FILED July 31, 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)	FAC123 S1
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, Redacted Version

July 31, 2020

TABLE OF CONTENTS

LIST OF EXHIBITS
LIST OF TABLES
1. Introduction and purpose of testimony
2. Findings and recommendations
 Duke's own data shows that the Company actually lost \$7.3 million over the months September 2019 – February 2020 through uneconomic commitment and operation of its coal fleet
4. Duke self-commits many of its coal-fired generating units the majority of the time17
 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 123 and 124.
 Duke would have saved ratepayers millions of dollars by operating Edwardsport on natural gas instead of coal in FAC 123 and FAC 124
 Duke commits Cayuga, even when uneconomic, in order to serve its steam customer, and at the expense of all other ratepayers.
8. The Commission should require Duke to make price-based unit commitment decision.46

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:	Event Notes from select Profit and Loss Analysis sheets produced
7		in response to OUCC 3-8d.
8	DG-5:	Nova Scotia Power Inc., Application for Extra Large Industrial
9		Active Demand Control Tariff. Nova Scotia Utility Review Board,
10		M09420. September 27, 2019.
11		

LIST OF TABLES

Table 1: Summary of actual and projected net revenue / losses at Duke's coal units9
Table 2 (CONFIDENTIAL): Net operational revenues in Millions in FAC 123 (including fuel cost and variable O&M costs)
Table 3 (CONFIDENTIAL): Net operational revenues in Millions in FAC 124 (including fuel cost and variable O&M costs)
Table 4: Unit commitment decisions for Duke's coal plants (non-outage hours)
Table 5 (CONFIDENTIAL): Event notes from Duke's Profit and Loss Analysis sheets.30

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,

3

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 more than seven years of professional experience as a
8		consultant, researcher, and analyst. A copy of my current resume is attached as
9		Exhibit DG-1.
10	Q	On whose behalf are you testifying in this case?
11	A	I am testifying on behalf of Sierra Club.
12	Q	Have you testified previously before the Indiana Utility Regulatory
13		Commission ("Commission")?
14	Α	Yes, I submitted testimony on behalf of Sierra Club in Duke Energy Indiana FAC
15		123 and FAC 124.
16	Q	What is the purpose of your testimony in this proceeding?
17	Α	In this proceeding, I review and evaluate the prudence of Duke Energy Indiana's
18		("Duke" or "Company") unit commitment decisions and related fuel costs for
19		FAC 123 between the dates of September 1, 2019 and November 30, 2019 and
20		
20		FAC 124 between the dates of December 1, 2019 and February 29, 2020.
20 21		FAC 124 between the dates of December 1, 2019 and February 29, 2020. Specifically, I review and evaluate Duke's justifications for maintaining coal-fired

1		customer. I also discuss the need for proper price-based data and analysis to
2		review the prudence of the Company's commitment decisions.
3	Q	How is your testimony structured?
4	Α	In Section 2 of my testimony, I summarize my findings and recommendations for
5		the Commission.
-		
6		In Section 3, I summarize the actual performance of the Company's coal units in
7		each of the FAC 123 and FAC 124 periods and I calculate the significant costs
8		that uneconomic commitment practices incurred for ratepayers.
0		
9		In Section 4, I evaluate Duke's unit commitment practices for the FAC 123 and
10		124 periods. I assess how often each coal unit is committed into the Midcontinent
11		Independent System Operator ("MISO") market with a "must-run" or "economic"
12		status during each period. I assess how the Company makes commitment
13		determinations and discuss the types of consumer losses that can result from
14		must-run commitment decisions.
15		In Section 5, I review the daily commitment Profit and Loss Analysis sheets that
16		Duke made available and assess the prudence of the Company's specific MISO
17		energy market commitment decisions based on the data available to the Company
18		at the time it made each decision.
10		
19		In Section 6, I summarize the cost to ratepayers of Duke operating Edwardsport
20		on coal and respond to the Company's invalid justifications for must-run
21		commitment decisions and operation of Edwardsport on coal instead of natural
22		gas.

1		In Section 7, I summarize the cost to ratepayers of Duke operating Cayuga 1 and
2		2, and outline my concerns with the Company uneconomically operating the plant
3		when it otherwise would not for the purpose of serving the steam customer.
4		Finally, in Section 8, I outline my recommendations as to how the Commission
5		could require Duke to follow price-based signals in making unit commitment
6		decision moving forward.
7	Q	What documents do you rely upon for your analysis, findings, and
8		observations?
0		
9	A	My analysis relies primarily upon the workpapers, exhibits, and discovery
9 10	A	My analysis relies primarily upon the workpapers, exhibits, and discovery responses of Duke's witnesses associated with this proceeding, information I
9 10 11	A	My analysis relies primarily upon the workpapers, exhibits, and discovery responses of Duke's witnesses associated with this proceeding, information I reviewed during an in-person visit to Duke Energy's Plainfield, Indiana office in
9 10 11 12	Α	My analysis relies primarily upon the workpapers, exhibits, and discovery responses of Duke's witnesses associated with this proceeding, information I reviewed during an in-person visit to Duke Energy's Plainfield, Indiana office in February 2020, as well as information reviewed during a virtual "site visit" with
9 10 11 12 13	Α	My analysis relies primarily upon the workpapers, exhibits, and discovery responses of Duke's witnesses associated with this proceeding, information I reviewed during an in-person visit to Duke Energy's Plainfield, Indiana office in February 2020, as well as information reviewed during a virtual "site visit" with Duke staff and lawyers conducted using Microsoft Teams in May 2020. In
9 10 11 12 13 14	Α	My analysis relies primarily upon the workpapers, exhibits, and discovery responses of Duke's witnesses associated with this proceeding, information I reviewed during an in-person visit to Duke Energy's Plainfield, Indiana office in February 2020, as well as information reviewed during a virtual "site visit" with Duke staff and lawyers conducted using Microsoft Teams in May 2020. In addition, I rely to a limited extent on certain external, publicly available
9 10 11 12 13 14 15	Α	My analysis relies primarily upon the workpapers, exhibits, and discovery responses of Duke's witnesses associated with this proceeding, information I reviewed during an in-person visit to Duke Energy's Plainfield, Indiana office in February 2020, as well as information reviewed during a virtual "site visit" with Duke staff and lawyers conducted using Microsoft Teams in May 2020. 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
9 10 11 12 13 14 15 16	Α	My analysis relies primarily upon the workpapers, exhibits, and discovery responses of Duke's witnesses associated with this proceeding, information I reviewed during an in-person visit to Duke Energy's Plainfield, Indiana office in February 2020, as well as information reviewed during a virtual "site visit" with Duke staff and lawyers conducted using Microsoft Teams in May 2020. 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.

17 2. FINDINGS AND RECOMMENDATIONS

18 **Q** Please summarize your findings.

19 **A** My primary findings are:

All but one of Duke's coal-fired power plants reported net operational losses
 (total energy and ancillary service market revenues minus variable fuel and
 operations and maintenance costs) in FAC 123 (September 1, 2019 through
 November 30, 2019), and every coal-fired power plant reported net

1		operational losses in FAC 124 (December 1, 2019 through February 29,
2		2020).
3	2.	Duke self-committed at least half of its coal-fired generating units
4		approximately 50 percent or more of the time during the FAC 123 and 124
5		periods.
6	3.	Duke's coal-fired generating unit commitment and operational practices led to
7		fleet-wide net operational revenues (energy sales on the MISO market less
8		variable operational costs) of less than half a million in FAC 123 and losses of
9		\$7.8 million in FAC 124, based on <i>actual</i> revenues and costs reported by the
10		Company.
11	4.	Duke's imprudent, uneconomic commitment and operations practices incurred
12		actual net losses of:
13		a. \$3.3 million at Edwardsport and \$1.9 million at Cayuga 1 and 2 for a
14		total of \$5.2 million in net operational losses in FAC 123.
15		b. \$4.3 million at Edwardsport and \$2.4 million at Cayuga 1 and 2 for a
16		total of \$6.7 million net operation losses in FAC 124.
17	5.	Duke's own data at the time it made each unit commitment decision did not
18		support committing and operating Edwardsport on coal-based syngas.
19		Specifically, Duke provided 127 Profit and Loss Analysis sheets prepared at
20		the time of its commitment decisions at issue here projecting that:
21		a. In FAC 123, the Company could have earned \$2.7 million from
22		operating Edwardsport on gas, rather than coal. Prior to making these
23		commitment decisions, Duke projected that gas operation would result
24		in a \$6.5 million more favorable energy margin compared to coal-
25		based syngas operation, which Duke projected would result in energy
26		market losses of \$3.7 million for FAC 123.
27		b. In FAC 124, the Company could have earned \$3.1 million from
28		operating Edwardsport on gas, rather than coal. Prior to making these

1		commitment decisions, Duke projected that gas operation would result
2		in a \$9.5 million more favorable energy margin compared to coal-
3		based syngas operation, which Duke projected would result in energy
4		market losses of \$6.4 million for FAC 124.
5	6.	Duke has failed to substantiate or quantify any of its claims that (a)
6		Edwardsport's air permit does not allow the plant to run full time on natural
7		gas; (b) it will lose essential personnel if Edwardsport converts to run full time
8		on natural gas; or (c) natural gas prices will increase if Edwardsport converts
9		to run full time on natural gas.
10	7.	Duke ignored the results of its own price-based Profit and Loss Analysis, and
11		in fact relied on no tools or analysis at any point during FAC 123 and FAC
12		124 to inform or assess Edwardsport's unit commitment practices.
13	8.	Duke's own data and analysis at the time it made each unit commitment
14		decision did not support committing and operating Cayuga 1 or 2 as "must-
15		run" as often as Duke did. Specifically, the Profit and Loss Analysis sheets
16		created for the days that Duke self-committed the units projected:
17		a. \$0.4 million in losses in FAC 123; and
18		b. \$3.0 million in losses in FAC 124.
19	9.	Duke states that its non-economic operations of Cayuga 1 and 2 are needed to
20		serve a steam customer. However, the Company has failed to demonstrate that
21		these uneconomic operations serve the best interests of retail customers.

