KyPSC Case No. 2024-00152
TABLE OF CONTENTS

VERIFICATION

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

The undersigned, Adam Pritchard, Lead Originator - FSO, 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.

Adam Pritchard, Affiant

Subscribed and sworn to before me by Adam Pritchard on this 6th day of September, 2024.

NOTARY PUBLIC

My Commission Expires:

SHAMELL M WILSON
My Comm. Expires
NOTARY PUBLIC
July 06, 2026
MECKLENBURG COUNTY, NC

VERIFICATION

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

The undersigned, Alan Mok, Financial Market Manager, 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 28 day of August, 2024.

NOTARY PUBLIC

My Commission Expires:

SHAMELL M WILSON
My Comm. Expires
NOTARY PUBLIC
July 06, 2026
MECKLENBURG COUNTY, NC

VERIFICATION

STATE OF Kentucky)
) **SS:**
COUNTY OF Pendleton)

MADISON BRADIE WYATT
Notary Public, Kentucky State at Large
My Commission Expires Aug. 8, 2026
Notary ID# KYNP56797

The undersigned, Brett Riggins, GM III Reg Stations, 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.

Brett Riggins, Affiant

Subscribed and sworn to before me by Brett Riggins on this 10th day of September, 2024.

NOTARY PUBLIC

My Commission Expires:

VERIFICATION

STATE OF OHIO)
) **SS:**
COUNTY OF HAMILTON)

The undersigned, Chad Donner, Principal Engineer, 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.

Chad Donner/Affiant

Subscribed and sworn to before me by Chad Donner on this 28th day of August, 2024.

NOTARY PUBLIC

My Commission Expires: July 8, 2027

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

VERIFICATION

STATE OF OHIO)
) **SS:**
COUNTY OF HAMILTON)

The undersigned, J. Michael Geers, Manager of the EHS Energy Transition Group, 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.

J. Michael Geers Affiant

Subscribed and sworn to before me by J. Michael Geers on this 3rd day of September, 2024.

NOTARY PUBLIC

My Commission Expires: July 8, 2027

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

VERIFICATION

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

The undersigned, John D. Swez, Managing Director, Trading and 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 D. Swez, Affiant

Subscribed and sworn to before me by John D. Swez on this 28 day of August, 2024.

NOTARY PUBLIC

My Commission Expires:

SHAMELL M WILSON
My Comm. Expires
NOTARY PUBLIC
July 06, 2026
MECKLENBURG COUNTY, NC

VERIFICATION

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

The undersigned, John Verderame, VP Fuels & Systems Optimization, 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.

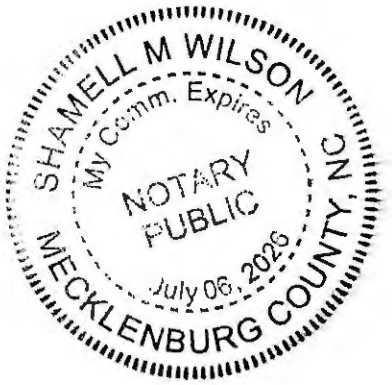
John Verderame

John Verderame, Affiant

Subscribed and sworn to before me by John Verderame on this 28 day of August, 2024.

NOTARY PUBLIC

My Commission Expires:



VERIFICATION

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

The undersigned, Matt Kalemba, Vice President Integrated Resource Planning, 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.

Matt Kalemba Affiant

Subscribed and sworn to before me by Matt Kalemba on this 3rd day of Sept., 2024.

NIMESH R. PATEL NOTARY PUBLIC MECKLENBURG COUNTY, N.C.

NOTARY PUBLIC

My Commission Expires:

My Commission Expires Nov. 7, 2024

VERIFICATION

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

The undersigned, Ryan Trogstad, Senior Data Science Consultant, 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.

Ryan Trogstad

Ryan Trogstad, Affiant

Subscribed and sworn to before me by Ryan Trogstad on this 5th day of September, 2024.

S. Jill Hamrick

NOTARY PUBLIC

My Commission Expires: 8/22/28

S Jill Hamrick
NOTARY PUBLIC
Mecklenburg County, NC
My Commission Expires August 22, 2028

VERIFICATION

STATE OF OHIO)
) **SS:**
COUNTY OF HAMILTON)

The undersigned, Sarah Lawler, VP Rates & Regulatory Strategy, 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.

