESCRIPTION OF THE CONCEPTS OF UNIT COMMITMENT AND DISPATCH.

A. "Unit Commitment" or "Commitment" is the process of determining the optimal mix of generation units to be placed online to economically and reliably meet projected system needs. "Generation Dispatch" or "Dispatch" is the process of economically optimizing the MW output of individual generators once they have been placed online (through the unit commitment process) by evaluating the instantaneous balancing of load and generation. Stated differently, the commitment process determines which generating units should be placed online and dispatch determines how those units are operated once they are online.

Q. PLEASE DESCRIBE GENERALLY THE COMPANY'S APPROACH TO COMMITMENT AND DISPATCH.

A. The Company performs a detailed daily process to determine the unit commitment plan that is necessary to economically and reliably meet projected system needs over the next seven days. The Company utilizes a production cost model called GenTrader to determine an optimal unit commitment plan to economically and reliably meet system requirements. The GenTrader model minimizes the production costs needed to serve the projected customer demand within reliability and other system constraints over a period of time whereas the Sierra Club analysis attempts to calculate generator margin using system lambda data without regard to customer demand. Inputs to the Company's GenTrader model include, but are not limited to, the following: 1) forecasted

customer energy demand; 2) fuel commodity and emission allowance market prices; 3) contracted transportation costs; 4) contractual obligations including power market purchases and sales; 5) generating unit parameters such as, but not limited to, minimum load, maximum load, heat rate, ramp rate, variable O&M, no-load costs, startup costs and shut-down costs; 6) planned unit outages and unit de-rates, and 7) reliability constraints such as units run to maintain day-ahead planning reserves or units required to run for transmission or voltage support. The GenTrader production cost model output produces the optimized hourly unit commitment plan for the 7-day forecast period. This unit commitment plan also provides the starting point for dispatch, but dispatch is then also subject to real time adjustments due to changing system conditions. The unit commitment plan is prepared daily and adjusted, as needed, throughout any given day to respond to changing real time system conditions.

Q. HAS THE COMPANY REVIEWED THE WORKPAPERS SUPPORTING THE SIERRA CLUB'S TESTIMONY IN THIS PROCEEDING?

A. Yes, the Company requested and received the workpapers supporting the testimony of Witness Glick and has reviewed the analysis in detail.

Q. PLEASE COMMENT GENERALLY ON THE FLAWS IDENTIFIED BY THE COMPANY IN THE SIERRA CLUB'S ANALYSIS REGARDING UNIT COMMITMENT DECISIONS.

A. The Sierra Club analysis fails to recognize that the Company runs a unit commitment model that minimizes the total costs necessary to serve native load within reliability constraints. The Sierra Club's analysis makes simplifying

assumptions (including decommitting large amounts of generation without regard to required levels of operating reserves or which units would have provided the additional generation), does not consider units required to operate for reliability or unit testing, and lacks the ability to account for additional startup or cycling costs that are included in the Company's GenTrader model.

Q. WHAT COSTS ARE UTILIZED AS INPUTS FOR THE COMPANY'S UNIT COMMITMENT MODEL?

A. Only variable costs are utilized in the unit commitment model. Fixed costs—which are those costs that will be incurred regardless of whether a unit is committed—are not considered in the development of the unit commitment plan.

Q. IS THE PRACTICE OF UNIT COMMITMENT PLANNING AND DISPATCHING UNITS BASED ON VARIABLE COSTS CONSISTENT WITH GOOD UTILITY PRACTICE?

A. Yes. Fixed fuel-related costs are "sunk," meaning that the cost will be incurred whether or not a unit is committed and dispatched. It is therefore entirely reasonable, and consistent with industry practice, to only utilize variable costs when making commitment and dispatch decisions. Inclusion of fixed costs into unit commitment and dispatch decisions, as suggested by the Sierra Club is not appropriate and will result in uneconomic outcomes for customers.