(net losses/revenues in \$Million)	FAC 123	FAC 124	Total
Edwardsport			
Actual net losses reported by Duke	(\$3.3)	(\$4.3)	(\$7.7)
Projected net losses/revenues from daily P&L sheets		C - 72 P - 14 P - 72	
Operation on coal	(\$3.7)	(\$6.4)	(\$10.2)
Operation on natural gas	\$2.7	\$3.1	\$5.9
Revenue delta between coal and natural gas	(\$6.5)	(\$9.5)	(\$16.0)
Cayuga 1 & 2			
Actual net losses reported by Duke	(\$1.9)	(\$2.4)	(\$4.3)
Projected net losses/revenues when committed as must-run from daily P&L sheets	(\$0.4)	(\$3.0)	(\$3.4)
Coal Fleet Summary			
Total (actual) fleet net revenue / losses	\$0.5	(\$7.8)	(\$7.3)
Total (actual) net losses for Edwardsport and Cayuga	(\$5.2)	(\$6.7)	(\$12.0)
Total (actual) net losses / revenue for rest of coal fleet	\$5.7	(\$1.1)	\$4.7
Sources: Duke responses to Sierra Club Data Requests No. 1.1(g), CON	FIDENTL	AL Attachn	nent SC

1 Table 1: Summary of actual and projected net revenue / losses at Duke's coal units

3 1.1-F; No. 1.1(i), CONFIDENTIAL Attachment SC 1.1-H; No. 1.1(l), CONFIDENTIAL Attachment 4 SC 1.1-J: No. 1.1(m), CONFIDENTIAL Attachment SC 1.1-K; No. 1.1(n), CONFIDENTIAL

Attachment SC 1.1-L; No. 1.1(o), CONFIDENTIAL Attachment SC 1.1-M; No. 1.1(p),

56 CONFIDENTIAL Attachment SC 1.1-M; No. 1.1(q), CONFIDENTIAL Attachment SC 1.1-N; Duke 7 response to OUCC 3.3, CONFIDENTIAL Attachment OUCC 3.3-A, IURC Cause No. 38707 FAC 123.

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

9 1.1(i), CONFIDENTIAL Attachment SC 1.1-H; No. 1.1(l), CONFIDENTIAL Attachment SC 1.1-J;

10 No. 1.1(m), CONFIDENTIAL Attachment SC 1.1-H; No. 1.1(n), Attachment SC 1.1-K; No. 1.1(o),

11 CONFIDENTIAL Attachment SC 1.1-L; No. 1.1(p), CONFIDENTIAL Attachment SC 1.1-L; No.

12 1.1(q), CONFIDENTIAL Attachment SC 1.1-M; Duke response to OUCC 3.3, CONFIDENTIAL 13 Attachment OUCC 3.3-A, IURC Cause No. 38707 FAC 124.

14 Duke response to CAC Data Request No. 1.2, Revised CONFIDENTIAL Attachments CAC 1.2-A.

15 CAC 1.2-B and CAC 1.2-C, IURC Cause No. 38707 FAC 123 S-1. P&L analysis for FAC 123 viewed

16 on-site on 2/26/2020. P&L analysis for FAC 124 viewed during virtual "site visit" using Microsoft 17

Teams on May 18, 2020.

18 Q Please summarize your recommendations.

19 A Based on my findings, I offer the following chief recommendations:

1. The Commission should disallow for Edwardsport: 20

1	a. 3.0 million of the plant's requested fuel costs ¹ for FAC 123 (out of
2	the total variable costs of \$3.3 million incurred during FAC 123) that
3	the Company incurred based on imprudent, uneconomic self-
4	commitment and operational decisions.
5	b. \$4.0 million of the plant's requested fuel costs for FAC 124 (out of the
6	total variable costs of \$4.3 million incurred during FAC 124) that the
7	Company incurred based on imprudent, uneconomic self-commitment
8	and operational decisions.
9	These amounts likely understate the losses that Duke is passing on to
10	customers by excluding the potential revenue gains that Duke could have
11	realized from operating Edwardsport on natural gas instead of coal. Based
12	on the Company's own commitment analysis projections, Duke could
13	have earned positive revenues of \$2.7 million in FAC 123 and \$3.1
14	million in FAC 124 if the plant operated on gas instead of on coal-based
15	syngas.
16	2. The Commission should disallow for Cayuga:
17	a. \$1.7 million in fuel costs for FAC 123 (out of the total \$1.9 million in
18	variable losses) that Duke imprudently incurred at Cayuga on the basis
19	of uneconomic commitment and operation.
20	b. \$2.2 million for FAC 124 (out of the total \$2.4 million in variable
21	losses) that Duke imprudently incurred at Cayuga on the basis of
22	uneconomic commitment and operation.
23	Further, the Commission should require Duke to conduct, and provide to
24	this Commission for evaluation, a cost of service study, or an alternative

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

1		robust analysis, to evaluate whether the steam contract is appropriately
2		covering the incremental and variable costs of operating Cayuga for the
3		purpose of serving the steam customer.
4	3.	The Commission should require Duke to develop a new, price-based profit
5		and loss analysis process for Edwardsport that does not require the Company
6		to contemplate regular cycling when the gasifiers are on. This analysis should
7		include a 3-month look-ahead analysis produced at the beginning of each FAC
8		period that projects plant revenues from operating on both coal-based syngas
9		and natural gas.
10		a. If the results of the 3-month forecast indicate that net revenues are
11		highest when the plant is operating on natural gas, the Company
12		should continue to produce and utilize the daily Profit and Loss
13		Analysis.
14		b. If the results of the 3-month forecast indicate that net revenues are
15		highest when the plant is operating on coal/syngas, the Company
16		should produce projections for every 14-day period to assess whether
17		operating on coal continues to be the most-economic option for
18		ratepayers during the FAC period.
19	4.	The Commission should require Duke to follow price-based signals at
20		Edwardsport and all other plants in making its unit commitment and dispatch
21		decisions. Further, Duke should provide a brief description memorializing the
22		reason for any deviance between the results of the Company's forward-
23		looking price-based analysis (the Profit and Loss Analysis, as well as the
24		recommended 14-day and 3-month analysis), and the Company's actual
25		commitment decision. The Commission should presume imprudence and
26		disallow recovery of any fuel costs associated with energy market losses
27		incurred at Edwardsport or any of Duke's plants as a result of not following
28		the results of the Company's own price-based process.

1		5. The Commission should require Duke to publish during every FAC docket a
2		public accounting for ratepayers of:
3		a. Total net revenue (or losses) from running Edwardsport in the FAC
4		period, defined as energy and ancillary service market revenue less
5		fuel and variable O&M
6		b. Monthly gas and coal consumption at Edwardsport in the FAC period;
7		c. Hours when the gasifiers were in outage in the FAC; and
8		d. Total net revenue (or losses) that the Company would have
9		incurred/earned from operating Edwardsport on natural gas for all
10		hours in the FAC period (applicable only if Edwardsport operated on
11		coal in the FAC period).
12 13 14	3.	DUKE'S OWN DATA SHOWS THAT THE COMPANY ACTUALLY LOST \$7.3 MILLION OVER THE MONTHS SEPTEMBER 2019 – FEBRUARY 2020 THROUGH UNECONOMIC COMMITMENT AND OPERATION OF ITS COAL FLEET.
15	Q	Please summarize the actual performance of Duke's coal fleet in FAC 123
16		based on your review of the Company's actual operational data.
17	Α	I reviewed data reported by Duke on the actual variable costs that Duke incurred
18		(fuel and variable O&M) and the actual energy market revenues that Duke earned
19		from operation of its coal fleet in FAC 123. As shown in Table 2, I found that
20		during FAC 123, only Gibson earned net revenues ² and Edwardsport and Cayuga
21		lost a combined \$5.2 million. These losses completely negated the revenues the
22		Company earned from operating its other units. If Duke had instead committed

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.

- 1 Edwardsport and Cayuga economically over this time, the Company would have
- 2 earned at least \$5.7 million in net energy market revenues instead of just \$0.5
- 3 million in revenue.
- 45

	Sept 2019	Oct 2019	Nov 2019	FAC 123 Total
Cayuga 1				(\$1.1)
Cayuga 2				(\$0.8)
Edwardsport				(\$3.3)
Gallagher 2				(\$0.1)
Gallagher 4				(\$0.1)
Gibson 1				\$3.0
Gibson 2				\$2.3
Gibson 3	-30 Hells			(\$0.3)
Gibson 4				(\$0.1)
Gibson 5				\$1.0
All	\$1.1	(\$1.9)	\$1.3	\$0.5

Table 2 (CONFIDENTIAL): Net operational revenues in Millions in FAC 123 (including fuel cost and variable O&M costs)

		All	\$1.1	(\$1.9)	\$1.5	20.2	22				
6		Sources: Duk	Sources: Duke responses to Sierra Club Data Requests No. 1.1(g), CONFIDENTIAL								
7		Attachment S	Attachment SC 1.1-F; No. 1.1(i), CONFIDENTIAL Attachment SC 1.1-H; No. 1.1(l),								
8		CONFIDENT	CONFIDENTIAL Attachment SC 1.1-J; No. 1.1(m), CONFIDENTIAL Attachment SC								
9		1.1-K; No. 1	(n), CONFIDE	NTIAL Attac	hment SC 1	.1-L; No. 1.1((0),				
10		CONFIDENT	CONFIDENTIAL Attachment SC 1.1-M: No. 1.1(p). CONFIDENTIAL Attachment SC								
11		1.1-M; No. 1.	1.1-M; No. 1.1(a), CONFIDENTIAL Attachment SC 1.1-N; Duke response to OUCC								
12		3.3, CONFID	ENTIAL Attach	ment OUCC	3.3-A, IUR	C Cause No.	38707 FAC 12.	3			
13		Note: Values	exclude losses i	ncurred duri	ng planned	and unplanne	ed outages.				
14	0	Please summarize f	he actual ner	formance	of Duke	s coal fleet	t in FAC 12	4			

15 based on the Company's actual operational data.

16 A As shown in Table 3, I find that Duke lost \$7.8 million in revenue in FAC 124

- 17 from operating its coal fleet during extended periods while the coal units were not
- 18 economic to operate. In fact, all of Duke's coal-fired power plants reported net
- 19 operational losses relative to energy market prices. Only two of Duke's 10 coal
- 20 units reported positive net operational revenues (two units were also economically

offline) during the period. Edwardsport and Cayuga lost a combined \$6.7 million
over the three months in FAC 124 based on uneconomic commitment and
operation. If Duke had instead committed Edwardsport and Cayuga economically
over this time, the Company could have reduced its losses to around \$1 million.
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 every plant over
consecutive months.

