FILED September 4, 2020 INDIANA UTILITY REGULATORY COMMISSION

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)	CAUSE NO. 38707-
UPDATE MONTHLY BENCHMARKS FOR)	FAC125
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)	

Direct Testimony of Devi Glick

On Behalf of Sierra Club

Public Version

September 4, 2020

TABLE OF CONTENTS

LIST OF EXHIBITS
LIST OF TABLES
1. Introduction and purpose of testimony
2. Findings and recommendations
3. Duke's own data shows that the Company actually lost \$28.9 million during FAC 125 through the uneconomic commitment and operation of its coal fleet11
4. Duke self-commits its coal-fired generating units the majority of the time15
5. Duke introduced a coal price decrement to address its coal oversupply in FAC 125, which magnified the impact of uneconomic coal plant operation on ratepayers22
6. Duke's coal oversupply, and purported need for a coal price decrement, was driven by imprudent coal contracting decisions
 Duke regularly ignores the results of its own forward-looking price-based analysis, which projected significant losses from the Company's unit commitment practices in FAC 125
 Duke would have saved ratepayers millions of dollars by operating Edwardsport on natural gas instead of coal in FAC 125
9. Duke commits Cayuga, even when uneconomic, in order to serve its steam customer, and at the expense of all other ratepayers
10. The Commission should require Duke to make price-based unit commitment decision

LIST OF EXHIBITS

1	DG-1:	Resume of Devi Glick
2	DG-2:	Duke Energy Indiana Public Responses to Requests for
3		Information
4	DG-3:	Duke Energy Indiana Confidential Responses to Requests for
5		Information
6	DG-4:	Nova Scotia Power Inc., Application for Extra Large Industrial
7		Active Demand Control Tariff. Nova Scotia Utility Review Board,
8		M09420. September 27, 2019.
9		

LIST OF TABLES

Table 1 (CONFIDENTIAL): Net operational revenues in Millions in FAC 125 (inclu- fuel cost and variable O&M costs)	ding 12
Table 2: Net revenue / losses for DEI's coal fleet during FAC 123 - 125	13
Table 3: Unit commitment decisions for Duke's coal plants (non-outage hours)	17
Table 4 (CONFIDENTIAL): Event notes from Duke's Profit and Loss Analysis sheet	ts.35

1 **1. INTRODUCTION AND PURPOSE OF TESTIMONY**

2 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.

6 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.

15 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
 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 before state utility regulators in Indiana, Texas,
 Arizona, New Mexico, Connecticut, Virginia, North Carolina, South Carolina,

1		and Florida. In the course of my work, I develop in-house electricity system
2		models and perform analysis using industry-standard electricity system models.
3		Before joining Synapse, I worked at Rocky Mountain Institute, focusing on a
4		wide range of energy and electricity issues. I have a master's degree in public
5		policy and a master's degree in environmental science from the University of
6		Michigan, as well as a bachelor's degree in environmental studies from
7		Middlebury College. I have eight years of professional experience as a consultant,
8		researcher, and analyst. A copy of my current resume is attached as Exhibit DG-1.
9	Q	On whose behalf are you testifying in this case?
10	Α	I am testifying on behalf of Sierra Club.
11	Q	Have you previously testified before the Indiana Utility Regulatory
12		Commission ("Commission")?
13	Α	Yes, I submitted testimony on behalf of Sierra Club in Duke Energy Indiana
14		("Duke" or "Company") FAC 123, FAC 124, and FAC 123 S1.
15	Q	What is the purpose of your testimony in this proceeding?
16	Α	In this proceeding, I review and evaluate the prudence of Duke's unit
17		commitment decisions and related fuel costs for FAC 125 between the dates of
18		March 1, 2020 and May 31, 2020. Specifically, I review and evaluate Duke's
19		justifications for maintaining coal-fired operations at Edwardsport and for
20		operating Cayuga to serve the industrial steam customer. I discuss Duke's use of a
21		fuel price decrement, its long-term coal contracting practices, and I reiterate the
22		need for proper price-based data and analysis to review the prudence of the
23		Company's commitment decisions.

1 Q How is your testimony structured?

2	Α	In Section 2 of my testimony, I summarize my findings and recommendations for
3		the Commission.
4		In Section 3, I summarize the actual performance of the Company's coal units in
5		the FAC 125 period and I calculate the significant costs that uneconomic
6		commitment practices incurred for ratepayers.
7		In Section 4, I evaluate Duke's unit commitment practices for the FAC 125
8		period. I assess how often each coal unit is committed into the Midcontinent
9		Independent System Operator ("MISO") market with a "must-run" or "economic"
10		status during each period. I assess how the Company makes commitment
11		determinations and discuss the types of consumer losses that can result from
12		must-run commitment decisions.
13		In Section 5, I discuss Duke's introduction of a coal price decrement and
14		summarize the impact that the decrement has on the Company's commitment and
15		dispatch practices.
16		In Section 6, I summarize Duke's current coal contracts, and discuss the
17		imprudent coal contracting decisions that caused the Company's oversupply
18		challenges.
19		In Section 7, I review the daily commitment Profit and Loss Analysis sheets that
20		Duke made available and assess the prudence of the Company's specific MISO
21		energy market commitment decisions based on the data available to the Company
22		at the time it made each decision.
23		In Section 8, I summarize the cost to ratepayers of Duke operating Edwardsport
24		on coal and respond to the Company's invalid justifications for must-run

1		commitment decisions and operation of Edwardsport on coal instead of natural
2		gas.
3		In Section 9, I summarize the cost to ratepayers of Duke operating Cayuga 1 and
4		2, and outline my concerns with the Company uneconomically operating the plant
5		for the purpose of serving the steam customer when it otherwise would not.
6		Finally, in Section 10, I outline my recommendations as to how the Commission
7		could require Duke to follow price-based signals in making unit commitment
8		decision moving forward.
9	Q	What documents do you rely upon for your analysis, findings, and
10		observations?
11	Α	My analysis relies primarily upon the workpapers, exhibits, and discovery
12		responses of Duke's witnesses associated with this proceeding. In addition, I rely
13		to a limited extent on certain external, publicly available documents.
14	2. <u>H</u>	INDINGS AND RECOMMENDATIONS
15	Q	Please summarize your findings.
16	Α	My primary findings are:
17		1. All of Duke's coal-fired power plants that were online reported net
18		operational losses (total energy and ancillary service market revenues minus
19		actual variable fuel and operations and maintenance costs) for the FAC 125
20		period (March 1, 2020 through May 31, 2020).
21		2. Duke self-committed all of its coal-fired power plants that were online over
22		half of the time during FAC 125.

1	3.	Duke introduced a coal price decrement during FAC 125 to address its coal
2		oversupply. This increased the number of hours over which the Company
3		operated its coal plants and magnified the impact of the Company's
4		uneconomic unit commitment practices on ratepayers.
5	4.	Duke's coal oversupply was driven in large part by its reliance on long term
6		coal contracts. The oversupply was exacerbated by the Company's signing of
7		two spot coal contracts, all in
8		for a combined total of of coal, while
9		simultaneously adjusting down its projected fuel burn for the year. These
10		imprudent contracting decision are responsible for an estimated
11		of the net losses at Gibson during FAC 125
12	5.	Duke's commitment and operational practices at its coal-fired generating units
13		led to fleet-wide net operational losses (energy sales on the MISO market less
14		variable operational costs) of \$28.9 million in FAC 125, based on actual
15		revenues and costs reported by the Company. This volume of net losses is
16		significantly higher than Duke reported in FAC 123 and 124 and was driven
17		by Duke's application of a coal price decrement, and subsequent increase in
18		economic self-commitment, at Gibson.
19	6.	Duke's imprudent, uneconomic commitment and operations practices incurred
20		actual net losses of \$6.8 million at Edwardsport, \$7.3 million at Cayuga, and
21		\$13.7 million at Gibson.
22	7.	Duke's own data at the time it made each commitment decision during FAC
23		125 did not support committing and operating Edwardsport on coal-based
24		syngas. Specifically, Duke's Profit and Loss analyses, which incorporated a
25		coal price decrement for most of FAC 125 and therefore under projects fuel
26		costs, <i>projected</i> earnings of \$2.2 million from operating the plant on gas. This
27		same analysis projected energy market losses of \$2.3 million from operating

