STATE OF NORTH CAROLINA	)	
	)	SS
COUNTY OF MECKLENBURH	)	

The undersigned, Alan Mok, Financial Market Manager - MW, being duly sworn, deposes and says that he has personal knowledge of the matters set forth in the foregoing data requests, and that the answers contained therein are true and correct to the best of his knowledge, information and belief.

Alan Mok Affiant

Subscribed and sworn to before me by Alan Mok on this 17th day of January.

2023.

Sland M. Wils.

NOTARY PUBLIC

My Commission Expires:



STATE OF NORTH CAROLINA	)	
	)	SS:
COUNTY OF MECKLENBURG	)	

The undersigned, Huyen C. Dang, Director of Accounting, being duly sworn, deposes and says that he has personal knowledge of the matters set forth in the foregoing data requests, and that the answers contained therein are true and correct to the best of his knowledge, information and belief.

Huyen C. Dang Affiant

Subscribed and sworn to before me by Huyen C. Dang on this 19 day of 2023.

NOTARY PUBLIC

My Commission Expires:

10/2/26

STATE OF NORTH CAROLINA	)	
	)	SS
COUNTY OF MECKLENBURG	)	

The undersigned, John Swez, Managing Director Trading & Dispatch, being duly sworn, deposes and says that he has personal knowledge of the matters set forth in the foregoing data requests, and that the answers contained therein are true and correct to the best of his knowledge, information and belief

John Swez Affiant

Subscribed and sworn to before me by John Swez on this 18 day of January 2023.

NOTARY PUBLIC

My Commission Expires:



STATE OF NORTH CAROLINA	)	
	)	SS
COUNTY OF MECKLENBURH	)	

The undersigned, Kimberly Hughes, Director Coal Origination, being duly sworn, deposes and says that she has personal knowledge of the matters set forth in the foregoing data requests, and that the answers contained therein are true and correct to the best of her knowledge, information and belief.

Kimberly Hughes Affiant

Subscribed and sworn to before me by Kimberly Hughes on this 17 day of

Fanuary, 2023.

NOTARY PUBLIC

My Commission Expires:

STATE OF OHIO	)	
	)	SS:
COUNTY OF HAMILTON	)	

The undersigned, Michael Geers, Manager Environmental Services, being duly sworn, deposes and says that he has personal knowledge of the matters set forth in the foregoing data requests, and that the answers contained therein are true and correct to the best of his knowledge, information and belief.

Michael Geers Affiant

Subscribed and sworn to before me by Michael Geers on this 24 day of houry, 2023.

NOTARY PUBLIC

My Commission Expires: July 8,2027

T Post

EMILIE SUNDERMAN Notary Public State of Ohio My Comm. Expires July 8, 2027

STATE OF NORTH CAROLINA	)	
	)	SS
COUNTY OF MECKLENBURG	)	

The undersigned, Scott Park, Managing Director IRP & Analytics, being duly sworn, deposes and says that he has personal knowledge of the matters set forth in the foregoing data requests, and that the answers contained therein are true and correct to the best of his knowledge, information and belief

Scott Park Affiant

Subscribed and sworn to before me by Scott Park on this 20 day of January, 2023.

PATRICIA C. ROSS NOTARY PUBLIC Mecklenburg County North Carolina

NOTARY PUBLIC

Patricia C. Ross

My Commission Expires: 10-23-2024

STATE OF INDIANA	)	
	)	SS
COUNTY OF HENDRICKS	)	

The undersigned, William C. Luke, VP Midwest Generation, being duly sworn, deposes and says that he has personal knowledge of the matters set forth in the foregoing data requests, and that the answers contained therein are true and correct to the best of his knowledge, information and belief.

William C. Luke, Affiant

, 2023.

MOTARY PUBLIC

My Commission Expires: 10/7/2030

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**SIERRA CLUB First Set Data Requests** 

Date Received: January 10, 2023

**PUBLIC SIERRA-DR-01-001** 

**REQUEST:** 

Please provide all public and confidential responses to Requests for Information issued by

Duke or any other party to this proceeding.

**RESPONSE:** 

**CONFIDENTIAL PROPRIETARY TRADE SECRET (As to Attachments only)** 

All public responses to Requests for Information can be found on the Kentucky Public

Service Commission's website here: View Case Filings for: 2022-00372 (ky.gov).

The confidential attachments to this response will be provided upon the execution

of a mutually acceptable confidentiality agreement.

PERSON RESPONSIBLE:

Legal

## SIERRA-DR-01-001 CONFIDENTIAL ATTACHMENTS

**SIERRA CLUB First Set Data Requests** 

Date Received: January 10, 2023

**PUBLIC SIERRA-DR-01-002** 

**REQUEST:** 

Please provide all confidential, unredacted testimony, exhibits, work papers, and schedules

supporting Duke's application in electronic, machine-readable format with formulae intact,

including all confidential or highly sensitive testimonies, exhibits, work papers, and

schedules supporting Duke's application.

**RESPONSE:** 

**CONFIDENTIAL PROPRIETARY TRADE SECRET (As to Attachment only)** 

The confidential attachment to this response will be provided upon the execution of a

mutually acceptable confidentiality agreement.

PERSON RESPONSIBLE:

Legal

## SIERRA-DR-01-002 CONFIDENTIAL ATTACHMENT

**SIERRA CLUB First Set Data Requests** 

Date Received: January 10, 2023

**PUBLIC SIERRA-DR-01-003** 

**REQUEST:** 

Please refer to the Direct Testimony of Scott Park at page 2. Please provide an unredacted

copy of the referenced June 2021 Duke Integrated Resource Plan ("IRP"), including all

appendices, exhibits, and/or workpapers in native format with all formulae intact.

**RESPONSE:** 

**CONFIDENTIAL PROPRIETARY TRADE SECRET (As to Attachment only)** 

Objection. This request seeks to elicit information that is irrelevant or beyond the scope of

the proceeding. Without waiving said objection, to the extent discoverable, and in the spirit

of discovery, the confidential attachment to this response will be provided upon the

execution of a mutually acceptable confidentiality agreement.

PERSON RESPONSIBLE:

Legal

## SIERRA-DR-01-003 CONFIDENTIAL ATTACHMENT

**SIERRA CLUB First Set Data Requests** 

Date Received: January 10, 2023

SIERRA-DR-01-004

**REQUEST:** 

Please refer to the Direct Testimony of Scott Park at pages 2 and 10 regarding Duke's 2021

IRP process. Please provide all public and confidential responses to Requests for

Information, including all workpapers and exhibits, provided by Duke to any party in

Kentucky Public Service Commission Case 2021-00245.

**RESPONSE:** 

Objection. This request is overbroad and unduly burdensome, seeks to elicit information

that is irrelevant or beyond the scope of these proceedings, and harassing in nature. Without

waiving said objection, to the extent discoverable, and in the spirit of discovery, all public

responses to Requests for Information can be found on the Kentucky Public Service

Commission's website here: View Case Filings for: 2021-00245 (ky.gov).

PERSON RESPONSIBLE:

Legal

**SIERRA CLUB First Set Data Requests** 

Date Received: January 10, 2023

**SIERRA-DR-01-005** 

**REQUEST:** 

Please refer to the Direct Testimony of Scott Park at pages 4-5. Please state whether Duke

could procure energy and capacity from MISO or otherwise to meet its generation and

capacity needs if East Bend were to be retired earlier than 2035.

**RESPONSE:** 

• Energy: If East Bend were retired and not replaced, PJM will continue to serve the

Company's energy needs, but of course the Company's customers would no longer

have the East Bend Station generation hedge. Additionally, the Company could

technically purchase energy from MISO and deliver to PJM in non-emergency

situations if transmission is available, but ultimately this option can be expensive,

subject to transmission availability, and is subject to potential curtailment during

emergency situations. As such, MISO is not a cost-effective, reliable, or viable

option for Duke Energy Kentucky's customers.

Capacity: If Duke Energy Kentucky stayed as a PJM FRR capacity entity, the

Company is responsible to replace the needed capacity in the Company's FRR plan

from resources in PJM or face penalties and/or FERC referral from PJM. If Duke

Energy Kentucky were to switch to the RPM capacity construct, the Company

could purchase the needed capacity from PJM, not MISO.

PERSON RESPONSIBLE:

John Swez

**SIERRA CLUB First Set Data Requests** 

Date Received: January 10, 2023

**SIERRA-DR-01-006** 

**REQUEST:** 

Has Duke conducted an economic or resource plan evaluation assessing retirement dates

for East Bend before 2035? If yes, please provide all documents reflecting such analyses.

If not, why not?

**RESPONSE:** 

Please refer to Duke Energy Kentucky's Integrated Resource Plan provided as SIERRA-

DR-01-003 Confidential Attachment.

PERSON RESPONSIBLE:

Scott Park

**SIERRA CLUB First Set Data Requests** 

Date Received: January 10, 2023

**SIERRA-DR-01-007** 

**REQUEST:** 

Please provide unredacted, in native format with all formulae intact, all analyses or

assessments that study the value of continued operation (e.g., all retirement studies, unit

condition assessments, or deactivation assessments) conducted since 2015, for East Bend

Generation Station, including, but not limited to, all studies, presentations, reports, or other

assessments conducted to determine how to comply with any existing, impending, or

potential environmental regulation.

**RESPONSE:** 

Objection. This request is overbroad and unduly burdensome, seeks to elicit information

that is irrelevant or beyond the scope of these proceedings, and outside of the test year.

Without waiving said objection, to the extent discoverable, and in the spirit of discovery,

please see Duke Energy Kentucky's Integrated Resource Plan provided as SIERRA-DR-

01-003 Confidential Attachment.

PERSON RESPONSIBLE:

As to objections, Legal

As to response, Scott Park

**SIERRA CLUB First Set Data Requests** 

Date Received: January 10, 2023

SIERRA-DR-01-008

**REQUEST:** 

For each retirement study or unit condition assessment in response to Sierra Club 1.4

above:

a. State which modeling software was used to conduct the analysis.

b. State the date that the analysis was performed.

c. State whether the units were modeled with an economic (market) or self-

commitment (must run) status for each year of the analysis.

d. State the date of each forecast or projection used in the analysis.

e. State the regulation or rational behind each retirement date(s) studied.

f. Provide all underlying workbooks with formulas intact that were used to

develop model input assumptions.

g. Identify all transmission grid updates or changes that would be needed to

allow for the retirement of East Bend.

h. Produce all analyses or assessments of the impact that retirement of each

unit would have on capacity adequacy, transmission grid stability,

transmission grid support, voltage support, or transmission system

reliability.

i. Provide each of the following inputs for each modeled scenario:

i. Heat rate (Btu)

ii. Projected Ongoing Capital expenditures (\$)

- iii. Variable Operation and Maintenance (\$/MWh)
- iv. Fixed Operation and Maintenance (\$/MW)
- v. Environmental compliance capital expenditures
- vi. All transmission upgrade costs assumed, if any (\$);
- vii. MISO energy price forecasts (with and without CO2 price);
- viii. MISO capacity price forecasts (with and without CO2 price);
- ix. CO2 price forecasts
- x. Coal price (\$/MMBtu)
- xi. Gas price (\$/MMBtu)
- j. For each replacement resource available to the model, provide each of the following inputs for each resource at the highest level of granularity used in conducting the analysis:
  - i. Replacement resource options
  - ii. Replacement resource size (MW)
  - iii. Year replacement resource is available (year)
  - iv. Cost of replacement resource option (\$/MW)
  - v. Annual capacity factor
- k. Provide all model outputs by unit, including:
  - i. Annual generation (MWh)
  - ii. Fuel Costs (\$)
  - iii. VOM Costs (\$)
  - iv. FOM Costs (\$)
  - v. Capital expenditures (\$)
  - vi. Other capital expenditures (\$)

vii. Energy and ancillary market revenues (\$)

1. Provide all post-processing workbooks with formulas intact that were used

to analyze study results outside the model.

**RESPONSE:** 

**CONFIDENTIAL PROPRIETARY TRADE SECRET (As to Attachment only)** 

Objection. This request is overbroad and unduly burdensome, seeks to elicit information

that is irrelevant or beyond the scope of these proceedings, and outside of the test year.

Without waiving said objection, to the extent discoverable, and in the spirit of discovery,

the output files for the preferred portfolio are included in SIERRA-DR-01-008 Confidential

Attachment.

PERSON RESPONSIBLE:

As to objections, Legal

As to response, Scott Park

## SIERRA-DR-01-008 CONFIDENTIAL ATTACHMENT

**SIERRA CLUB First Set Data Requests** 

Date Received: January 10, 2023

PUBLIC SIERRA-DR-01-009

(incorrectly labeled as 1.6)

**REQUEST:** 

For East Bend, please provide the following historical annual data from 2011 and through

2020, and by month as available for 2021:

a. Installed Capacity

b. Unforced Capacity

c. Capacity Factor

d. Equivalent Availability Factor (EAF)

e. Heat Rate

f. Forced or random outage rate

g. Effective forced outage rate (EFORd)

h. Fixed O&M costs

i. Non-Fuel Variable O&M costs

j. Fuel Costs (by fuel type)

**RESPONSE:** 

**CONFIDENTIAL PROPRIETARY TRADE SECRET (As to Attachment only)** 

Objection. This request is overbroad and unduly burdensome, seeks to elicit information

that is irrelevant, outside of the test year, beyond the scope of these proceedings, and does

not exist in the format requested. Without waiving said objection, to the extent

discoverable, and in the spirit of discovery:

- a. through g. Please see SIERRA-DR-01-009 Confidential Attachment 1.
- Fixed O&M costs are not available. h.
- Non-fuel variable O&M costs are not available. i.
- j. Please see SIERRA-DR-01-009 Confidential Attachment 2.