8 9

	Dec 2019	Jan 2020	Feb 2020	FAC 124 Total
Cayuga 1				(\$0.8)
Cayuga 2				(\$1.6)
Edwardsport				(\$4.3)
Gallagher 2				(\$0.2)
Gallagher 4				(\$0.2)
Gibson 1	50. <u></u> 53			\$0.3
Gibson 2				(\$0.6)
Gibson 3				(\$0.4)
Gibson 4			10-10	\$0.3
Gibson 5			a - 58	(\$0.3)
All	(\$2.3)	(\$2.1)	(\$3.5)	(\$7.8)

 Table 3 (CONFIDENTIAL): Net operational revenues in Millions in FAC

 124 (including fuel cost and variable O&M costs)

10	Sources: Duke responses to Sierra Club Data Requests No. 1.1(g), CONFIDENTIAL
11	Attachment SC 1.1-F; No. 1.1(i), CONFIDENTIAL Attachment SC 1.1-H; No. 1.1(l),
12	CONFIDENTIAL Attachment SC 1.1-J; No. 1.1(m), CONFIDENTIAL Attachment SC
13	1.1-H; No. 1.1(n), Attachment SC 1.1-K; No. 1.1(o), CONFIDENTIAL Attachment SC
14	1.1-L; No. 1.1(p), CONFIDENTIAL Attachment SC 1.1-L; No. 1.1(q),
15	CONFIDENTIAL Attachment SC 1.1-M Duke response to OUCC 3.3,
16	CONFIDENTIAL Attachment OUCC 3.3-A, IURC Cause No. 38707 FAC 124.
17	Note: Values exclude losses incurred during planned and unplanned outages.

1QPlease summarize the net operational performance of Duke's coal units in2aggregate over the six months of FAC 123 and 124?

3 Α Duke accrued a total of \$7.3 million in net operational losses from operating its 4 coal fleet rather than buying energy from the market over the period of FAC 123 5 and FAC 124. Based on the variable cost information provided by the Company for FAC 123 and FAC 124, fuel costs account for between and percent of 6 variable operating costs in each hour (percentage varies by unit).³ Specifically, 7 fuel costs accounted for around percent of variable operating costs at Cayuga 8 9 Units 1 and 2 and around percent of variable operating costs at Edwardsport. This means that approximately \$6.4 million of the total losses over this period can 10 11 be attributed to fuel costs.

12 **Q** How were the values in Table 2 and Table 3 calculated?

A I calculated the values in Table 2 and Table 3 based on the Company's own
 hourly cost and operational revenue data. 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 revenues) provided by the Company. I removed loses incurred during

³ Synapse analysis based on Duke responses to Sierra Club No. 1.1(i) CONFIDENTIAL Attachment SC 1.1-H, IURC Cause No. 38707 FAC 123, and Sierra Club No. 1-1(i) CONFIDENTIAL Attachment SC 1.1-H, IURC Cause No. 38707 FAC 124. All <u>public</u> discovery responses cited herein, except for spreadsheets, have been included in Exhibit DG-2. All <u>confidential</u> discovery responses cited herein, except for spreadsheets, have been included in Exhibit DG-3. All discovery responses provided in spreadsheets will be included with workpapers.

planned and 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 displayed in the two tables.

4 Q What do you conclude from the significant losses experienced by Duke from 5 operating its coal-fired power plants in FAC 123 and FAC 124?

- A First, Duke had a better option in the market. Duke's coal plants are generally
 uncompetitive with other market resources in this energy market landscape and
 customers would have been better served if Duke had committed its coal plants
 economically and purchased energy from the market to meet any customer needs
 not met by the Company's economically committed resources.
- 11 Second, the market revenue Duke is earning at many of its plants is not even 12 covering the fuel and variable costs needed to operate them. This means that 13 plants are losing money for every hour they operate, and therefore making no
- 14 contribution towards the fixed and capital costs incurred at the power plants.
- 15 Third, Duke does not utilize its own price-based predictive analysis tool to
- 16 properly inform unit commitment decisions at many of its coal plants. As
- 17 explained below, the Company does in fact prepare forward-looking profit and
- 18 loss *projections* in advance of the Company's unit commitment decision.

⁴ See Duke Response to OUCC Data Request No. 3.3, CONFIDENTIAL Attachment OUCC 3.3-A, IURC Cause No. 38707 FAC 123. Duke Response to OUCC Data Request No. 3.3, CONFIDENTIAL Attachment OUCC 3.3A, IURC Cause No. 38707 FAC 124. Duke Response to Sierra Club Data Request No. 1-1(g), CONFIDENTIAL Attachment SC 1.1-F, IURC Cause No. 38797 FAC 123. Duke Response to Sierra Club Data Request No. 1-1(g), CONFIDENTIAL Attachment SC 1.1-F, IURC Cause No. 38797 FAC 124.

- 1 However, the Company completely ignores the results of these analyses at
- 2 Edwardsport and Cayuga and regularly makes imprudent unit commitment
- 3 decisions. These commitment decisions are directly responsible for a significant
- 4 portion of the net revenue losses that Duke seeks to impose on ratepayers in this
- 5 docket through imprudently incurred fuel costs.

6 4. <u>DUKE SELF-COMMITS MANY OF ITS COAL-FIRED GENERATING UNITS THE MAJORITY</u> 7 <u>OF THE TIME.</u>

8 Q Please describe how coal units are committed within the MISO wholesale 9 market.

A In MISO, utilities generally commit dispatchable generating units with a status of
 "economic"⁵ thereby making the market operator responsible for unit
 commitment decisions.⁶ While maintaining system reliability, the market operator
 makes operational decisions based on short-term economics to ensure customers
 are served by the lowest cost resources. For units with long startup and shut-down
 times, such as coal plants, however, utilities may elect to maintain control of unit
 commitment decision, designing independent processes outside of the MISO

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 up to 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.

market to determine when to commit a unit at its minimum operating level.⁷
Unlike the market operator, generation owners may choose not to incorporate
costs into their decision-making process, and may elect to commit units as "mustrun," regardless of economics.

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

6 Α A unit designated as must-run will operate at least at its minimum operating level. 7 The market operator may then ramp the unit up from that minimum operating 8 level, but a must-run designation ensures that the unit remains online. During that 9 time period, it receives market revenue (and incurs incumbent operational costs) 10 but does not set the market price of energy. Similarly, if the market price of 11 energy falls below its operational cost, it will not turn off and can incur losses. As 12 such, in order to net a benefit from the decision to commit a unit into the market, 13 an operator must create market price projections. Utilities that elect to self-14 commit slow-ramp coal units may conduct a projection of market prices 15 extending several days into the future to ensure that a commitment election has a 16 likely net positive outcome.

17 Q How did Duke commit its coal units during FAC 123 and FAC 124?

18 A Duke operates four coal plants: Edwardsport, Gibson, Gallagher, and Cayuga.
19 Based on the Company's unit commitment data, I find that during FAC 123 and

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	FAC 124, the Company self-committed (i.e., entered the unit into the MISO
2	market with a must-run status) at least half of its coal-fired generating units (five
3	out of ten) approximately 50 percent or more of the time. ⁸
4	Of the four plants, only Gallagher is regularly committed as "economic," rather
5	than committed as "must-run."9 Edwardsport was online and committed as must-
6	run in all non-outage hours in both FAC 123 and FAC 124. ¹⁰¹¹
7	In FAC 123, Gibson 1 was set to a must-run status in all non-outage hours, and
8	Cayuga 1, Gibson 2, Gibson 3, and Gibson 5 were set to must-run in more than 60
9	percent of non-outage hours. ¹²
10	In FAC 124, Gibson 2 and Gibson 4 were set to a must-run status over 70 percent
11	of non-outage hours. ¹³ Full results are shown in Table 4.

⁸ See Duke Response to Sierra Club Data Request No. 1.1(g), CONFIDENTIAL Attachment SC 1.1-F, IURC Cause No. 38707-FAC 123. Duke Response to Sierra Club Data Request No. 1.1(g), CONFIDENTIAL Attachment SC 1.1-F, IURC Cause No. 38707-FAC 124.

⁹ Id.

¹⁰ Id.

¹¹ Duke reported no outages at Edwardsport during FAC 124, however the gasifiers were out of service for part of December and therefore Duke operated the plant on natural gas for approximately half of the month.

¹² See Duke Response to Sierra Club Data Request No. 1.1(g), CONFIDENTIAL Attachment SC 1.1-F, IURC Cause No. 38707-FAC 123. Duke Response to Sierra Club Data Request No. 1.1(g), CONFIDENTIAL Attachment SC 1.1-F, IURC Cause No. 38707-FAC 124.

¹³ *Id*.

	FAC 123		FAC 124		FAC 123 & 124	
	Must- Run	Economic	Must- Run	Economic	Must- Run	Economic
Cayuga 1	82%	18%	37%	63%	59%	41%
Cayuga 2	43%	57%	52%	48%	48%	52%
Edwardsport 1	100%	0%	100%	0%	100%	0%
Gibson 1	100%	0%	46%	54%	75%	25%
Gibson 2	90%	10%	85%	15%	88%	12%
Gibson 3	69%	31%	23%	77%	42%	58%
Gibson 4	0%	100%	73%	27%	67%	33%
Gibson 5	83%	17%	17%	83%	44%	56%
Gallagher 2	0%	100%	2%	98%	1%	99%
Gallagher 4	0%	100%	2%	98%	1%	99%

Table 4: Unit commitment decisions for Duke's coal plants (non-outage hours)

2 3

1

4

Sources: Duke Response to Sierra Club Data Request No. 1.1(g), CONFIDENTIAL Attachment SC 1.1-F, Cause No. 38707-FAC 123. Duke Response to Sierra Club Data Request No. 1.1(g), CONFIDENTIAL Attachment SC 1.1-F, Cause No. 38707-FAC 124.

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

6 Α During an outage, a generator has operational consideration outside of short-term 7 energy market prices. Therefore, I exclude these hours to look only at the 8 commitment elections when economics are the predominant consideration facing 9 a unit. Specifically, I have removed data from all planned and unplanned outage periods, as identified by the Company,¹⁴ from all analysis performed throughout 10

¹⁴ See Duke Response to OUCC Data Request No. 3.3, CONFIDENTIAL Attachment 3.3-A, IURC Cause No. 38707 FAC 123. Duke Response to OUCC Data Request No. 3.3, CONFIDENTIAL Attachment 3.3A, IURC Cause No. 38707 FAC 124. Duke Response to Sierra Club Data Request No. 1-1(g), CONFIDENTIAL Attachment 1-1F, IURC Cause No. 38797 FAC 123. Duke Response to Sierra Club Data Request No. 1-1(g), CONFIDENTIAL Attachment 1-1F, IURC Cause No. 38797 FAC 124.

my testimony. However, it is important to note that unplanned outages can result
from imprudent operations and maintenance planning decisions, and that
increased operations can make it more likely that an unplanned outage will occur.
While an individual commitment decision is not necessarily responsible for
causing an outage, a pattern of imprudent commitment decisions and unnecessary
plant operation could be tied to an increased frequency of plant outages.