1		Edwardsport on coal-based syngas, or a \$4.5 million favorable energy margin
2		for gas over coal at the plant.
3		8. Duke has failed to substantiate or quantify any of the non-economic claims it
4		has advanced to justify continued uneconomic operation of Edwardsport.
5		Duke's own data and analysis at the time it made each unit commitment
6		decision did not support committing and operating Cayuga 1 or 2 as must-run
7		as often as Duke did. Specifically, the Profit and Loss Analysis sheets created
8		for the days that Duke self-committed the units, all of which included a fuel
9		price decrement for the Cayuga units, projected \$1.0 million in losses during
10		FAC 125.
11		9. Duke states that its non-economic operations of Cayuga 1 and 2 are needed to
12		serve a steam customer. But the Company has failed to demonstrate that these
13		uneconomic operations serve the best interests of retail customers.
14		10. Duke ignored the results of its own price-based Profit and Loss Analysis, and
15		in fact did not rely on any tools or analysis at any point during FAC 125 to
16		inform or assess Edwardsport's, and at least one of Cayuga's, unit
17		commitment practices.
18	Q	Please summarize your recommendations.
19	Α	Based on my findings, I offer the following chief recommendations:
20		1. The Commission should disallow for Edwardsport \$6.1 million of the plant's
21		requested fuel costs ¹ for FAC 125 (out of the total net losses of \$6.8 million)
22		that the Company incurred based on imprudent, uneconomic self-commitment
	-	

¹ I assume net losses are composed of the same mix of fuel and variable costs as total net revenues.

1		and operational decisions. This amount likely understates the losses that Duke
2		is passing on to customers by excluding potential revenue gains that Duke
3		could have realized from operating Edwardsport on natural gas instead of on
4		coal-based syngas (which Duke estimated at \$2.2 million in its Profit and Loss
5		analysis, however that analysis includes the decrement and therefore
6		understates fuel costs and therefore the net revenue difference between
7		operation on the two fuel types).
8	2.	The Commission should disallow for Cayuga \$6.5 million in fuel costs for
9		FAC 125 (out of the total \$7.3 million in net losses) that Duke imprudently
10		incurred at Cayuga on the basis of uneconomic commitment and operation.
11		Further, the Commission should require Duke to conduct, and provide to this
12		Commission for evaluation, a cost of service study, or an alternative robust
13		analysis, to evaluate whether the steam contract is appropriately covering the
14		incremental and variable costs of operating Cayuga for the purpose of serving
15		the steam customer.
16	3.	The Commission should disallow at least out of the total \$14
17		million in variable net losses on the basis of imprudent execution of spot coal
18		contracts at Gibson. These contracts exacerbated Duke's coal oversupply and
19		caused Duke to self-commit and run Gibson at a higher frequency than it
20		would have otherwise to use up the coal oversupply.
21	4.	The Commission should require Duke to develop a new, price-based profit
22		and loss analysis process for Edwardsport that does not require the Company
23		to contemplate frequent cycling when the gasifiers are on. This analysis
24		should include a 3-month look-ahead analysis produced at the beginning of
25		each FAC period that projects plant revenues from operating on both coal-
26		based syngas and natural gas.
27		a. If the results of the 3-month forecast indicate that net revenues are
28		highest when the plant is operating on natural gas, the Company

1		should continue to produce and utilize the daily Profit and Loss
2		Analysis to direct the plant's daily commitment decisions on natural
3		gas.
4		b. If the results of the 3-month forecast indicate that net revenues are
5		highest when the plant is operating on coal-based syngas, the
6		Company should produce projections for every 14-day period to assess
7		whether operating on coal continues to be the most-economic option
8		for ratepayers during the FAC period.
9	5.	The Commission should require Duke to follow price-based signals at
10		Edwardsport and all other plants in making its unit commitment and dispatch
11		decisions. Further, Duke should provide a brief record memorializing the
12		reason for any deviance between the results of the Company's forward-
13		looking price-based analysis (the Profit and Loss Analysis, as well as the
14		recommended 14-day and 3-month analysis), and the Company's actual
15		commitment decision. The Commission should presume imprudence and
16		disallow recovery of any fuel costs associated with energy market losses
17		incurred at Edwardsport or any of Duke's plants as a result of not following
18		the results of the Company's own price-based process.
19	6.	The Commission should require Duke to publish during every FAC docket a
20		public accounting for ratepayers of:
21		a. Total net revenue (or losses) from running Edwardsport in the FAC
22		period, defined as energy and ancillary service market revenue less
23		fuel and variable O&M
24		b. Monthly gas and coal consumption at Edwardsport in the FAC period;
25		c. Hours when the gasifiers were in outage in the FAC period; and
26		d. Total net revenue (or losses) that the Company would have
27		incurred/earned from operating Edwardsport on natural gas for all

1	hours in the FAC period (applicable only if Edwardsport operated on
2	coal in the FAC period).

3 3. <u>Duke's own data shows that the Company actually lost \$28.9 million</u> 4 <u>During FAC 125 through the uneconomic commitment and operation of</u> 5 <u>ITS COAL FLEET.</u>

6	Q	Please summarize the actual performance of Duke's coal fleet in FAC 125
7		based on your review of the Company's actual operational data.

- 8 A I reviewed data reported by Duke on the *actual* variable costs that Duke incurred
- 9 (fuel and variable O&M) and the *actual* energy market revenues that Duke earned
- 10 from operation of its coal fleet in FAC 125. As shown in Table 1, I found that
- 11 during FAC 125, every Duke plant that was online reported net losses.²
- 12 Edwardsport and Cayuga lost a combined \$14.1 million, and Gibson units 2-5
- 13 together reported net losses of \$13.7 million.

² Throughout my testimony, when I discuss net revenue or net loss, I am referring to energy margins: short-run variable costs relative to short-run energy and ancillary market revenues.

 Table 1 (CONFIDENTIAL): Net operational revenues in Millions in

 FAC 125 (including fuel cost and variable O&M costs)

	Mar 2020	Apr 2020	May 2020	FAC 125 Total
Cayuga 1				(\$3.8)
Cayuga 2				(\$3.5)
Edwardsport				(\$6.8)
Gallagher 2				(\$0.0)
Gallagher 4				(\$0.0)
Gibson 1		5877) 1.197	100	\$0.0
Gibson 2				(\$5.0)
Gibson 3				(\$3.4)
Gibson 4				(\$3.2)
Gibson 5				(\$3.2)
All	(\$10.8)	(\$10.2)	(\$7.9)	(\$28.9)

Sources: Duke responses to Sierra Club Data Requests No. 1.1(e), CONFIDENTIAL Attachment
 SC 1.1-D; No. 1.1(g), CONFIDENTIAL Attachment SC 1.1-F; No. 1.1(j), CONFIDENTIAL
 Attachment 1.1-H; No. 1.1(l), Attachment 1.1-I; No.1.1(m) and (n), CONFIDENTIAL Attachment
 1.1-J; Duke response to OUCC 2.3, Confidential Attachment OUCC 2-3A.
 Note: Values exclude losses incurred during planned and unplanned outages.

- 8 Q How were the values in Table 1 calculated?
- 9 A I calculated the values in Table 1 based on the Company's own hourly cost and
- 10 operational revenue data. Specifically, for each unit, I calculated the hourly
- 11 variable production cost based on the hourly actual variable production cost³
- 12 values (which includes fuel and variable O&M) and total unit hourly generation. I
- 13 then calculated net operational revenues by comparing the total variable
- 14 production costs to the operational revenues (energy and ancillary service
- 15 revenues) provided by the Company. I removed loses incurred during planned and

³ In the FAC 123 and FAC 124 dockets, I based my calculations on the Company's reported marginal fuel costs, but in this docket, with the introduction of the decrement, I switched to actual reported fuel costs.

unplanned outages (as identified by the Company),⁴ and then I summed the net
 hourly revenues for each hour in a month to find the monthly totals.

3 Q How do the Company's losses during FAC 125 compare to its losses in prior 4 FAC periods?

A Duke's net losses during FAC 125 were \$28.9 million. This is significantly higher
than its net losses of \$12.7 million in FAC 124, and net revenue of \$5.6 million in
FAC 123, as shown in Table 2. There are two factors that drove this spike in net
losses (and each compounded the other): low locational marginal prices ("LMP")
and Duke's use of a coal price decrement.