As to objections, Legal As to response, Scott Park PERSON RESPONSIBLE:

## SIERRA-DR-01-009 CONFIDENTIAL ATTACHMENT 1

## SIERRA-DR-01-009 CONFIDENTIAL ATTACHMENT 2

**SIERRA CLUB First Set Data Requests** 

Date Received: January 10, 2023

SIERRA-DR-01-010

(incorrectly labeled as 1.7)

**REQUEST:** 

For East Bend, for each of the years 2022 through 2035, please identify the Company's

most recent projection of:

a. Installed Capacity

b. Unforced Capacity

c. Capacity factor

d. Availability

e. Heat rate

f. Forced or random outage rate

g. Fixed O&M cost

h. Variable O&M cost

i. Fuel cost (by fuel type)

**RESPONSE:** 

Please refer to previously provided SIERRA-DR-01-008 Attachment.

PERSON RESPONSIBLE:

Scott Park

**SIERRA CLUB First Set Data Requests** 

Date Received: January 10, 2023

**PUBLIC SIERRA-DR-01-011** 

**REQUEST:** 

Please provide the following for Duke Kentucky, with supporting workpapers (in

electronic, machine-readable format):

a. Annual peak load since 2015 (or earliest available).

b. Annual MISO capacity reserve requirement since 2015 (or earliest

available).

c. Annual sales since 2015 (or earliest available).

d. Annual generation since 2015 (or earliest available).

e. Annual off-system energy sales in GWhs since 2015 (or earliest available).

f. Annual off-system energy sales revenues in dollars since 2015 (or earliest

available).

g. Annual off-system energy purchases in GWhs since 2015 (or earliest

available).

h. Annual off-system energy purchases revenues in dollars since 2015 (or

earliest available).

**RESPONSE:** 

**CONFIDENTIAL PROPRIETARY TRADE SECRET (As to Attachment only)** 

Objection. This request is overbroad and unduly burdensome and seeks to elicit

information beyond the scope of these proceedings and outside of the test year. Without

waiving said objection, to the extent discoverable, and in the spirit of discovery:

a. According to the Company Energy Accounting System (TGIS) for Duke Energy Kentucky Load inclusive of transmission and distribution losses and including Longbranch load, the peak Duke Energy Kentucky load since 2015 occurred on 7-25-2016, HE 1400 (EST) at 855 MW.

b. Duke Energy Kentucky is not a member of MISO.

c., d., e., f., g., h. - Please see SIERRA-DR-01-011 Confidential Attachment.

**PERSON RESPONSIBLE:** As to objections, Legal

As to response, Scott Park

## SIERRA-DR-01-011 CONFIDENTIAL ATTACHMENT

**SIERRA CLUB First Set Data Requests** 

Date Received: January 10, 2023

SIERRA-DR-01-012

(incorrectly labeled as 1.9)

**REQUEST:** 

For East Bend, please provide the following:

a. Historical capital expenditures since 2010.

b. Projected capital expenditures through 2035.

c. Provide a specific accounting of all projects and capital expenditures

already scheduled or planned at each unit over the next ten years.

d. For each capital expenditure involving more than \$1 million, please provide

all analyses of the present value of those investments versus retirement or replacement. If

the Company did not perform any such analysis, why not?

**RESPONSE:** 

Objection. This request is overbroad and unduly burdensome, seeks to elicit information

that is irrelevant or beyond the scope of these proceedings, and outside of the test year.

Without waiving said objection, to the extent discoverable, and in the spirit of discovery:

a. Objection. This request is overly broad, unduly burdensome, unreasonable,

irrelevant and seeks information that is outside the test year in these proceedings.

Moreover, this request is harassing insofar as it is seeking voluminous data spanning

thirteen years that includes projects that have already been approved and completed.

Without waiving said objection, and in the spirit of discovery, see response to KROGER-

DR-01-003 and AG-DR-01-113 which included data going back five and two years,

respectively.

b. Objection. This request is overly broad, unduly burdensome, unreasonable,

irrelevant and seeks information that is outside the test year in these proceedings, does not

exist in the format requested, and not relevant to the Company's application for an increase

in its electric base rates. Without waiving said objection, and to the extent discoverable,

please see responses to SIERRA-DR-01-003 Confidential Attachment, KROGER-DR-01-

003 Confidential Attachment, and AG-DR-01-113 Attachment 2.

c. See response to (b) above.

d. Objection. This request seeks information is irrelevant, not likely to lead to

the discovery of relevant admissible evidence and is not otherwise related to the subject of

this proceeding seeking to establish new base rates for Duke Energy Kentucky. Without

waiving said objection, and to the extent discoverable, the Company did not perform this

analysis. The information does not exist in the format requested.

PERSON RESPONSIBLE:

As to objections, Legal

As to response, William C. Luke/Huyen C. Dang – a.

As to response, Scott Park -b., c.

As to response, Sarah E. Lawler – d.

**SIERRA CLUB First Set Data Requests** 

Date Received: January 10, 2023

**SIERRA-DR-01-013** 

(incorrectly labeled as 1.10)

**REQUEST:** 

Provide company plant in service amounts from 2015 through the present for East Bend,

for each month. For each month, include plant balance as of the first day of the month,

addition, transfers, retirements, and plant balance at the end of the month.

**RESPONSE:** 

Objection. This request is overbroad and seeks to elicit information beyond the scope of

these proceedings and outside of the test year. Without waiving said objection, to the extent

discoverable, and in the spirit of discovery: Please see SIERRA-DR-01-013 Attachment.

PERSON RESPONSIBLE:

As to objections, Legal

As to response, Huyen C. Dang

Duke Energy Kentucky
East Bend Plant In Service (Production Assets only)
Jan'15-Nov'22

Month	Beginning Balance	Addition	Adjustment*	Retirement	Transfer	End Balance
Jan-15	458,001,876	879,985		(933,676)	251,236	458,199,421
Feb-15	458,199,421	59,892		-		458,259,313
Mar-15	458,259,313	297,623				458,556,936
Apr-15	458,556,936	172,743				458,729,679
May-15	458,729,679	1,644,082		(1,282,389)		459,091,372
Jun-15	459,091,372	16,625,799		12,518,438		488,235,609
Jul-15	488,235,609	744,863		(16,497,211)		472,483,261
Aug-15	472,483,261	1,154,209	199,951,580	(177,359)		673,411,691
Sep-15	673,411,691	234,004	-	20,118		673,665,812
Oct-15	673,665,812	93,458		132,223		673,891,494
Nov-15	673,891,494	43,746		-		673,935,240
Dec-15	673,935,240	850,235		(64,941)		674,720,534
Jan-16	674,720,534	1,354,845		(343,370)		675,732,010
Feb-16	675,732,010	474,575		(179,254)		676,027,330
Mar-16	676,027,330	10,558,762				686,586,092
Apr-16	686,586,092	513,534		(2.225.656)	-	687,099,626
May-16	687,099,626	7,712,385		(2,225,656)		692,586,355
Jun-16	692,586,355	3,119,140		(1,105,431)		694,600,064
Jul-16	694,600,064	3,497,337		(948,246)		697,149,155
Aug-16	697,149,155	491,595		222 421		697,640,751
Sep-16 Oct-16	697,640,751 698,034,995	161,813 732,029		232,431 (276,228)		698,034,995 698,490,796
Nov-16	698,490,796	773,522		(225,501)		699,038,817
Dec-16	699,038,817	2,898,883		(277,712)		701,659,987
Jan-17	701,659,987	121,695		(87,834)		701,693,847
Feb-17	701,693,847	282,091		(117,826)		701,858,112
Mar-17	701,858,112	1,434,471		(1,035,203)		702,257,381
Apr-17	702,257,381	201,060		(28,762)		702,429,678
May-17	702,429,678	1,720,065		(516,485)		703,633,258
Jun-17	703,633,258	1,729,161		693,480		706,055,899
Jul-17	706,055,899	512,047		(142,740)		706,425,207
Aug-17	706,425,207	106,649		(26,671)		706,505,184
Sep-17	706,505,184	480,617		43,596		707,029,397
Oct-17	707,029,397	87,638				707,117,035
Nov-17	707,117,035	266,506		(186,832)		707,196,709
Dec-17	707,196,709	44,397,906		(153,549)		751,441,066
Jan-18	751,441,066	2,334,235		(559,618)		753,215,684
Feb-18	753,215,684	749,987		(191,267)		753,774,404
Mar-18	753,774,404	465,480		(97,443)		754,142,440
Apr-18	754,142,440	280,278		(142,650)		754,280,069
May-18	754,280,069	325,289		4,095		754,609,452
Jun-18	754,609,452	93,396,471		(28,001,679)		820,004,245
Jul-18	820,004,245	557,116		(5,703)		820,555,657
Aug-18	820,555,657	2,004,347		(275,288)		822,284,716
Sep-18	822,284,716	7,481,171		(253,411)		829,512,476
Oct-18	829,512,476	982,316				830,494,792

				SIERRA-DR-U	1-010 Attaciiiieiit
Nov-18	830,494,792	12,539,017	(270,324)		Page 2 of 2 842,763,485
Dec-18	842,763,485	2,828,636	(168,587)		845,423,533
Jan-19	845,423,533	326,959	(64,103)		845,686,389
Feb-19	845,686,389	136,462	(161,011)		845,661,841
Mar-19	845,661,841	30,762,737	(206,859)		876,217,719
Apr-19	876,217,719	1,638,831	(1,559,792)		876,296,758
May-19	876,296,758	4,358,914	(4,516,886)		876,138,786
Jun-19	876,138,786	1,416,997	(30,755,017)		846,800,766
Jul-19	846,800,766	403,033	(768,158)		846,435,640
Aug-19	846,435,640	475,059	30,250,266		877,160,966
Sep-19	877,160,966	(236,000)	(74,855,341)		802,069,625
Oct-19	802,069,625	(2,320)	65,150,883		867,218,188
Nov-19	867,218,188	4,373,767	(3,030,067)		868,561,888
Dec-19	868,561,888	12,024,343	2,803,505	0	883,389,736
Jan-20	883,389,736	581,217	1,554,047		885,525,000
Feb-20	885,525,000	17,177,604	(130,879)		902,571,725
Mar-20	902,571,725	21,167,535	(12,730,228)		911,009,032
Apr-20	911,009,032	741,494	(367,566)		911,382,961
May-20	911,382,961	50,625	739,464		912,173,049
Jun-20	912,173,049	568,830	(263,812)		912,478,067
Jul-20	912,478,067	149,049			912,627,116
Aug-20	912,627,116	150,077	(63,088)		912,714,105
Sep-20	912,714,105	(2,008,469)	(22,942)		910,682,694
Oct-20	910,682,694	215,122	(494,488)		910,403,328
Nov-20	910,403,328	10,807,761	(6,357,060)		914,854,029
Dec-20	914,854,029	1,397,654	(2,488,873)		913,762,810
Jan-21	913,762,810	(50,038)	8,572		913,721,344
Feb-21	913,721,344	253,959	(236,418)		913,738,885
Mar-21	913,738,885	4,045,151	(587,787)		917,196,249
Apr-21	917,196,249	642,446	(1,334,600)		916,504,095
May-21	916,504,095	267,325	(111,672)		916,659,748
Jun-21	916,659,748	700,651	(1,905,130)		915,455,268
Jul-21	915,455,268	313,315	(20,716)		915,747,868
Aug-21	915,747,868	761	11,745		915,760,373
Sep-21	915,760,373	27,554	104,277		915,892,204
Oct-21	915,892,204	1,000,177	18,308,571		935,200,953
Nov-21	935,200,953	690,062	(15,904,422)		919,986,593
Dec-21	919,986,593	9,193,010	(3,617,536)		925,562,068
Jan-22	925,562,068	23,085,399	(14,316,807)		934,330,660
Feb-22	934,330,660	338,590	(1,361,782)		933,307,468
Mar-22	933,307,468	425,854	(207,523)		933,525,799
Apr-22	933,525,799	285,760	(33,115)		933,778,444
May-22	933,778,444	414,413	(135,791)		934,057,066
Jun-22	934,057,066	153,482	-		934,210,548
Jul-22	934,210,548	420,746	771,543		935,402,837
Aug-22	935,402,837	1,409,885	1,562,495		938,375,218
Sep-22	938,375,218	323,552	(3,007,354)		935,691,417
Oct-22	935,691,417	(254,713)	(762,237)		934,674,467
Nov-22	934,674,467	6,226,025	(3,809,354)		937,091,138

<sup>\*</sup>Adjustment represented East Bend Acquisition

**SIERRA CLUB First Set Data Requests** 

Date Received: January 10, 2023

SIERRA-DR-01-014

(incorrectly labeled as 1.11)

**REQUEST:** 

a. Provide the Company's three most-recent commodity and power market

price forecasts. Indicate the date of each forecast.

b. Provide total energy and ancillary service market revenues for East Bend,

for the period 2017–2022.

