STATE OF INDIANA
INDIANA UTILTIY REGULATORY COMMISSION

APPLICATION OF DUKE ENERGY INDIANA, LLC FOR APPROVAL OF A CHANGE IN ITS FUEL COST ADJUSTMENT FOR ELECTRIC SERVICE, FOR APPROVAL OF A CHANGE IN ITS FUEL COST ADJUSTMENT FOR HIGH PRESSURE STEAM SERVICE, AND TO UPDATE MONTHLY BENCHMARKS FOR CALCULATION OF PURCHASED POWER COSTS IN ACCORDANCE WITH INDIANA CODE §8-1-2-42, INDIANA CODE §8-1-2-42.3 AND VARIOUS ORDERS OF THE INDIANA REGULATORY COMMISSION	)	**CAUSE NO. 38707-FAC124**

PUBLIC VERSION

Direct Testimony of Devi Glick

On Behalf of Sierra Club

June 4, 2020

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1. INTRODUCTION AND PURPOSE OF TESTIMONY

Q Please state your name and occupation.

A My name is Devi Glick. I am a Senior Associate at Synapse Energy Economics, Inc. My business address is 485 Massachusetts Avenue, Suite 3, Cambridge, Massachusetts 02139.

Q Please describe Synapse Energy Economics.

A Synapse is a research and consulting firm specializing in energy and environmental issues, including electric generation, transmission and distribution system reliability, ratemaking and rate design, electric industry restructuring and market power, electricity market prices, stranded costs, efficiency, renewable energy, environmental quality, and nuclear power.

Synapse's clients include state consumer advocates, public utilities commission staff, attorneys general, environmental organizations, federal government agencies, and utilities.

Q Please summarize your work experience and educational background.

A At Synapse, I conduct economic analysis and write testimony and publications that focus on a variety of issues related to electric utilities. These issues include, non-exhaustively, power plant economics, utility resource planning practices, valuation of distributed energy resources, and utility handling of coal combustion residuals waste. I have submitted expert testimony on plant economics, utility resource needs, and solar valuation in the states of Indiana, Texas, Arizona, New Mexico, Connecticut, Virginia, North Carolina, South Carolina, and Florida. In

the course of my work, I develop in-house models and perform analysis using industry-standard models.

Prior to joining Synapse, I worked at Rocky Mountain Institute, focusing on a wide range of energy and electricity issues. I have a master's degree in public policy and a master's degree in environmental science from the University of Michigan, as well as a bachelor's degree in environmental studies from Middlebury College. I have more than seven years of professional experience as a consultant, researcher, and analyst. A copy of my current resume is attached as Exhibit DG-1.

Q On whose behalf are you testifying in this case?

A I am testifying on behalf of Sierra Club.

Q Have you testified previously before the Indiana Utility Regulatory Commission ("Commission")?

A Yes, I submitted testimony on behalf of Sierra Club in Duke Energy Indiana FAC 123.

Q What is the purpose of your testimony in this proceeding?

A I review and evaluate the prudence of Duke Energy Indiana's ("Duke" or "Company") unit commitment decisions and related fuel costs between the dates of December 1, 2019 and February 29, 2020. I also discuss the need to review the prudence of the Company's commitment decisions in a proper venue.

In Section 3 of my testimony, I evaluate Duke's unit commitment practices for this FAC 124 period. My analysis looks first at Duke's unit commitment practices

in the aggregate over the three months between December 1, 2019 and February 29, 2020. I evaluate how often each coal unit is committed into the Midcontinent Independent System Operator ("MISO") market with a must-run or economic status to assess the Company's general patterns of commitment. I discuss the category of losses that can result from must-run commitment decisions.

Next, I review the daily commitment decision matrices that Duke made available and assess the prudence of the Company's specific MISO energy market commitment decisions based on the data available to the Company at the time it made each decision. I evaluate the frequency of uneconomic commitment and the actual performance of the units, and I calculate the significant costs that uneconomic commitment practices incurred for ratepayers. I summarize the Company's invalid justifications for must-run commitment decisions, including burning-off coal oversupply and operational constraints at Edwardsport.

Finally, I discuss how Duke's Fuel Adjustment Clause ("FAC") process does not allow for sufficient review of the Company's unit commitment and dispatch decisions and I review examples of other jurisdictions that have provided venues for reviewing the prudence of specific commitment decisions on a more reasonable timeline.

Q What documents do you rely upon for your analysis, findings, and observations?

A My analysis relies primarily upon the workpapers, exhibits, and discovery responses of Duke's witnesses associated with this proceeding, as well as information I reviewed during a virtual "site visit" with Duke staff and lawyers conducted using Skype. In addition, I rely to a limited extent on certain external,

publicly available documents such as the Southwest Power Pool's ("SPP") 2018 State of the Market Report.

2. FINDINGS AND RECOMMENDATIONS

Q Please summarize your findings.

A My primary findings include the following:

1. [redacted] of Duke's coal-fired power plants reported net operational losses (total energy and ancillary service market revenues minus variable fuel and O&M costs) over the period December 1, 2019 through February 29, 2020.

2. Duke self-committed [redacted] of its coal-fired generating units approximately [redacted] or more of the time during this FAC 124 period.

3. Duke's coal-fired generating unit commitment and operational practices led to fleet-wide operational losses of $[redacted] from December 1, 2019 through February 29, 2020, based on actual revenues and costs. This represents a much higher level of losses than seen during FAC 123.

4. Edwardsport alone lost $[redacted] from December 1, 2019 through February 29, 2020 and Cayuga lost $[redacted] based on uneconomic commitment and operation for a net avoidable loss for these two plants of $[redacted].