Sarah Lawler Affiant

Subscribed and sworn to before me by Sarah Lawler on this 3rd day of September, 2024.

NOTARY PUBLIC

My Commission Expires: July 8, 2027

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

VERIFICATION

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

The undersigned, Scott Burnside, Director - Unit Commitment and Post Analysis, being duly sworn, deposes and says that he has personal knowledge of the matters set forth in the foregoing data requests are true and correct to the best of his knowledge, information and belief.

Scott Burnside, Affiant

Subscribed and sworn to before me by Scott Burnside on this 3 day of September, 2024.

NOTARY PUBLIC

My Commission Expires:

SHAMELL M WILSON
My Comm. Expires
NOTARY PUBLIC
July 06, 2026
MECKLENBURG COUNTY, NC

VERIFICATION

STATE OF KENTUCKY)
) **SS:**
COUNTY OF JEFFERSON)

The undersigned, Dan Sympson, General & Regulatory Strategy Director, 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.

Dan Sympson, Affiant

Subscribed and sworn to before me by Dan Sympson on this 3rd day of September, 2024.

NOTARY PUBLIC

My Commission Expires: 09/20/2027

BENJAMIN BERDICHEVSKY
Notary Public - State at Large
Kentucky
My Commission Expires Sept. 20, 2027
Notary ID KYNP79738

Duke Energy Kentucky
Case No. 2024-00152
STAFF First Set of Data Requests
Date Received: August 23, 2024

STAFF-DR-01-001

REQUEST:

Refer to the Direct Testimony of John A. Verderame (Verderame Direct Testimony), page 6, lines 14-16.

a. Explain whether the current supplier of magnesium enhanced lime (MEL) is a supplier of the lime product envisioned in the Limestone Conversion project.

b. If the Limestone Conversion project is approved, explain whether there are multiple providers of the lime product necessary for the new process.

c. Explain the state of the market for the alternate lime product necessary for the Limestone Conversion project.

RESPONSE:

a. The current supplier of magnesium enhanced lime also produces limestone and mineral-based products and could be a potential supplier of limestone once the conversion project is complete.

b. There are currently multiple sources of limestone with access to the Ohio river that could be utilized as potential sources in the new process. The Company would procure limestone using its competitive commodity procurement process.

c. In contrast to MEL, limestone is utilized as a raw product that does not require additional processing and is more vastly available through a number of producers. Limestone is used in significant amounts and usage is growing at a compound annual growth rate of greater than 2% during the forecast period (2024-2029). The growth in

construction activities and the growing use of limestone in cement production are major factors driving the growth of the market. More specifically, limestone is the primary material used by the utility industry for SO_2 emissions control, meaning there is greater opportunity for a competitive supply process and mitigated sole supplier risk.

PERSON RESPONSIBLE: John A. Verderame

Duke Energy Kentucky
Case No. 2024-00152
STAFF First Set of Data Requests
Date Received: August 23, 2024

STAFF-DR-01-002

REQUEST:

Refer to the Verderame Direct Testimony, page 16, lines 22-24 and page 17, lines 1-8.

a. Compare and contrast the assumptions used in the production cost modeling of the two scenarios.

b. Explain whether the forecast PJM energy and capacity market prices modeled in the present proceeding are the same as those used in Duke Kentucky's Integrated Resource Plan Case No. 2024-00197.2 If not, explain any differences and the reasons for those differences in the assumptions used.

c. Explain how the recent results of the PJM 2024/2025 Base Residual Auction affect Duke Kentucky's analysis in the present proceeding.

d. Explain how, if at all, the Duke Energy Ohio Kentucky (DEOK) PJM Load Zone being constrained affects Duke Kentucky's ability to acquire replacement capacity if the Limestone Conversion project is not approved.

RESPONSE:

a. To calculate the East Bend dispatch cost a basket of market coals is optimized to derive a blended product that serves as a least-cost market dispatch coal, inclusive of coal cost, reagent costs, and transportation. This process was performed for both the quicklime and limestone cases, with the quicklime case using reagent consumption rates representative of the existing emissions control process and limestone using reagent assumptions based on guidance from plant engineering staff.

For quicklime this resulted in a blended coal that had a #5.62 SO2 content and a heat content of 11703 btu/lb. Dispatch costs (inclusive of reagents and transport) escalated from $3.83/mmbtu to $4.19/mmbtu over the model horizon.