**RESPONSE:** 

Objection. This request is overbroad and unduly burdensome and seeks to elicit

information that is irrelevant or beyond the scope of these proceedings and outside of the

test year. Without waiving said objection, to the extent discoverable, and in the spirit of

discovery:

a. Please see SIERRA-DR-01-014(a) Attachment for the commodity and

power market prices used in the three most recent forecasts.

b. Please see SIERRA-DR-01-014(b) Attachment for energy and ancillary

service market revenues for 2017 through 2022. Note that the information in the

spreadsheet is included on two different tabs – the first being Energy Revenues and second

being Ancillary Services Revenues.

i. Energy Revenues Tab: Energy Revenues are specific to the East

Bend Generation Station from CommoditiesXL ("CXL") the Company's system of record

for 2017 through 2022 and summed by month. For the purposes of this response, Day-Ahead Energy Revenues are considered (1) Day-Ahead Spot Market Energy, (2) Day-Ahead Transmission Congestion, and (3) Day-Ahead Transmission Losses. Real-Time Energy Charges or Credits are considered (1) Balancing Spot Market Energy, (2) Balancing Transmission Congestion, and (3) Balancing Transmission Losses. Day-Ahead Energy Revenues and Real-Time Energy Charges and Credits added together are the East Bend total Energy Revenues. Revenues from Operating Reserve Payments (Make Whole Payments), Revenues from Financial Transmission Rights, and Revenues from Transmission Loss Credits were not considered Energy Revenues for purposes of this response.

ii. Ancillary Services Tab: For the purpose of this response, Ancillary Services charges and credits are considered (1) Reactive Supply and Voltage Control from Generation and Other Sources Service, (2) Regulation and Frequency Response Service, (3) Synchronized Reserve, (4) Day-Ahead Scheduling Reserve, and (5) Black Start Service. Due to the Company change to a new bid/offer/settlement software, Ancillary Services charges and credits from March 2020 through December 2022 are from the Company's Adapt2 software system and Ancillary Services charges and credits prior to March 2020 are from the Company's nMarket software system. However, the ancillary services charges and credits are not able to be separated to East Bend activity only. Thus, these payments and charges are not specific to East Bend Station and are for the entire Duke Energy Kentucky portfolio. Due to the nature of ancillary services charges and credits, a rough approximation of the East Bend only charges and credits can be made by taking (1) 50% of the Reactive Supply and Voltage Control from Generation and Other

Sources Service, (2) 100% of the Regulation and Frequency Response Service, (3) 100% of the Synchronized Reserve, (4) 0% of the Day-Ahead Scheduling Reserve, and (5) 0% of the Black Start Service

**PERSON RESPONSIBLE:** As to objections, Legal

As to response, John D. Swez

# 11/9/2022

	Se					Seasonal NOx	
				AD Hub	AD Hub	Allowance	NAPP
		Henry Hub	Tetco M1	Off-Peak	On-Peak	Group 3	Coal
COB Date	Curve Date	(\$/mmbtu)	(\$/mmbtu)	(\$/MWh)	(\$/MWh)	(\$/ton)	(\$/ton)
11/9/2022	1-Jan-23	\$6.23	\$6.04	\$84.95	\$100.65	\$0	\$133.00
11/9/2022	1-Feb-23	\$5.97	\$5.78	\$78.80	\$90.85	\$0	\$133.00
11/9/2022	1-Mar-23	\$5.31	\$5.05	\$57.30	\$66.45	\$0	\$122.00
11/9/2022	1-Apr-23	\$4.68	\$4.37	\$47.15	\$62.75	\$0	\$122.00
11/9/2022	1-May-23	\$4.65	\$4.34	\$44.80	\$63.15	\$13,000	\$122.00
11/9/2022	1-Jun-23	\$4.73	\$4.41	\$43.30	\$66.55	\$13,000	\$118.00
11/9/2022	1-Jul-23	\$4.81	\$4.48	\$52.25	\$81.40	\$13,000	\$118.00
11/9/2022	1-Aug-23	\$4.81	\$4.49	\$47.10	\$74.70	\$13,000	\$118.00
11/9/2022	1-Sep-23	\$4.76	\$4.44	\$40.25	\$63.15	\$13,000	\$116.00
11/9/2022	1-Oct-23	\$4.82	\$4.50	\$40.65	\$57.90	\$0	\$116.00
11/9/2022	1-Nov-23	\$5.13	\$4.85	\$42.15	\$57.95	\$0	\$116.00
11/9/2022	1-Dec-23	\$5.46	\$5.17	\$53.95	\$65.15	\$0	\$114.00
11/9/2022	1-Jan-24	\$5.64	\$5.39	\$78.95	\$90.10	\$0	\$114.00
11/9/2022	1-Feb-24	\$5.41	\$5.11	\$72.75	\$84.70	\$0	\$114.00
11/9/2022	1-Mar-24	\$4.89	\$4.59	\$48.30	\$59.55	\$0	\$113.00
11/9/2022	1-Apr-24	\$4.20	\$4.00	\$35.70	\$55.30	\$0	\$113.00
11/9/2022	1-May-24	\$4.13	\$3.92	\$34.40	\$55.65	\$13,000	\$113.00
11/9/2022	1-Jun-24	\$4.19	\$3.99	\$34.70	\$57.35	\$13,000	\$112.00
11/9/2022	1-Jul-24	\$4.26	\$4.05	\$41.80	\$72.30	\$13,000	\$112.00
11/9/2022	1-Aug-24	\$4.28	\$4.07	\$38.55	\$67.65	\$13,000	\$112.00
11/9/2022	1-Sep-24	\$4.26	\$4.06	\$33.40	\$54.40	\$13,000	\$112.00
11/9/2022	1-Oct-24	\$4.35	\$4.14	\$33.10	\$49.10	\$0	\$112.00
11/9/2022	1-Nov-24	\$4.66	\$4.46	\$35.10	\$49.95	\$0	\$112.00
11/9/2022	1-Dec-24	\$5.05	\$4.85	\$46.70	\$59.10	\$0	\$102.00
11/9/2022	1-Jan-25	\$5.25	\$5.04	\$67.85	\$79.45	\$0	\$102.00
11/9/2022	1-Feb-25	\$5.08	\$4.87	\$63.35	\$74.55	\$0	\$102.00
11/9/2022	1-Mar-25	\$4.73	\$4.53	\$40.20	\$55.75	\$0	\$102.00
11/9/2022	1-Apr-25	\$4.18	\$3.97	\$34.30	\$53.75	\$0	\$102.00
11/9/2022	1-May-25	\$4.14	\$3.94	\$33.65	\$53.45	\$13,000	\$102.00
11/9/2022	1-Jun-25	\$4.21	\$4.00	\$33.35	\$52.60	\$13,000	\$102.00
11/9/2022	1-Jul-25	\$4.30	\$4.09	\$39.90	\$69.20	\$13,000	\$102.00
11/9/2022	1-Aug-25	\$4.32	\$4.12	\$36.30	\$65.95	\$13,000	\$102.00
11/9/2022	1-Sep-25	\$4.31	\$4.10	\$33.55	\$55.15	\$13,000	\$102.00
11/9/2022	1-Oct-25	\$4.39	\$4.18	\$35.15	\$50.85	\$0	\$102.00
11/9/2022	1-Nov-25	\$4.69	\$4.48	\$36.05	\$51.60	\$0	\$102.00
11/9/2022	1-Dec-25	\$5.04	\$4.83	\$40.45	\$55.95	\$0	\$105.68

# 11/9/2022

						Seasonal NOx		
				AD Hub AD Hub Allowance		NAPP		
		Henry Hub	Tetco M1	Off-Peak	On-Peak	Group 3	Coal	
COB Date	Curve Date	(\$/mmbtu)	(\$/mmbtu)	(\$/MWh)	(\$/MWh)	(\$/ton)	(\$/ton)	
11/9/2022	1-Jan-26	\$5.22	\$5.01	\$64.20	\$79.70	\$0	\$105.68	
11/9/2022	1-Feb-26	\$5.05	\$4.84	\$60.10	\$74.75	\$0	\$105.68	
11/9/2022	1-Mar-26	\$4.70	\$4.49	\$42.05	\$54.70	\$0	\$105.68	
11/9/2022	1-Apr-26	\$4.14	\$3.93	\$36.65	\$52.00	\$0	\$105.68	
11/9/2022	1-May-26	\$4.11	\$3.90	\$33.25	\$52.05	\$13,000	\$105.68	
11/9/2022	1-Jun-26	\$4.19	\$3.98	\$32.85	\$51.75	\$13,000	\$105.68	
11/9/2022	1-Jul-26	\$4.26	\$4.05	\$37.00	\$67.00	\$13,000	\$105.68	
11/9/2022	1-Aug-26	\$4.29	\$4.08	\$33.95	\$62.70	\$13,000	\$105.68	
11/9/2022	1-Sep-26	\$4.27	\$4.06	\$33.20	\$53.15	\$13,000	\$105.68	
11/9/2022	1-Oct-26	\$4.34	\$4.14	\$33.40	\$51.10	\$0	\$105.68	
11/9/2022	1-Nov-26	\$4.65	\$4.44	\$34.90	\$50.95	\$0	\$105.68	
11/9/2022	1-Dec-26	\$5.01	\$4.81	\$39.35	\$54.45	\$0	\$109.45	
11/9/2022	1-Jan-27	\$5.20	\$4.99	\$55.50	\$79.35	\$0	\$109.45	
11/9/2022	1-Feb-27	\$5.03	\$4.82	\$50.70	\$73.10	\$0	\$109.45	
11/9/2022	1-Mar-27	\$4.69	\$4.48	\$42.80	\$56.45	\$0	\$109.45	
11/9/2022	1-Apr-27	\$4.12	\$3.91	\$37.95	\$51.35	\$0	\$109.45	
11/9/2022	1-May-27	\$4.09	\$3.88	\$33.95	\$51.20	\$13,000	\$109.45	
11/9/2022	1-Jun-27	\$4.17	\$3.96	\$33.40	\$50.35	\$13,000	\$109.45	
11/9/2022	1-Jul-27	\$4.25	\$4.05	\$38.25	\$63.15	\$13,000	\$109.45	
11/9/2022	1-Aug-27	\$4.28	\$4.08	\$34.75	\$58.55	\$13,000	\$109.45	
11/9/2022	1-Sep-27	\$4.28	\$4.07	\$33.85	\$52.60	\$13,000	\$109.45	
11/9/2022	1-Oct-27	\$4.36	\$4.15	\$34.20	\$51.05	\$0	\$109.45	
11/9/2022	1-Nov-27	\$4.66	\$4.45	\$35.35	\$51.55	\$0	\$109.45	
11/9/2022	1-Dec-27	\$5.04	\$4.83	\$40.15	\$55.55	\$0	\$113.35	

### 11/30/2022

,	22							
							Seasonal	
							NOx	
					AD Hub	AD Hub	Allowance	
			Henry Hub	Tetco M1	Off-Peak	On-Peak	Group 3	Coal
		Curve Date	(\$/mmbtu)	(\$/mmbtu)	(\$/MWh)	(\$/MWh)	(\$/ton)	(\$/ton)
	11/30/2022	1-Jan-23	\$6.93	\$6.68	•	\$119.20	\$0	\$138.00
	11/30/2022	1-Feb-23	\$6.82	\$6.57	-	\$106.85	\$0	-
	11/30/2022	1-Mar-23	\$6.18	•	•	\$77.60	-	•
	11/30/2022	1-Apr-23	\$5.25		•	\$69.30		-
	11/30/2022	1-May-23	\$5.18	\$4.86	\$51.25	\$70.55		
	11/30/2022	1-Jun-23	\$5.26	\$4.93	-	\$75.45		
	11/30/2022	1-Jul-23	\$5.34	\$4.99		\$97.20		
	11/30/2022	1-Aug-23	\$5.34	\$5.00	\$53.20	\$83.55	\$17,250	\$121.00
	11/30/2022	1-Sep-23	\$5.29	\$4.95	\$44.95	\$71.20		\$120.00
	11/30/2022	1-Oct-23	\$5.35	\$5.01	\$45.45	\$64.70	\$0	\$120.00
	11/30/2022	1-Nov-23	\$5.61	\$5.33	\$46.70	\$65.00	\$0	\$120.00
	11/30/2022	1-Dec-23	\$5.98	\$5.69	\$64.15	\$76.05	\$0	\$114.00
	11/30/2022	1-Jan-24	\$6.21	\$5.95	\$87.25	\$104.90	\$0	\$114.00
	11/30/2022	1-Feb-24	\$5.91	\$5.62	\$80.50	\$98.95	\$0	\$114.00
	11/30/2022	1-Mar-24	\$5.18	\$4.89	\$54.20	\$65.10	\$0	\$113.00
	11/30/2022	1-Apr-24	\$4.28	\$4.03	\$40.70	\$59.05	\$0	\$113.00
	11/30/2022	1-May-24	\$4.20	\$3.95	\$38.55	\$60.15	\$17,250	\$113.00
	11/30/2022	1-Jun-24	\$4.27	\$4.02	\$38.60	\$62.65	\$17,250	\$112.00
	11/30/2022	1-Jul-24	\$4.34	\$4.08	\$47.00	\$79.50	\$17,250	\$112.00
	11/30/2022	1-Aug-24	\$4.37	\$4.11	\$43.25	\$74.35	\$17,250	\$112.00
	11/30/2022	1-Sep-24	\$4.33	\$4.07	\$36.55	\$59.20	\$17,250	\$112.00
	11/30/2022	1-Oct-24	\$4.42	\$4.16	\$37.50	\$52.35	\$0	\$112.00
	11/30/2022	1-Nov-24	\$4.72	\$4.46	\$40.50	\$53.30	\$0	\$112.00
	11/30/2022	1-Dec-24	\$5.15	\$4.89	\$53.20	\$65.10	\$0	\$102.00
	11/30/2022	1-Jan-25	\$5.41	\$5.15	\$73.75	\$90.05	\$0	\$102.00
	11/30/2022	1-Feb-25	\$5.21	\$4.95	\$68.95	\$84.60	\$0	\$102.00
	11/30/2022	1-Mar-25	\$4.79	\$4.54	\$45.30	\$59.30	\$0	\$102.00
	11/30/2022	1-Apr-25	\$4.14	\$3.89	\$38.30	\$58.45	\$0	\$102.00
	11/30/2022	1-May-25	\$4.11	\$3.85	\$37.55	\$58.15	\$17,250	\$102.00
	11/30/2022	1-Jun-25	\$4.19	\$3.93	\$37.25	\$57.15	\$17,250	\$102.00
	11/30/2022	1-Jul-25	\$4.29	\$4.03	\$44.45	\$74.90	\$17,250	\$102.00
	11/30/2022	1-Aug-25	\$4.32	\$4.06	\$40.50	\$71.35	\$17,250	\$102.00
	11/30/2022	1-Sep-25	\$4.31	\$4.05	\$37.45	\$59.80	\$17,250	\$102.00
	11/30/2022	1-Oct-25	\$4.39	\$4.13	\$39.25	\$55.30	\$0	\$102.00
	11/30/2022	1-Nov-25	\$4.71	\$4.45	\$40.25	\$56.05	\$0	\$102.00
	11/30/2022	1-Dec-25	\$5.09	\$4.83	\$45.30	\$62.90	\$0	\$105.68