5. Duke's own data at the time did not support committing and operating Edwardsport on coal. Specifically, the Profit and Loss analysis suggested that over the period December 1, 2019 through February 29, 2020, Duke would earn $3.1 million in projected revenues from operating Edwardsport on gas, a net difference of $9.5 million relative to projected losses of $6.4 million from operating the unit on syngas/coal suggested by the same analysis.

6. Duke's own data at the time did not support committing and operating Cayuga 1 or 2 as must run as often as Duke did. Specifically, the Profit and Loss analysis completed for the days that Duke self-committed the units over the period December 1, 2019 through February 29, 2020 projected losses of $3.0 million from doing so.

7. The Duke FAC process does not allow for sufficient review of the Company's commitment decisions.

Q Please summarize your recommendations.

A Based on my findings, I offer the following chief recommendations, listed in order of the discussion that follows later in my testimony:

1. The Commission should disallow $[redacted] in fuel costs out of the total $[redacted] in variable losses (assuming losses are composed of the same mix of fuel and variable costs as total net revenues) that the Company incurred at Edwardsport based on uneconomic self-commitment and operational decisions. I will note that this amount likely understates the losses that Duke is passing on to customers by excluding the potential revenue gains that Duke could have realized from operating Edwardsport on natural gas instead of coal. In fact, the Company's own commitment analysis projects that Duke could have earned positive revenues resulting in a net revenues of $5.8 million in the months of January and February if the plant operated on gas instead of on coal-based syngas.
2. The Commission should disallow $[redacted] in fuel costs out of the total $[redacted] in variable losses that Duke incurred at Cayuga on the basis of uneconomic commitment and operation. Further, the Commission should require Duke to conduct robust modeling and analysis to evaluate whether the steam contract is appropriately covering the incremental and variable costs to the system of serving the steam customer.
3. In addition, the Commission should open a sub-docket, as it did in FAC 123, to enable a full review of Duke's unit commitment practices and related fuel costs outside of the accelerated FAC docket timeline. For efficiency, the

Commission might consider consolidating the FAC 124 subdocket with the existing FAC 123 subdocket.

3. DUKE SELF-COMMITS MANY OF ITS COAL-FIRED GENERATING UNITS THE MAJORITY OF THE TIME.

Q Please describe how coal units are committed within the MISO wholesale market.

A In wholesale markets (MISO, in this case), dispatchable power plants generally let the market make full commitment and dispatch decisions. However, for units with startup and shutdown times that extend beyond the day-ahead market, such as coal-fired boilers, a utility generally has to design a process to decide independently whether the unit will be "committed" or made available to the market at its minimum operating level.[1] This means that generation owners actually have considerable influence in the process, and market operators have less discretion or control to operate units based on short-term economics than with dispatchable units. If a unit is committed as "must run" by the owner, which I also refer to as "self-commitment," it is guaranteed to operate up to its minimum level, regardless of cost. Therefore, there is a burden on the generation owner to make prudent unit commitment decisions. Once the unit commitment decision is made, the level of generation output (above the minimum) is generally left to the market. The operating level is based upon the marginal running cost assumptions provided by the owner in the form of offers or bids to, in this instance, MISO.

[1] Minimum operating level is an output threshold often determined operationally, and below which a generator is either less stable or operates inefficiently.

MISO allows for five potential commitment statuses: outage, emergency, economic, must run, and not participating.[2] Under economic commitment, MISO algorithms that take into account a unit's projected operational costs determine whether the unit will be online the next day. Units also have the option of "self-committing" or operating as "must run." This means the utility, in this case Duke, is independently deciding to operate a unit up to its minimum capacity regardless of whether MISO determines that it is economic to do so.

Q How does Duke assess if a unit should commit to operate in MISO?

A Duke uses an economic assessment process most weekdays to determine whether to commit its units the next day (or the next three days for each Friday). In this assessment, the Company reviews forecasted market prices and projected variable startup, shutdown, and operational costs for the next seven days to project net operational revenues (or losses if the variable startup and operational costs are more than generation would earn from the market) for each unit.[3,4] Duke repeats the process three times for a total of 21 days. The Company records all revenue projections and commitment decisions for the following day on a sheet called the "Daily Generating Unit P&L Analysis" (or Profit & Loss analysis).

If a unit is projected to be profitable, then ratepayers expect to see savings from operating the unit relative to the acquisition of market-supplied power. If the unit is projected to lose money, then ratepayers expect to see savings by the

[2] MISO Business Practices Manual No. 002 – Energy and Operating Reserve Markets. Version 19. Section 4.2.3.4.6.

[3] P&L analysis viewed during virtual "site visit" using Skype on 5/18/2020.

[4] Duke Response to Sierra Club Data Request No. 1.3(a).

acquisition of market-supplied power. Therefore, Duke should be electing to self-commit its units on a forward-looking basis only if it expects to make positive energy market margins, and the Company should keep a unit offline if it is projected to operate at a loss.

Q How did Duke commit its coal units over the three months between December 2019 and February 2020?

A Based on unit commitment data provided by the Company in discovery, I find that that the Company self-committed (i.e., must run commitment) [redacted] of its coal-fired generating units [redacted] of the units) approximately [redacted] percent or more of the time.[5]

Q Do the Company's commitment practices vary across its coal-fired generating units between December 2019 and February 2020?