For limestone, the modeled coal was a #6 SO2 product at 11782 btu/lb, with dispatch costs escalating from $2.77/mmbtu to $2.97/mmbtu over the model horizon.

This market dispatch price difference (fuel cost and reagent O&M) was the only change between the two model runs used for projecting energy costs. Non reagent O&M costs, unit outage rates, etc. were assumed to be negligibly different between the two scenarios. Power and gas prices, forced outages distributions, and planned outage assumptions were held constant in each case.

b. Energy prices were modeled for this proceeding, capacity prices were not.

The energy prices that informed the 2027-2029 model projections in this proceeding are a product of Duke Energy's mid-horizon (typically current year plus five (5) calendar years) production cost model, PowerSIMM. Duke Energy's configuration of the PowerSIMM model simulates future power prices starting from monthly forward pricing curves, specifically PJM AD Hub for Duke Energy Kentucky. These monthly power prices are then scaled to hourly, unit-level price shapes based on historical relationships between weather, gas, and power. This analysis used forward commodity pricing as of a 4-1-2024 close-of-business (COB) date. Policy and market hypotheticals such as the new EPA 111 rules, carbon regulations, etc., are only included in the power pricing insofar as they influenced market participant buying and selling behavior, which would be captured in the traded market forward prices as of the given COB date.

In the case of Integrated Resource Plan Case No. 2024-00197.2 Encompass would have been used. Encompass is Duke Energy's long term (typically further than five year) model utilizing entirely different methodologies for price formation. As an example, depending on the scenario presented Encompass may factor estimated impacts from EPA 111 explicitly, in contrast to PowerSIMM. The focus of the two models is on different parameters and windows of time, making direct comparisons of simulated prices not particularly meaningful.

c. Assuming that the question was meant to refer to the recent PJM 2025/2026 Base Residual Auction (BRA) results that were posted in late July 2024, the capacity clearing price of $269.92/MW-Day reflects almost a 10-fold increase in the BRA clearing price of $28.92/MW-Day for the 2024/2025 PJM BRA.

Additionally, as the Staff is aware, East Bend is an important resource in the Company's Fixed Resource Requirement (FRR) plan. The Company believes that due to various factors, a trend of higher capacity prices is likely to be seen in future auctions. The impact to Duke Energy Kentucky's FRR plan depends on the Company's capacity position. If Duke Energy Kentucky maintains its slightly long capacity position, the Duke Energy Kentucky customer will benefit due to higher capacity prices since excess capacity not utilized for its FRR plan is generally sold into either the BRA or Incremental Auctions. However, if Duke Energy Kentucky were to have a short capacity position, this general increasing capacity price trend and availability of capacity can negatively impact Duke Energy Kentucky due to higher cost bilaterial capacity purchases and less bilaterial capacity availability. Additionally, in the case that Duke Energy Kentucky is not able to

meet its FRR plan and must rely on a bilaterial capacity purchase, the unavailability of bilaterial capacity could lead to a significant a FRR deficiency penalty assessment.

Since East Bend's capacity amount does not change because of the limestone conversion, the higher capacity price in this auction was not factored into the analysis. However, the higher capacity prices do highlight the importance of East Bend as a Company capacity resource.

d. Since the limestone conversion project does not impact the capacity value of the unit, there is no impact to the Company's ability to acquire replacement capacity if the project is not approved.

PERSON RESPONSIBLE: Ryan Trogstad – a., b.
John Swez – c., d.

Duke Energy Kentucky
Case No. 2024-00152
STAFF First Set of Data Requests
Date Received: August 23, 2024

STAFF-DR-01-003

REQUEST:

Refer to the Verderame Direct Testimony, page 17, lines 12-14.

a. Explain whether the modeled PJM purchase volume prices are premised on no other generator in the DEOK PJM Load Zone having the same MEL issues, and thus, PJM energy prices are not affected by this particular environmental reagent issue.

b. In addition to reducing higher cost PJM energy purchase volumes, explain what other factors will lead to an estimated $1.48/MWh decline in the system average fuel rate.

c. Confirm that reagent costs are recovered in the environmental surcharge rate and not the fuel adjustment clause. If not confirmed, explain why not.

RESPONSE:

a. As discussed in STAFF-DR-01-002, the modeled PJM energy prices were based on the monthly forward PJM AD Hub price curve. These monthly power prices are then scaled to hourly, unit-level price shapes based on historical relationships between weather, gas, and power. Any impacts from reagent costs are only included in the power pricing insofar as they influenced market participant buying and selling behavior, which would be captured in the traded forwards as of the given COB date.