7 Q Why is it concerning that Duke is using a must-run commitment status at its 8 coal-fired generating units so frequently?

9 A It may be reasonable for Duke to take control of its unit commitment decisions if
10 the utility demonstrates that its internal decision process produces greater net
11 revenues and a more-economic outcome than relying solely on the MISO market.
12 My analysis shows that during FAC 123 and 124, however, Duke not only
13 ignored the results of its price-based analysis but lost a significant amount of
14 ratepayers' money as a result of its imprudent operational decisions.

As discussed above, when Duke commits a unit in "economic" status, the 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. The market will operate Duke's plants only if they are the least-cost option.

20 Under a "self-commit" framework Duke takes over the decision-making process 21 and should seek to minimize cost by operating its units only when they are lower 22 cost than market energy. MISO is provided no transparency or control over these 23 independent processes used by generation owners to make unit commitment 24 decisions, and in fact, a generation owner can operate its units however it elects, 25 so long as the Commission allows it to continue recovering the costs of doing so.

21

If, and when, Duke commits a unit in MISO uneconomically (that is with variable
 costs above the market Locational Marginal Price ("LMP")), Duke is only paid by
 MISO based on the market LMP.¹⁵ However, the full cost is still incurred by
 Duke to run that plant. This means that the fuel costs not economically incurred
 are passed onto Duke's ratepayers in their monthly bills through the fuel charge.

6

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

A Duke has developed a price-based forward-looking analysis process called the
Profit and Loss Analysis. Duke conducts this analysis most weekdays to
determine whether to commit its units the next day (or the next three days for
each Friday) and records all revenue projections and commitment decisions for
the following day on a sheet called the "Daily Generating Unit P&L Analysis."
The Company prepared 57 Profit and Loss Analysis sheets during FAC 123 and
58 during FAC 124.

In these assessments, the Company reviews forecasted energy market prices¹⁶ and projected variable startup, shutdown, and operational costs for the next three weeks to project net operational revenues (or losses) for each unit for each individual day and over the entire week period.^{17,18} If a unit is projected to be

¹⁵ The market revenue Duke receives includes energy and ancillary market revenue from both the day-ahead and real-time markets.

¹⁶ Duke does not forecast and include ancillary service market revenue and other makewhole payments in its Profit and Loss Analysis.

¹⁷ P&L analysis for FAC 123 viewed during in-person visit to Duke Energy's Plainfield, Indiana site on February 26, 2020. Also, provided in Duke response to CAC Data Request No. 1.2, Revised CONFIDENTIAL Attachments CAC 1.2-A. CAC 1.2-B and CAC 1.2-C, IURC Cause No. 38707 FAC 123 S-1. P&L analysis for FAC 124 viewed during virtual "site visit" using Microsoft Teams on May 18, 2020.

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 acquisition of market-supplied power.

According to the Company, Duke staff also hold daily meetings at 6:30 AM and
9:30 AM to discuss the commitment status for each unit.¹⁹ However, the company
has provided no record of those meetings, therefore it is impossible to assess the
role of these meetings on the imprudent commitment decisions that have occurred
during FAC 123 and FAC 124. Further, as discussed below, neither these
meetings nor the Profit and Loss Analysis appear to impact the Company's unit
commitment decisions at Edwardsport and often at Cayuga.

11 Q How should Duke be using the results of its price-based analysis to inform 12 unit commitment decision?

13 A Duke should be making unit commitment decisions based on the results of its

- 14 price-based analysis, or else documenting why the results are not being followed.
- 15 Specifically, Duke should be electing to self-commit its units on a forward-
- 16 looking basis if it expects to make positive energy market margins, and the
- 17 Company should keep a unit offline if it is projected to operate at a loss.

¹⁸ See Duke Response to Sierra Club Data Request No. 1.3(a), IURC Cause No. 38707-FAC 123. Duke Response to Sierra Club Data Request No. 1.3(a), IURC Cause No. 38707-FAC 124.

¹⁹ See Rebuttal testimony of Duke witness J. Swez, pages 21-22. IURC Cause No. 38707 124. Rebuttal testimony of Duke witness J. Swez, pages 30-31. IURC Cause No. 38707 124.

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

3 No. Duke does not actually rely on the results of its Profit and Loss Analysis to Α 4 inform its unit commitment decision at Edwardsport and at least one of the 5 Cayuga units. Indeed, the Company admitted in both FAC testimonies and in its rate case that there are factors dictating plant commitment and dispatch decisions 6 beyond customer economics, including unit testing;²⁰ the steam customer served 7 by Cayuga; and, at Edwardsport, the 14-day cycling timeline for the gasification 8 9 system, the plant's air permit, "fuel diversity," natural gas supply constraints, and coal oversupply considerations.²¹ However, as I discuss in Sections 6 and 7, the 10 Company has failed to present sufficient qualitative or quantitative evidence to 11 12 support any of these alternative justifications for its uneconomic decisions.

²⁰ Company witness John Swez notes in his direct testimony in the subdocket (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 cycling does not require a unit to operate for weeks or even months at a time, as illustrated by Duke response to Sierra Club Request 2-1, Confidential Attachment 2.1D, and therefore cannot be a valid explanation for Duke's prolonged periods of uneconomic operation.

²¹ 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.

1 5. Duke regularly ignores the results of its own forward-looking price 2 BASED ANALYSIS, WHICH PROJECTED SIGNIFICANT LOSSES FROM THE COMPANY'S 3 UNIT COMMITMENT PRACTICES IN FAC 123 AND 124.

4 Q Please summarize your findings regarding Duke's self-commitment practices 5 in FAC periods 123 and 124.

A During the FAC 123 and 124 periods, Duke ran Edwardsport on coal *one hundred percent of the time* that the gasifiers were available—regardless of the results
from its own Profit and Loss Analysis sheets.²² 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.²³ The Company did use the results of its analysis, to varying degrees, to
inform its unit commitment decisions for its remaining coal plants.

13 Q How did Duke describe its use of its daily price-based economic analysis to 14 make unit self-commitment decisions?

A Duke claimed that it uses its daily Profit and 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"²⁴ the Company self-commits the unit into the
 MISO market. Duke later modified that statement, clarifying that "the Daily Profit

²² Direct testimony of Duke witness J. Swez, page 25. IURC Cause No. 38707 123 S1.
²³ Id., page 10.

²⁴ See Duke Response to Sierra Club Data Request No. 1.3(a), IURC Cause No. 38707 FAC 123. Duke Response to Sierra Club Data Request No. 1.3(a), IURC Cause No. 38707 FAC 124.

1	and Loss Analysis informs the commitment decision, it does not determine the
2	commitment decision." ²⁵

- Q Are these statements consistent with the Company's actual unit commitment
 decisions based on your review of the Profit and Loss Analysis sheets?
- 5 Α No. My review of the Company's Profit and Loss Analyses found numerous 6 instances in FAC 123 and FAC 124 where the Company imprudently kept or 7 brought a unit online even when its own analysis projected that doing so would 8 result in variable production costs in excess of market-based energy revenues. 9 This means that at the time of the self-scheduling decisions at issue in these FAC 10 periods, Duke knew, based on its own predictive analysis, that it would very 11 likely have saved customers money by either decommitting units or keeping units 12 offline.

13 Q Did Duke make the results of its internal commitment process and analysis 14 readily available for review?

A No. My review of Duke's analysis was initially severely inhibited by Duke's
insistence that its analysis be viewed on site without copying materials or taking
photographs. In February 2020, I traveled to Duke's Plainfield, Indiana office to
review FAC 123 data and manually transcribe thousands of data points. Due to
the COVID-19 pandemic, Duke then agreed to let me view the documents
through a virtual "site visit" conducted through Microsoft Teams for FAC 124 in
May 2020, where my team and I once again had to manually transcribe thousands

²⁵ See Rebuttal Testimony of Duke Witness J. Swez, page 13. IURC Cause No. 38707 FAC 124.

1		of data points. On July 2, 2020, months after I completed my analysis for both
2		FAC 123 and FAC 124, Duke produced the Profit and Loss Analysis sheets for
3		FAC 123 after the Administrative Law Judge granted a motion to compel
4		production of these sheets.
5	Q	Are you aware of any other utility that requires witnesses to review in person
6		and manually transcribe utility commitment material under observation?
7	Α	No. Duke's insistence during FAC 123 and FAC 124 that my review of their past
8		commitment practices be conducted through an in-person or virtual "site visit"
9		under supervision, and that I manually transcribe all information and data needed
10		for my analysis, is unusual and a significant hurdle to reasonable review.
11	Q	What did you find in reviewing the Company's individual Profit and Loss
11 12	Q	What did you find in reviewing the Company's individual Profit and Loss Analysis sheets?
11 12 13	Q	What did you find in reviewing the Company's individual Profit and Loss Analysis sheets? In reviewing the company's 57 individual Profit and Loss Analysis from FAC 123
11 12 13 14	Q A	What did you find in reviewing the Company's individual Profit and LossAnalysis sheets?In reviewing the company's 57 individual Profit and Loss Analysis from FAC 123and 58 from FAC 124 in combination with the Company's actual unit cost and
11 12 13 14 15	Q A	 What did you find in reviewing the Company's individual Profit and Loss Analysis sheets? In reviewing the company's 57 individual Profit and Loss Analysis from FAC 123 and 58 from FAC 124 in combination with the Company's actual unit cost and revenue data, I found multiple weeks where Duke committed a unit as must-run
11 12 13 14 15 16	Q A	 What did you find in reviewing the Company's individual Profit and Loss Analysis sheets? In reviewing the company's 57 individual Profit and Loss Analysis from FAC 123 and 58 from FAC 124 in combination with the Company's actual unit cost and revenue data, I found multiple weeks where Duke committed a unit as must-run despite its own analysis indicating that the Company would save money by either
11 12 13 14 15 16 17	Q	 What did you find in reviewing the Company's individual Profit and Loss Analysis sheets? In reviewing the company's 57 individual Profit and Loss Analysis from FAC 123 and 58 from FAC 124 in combination with the Company's actual unit cost and revenue data, I found multiple weeks where Duke committed a unit as must-run 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
111 12 13 14 15 16 17 18	Q	 What did you find in reviewing the Company's individual Profit and Loss Analysis sheets? In reviewing the company's 57 individual Profit and Loss Analysis from FAC 123 and 58 from FAC 124 in combination with the Company's actual unit cost and revenue data, I found multiple weeks where Duke committed a unit as must-run 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. Exhibit DG-4 contains a detailed
 11 12 13 14 15 16 17 18 19 	Q	 What did you find in reviewing the Company's individual Profit and Loss Analysis sheets? In reviewing the company's 57 individual Profit and Loss Analysis from FAC 123 and 58 from FAC 124 in combination with the Company's actual unit cost and revenue data, I found multiple weeks where Duke committed a unit as must-run 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. Exhibit DG-4 contains a detailed review of a sample of three Profit and Loss Analysis sheets from each of FAC

 ²⁶ See Duke response to OUCC request No. 3.8(d), CONFIDENTIAL Attachment OUCC 3.8-D, IURC Cause No. 38707 FAC 123. Duke response to OUCC request No. 3.8(d), CONFIDENTIAL Attachment OUCC 3.8-D, IURC Cause No. 38707 FAC 124.