10 Table 2: Net revenue / losses for DEI's coal fleet during FAC 123 - 125

123 \$5.6	124 (\$12.7)	125 (\$28.9)	(\$36.1)
\$5.6	(\$12.7)	(\$28.9)	(\$36.1)
$(^{}4,2)$			
((12))			
(\$4.2)	(\$4.7)	(\$6.8)	(\$15.7)
\$0.9	(\$3.6)	(\$7.3)	(\$9.9)
\$8.9	(\$4.0)	(\$14.7)	(\$9.8)
(\$0.1)	(\$0.5)	(\$0.1)	(\$0.6)
(\$0.9 \$8.9 (\$0.1)	\$0.9 (\$3.6) \$8.9 (\$4.0) (\$0.1) (\$0.5)	\$0.9 (\$3.6) (\$7.3) \$8.9 (\$4.0) (\$14.7) \$\$0.1) (\$0.5) (\$0.1) ests No. 1.1 parts a-q and all \$\$100000000000000000000000000000000000

¹² 13

⁴ Duke responses to Sierra Club Data Requests No. 1.1(e), CONFIDENTIAL Attachment SC 1.1-D; No. 1.1(g), CONFIDENTIAL Attachment SC 1.1-F; No. 1.1(j), CONFIDENTIAL Attachment 1.1-H; No. 1.1(l), Attachment 1.1-I; No.1.1(m) and (n), CONFIDENTIAL Attachment 1.1-J; Duke response to OUCC 2.3, Confidential Attachment OUCC 2-3A.

1		First, LMPs dropped in FAC 125, likely due to economic impacts of the COVID-
2		19 pandemic. This decreased net revenues and made Duke's units even more
3		uncompetitive relative to other market resources than they were previously.
4		Second, Duke's application of a coal price decrement to Edwardsport, Cayuga,
5		and Gibson in FAC 125 increased the number of hours in which the Company
6		uneconomically committed coal units. This decrement did not significantly impact
7		unit commitment decisions at Edwardsport and Cayuga, where Duke was already
8		self-committing the plants most of the time without regard for economics. But the
9		decrement did increase the commitment and dispatch of Gibson units 2-5 relative
10		to the prior FAC period.
11		Specifically, Duke self-committed the Gibson units during 54 percent of the hours
12		in the months of March through May 2020 and operated the units at a 38 percent
13		capacity factor during this time. In the prior FAC 124 period Gibson units were
14		committed during 41 percent of the hours and operated at an average plant
15		capacity factor of 24 percent. The combination of increased self-commitment,
16		increased dispatch of the units when they were online, and lower market revenue
17		for each kWh, caused a dramatic increase in net losses.
18	Q	What else do you conclude from the significant losses experienced by Duke
19		from operating its coal-fired power plants in FAC 125?
20		First, with lower LMPs, Duke's coal plants are even more uncompetitive with
21		other resources in this energy market than previously. Customers would have
22		been better served if Duke economically committed its resources and purchased
23		energy from the market to meet any outstanding customer needs not met by the

24 economically committed resources.

Second, the market revenue Duke earned at many of its coal units is not even
covering the fuel and variable costs needed to operate them. The plants are losing
money for every hour they operate, and therefore making no contribution towards
the fixed and capital costs incurred at the power plants.
Finally, Duke's decision not to follow the results of its own price-based predictive
analysis tool in making commitment decisions at many of its coal plants,
specifically Edwardsport and Cayuga, results in significant net revenue losses,
which the Company now seeks to impose on ratepayers through imprudently
incurred fuel costs.

10 4. Duke self-commits its coal-fired generating units the majority of the 11 TIME.

12 Q Please describe how coal units are committed within the MISO wholesale 13 market.

- 14 A In MISO, utilities generally commit dispatchable generating units with a status of
- 15 "economic"⁵ thereby making the market operator responsible for unit
- 16 commitment decisions.⁶ While maintaining system reliability, the market operator

⁵ MISO has five commitment statuses: outage, emergency, economic, must-run, and not participating. When a unit "self-commits" or operates as "must-run," this means the utility, in this case Duke, is independently deciding to operate a unit at or above its minimum capacity regardless of whether MISO determines that it is economic to do so. In contrast, 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.

⁶ In my testimony, I will use the term "unit commitment" to refer to the decision made by the utility or the market on whether to operate a unit at its minimum operating level and therefore make it available to the market. I will use the term "unit dispatch" to refer to the decision by the utility or the market on how to operate a unit above its minimum operating level once the unit has been committed online.

1 makes operational decisions based on short-term economics to ensure customers 2 are served by the lowest cost resources. For units with long startup and shut-down 3 times, such as coal plants, however, utilities may elect to maintain control of unit 4 commitment decision, designing independent processes outside of the MISO market to determine when to commit a unit at its minimum operating level.⁷ 5 Unlike the market operator, generation owners may choose not to incorporate 6 7 costs into their decision-making process, and may elect to commit units as must-8 run, regardless of economics.

9 Q What happens if a unit is committed with a must-run status?

10 Α A unit designated as must-run will operate at least at its minimum operating level. The market operator may then ramp the unit up from that minimum operating 11 12 level, but a must-run designation ensures that the unit remains online. During that time period, it receives market revenue (and incurs incumbent operational costs) 13 14 but does not set the market price of energy. Similarly, if the market price of 15 energy falls below its operational cost, the unit will not turn off and can incur losses. As such, in order to net a benefit from the decision to commit a unit into 16 17 the market, an operator must create market price projections. Utilities that elect to 18 self-commit (commit into the market in must-run status) slow-ramp coal units 19 may conduct a projection of market prices extending several days into the future 20 to ensure that a commitment election has a likely net positive outcome.

⁷ Minimum operating level is an output threshold often determined operationally, and below which a generator is either less stable or operates inefficiently. 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 MISO.

1 Q How did Duke commit its four coal plants during FAC 125?

A The Company self-committed all of its coal units that were online⁸ over half the time⁹, and in fact self-committed all except Cayuga 1 more than 75 percent of the time. Edwardsport was online and committed as must-run in all non-outage hours in FAC 125.¹⁰ Full results are shown in Table 3.

6

 Table 3: Unit commitment decisions for Duke's coal plants (non-outage hours)

	FA	AC 123	F.	AC 124	FA	AC 125
	Must- Run	Economic	Must- Run	Economic	Must- Run	Economic
Cayuga 1	82%	18%	37%	63%	58%	42%
Cayuga 2	43%	57%	52%	48%	75%	25%
Edwardsport 1	100%	0%	100%	0%	100%	0%
Gibson 1	100%	0%	46%	54%	0%	0%
Gibson 2	90%	10%	85%	15%	94%	6%
Gibson 3	69%	31%	23%	77%	79%	21%
Gibson 4	0%	100%	73%	27%	92%	8%
Gibson 5	83%	17%	17%	83%	82%	18%
Gallagher 2	0%	100%	2%	98%	0%	100%
Gallagher 4	0%	100%	2%	98%	0%	100%

7 8 Sources: Duke Response to Sierra Club Data Request No. 1.1(e), CONFIDENTIAL Attachment SC 1.1-D.

⁸ Edwardsport, Gibson 2-5, and Cayuga were online, Gibson 1 was in outage and Gallagher was economically offline for the entirety of FAC 125.

⁹ Duke Response to Sierra Club Data Request No. 1.1(e), CONFIDENTIAL Attachment SC 1.1-D.

¹⁰ *Id*.

1 Q Why do you present results for non-outage hours instead of total hours?

A During an outage, a generator has operational consideration outside of short-term
 energy market prices. I exclude these hours to focus on the commitment elections
 when economics should be the predominant consideration facing a unit.
 Specifically, I have removed data from all planned and unplanned outage periods,
 as identified by the Company,¹¹ from all analysis performed throughout my
 testimony.

8 Unplanned outages can result from imprudent operations and maintenance 9 planning decisions, though, and increased operations can make it more likely that 10 an unplanned outage will occur. While an individual commitment decision is not 11 necessarily responsible for causing an outage, a pattern of imprudent commitment 12 decisions and unnecessary plant operation could be tied to an increased frequency 13 of plant outages.

14 Q How does the Company's unit commitment behavior compare to its practices 15 in the prior FAC period?

A Duke self-committed its coal plants, specifically Gibson units 2-5, into MISO
 with a must-run status significantly more in FAC 125 than in the prior two FAC
 periods, as shown in Table 3. This increase in self-commitment was driven in
 large part by Duke's use of a coal price decrement when making unit commitment
 decisions.