Additionally, modeled PJM energy prices were held constant between the two scenarios. The displaced purchases result from the increased dispatch of East Bend

resulting in a reduction of PJM energy market purchases required to meet Duke Energy Kentucky customer demand.

b. Displaced purchases are the predominant savings. A slightly cheaper fuel blend is assumed in the limestone case based on the economics of using higher sulfur coals, which amounts to around a 1% coal fuel savings relative to the fuel blend cost optimized for quicklime. Additionally, about $700,000 annually of gas fuel cost at Woodsdale is being shifted from serving native load to nonnative sales, with that peaking generation being replaced by East Bend coal generation which is roughly half as expensive. These two considerations amount to approximately 10% of the $1.48/MWh system average fuel rate reduction.

c. Confirmed**.**

PERSON RESPONSIBLE: Ryan Trogstad – a., b.
John A. Verderame – c.

Duke Energy Kentucky
Case No. 2024-00152
STAFF First Set of Data Requests
Date Received: August 23, 2024

STAFF-DR-01-004

REQUEST:

Refer to the Verderame Direct Testimony, page 18, lines 7-9.

a. Explain the approximate timing of the three-month outage and the steps Duke Kentucky plans to take to mitigate possible high energy purchase prices during the outage.

b. Explain whether Duke Kentucky will be required to obtain capacity to fulfill its PJM obligations during the three-month outage and, if necessary, whether the recent Base Residual Auction capacity clearing prices will have an impact on that purchase.

RESPONSE:

a. During the three-month planned outage associated with limestone conversion, since this would be scheduled outage, the Company may elect to hedge a portion or all of the outage by purchasing energy at a fixed price in the forward market.

b. The Company typically schedules planned outages during times of the year when system conditions allow, such as during the spring and fall. No additional capacity would be required to be purchased by the Company, thus no impact from higher capacity prices is expected.

PERSON RESPONSIBLE: John Swez

Duke Energy Kentucky
Case No. 2024-00152
STAFF First Set of Data Requests
Date Received: August 23, 2024

PUBLIC STAFF-DR-01-005

REQUEST:

Refer to the Duke Kentucky Application, page 5, Item 12.

a. Explain the specific additional limitations to MEL supply that are referred to here.

b. Explain how the limitations may lead to material cost increases and a risk in availability of supply alternatives.

RESPONSE:

CONFIDENTIAL PROPRIETARY TRADE SECRET

a. As stated in Mr. Verderame's Direct Testimony, page 5, lines 1 through 8, the limited availability of the reagent product in conjunction with the rapidly increasing costs may adversely affect not only the competitiveness of East Bend Station in today's power markets, but also pose continued risks to the East Bend Station from a reliability, compliance and economic perspective.

b. As stated in Mr. Verderame's Direct Testimony, page 6, lines 12 through 22, the lack of a competitive market for the MEL product and the [redacted] presents a significant risk of further cost increases. The lack of a functioning competitive market as stated in Mr. Verderame's Direct Testimony, page 7, lines 20 through 24, places the company at a significant disadvantage in pricing negotiations. In addition, there is fuel security risk stemming from the scarcity of the MEL product that has the correct chemical content required to operate the WFGD which places

the continued operation of the station at risk. If the Company is unable to secure the necessary reagents to operate the WFGD, East Bend will be unable to comply with required environmental regulations and be forced to shut down prematurely, and possibly permanently.

PERSON RESPONSIBLE: John A. Verderame

Duke Energy Kentucky
Case No. 2024-00152
STAFF First Set of Data Requests
Date Received: August 23, 2024

STAFF-DR-01-006

REQUEST:

Refer to the Verderame Direct Testimony, page 10, line 14.

a. Provide a description of the Company's Fixed Resource Requirement (FRR) Plan.

b. Provide a copy of the FRR Plan.