1	I found two sustained periods of more than 30 days in FAC 123 and four
2	sustained periods of more than 30 days in FAC 124 (one occurrence spans both
3	FAC periods) when the Company brought online, or left online, a unit despite its
4	own commitment analysis showing that net losses would be lower if the unit was
5	not brought online or was taken offline. I provide a full description of all such
6	instances in Table 5 and summarize the instances from FAC 123 ²⁷ and 124 here: ²⁸
7	1. At Edwardsport, Duke brought the unit back online from an outage on
8	September 21 despite the Company's analysis that same day projecting losses
9	of from operating over the next 7 days. Duke then operated the unit
10	continuously as "must-run" for over five months (September 21, 2019 through
11	at least the end of February 2020), operating on coal during all hours when its

²⁷ Duke responses to Sierra Club Data Requests No. 1.1(g), CONFIDENTIAL Attachment SC 1.1-F; No. 1.1(i), CONFIDENTIAL Attachment SC 1.1-H; No. 1.1(l), CONFIDENTIAL Attachment SC 1.1-J; No. 1.1(m), CONFIDENTIAL Attachment SC 1.1-K; No. 1.1(n), CONFIDENTIAL Attachment SC 1.1-L; No. 1.1(o), CONFIDENTIAL Attachment SC 1.1-M; No. 1.1(p), CONFIDENTIAL Attachment SC 1.1-M; No. 1.1(q), CONFIDENTIAL Attachment SC 1.1-N; Duke response to OUCC 3.3, CONFIDENTIAL Attachment OUCC 3.3-A, IURC Cause No. 38707 FAC 123. Duke response to CAC Data Request No. 1.2, Revised CONFIDENTIAL Attachments CAC 1.2-A. CAC 1.2-B and CAC 1.2-C, IURC Cause No. 38707 FAC 123 S-1. P&L analysis for FAC 123 viewed on-site on 2/26/2020.

²⁸ Duke responses to Sierra Club Data Requests No. 1.1(g), CONFIDENTIAL Attachment SC 1.1-F; No. 1.1(i), CONFIDENTIAL Attachment SC 1.1-H; No. 1.1(l), CONFIDENTIAL Attachment SC 1.1-J; No. 1.1(m), CONFIDENTIAL Attachment SC 1.1-H; No. 1.1(n), Attachment SC 1.1-K; No. 1.1(o), CONFIDENTIAL Attachment SC 1.1-L; No. 1.1(p), CONFIDENTIAL Attachment SC 1.1-L; No. 1.1(q), CONFIDENTIAL Attachment SC 1.1-M; Duke response to OUCC 3.3, CONFIDENTIAL Attachment OUCC 3.3-A, IURC Cause No. 38707 FAC 124. P&L analysis for FAC 124 viewed during virtual "site visit" using Microsoft Teams on May 18, 2020.

1		gasifiers were not in outage. ²⁹ Duke failed to de-commit Edwardsport on coal
2		during both FAC periods, even knowing it would continue to incur energy
3		market losses.
4	2.	At Cayuga 1, Duke's analysis conducted on October 3 projected a benefit to
5		taking the unit offline on October 4, but instead Duke committed the unit as
6		"must-run" through November 4. Duke <i>projected</i> the unit would incur a total
7		of in losses over the period. Duke reported in <i>actual</i> losses
8		from Cayuga 1 over that time period.
9	3.	At Cayuga 1, Duke's analysis conducted on December 20 projected a benefit
10		to taking Cayuga 1 offline, but instead Duke committed the unit as "must-run"
11		and kept it online through January 21, 2020. The unit was projected to incur
12		in losses over first week.
13	4.	At Cayuga 2, analysis conducted on January 16 indicated a benefit to keeping
14		Cayuga 2 offline (the unit had been committed as "economic" but not run
15		since 12/3/2019). Instead, Duke committed the unit as "must-run" through the
16		end of the FAC period. The unit was <i>projected</i> to incur in losses in
17		just the first week (analysis from prior days that week projected weekly losses
18		above).
19	5.	At Gibson 2, analysis conducted January 17 indicated a benefit to keeping the
20		unit offline, but instead Duke brought the unit back online from an outage on
21		January 20, 2020 and committed it as "must-run" through the end of the FAC
22		period. The unit was <i>projected</i> to lose in the first week.

 ²⁹ See Duke response to Sierra Club No. 1-1(g), CONFIDENTIAL Attachment SC 1.1-F, IURC Cause No. 38707 123. Duke response to Sierra Club No. 1-1(g), CONFIDENTIAL Attachment SC 1.1-F, IURC Cause No. 38707 124.

Table 5 (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				
9/21/2019	9/21/2019 - 2/29/2020	Analysis conducted on 9/21/2019 <i>projected</i> a benefit to keeping Edwardsport offline. 96 of the 103 Profit and Loss Analysis sheets created between 9/21/2019 and 2/29/2020 <i>projected</i> weekly net operational losses from operating the unit on coal. In FAC 124, all 58 Profit and Loss Analysis sheets <i>projected</i> weekly net operational losses of between from operating the unit on coal.	Edwardsport was brought back online from an outage on 9/21/2019 and operated continuously as "must-run" on coal during all hours that the gasifiers were not in outage over the next five months.	
Cayuga 1			1.M. 16	
10/03/2019	10/4/2019- 11/4/2019	Analysis conducted on 10/3/2019 <i>projected</i> a benefit to taking Cayuga 1 offline the next day. The unit was projected to incur a total of million in losses over the one-month period.	Cayuga 1 was committed as "must-run" and kept online through 11/4/2019 (when it appears the unit came offline due to an outage).	
12/20/2019	12/21/2019- 1/21/2020	Analysis conducted on 12/20/2019 projected a benefit to taking Cayuga 1 offline. The unit was projected to incur million in losses over first week. Company produced 16 additional Profit and Loss Analysis sheets between 12/20/2019 and 1/20/2020. Every sheet projected weekly net losses from operating the	Cayuga 1 was committed as "must-run" and kept online through 1/21/2020 (when the unit was switched back to "economic," was committed by the market for one day and then economically not run for the	

		unit, which averaged to million in projected losses over the month.	remainder of the period).
Cayuga 2			
1/16/2020	1/17/2020- 2/29/2020	Analysis conducted on 1/16/2020 indicated a benefit to keeping Cayuga 2 offline (the unit had been committed as "economic" but not run since 12/3/2019). The unit was <i>projected</i> to incur in losses in just the first week (analysis from prior days that week <i>projected</i> weekly losses above (analysis). Company produced a total of 32 Profit and Loss Analysis sheets between 1/16/2020 and 2/29/2020. Every sheet <i>projected</i> weekly net losses from operating the unit, which averaged a <i>projected</i> million in losses over the period.	The unit was committed as "must-run" through the end of the FAC period.
Gibson 2			
1/17/2020	1/20/2020- 2/29/2020	Analysis conducted on 1/17/2020 indicated a benefit to keeping the unit offline. The unit was <i>projected</i> to lose for the first week. Company produced a total of 30 Profit and Loss Analysis sheets during the period from 1/17/2020 through 2/29/2020. Every sheet <i>projected</i> weekly net losses from operating the unit, ranging between	The unit was brought back online from an outage on 1/20/2020 and- committed as "must-run" through the end of the FAC period.

1 Q How did you calculate these values discussed above?

1	Α	I reviewed 115 Profit and Loss Analysis sheets for FAC 123 and FAC 124 that
2		the Company prepared to make unit commitment decisions for the 182 days
3		between September 1, 2019 and February 29, 2020. ³⁰ My team and I manually
4		transcribed thousands of net revenue values, unit commitment decision, and
5		current unit status classifications, and again manually confirmed our transcription
6		using the later-produced PDFs.
7		To calculate the total projected revenue or losses associated with self-
8		commitment at each unit at Edwardsport, Cayuga, and Gibson, I summed the
9		daily projected net revenues or losses from every Profit and Loss Analysis sheet
10		prepared for days when a unit was self-committed. Specifically, I summed the
11		projected values for each day from the Profit and Loss Analysis prepared the prior
12		day (or the most-recent day when the prior day was a weekend or no Profit and
13		Loss Analysis sheet had been created the prior day) for operation of each unit.
14		For Edwardsport, I summed the projected values for each day for operation of the
15		plant both on syngas/coal and on natural gas. I then calculated the difference
16		between the projected operational losses or revenues from the unit when operating
17		on each fuel source.
18	Q	How close were the unit's actual net revenues or losses to the values
19		projected by the Company in its Profit and Loss Analysis sheets?
20	A	Duke's actual losses were reasonably close to forecasted losses. During FAC 123
21		Duke projected \$3.7 million in losses from operating Edwardsport on coal and

³⁰ Profit and Loss sheets were not produced for some days and are not prepared on weekends and some holidays.