### 11/30/2022

						Seasonal	
						NOx	
				AD Hub	AD Hub	Allowance	NAPP
		Henry Hub	Tetco M1	Off-Peak	On-Peak	Group 3	Coal
COB Date	Curve Date	(\$/mmbtu)	(\$/mmbtu)	(\$/MWh)	(\$/MWh)	(\$/ton)	(\$/ton)
11/30/2022	1-Jan-26	\$5.30	\$5.04	\$71.85	\$87.95	\$0	\$105.68
11/30/2022	1-Feb-26	\$5.10	\$4.84	\$67.30	\$82.65	\$0	\$105.68
11/30/2022	1-Mar-26	\$4.70	\$4.45	\$46.90	\$59.70	\$0	\$105.68
11/30/2022	1-Apr-26	\$4.07	\$3.82	\$40.70	\$56.50	\$0	\$105.68
11/30/2022	1-May-26	\$4.04	\$3.78	\$36.90	\$56.55	\$17,250	\$105.68
11/30/2022	1-Jun-26	\$4.12	\$3.86	\$36.45	\$56.20	\$17,250	\$105.68
11/30/2022	1-Jul-26	\$4.20	\$3.94	\$41.05	\$72.80	\$17,250	\$105.68
11/30/2022	1-Aug-26	\$4.23	\$3.98	\$37.75	\$68.15	\$17,250	\$105.68
11/30/2022	1-Sep-26	\$4.23	\$3.97	\$36.85	\$57.65	\$17,250	\$105.68
11/30/2022	1-Oct-26	\$4.31	\$4.05	\$37.05	\$55.50	\$0	\$105.68
11/30/2022	1-Nov-26	\$4.63	\$4.38	\$38.75	\$55.35	\$0	\$105.68
11/30/2022	1-Dec-26	\$5.05	\$4.79	\$43.85	\$59.40	\$0	\$109.45
11/30/2022	1-Jan-27	\$5.26	\$5.01	\$62.35	\$87.30	\$0	\$109.45
11/30/2022	1-Feb-27	\$5.05	\$4.79	\$56.90	\$80.55	\$0	\$109.45
11/30/2022	1-Mar-27	\$4.66	\$4.40	\$47.70	\$61.95	\$0	\$109.45
11/30/2022	1-Apr-27	\$4.03	\$3.77	\$42.15	\$56.15	\$0	\$109.45
11/30/2022	1-May-27	\$4.01	\$3.76	\$37.75	\$55.95	\$17,250	\$109.45
11/30/2022	1-Jun-27	\$4.09	\$3.84	\$37.15	\$54.95	\$17,250	\$109.45
11/30/2022	1-Jul-27	\$4.18	\$3.92	\$42.45	\$68.95	\$17,250	\$109.45
11/30/2022	1-Aug-27	\$4.21	\$3.95	\$38.60	\$64.05	\$17,250	\$109.45
11/30/2022	1-Sep-27	\$4.21	\$3.95	\$37.60	\$57.45	\$17,250	\$109.45
11/30/2022	1-Oct-27	\$4.29	\$4.03	\$38.00	\$55.70	\$0	\$109.45
11/30/2022	1-Nov-27	\$4.62	\$4.37	\$39.30	\$56.40	\$0	\$109.45
11/30/2022	1-Dec-27	\$5.04	\$4.78	\$44.70	\$60.95	\$0	\$113.35