A Yes. Duke Energy Indiana operates four coal plants: Edwardsport, Gibson, Gallagher, and Cayuga. Of the four, only Gallagher is regularly committed as "economic," rather than committed as "must run."[6]

Edwardsport was online and committed as must-run during [redacted] percent of the total hours during December 2019 through February 2020 (the plant reported no outages during the period, however the gasifiers were out of service for part of

[5] Duke Response to Sierra Club Data Request No. 1.1(g), CONF Attachment SC 1.1-F. All public discovery responses cited herein have been included in Exhibit DG-2. All confidential discovery responses cited herein have been included in Exhibit DG-3.
[6] *Id.*

December and therefore the plant operated on natural gas for approximately half of the month).[7]

As shown in Table 1, Gibson 2 and Gibson 4 were set to a must-run status over [redacted] percent of non-outage hours, and Cayuga 1, Cayuga 2, and Gibson 1 were set to must-run between [redacted] percent of non-outage hours, and Gibson 3 and Gibson 5 were set to must-run less than [redacted] percent of non-outage hours.[8]

Table 1: Unit commitment decisions for Duke's coal plants (non-outage hours) Dec. 2019-Feb. 2020

	Must-Run	Economic
Cayuga 1	[redacted]	[redacted]
Cayuga 2	[redacted]	[redacted]
Edwardsport 1	[redacted]	[redacted]
Gibson 1	[redacted]	[redacted]
Gibson 2	[redacted]	[redacted]
Gibson 3	[redacted]	[redacted]
Gibson 4	[redacted]	[redacted]
Gibson 5	[redacted]	[redacted]
Gallagher 2	[redacted]	[redacted]
Gallagher 4	[redacted]	[redacted]

Source: Duke Response to Sierra Club Data Request No. 1.1(g), CONF Attachment SC 1.1-F.

[7] *Id.*
[8] *Id.*

Q How does the Company's unit commitment behavior compare to its practices in the prior FAC period?

A Duke decreased the frequency with which it self-committed many of its coal-fired power plants during December 2019 through February 2020 relative to the three months before.[9] However, as stated above, the Company still self-committed [redacted] its units a significant portion of the time. Further, energy market prices (i.e., locational marginal prices or LMPs) were also down significantly (18 percent)[10] between FAC 124 and FAC 123. As a result, even with a somewhat lower frequency of must-run commitment decisions, Duke's decisions to self-commit units still led to significant unnecessary net operational losses (as will be detailed in Section 4) that will be passed on to ratepayers absent Commission protection.

Q Why is it concerning that Duke is self-committing many of its coal-fired generating units so frequently?

A When Duke selects the economic commitment status, the MISO market operator decides whether to keep or bring the unit online at its minimum operating level by comparing the variable cost of starting and operating the unit to the relevant variable costs of all other units available to the market. If there is enough energy available to serve demand from lower-cost units, MISO will not commit Duke's unit. Duke can then procure electricity from the market to serve its customers and at a lower cost than it would have incurred to commit and operate its own unit. The Company's process for deciding how and when to self-commit should result

[9] Direct Testimony of J. Swez, IURC Cause No. 38707 FAC 123 S1, page 16.
[10] *Id.*

in reasonable decisions that do not bring or keep units online when they are projected to lose money over a multi-day, week-long, or longer time horizon.

Based on my review of the Company's internal commitment-decision process (as discussed below), I see no indication that the Company's internal processes are aligned with, or guaranteed to serve, the best interest of ratepayers. In fact, as discussed below, I have found numerous instances where the Company kept or brought a unit online even when its own internal commitment analysis projected that doing so would lose money. Indeed, the Company admitted in its pending rate case that there are other factors dictating plant commitment and dispatch decisions beyond strictly customer economics (including plant jobs at Edwardsport, the steam customer served by Cayuga, and coal oversupply considerations).[11]

MISO does not have transparency into the Company's internal commitment process. The Company can operate its units however it elects, as long as the Commission allows it to continue recovering the costs of doing so. This means that the Commission's oversight in proceedings like this one is the only real mechanism to ensure that the Company is operating its units to serve the best interest of Indiana ratepayers.

[11] *See* Rebuttal Testimony of Cecil T. Gurganus (Pet. Ex. 49), Cause No. 45253 (Dec. 4, 2019), pages 9-10.

4. DUKE'S UNIT COMMITMENT DECISIONS LED TO SIGNIFICANT UNNECESSARY NET OPERATIONAL LOSSES DURING THE PERIOD FROM DECEMBER 1, 2019 TO FEBRUARY 29, 2020.

Q Is there evidence that Duke's self-commitment practices resulted in net losses during this FAC period?

A Yes. Based on my analysis, I find that [redacted] of Duke's coal-fired power plants reported net operational losses over the period December 1, 2019 through February 29, 2020. Specifically, I find that the Company's uneconomic self-commitment of its coal units over the period from December 1, 2019 to February 29, 2020 resulted in net losses of $[redacted]. This represents a much higher level of losses than seen during the FAC 123 period. Uneconomic commitment of Cayuga and Edwardsport together accounted for the majority of these losses, totaling $[redacted] over this period. If Duke had instead committed Edwardsport and Cayuga economically over this time, the Company would have lost less than $[redacted] over this period.

It is concerning that even with a decrease in the use of self-commitment practices at some of its plants, Duke still accumulated substantial net losses. These losses demonstrate (1) how uncompetitive Duke's coal fleet is with other market resources in this energy market landscape and (2) the importance of Duke improving its unit commitment and dispatch practices at all plants during all hours.

Q How does Duke describe its use of the daily economic analysis (Profit & Loss analysis) to make unit self-commitment decisions?

A Duke uses its daily economic analysis (Profit & Loss analysis) to evaluate projected net revenues for each unit over the next week (and as far out as 21 days)

relative to the price of market power. Duke stated that when "a unit is expected to have a positive margin" such that "the revenues received are projected to be greater than the variable production costs"[12] the Company self-commits the unit into the MISO market.