1		actually saw \$3.3 million in losses. During FAC 124, Duke projected \$6.4 million
2		in losses and actually saw \$4.3 million in losses. In both time periods, the
3		gasifiers were offline part of the time. If the gasifier had been online 100 percent
4		of the time, actual losses would likely have been even larger.
5		For Cayuga, during FAC 123, the Company projected net losses of \$0.4 million
6		for operating on the days when the units were committed in must-run status and
7		the Company's actual losses were \$1.9 million. During FAC 124 the Company
8		projected net losses of \$3.0 million for operating on the days when the units were
9		committed in must-run status, and the Company's actual losses were \$2.4 million.
10	Q	What does Duke say about the relationship between the Profit and Loss
11		Analysis and the actual net revenue data and the reasonableness of relying
11 12		Analysis and the actual net revenue data and the reasonableness of relying on the Profit and Loss Analysis?
11 12 13	A	Analysis and the actual net revenue data and the reasonableness of relying on the Profit and Loss Analysis? Duke asserts that the Profit and Loss Analysis is slightly conservative ³¹ and
11 12 13 14	A	 Analysis and the actual net revenue data and the reasonableness of relying on the Profit and Loss Analysis? Duke asserts that the Profit and Loss Analysis is slightly conservative³¹ and misses categories of revenue. Specifically, Duke witness John Swez mentioned
 11 12 13 14 15 	A	 Analysis and the actual net revenue data and the reasonableness of relying on the Profit and Loss Analysis? Duke asserts that the Profit and Loss Analysis is slightly conservative³¹ and misses categories of revenue. Specifically, Duke witness John Swez mentioned the omission of MISO ancillary market revenue from the Profit and Loss
 11 12 13 14 15 16 	Α	 Analysis and the actual net revenue data and the reasonableness of relying on the Profit and Loss Analysis? Duke asserts that the Profit and Loss Analysis is slightly conservative³¹ and misses categories of revenue. Specifically, Duke witness John Swez mentioned the omission of MISO ancillary market revenue from the Profit and Loss Analysis. It is true that the Profit and Loss Analysis is based on day-ahead energy
 11 12 13 14 15 16 17 	Α	 Analysis and the actual net revenue data and the reasonableness of relying on the Profit and Loss Analysis? Duke asserts that the Profit and Loss Analysis is slightly conservative³¹ and misses categories of revenue. Specifically, Duke witness John Swez mentioned the omission of MISO ancillary market revenue from the Profit and Loss Analysis. It is true that the Profit and Loss Analysis is based on day-ahead energy market revenues, and therefore does not include ancillary and other market
 11 12 13 14 15 16 17 18 	Α	 Analysis and the actual net revenue data and the reasonableness of relying on the Profit and Loss Analysis? Duke asserts that the Profit and Loss Analysis is slightly conservative³¹ and misses categories of revenue. Specifically, Duke witness John Swez mentioned the omission of MISO ancillary market revenue from the Profit and Loss Analysis. It is true that the Profit and Loss Analysis is based on day-ahead energy market revenues, and therefore does not include ancillary and other market payments. However, ancillary revenues accounted for a fraction of a percent of
 11 12 13 14 15 16 17 18 19 	Α	 Analysis and the actual net revenue data and the reasonableness of relying on the Profit and Loss Analysis? Duke asserts that the Profit and Loss Analysis is slightly conservative³¹ and misses categories of revenue. Specifically, Duke witness John Swez mentioned the omission of MISO ancillary market revenue from the Profit and Loss Analysis. It is true that the Profit and Loss Analysis is based on day-ahead energy market revenues, and therefore does not include ancillary and other market payments. However, ancillary revenues accounted for a fraction of a percent of total actual revenues in FAC 123 and 124 and all categories of make-whole and
 11 12 13 14 15 16 17 18 19 20 	Α	Analysis and the actual net revenue data and the reasonableness of relying on the Profit and Loss Analysis? Duke asserts that the Profit and Loss Analysis is slightly conservative ³¹ and misses categories of revenue. Specifically, Duke witness John Swez mentioned the omission of MISO ancillary market revenue from the Profit and Loss Analysis. It is true that the Profit and Loss Analysis is based on day-ahead energy market revenues, and therefore does not include ancillary and other market payments. However, ancillary revenues accounted for a fraction of a percent of total actual revenues in FAC 123 and 124 and all categories of make-whole and underpayment adjustments accounted for just over one percent of total market

³¹ See Rebuttal Testimony of J. Swez, IURC Cause No. 38707 FAC 124, page 14.

revenue in FAC 123 and a fraction of a percent in FAC 124.³² Therefore, the
 omission of ancillary revenues from the Profit and Loss Analysis is not a reason
 to ignore the projections as a basis for economic decision-making based on a
 presumption that the Analysis is overly conservative.

56.DUKE WOULD HAVE SAVED RATEPAYERS MILLIONS OF DOLLARS BY OPERATING6EDWARDSPORT ON NATURAL GAS INSTEAD OF COAL IN FAC 123 AND FAC 124.

- Q What did you find about the Company's decision to operate Edwardsport
 predominately on coal in FAC 123 and FAC 124 based on your review of the
 Company's Profit and Loss Analysis?
- 10 Α As discussed above, the Company committed Edwardsport as must-run on 11 syngas-based coal 100 percent of the time that both gasifiers were available, 12 despite its own analysis clearly showing that self-committing and operating the unit on syngas/coal could result in \$16.0 million in projected net losses over FAC 13 123 and 124 relative to operating the unit on gas.³³ 14 15 Specifically, in FAC 123, Duke *projected* net losses relative to buying energy 16 from the market of \$3.7 million from self-committing and operating the unit on 17 syngas/coal. The Company's same analysis projected total net revenues of \$2.7
- 18 million relative to buying energy from the market if the unit instead operated on

³² See Duke response to Sierra Club Data Request No.1.1 (o), (p), CONFIDENTIAL Attachment 1.1-M. IURC Cause No. 38707 FAC 123. Duke response to Sierra Club No.1-1 (o), (p), CONFIDENTIAL Attachment 1-1L. IURC Cause No. 38707 FAC 124.

³³ Edwardsport operated on natural gas for part of the time in September, October, and November, and then for about half the month in December due to forced outages at the gasifiers. These outages saved customers money by preventing Duke from committing Edwardsport on syngas/coal.

1		natural gas. That is a difference of \$6.5 million in <i>projected</i> revenue from self-
2		committing and operating the unit on coal instead of natural gas, which is revenue
3		that Duke should be earning to cover some of the plant's fixed and capital costs.
4		In FAC 124, Duke projected net losses of \$6.4 million from self-committing and
5		operating the unit on syngas/coal relative to buying energy from the market. The
6		Company's same analysis projected net revenue of \$3.1 million relative to buying
7		energy from the market if the unit instead operated on natural gas. That is a
8		difference of \$9.5 million in projected losses from self-committing and operating
9		the unit on coal instead natural gas.
10		As discussed above, Duke reported actual losses of \$3.3 million and \$4.3 million
11		due to Edwardsport operations in FAC 123 and 124 respectively.
12	Q	Does this analysis include all possible revenues and costs that Duke is likely
13		to see from operating Edwardsport on gas instead of coal?
14		
	Α	No. Witness Swez discusses several categories of costs that would be incurred
15	Α	No. Witness Swez discusses several categories of costs that would be incurred from switching to gas full time (including a potential capacity derating). ³⁴
15 16	Α	No. Witness Swez discusses several categories of costs that would be incurred from switching to gas full time (including a potential capacity derating). ³⁴ However, when the plant is operating on gas, operating costs are also lower than
15 16 17	Α	No. Witness Swez discusses several categories of costs that would be incurred from switching to gas full time (including a potential capacity derating). ³⁴ However, when the plant is operating on gas, operating costs are also lower than when the plant operates on coal, and the unit is typically committed and
15 16 17 18	Α	No. Witness Swez discusses several categories of costs that would be incurred from switching to gas full time (including a potential capacity derating). ³⁴ However, when the plant is operating on gas, operating costs are also lower than when the plant operates on coal, and the unit is typically committed and dispatched economically. ³⁵ Duke should be able to turn the plant on and off with
15 16 17 18 19	Α	No. Witness Swez discusses several categories of costs that would be incurred from switching to gas full time (including a potential capacity derating). ³⁴ However, when the plant is operating on gas, operating costs are also lower than when the plant operates on coal, and the unit is typically committed and dispatched economically. ³⁵ 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 up
15 16 17 18 19 20	Α	No. Witness Swez discusses several categories of costs that would be incurred from switching to gas full time (including a potential capacity derating). ³⁴ However, when the plant is operating on gas, operating costs are also lower than when the plant operates on coal, and the unit is typically committed and dispatched economically. ³⁵ 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 up and down more easily to lower the operating level during times when the unit is
15 16 17 18 19 20 21	Α	No. Witness Swez discusses several categories of costs that would be incurred from switching to gas full time (including a potential capacity derating). ³⁴ However, when the plant is operating on gas, operating costs are also lower than when the plant operates on coal, and the unit is typically committed and dispatched economically. ³⁵ 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 up and down more easily to lower the operating level during times when the unit is online but LMPs are low. For this reason, and despite Swez's claims of

 ³⁴ See Duke Energy Response to Commission's June 12, 2020 Docket Entry.
 ³⁵ See Direct Testimony of Duke witness J. Swez, IURC Cause No. 38707 FAC 124, page 19.

1		unaccounted-for gas-related costs, my analysis likely underestimates the revenues
2		from operating Edwardsport on natural gas, and therefore net losses relative to
3		operating on coal.
4	Q	How does Duke explain its continued operation of Edwardsport on coal when
5		its own analysis shows it would avoid significant losses operating on natural
6		gas?
7	Α	Duke provides several explanations for why it is not reasonable to operate
8		Edwardsport primarily or exclusively on natural gas, though the Company does
9		not adequately explain or substantiate any of these claims. The stated reasons are:
10		1. The gasification system has a 14-day cycling time and therefore cannot be
11		turned off for short periods of time if the unit is switched back and forth
12		between coal/syngas and natural gas. ³⁶
13		2. Decommitting the gasifiers for a long period of time would cause a loss of
14		essential personnel. ³⁷
15		3. Operating solely on natural gas for a prolonged period is not permitted or
16		authorized by the station's air permit. ³⁸
17		4. Switching to natural gas would be essentially a permanent decision that would
18		lose the diversity value of coal and subject the Company to gas price
19		volatility. ³⁹

³⁶ *Id.*, page 27.
³⁷ *See*, for example, Direct testimony of J. Swez, IURC Cause No. 38707 FAC 123 S1, page 27. ³⁸ *Id.*, page 28. Duke Response to Sierra Club 1.12 in IURC Cause No. 38707 FAC 123

S1.