#### 1/3/2023

NAPP Coal Pate							Seasonal NOx	
COB Date Curve Date   (\$/mmbtu)   (\$/mmbtu)   (\$/mwh)   (\$/mwh)					AD Hub Off-	AD Hub On-	Allowance	
COB Date Curve Date   (\$/mmbtu)   (\$/mmbtu)   (\$/mwh)   (\$/mwh)			Henry Hub	Tetco M1	Peak	Peak	Group 3	NAPP Coal
1/3/2023         1-Jan-23         \$4.71         \$4.18         \$48.50         \$52.35         \$0         \$123.00           1/3/2023         1-Feb-23         \$3.99         \$3.60         \$59.45         \$64.55         \$0         \$123.00           1/3/2023         1-Mar-23         \$3.64         \$3.19         \$48.00         \$53.90         \$0         \$121.00           1/3/2023         1-Apr-23         \$3.55         \$3.17         \$41.75         \$52.05         \$0         \$121.00           1/3/2023         1-Jun-23         \$3.58         \$3.19         \$41.40         \$53.05         \$16,000         \$118.00           1/3/2023         1-Jul-23         \$3.83         \$3.42         \$49.35         \$76.45         \$16,000         \$118.00           1/3/2023         1-Aug-23         \$3.85         \$3.44         \$44.50         \$66.80         \$16,000         \$118.00           1/3/2023         1-Sep-23         \$3.81         \$3.41         \$38.30         \$56.30         \$16,000         \$116.00           1/3/2023         1-Nov-23         \$4.25         \$3.97         \$37.15         \$50.50         \$0         \$116.00           1/3/2023         1-Nov-23         \$4.25         \$3.97         \$37.15	COB Date	Curve Date	•	(\$/mmbtu)	(\$/MWh)	(\$/MWh)	(\$/ton)	(\$/ton)
1/3/2023         1-Feb-23         \$3.99         \$3.60         \$59.45         \$64.55         \$0         \$123.00           1/3/2023         1-Mar-23         \$3.64         \$3.19         \$48.00         \$53.90         \$0         \$121.00           1/3/2023         1-Apr-23         \$3.55         \$3.17         \$41.75         \$52.05         \$0         \$121.00           1/3/2023         1-Jun-23         \$3.71         \$3.33         \$42.00         \$58.95         \$16,000         \$118.00           1/3/2023         1-Jul-23         \$3.83         \$3.42         \$49.35         \$76.45         \$16,000         \$118.00           1/3/2023         1-Aug-23         \$3.85         \$3.44         \$44.50         \$67.80         \$16,000         \$118.00           1/3/2023         1-Sep-23         \$3.81         \$3.41         \$38.30         \$56.30         \$16,000         \$116.00           1/3/2023         1-Oct-23         \$3.87         \$3.47         \$36.80         \$50.05         \$0         \$116.00           1/3/2023         1-Dec-23         \$4.70         \$4.42         \$55.45         \$66.60         \$0         \$114.00           1/3/2023         1-Jan-24         \$4.95         \$4.70         \$77.30			•	• • •	• • •		*	•
1/3/2023         1-Mar-23         \$3.64         \$3.19         \$48.00         \$53.90         \$0         \$121.00           1/3/2023         1-Apr-23         \$3.55         \$3.17         \$41.75         \$52.05         \$0         \$121.00           1/3/2023         1-Im-23         \$3.58         \$3.19         \$41.40         \$53.05         \$16,000         \$118.00           1/3/2023         1-Jul-23         \$3.71         \$3.33         \$42.00         \$58.95         \$16,000         \$118.00           1/3/2023         1-Jul-23         \$3.83         \$3.42         \$49.35         \$76.45         \$16,000         \$118.00           1/3/2023         1-Aug-23         \$3.85         \$3.44         \$44.50         \$67.80         \$16,000         \$118.00           1/3/2023         1-Sep-23         \$3.81         \$3.41         \$38.30         \$56.30         \$16,000         \$116.00           1/3/2023         1-Oct-23         \$3.87         \$3.47         \$36.80         \$50.50         \$0         \$116.00           1/3/2023         1-Dec-23         \$4.70         \$4.42         \$55.45         \$65.60         \$0         \$114.00           1/3/2023         1-Jan-24         \$4.95         \$4.70         \$77.30			\$3.99	\$3.60	\$59.45	\$64.55	\$0	\$123.00
1/3/2023         1-May-23         \$3.58         \$3.19         \$41.40         \$53.05         \$16,000         \$121.00           1/3/2023         1-Jun-23         \$3.71         \$3.33         \$42.00         \$58.95         \$16,000         \$118.00           1/3/2023         1-Jul-23         \$3.83         \$3.42         \$49.35         \$76.45         \$16,000         \$118.00           1/3/2023         1-Aug-23         \$3.85         \$3.44         \$44.50         \$67.80         \$16,000         \$118.00           1/3/2023         1-Sep-23         \$3.81         \$3.41         \$38.30         \$56.30         \$16,000         \$116.00           1/3/2023         1-Oct-23         \$3.87         \$3.47         \$36.80         \$50.05         \$0         \$116.00           1/3/2023         1-Dec-23         \$4.70         \$4.42         \$55.45         \$65.60         \$0         \$114.00           1/3/2023         1-Dec-23         \$4.70         \$4.42         \$55.45         \$65.60         \$0         \$114.00           1/3/2023         1-Feb-24         \$4.79         \$4.50         \$71.15         \$79.70         \$0         \$114.00           1/3/2023         1-Mar-24         \$4.24         \$3.95         \$44.75 <td>1/3/2023</td> <td>1-Mar-23</td> <td>\$3.64</td> <td>\$3.19</td> <td>\$48.00</td> <td>\$53.90</td> <td>\$0</td> <td>\$121.00</td>	1/3/2023	1-Mar-23	\$3.64	\$3.19	\$48.00	\$53.90	\$0	\$121.00
1/3/2023         1-Jun-23         \$3.71         \$3.33         \$42.00         \$58.95         \$16,000         \$118.00           1/3/2023         1-Jul-23         \$3.83         \$3.42         \$49.35         \$76.45         \$16,000         \$118.00           1/3/2023         1-Aug-23         \$3.85         \$3.44         \$44.50         \$67.80         \$16,000         \$118.00           1/3/2023         1-Sep-23         \$3.81         \$3.41         \$38.30         \$56.30         \$16,000         \$116.00           1/3/2023         1-Oct-23         \$3.87         \$3.47         \$36.80         \$50.05         \$0         \$116.00           1/3/2023         1-Dec-23         \$4.25         \$3.97         \$37.15         \$50.50         \$0         \$116.00           1/3/2023         1-Dec-23         \$4.70         \$4.42         \$55.45         \$65.60         \$0         \$114.00           1/3/2023         1-Feb-24         \$4.79         \$4.50         \$71.15         \$79.70         \$0         \$114.00           1/3/2023         1-Mar-24         \$4.24         \$3.95         \$44.75         \$53.95         \$0         \$113.00           1/3/2023         1-Mar-24         \$3.66         \$3.40         \$36.05	1/3/2023	1-Apr-23	\$3.55	\$3.17	\$41.75	\$52.05	\$0	\$121.00
1/3/2023         1-Jul-23         \$3.83         \$3.42         \$49.35         \$76.45         \$16,000         \$118.00           1/3/2023         1-Aug-23         \$3.85         \$3.44         \$44.50         \$67.80         \$16,000         \$118.00           1/3/2023         1-Sep-23         \$3.81         \$3.41         \$38.30         \$56.30         \$16,000         \$116.00           1/3/2023         1-Oct-23         \$3.87         \$3.47         \$36.80         \$50.05         \$0         \$116.00           1/3/2023         1-Nov-23         \$4.25         \$3.97         \$37.15         \$50.50         \$0         \$116.00           1/3/2023         1-Dec-23         \$4.70         \$4.42         \$55.45         \$65.60         \$0         \$114.00           1/3/2023         1-Jan-24         \$4.95         \$4.70         \$77.30         \$86.45         \$0         \$114.00           1/3/2023         1-Feb-24         \$4.79         \$4.50         \$71.15         \$79.70         \$0         \$114.00           1/3/2023         1-Mar-24         \$4.24         \$3.95         \$44.75         \$53.95         \$0         \$113.00           1/3/2023         1-Jun-24         \$3.75         \$3.50         \$35.60	1/3/2023	1-May-23	\$3.58	\$3.19	\$41.40	\$53.05	\$16,000	\$121.00
1/3/2023         1-Aug-23         \$3.85         \$3.44         \$44.50         \$67.80         \$16,000         \$118.00           1/3/2023         1-Sep-23         \$3.81         \$3.41         \$38.30         \$56.30         \$16,000         \$116.00           1/3/2023         1-Oct-23         \$3.87         \$3.47         \$36.80         \$50.05         \$0         \$116.00           1/3/2023         1-Nov-23         \$4.25         \$3.97         \$37.15         \$50.50         \$0         \$116.00           1/3/2023         1-Dec-23         \$4.70         \$44.42         \$55.45         \$65.60         \$0         \$114.00           1/3/2023         1-Feb-24         \$4.95         \$4.70         \$77.30         \$86.45         \$0         \$114.00           1/3/2023         1-Feb-24         \$4.79         \$4.50         \$71.15         \$79.70         \$0         \$114.00           1/3/2023         1-Mar-24         \$4.24         \$3.95         \$44.75         \$53.95         \$0         \$113.00           1/3/2023         1-Jun-24         \$3.75         \$3.50         \$35.60         \$50.40         \$0         \$113.00           1/3/2023         1-Jun-24         \$3.85         \$3.59         \$42.55	1/3/2023	1-Jun-23	\$3.71	\$3.33	\$42.00	\$58.95	\$16,000	\$118.00
1/3/2023         1-Sep-23         \$3.81         \$3.41         \$38.30         \$56.30         \$16,000         \$116.00           1/3/2023         1-Oct-23         \$3.87         \$3.47         \$36.80         \$50.05         \$0         \$116.00           1/3/2023         1-Nov-23         \$4.25         \$3.97         \$37.15         \$50.50         \$0         \$116.00           1/3/2023         1-Dec-23         \$4.70         \$4.42         \$55.45         \$65.60         \$0         \$114.00           1/3/2023         1-Jan-24         \$4.95         \$4.70         \$77.30         \$86.45         \$0         \$114.00           1/3/2023         1-Feb-24         \$4.79         \$4.50         \$71.15         \$79.70         \$0         \$114.00           1/3/2023         1-Mar-24         \$4.24         \$3.95         \$44.75         \$53.95         \$0         \$113.00           1/3/2023         1-Apr-24         \$3.70         \$3.45         \$37.70         \$50.40         \$0         \$113.00           1/3/2023         1-Jun-24         \$3.66         \$3.40         \$36.05         \$50.95         \$16,000         \$111.00           1/3/2023         1-Jun-24         \$3.85         \$3.59         \$42.55         \$	1/3/2023	1-Jul-23	\$3.83	\$3.42	\$49.35	\$76.45	\$16,000	\$118.00
1/3/2023         1-Oct-23         \$3.87         \$3.47         \$36.80         \$50.05         \$0         \$116.00           1/3/2023         1-Nov-23         \$4.25         \$3.97         \$37.15         \$50.50         \$0         \$116.00           1/3/2023         1-Dec-23         \$4.70         \$4.42         \$55.45         \$65.60         \$0         \$114.00           1/3/2023         1-Jan-24         \$4.95         \$4.70         \$77.30         \$86.45         \$0         \$114.00           1/3/2023         1-Feb-24         \$4.79         \$4.50         \$71.15         \$79.70         \$0         \$114.00           1/3/2023         1-Mar-24         \$4.24         \$3.95         \$44.75         \$53.95         \$0         \$113.00           1/3/2023         1-Mar-24         \$3.66         \$3.40         \$36.05         \$50.95         \$16,000         \$113.00           1/3/2023         1-Jun-24         \$3.75         \$3.50         \$35.60         \$54.45         \$16,000         \$111.00           1/3/2023         1-Jul-24         \$3.85         \$3.59         \$42.55         \$69.60         \$16,000         \$111.00           1/3/2023         1-Jul-24         \$3.88         \$3.61         \$39.20	1/3/2023	1-Aug-23	\$3.85	\$3.44	\$44.50	\$67.80	\$16,000	\$118.00
1/3/2023         1-Nov-23         \$4.25         \$3.97         \$37.15         \$50.50         \$0         \$116.00           1/3/2023         1-Dec-23         \$4.70         \$4.42         \$55.45         \$65.60         \$0         \$114.00           1/3/2023         1-Jan-24         \$4.95         \$4.70         \$77.30         \$86.45         \$0         \$114.00           1/3/2023         1-Feb-24         \$4.79         \$4.50         \$71.15         \$79.70         \$0         \$114.00           1/3/2023         1-Mar-24         \$4.24         \$3.95         \$44.75         \$53.95         \$0         \$113.00           1/3/2023         1-Apr-24         \$3.70         \$3.45         \$37.70         \$50.40         \$0         \$113.00           1/3/2023         1-Apr-24         \$3.66         \$3.40         \$36.05         \$50.95         \$16,000         \$111.00           1/3/2023         1-Jun-24         \$3.75         \$3.50         \$35.60         \$54.45         \$16,000         \$111.00           1/3/2023         1-Jul-24         \$3.88         \$3.59         \$42.55         \$69.60         \$16,000         \$111.00           1/3/2023         1-Sep-24         \$3.84         \$3.58         \$32.50	1/3/2023	1-Sep-23	\$3.81	\$3.41	\$38.30	\$56.30	\$16,000	\$116.00
1/3/2023         1-Dec-23         \$4.70         \$4.42         \$55.45         \$65.60         \$0         \$114.00           1/3/2023         1-Jan-24         \$4.95         \$4.70         \$77.30         \$86.45         \$0         \$114.00           1/3/2023         1-Feb-24         \$4.79         \$4.50         \$71.15         \$79.70         \$0         \$114.00           1/3/2023         1-Mar-24         \$4.24         \$3.95         \$44.75         \$53.95         \$0         \$113.00           1/3/2023         1-Apr-24         \$3.70         \$3.45         \$37.70         \$50.40         \$0         \$113.00           1/3/2023         1-May-24         \$3.66         \$3.40         \$36.05         \$50.95         \$16,000         \$113.00           1/3/2023         1-Jun-24         \$3.75         \$3.50         \$35.60         \$54.45         \$16,000         \$111.00           1/3/2023         1-Ju-24         \$3.85         \$3.59         \$42.55         \$66.60         \$16,000         \$111.00           1/3/2023         1-Aug-24         \$3.88         \$3.61         \$39.20         \$64.80         \$16,000         \$111.00           1/3/2023         1-Sep-24         \$3.84         \$3.58         \$32.50	1/3/2023	1-Oct-23	\$3.87	\$3.47	\$36.80	\$50.05	\$0	\$116.00
1/3/2023         1-Jan-24         \$4.95         \$4.70         \$77.30         \$86.45         \$0         \$114.00           1/3/2023         1-Feb-24         \$4.79         \$4.50         \$71.15         \$79.70         \$0         \$114.00           1/3/2023         1-Mar-24         \$4.24         \$3.95         \$44.75         \$53.95         \$0         \$113.00           1/3/2023         1-Apr-24         \$3.70         \$3.45         \$37.70         \$50.40         \$0         \$113.00           1/3/2023         1-May-24         \$3.66         \$3.40         \$36.05         \$50.95         \$16,000         \$113.00           1/3/2023         1-Jun-24         \$3.75         \$3.50         \$35.60         \$54.45         \$16,000         \$111.00           1/3/2023         1-Jul-24         \$3.85         \$3.59         \$42.55         \$69.60         \$16,000         \$111.00           1/3/2023         1-Jul-24         \$3.88         \$3.61         \$39.20         \$64.80         \$16,000         \$111.00           1/3/2023         1-Sep-24         \$3.84         \$3.58         \$32.50         \$52.20         \$16,000         \$110.00           1/3/2023         1-Oct-24         \$3.93         \$3.67         \$33.85 <td>1/3/2023</td> <td>1-Nov-23</td> <td>\$4.25</td> <td>\$3.97</td> <td>\$37.15</td> <td>\$50.50</td> <td>\$0</td> <td>\$116.00</td>	1/3/2023	1-Nov-23	\$4.25	\$3.97	\$37.15	\$50.50	\$0	\$116.00
1/3/2023         1-Feb-24         \$4.79         \$4.50         \$71.15         \$79.70         \$0         \$114.00           1/3/2023         1-Mar-24         \$4.24         \$3.95         \$44.75         \$53.95         \$0         \$113.00           1/3/2023         1-Apr-24         \$3.70         \$3.45         \$37.70         \$50.40         \$0         \$113.00           1/3/2023         1-May-24         \$3.66         \$3.40         \$36.05         \$50.95         \$16,000         \$113.00           1/3/2023         1-Jun-24         \$3.75         \$3.50         \$35.60         \$54.45         \$16,000         \$111.00           1/3/2023         1-Jul-24         \$3.85         \$3.59         \$42.55         \$69.60         \$16,000         \$111.00           1/3/2023         1-Aug-24         \$3.88         \$3.61         \$39.20         \$64.80         \$16,000         \$111.00           1/3/2023         1-Sep-24         \$3.84         \$3.58         \$32.50         \$52.20         \$16,000         \$110.00           1/3/2023         1-Oct-24         \$3.93         \$3.67         \$33.85         \$46.60         \$0         \$110.00           1/3/2023         1-Dec-24         \$4.79         \$4.53         \$53.75 <td>1/3/2023</td> <td>1-Dec-23</td> <td>\$4.70</td> <td>\$4.42</td> <td>\$55.45</td> <td>\$65.60</td> <td>\$0</td> <td>\$114.00</td>	1/3/2023	1-Dec-23	\$4.70	\$4.42	\$55.45	\$65.60	\$0	\$114.00
1/3/2023         1-Mar-24         \$4.24         \$3.95         \$44.75         \$53.95         \$0         \$113.00           1/3/2023         1-Apr-24         \$3.70         \$3.45         \$37.70         \$50.40         \$0         \$113.00           1/3/2023         1-Jun-24         \$3.66         \$3.40         \$36.05         \$50.95         \$16,000         \$111.00           1/3/2023         1-Jun-24         \$3.75         \$3.50         \$35.60         \$54.45         \$16,000         \$111.00           1/3/2023         1-Jul-24         \$3.85         \$3.59         \$42.55         \$69.60         \$16,000         \$111.00           1/3/2023         1-Aug-24         \$3.88         \$3.61         \$39.20         \$64.80         \$16,000         \$111.00           1/3/2023         1-Sep-24         \$3.84         \$3.58         \$32.50         \$52.20         \$16,000         \$110.00           1/3/2023         1-Oct-24         \$3.93         \$3.67         \$33.85         \$46.60         \$0         \$110.00           1/3/2023         1-Dec-24         \$4.29         \$4.03         \$36.55         \$48.60         \$0         \$102.00           1/3/2023         1-Jan-25         \$5.09         \$4.82         \$74.60 <td>1/3/2023</td> <td>1-Jan-24</td> <td>\$4.95</td> <td>\$4.70</td> <td>\$77.30</td> <td>\$86.45</td> <td>\$0</td> <td>\$114.00</td>	1/3/2023	1-Jan-24	\$4.95	\$4.70	\$77.30	\$86.45	\$0	\$114.00