Q Is this statement consistent with the Company's actual unit commitment decisions based on your review of the P&L analysis sheets?

A No. My review of the Profit & Loss analysis finds that the Company regularly self-commits its units even when its own analysis indicates that doing so will result in variable production costs (which include both fuel cost and non-fuel variable O&M costs) that exceed revenues. This means that during this FAC period the Company self-committed units even when it knew it would lose money on a variable basis by operating a particular unit.

Duke provided copies of three examples of the Profit & Loss sheets in response to a data request for the dates of December 17, January 17, and February 14.[13] The analysis from these three days showed multiple instances where Duke ignored the result of its own analysis. More specifically, Duke self-committed its units despite its own analysis indicating that the Company would save money by either operating the unit on a different fuel or allowing the units to be economically committed through the MISO market process, rather than self-committed. For example:

[12] Duke Response to Sierra Club Data Request No. 1.3(a).
[13] Duke response to OUCC request 3-8(d), Confidential Attachment OUCC 3-8.D.

1. On January 17, Duke projected losses over the next seven days at Cayuga unit 2, adding up to a total net loss of $[redacted] compared to a shutdown cost of $[redacted]. Despite this, Duke kept the unit online, perhaps to serve its steam customer. It is unclear whether the steam customer is responsible for paying for these losses, or whether at least some portion is unreasonably passed on to Duke's electric ratepayers.

2. On February 14, Duke projected losses in each of the next seven days at Edwardsport, totaling $[redacted] when running on coal/syngas. However, Duke still chose to self-commit the unit and run it on coal/syngas on February 15.[14] Furthermore, generation data indicates that the Company kept the units online through the end of the FAC period.

    a. Duke estimates Edwardsport cold-startup cost of $[redacted] (the Company provided no shutdown costs for the Edwardsport unit). That estimate suggests a projected savings of $[redacted] if the unit was shut down for that week instead of running on coal.[15]

    b. Projected net revenues from running the unit on natural gas were $[redacted]. That projection indicates a savings of $[redacted] for the week if the plant was run on natural gas instead of coal.[16]

[14] Direct Testimony of Duke witness J. Swez., page 19. According to Company witness J. Swez, when the gasifiers are available or operating, the unit is offered into MISO as must-run, and when the unit is run on natural gas, it is typically offered as economic, therefore I assume that the Company was operating the plant on syngas the entire time.

[15] Duke response to OUCC request 3-8(d), Confidential Attachment OUCC 3-8.D.

[16] *Id*.

3. On February 14, Duke projected losses over the next seven days at both Cayuga unit 2 and Gibson unit 2. Duke had been committing each unit as must-run since the middle of January and continued to do so through the end of the FAC 124 period.

   a. For Cayuga unit 2, the projected losses added up to a net loss of $[redacted] for the upcoming week compared to a shutdown cost of $[redacted].[17]

   b. For Gibson unit 2, the projected losses added up to a net loss of $[redacted] compared to a shutdown cost of $[redacted].[18]

Q You stated that the variable costs included both fuel and non-fuel variable O&M. Can you determine which portion of net revenues or losses is attributed to fuel costs?

A Not precisely. However, based on the variable cost information provided by the Company, fuel costs account for between [redacted] and [redacted] percent of variable operating costs on average in each hour at all units.[19] Specifically, fuel costs accounted for [redacted] and [redacted] percent of variable operating costs at Cayuga units 1 and 2 and [redacted] percent of variable operating costs at Edwardsport.

[17] *Id.*
[18] *Id.*
[19] Synapse analysis based on Duke response to Sierra Club 1-1(i) CONFIDENTIAL.

Q Did you review the Company's unit commitment analysis for any other dates?

A Yes, I reviewed the Company's Profit & Loss analysis for most of the rest of the three-month period covered by FAC 124. This review was limited, however, by Duke's insistence that this information be reviewed on site without copying materials or taking photographs. Due to the COVID-19 pandemic, Duke agreed to let me view the documents through a virtual "site visit" conducted through Skype. Despite the obvious logistical and quality control challenges to taking notes on unit commitment analysis spreadsheets with projected revenues for 10 units over 91 days, with the data my team and I transcribed I found evidence of numerous occasions in which Duke self-committed its units despite its own analysis indicating that doing so would result in unnecessary net losses. In other words, for many instances as I explain herein, Duke knew at the time of the self-scheduling decisions at issue in this FAC period that it would very likely have saved customers money by de-committing units.

Q Are you aware of any other utility that requires witnesses to review in person and manually transcribe utility commitment material under observation?

A No. Counsel informs me that another Indiana utility, Indianapolis Power & Light Company, produced its commitment decision documents without requiring on-site review in a recent FAC docket for that utility. Duke's insistence that my review of their past dispatch practices be conducted through a virtual "site visit" under supervision, and that I manually transcribe all information and data needed for my analysis is unusual and a significant hurdle to reasonable review.

Q What specifically did you find in this review of the Company's Profit & Loss analysis sheets?