¹¹ See Duke Response to OUCC Data Request No. 2.3, CONFIDENTIAL Attachment 2.3-A. Duke Response to Sierra Club Request No. 1.1(e), CONFIDENTIAL Attachment 1.1-D.

1QWhy is it concerning that Duke is using a must-run commitment status at its2coal-fired generating units so frequently?

A Duke has not demonstrated that its internal decision process produces greater net
revenues and a more-economic outcome than relying solely on the MISO market.
Instead, during FAC 125 Duke ignored the results of its price-based analysis,
made imprudent unit commitment decision, and, as one would predict, lost a
significant amount of ratepayers' money.

8 When Duke commits a unit in "economic" status, the market operator decides 9 whether to keep or bring the unit online at its minimum operating level by 10 comparing the variable cost of starting and operating the unit to the relevant 11 variable costs of all other units available to the market. MISO will operate Duke's 12 plants only if they are the least-cost option.

Under a "self-commit" framework, Duke takes over the decision-making process.
The Company should seek to minimize cost by operating its units only when they
are lower cost than market energy, but MISO is provided no transparency or
control over these independent processes used by generation owners to make unit
commitment decisions. In fact, a generation owner can operate its units however it
elects, so long as the Commission allows it to continue recovering the costs of
doing so.

If, and when, Duke commits a unit in MISO uneconomically (that is with variable
costs above the market LMP), Duke is only paid by MISO based on the market

LMP.¹² But, the full cost is still incurred by Duke to run that plant. The fuel costs
 not economically incurred are still passed onto ratepayers in their monthly bills
 through the fuel charge.

4

Q What tools does Duke have to inform its unit commitment decisions?

5 A Duke has developed a price-based forward-looking analysis process called the
6 Profit and Loss Analysis. Duke conducts this analysis most weekdays to
7 determine whether to commit its units the next day (or the next three days for
8 each Friday) and records all revenue projections and commitment decisions for
9 the following day on a sheet called the "Daily Generating Unit P&L Analysis."
10 The Company prepared 60 Profit and Loss Analysis sheets during FAC 125.

- 11 In these assessments, the Company reviews forecasted energy market prices¹³ and
- 12 projected variable startup, shutdown, and operational costs for the next three
- 13 weeks to project net operational revenues (or losses) for each unit for each
- 14 individual day and over the entire three week period.¹⁴ If a unit is projected to be
- 15 profitable, then ratepayers expect to see savings from operating the unit relative to
- 16 the acquisition of market-supplied power. If the unit is projected to lose money,
- 17 then ratepayers expect to see savings by the acquisition of market-supplied power.

¹² The market revenue Duke receives includes energy and ancillary market revenue from both the day-ahead and real-time markets.

¹³ Duke does not forecast and include ancillary service market revenue and other makewhole payments in its Profit and Loss Analysis.

¹⁴ Duke Response to Sierra Club Data Request No. 1.3(a); Duke response to Sierra Club Request 1.3(c.ii), CONFIDENTIAL Attachments SC 1.3-A, SC 1.3-B, and SC 1.3-C.

1	According to the Company, members of Duke's staff also hold daily meetings at
2	6:30 a.m. and 9:00 a.m. to discuss the commitment status for each unit. ¹⁵ But the
3	company has provided no record of these meetings; therefore it is impossible to
4	assess the role of these meetings on the imprudent commitment decisions that
5	have occurred during FAC 125. Further, as discussed below, neither these
6	meetings nor the Profit and Loss Analysis appear to impact the Company's unit
7	commitment decisions at Edwardsport and often at Cayuga.

8 Q How should Duke be using the results of its price-based analysis to inform 9 unit commitment decision?

A Duke should be making unit commitment decisions based on the results of its
 price-based analysis, or else documenting why the results are not being followed.
 Specifically, Duke should be electing to self-commit its units on a forward looking basis if it expects to make positive energy market margins (incorporating
 consideration of start-up and shut-down costs), and the Company should keep a
 unit offline if it is projected to operate at a loss.

16 Q Does Duke follow its price-based analysis to make its unit commitment 17 decision at all of its coal-fired power plants?

A No. Duke does not actually rely on the results of its Profit and Loss Analysis to
 inform its unit commitment decision at Edwardsport and at least one of the
 Cayuga units. Indeed, the Company admitted in FAC 123, FAC 124 and in its
 most-recent rate case that there are factors dictating plant commitment and

¹⁵ See Rebuttal testimony of Duke witness J. Swez, pages 4-6. IURC Cause No. 38707 123 S1.

1	dispatch decisions beyond customer economics, including unit testing; ¹⁶ the steam
2	customer served by Cayuga; and, at Edwardsport, the 14-day cycling timeline for
3	the gasification system, the plant's air permit, "fuel diversity," natural gas supply
4	constraints, and coal oversupply considerations. ¹⁷ But, as I discuss in Sections 8
5	and 9, the Company has failed to present sufficient qualitative or quantitative
6	evidence to support any of these alternative justifications for its uneconomic
7	decisions. Duke did rely on the results of its Profit and Loss Analysis to varying
8	degrees in committing Gibson during FAC 125.

9 5. <u>Duke introduced a coal price decrement to address its coal oversupply</u> 10 <u>in FAC 125, which magnified the impact of uneconomic coal plant</u> 11 <u>operation on ratepayers.</u>

12 Q Did Duke introduce any changes to its unit commitment decision-making 13 process during FAC 125?

A Yes, on March 11, Duke began applying a coal price decrement to the dispatch
 costs of the Gibson 2-5, Cayuga 1 and 2, and Edwardsport to, in Duke's words,

¹⁶ Company witness John Swez notes in his direct testimony in IURC Cause No. 38707 123 S1 (pages 9–11) that there are times when units need to be self-committed for testing purposes or to make sure maintenance or repairs were performed properly. However, testing and maintenance do not require a unit to operate for weeks or even months at a time, and therefore cannot be a valid explanation for Duke's prolonged periods of uneconomic operation.

 ¹⁷ Direct testimony of Duke witness J. Swez, pages 26-28. IURC Cause No. 38707 123 S1. Rebuttal testimony of Cecil T. Gurganus (Pet. Ex. 49), Cause No. 45253 (Dec. 4, 2019), pages 9-10.

"reflect the economics of additional costs associated with avoiding or reducing
 surplus coal inventories."^{18,19}

3 Q What is a coal price decrement?

4 Α A decrement is a decision-making tool and does not reflect an actual cost that the 5 Company has incurred. Duke's coal price decrement represents the estimated 6 avoided cost that the Company would have to pay to manage its oversupply of 7 coal but for the dispatch and operation of a unit that would otherwise not run. The 8 logic behind a decrement is that the cost to run a unit uneconomically in order to 9 burn oversupplied coal is lower than the cost of an alternative storage, resale 10 option, or coal contract decision. Often long-term coal contracts contain terms 11 that allow for a reduction in the coal take, or a deferral of the delivery date, and 12 these terms should be exhausted before any decrement is implemented. Further, as 13 more and more coal plants retire, the remaining plants have increased market 14 power relative to the remaining mines. It is in the best interest of ratepayers for 15 utilities to seek to renegotiate more flexible terms for deferral or delivery where 16 they do not already exist.

17 Q How does a coal price decrement work in theory?

A decrement is implemented by reducing the dispatch fuel cost used in an offer
 curve, or other unit commitment and dispatch decision-making tool, by the
 amount of the alternative options (the avoided cost). This allows the utility to
 purport to justify deliberately and systematically committing a unit below cost.

¹⁸ Duke response to CAC Date Request No. 1.7 (a).

¹⁹ Direct testimony of Duke witness J. Swez, pages 16-17.

1 Units operate when they otherwise would not have run (or would have run at a 2 lower operating level), thereby consuming oversupplied coal and avoiding (or 3 reducing) the need for the Company to spend money on higher cost alternatives 4 for storage, resale, or contract decisions to address the oversupplied coal.

5 Q Does the decrement impact all unit commitment decisions at all of Duke's 6 coal plants?

- A No, the decrement only impacts commitment at units where (1) the units are being
 committed economically (either by MISO or by proper use of price-based
 analysis); and (2) variable costs are higher than the LMP prior to the application
 of a decrement and lower than the LMP after the application of a decrement.
- 11 The decrement does not impact commitment decisions at units that where (1) the 12 unit is set to must-run without regard for economics; (2) variable costs are higher 13 than the LMP before and after the application of the decrement; and (3) variable 14 costs are lower than LMP even before the application of the decrement.