RESPONSE:

a. The initial Duke Energy Kentucky FRR plan for 2025/2026 consists of East Bend, Woodsdale 1-6, and Demand Response in amounts as specified below. The preliminary load obligation is 800.6 MW and 24 MW is the calculated 3% threshold that Duke Energy Kentucky must carry in the FRR plan in order to make capacity sales. Duke Energy Kentucky has set aside 824.6 MW for the load obligation and 3% threshold. In addition, Duke Energy Kentucky has 52.9 MW excess capacity.

b. See below for details of the Duke Energy Kentucky FRR plan:

2025/2026 Initial
FRR Plan

Resource	Nameplate ICAP (MW)	Class Level ELCC	Performance Adj Factor	Accredited UCAP Factor	Nameplate UCAP (MW)	FRR Committed (MW) - Load Obligation	FRR Committed (MW) - Add'l 3% Holdback	RPM Committed (MW)	Capacity Position (MW)
East Bend	600	0.84	0.99	0.83160	499	422	24	0	53
Woodsdale 1	77	0.79	0.94	0.74260	57.2	57.2	0	0	0
Woodsdale 2	77	0.79	1.07	0.84530	65.1	65.1	0	0	0
Woodsdale 3	77	0.79	1.01	0.79790	61.4	61.4	0	0	0
Woodsdale 4	77	0.79	1.05	0.82950	63.9	63.9	0	0	0
Woodsdale 5	77	0.79	1.06	0.83740	64.5	64.5	0	0	0
Woodsdale 6	77	0.79	1.06	0.83740	64.5	64.5	0	0	0
Demand Response	2.6	0.76	1.00	0.76000	2	2	0	0	0
Total	1064.6				877.6	800.6	24	0	53

DEK UCAP	877.6
DEK Capacity Load Obligation	800.6
DEK 3% Holdback	24
DEK RPM Sales	0
DEK Total Excess Capacity	53

Additionally, enclosed is PJM acceptance of Duke Energy Kentucky FRR plan for 2025/2206:

From: Hayik, Seth A. <Seth.Hayik@pjm.com>
Sent: Wednesday, June 19, 2024 8:16 AM
To: Garnett, Bryan L <Bryan.Garnett@duke-energy.com>; Mok, Alan <Alan.Mok@duke-energy.com>; Sturgeon, John T <John.Sturgeon@duke-energy.com>
Cc: Langbein, Peter <Peter.Langbein@pjm.com>
Subject: [EXTERNAL] DEK 25/26 FRR Capacity Plan

***** CAUTION! EXTERNAL SENDER *** STOP. ASSESS. VERIFY!!** Were you expecting this email? Are grammar and spelling correct? Does the content make sense? Can you verify the sender? If suspicious report it, then do not click links, open attachments or enter your ID or password.

Hi Alan,

PJM is notifying Duke Energy Kentucky, Inc. (DEK), that they have submitted an initial FRR Capacity Plan at least one month prior to the conduct of the BRA for the 2025/2026 Delivery Year that demonstrates it has sufficient capacity resources in its FRR resource portfolio in Capacity Exchange to satisfy:

- Preliminary Daily UCAP Obligations for its FRR Service Area
- Minimum Internal Resource Requirement
- Threshold was met

Thank you for your timely submission, and please let us know if you have any questions.

Seth Hayik
Sr. Analyst II, Capacity Market & Demand Response Operations

seth.hayik@pjm.com
PJM Interconnection | 2750 Monroe Blvd. | Audubon, PA 19403

PERSON RESPONSIBLE: Alan Mok

Duke Energy Kentucky
Case No. 2024-00152
STAFF First Set of Data Requests
Date Received: August 23, 2024

STAFF-DR-01-007

REQUEST:

Refer to the Verderame Direct Testimony, page 12, lines 8-12.

a. Explain the basis for the assumption that "replacement specific-unit capacity cannot be found."

b. Explain whether it is conceivable that a lesser amount of specific-unit capacity could be available.

c. If so, explain how this would affect the analysis.

RESPONSE:

a. One challenge of meeting the Company's FRR plan is that the Duke Energy Kentucky must locate a certain, PJM-determined percentage of its unit-specific generation that is included in its FRR plan within the DEOK zone, called the PJM minimum internal resource requirement. This percentage can change each year, and while the current year's requirement is a low 4.4% percent, the previous yearly required value was 29.3%. The Company cannot predict with certainty where this requirement will be year to year. If a particular year's FRR plan required a purchase of additional capacity due to East Bend being unavailable, some or all of that purchase may need to be within DEOK to meet this limitation. Even before announced merchant generation retirements located within the DEOK zone occur, there is a limited supply of bilateral capacity within the DEOK zone. If the PJM minimum internal resource requirement is not a limiting factor, then unit specific capacity can be procured outside of the DEOK zone but within PJM. Even in the case that

that PJM minimum internal resource requirement is not a restriction and replacement capacity can be purchased in another zone in PJM, capacity owners are not obligated to sell in the bilateral market and the Company has no way to ensure that bilateral capacity is available for purchase, or if it is available, at what price. With the recent 2025/2026 BRA clearing price of $269.92/MW-Day and forecasted tightening PJM reserve margins, capacity prices are expected to increase. Capacity owners are not obligated to sell bilaterial capacity and may choose to sell in the PJM BRA or incremental auctions, making replacement supply uncertain.