Q. WHAT IS THE SIERRA CLUB'S BENCHMARK FOR ECONOMIC UNIT COMMITMENT AND DISPATCH?

A. The Sierra Club states in testimony that "[w]hen a unit is committed economically, the unit is reasonably expected to be lower cost than the marginal cost of energy, called 'system lambda' over the next day or days."[5]

Q. DO YOU AGREE THAT SYSTEM LAMBDA IS AN APPROPRIATE MEASURE OF WHETHER A UNIT COMMITMENT DECISION IS ECONOMIC?

A. No. System lambda is a calculation of *instantaneous* system *incremental* cost, whereas unit commitment decisions are appropriately made based on the *total* variable cost of generation over a *multi-day* period. If a unit is projected to provide economic benefits to customers over a multi-day period based on the total variable cost of generation, then the unit is placed online. Once online, the unit is dispatched based on the instantaneous system incremental cost. In other words, system lambda is the appropriate price signal for dispatch decisions but not for a backward-looking unit commitment analysis. The Sierra Club analysis fails to incorporate the Company's actual unit commitment methodology.

Q. IN REVIEWING THE SIERRA CLUB'S WORKPAPERS, DID THE COMPANY IDENTIFY SPECIFIC FLAWS IN THE ANALYSIS SUPPORTING SIERRA CLUB'S RECOMMENDED DISALLOWANCE OF $1.4 MILLION?

A. Yes. The biggest flaw in the Sierra Club's analysis appears to be the assumption that there was almost unlimited generation available at this lambda price to replace generation. This assumption betrays a fundamental lack of

[5] Glick Testimony, at 30-32.

understanding of the real world of utility operations in which the reality is that there is only a finite amount of generation available at the lambda price. This assumption—that there is a large amount of additional, unidentified, more economic generation that could have replaced these decommitted units—is flawed because this additional generation either did not exist, did not exist at the given lambda price, or a combination of both.

Witness Glick asserts that "it would have been less costly to serve retail ratepayers with *other* resources,"[6] and yet never identifies which specific set of "other resources" could have actually been deployed at those times while still ensuring reliability. Stated differently, the Sierra Club does not attempt to offer a credible or specific explanation of how the Company could have replaced the approximately 3,143 MW of reliable generation energy and capacity (the total of the capability of the Mayo and Roxboro 1-4 units in question in this proceeding is 3,143 MW) provided by the Company's coal units nor identifies which specific resources should have been dispatched to serve customers absent these generators.

Further, the lambda represents the additional cost of a generator necessary to serve the *next* additional MW of system demand. Thus, if lambda in a given hour was $20/MWh, this means that if there was 1 additional MW of demand, the cost to serve that additional MW of demand would be $20/MWh since the unit on-line with an incremental cost of $20/MWh would need to increase in

[6] Glick Testimony, at 8.

output by 1 MW. Alternatively, if there was 1 MW less of generation available, the cost of another unit to increase its output to replace this amount would be again $20/MWh. By making the statement that DEP could have de-committed at times literally approximately 3,000 MW generation capacity and replaced all of this missing generation with additional generation all priced equally at the lambda cost that is meant to represent the cost of the next MW is inaccurate.

Sierra Club also made numerous other improper assumptions regarding lambda, such as not including the components associated with a generator necessary to serve an additional need (no-load and startup costs) and equating lambda to a Locational Marginal Price ("LMP") that is produced in an RTO. This will be discussed more later in this testimony.

Q. THE SIERRA CLUB ALSO OFFERS A COMPARISON OF CERTAIN UNITS' MONTHLY AVERAGE COST OF GENERATION TO A MONTHLY AVERAGE SYSTEM LAMBDA.[7] IS THIS AN APPROPRIATE COMPARISON?

A. No, this comparison is invalid. First, system lambda is the instantaneous marginal cost on the system and varies, sometimes substantially, over the course of day and certainly over the course of a month. To average all instantaneous values ignores the variability that actually occurs over the course of a month. Averaging these values over a month has less value because it ignores the fact that delivering energy to a customer is a 24 hour a day, 7 days a week, 365 days a year obligation. Averaging instantaneous data into a monthly comparison

[7] Glick Testimony, at 30-32.

ignores the fact that the unit may have been critical to supplying customer demand in shorter critical periods of time, but not in another period. Stated simply, a unit with a higher average cost is still often critical in ensuring reliability during a high price period on the system even where the average system lambda is lower than the average cost of the unit. Witness Glick does not consider the actual minute by minute dispatch decisions made by the Company to ensure reliable and economic service, engaging in hindsight-based retroactive "paper" analysis without any real operational knowledge or experience concerning the reliability and cost considerations that drive the Company's decisions.