Q Can the coal oversupply problem and the need for the decrement be tied to the reduced demand for electricity driven by the economic impacts of the COVID-19 pandemic?

A No. Duke began implementing the coal price decrement on March 11, before the
 energy market responded to the pandemic's impacts. As I will discuss in section
 6, Duke's coal oversupply problem is a direct result of the Company's imprudent
 decision-making in signing long-term coal contracts,²⁰ even while the prices of

²⁰ Duke response to Sierra Club Request No. 1.5, CONFIDENTIAL Attachment 1.5-A.

1		alternatives, including natural gas and renewables have been consistently and
2		steadily falling.
2	0	Is the decomposition of the first of in Dults's much and fuel shound in this much adding?
3	Q	is the decrement reflected in Duke's proposed fuel charge in this proceeding:
4	Α	No. Duke is proposing to charge ratepayers the full actual fuel cost. To reiterate,
5		the decrement is just a tool used for making unit dispatch and commitment
6		decision.
7	0	How are sustamore imposted by the application of the decrement?
/	Q	now are customers impacted by the application of the decrement:
8	Α	The decrement magnifies the impact of uneconomic coal plant operation on
9		ratepayers by increasing the number of hours over which the plants
10		uneconomically operate. Customers are saddled with the net losses (the difference
11		between the cost to operate the plant and market revenue Duke earns) regardless
12		as to whether the Company uses a fuel cost with the decrement or the marginal
13		fuel cost to make its unit commitment and dispatch decisions.
1 4	0	
14	Q	Which of Duke's data and analysis discussed in your testimony reflects the
15		coal price decrement?
16	Α	The decrement is a decision-making tool, and therefore is incorporated into
17		Duke's Profit and Loss Analysis. ²¹ The decrement is not included in the actual
18		results because it does not represent an actual cost or benefit incurred. All actual
19		data reflect the actual fuel cost. The Profit and Loss Analysis will not align with

²¹ Duke response to CAC Request No. 1.8.

the actual net revenue or losses incurred during FAC 125 because of this
 difference.

3 6. <u>DUKE'S COAL OVERSUPPLY, AND PURPORTED NEED FOR A COAL PRICE DECREMENT,</u> 4 <u>WAS DRIVEN BY IMPRUDENT COAL CONTRACTING DECISIONS.</u>

- 5 Q It is reasonable for Duke to pass the cost of its coal oversupply onto its
 6 ratepayers?
- A No, the need to choose between uneconomic dispatch to use up a coal supply or
 higher cost resale and storage options, and saddle ratepayers with the resulting
 costs, is the product of imprudent coal contracting decisions that caused Duke to
 have an oversupply of coal.

11 Q Is this the first time Duke has introduced a coal price decrement to address 12 an oversupply of coal?

- 13 A No. Duke has implemented a coal price decrement at least twice before.
- 14 Specifically, between February 2012 and January 2014, and then again between
- July 2015 and June 2016, the Company applied a decrement at some of its coalunits.



¹ Q Please describe Duke's current coal contracts.

²² Duke CONFIDENTIAL Response to CAC Request No. 4.2, CONFIDENTIAL Attachment CAC 4.2-A.

 $^{^{23}}$ *Id*.

²⁴ Id. Duke Response to Sierra Club Request No. 1.5, CONFIDENTIAL Attachment SC 1.5-B.

²⁵ Duke Response to CAC Request No. 4.2, CONFIDENTIAL Attachment CAC 4.2-A; Direct Testimony of Duke Witness B. Phipps in Cause No. 38707 FAC 124 at p. 7.

1QHas Duke sought a specific prudence determination for the decision to enter2into any of its active supply contracts?

A No. To my knowledge Duke has not sought, nor has the Commission made, a
finding of prudence for any of these coal supply contracts.

5 Q How do the Company's long-term coal contracts compare to other significant 6 investments made by Duke?

- 7 A The scale of investment for some of Duke's coal contracts, on both a monetary
 8 and temporal basis, is comparable to the construction of an entirely new
 9 generation facility.
- 10 A new 500 megawatt combined cycle gas plant, for example, would cost around 11 \$400 million dollars to build. If Duke wants to construct this new facility, with its 12 several hundred-million-dollar price tag and multi-decade lifetime, the Company 13 would have to seek a prudence review from the Commission. Only then would it 14 be allowed to put the asset into its rate base and recover the cost from ratepayers. 15 No such prudential review occurred before Duke entered into its coal purchase 16 agreements, even though some are of similar magnitude. Instead Duke has 17 purported to lock ratepayers into a high-cost obligation without any prudential 18 review.

1QCan Duke resell any of its coal or coal contracts as a way to reduce the2burden on ratepayers?

A No, not according to the Company. Duke acknowledges that it has never resold,
 or sought to resell coal, at any point during this FAC period or at any point in the
 past.²⁶ Further, Company witness Phillips acknowledged that "due to continued
 weak coal market conditions, resale options will continue to be extremely difficult
 in the near term."²⁷ While these economic conditions mean that Duke likely has
 significant negotiation power with respect to its coal suppliers, Duke may not
 have an option to re-sell coal to reduce its oversupply.

10 Q What are the risks associated with a coal procurement strategy that relies 11 heavily on long-term contracts?

A Any long-term contract brings the risk that the assumptions used at the time the
 contract was entered into will not hold true for the length of the contract. The
 longer the term of the contract and the higher the cost, the greater the risk to
 ratepayers.

- While long-term contracts can be used as a hedge against future price volatility,
 there are also significant downside risks. First, long-term contracts inherently
- 18 require the utility to forgo other options, whether that is purchasing cheaper
- 19 energy from other sources or securing lower cost fuel from other suppliers.
- 20 Further, long-term contracts generally come with must-take provisions that lock

²⁶ Duke Response to CAC Request No. 2.7.

²⁷ Direct Testimony of Duke Witness B. Phipps, page 9.



²⁸ Duke CONFIDENTIAL Response to CAC Request No. 4.2, CONFIDENTIAL Attachment CAC 4.2-A. Duke CONFIDENTIAL response to CAC Request No. 4.5, CONFIDENTIAL Attachment CAC 4.5-A; Direct Testimony of Duke Witness B. Phipps in Cause No. 38707 FAC 124 at p. 7.



²⁹ Cross-Examination of Brett Phipps, IURC Cause No. 45253, January 29, 2020, at F-48-49; Duke CONFIDENTIAL Response to CAC Request No. 4.2.

³⁰ Cross-Examination of Brett Phipps, IURC Cause No. 45253, January 29, 2020, at F-48-49.

³¹ Duke CONFIDENTIAL Response to CAC Request No. 4.2.

³² Direct Testimony of OUCC Witness M. Eckert, IURC Cause No. 38707-FAC 123.

³³ According to Duke CONFIDENTIAL Response to OUCC Request No. 2.10,

down its burn forecast the second time to 6.5 million tons—this still means that
 Duke signed two new contracts during a period when its future fuel burn projects
 were highly uncertain, but definitively trending downward.

4 Q Is any portion of Duke's losses during this FAC period attributable to these 5 imprudent spot purchases?

A Yes. Gibson received **and the second of coal from spot purchases during the FAC** 125 period.³⁴ Although the decrement had a minimal impact at Edwardsport and
 Cayuga (units already being committed regardless of economics), at Gibson³⁵ the
 application of a decrement made units 2-5 appear to have a favorable energy
 margin where they would have appeared uneconomic before.

- 11The decrement, combined with Duke's general willingness to disregard the results12of its Profit and Loss Analysis, explains why Duke's use of must-run status at
- 13 Gibson was significantly higher during this FAC period as compared to the
- 14 previous two FAC periods, despite consistently *lower* LMPs.³⁶ The combination
- 15 of these two factors also explains the dramatic increase in net losses accrued at
- 16 Gibson (nearly \$14 million) during this time relative to prior FAC periods.
- 17Gibson burnedduring this period. 37 So if we assume the full18from spot contracts was consumed, that's

of the \$14 million in net losses that can be attributed just to the spot contracts in FAC 125.

19

³⁴ Duke CONFIDENTIAL Response to CAC Request No. 2.1(a).

³⁵ Gibson unit 1 was offline in outage for FAC 125.

³⁶ See Table 3.