A In reviewing the Profit & Loss analysis in combination with the Company's actual unit cost and revenue data, I found that in at least four instances during the time between December 1, 2019 and February 29, 2020, the Company brought online, or left online, a unit despite its own commitment analysis showing that net losses would be lower if the unit was not brought online or was taken offline. Specifically:

1. At Edwardsport, the unit had been brought back online from an outage on September 21 (during the prior FAC period) despite the September 21 analysis projecting losses from operating.[20] The unit then operated continuously as must-run over five plus months (September 21, 2019 through at least the end of February 2020), operating on coal during all hours its gasifiers were not in outage.[21] At the outset of the instant FAC proceeding, i.e., on December 1, 2019, Duke failed to de-commit Edwardsport on coal even knowing it would continue to incur energy market losses.

    a. Duke created a total of 58 Profit & Loss sheets during the months of December 2019 through February 2020. Every single one projected weekly net operational losses of between $[redacted] and $[redacted] from operating the Edwardsport unit on coal.[22]

[20] Direct Testimony of D. Glick, FAC 123, pages 16-18.
[21] Duke response to Sierra Club 1-1(g).
[22] P&L analysis viewed during virtual "site visit" using Skype on 5/18/2020.

b. Duke operated Edwardsport on coal with both gasifiers online over 93 percent of the time in January and February. In December, Duke had gasifier challenges and only operated Edwardsport on coal approximately half the time.[23]

c. As discussed already, Duke reported $[redacted] in net operational losses during just the three months covered by FAC 124 for Edwardsport.[24]

2. At Cayuga unit 1, Duke's analysis conducted on December 20, 2019 projected a benefit to taking the unit offline, but instead Duke self-committed the unit on December 21, 2019 and kept it online through January 21, 2020 (when the unit was switched back to economic commitment, operated for one day and then economically went offline through the end of the period).[25]

a. Duke's December 20, 2019 analysis projected Cayuga unit 1 would incur $[redacted] in losses over first week.[26]

b. Duke made available a total of 17 Profit & Loss sheets between December 20, 2019 and January 20, 2020. Every single one projected weekly net losses from operating Cayuga unit 1. The

[23] Duke response to Sierra Club 2.1(a).
[24] Duke response to Sierra Club 1-1(g), (i), (l), (m), (o), (q).
[25] Duke response to Sierra Club 1-1(g); P&L analysis viewed during virtual "site visit" through Skype on 5/18/2020.
[26] P&L analysis viewed during virtual "site visit" through Skype on 5/18/2020.

weekly projections summed over the month averaged a total of $1.1 million in projected losses.[27]

c. Duke reported actual losses of $[redacted] from operating Cayuga unit 1 over the period December 21, 2019 through January 21, 2020.[28]

3. At Cayuga unit 2, Duke's analysis conducted on January 16, 2020 indicated a benefit to keeping the unit offline (the unit had been offered in economic status but not run since December 3, 2019). However, Duke opted to self-commit the unit on January 17, 2020 and continued to operate it in must-run status through the end of the FAC 124 period.[29]

a. Duke's January 16, 2020 analysis projected Cayuga unit 2 would incur $[redacted] in losses in just the first week (analysis from prior days that week had projected weekly losses above $[redacted]).[30]

b. Duke produced a total of 32 Profit & Loss sheets during January 16, 2020 through February 29, 2020. Every single one projected

[27] *Id.* I summed the weekly projections from the 17 sheets produced between December 20, 2019 and January 20, 2020 to find average weekly projected losses. I then multiplied the weekly average by the number of weeks in the period to find the total losses for the month.

[28] Duke response to Sierra Club 1-1(g), (i), (l), (m), (o), (q).

[29] Duke response to Sierra Club 1-1(g); P&L analysis viewed during virtual "site visit" through Skype on 5/18/2020.

[30] P&L analysis viewed during virtual "site visit" through Skype on 5/18/2020.

weekly net losses from operating Cayuga unit 2, which averaged a projected $1.8 million in losses over the period.[31]

c. Duke reported actual losses of $[redacted] from operating Cayuga unit 2 over the period January 17, 2020 through February 29, 2020.[32]

4. At Gibson unit 2, the unit was brought back online from an outage on January 20, 2020 and self-committed, despite Duke's own analysis conducted on January 17 indicating a benefit to keeping the unit offline. The unit was operated as must-run through the end of the period.[33]

a. Duke's January 17, 2020 analysis indicated Gibson unit 2 was expected to lose $[redacted] over the next week.[34]

b. Duke produced a total of 30 Profit & Loss sheets during the period from January 17, 2020 through February 29, 2020. Every single one projected weekly net losses from operating Gibson unit 2, ranging between $[redacted] and $[redacted] (for just the following week).[35]

[31] *Id.*
[32] Duke response to Sierra Club 1-1(g), (i), (l), (m), (o), (q).
[33] Duke response to Sierra Club 1-1(g); P&L analysis viewed during virtual "site visit" through Skype on 5/18/2020.
[34] P&L analysis viewed during virtual "site visit" through Skype on 5/18/2020.
[35] *Id.*

c. Duke reported actual losses of $[redacted] from operating Gibson unit 2 over the period January 20, 2020 through February 29, 2020.[36]

Q How did you calculate these values discussed above?

A I completed the analysis discussed above based on my review of the 58 "Profit & Loss" analysis sheets that the Company prepared to make unit commitment decisions for the 91 days between December 1, 2019 and February 29, 2020 (the sheets were missing on some days and are not prepared on weekends and some holidays). During my virtual "site visit" with Duke staff, my team and I manually transcribed thousands of net revenue values, unit commitment decision, and current unit status classifications. Based on this process, none of the data can be validated or checked for errors after the fact, a major limitation of Duke's insistence on manual transcription.

To calculate the total projected revenue or losses associated with self-commitment at each unit at Edwardsport, Cayuga, and Gibson, I summed the daily projected net revenues or losses from every Profit & Loss analysis sheet prepared for days when a unit was self-committed between December 1, 2019 and February 29, 2020. Specifically, I summed the projected values for each day from the Profit & Loss analysis prepared the prior day (or the most recent day when the prior day was a weekend, or otherwise no analysis had been produced) for operation of each unit.