b. Yes. There are many plausible scenarios, as described in part a, where less or no bi-lateral capacity is available, especially with a large replacement such as would be the case with approximate 550 MW capacity supplied annually by East Bend.

c. The analysis assumed that unit specific capacity could not be found during the first year where replacement was needed. Thus, in the first year, there would be no change to the analysis since it was already assumed replacement capacity was not available. However, in the 2nd and 3rd years, to the extent that replacement capacity is greater than what was assumed, the costs in years 2 and 3 would be greater. Note that this testimony was submitted prior to the 2025/20226 PJM Base Residual Auction (BRA). At the time, the bi-lateral market price for capacity was approximately $80/MW-Day and was escalated to $100/MW-Day to represent the cost of bilateral capacity in the 3rd year of replacement. Since the 2025/2026 BRA results were announced in late July 2024, the bilateral capacity market has approximately tripled. If a replacement price equal to the current bilaterial market price of $300/MW-Day is used, the costs for the 2nd and 3rd years replacement have changed from a cost of $18.4 M per year to $55.2M per year. Thus, the three-year capacity

impact total is now $192.4 million, or $82 million for the 1st year plus $55.2 million for the 2nd year plus $55.2 million for the 3rd year.

2nd and 3rd Years Replacement Capacity = 600 MW x .84 (ELCC Class Rating) x $300/MW-Day x 365 days = $55.2 million per year.

PERSON RESPONSIBLE: John Swez
Alan Mok

Duke Energy Kentucky
Case No. 2024-00152
STAFF First Set of Data Requests
Date Received: August 23, 2024

STAFF-DR-01-008

REQUEST:

Refer to the Verderame Direct Testimony, page 13, lines 3-5. Provide support for the assumptions used for this calculation.

RESPONSE:

As discussed in testimony, the margin of a coal unit can vary substantially from year to year. Although $5/MWh margin was assumed for East Bend's energy margin in the replacement energy calculations, the actual unit margin has varied from as high as $44.60/MWh in 2022 to -$6.50/MWh in 2023. The 5 ½ year average margin was $10.3/MWh. Updating the energy replacement cost calculations using $10.3/MWh instead of the previously assumed $5/MWh, the new resulting energy impact is $32.5 million per year, or $97.5 million over the three-year period, instead of the $47.3 million previously calculated, an increase of $50.2 million.

East Bend Station	Net Actual Generation (MWh)	PJM Energy Market Revenue ($)	Fuel Costs ($)	Revenue ($/MWh)	Fuel Cost $/MWh)	Margin ($/MWh)
2019	3,165,500	$ 80,764,631	$ 67,767,903	$ 26	$ 21	$ 4.1
2020	2,269,190	$ 51,214,368	$ 50,256,155	$ 23	$ 22	$ 0.4
2021	2,542,673	$ 83,491,681	$ 54,171,470	$ 33	$ 21	$ 11.5
2022	2,777,700	$ 203,779,804	$ 79,902,243	$ 73	$ 29	$ 44.6
2023	2,211,385	$ 70,944,881	$ 85,370,908	$ 32	$ 39	$ (6.5)
YTD 2024 (thru July)	1,554,214	$ 49,872,147	$ 53,561,267	$ 32	$ 34	$ (2.4)
	$ 14,520,662	$ 540,067,513	$ 391,029,946	$ 37	$ 27	$ 10.3

Annual Replacement Energy = 600 MW x .60 (Net Capacity Factor) x $10.3/MWh x 8760 hours = $32.5 million/year.

PERSON RESPONSIBLE: John Swez

Duke Energy Kentucky
Case No. 2024-00152
STAFF First Set of Data Requests
Date Received: August 23, 2024

PUBLIC STAFF-DR-01-009

REQUEST:

Refer to the Verderame Direct Testimony, page 14, line 21 and page 15, line 8, where two alternatives to the proposed project were discussed.

a. Explain whether any other alternatives were considered beyond these.

b. If so, list those alternatives and discuss why they were not included here.