³⁷ Duke CONFIDENTIAL Response to CAC Request No. 2.1(b).

Q What do you conclude regarding the efforts Duke took to manage its coal oversupply and the losses the Company seeks to pass onto its ratepayers?

3 Α Although some portion of these FAC 125 losses can be attributed to lower LMPs, 4 Duke's increased use of the must-run commitment status in an effort to manage 5 its coal oversupply amplified the downside risks and losses associated with its 6 imprudent commitment decisions. Any efforts Duke could have taken to reduce 7 plant operation to adapt to the lower market conditions during the FAC 125 8 period were apparently complicated by the Company's coal oversupply, including 9 long-term contracts and imprudent spot purchases delivered to Gibson during the 10 period. This forced Duke to operate and thus accept unusually low prices for its 11 generation.

DUKE REGULARLY IGNORES THE RESULTS OF ITS OWN FORWARD-LOOKING PRICE BASED ANALYSIS, WHICH PROJECTED SIGNIFICANT LOSSES FROM THE COMPANY'S UNIT COMMITMENT PRACTICES IN FAC 125.

15 Q Please summarize your findings regarding Duke's self-commitment practices 16 in FAC periods 125.

A During the FAC 125 periods, Duke ran Edwardsport on coal whenever the
 gasifiers were available—regardless of the results from its own Profit and Loss
 Analysis sheets.³⁸ During the same period, Duke also operated either Cayuga
 Units 1 or 2 at all times to provide steam to the steam customer, once again
 regardless of the results of its Profit and Loss Analysis sheets.³⁹ The Company did
 use the results of its analysis, to varying degrees, to inform its unit commitment

³⁸ Direct Testimony of Duke witness J. Swez, page 21.

³⁹ Direct Testimony of Duke witness J. Swez, page 25. IURC Cause No. 38707 123 S1.

1		decisions for Gibson 2-5. Duke's Profit and Loss Analysis sheets incorporate the
2		coal price decrement for Edwardsport, Cayuga, and Gibson for FAC 125.
3	Q	Can you provide specific examples from Dukes own Profit and Loss Analysis
4		where the Company projected losses yet still operated the unit?
5	Α	I found several instances at Edwardsport, Cayuga 2, and Gibson 2 and 3 when the
6		Company brought online, or left online, a unit despite its own commitment
7		analysis, incorporating the fuel price decrement, showing that net losses would be
8		lower if the unit was not brought online or was taken offline. I provide a full
9		description of all such instances in Table 4.40
10		1. At Edwardsport, Duke operated the unit continuously as must-run on coal
11		during all hours when its gasifiers were not in outage from September 21,
12		2019 until May 30, 202, at which time the plant went offline for a planned
13		outage. Duke failed to de-commit Edwardsport on coal at any point during
14		that nearly eight-month period, even knowing it would continue to incur
15		energy market losses.
16		2. At Cayuga unit 2, Duke's analysis conducted every day between March 23
17		and April 9 projected weekly losses and a benefit in taking the unit offline, but
18		instead Duke committed the unit as must-run through April 28, when the plant
19		came offline during an unplanned outage.

⁴⁰ Duke Responses to Sierra Club Data Requests No. 1.1(e), CONFIDENTIAL Attachment SC 1.1-D; No. 1.1(g), CONFIDENTIAL Attachment SC 1.1-F; No. 1.1(j), CONFIDENTIAL Attachment 1.1-H; No. 1.1(l), Attachment 1.1-I; No.1.1(m) and (n), CONFIDENTIAL Attachment 1.1-J; Duke response to OUCC 2.3, Confidential Attachment OUCC 2-3A. P&L analysis for FAC provided in Duke Response to SC 1.3(c.ii), CONFIDENTIAL Attachments SC 1.3-A, SC 1.3-B, and SC 1.3-C.

1	3.	At Gibson unit 2, Duke's analysis conducted on March 5 projected a benefit to
2		keeping the unit offline. Instead, Duke switched the unit from an "economic"
3		to "must-run" commitment status and kept it online (except for a single
4		planned outage) through May 23, 2020.
5	4.	At Gibson unit 3, every analysis conducted between March 20 and April 8
6		projected net weekly losses even with the coal price decrement, suggesting a
7		benefit to taking the unit offline. Duke instead committed the unit as must-run
8		every day during this period.

9 10

Table 4 (CONFIDENTIAL): Event notes from Duke's Profit and Loss Analysis sheets

Date analysis completed	Date(s) analysis covered	Profit and Loss Analysis findings	Utility commitment decision	Actual net operational losses
Edwardsport				
2/28/2020	3/1/2020 – 5/30/2020	Analysis conducted on 02/28/2020 for the first day of the FAC period, <i>projected</i> net losses of the week. Every Profit and Loss Analysis sheet created between 2/28/2020 and 3/11/2020, when the coal price decrement was implemented, projected weekly net losses of between and the second	The unit was operated continuously as must-run on coal during all hours that the gasifiers were not in outage from the beginning of FAC 125 until 5/30/2020 when the unit was brought offline for a planned outage.	\$6.8 million
Cayuga 2				
2/28/2020	3/1/2020- 4/28/2020	Analysis conducted on 2/28/2020 for the first day of the FAC period, <i>projected</i> net losses of for the week. Every Profit and Loss Analysis sheet created between 2/28/2020 and 3/11/2020, when the coal price decrement was implemented, projected	The unit was committed as must- run from the beginning of FAC 125 until 4/28/2020 when the unit came offline due to a forced outage.	

		weekly net losses of between and Even after the decrement was implemented, every analysis between 3/23/2020 and 4/28/2020 projected weekly net losses of between and	
Gibson 2			
3/5/2020	3/6/2020 – 5/23/2020	Analysis conducted on 3/5/2020 indicated a benefit to keeping the unit offline. The unit was <i>projected</i> to lose in the first week.	The unit was switched from economic to must- run on 3/6/2020 and stayed as must- run until 5/23/2020 (with one unplanned outage on 3/19)
Gibson 3			
3/30/2020	3/20/2020 - 4/8/2020	Even after the coal price decrement was implemented, every analysis conducted between 3/30/2020 and 4/8/2020 projected net weekly losses of between and	The unit was on and committed as must-run for the entire time between 3/20/2020 and 4/8/2020.

1 Q How did you calculate these values discussed above?

2 A I reviewed the 60 Profit and Loss Analysis sheets for FAC 125 that the Company

- prepared to make unit commitment decisions for the 92 days between March 1,
 2020 and May 31, 2020.⁴¹
- 5 To calculate the total *projected* revenue or losses associated with self-
- 6 commitment at each unit at Edwardsport, Cayuga, and Gibson, I summed the

⁴¹ Profit and Loss Analysis sheets were not produced for some days and are not prepared on weekends and some holidays.

1daily *projected* net revenues or losses from every Profit and Loss Analysis sheet2prepared for days when a unit was self-committed. Specifically, I summed the3*projected* values for each day from the Profit and Loss Analysis prepared the prior4day (or the most-recent day when the prior day was a weekend or no Profit and5Loss Analysis sheet had been created the prior day) for operation of each unit.

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 Why are the Duke's actual net losses significantly higher than the net losses projected by the Company in its Profit and Loss Analysis sheets?

12 Α As discussed in section 5, during FAC 125 Duke applied a coal price decrement 13 to reduce the coal cost used to make unit-commitment decisions at Edwardsport, 14 Cayuga, and Gibson by the avoided cost of storing or reselling the coal. The Profit 15 and Loss analysis reflects this decrement, and therefore understates the true cost 16 of operating each coal unit. This means that even if Duke forecasted LMPs with 17 100 percent accuracy, its actual losses would still be higher than the Profit and 18 Loss by the amount of the decrement. This is why, for example, Duke's actual 19 reported net losses at Edwardsport were \$6.8 million during FAC 125, but the 20 Company's Profit and Loss Analysis, which incorporated the decrement, 21 forecasted only \$2.1 million in net losses at that plant.

18.DUKE WOULD HAVE SAVED RATEPAYERS MILLIONS OF DOLLARS BY OPERATING2EDWARDSPORT ON NATURAL GAS INSTEAD OF COAL IN FAC 125.