1/3/2023         1-Apr-24         \$3.70         \$3.45         \$37.70         \$50.40         \$0         \$113.00           1/3/2023         1-May-24         \$3.66         \$3.40         \$36.05         \$50.95         \$16,000         \$113.00           1/3/2023         1-Jun-24         \$3.75         \$3.50         \$35.60         \$54.45         \$16,000         \$111.00           1/3/2023         1-Jul-24         \$3.85         \$3.59         \$42.55         \$69.60         \$16,000         \$111.00           1/3/2023         1-Aug-24         \$3.88         \$3.61         \$39.20         \$64.80         \$16,000         \$111.00           1/3/2023         1-Sep-24         \$3.84         \$3.58         \$32.50         \$52.20         \$16,000         \$110.00           1/3/2023         1-Oct-24         \$3.93         \$3.67         \$33.85         \$46.60         \$0         \$110.00           1/3/2023         1-Nov-24         \$4.29         \$4.03         \$36.55         \$48.60         \$0         \$110.00           1/3/2023         1-Jan-25         \$5.09         \$4.82         \$74.60         \$84.60         \$0         \$102.00           1/3/2023         1-Feb-25         \$4.89         \$4.63         \$69.95 <td>1/3/2023</td> <td>1-Feb-24</td> <td>\$4.79</td> <td>\$4.50</td> <td>\$71.15</td> <td>\$79.70</td> <td>\$0</td> <td>\$114.00</td>	1/3/2023	1-Feb-24	\$4.79	\$4.50	\$71.15	\$79.70	\$0	\$114.00
1/3/2023         1-May-24         \$3.66         \$3.40         \$36.05         \$50.95         \$16,000         \$113.00           1/3/2023         1-Jun-24         \$3.75         \$3.50         \$35.60         \$54.45         \$16,000         \$111.00           1/3/2023         1-Jul-24         \$3.85         \$3.59         \$42.55         \$69.60         \$16,000         \$111.00           1/3/2023         1-Aug-24         \$3.88         \$3.61         \$39.20         \$64.80         \$16,000         \$111.00           1/3/2023         1-Sep-24         \$3.84         \$3.58         \$32.50         \$52.20         \$16,000         \$110.00           1/3/2023         1-Oct-24         \$3.93         \$3.67         \$33.85         \$46.60         \$0         \$110.00           1/3/2023         1-Nov-24         \$4.29         \$4.03         \$36.55         \$48.60         \$0         \$110.00           1/3/2023         1-Dec-24         \$4.79         \$4.53         \$53.75         \$65.10         \$0         \$102.00           1/3/2023         1-Jan-25         \$5.09         \$4.82         \$74.60         \$84.60         \$0         \$102.00           1/3/2023         1-Feb-25         \$4.89         \$4.63         \$69.95 <td>1/3/2023</td> <td>1-Mar-24</td> <td>\$4.24</td> <td>\$3.95</td> <td>\$44.75</td> <td>\$53.95</td> <td>\$0</td> <td>\$113.00</td>	1/3/2023	1-Mar-24	\$4.24	\$3.95	\$44.75	\$53.95	\$0	\$113.00
1/3/2023       1-Jun-24       \$3.75       \$3.50       \$35.60       \$54.45       \$16,000       \$111.00         1/3/2023       1-Jul-24       \$3.85       \$3.59       \$42.55       \$69.60       \$16,000       \$111.00         1/3/2023       1-Aug-24       \$3.88       \$3.61       \$39.20       \$64.80       \$16,000       \$111.00         1/3/2023       1-Sep-24       \$3.84       \$3.58       \$32.50       \$52.20       \$16,000       \$110.00         1/3/2023       1-Oct-24       \$3.93       \$3.67       \$33.85       \$46.60       \$0       \$110.00         1/3/2023       1-Nov-24       \$4.29       \$4.03       \$36.55       \$48.60       \$0       \$110.00         1/3/2023       1-Dec-24       \$4.79       \$4.53       \$53.75       \$65.10       \$0       \$102.00         1/3/2023       1-Jan-25       \$5.09       \$4.82       \$74.60       \$84.60       \$0       \$102.00         1/3/2023       1-Feb-25       \$4.89       \$4.63       \$69.95       \$79.60       \$0       \$102.00         1/3/2023       1-Apr-25       \$3.87       \$3.61       \$37.55       \$50.40       \$0       \$102.00         1/3/2023       1-May-25       \$3.83 </td <td>1/3/2023</td> <td>1-Apr-24</td> <td>\$3.70</td> <td>\$3.45</td> <td>\$37.70</td> <td>\$50.40</td> <td>\$0</td> <td>\$113.00</td>	1/3/2023	1-Apr-24	\$3.70	\$3.45	\$37.70	\$50.40	\$0	\$113.00
1/3/2023       1-Jul-24       \$3.85       \$3.59       \$42.55       \$69.60       \$16,000       \$111.00         1/3/2023       1-Aug-24       \$3.88       \$3.61       \$39.20       \$64.80       \$16,000       \$111.00         1/3/2023       1-Sep-24       \$3.84       \$3.58       \$32.50       \$52.20       \$16,000       \$110.00         1/3/2023       1-Oct-24       \$3.93       \$3.67       \$33.85       \$46.60       \$0       \$110.00         1/3/2023       1-Nov-24       \$4.29       \$4.03       \$36.55       \$48.60       \$0       \$110.00         1/3/2023       1-Dec-24       \$4.79       \$4.53       \$53.75       \$65.10       \$0       \$102.00         1/3/2023       1-Jan-25       \$5.09       \$4.82       \$74.60       \$84.60       \$0       \$102.00         1/3/2023       1-Feb-25       \$4.89       \$4.63       \$69.95       \$79.60       \$0       \$102.00         1/3/2023       1-Mar-25       \$4.46       \$4.19       \$39.70       \$53.25       \$0       \$102.00         1/3/2023       1-Jun-25       \$3.87       \$3.61       \$37.55       \$50.40       \$0       \$102.00         1/3/2023       1-Jun-25       \$3.93	1/3/2023	1-May-24	\$3.66	\$3.40	\$36.05	\$50.95	\$16,000	\$113.00
1/3/2023       1-Aug-24       \$3.88       \$3.61       \$39.20       \$64.80       \$16,000       \$111.00         1/3/2023       1-Sep-24       \$3.84       \$3.58       \$32.50       \$52.20       \$16,000       \$110.00         1/3/2023       1-Oct-24       \$3.93       \$3.67       \$33.85       \$46.60       \$0       \$110.00         1/3/2023       1-Nov-24       \$4.29       \$4.03       \$36.55       \$48.60       \$0       \$110.00         1/3/2023       1-Dec-24       \$4.79       \$4.53       \$53.75       \$65.10       \$0       \$102.00         1/3/2023       1-Jan-25       \$5.09       \$4.82       \$74.60       \$84.60       \$0       \$102.00         1/3/2023       1-Feb-25       \$4.89       \$4.63       \$69.95       \$79.60       \$0       \$102.00         1/3/2023       1-Mar-25       \$4.46       \$4.19       \$39.70       \$53.25       \$0       \$102.00         1/3/2023       1-Apr-25       \$3.87       \$3.61       \$37.55       \$50.40       \$0       \$102.00         1/3/2023       1-Jun-25       \$3.83       \$3.57       \$35.85       \$51.00       \$16,000       \$102.00         1/3/2023       1-Jun-25       \$4.01	1/3/2023	1-Jun-24	\$3.75	\$3.50	\$35.60	\$54.45	\$16,000	\$111.00
1/3/2023       1-Sep-24       \$3.84       \$3.58       \$32.50       \$52.20       \$16,000       \$110.00         1/3/2023       1-Oct-24       \$3.93       \$3.67       \$33.85       \$46.60       \$0       \$110.00         1/3/2023       1-Nov-24       \$4.29       \$4.03       \$36.55       \$48.60       \$0       \$110.00         1/3/2023       1-Dec-24       \$4.79       \$4.53       \$53.75       \$65.10       \$0       \$102.00         1/3/2023       1-Jan-25       \$5.09       \$4.82       \$74.60       \$84.60       \$0       \$102.00         1/3/2023       1-Feb-25       \$4.89       \$4.63       \$69.95       \$79.60       \$0       \$102.00         1/3/2023       1-Mar-25       \$4.46       \$4.19       \$39.70       \$53.25       \$0       \$102.00         1/3/2023       1-Apr-25       \$3.87       \$3.61       \$37.55       \$50.40       \$0       \$102.00         1/3/2023       1-Jun-25       \$3.83       \$3.57       \$35.85       \$51.00       \$16,000       \$102.00         1/3/2023       1-Jun-25       \$3.93       \$3.66       \$34.95       \$53.45       \$16,000       \$102.00         1/3/2023       1-Aug-25       \$4.01	1/3/2023	1-Jul-24	\$3.85	\$3.59	\$42.55	\$69.60	\$16,000	\$111.00
1/3/2023       1-Oct-24       \$3.93       \$3.67       \$33.85       \$46.60       \$0       \$110.00         1/3/2023       1-Nov-24       \$4.29       \$4.03       \$36.55       \$48.60       \$0       \$110.00         1/3/2023       1-Dec-24       \$4.79       \$4.53       \$53.75       \$65.10       \$0       \$102.00         1/3/2023       1-Jan-25       \$5.09       \$4.82       \$74.60       \$84.60       \$0       \$102.00         1/3/2023       1-Feb-25       \$4.89       \$4.63       \$69.95       \$79.60       \$0       \$102.00         1/3/2023       1-Mar-25       \$4.46       \$4.19       \$39.70       \$53.25       \$0       \$102.00         1/3/2023       1-Apr-25       \$3.87       \$3.61       \$37.55       \$50.40       \$0       \$102.00         1/3/2023       1-Jun-25       \$3.83       \$3.57       \$35.85       \$51.00       \$16,000       \$102.00         1/3/2023       1-Jun-25       \$3.93       \$3.66       \$34.95       \$53.45       \$16,000       \$102.00         1/3/2023       1-Jul-25       \$4.01       \$3.75       \$42.50       \$67.65       \$16,000       \$102.00         1/3/2023       1-Sep-25       \$4.05	1/3/2023	1-Aug-24	\$3.88	\$3.61	\$39.20	\$64.80	\$16,000	\$111.00
1/3/2023       1-Nov-24       \$4.29       \$4.03       \$36.55       \$48.60       \$0       \$110.00         1/3/2023       1-Dec-24       \$4.79       \$4.53       \$53.75       \$65.10       \$0       \$102.00         1/3/2023       1-Jan-25       \$5.09       \$4.82       \$74.60       \$84.60       \$0       \$102.00         1/3/2023       1-Feb-25       \$4.89       \$4.63       \$69.95       \$79.60       \$0       \$102.00         1/3/2023       1-Mar-25       \$4.46       \$4.19       \$39.70       \$53.25       \$0       \$102.00         1/3/2023       1-Apr-25       \$3.87       \$3.61       \$37.55       \$50.40       \$0       \$102.00         1/3/2023       1-May-25       \$3.83       \$3.57       \$35.85       \$51.00       \$16,000       \$102.00         1/3/2023       1-Jun-25       \$3.93       \$3.66       \$34.95       \$53.45       \$16,000       \$102.00         1/3/2023       1-Jul-25       \$4.01       \$3.75       \$42.50       \$67.65       \$16,000       \$102.00         1/3/2023       1-Aug-25       \$4.05       \$3.79       \$38.75       \$64.20       \$16,000       \$102.00         1/3/2023       1-Sep-25       \$4.05 </td <td>1/3/2023</td> <td>1-Sep-24</td> <td>\$3.84</td> <td>\$3.58</td> <td>\$32.50</td> <td>\$52.20</td> <td>\$16,000</td> <td>\$110.00</td>	1/3/2023	1-Sep-24	\$3.84	\$3.58	\$32.50	\$52.20	\$16,000	\$110.00
1/3/2023       1-Dec-24       \$4.79       \$4.53       \$53.75       \$65.10       \$0       \$102.00         1/3/2023       1-Jan-25       \$5.09       \$4.82       \$74.60       \$84.60       \$0       \$102.00         1/3/2023       1-Feb-25       \$4.89       \$4.63       \$69.95       \$79.60       \$0       \$102.00         1/3/2023       1-Mar-25       \$4.46       \$4.19       \$39.70       \$53.25       \$0       \$102.00         1/3/2023       1-Apr-25       \$3.87       \$3.61       \$37.55       \$50.40       \$0       \$102.00         1/3/2023       1-May-25       \$3.83       \$3.57       \$35.85       \$51.00       \$16,000       \$102.00         1/3/2023       1-Jun-25       \$3.93       \$3.66       \$34.95       \$53.45       \$16,000       \$102.00         1/3/2023       1-Jul-25       \$4.01       \$3.75       \$42.50       \$67.65       \$16,000       \$102.00         1/3/2023       1-Aug-25       \$4.05       \$3.79       \$38.75       \$64.20       \$16,000       \$102.00         1/3/2023       1-Sep-25       \$4.05       \$3.78       \$33.25       \$51.65       \$16,000       \$102.00	1/3/2023	1-Oct-24	\$3.93	\$3.67	\$33.85	\$46.60	\$0	\$110.00
1/3/2023       1-Jan-25       \$5.09       \$4.82       \$74.60       \$84.60       \$0       \$102.00         1/3/2023       1-Feb-25       \$4.89       \$4.63       \$69.95       \$79.60       \$0       \$102.00         1/3/2023       1-Mar-25       \$4.46       \$4.19       \$39.70       \$53.25       \$0       \$102.00         1/3/2023       1-Apr-25       \$3.87       \$3.61       \$37.55       \$50.40       \$0       \$102.00         1/3/2023       1-May-25       \$3.83       \$3.57       \$35.85       \$51.00       \$16,000       \$102.00         1/3/2023       1-Jun-25       \$3.93       \$3.66       \$34.95       \$53.45       \$16,000       \$102.00         1/3/2023       1-Jul-25       \$4.01       \$3.75       \$42.50       \$67.65       \$16,000       \$102.00         1/3/2023       1-Aug-25       \$4.05       \$3.79       \$38.75       \$64.20       \$16,000       \$102.00         1/3/2023       1-Sep-25       \$4.05       \$3.78       \$33.25       \$51.65       \$16,000       \$102.00	1/3/2023	1-Nov-24	\$4.29	\$4.03	\$36.55	\$48.60	\$0	\$110.00
1/3/2023       1-Feb-25       \$4.89       \$4.63       \$69.95       \$79.60       \$0       \$102.00         1/3/2023       1-Mar-25       \$4.46       \$4.19       \$39.70       \$53.25       \$0       \$102.00         1/3/2023       1-Apr-25       \$3.87       \$3.61       \$37.55       \$50.40       \$0       \$102.00         1/3/2023       1-May-25       \$3.83       \$3.57       \$35.85       \$51.00       \$16,000       \$102.00         1/3/2023       1-Jun-25       \$3.93       \$3.66       \$34.95       \$53.45       \$16,000       \$102.00         1/3/2023       1-Jul-25       \$4.01       \$3.75       \$42.50       \$67.65       \$16,000       \$102.00         1/3/2023       1-Aug-25       \$4.05       \$3.79       \$38.75       \$64.20       \$16,000       \$102.00         1/3/2023       1-Sep-25       \$4.05       \$3.78       \$33.25       \$51.65       \$16,000       \$102.00	1/3/2023	1-Dec-24	\$4.79	\$4.53	\$53.75	\$65.10	\$0	\$102.00
1/3/2023       1-Mar-25       \$4.46       \$4.19       \$39.70       \$53.25       \$0       \$102.00         1/3/2023       1-Apr-25       \$3.87       \$3.61       \$37.55       \$50.40       \$0       \$102.00         1/3/2023       1-May-25       \$3.83       \$3.57       \$35.85       \$51.00       \$16,000       \$102.00         1/3/2023       1-Jun-25       \$3.93       \$3.66       \$34.95       \$53.45       \$16,000       \$102.00         1/3/2023       1-Jul-25       \$4.01       \$3.75       \$42.50       \$67.65       \$16,000       \$102.00         1/3/2023       1-Aug-25       \$4.05       \$3.79       \$38.75       \$64.20       \$16,000       \$102.00         1/3/2023       1-Sep-25       \$4.05       \$3.78       \$33.25       \$51.65       \$16,000       \$102.00	1/3/2023	1-Jan-25	\$5.09	\$4.82	\$74.60	\$84.60	\$0	\$102.00
1/3/2023       1-Apr-25       \$3.87       \$3.61       \$37.55       \$50.40       \$0       \$102.00         1/3/2023       1-May-25       \$3.83       \$3.57       \$35.85       \$51.00       \$16,000       \$102.00         1/3/2023       1-Jun-25       \$3.93       \$3.66       \$34.95       \$53.45       \$16,000       \$102.00         1/3/2023       1-Jul-25       \$4.01       \$3.75       \$42.50       \$67.65       \$16,000       \$102.00         1/3/2023       1-Aug-25       \$4.05       \$3.79       \$38.75       \$64.20       \$16,000       \$102.00         1/3/2023       1-Sep-25       \$4.05       \$3.78       \$33.25       \$51.65       \$16,000       \$102.00	1/3/2023	1-Feb-25	\$4.89	\$4.63	\$69.95	\$79.60	•	\$102.00
1/3/2023       1-May-25       \$3.83       \$3.57       \$35.85       \$51.00       \$16,000       \$102.00         1/3/2023       1-Jun-25       \$3.93       \$3.66       \$34.95       \$53.45       \$16,000       \$102.00         1/3/2023       1-Jul-25       \$4.01       \$3.75       \$42.50       \$67.65       \$16,000       \$102.00         1/3/2023       1-Aug-25       \$4.05       \$3.79       \$38.75       \$64.20       \$16,000       \$102.00         1/3/2023       1-Sep-25       \$4.05       \$3.78       \$33.25       \$51.65       \$16,000       \$102.00			\$4.46	\$4.19	\$39.70	\$53.25	•	\$102.00
1/3/2023       1-Jun-25       \$3.93       \$3.66       \$34.95       \$53.45       \$16,000       \$102.00         1/3/2023       1-Jul-25       \$4.01       \$3.75       \$42.50       \$67.65       \$16,000       \$102.00         1/3/2023       1-Aug-25       \$4.05       \$3.79       \$38.75       \$64.20       \$16,000       \$102.00         1/3/2023       1-Sep-25       \$4.05       \$3.78       \$33.25       \$51.65       \$16,000       \$102.00	1/3/2023	1-Apr-25	\$3.87	\$3.61	\$37.55	\$50.40	\$0	\$102.00
1/3/2023       1-Jul-25       \$4.01       \$3.75       \$42.50       \$67.65       \$16,000       \$102.00         1/3/2023       1-Aug-25       \$4.05       \$3.79       \$38.75       \$64.20       \$16,000       \$102.00         1/3/2023       1-Sep-25       \$4.05       \$3.78       \$33.25       \$51.65       \$16,000       \$102.00	1/3/2023	1-May-25	\$3.83	\$3.57	\$35.85	\$51.00	\$16,000	\$102.00
1/3/2023       1-Aug-25       \$4.05       \$3.79       \$38.75       \$64.20       \$16,000       \$102.00         1/3/2023       1-Sep-25       \$4.05       \$3.78       \$33.25       \$51.65       \$16,000       \$102.00	1/3/2023	1-Jun-25	\$3.93	\$3.66	\$34.95	\$53.45	\$16,000	\$102.00
1/3/2023 1-Sep-25 \$4.05 \$3.78 \$33.25 \$51.65 \$16,000 \$102.00	1/3/2023	1-Jul-25	\$4.01	\$3.75	\$42.50	\$67.65	\$16,000	\$102.00
	1/3/2023	1-Aug-25	\$4.05	\$3.79	\$38.75	\$64.20	\$16,000	\$102.00
1/3/2023 1-Oct-25 \$4.15 \$3.88 \$35.65 \$47.50 \$0 \$102.00	1/3/2023	1-Sep-25	\$4.05	\$3.78	\$33.25	\$51.65	\$16,000	\$102.00
		1-Oct-25	•	•			•	
1/3/2023 1-Nov-25 \$4.47 \$4.21 \$36.40 \$49.40 \$0 \$102.00	1/3/2023	1-Nov-25	\$4.47	\$4.21	\$36.40	\$49.40		\$102.00
1/3/2023 1-Dec-25 \$4.91 \$4.65 \$50.10 \$61.55 \$0 \$101.00	1/3/2023	1-Dec-25	\$4.91	\$4.65	\$50.10	\$61.55	\$0	\$101.00