Second, the average cost of generation cited by the Sierra Club is also misleading because average costs are not the prices on which the Company makes dispatch decisions. A generating unit's marginal cost on which dispatch decisions are made is lower than its average cost of generation because average cost of generation includes startup fuel costs and no-load cost (which is the cost of fuel needed to maintain a generator connected to the grid), all of which are sunk costs for dispatch decisions.

Q. DOES THE SIERRA CLUB IGNORE OTHER ASPECTS OF THE COMMITMENT AND DISPATCH PROCESS?

A. Yes, Sierra Club did not consider the necessity of maintaining day-ahead planning reserves, operating reserves, and regulating reserves in order to maintain system reliability. The Company's unit commitment plans include 1,195 MW of these reserves, which are available capacity above and beyond

DEP's expected peak load to account for the potential loss of a unit, regulating reserves, or load forecasting error. This capacity must be online or available within a short period of time. At times, the Company must turn on a coal unit to ensure that DEP has 1,195 MW of day-ahead planning reserves. The fact that the Company must turn on a coal unit in order to maintain the 1,195 MW of reserves was not considered in the Sierra Club analysis. By not including the instances when the Company had to turn on a unit in order to maintain 1,195 MW of reserves, the Sierra Club produces flawed conclusions based on operational assumptions that do not align with the Company's real world obligations to ensure reliability.

Q. WHAT ADDITIONAL RELIABILITY ASPECTS OF THE COMPANY'S UNIT COMMITMENT PRACTICES WERE NOT CONSIDERED IN THE SIERRA CLUB'S ANALYSIS?

A. The Sierra Club analysis did not recognize that the specific units at Mayo and Roxboro Stations are often required to operate for system reliability, depending on the amount of DEP load and other system operating conditions. The number of specific unit(s) will tend to increase with increasing customer demand and other transmission conditions. The Sierra Club study inaccurately assumed that these units could be decommitted in any hour, once again failing to appreciate the real world operational decisions made by the Company. In fact, all 5 units at Mayo and Roxboro 1-4 were shown as off-line multiple times in the Sierra Club analysis at times, when in fact, such units were required to operate for voltage support. Stated differently, Witness Glick's recommendation are

premised on a theoretical scenario that, if actually implemented, would have resulted in substantial reliability concerns.

Q. WHAT FURTHER FLAWS UNDERLY SIERRA CLUB'S $1.4 MILLION DISALLOWANCE RECOMMENDATION?[8]

A. As explained above, Sierra Club's analysis assumed that that there was an almost unlimited amount of generation available at lambda, which is incorrect. In addition, Sierra Club's analysis ignores the real costs of commitment that are associated with starting a unit (startup costs) and keeping the unit on-line but not related to a change in generation output (no-load costs). The Sierra Club analysis essentially assumes that a marginal generating unit can be turned on-line with a zero cost and be can be kept on-line as well, again with zero cost since the Sierra Club analysis compared the *total* variable cost of generation over a *multi-day* period against only the incremental cost of moving a unit up or down. This approach ignores the physical realities of startup and no-load costs, which can be significant costs.

Q. PLEASE FURTHER EXPLAIN THIS CONCEPT.

A. As an example, using the cost of Roxboro 1 from the Company's Unit Cost Priority (UCP) database:

> 379 MW net capability

> Startup cost of $12,434

> No-load cost of $311/hour

> Incremental cost at full load of $17.20/MWh.

[8] Glick Testimony, at 10

- The unit commitment evaluation determined that this unit was the next (marginal) unit to be committed, was turned on from an off-line state, and minimized customer costs within the reliability constraints given for a 5-day period.
- The unit generated 33,120 MWh over this 5-day period. (Full load 16 hours per day and min load 8 hours per day)

An analysis like the Sierra Club analysis would compare the total production costs over the period to the incremental cost (lambda) and would not include the startup and no-load costs.