1		5. The company does not currently contract for enough natural gas to run
2		Edwardsport fully on natural gas in addition to running the Wheatland and
3		Vermillion stations. Further, switching Edwardsport to natural gas would
4		likely make natural gas supply scarcer and drive up gas prices. ⁴⁰
5	Q	To Duke's claim that the results of your analysis are erroneous because the
6		gasification system cannot be turned on and off regularly, how do you
7		respond?
8	Α	Neither my analysis nor recommendations contemplate regularly switching back
9		and forth between coal and gas and turning the gasification system on and off.
10		Similarly, I am not recommending that Duke shut down operations at
11		Edwardsport for short periods of time to avoid temporary low-cost periods, such
12		as weekends. Indeed, I have never challenged the fact of a 14-day cycling time for
13		the gasification system.
14		My analysis found that (1) Edwardsport continuously lost revenue relative to
15		market energy prices when fired on syngas coal; (2) Edwardsport would have
16		earned revenue relative to market energy if the plant has switched to natural gas
17		for the entire FAC 123 and FAC 124 time periods. Therefore, the Company's
18		assertion that my findings are erroneous based on a failure to consider these
19		operational constraints is wrong.

³⁹ *Id.*, page 27-28.
⁴⁰ See Rebuttal testimony of J. Swez, IURC Cause No. 38707 FAC 124, pages 28-29.

1		In additional, it is critical to note that the 14-day cycling limitation only applies
2		when the plant is operating on coal/syngas. When the plant is operating on natural
3		gas, the gasification system is off and the plant's startup and shutdown timeline
4		and costs are much lower. Duke is knowingly sacrificing the flexibility to turn the
5		plant on and off in response to market price signals by operating the plant on coal.
6	Q	In regard to Duke's claim around essential personnel, how many employees
7		would be lost if Edwardsport switched to operate on gas for a long period of
8		time?
9	Α	Duke failed to provide evidence to support its claim that there will be a loss of
10		essential personnel if Edwardsport switches to gas. Specifically:
11		1. Duke refused to provide the number of employees that work on the
12		gasification system and/or are considered essential personnel, stating that the
13		Company does not keep a record of this information (i.e., "the number of
14		employees and contractors that work on specific equipment at Edwardsport"
15		or "which employees are 'essential""). ⁴¹
16		2. Duke refused to provide the number of full-time employees that would be
17		required at Edwardsport if the plant switched to gas full time. The Company
18		stated that such "a calculation or compilation [] has not already been
19		performed and that Duke Energy Indiana objects to performing [it]."42
20		3. Further, Duke has provided no information on the specific tasks that the
21		"essential" personnel perform at Edwardsport, nor indicated why the

⁴¹ Duke response to Sierra Club No. 3.1 and No. 3.2 in IURC Cause No. 38707 FAC 123 S1.
 ⁴² Duke response to Sierra Club No. 5.3 in IURC Cause No. 38707 FAC 123 S1.

- "essential" personnel could not continue to work on the plant if it were to
 switch to natural gas for full-time operation.
- It is extremely concerning that the Company repeatedly advances the claim that switching to gas would result in a loss of essential personnel as a key reason to keep the plant incurring substantial losses on coal, yet failed to provide any actual data or analysis as to the number or roles of workers that a switch to gas would impact.
- 8 Q For Duke's claim around its ability to operate on natural gas and comply
 9 with its air permit, what legal or technical analysis has the Company done to
 10 validate this concern?
- 11AThe Company failed to provide any analysis to assess any legal constraints of12operating Edwardsport on natural gas. When asked to identify provisions of its air13permit that the Company believes are inconsistent with operating Edwardsport on14gas, Duke responded that "the Company has not completed a specific evaluation15of how the air permit requirements would change as a result of altering the facility16so that it would run exclusively on natural gas."
- Once again, the Company admits that it has performed no analysis to substantiate
 one of the claims it put forward in both FAC 123 and FAC 124 for why it cannot
 operate Edwardsport on natural gas.

⁴³ *Id*.

1QIn regard to Duke's claim that switching Edwardsport to gas would eliminate2fuel diversity, how do you respond?

A Duke is disingenuously using the claim of fuel diversity—an argument
fundamentally about a long-term economic hedge, that if it has merits at all,
should be addressed in a long-term resource planning docket—to justify
continued reliance on high-cost coal at Edwardsport while it operates its Indiana
fleet overwhelmingly on coal.

8 The value of fuel diversity comes from allowing a fuel-diverse utility to respond 9 quickly and flexibly to changes in the market, therefore optimizing customer costs 10 based on its diversity. However, the Company has lumbered on, burning the 11 highest cost fuel at a net loss to customers whenever the gasifiers were available, 12 even as the cost of gas and market-based energy dropped precipitously in late 13 2019 and early 2020.⁴⁴

14It is not reasonable to make ratepayers pay millions of dollars to burn coal now15just to preserve the option of burning coal, all while acknowledging that there is16no expectation of a return to high gas prices.⁴⁵ Indeed, burning a non-economic17fuel in excess over a short term is antithetical to the economic arguments that18might undergird fuel diversity: taking sustained losses by operating out of merit is19not a hedge, but simply a loss.

Further, it is important to note that Duke does not actually need *fuel* diversity, it needs *resource* diversity (or generation diversity, as the Company calls it in its

⁴⁴ See Rebuttal Testimony of J. Swez, IURC Cause No. 38707 FAC 124, pages 26-27.

⁴⁵ See Rebuttal Testimony of J. Swez, IURC Cause No. 38707 FAC 124, page 29.

1		latest IRP). ⁴⁶ If the Company were genuinely concerned about mitigating fuel
2		price volatility, it would evaluate resources with zero fuel cost, including battery
3		storage, solar, wind, and demand-side management solutions, instead of
4		presenting a false binary choice between natural gas and coal.
5	Q	In regard to Duke's final claim that it has not contracted for sufficient firm
6		gas capacity to serve Edwardsport, and switching Edwardsport to run full
7		time on natural gas would drive up gas prices, how do you respond?
8	Α	Duke's own Profit and Loss Analysis shows that Duke will earn significant net
9		revenues by operating Edwardsport full time on gas relative to its current coal
10		operation. If this is inaccurate, the Company should update its analysis to properly
11		reflect this claim. However, Duke pointedly did not provide any support for its
12		claim that increased volume of gas purchases as a result of switching Edwardsport
13		to gas operation would make gas supplies scarcer and drive up the price of that
14		gas, either to Edwardsport or to Wheatland and Vermillion. When asked about
15		this economic claim Duke responded that buying more gas will cost more
16		money. ⁴⁷ No one disputes this fact.
17		In addition, Duke's claim around gas prices is based in the assumption that the
18		only alternative to Edwardsport's current operation on coal is to operate

19 Edwardsport at full output on natural gas. However, Duke has not demonstrated a

 ⁴⁶ Robert Walton, *Duke Indiana IRP adds 2.35 GW wind and solar, keeps some coal online for almost 20 years*. Utility Dive, June 2019, available at https://www.utilitydive.com/news/duke-indiana-irp-adds-1240-mw-gas-keeps-some-coal-online-for-almost-20-ye/557445/.

⁴⁷ Duke CONFIDENTIAL response to Sierra Club Data Request No. 4.7(a), IURC Cause No. 38707 FAC 123 S1.

1 need for 100 percent of Edwardsport's natural gas capacity to meet resource adequacy or energy needs. In 2019, Duke purchased energy from the market to 2 serve over 30 percent of its native load,⁴⁸ and the Company stated that it met 46 3 percent of its energy needs through market purchased during FAC 124 (and as 4 much as 70 percent in some hours).⁴⁹ In other words, Edwardsport does not need 5 to operate on natural gas at full output in order to save ratepayers money relative 6 to operation on coal. Ratepayers would still be better off by running Edwardsport 7 8 on natural gas at partial capacity and purchasing the rest of its energy needs from 9 the market.

Finally, and perhaps most importantly, even if natural gas prices did go up with an increase in demand, so long the cost of natural gas per unit of energy produced is below the cost of coal, ratepayers will be better off operating the plant on natural gas than on coal. Importantly, as the price of gas approaches the price of coal, market purchases will be preferable to operating Edwardsport on either fuel.

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 (to the order of \$7.7 million every
 six months) if Duke were to turn the plant off and procure market energy.

⁴⁸ See Rebuttal Testimony of J. Swez, IURC Cause No. 38707 FAC 123, page 19.

⁴⁹ See Rebuttal Testimony of J. Swez, IURC Cause No. 38707 FAC 124, page 17.

17. DUKE COMMITS CAYUGA, EVEN WHEN UNECONOMIC, IN ORDER TO SERVE ITS2STEAM CUSTOMER, AND AT THE EXPENSE OF ALL OTHER RATEPAYERS.

- 3 Q What did you find about the Company's self-commitment of Cayuga Units 1
 4 and 2 in FAC 123 and FAC 124 based on your review of the Profit and Loss
 5 Analysis and actual net revenue data?
- A I found that during nearly all of FAC 123⁵⁰ and during the majority of FAC 124,⁵¹
 Duke had at least one of the Cayuga units self-committed in must-run status,
 despite clear indications from its contemporaneous decision documents that the
 unit(s) were *predicted* to accrue significant losses during that time.⁵² Specifically:
 Duke's own analysis *predicted* \$0.4 million in losses in FAC 123 from
 operating the Cayuga units on the days they were set to must-run status
- 12 relative to buying energy from the market.⁵³ The two units together *actually*
- 13 lost \$1.9 million in FAC 123.⁵⁴

⁵⁰ Cayuga 1 and 2 were both in outage for two days during FAC 123.

⁵¹ From December 23, 2019 through February 29, 2020.

⁵² P&L analysis for FAC 123 viewed on site on 2/26/2020. P&L analysis for FAC 124 viewed during virtual "site visit" through Microsoft Teams on 5/18/2020. Duke response to CAC Data Request No. 1.2, Revised CONFIDENTIAL Attachments CAC 1.2-A. CAC 1.2-B and CAC 1.2-C, IURC Cause No. 38707 FAC 123 S1.

⁵³ *Id*.

⁵⁴ Duke responses to Sierra Club Data Requests No. 1.1(g), CONFIDENTIAL Attachment SC 1.1-F; No. 1.1(i), CONFIDENTIAL Attachment SC 1.1-H; No. 1.1(l), CONFIDENTIAL Attachment SC 1.1-J; No. 1.1(m), CONFIDENTIAL Attachment SC 1.1-K; No. 1.1(n), CONFIDENTIAL Attachment SC 1.1-L; No. 1.1(o), CONFIDENTIAL Attachment SC 1.1-M; No. 1.1(p), CONFIDENTIAL Attachment SC 1.1-M; No. 1.1(q), CONFIDENTIAL Attachment SC 1.1-N; Duke response to OUCC 3.3, CONFIDENTIAL Attachment OUCC 3.3-A, IURC Cause No. 38707 FAC 123.