- Q What did you find about the Company's decision to operate Edwardsport
 predominately on coal in FAC 125 based on your review of the Company's
 Profit and Loss Analysis and actual data?
- A As discussed above, during FAC 125 the Company committed Edwardsport as
 must-run on syngas-based coal whenever gasifiers were available, despite its own
 analysis showing that operating the unit on gas could produce positive net
 revenues for customers (positive revenue that Duke should be earning to cover
 some of the plant's fixed and capital costs). Specifically, even with the coal price
 decrement, Duke *projected* the following, relative to buying energy from the
 market:
- Net losses of \$2.3 million from self-committing and operating the unit on syngas/coal;
- Net revenues of \$2.2 million if the unit instead operated on natural gas;
 and
- A difference of \$4.5 million in revenue from self-committing and
 operating the unit on coal instead of natural gas.
- 19 Duke reported actual losses of \$6.8 million at Edwardsport during FAC 125.

1QDoes this analysis include all possible revenues and costs that Duke is likely2to see from operating Edwardsport on gas instead of coal?

3 No. In a prior FAC proceeding, Witness Swez discussed several categories of Α 4 costs that would be incurred from switching to gas full time (including a potential capacity derating).⁴² But, when the plant is operating on gas, operating costs are 5 also lower than when the plant operates on coal, and the unit is typically 6 committed and dispatched economically.⁴³ Duke should be able to turn the plant 7 on and off with less lead time and at a lower cost than when operating on coal, 8 9 and also ramp up and down more easily to lower the operating level during times 10 when the unit is online but LMPs are low. For this reason, and despite Swez's 11 claims of unaccounted-for gas-related costs, my analysis likely underestimates the revenues from operating Edwardsport on natural gas, and therefore net losses 12 13 relative to operating on coal.

14QHow does Duke explain its continued operation of Edwardsport on coal when15its own analysis shows it would avoid significant losses operating on natural16gas?

In FAC 123, FAC 124, and FAC 123 S1, Duke offered several explanations for
 why it is not reasonable to operate Edwardsport primarily or exclusively on
 natural gas. The Company still has not adequately explained or substantiated any
 of these claims and none of them change my findings or recommendations.

⁴² See Duke Energy Response to Commission's June 12, 2020 Docket Entry.

⁴³ See Direct Testimony of Duke witness J. Swez, IURC Cause No. 38707 FAC 124, page 19.

1	1.	Cycling time: Duke states that the gasification system has a 14-day
2		cycling time and cannot be turned off for short periods of time. I do not
3		challenge this, and my analysis does not contemplate regularly switching
4		back and forth between coal and gas. ⁴⁴ I found that Edwardsport would
5		have earned positive net revenue relative to market energy and relative to
6		operating on coal-based syngas if the plant had switched to natural gas for
7		the entire FAC 125. There is no need to switch fuels or cycle the
8		gasification system to act on this finding.
9	2.	Essential personnel: Duke repeatedly advanced the claim that switching
10		to gas would result in a loss of essential personnel. But the Company
11		failed to provide any information that would allow substantiation of this
12		claim, including the number of employees who currently work on the
13		gasification system, the number who would be required if the plant
14		switched to gas, the specific tasks that the "essential" personnel perform at
15		Edwardsport, and an explanation for why the skills of existing personnel
16		are non-transferable if the plant switches to gas. ⁴⁵
17	3.	Air permit: Duke claims that operating solely on natural gas for a
18		prolonged period is not permitted or authorized by the station's air
19		permit. ⁴⁶ But the Company admits that it has not completed any analysis
20		or specific evaluation to support this assertion.

 ⁴⁴ *Id.*, page 27.
 ⁴⁵ *See*, for example, Direct testimony of J. Swez, IURC Cause No. 38707 FAC 123 S1, page 27.

⁴⁶ *Id.*, page 28. Duke Response to Sierra Club 1.12 in IURC Cause No. 38707 FAC 123 S1.

1	4.	Natural gas supply and prices: Duke has stated that the Company does
2		not currently contract for enough natural gas to run Edwardsport fully on
3		natural gas, and that switching Edwardsport to natural gas would likely
4		drive up gas prices. ⁴⁷ But Duke's own Profit and Loss Analysis once again
5		projects that for FAC 125 Duke will earn significant net revenues by
6		operating Edwardsport full time on gas relative to operation on coal. If this
7		analysis does not reflect Duke's current assumptions on Edwardsport's gas
8		costs, the Company should update its analysis. Further, so long as gas
9		prices remain below coal prices per unit of energy produced, customers
10		will still be better off on gas.
11	5.	Fuel diversity: Duke asserts that switching to natural gas would be
12		essentially a permanent decision that would lose the diversity value of coal
13		and subject the Company to gas price volatility. ⁴⁸ But the Company fails
14		to understand that the value of fuel diversity comes from allowing a fuel-
15		diverse utility to respond quickly and flexibly to changes in the market,
16		therefore optimizing customer costs based on its diversity. Burning a non-
17		economic fuel in excess over a short term is antithetical to the economic
18		arguments that might undergird a decision to maintain fuel diversity:
19		taking sustained losses by operating out of merit is not a hedge, but simply
20		a loss. Further, the company does not need fuel diversity, it needs resource
21		diversity, and this issue should be addressed in a resource planning docket.

 ⁴⁷ See Rebuttal testimony of J. Swez, IURC Cause No. 38707 FAC 124, pages 28-29.
 ⁴⁸ Id., page 27-28.

Q What alternatives does Duke have to operating Edwardsport on coal or gas that would also save ratepayers money?

A Duke could turn Edwardsport off and buy energy from the market. My analysis
shows that even if Duke did not want to switch Edwardsport operations to gas, its
customers would still save money in total costs (on the order of \$6.8 million) if
Duke were to turn the plant off and procure market energy.

9. <u>DUKE COMMITS CAYUGA, EVEN WHEN UNECONOMIC, IN ORDER TO SERVE ITS</u> 8 <u>STEAM CUSTOMER, AND AT THE EXPENSE OF ALL OTHER RATEPAYERS.</u>

- 9 Q What did you find about the Company's self-commitment of Cayuga units 1
 10 and 2 in FAC 125 based on your review of the Profit and Loss Analysis and
 11 actual net revenue data?
- 12 Α I found that throughout the FAC 125 period, Duke had at least one of the Cayuga 13 units self-committed in must-run status, despite clear indications from its 14 contemporaneous decision documents that the unit(s) were *predicted* to accrue significant losses during that time.⁴⁹ Specifically, Duke's own analysis with the 15 inclusion of the coal price decrement predicted \$1.0 million in losses in FAC 125 16 from operating the Cayuga units on the days they were set to must-run status 17 relative to buying energy from the market.⁵⁰ The two units together *actually lost* 18 \$7.3 million.⁵¹ 19

⁴⁹ Profit and Loss Analysis for FAC provided in Duke Response to SC 1.3(c.ii), CONFIDENTIAL Attachments SC 1.3-A, SC 1.3-B, and SC 1.3-C.

⁵⁰ *Id*.

⁵¹ Duke responses to Sierra Club Data Requests No. 1.1(e), CONFIDENTIAL Attachment SC 1.1-D; No. 1.1(g), CONFIDENTIAL Attachment SC 1.1-F; No. 1.1(j),

I am concerned that Duke is operating the plant even when it is not economic to
 do so in order to provide steam to an industrial customer and that the costs to
 provide this steam service are being subsidized by Duke's electric ratepayers.

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

A First, in the rate case (Cause No. 45253), Mr. Swez indicated that Cayuga station
supplies steam to an industrial customer and that, "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."⁵² In
order to serve the steam customer, one of Cayuga units 1 or 2 is generally selfcommitted and self-scheduled above its normal minimum operating level
regardless of economics.

Second, Company witness Diaz indicated that Duke's contract with the steam customer dates back to 1974. When Cayuga was online all the time operating as a baseload resource, this contract structure was logical. Even in 2012 when the contract was last amended, the Cayuga units were operating at 50 to 60 percent capacity factors⁵³ and likely still earning positive net revenues in more hours than today. Today, even with Duke self-committing at least one Cayuga unit regularly

CONFIDENTIAL Attachment 1.1-H; No. 1.1(l), Attachment 1.1-I; No.1.1(m) and (n), CONFIDENTIAL Attachment 1.1-J; Duke response to OUCC 2.3, Confidential Attachment OUCC 2-3A. P&L analysis for FAC provided in Duke Response to SC 1.3(c.ii), CONFIDENTIAL Attachments SC 1.3-A, SC 1.3-B, and SC 1.3-C.
 ⁵² See Rebuttal Testimony of J. Swez, IURC Cause No. 45253, page 29.