### 1/3/2023

						Seasonal NOx	
				AD Hub Off-	AD Hub On-	Allowance	
		Henry Hub	Tetco M1	Peak	Peak	Group 3	NAPP Coal
COB Date	Curve Date	(\$/mmbtu)	(\$/mmbtu)	(\$/MWh)	(\$/MWh)	(\$/ton)	(\$/ton)
1/3/2023	1-Jan-26	\$5.22	\$4.95	\$69.30	\$83.75	\$0	\$101.00
1/3/2023	1-Feb-26	\$5.02	\$4.75	\$64.85	\$78.65	\$0	\$101.00
1/3/2023	1-Mar-26	\$4.62	\$4.35	\$45.30	\$54.15	\$0	\$101.00
1/3/2023	1-Apr-26	\$3.99	\$3.73	\$39.35	\$51.35	\$0	\$101.00
1/3/2023	1-May-26	\$3.94	\$3.68	\$35.60	\$51.50	\$16,000	\$101.00
1/3/2023	1-Jun-26	\$4.02	\$3.76	\$35.20	\$51.25	\$16,000	\$101.00
1/3/2023	1-Jul-26	\$4.10	\$3.84	\$39.70	\$66.40	\$16,000	\$101.00
1/3/2023	1-Aug-26	\$4.13	\$3.87	\$36.50	\$62.10	\$16,000	\$101.00
1/3/2023	1-Sep-26	\$4.12	\$3.86	\$35.55	\$52.55	\$16,000	\$101.00
1/3/2023	1-Oct-26	\$4.22	\$3.96	\$35.75	\$50.55	\$0	\$101.00
1/3/2023	1-Nov-26	\$4.55	\$4.28	\$37.35	\$50.45	\$0	\$101.00
1/3/2023	1-Dec-26	\$4.99	\$4.72	\$42.35	\$54.00	\$0	\$104.60
1/3/2023	1-Jan-27	\$5.25	\$4.98	\$61.15	\$80.00	\$0	\$104.60
1/3/2023	1-Feb-27	\$5.03	\$4.76	\$55.85	\$73.65	\$0	\$104.60
1/3/2023	1-Mar-27	\$4.63	\$4.37	\$46.25	\$57.00	\$0	\$104.60
1/3/2023	1-Apr-27	\$4.02	\$3.75	\$41.05	\$51.75	\$0	\$104.60
1/3/2023	1-May-27	\$3.99	\$3.73	\$36.65	\$51.55	\$16,000	\$104.60
1/3/2023	1-Jun-27	\$4.07	\$3.81	\$36.15	\$50.65	\$16,000	\$104.60
1/3/2023	1-Jul-27	\$4.15	\$3.89	\$41.35	\$63.60	\$16,000	\$104.60
1/3/2023	1-Aug-27	\$4.19	\$3.92	\$37.45	\$59.10	\$16,000	\$104.60
1/3/2023	1-Sep-27	\$4.19	\$3.92	\$36.50	\$53.00	\$16,000	\$104.60
1/3/2023	1-Oct-27	\$4.27	\$4.01	\$36.85	\$51.35	\$0	\$104.60
1/3/2023	1-Nov-27	\$4.60	\$4.34	\$38.20	\$51.95	\$0	\$104.60
1/3/2023	1-Dec-27	\$5.03	\$4.77	\$43.35	\$55.95	\$0	\$108.33

# East Bend PJM Energy Revenues: 2017 - 2022

Risk Year: 2017 Day-Ahead Energy Revenues Real-Time Energy Charges/Credits Total	Total	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	\$123,192,725	\$12,458,205	\$8,780,947	\$12,897,393	\$10,957,142	\$7,519,237	\$10,108,862	\$8,144,501	\$11,042,144	\$11,225,615	\$10,377,363	\$9,749,505	\$9,931,811
	-\$1,943,867	-\$136,637	-\$347,762	-\$141,016	-\$279,353	-\$81,787	\$148,663	-\$13,481	-\$170,076	-\$752,594	\$28,645	-\$103,081	-\$95,388
	<b>\$121,248,858</b>	<b>\$12,321,568</b>	<b>\$8,433,186</b>	<b>\$12,756,377</b>	<b>\$10,677,789</b>	<b>\$7,437,450</b>	<b>\$10,257,526</b>	<b>\$8,131,019</b>	<b>\$10,872,067</b>	<b>\$10,473,021</b>	<b>\$10,406,008</b>	<b>\$9,646,424</b>	<b>\$9,836,423</b>
Risk Year: 2018 Day-Ahead Energy Revenues Real-Time Energy Charges(Credits Total	Total	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	\$91,627,292	\$15,208,216	\$7,636,604	\$526,291	\$0	\$0	\$3,807,464	\$10,601,413	\$10,676,735	\$9,298,440	\$12,086,442	\$10,567,504	\$11,218,183
	-\$2,259,167	\$389,721	-\$749,836	-\$110,643	-\$138,364	-\$154,870	\$318,093	\$98,521	-\$982,306	\$147,326	-\$1,184,326	\$154,805	-\$47,288
	\$89,368,125	<b>\$15,597,937</b>	<b>\$6,886,768</b>	<b>\$415,648</b>	<b>-\$138,364</b>	<b>-\$154,870</b>	<b>\$4,125,557</b>	<b>\$10,699,934</b>	<b>\$9,694,429</b>	<b>\$9,445,766</b>	<b>\$10,902,116</b>	<b>\$10,722,309</b>	<b>\$11,170,895</b>
Risk Year: 2019 Day-Ahead Energy Revenues Real-Time Energy Charges/Credits Total	Total	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	\$84,551,936	\$11,021,778	\$8,259,287	\$11,532,002	\$0	\$7,470,660	\$8,273,577	\$9,485,913	\$8,846,569	\$9,782,657	\$881,564	\$782,600	\$8,215,330
	-\$3,787,305	\$17,911	-\$119,809	-\$637,583	-\$121,159	-\$67,274	-\$502,846	\$222,521	-\$254,517	-\$234,932	-\$2,085,736	-\$32,895	\$29,013
	<b>\$80,764,631</b>	<b>\$11,039,688</b>	\$8,139,479	<b>\$10,894,418</b>	- <b>\$121,159</b>	<b>\$7,403,387</b>	<b>\$7,770,731</b>	<b>\$9,708,434</b>	<b>\$8,592,052</b>	<b>\$9,547,725</b>	- <b>\$1,204,172</b>	<b>\$749,705</b>	<b>\$8,244,343</b>
Risk Year: 2020 Day-Ahead Energy Revenues Real-Time Energy Charges/Credits Total	Total	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	\$51,523,597	\$6,118,956	\$3,121,380	\$4,466,436	\$0	\$0	\$5,534,692	\$8,824,425	\$8,779,183	\$3,757,155	\$0	\$1,180,232	\$9,741,137
	-\$309,230	-\$411,397	-\$167,780	-\$257,203	-\$83,102	-\$83,299	\$145,355	\$194,917	\$202,850	\$256,936	-\$88,417	-\$205,176	\$187,087
	<b>\$51,214,368</b>	<b>\$5,707,559</b>	<b>\$2,953,600</b>	<b>\$4,209,234</b>	<b>-\$83,102</b>	<b>-\$83,299</b>	<b>\$5,680,047</b>	<b>\$9,019,342</b>	<b>\$8,982,033</b>	<b>\$4,014,091</b>	<b>-\$88,417</b>	<b>\$975,057</b>	<b>\$9,928,224</b>
Risk Year: 2021 Day-Ahead Energy Revenues Real-Time Energy Charges/Credits Total	Total	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	\$86,784,800	\$7,373,980	\$15,892,144	\$7,517,751	\$6,665,158	\$7,911,542	\$12,219,616	\$12,974,776	\$14,017,830	\$1,775,308	\$0	\$0	\$436,695
	-\$3,293,119	-\$357,690	-\$57,706	-\$1,430,244	\$46,101	\$132,351	-\$158,382	-\$478,456	-\$1,032,825	\$371,317	-\$184,201	-\$310,421	\$167,037
	<b>\$83,491,681</b>	<b>\$7,016,290</b>	<b>\$15,834,437</b>	<b>\$6,087,507</b>	<b>\$6,711,259</b>	<b>\$8,043,893</b>	<b>\$12,061,234</b>	<b>\$12,496,320</b>	<b>\$12,985,005</b>	<b>\$2,146,625</b>	- <b>\$184,201</b>	<b>-\$310,421</b>	<b>\$603,732</b>
Risk Year: 2022 Day-Ahead Energy Revenues Real-Time Energy Charges/Credits Total	Total	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	\$217,327,392	\$20,291,962	\$12,852,840	\$13,809,649	\$14,698,978	\$22,781,780	\$31,666,622	\$29,320,893	\$14,138,353	\$15,160,825	\$0	\$13,973,337	\$28,632,154
	-\$13,547,831	-\$321,008	-\$463,800	-\$639,875	-\$2,904,378	-\$1,475,064	\$280,133	-\$2,388,689	-\$2,577,703	-\$629,096	-\$243,824	-\$717,506	-\$1,467,021
	<b>\$203,779,560</b>	<b>\$19,970,954</b>	\$12,389,040	\$13,169,774	<b>\$11,794,600</b>	<b>\$21,306,716</b>	<b>\$31,946,755</b>	\$26,932,204	\$11,560,649	\$14,531,729	- <b>\$243,824</b>	\$13,255,831	<b>\$27,165,133</b>
Risk Year: 2017-2022  Day-Ahead Energy Revenues  Real-Time Energy Charges/Credits  Total	Total	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	\$655,007,742	\$72,473,097	\$56,543,202	\$50,749,521	\$32,321,278	\$45,683,219	\$71,610,833	\$79,351,921	\$67,500,814	\$51,000,001	\$23,345,369	\$36,253,179	\$68,175,310
	-\$25,140,520	-\$819,101	-\$1,906,693	-\$3,216,563	-\$3,480,256	-\$1,729,943	\$231,017	-\$2,364,667	-\$4,814,578	-\$841,044	-\$3,757,859	-\$1,214,274	-\$1,226,560
	\$629,867,222	\$71,653,996	\$54,636,510	\$47,532,958	\$28,841,022	<b>\$43,953,276</b>	\$71,841,850	\$76,987,254	\$62,686,236	\$50,158,957	\$19,587,510	\$35,038,904	\$66,948,749

Source: CXL

Duke Energy Kentucky Case No. 2022-00372 SIERRA CLUB First Set Data Requests

Date Received: January 10, 2023

CONFIDENTIAL SIERRA-DR-01-015 (incorrectly labeled as 1.12)

**REQUEST:** 

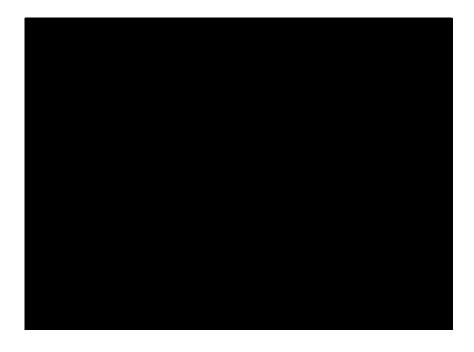
Provide total projected energy and ancillary service market revenues for East Bend, for the period 2023–2035.

**RESPONSE:** 

**CONFIDENTIAL PROPRIETARY TRADE SECRET** 

Objection. This request seeks to elicit information that is irrelevant. Without waiving said objection, to the extent discoverable, and in the spirit of discovery:

Below are the energy revenues for East Bend for energy sales in the No Carbon Regulation scenario. Modeling for the 2021 IRP did not include separate Ancillary Services revenues.



PERSON RESPONSIBLE:

As to objection, Legal As to response, Scott Park

**SIERRA CLUB First Set Data Requests** 

Date Received: January 10, 2023

**SIERRA-DR-01-016** 

(incorrectly labeled as 1.13)

**REQUEST:** 

Has Duke conducted any analysis of the potential costs and timing for such costs at East

Bend to comply with EPA's proposed Good Neighbor Plan, 87 Fed. Reg. 20,036 (Apr. 6,

2022)? If so, please provide all documents reflecting such analyses. If not, why not?