1		2. Duke's own analysis <i>predicted</i> \$3.0 million in losses in FAC 124 from
2		operating the Cayuga units on the days they were set to must-run. ⁵⁵ The two
3		units together <i>actually</i> lost \$2.4 million in FAC 124. ⁵⁶
4		I am concerned that Duke is operating the plant even when it is not economic to
5		do so in order to provide steam to an industrial customer and that the costs to
6		provide this steam service are being subsidized by Duke's electric ratepayers.
7	Q	Please explain the basis of your concerns that operation of Cayuga to serve
8		the industrial steam customer is being subsidized by ratepayers.
9	A	First, in the rate case (Cause No. 45253), Mr. Swez indicated that Cayuga station
9 10	Α	First, in the rate case (Cause No. 45253), Mr. Swez indicated that Cayuga station supplies steam to an industrial customer and that it has specific operational
9 10 11	Α	First, in the rate case (Cause No. 45253), Mr. 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
9 10 11 12	A	First, in the rate case (Cause No. 45253), Mr. 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
9 10 11 12 13	Α	First, in the rate case (Cause No. 45253), Mr. 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." ⁵⁷ This means that, in
9 10 11 12 13 14	Α	First, in the rate case (Cause No. 45253), Mr. 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." ⁵⁷ This means that, in order to serve the steam customer, one of Cayuga Units 1 or 2 is generally self-

⁵⁵ P&L analysis for FAC 123 viewed on site on 2/26/2020. P&L analysis for FAC 124 viewed during virtual "site visit" through Microsoft Teams on 5/18/2020. Duke response to CAC Data Request No. 1.2, Revised CONFIDENTIAL Attachments CAC 1.2-A. CAC 1.2-B and CAC 1.2-C, IURC Cause No. 38707 FAC 123 S-1.

⁵⁶ Duke responses to Sierra Club Data Requests No. 1.1(g), CONFIDENTIAL Attachment SC 1.1-F; No. 1.1(i), CONFIDENTIAL Attachment SC 1.1-H; No. 1.1(l), CONFIDENTIAL Attachment SC 1.1-J; No. 1.1(m), CONFIDENTIAL Attachment SC 1.1-H; No. 1.1(n), Attachment SC 1.1-K; No. 1.1(o), CONFIDENTIAL Attachment SC 1.1-L; No. 1.1(p), CONFIDENTIAL Attachment SC 1.1-L; No. 1.1(q), CONFIDENTIAL Attachment SC 1.1-M; Duke response to OUCC 3.3, CONFIDENTIAL Attachment OUCC 3.3-A, IURC Cause No. 38707 FAC 124.

⁵⁷ See Rebuttal Testimony of J. Swez, IURC Cause No. 45253, page 29.

committed and self-scheduled above its normal minimum operating level
 regardless of economics.

3 Second, Company witness M. Diaz indicated that Duke's contract with the steam 4 customer dates back to 1974. It likely made sense to sell the waste steam to the 5 industrial customer at that time when Cayuga was always online providing electricity. However, the contract likely did not contemplate the scenario where 6 7 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 8 operating at 50 to 60 percent capacity factors⁵⁸ and likely still earning positive net 9 revenues in more hours than today. In contrast, even with Duke self-committing at 10 11 least one Cayuga unit regularly, both units operated at around only a 30 percent capacity factor between the months of December 2019 and February 2020. 12 13 Duke's existing contract with the industrial customer is likely not suited for the 14 current reality that Cayuga cannot economically operate during many hours of the 15 year.

16 Third, Duke acknowledged that it has not calculated the impact on electrical 17 customers' costs of running Cayuga due to the requirement to supply steam when 18 it otherwise would not have run based on expected energy market margins. The 19 Company defended this decision stating that "there are multiple assumptions that the Company would have to make in order to perform this calculation."⁵⁹ But that 20 21 is exactly why Duke needs to perform a cost of service study (or other 22 comparative analysis). In order to understand the cost of operating Cayuga to 23 serve the steam customer, Duke should be modeling its electricity system with

⁵⁸ EIA form 923 data.

⁵⁹ See, Duke response to Sierra Club No. 1.9 (a), IURC Cause No. 38707 FAC 124.

- 1 and without the requirement to provide steam to the industrial customer.
- 2 Modeling of this type has been used in other jurisdictions to set tariffs for a
- 3 specific large industrial customer in order to ensure that the industrial customer is
- 4 covering not only the variable costs to serve it but all other incremental costs to
- 5 the system of providing its service.⁶⁰
- 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
 have de-committed (i.e. shutdown for reserve shutdown) is not currently allocated
 to the steam customer."⁶¹

10 8. The Commission should require Duke to make price-based unit 11 commitment decision.

12 Q Have other entities raised concerns about self-commitment in the wholesale 13 markets?

A Yes. The issue has arisen in both MISO and the Southwest Power Pool ("SPP")
within the past year. The SPP Market Monitor Unit ("MMU") has 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

⁶⁰ See, Exhibit DG-5, Nova Scotia Power Inc, Application for Extra Large Industrial Active Demand Control Tariff. Nova Scotia Utility Review Board, M09420. September 27, 2019.

⁶¹ See, Duke response to CAC No. 2.27, IURC Cause No. 38707 FAC 123 S1.

"likely lead to ratepayer benefits in the form of cost reduction."⁶² Public utilities
 commissions in both Minnesota and Missouri have opened formal dockets to
 investigate utility self-commitment and self-dispatch practices,⁶³ and a number of
 utilities, including Northern States Power Company,⁶⁴ Southwestern Public
 Service Company,⁶⁵ and Southwestern Electric Power Company have shifted
 plants⁶⁶ to "economic" commitment or seasonal operations.

7 Q What is the scope of the FAC proceedings?

8 A The FAC proceedings cover the reasonableness of fuel costs incurred by the

9 Company to provide electricity to ratepayers during the three-month period

10 reviewed. The reasonableness of fuel costs depends on the reasonableness of unit

11 commitment decisions, among other factors.

⁶² 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).

⁶³ 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.

⁶⁴ 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).

⁶⁵ 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).

⁶⁶ Gheorghiu, Iulia. Cleco, "SWEPCO shift coal plant use, target 2.8 GW renewables in latest resource plans." Utility Dive (Sept. 6, 2019).

1 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. The expedited timeline allows very little time to issue
discovery requests and review and process data. The process is complicated
further by Duke's insistence that the most-relevant source of information, the
"Daily Generating Unit P&L Analysis" sheets, be reviewed on-site in person.

However, I believe the process could be sufficient if the Commission instituted
requirements for Duke to provide specific data and analysis necessary to assess
the prudence of the Company's unit commitment practices at the outset of the
proceeding as part of all future FAC filings.

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?

14 Α I recommend that Duke be required to submit in its FAC application all Profit and 15 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, 16 17 Duke should provide a brief description memorializing the reason for any 18 deviance between the results of the Company's forward-looking price-based 19 analysis and the Company's actual commitment decision. In addition, Duke 20 should provide hourly data sufficient for the Commission to calculate the net 21 revenues that each plant actually incurred in each FAC period, including 22 generation, accounting fuel cost, total variable cost, unit LMP, day ahead 23 commitment status, energy and ancillary market revenues, and actual outages.

1QCould the Company's current Profit and Loss Analysis for commitment2decision for Edwardsport be supplemented?

3 Α Yes. Given Duke's practice of disregarding the results of its Profit and Loss 4 Analysis in its unit commitment practices at Edwardsport, Duke should develop a 5 new price-based analysis process that the Company will actually use to 6 supplement the existing Profit and Loss Analysis. In contrast to the one day and 7 one-week decision window of the Company's current Profit and Loss Analysis, 8 this analysis should extend beyond the plant's 14-day cycling window to inform 9 the plant's commitment decisions based on seasonal market and fuel price trends. 10 Moving from a daily to a seasonal analysis window will allow the Company to 11 make commitment decision over a longer timeline (multiple weeks, or even 12 months), and therefore should address the Company's concern about the cost and 13 impact of frequent plant cycling. This analysis should be included in the FAC 14 application for review.

Q What are your specific recommendations for the Company's new forwardlooking analysis process at Edwardsport?

- A The Company should be required to produce at the beginning of each 3-month
 FAC period a projected forecast of plant revenues from operating the plant on
 both coal-based syngas and natural gas.
- If the results of the 3-month forecast indicate that net revenues are highest when the plant is operating on natural gas, I recommend that the Company still be required to produce and utilize the daily Profit and Loss Analysis sheets to direct the plant's daily commitment decisions on natural gas.

1		If the results of the 3-month forecast indicate that net revenues are highest when
2		the plant is operating on coal/syngas, I recommend that the Company produce
3		updated projections every 14 days to assess whether operation on coal continues
4		to be the most-economic option for ratepayers during the FAC period. The
5		Company should be required to abide by the results of all 3-month, 14-day, and
6		one-day price-based analysis, and otherwise memorialize any deviations.
7	Q	Under your recommended plan for oversight would any of the price-based
8		analysis be available for Duke's customers to review?
9	Α	No, so long as the utility maintains its position on the confidentiality of much of
10		the data. Therefore, I recommend that Duke be required to publish a public
11		accounting for each FAC period that allows ratepayers to see how Edwardsport is
12		operating. This report should contain the following items:
13		1. Total net revenue (or losses) from running Edwardsport in the FAC period;
14		2. Monthly gas and coal consumption at Edwardsport in the FAC period;
15		3. Total hours when the gasifiers were in outage in the FAC; and
16		4. Total net revenue (or losses) that the Company would have incurred/earned
17		from operating the plant on natural gas for all hours in the FAC period.
18	Q	What are your recommendations regarding the Commission's assessment of
19		Company commitment practices?
20	Q	The Commission should require Duke to follow price-based signals at
21		Edwardsport and all other plants in making its unit commitment decisions.
22		Further, the Commission should disallow recovery of losses incurred at
23		Edwardsport as part of Duke's fuel adjustment charge if Duke does not follow

market price signals or the results of its own price-based process and thereby fails
 to generate or purchase power at the lowest reasonable cost.

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 noneconomic outcomes for customers. A fuel docket is an appropriate forum for the
 examination of these costs.
- **Q** Does this conclude your testimony?
- **A** Yes.