⁵³ EIA form 923 data.

and incorporating a fuel price decrement into its offer curve, both units operated
 at around only a 40 percent capacity factor between the months of March 2020
 and May 2020.⁵⁴ Duke's existing contract with the industrial customer is not well
 suited for the reality that Cayuga cannot economically operate a significant
 portion of the time.

6 Third, Duke acknowledged that it has not calculated the impact on electrical 7 customers' costs of running Cayuga due to the requirement to supply steam when 8 it otherwise would not have run based on expected energy market margins. The 9 Company defended this decision stating that "there are multiple assumptions that the Company would have to make in order to perform this calculation."⁵⁵ But that 10 11 is exactly why Duke needs to perform a cost of service study (or other 12 comparative analysis). In order to understand the cost of operating Cayuga to 13 serve the steam customer, Duke should be modeling its electricity system with 14 and without the requirement to provide steam to the industrial customer. 15 Modeling of this type has been used in other jurisdictions to set tariffs for a 16 specific large industrial customer in order to ensure that the industrial customer is covering not only the variable costs to serve it but all other incremental costs to 17 the system of providing its service.⁵⁶ 18

Finally, Duke acknowledged that the "MISO energy market impact when running
a Cayuga unit to supply steam to the industrial customer when it otherwise would

⁵⁴ Duke responses to Sierra Club Data Requests No.1.1(g), CONFIDENTIAL Attachment SC 1.1-F.

⁵⁵ See, Duke response to Sierra Club No. 1.9 (a), IURC Cause No. 38707 FAC 124.

⁵⁶ 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.

have de-committed (i.e. shutdown for reserve shutdown) is not currently allocated
 to the steam customer."⁵⁷ Duke therefore concedes that electric customers are
 subsidizing the steam customer.

4 10. <u>THE COMMISSION SHOULD REQUIRE DUKE TO MAKE PRICE-BASED UNIT</u> 5 <u>COMMITMENT DECISION.</u>

- 6 Q Have other entities raised concerns about self-commitment in the wholesale
 7 markets?
- 8 Α Yes. The issue has arisen in both MISO and the Southwest Power Pool ("SPP") 9 within the past year. The SPP Market Monitor Unit ("MMU") has raised concerns about self-commitment in multiple reports. The MMU concluded that reducing 10 11 self-commitment will not only lead to better price signals, but it will "likely help 12 market participants make better short-run and long-run decisions," and will "likely lead to ratepayer benefits in the form of cost reduction."⁵⁸ Public utilities 13 commissions in both Minnesota and Missouri have opened formal dockets to 14 investigate utility self-commitment and self-dispatch practices,⁵⁹ and a number of 15 utilities, including Northern States Power Company,⁶⁰ Southwestern Public 16

⁵⁷ See, Duke response to CAC No. 2.27, IURC Cause No. 38707 FAC 123 S1.

⁵⁸ 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).

⁵⁹ 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.

⁶⁰ 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).

Service Company,⁶¹ and Southwestern Electric Power Company⁶² have shifted
 plants to "economic" commitment or seasonal operations.

3 Q What is the scope of the FAC proceedings?

- A The FAC proceedings address 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.
- 8 Q Do you have concerns with Duke's FAC proceeding and process?
- 9 A Yes, I believe that the existing process does not allow for sufficient oversight of
 10 unit commitment decisions. The expedited timeline allows very little time to issue
 11 discovery requests and review and process data.
- 12 I believe the process could be sufficient if the Commission instituted requirements
- 13 for Duke to provide specific data and analysis necessary to assess the prudence of
- 14 the Company's unit commitment practices at the outset of the proceeding as part
- 15 of all future FAC filings.

⁶¹ 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).

⁶² Gheorghiu, Iulia. Cleco, "SWEPCO shift coal plant use, target 2.8 GW renewables in latest resource plans." Utility Dive (Sept. 6, 2019).

Q What information specifically do you recommend that Duke be required to provide in each FAC filing to allow a review of the prudence of its unit commitment practices?

4 Α I recommend that Duke be required to submit in its FAC application all Profit and 5 Loss Analysis sheets (in their native, e.g., Excel, spreadsheet file formats) prepared for each day that falls within the FAC period. Along with these sheets, 6 7 Duke should provide a brief description memorializing the reason for any 8 deviation from the results of the Company's forward-looking price-based analysis 9 and the Company's actual commitment decision. In addition, Duke should 10 provide hourly data sufficient for the Commission to calculate the net revenues 11 that each plant actually incurred in each FAC period, including generation, 12 accounting fuel cost, total variable cost, unit LMP, day ahead commitment status, 13 energy and ancillary market revenues, and actual outages.

Q Should the Company's current Profit and Loss Analysis for commitment decisions at Edwardsport be supplemented?

16 Α Yes. Given Duke's practice of disregarding the results of its Profit and Loss 17 Analysis in its unit commitment practices at Edwardsport, Duke should develop a 18 new price-based analysis process that the Company will actually use to 19 supplement the existing Profit and Loss Analysis. In contrast to the one day and 20 one-week decision window of the Company's current Profit and Loss Analysis, 21 this supplemental analysis should extend beyond the plant's 14-day cycling 22 window to inform the plant's commitment decisions based on seasonal market 23 and fuel price trends. Moving from a daily to a seasonal analysis window will 24 allow the Company to make commitment decision over a longer timeline 25 (multiple weeks, or even months), and therefore should address the Company's

1		concern about the cost and impact of frequent plant cycling. This analysis should
2		be included in the FAC application for review.
3	Q	What are your specific recommendations for the Company's new forward-
4		looking analysis process at Edwardsport?
5	Α	The Company should be required to produce at the beginning of each 3-month
6		FAC period a projected forecast of plant revenues from operating the plant on
7		both coal-based syngas and natural gas.
8		If the results of the 3-month forecast indicate that net revenues are highest when
9		the plant is operating on natural gas, I recommend that the Company still be
10		required to produce and utilize the daily Profit and Loss Analysis sheets to direct
11		the plant's daily commitment decisions on natural gas.
12		If the results of the 3-month forecast indicate that net revenues are highest when
13		the plant is operating on coal/syngas, I recommend that the Company produce
14		updated projections every 14 days to assess whether operation on coal continues
15		to be the most-economic option for ratepayers during the FAC period. The
16		Company should be required to abide by the results of all 3-month, 14-day, and
17		one-day price-based analysis, and otherwise memorialize any deviations.
18	Q	Under your recommended plan for oversight would any of the price-based
19		analysis be available for Duke's customers to review?
20	Α	No, so long as the utility maintains its position on the confidentiality of much of
21		the data. Therefore, I recommend that Duke be required to publish a public
22		accounting for each FAC period that allows ratepayers to see how Edwardsport is
23		operating. This report should contain the following items:

- Total net revenue (or losses) from running Edwardsport in the FAC period;
 Monthly gas and coal consumption at Edwardsport in the FAC period;
 Total hours when the gasifiers were in outage in the FAC; and
- 4 4. Total net revenue (or losses) that the Company would have incurred/earned
 5 from operating the plant on natural gas for all hours in the FAC period.
- 6 Q What are your recommendations regarding the Commission's assessment of
 7 Duke's commitment practices?
- 8 Q The Commission should require Duke to follow price-based signals at 9 Edwardsport and all other plants in making its unit commitment decisions. Such a 10 requirement is necessary if the Commission is to fulfill its obligation to assure the 11 lowest energy cost reasonably possible. Further, the Commission should disallow 12 recovery of losses incurred at Edwardsport as part of Duke's fuel adjustment charge if Duke does not follow market price signals or the results of its own price-13 14 based process and thereby fails to generate or purchase power at the lowest 15 reasonable cost.

16 Q What are your recommendations regarding the Commission's

- 17 implementation of a disallowance for FAC 125?
- 18AI recommend that the Commission disallow in the current docket \$6.1 million for19Edwardsport, \$6.5 million for Cayuga 1 and 2, and at leastat Gibson20in fuel costs incurred based on imprudent, uneconomic self-commitment, and
- 21 operational decisions, and imprudent spot and short-term coal contract decisions..

1QDo you have any recommendations regarding Dukes' coal contracting2decisions?

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 noneconomic outcomes for customers.

8 Q Does this conclude your testimony?

9 A Yes.