**RESPONSE:** 

Duke Energy Kentucky has reviewed the proposal which would result in a change to the

number of ozone season NOx allowances allocated to East Bend Station starting with the

effective date of the final rule. EPA proposed other potential changes to its trading rule as

well. Based on the proposal and using its existing Selective Catalytic Reduction (SCR)

NOx controls, East Bend should be able to comply with the final rule without addition

upgrades.

PERSON RESPONSIBLE:

J. Michael Geers

**SIERRA CLUB First Set Data Requests** 

Date Received: January 10, 2023

**SIERRA-DR-01-017** 

(incorrectly labeled as 1.14)

**REQUEST:** 

Confirm that Kentucky is part of the Group 3 Trading Program under EPA's Update to the

Cross-State Air Pollution Rule. If not confirmed, please explain which Trading Group to

which Kentucky belongs.

**RESPONSE:** 

Under EPA's 2021 Update to the Cross-State Air Pollution Rule, impacted Electric

Generating Units in the State of Kentucky are part of the Group 3 Trading Program.

PERSON RESPONSIBLE:

J. Michael Geers

**SIERRA CLUB First Set Data Requests** 

Date Received: January 10, 2023

**SIERRA-DR-01-018** 

(incorrectly labeled as 1.15)

**REQUEST:** 

Please provide the total number of NOx credit purchases under CSAPR and cost by year

for East Bend from 2017 to present.

**RESPONSE:** 

Objection. This request seeks to elicit information that is irrelevant. Without waiving said

objection, to the extent discoverable, and in the spirit of discovery, Duke Energy Kentucky

did not need to purchase any ozone season or annual NOx allowances for compliance.

PERSON RESPONSIBLE:

As to objection, Legal

As to response, J. Michael Geers

**SIERRA CLUB First Set Data Requests** 

Date Received: January 10, 2023

**SIERRA-DR-01-019** 

(incorrectly labeled as 1.16)

**REQUEST:** 

Does Duke have a forecast for NOx credit costs under CSAPR or EPA's proposed Good

Neighbor Plan, 87 Fed. Reg. 20,036 (Apr. 6, 2022)? If yes, please provide all forecasts

through 2030. If not, why?

**RESPONSE:** 

Objection. To the extent this request is intended to be duplicative of SIERRA-DR-01-016

(incorrectly labeled as 1.13), it must be seen as intending to harass. Without waiving said

objection, to the extent discoverable, and in the spirit of discovery, refer to the response for

SIERRA-DR-01-016. In addition, it is difficult to predict the future cost of ozone season

NOx allowances because the market will react to a number of factors such as the exact date

that the final rule becomes effective, the final scope of sources included in the relevant

trading region, and any other changes EPA may make to the trading program.

PERSON RESPONSIBLE:

As to objection, Legal

As to response, J. Michael Geers

**SIERRA CLUB First Set Data Requests** 

Date Received: January 10, 2023

SIERRA-DR-01-020

(incorrectly labeled as 1.17)

**REQUEST:** 

Has Duke conducted any analysis of the potential compliance costs at East Bend to comply

with EPA's Regional Haze Rule for the second planning period, 40 C.F.R. § 51.308? If so,

please provide all documents reflecting such analyses. If not, why not?

**RESPONSE:** 

At this time Duke Energy Kentucky does not anticipate additional compliance cost at East

Bend for the second planning period.

PERSON RESPONSIBLE:

J. Michael Geers

**SIERRA CLUB First Set Data Requests** 

Date Received: January 10, 2023

**SIERRA-DR-01-021** 

(incorrectly labeled as 1.18)

**REQUEST:** 

Has Duke conducted any analysis of the compliance costs at East Bend to comply with

EPA's Coal Combustion Residuals Rule ("CCR Rule"), 40 C.F.R. Part 257, at East Bend?

If so, please provide all documents reflecting such analyses. If not, why not? a.

Identify the total cost of the projects the Company intends to undertake or b.

has undertaken at East Bend to comply with the CCR Rule.

State the year these costs have been or will be incurred. c.

d. Please identify and describe each itemized capital expenditure required to

complete the CCR Rule compliance project.

State whether any of those costs are included in Duke's test year, and if so, e.

Identify the specific costs included.

f. Could any of those ELG Rule expenditures be avoided by making a

commitment to cease burning coal under the CCR Rule's alternative closure

provisions, 40 C.F.R. § 257.103? If so, please identify each specific

avoidable cost.

Please provide all evaluations of the technical or engineering compliance g.

options for the CCR Rule for East Bend.

h. Produce all evaluation(s) that the Company performed to determine that

incurring any avoidable CCR Rule costs at East Bend is in customers' best

interest (i.e., present value of retrofit versus retirement analyses). For any such evaluation, provide the following data:

- i. All workpapers, with formulas intact.
- Provide a list of all capital expenditures associated with CCR Rule compliance included in each modeled scenario and provide the cost of each.
- iii. MISO Energy price forecasts (with and without CO2 price);
- iv. MISO Capacity price forecasts (with and without CO2 price);
- v. CO2 price forecasts
- vi. Coal price (\$/MMBtu)
- vii. Gas price (\$/MMBtu)
- viii. Heat rate (Btu)
- ix. Capital expenditures (\$)
- x. Variable Operation and Maintenance (\$/MWh)
- xi. Fixed Operation and Maintenance (\$/MW)
- xii. For each replacement resource available to the model, provide each of the following inputs for each resource at the highest level of granularity used in conducting the retrofit analysis:
  - 1. Replacement resource options
  - 2. Replacement resource size (MW)
  - 3. Year replacement resource is available (year)
  - 4. Cost of replacement resource option (\$/MW)
  - 5. Annual capacity factor
  - 6. Year of transmission upgrade (if required)

#### 7. Cost of transmission upgrade (if required)

#### **RESPONSE:**

- a. Objection, this request is overly broad and unduly burdensome as there are no time parameters with this request and the request seeks "all documents." Moreover, this request is further objectionable as it is harassing in nature insofar as it seeks information that is publicly available and equally as accessible to the Sierra Club. Without waiving said objection, and to the extent discoverable, see Case No. 2021-0290, Case No. 2021-0290, Case No. 2018-0156, Case No. 2016-0268, Case No. 2016-0398, Case No. 2015-0187, and Case No. 2015-0059.
- b. See response to (a) above.
- c. See response to (a) above.
- d. See response to (a) above.
- e. Objection. This request is irrelevant, over broad and unduly burdensome. Without waiving said objection, the Company has not conducted the analysis in the manner requested. See Direct Testimony of Lisa Steinkuhl noting the Company is proposing to roll existing projects currently recovered in its Environmental Surcharge Mechanism (ESM) into base rates as part of this case. The Company is proposing to keep the ARO in the ESM.
- f. Objection. This request is irrelevant, seeks a legal conclusion, and calls for speculation. Moreover, this request seeks to propose an impossible hypothetical as under the proposed scenario, Duke Energy Kentucky would not have adequate generation to meet its load and resource requirements in PJM. Without waiving said objection, and to the extent discoverable, the Company had an existing ash basin and other facilities that needed to comply with ELG upon decommissioning.

g. See response to (a) above.

h. Objection. This request is overbroad, unduly burdensome, seeks information that is

irrelevant and not likely to lead to the discovery of admissible and relevant

evidence. Moreover, this request seeks information that does not exist and misstates

facts insofar as Duke Energy Kentucky is not a member of MISO. In addition the

question is moot because the projects involved were previous approved and

constructed. Without waiving said objection, and to the extent discoverable, there

were no evaluations to assess potentially avoidable CCR Rule costs incurred at East

Bend. The ash pond and landfills would have required closure under CCR rule

regardless of whether the plant continued to operate or not.

PERSON RESPONSIBLE:

As to objections, Legal

As to response, J. Michael Geers – a. thru d., f thru h.

As to response, Sarah E. Lawler – e.

**SIERRA CLUB First Set Data Requests** 

Date Received: January 10, 2023

SIERRA-DR-01-022

(incorrectly labeled as 1.19)

**REQUEST:** 

Has Duke conducted any analysis of the compliance costs at East Bend to comply with

EPA's Effluent Limitations Guidelines ("ELG Rule"), 40 C.F.R. Part 423, at East Bend?

a. If so, please provide all documents reflecting such analyses. If not, why not?

b. Identify the total cost of the projects the Company intends to undertake or

has undertaken at East Bend to comply with the ELG Rule.

c. State the year these costs have been or will be incurred.

d. Please identify and describe each itemized capital expenditure required to

complete the ELG Rule compliance project.

e. State whether any of those costs are included in Duke's test year, and if so,

Identify the specific costs included.

f. Could any of those ELG Rule expenditures be avoided by making a

commitment to cease burning coal under the ELG Rule's alternative closure

provisions, 40 C.F.R. § 423.19(f)? If so, please identify each specific

avoidable cost.

g. Please provide all evaluations of the technical or engineering compliance

options for the ELG Rule for East Bend.

h. Produce all evaluation(s) that the Company performed to determine that

incurring any avoidable ELG Rule costs at East Bend is in customers' best

interest (i.e., present value of retrofit versus retirement analyses). For any such evaluation, provide the following data:

- i. All workpapers, with formulas intact.
- Provide a list of all capital expenditures associated with ELG Rule compliance included in each modeled scenario and provide the cost of each.
- iii. MISO Energy price forecasts (with and without CO2 price);
- iv. MISO Capacity price forecasts (with and without CO2 price);
- v. CO2 price forecasts
- vi. Coal price (\$/MMBtu)
- vii. Gas price (\$/MMBtu)
- viii. Heat rate (Btu)
- ix. Capital expenditures (\$)
- x. Variable Operation and Maintenance (\$/MWh)
- xi. Fixed Operation and Maintenance (\$/MW)
- xii. For each replacement resource available to the model, provide each of the following inputs for each resource at the highest level of granularity used in conducting the retrofit analysis:
  - 8. Replacement resource options
  - 9. Replacement resource size (MW)
  - 10. Year replacement resource is available (year)
  - 11. Cost of replacement resource option (\$/MW)
  - 12. Annual capacity factor
  - 13. Year of transmission upgrade (if required)

14. Cost of transmission upgrade (if required)

**RESPONSE:** 

Objection. This request is overbroad, unduly burdensome, seeks information that is

irrelevant and not likely to lead to the discovery of admissible and relevant evidence. In

addition the question is moot because the projects involved were previous approved and

constructed. Without waiving said objection, and to the extent discoverable:

a. N/A. The East Bend Generating Station is fully compliant with the 2015

and 2020 Steam Electric ELG Rules.

b. The bottom ash submerged flight conveyor project was completed during

2018 and cost approximately \$32.1 million.

c. The bottom ash submerged flight conveyor project was completed during

2018.

d. Bottom ash submerged flight conveyor = approximately \$32.1 million.

e. Yes. These costs are included in base rates. Base rates in this proceeding

would reflect a return on and of the remaining NBV of the project in the test

period.

f. As the bottom ash submerged flight conveyor was installed prior to the 2020

ELG Rule "alternative closure provisions," this question is not applicable.

g. N/A.

h. N/A.

PERSON RESPONSIBLE:

J. Michael Geers

**SIERRA CLUB First Set Data Requests** 

Date Received: January 10, 2023

SIERRA-DR-01-023

(incorrectly labeled as 1.20)

**REQUEST:** 

Has Duke conducted any analyses or assessments evaluating the impacts of the Inflation

Reduction Act on the continued operation, replacement, or retirement (e.g., all retirement

studies, unit condition assessments, or deactivation assessments) of any of its fossil-fuel

burning generation resources? If yes, please provide all analyses, unreducted and in native

format with all formulae intact. If not, why hasn't Duke conducted such an analysis?

**RESPONSE:** 

The Company has not performed any detailed analysis of the IRA impacts, as it relates to

its Integrated Resource Planning beyond high level considerations of tax incentive and

updating of fuel prices. Other factors, however, will impact the continued operation,

replacement, or retirement of East Bend, including but not limited to cost of new resources

and supply chain and inflationary pressures. All else being equal, the Company expects

that the IRA will drive more renewable additions putting downward pressure on energy

prices which would decrease the capacity factor of coal generation. However, for reliability

purposes, coal units could be kept around for capacity resources rather than as energy

producing resources as has been past practice. While some newer technologies are

incentivized through the IRA, those incentivized resources will impact economics and may

or may not accelerate coal retirement.

PERSON RESPONSIBLE:

Scott Park

**SIERRA CLUB First Set Data Requests** 

Date Received: January 10, 2023

SIERRA-DR-01-024

(incorrectly labeled as 1.21)

**REQUEST:** 

Refer to the Direct Testimony of Sarah E. Lawler at 12-13.

a. Please confirm that renewable energy resources like solar and wind

generation resources have zero gas or coal fuel costs.

b. Has Duke evaluated whether diversifying its generation portfolio would

reduce the fuel price volatility issues identified in the Direct Testimony of Sarah E. Lawler?

If yes, please provide all documentation of such evaluation. If no, please explain why not.

c. Does Duke have any fuel contracts requiring the purchase of coal or gas to

serve East Bend or Woodsdale? If so, please provide all such contracts.

**RESPONSE:** 

a. Solar and wind resources do not consume any natural gas or coal and as a

result do not include any gas or coal fuel costs.

b. A specific evaluation has not been done, but any generation provided by

solar or wind, given the respective fuel costs of each, would displace market purchases.

Since market prices are more volatile than the fuel cost of solar or wind, fuel price and

market purchase volatility would be reduced.

c. Objection. This request seeks public information that is equally accessible

by Sierra Club and thus must be viewed as intending to harass. Without waiving said

objection, to the extent discoverable, and in the spirit of discovery, coal contracts are

publicly available on the Kentucky Public Service Commission's website here: <u>Fuel</u> Contracts (ky.gov).

Duke Energy Kentucky does not have natural gas fuel supply contracts requiring the purchase of gas for Woodsdale.

**PERSON RESPONSIBLE:** As to objection, Legal

As to response, Scott Park