Thus, the total cost to run the unit for the period = $12,434 (startup cost) + 5 days x 24 hours x $311/hour (no-load cost) + 33,120 MWh x $17.20/MWh (incremental cost) = $619,418

> The average cost of the unit = $619,418 / 33,120 MWh = **$18.70/MWh**

> The incremental cost to run the unit = **$17.20/MWh**

The Sierra Club analysis effectively compared the cost to run the unit, $18.70/MWh, to a unit's incremental cost of $17.20/MWh, ignoring the impact of startup and no-load costs and concluding that Duke Energy incurred avoidable excess costs. Thus, in this example, the Sierra Club would have concluded that there was an "excess cost to the customer" of $49,680, calculated by taking 33,120 MWh x ($17.20/MWh - $18.70/MWh). However, the unit was the next economic unit to be committed to serve the given customer demand and the physical costs necessary to run the unit, startup and no-load costs, are real costs necessary to run a generating unit and must be included. This simple example could be repeated for any marginal unit, which the coal units described in this testimony are

frequently; the marginal unit will always show a "loss" when compared to the lambda (incremental cost) due to the fact that there are additional costs (startup and no-load costs) that are not included in the lambda calculation. Finally, this fact would be true for other types of marginal units as well.

Q. ARE THERE ANY PARALLELS IN THE ENERGY INDUSTRY THAT FURTHER HELP EXPLAIN THIS ISSUE?

A. Yes. This comparison is exactly why in a RTO, there are credits that are paid to keep generators whole in the situation where the unit is committed by the RTO (called Make Whole Payments in MISO or Balancing Operating Reserve Payments in PJM) in the event that the revenues received by the unit were less than the costs to run the unit as defined by the units offer. Thus, essentially what the Sierra Club did was compare the cost to run a generating unit (the average cost) to the revenues received by a generating unit if it were in an RTO and if LMP were set by a units incremental cost only without consideration of these additional payments. DEP is not in an RTO and assuming that the Company's Lambda price data is equivalent to an RTO's LMP data is an improper use of the system Lambda data.

Q. WHAT WOULD HAVE HAPPENED IF THE COMPANY DECOMMITTED THE COAL GENERATING UNITS AS SUGGESTED BY THE SIERRA CLUB FOR THE HOURS IDENTIFIED IN THEIR ANALYSIS?

A. It is impossible to say with exact certainty the outcome in every hour since the Company would have made every effort to maintain reliable electric service to our customers as well as not have an increase in costs. However, decommitment of

these generators would have caused the Company to operate without adequate day-ahead planning reserves, forced the Company to rely on non-firm energy purchases at times to maintain customer reliability, purchased more expensive energy than the generators that would have been de-committed, and likely ultimately resulted in curtailing customer load multiple times throughout this period.

For example, on Monday, July 27, 2020 in hour 11, the Sierra Club analysis concluded that 1,714 MW of generation should have be decommitted, which was comprised of all 5 units in question, Mayo and Roxboro 1-4. With the Company's current generation stack, it is unreasonable to expect that on a day in which the high temperature was 96F in Raleigh and DEP system load peaked at 13,134 MW, 612 MW shy of the all-time DEP summer peak load, that the Company should have turned off 1,714 MW of coal generation in this hour (3,143 MW of capability in total) and not have suffered adverse consequences. These real world adverse consequences were not considered in the simplistic and flawed analysis performed by Witness Glick. Additionally, as was discussed previously, all 5 of these units were also required to be on-line on this day due to local voltage support due to the high amount of customer demand.