[36] Duke response to Sierra Club 1-1(g), (i), (l), (m), (o), (q).

For Edwardsport, I summed the projected values for each day for operation of the plant both on syngas/coal and on natural gas. I then calculated the difference between the projected operational losses or revenues from the unit when operating on each fuel source.

Q What else did you find about the Company's self-commitment of Edwardsport from December 1, 2019 through February 29, 2020 based on your review of the Company's Profit & Loss analysis?

A I find that the Company knowingly made the decision to uneconomically self-commit Edwardsport on coal [redacted] of the time that both gasifiers were available, despite its own analysis clearly showing that self-committing and operating the unit on syngas/coal would result in $9.5 million in projected net losses for ratepayers relative to operating the unit on gas (note that Edwardsport did end up operating on natural gas for about half the month in December due to forced outages that seem to have inadvertently saved customers money by preventing Duke from committing Edwardsport on syngas/coal). Specifically, Duke's own Profit & Loss analysis showed the following:[37]

1. Projected total losses of $6.4 million from self-committing and operating the unit on syngas/coal ($4.4 million for just January and February).
2. Projected total revenues of $3.1 million if the unit was instead operated on gas.
3. Projected net avoidable losses of $9.5 million ($5.8 million for just January and February) from self-committing and operating the unit on coal instead of

[37] P&L analysis viewed during virtual "site visit" through Skype on 5/18/2020.

operating the unit on gas. These are losses that the Company seeks to pass on to ratepayers through the fuel costs that it incurred.

It is important to note that my analysis likely underestimates the revenues from operating Edwardsport on gas, and therefore net losses relative to operating on coal. This is because when the unit is operated on gas, startup costs are lower and the unit is typically committed and dispatched economically, according to Company witness J. Swez.[38] Duke should be able to turn the plant on and off with less lead time and at a lower cost than when operating on coal, and also ramp it up and down more easily to lower the operating level during times when the unit is online but LMPs are low.

Q What else did you find about the Company's self-commitment of Cayuga Units 1 and 2 from December 1, 2019 through February 29, 2020 based on your review of the Profit & Loss analysis and actual net revenue data?

A I found that from December 23, 2019 through the end of the FAC 124 period, Duke always had at least one of the Cayuga units self-committed in must-run status, despite clear indications from its contemporaneous decision documents that committing the units on the days they were self-committed were predicted to result in $3.0 million in losses between December 1, 2019 and February 29, 2020. The two units together lost a total of $[redacted] over the three months between December 1, 2019 and February 29, 2020.[39] I am concerned that Duke is operating the plant even when it is not economic to do so in order to provide

[38] Direct Testimony of Duke witness J. Swez, page 19.
[39] Duke response to Sierra Club 1-1(g), (i), (l), (m), (o), (q).

steam to an industrial customer and that the costs to provide this steam service are being subsidized by Duke's electric ratepayers.

Q Please explain the basis of your concerns that operation of Cayuga to serve the industrial steam customer is being subsidized by ratepayers.

A First, in the rate case (Cause No. 45253), Company witness J. Swez indicated that Cayuga station supplies steam to an industrial customer and that it has specific operational requirements in order to do so. Specifically, "the unit supplying steam must be on-line and operated to at least at a minimum load of 300 MW net, approximately 70 MW higher than the normal minimum load of the unit."[40] This means that, in order to serve the steam customer, one of Cayuga 1 or 2 is generally self-committed and self-scheduled above its normal minimum operating level regardless of economics.

Second, in FAC 123 S1, Company witness M. Diaz indicated that Duke's contract with the steam customer dates back to 1974. It likely made sense to sell the waste steam to the industrial customer at this time when Cayuga was always online providing electricity. However, the contract likely did not contemplate the scenario where the plant was no longer able to economically run full time as a baseload resource. Even in 2012 when the contract was last amended, the Cayuga units were operating with 50 to 60 percent capacity factors[41] and likely still earning positive net revenues in more hours than today. Today, even with Duke self-committing at least one unit Cayuga unit regularly, both units operated at around only a 30 percent capacity factor between the months of December 2019

[40] *See* Rebuttal Testimony of J. Swez, Cause No. 45253 (Dec. 4, 2019), page 29.
[41] EIA form 923 data.

and February 2020. Duke's existing contract with the industrial customer is likely not suited for the current reality that Cayuga cannot economically operate during many hours of the year.

Third, Duke acknowledged that it has not calculated the impact on electrical customers' costs of running Cayuga due to the requirements to supply steam when it otherwise would not have run based on expected energy market margins. The Company defended this decision stating that "there are multiple assumptions that the Company would have to make in order to perform this calculation."[42] But that is exactly why Duke needs to perform this analysis. In order to understand the cost of operating Cayuga to serve the steam customer, Duke should be modeling its electricity system with and without the requirement to provide steam to the industrial customer. Modeling of this type has been used in other jurisdictions to set tariffs for specific large industrial customers in order to ensure the industrial customer is covering not only the variable costs to serve them but all other incremental costs to the system of providing service to them.[43]

Q Did you also review the Company's data on the actual performance of its coal fleet during the months of December 2019 through February 2020?

A Yes, I reviewed data from the Company on its actual variable costs (fuel and variable O&M) and energy market revenues to operate its coal fleet between December 1, 2019 and February 29, 2020. This data is distinct from the Company's Profit & Loss analysis, which is forward-looking. As discussed

[42] Duke response to Sierra Club 1.9 (a).