Q. WHAT OTHER FLAWS HAVE YOU IDENTIFIED IN WITNESS GLICK'S ANALYSIS?

A. The analysis appears to assume that the coal units in question can be turned off and back on instantaneously without the required startup or shutdown time, can turned off and back on without the required startup cost, assumed a zero minimum

generation amount for an on-line unit, and ignores the risk associated with shutting down and re-starting the unit. The analysis totals all hours with "negative margins" for each unit, sums all these values together, and reaches the alleged "excess cost" figure. However, in doing this, the analysis allows a unit to continue to contribute positively (the positive margin hours) when in reality the unit would not have been able to in these hours since there would have been a time needed to startup back up or an additional cost. Alternately, if the analysis did not assume this startup time and cost issue, it then assumed that a unit's minimum loading was equal to zero. In reality, an on-line unit can only drop to a certain minimum level—called the unit's minimum load—without coming off-line. Essentially, Witness Glick's analysis appears to treat the units like light switches that can be turned on and off instantaneously, ignoring the real world operational constraints that must be considered.

Q. IS THE SIERRA CLUB ANALYSIS BASED ON HINDSIGHT?

A. Yes. While our testimony has identified numerous specific incorrect assumptions and conclusions, it is also important to note a larger flaw in Sierra Club's analysis: namely, that Sierra Club's analysis is a theoretical backward-looking analysis that employs perfect hindsight. Our understanding is that Commission has repeatedly confirmed that hindsight analysis is not permitted for purposes of assessing prudence. Instead, a disallowance recommendation must be based on a contemporaneous view of the action or decision in question. From this perspective, Witness Glick has utterly failed to support the disallowance recommendation by failing to articulate or demonstrate what specific decisions should have been made differently while still ensuring reliability for customers.

Witness Glick's analysis is nearly completely predicated on perfect hindsight—it performs calculations using the actual lambda information developed from the actual exact customer demand and unit availabilities and then attempts to calculate the perfect commitment and dispatch decisions (though still resulting in flawed conclusions). But this approach is not consistent with the Commission's precedent on hindsight as the Company did not have "perfect" information on which to rely on when making the actual commitment and dispatch decisions.

Q. IN WHAT WAYS IS SIERRA CLUB'S TESTIMONY IN THIS PROCEEDING SIMILAR TO ITS TESTIMONY IN THE RECENT DEC RATE CASE IN DOCKET NO. E-7, SUB 1214 AND THE DEP RATE CASE IN DOCKET NO. E-2, SUB 1219?

A. In the DEC rate case in Docket No. E-7, Sub 1214, Sierra Club's witness made several recommendations concerning the Company's coal units, all of which were rejected by the Commission. In rejecting the Sierra Club's witnesses recommendations, the Commission observed, in part, that the Sierra Club witness had, by her own admission, failed to "evaluate what replacement alternatives the Company should have chosen instead of making the investments, and did not identify any particular investment DEC should not have made." The Commission also noted that the Sierra Club witness had acknowledged that "she did not analyze whether shutting the units down was a feasible path DEC could have chosen and still have been able to meet its service obligations." Nearly identical allegations were raised by Sierra Club's witnesses in the DEP rate case in Docket No. E-2, Sub 1219 and were similarly rejected by the Commission.

Choosing to ignore the Commission's clear precedent, the Sierra Club makes generalized allegations of imprudence in this proceeding that are once again based solely on hindsight, while failing to even attempt to demonstrate an alternative set of decisions that the Company should have made and whether such decisions were—as highlighted by the Commission in the DEP and DEC rate cases—"feasible" or would have allowed the Company to "meet its service obligations." And this failure is even more striking given the multiple prior instances in which the Commission has affirmed—in response to Sierra Club allegations—the need to do so. The Company questions whether the recycling of previously rejected positions is an efficient use of Commission resources or the regulatory process.

IV. COAL UNIT COSTS

Q. PLEASE RESPOND TO THE SIERRA CLUB TESTIMONY CONCERNING "UNDERREPRESENTED COSTS."[9]

A. Witness Glick refers to "underrepresented costs" (a term that is not explained) and then states "[i]f DEP updated its marginal costs to represent the actual production cost of each unit, its coal units would shift higher on the supply stack."[10] While it is common sense that shifting more costs from fixed to variable will cause a resource to move higher in the stack, the Sierra Club fails to identify any specific cost that DEP is allegedly mis-categorizing. When