[43] *See*, Exhibit DG-4, Nova Scotia Power Inc, Application for Extra Large Industrial Active Demand Control Tariff. Nova Scotia Utility Review Board, M09420. September 27, 2019.

above, the Profit & Loss analysis projects units' expected losses and revenues from operating in the day-ahead market to help the Company make unit commitment decisions, but it does not reflect the revenues and losses that actually resulted.

As shown in Table 2, I find that Duke lost [redacted] over the three months from December 2019 through February 2020 from operating its coal fleet during extended periods while the coal units were otherwise non-economic to operate. [redacted] of Duke's coal-fired power plants reported net operational losses over the period December 1, 2019 through February 29, 2020, and in fact only [redacted] of Duke's 10 coal units reported positive net operational revenues during this time. Edwardsport and Cayuga lost a combined [redacted] over the three months based on uneconomic commitment and operation. While it may be reasonable to have losses on an hourly and even daily basis for some units, it is not reasonable for a utility to incur losses at [redacted] plant over the course of at least three consecutive months.

Table 2: Net operational revenues $Million (including fuel cost and variable O&M costs)

Unit	December 2019	January 2020	February 2020	Total
Cayuga 1	[redacted]	[redacted]	[redacted]	[redacted]
Cayuga 2				
Edwardsport				
Gallagher2				
Gallagher 4				
Gibson 1				
Gibson 2				
Gibson 3				
Gibson 4				
Gibson 5				
All				
Units with net losses				
Units with net revenue				

Source: Duke response to Sierra Club 1-1(g), (i), (l), (m), (o), (q) and Duke response to OUCC 3.3-A CONFIDENTIAL Attachments.
Note: Values exclude losses incurred during unplanned outages.

Q How are the values in Table 2 calculated?

A I calculated the values in Table 2 based on the Company's own hourly cost and operational revenue data that was provided in discovery. Specifically, for each unit, I calculated the hourly variable production cost based on the weekly marginal variable production cost values (which includes fuel and variable O&M) and total unit hourly generation. I then calculated net operational revenues by comparing the total variable production costs to the operational revenues (energy and ancillary service market revenues) provided by the Company. I removed loses incurred during unplanned outages, and then I summed the net hourly revenues for each hour in a month to find the monthly totals displayed in Table 2.

Q How close were the unit's actual net revenues or losses to the values projected by the Company in its Profit & Loss analysis sheets?

A Duke's actual losses were not that far off from the projections between December 2019 and February 2020. For the operation of Edwardsport, the Company projected net losses of $6.4 million from operating the unit on syngas/coal, and the Company's actual losses were $[redacted]. For Cayuga, the Company projected net losses of $3.0 million for operating on the days when the units were committed in must-run status, and the Company's actual losses were $[redacted].

Q What do you conclude from the significant losses experienced by Duke from operating its coal-fired power plants over the period December 1, 2019 through February 29, 2020?

A Locational marginal prices were low during this FAC 124 period (18 percent lower relative to the FAC 123 period),[44] which made it harder for Duke to cover the operational costs of its coal plants and should have caused the Company to rely more heavily on "economic" commitment. Despite the lower energy prices, Duke continued to self-commit many of its coal plants. Edwardsport in particular, Duke stated, performed at an 86.4 percent capacity factor for the reporting period.[45] Duke's high usage of Edwardsport and its continued reliance on its entire coal fleet is concerning for a number of reasons.

First, Duke had a better option in the market. Customers would have been better served if Duke had committed its coal plants economically (or at the very least for

[44] Direct Testimony of J. Swez, IURC Cause No. 38707 FAC 123 S1, page 16.
[45] *Id.*

Edwardsport, made commitment decision taking into account the full startup and shutdown time and cost for each unit), and purchased energy from the market.

Second, Duke reported net operational losses at [redacted] plant for each month during the FAC 124 period. This means that not only is Duke not even covering the fuel and variable costs needed to operate the units, but it also is making no contribution towards the fixed and capital costs of any of its coal-fired power plants.

Q Do you have any other concerns with the patterns of losses seen during this FAC 124 period?

A Yes, with fleet-wide losses incurred during the prior FAC 123 period[46] and now the significant losses seen this period, I am concerned that during the next FAC 125 it will be challenging for the Commission to determine what portion of losses are attributed to the COVID-19 pandemic, and what level of losses it should have expected based on recent utility performance. It is important the Commission understand that Duke's entire coal fleet was performing extremely poorly before the pandemic so as not to falsely attribute poor utility commitment behavior to pandemic impacts.[47]

[46] Direct Testimony of D. Glick, FAC 123, page 6.

[47] Further, if costs continue to exceed LMPs in most hours, as we see during this FAC period, but Duke continues to self-commit its units, the Company will also continue to lose money from operating its coal plants. Lower sales that reduce the use of its coal fleet could actually reduce costs more than it reduces revenues, and therefore could serve ratepayers better than in the current FAC period.

5. COMMISSIONS AND UTILITIES ELSEWHERE HAVE BEGUN TO EXPLORE AND ADDRESS THE ISSUE OF UNIT SELF-COMMITMENT.

Q Has the Indiana Commission acknowledged concerns about self-commitment in the wholesale markets?

A Yes, in Duke FAC 123, the Commission stated that it agreed with Sierra Club and Citizens Action Coalition of Indiana that "the public interest would be served by a detailed review of the Applicant." Therefore, the Commission opened a sub-docket as part of FAC 123 to address unit commitment practices.[48]

Q Have other entities raised concerns about self-commitment in the wholesale markets?