[9] Glick Testimony, at 40
[10] *Id.*

making unit commitment and dispatch decisions, the Company evaluates all generation cost types and appropriately categorizes them as fixed or variable. It would be inappropriate and potentially result in less economic commitment and dispatch outcomes to assign fixed costs as variable for inclusion into unit commitment and dispatch prices just to achieve a desired result of seeing coal units shift higher on the supply stack and "an increase in the valuation of alternative new resources."[11]

Q. WITNESS GLICK ASSERTS THAT DEP WITNESS VERDERAME "ACKNOWLEDGED THAT THE CURRENT RAIL CONTRACT STRUCTURE DOES NOT SERVE CUSTOMERS."[12] PLEASE RESPOND.

A. Witness Glick's assertion in this respect simply takes the testimony of DEP witness Verderame completely out of context. As is made clear from the question in Witness Verderame's testimony (which Witness Glick omits), Witness Verderame's statement is forward-looking, addressing a future "expected" decline in fuel burns and explaining the need for the Company to negotiate new rail transportation rates instead of simply extending the existing fixed/variable contract. Witness Glick willfully ignores the plain context of Witness Verderame's statement.

Regardless, the rail transportation contract effective during the test period included both fixed and variable cost components. The estimated fixed and variable transportation costs were appropriately included in the prior billing

[11] *Id.*
[12] Glick Testimony, at 38

period estimated cost of consumption used to determine the approved customer billed rates. The fixed costs were then appropriately excluded from unit commitment and dispatch modeling as fixed costs are not a factor in the Company's generator commitment decisions.

Q. PLEASE RESPOND TO THE SIERRA CLUB ASSERTIONS REGARDING THE PERFORMANCE OF THE COMPANY'S COAL UNITS.

A. The Sierra Club testimony purports to assess the "economic performance" of DEP's units and generally asserts that DEP's coal units were "minimally utilized" based on the capacity factors of the units. As an initial matter, assessing the capacity factors of units and their value to the system is not relevant to a fuel proceeding.

There is certainly no dispute that certain of the Company's coal units do have lower capacity factors than in the past. As stated, the Company maintains required capacity resources to meet its system requirements and obligations, and the fact that certain units are not required to operate at times does not equate to poor performance or mean that the units are not necessary to ensure reliability. The Sierra Club characterization and comparisons ignore the Company's capacity reserve requirements and obligations and the fact the annualized capacity factors of certain coal units are lower because the Company committed and dispatched other more cost-effective units or, if available purchased energy and capacity from the bi-lateral power market before

committing and dispatching such units. However, a reduced capacity factor in a particular year does not eliminate the need for these units.

Q. PLEASE RESPOND TO THE SIERRA CLUB STATEMENT THAT THE MAYO AND ROXBORO UNITS HAVE SOME OF THE HIGHEST FUEL COSTS AMONG COAL PLANTS IN THE COUNTRY.

A. Witness Glick's comparison of the DEP coal units to all the coal units in the country is oversimplified and fails to consider many aspects that would be necessary to make an accurate comparison. As an initial matter, comparing the fuel costs of DEP units to all the coal units in the United States is not relevant to a fuel proceeding. Furthermore, Sierra Club compared units without regard to location, types of coal, or the technology required at each unit to burn the various coals, among other factors. For example, the units on the referenced list with the lowest coal costs are all located in or near the coal producing regions such as in the state of Wyoming. It is commonsense that such units would have lower costs since these units have low transportation costs and utilize lower cost Powder River Basin coal.

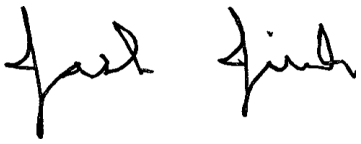
Q. DOES THIS CONCLUDE YOUR PRE-FILED REBUTTAL TESTIMONY?

A. Yes, it does.

CERTIFICATE OF SERVICE

I certify that a copy of Duke Energy Progress, LLC's Rebuttal Testimony, in Docket No. E-2, Sub 1272, has been served by electronic mail, hand delivery, or by depositing a copy in the United States mail, postage prepaid, properly addressed to parties of record.

This the 9th day of September, 2021.



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