A Yes. The issue has arisen in both MISO and the Southwest Power Pool ("SPP") within the past year. Public utilities commissions in both Minnesota and Missouri have opened formal dockets to investigate utility self-commitment and self-dispatch practices.[49] The SPP Market Monitor Unit ("MMU") raised concerns about self-commitment in multiple reports. The MMU concluded that reducing self-commitment will not only lead to better price signals, but it will "likely help market participants make better short-run and long-run decisions," and will "likely lead to ratepayer benefits in the form of cost reduction."[50]

[48] Docket Entry Granting Motion to Open Subdocket, IUCC, March 12, 2020.

[49] See Mo. Pub. Serv. Comm'n, Docket No. EW-2019-0370; Minn. P.U.C., Dockets Nos. E999/AA-17-492 and E999/AA-18-373.

[50] Southwest Power Pool, Self-committing in SPP markets: Overview, impacts, and recommendations (Dec. 2019); Power Pool–Market Monitoring Unit, State of the Market 2018 at 5 (May 15, 2019).

Q What options have utilities pursued to minimize costs to ratepayers from uneconomic commitment and operation of coal plants?

A Several utilities have moved away from year-round self-commitment and evaluated moving to seasonal operations at some of their plants. For example:

1. Northern States Power Company ("NSP") recently updated its bid practices and now offers two of its coal plants into the market with a default commitment status of "economic." This has resulted in a large reduction in hours run at both plants.[51] NSP also petitioned the Minnesota PUC to allow it to offer both plants into MISO on only a seasonal basis going forward[52] as a way to save ratepayers money.
2. Southwestern Public Service Company ("SPS") switched from predominately self-committing its units to utilizing economic dispatch in November 2018.[53] This decision resulted in SPS committing its units in market status more than 80 percent of the time between November 2018 and December 2019.[54] SPS is also seeking approval to switch one of its plants to seasonal operations.

[51] In the Matter of the Petition of Northern States Power Company, d.b.a. Xcel Energy, for Approval of a Plan to Offer Generating Resources into the MISO Market on a Seasonal Basis, Petition Minn. P.U.C. Docket No. E002/M-19-809 (docket initiated Dec. 20, 2019).

[52] *Id.*

[53] Rebuttal Testimony of W. Grant on Behalf of SPS, N.M. Pub. Regulation Comm'n Case No. 19-00170-UT at 36-27 (Dec. 20, 2019).

[54] *Id.*

3. Southwestern Electric Power Company has switched the Dolet Hill plant in Louisiana to seasonal operation, shutting the plant down in off-peak seasons when demand is low and bringing back online just for the peak seasons.[55]

6. THE DUKE FAC PROCESS DOES NOT ALLOW FOR SUFFICIENT REVIEW OF DUKE'S UNIT COMMITMENT DECISIONS.

Q What is the scope of the FAC proceedings?

A The FAC proceedings cover the reasonableness of fuel costs incurred by the Company to provide electricity to ratepayers during the three-month period reviewed. The reasonableness of fuel costs depends on the reasonableness of unit commitment decisions, among other factors.

Q Do you have concerns with Duke's FAC proceeding and process?

A Yes, I believe that the existing process does not allow for sufficient oversight of unit commitment decisions, especially because of Duke's insistence for on-site review of its commitment documents. There is only a month between the date on which the Company files its application and the date intervenor testimony is due, according to Duke's application in this proceeding.[56] This process allows very little time to issue discovery requests and review and process data. The review process is complicated further by Duke's insistence that the most relevant source of information, the "Daily Generating Unit P&L Analysis" sheets, are only available for review in person on site. This timeline also gives the Commission

[55] Gheorghiu, Iulia. Cleco, "SWEPCO shift coal plant use, target 2.8 GW renewables in latest resource plans." Utility Dive (Sept. 6, 2019).

[56] Application, page 2.

very little time to explore in detail the issues at hand. The Commission acknowledged this limitation when it opened a sub-docket in FAC 123, stating it agreed that a detailed review "is not possible within the statutory time constraints of the FAC summary proceeding."[57]

Further, the quarterly frequency of filings does not allow for the most efficient allocation of time and resources from both the utility and the Commission in evaluating commitment practices.

Q What are your recommendations regarding review of Company commitment practices?

A I recommend that the Commission create a subdocket or another process that allows annual review of unit commitment and dispatch practices over the prior year, and that allows for a refund to customers if warranted. This process should include sufficient time for discovery and full analysis and review of the Company's unit commitment practices. In addition, the Commission should require the Company to file its Profit & Loss spreadsheets with the Commission and make them available to intervenors in their native (e.g., Excel) spreadsheet file formats. For the instant FAC 124, I recommend that the Commission open a subdocket to review Duke's unit commitment decisions for this FAC 124 period and that allows sufficient time to adjudicate these issues. For efficiency, the Commission might consider consolidating a FAC 124 subdocket with the already existing FAC 123 subdocket.

[57] Docket Entry Granting Motion to Open Subdocket, IUCC, March 12, 2020.

Q Is such a prudence review process employed by other Commissions?

A Yes. Other jurisdictions in the Midwest have venues for review of the prudence of unit commitment decisions over a longer time horizon. In Michigan there is an annual Power Supply Cost Recovery Plan proceeding, which is a reconciliation docket that allows for review of the prudence of the Company's commitment practices. In Missouri, there is a fuel prudence review docket that occurs every 18 months that also allows for review of this issue. In Missouri, this prudence review supplements quarterly FAC adjustment filings.

Q What other recommendations do you have for the Commission?

A To the extent that the Company's commitment decisions have been guided by must-take or minimum-take provisions in medium- or long-term coal contracts, the Commission must examine these contracts to determine if the Company has entered coal contracts prudently, or if its coal contracts have resulted in non-economic outcomes for customers. A fuel docket is an appropriate forum for the examination of these costs.

Q Does this conclude your testimony?

A Yes.