RESPONSE:

CONFIDENTIAL PROPRIETARY TRADE SECRET

a. As stated in Mr. Verderame's Direct Testimony, East Bend's WFGD process relies upon a highly specialized version of quicklime to control SO2 emissions. The company issued a public request for proposal in 2023 [redacted]. Over the past year, the Company has made numerous attempts to locate an alternative supply of high magnesium lime, or alternatively, an alternative supply of standard quicklime that could be combined with magnesium hydroxide slurry for use at the station to no avail. In negotiations with the current supplier, discussions regarding the possibility of a longer-term agreements were denied by the supplier based on market uncertainty. As the East Bend Station requires this specific MEL product, these were the only viable options for consideration.

b. N/A

PERSON RESPONSIBLE: John A. Verderame

Duke Energy Kentucky
Case No. 2024-00152
STAFF First Set of Data Requests
Date Received: August 23, 2024

STAFF-DR-01-010

REQUEST:

The JAV-1 Attachment is referenced in the Verderame Direct Testimony but has not been provided. Provide a copy of the JAV-1 Attachment.

RESPONSE:

Please see STAFF-DR-01-010 Attachment.

PERSON RESPONSIBLE: John A. Verderame

Duke Energy Kentucky, Inc.
Environmental Compliance Plan

Project #	Project Description	Air Pollutant or Waste/Byproduct to be controlled	Control Facility	Generating Station	Environmental Regulation	Environmental Permits[1]	Scheduled Completion	Actual (A) or Est. (E) Projected Capital Cost ($Million)
1.	EB020290 Lined Retention Basin West;	Bottom Ash	CCR/ELG	East Bend	EPA CCR and ELG Final Rules	Division of Surface Water, KPDES Permit #0040444 Dam Safety Permit from Division of Surface Water listed (Stream Construction Permit), Permit No. **26395P**	November 2018	$10(A)
2.	EB020745 Lined Retention Basin East;	Bottom Ash	CCR/ELG	East Bend	EPA CCR and ELG Final Rules	Division of Surface Water, KPDES Permit #0040444 Dam Safety Permit from Division of Surface Water listed (Stream Construction Permit), Permit No. **26395P**	2021	$10(A)
3.	EB020298 East Bend SW/PW Reroute; and	Bottom Ash, misc., CCR runoff	CCR/ELG KY groundwater regulations	East Bend	EPA CCR and ELG Final Rules, KPDES	KDWM, Permit number SW00800006, KDEP Division of Surface Water, KPDES Permit #0040444	2020	$30 (A)
4.	ARO for Pond Closure;	Bottom Ash	CCR/ELG, KY Ground water regulations	East Bend	EPA CCR and ELG Final Rules and KPDES	KDEP Division of Waste Management concurrence for clean closure.	2021	$28 (A)
5.	EB021281 East Bend Landfill Cell 2;	Bottom Ash, FGD, Fly Ash	CCR/KY CCR regulations	East Bend	EPA CCR and ELG Final Rules and KPDES, KY CCR Regulations	KDWM, Permit number SW00800006, KDEP	2020	$17 (A)
6.	ARO for East Landfill Closure;	East Landfill Closure	CCR, KY groundwater regulations applicable to coal combustion	East Bend	EPA CCR Final Rules and KY CCR Regulations	KDWM, Permit number SW00800006, KDEP	2023	$16 (A)
7.	ARO for West Landfill Ongoing Maintenance;	West Landfill Routine Maintenance, Groundwater and Well Monitoring Costs	CCR, KY groundwater regulations	East Bend			Ongoing	N/A

[1] Permits filed with Commission in Case No. 2016-00398

8.	Limestone Conversion;	SO_2, mercury	CSAPR, MATS	East Bend	CSAPR, MATS	East Bend Title V Permit V-12-023, Minor Permit Revision filed July 17, 2024	2026	$125.8 (E)
9.	Consumables (EAs Reagents, etc.)	SO_2, NOx, CO_2	CSAPR	East Bend	CSAPR	Est Bend Title V Permit V-12-023	Ongoing	N/A

Duke Energy Kentucky, Inc.

Environmental Compliance Plan

Project #	Project Description	Air Pollutant or Waste/Byproduct to be controlled	Control Facility	Generating Station	Estimated Annual O&M			
					2026	2027	2028	2029
1.	EB020290 Lined Retention Basin West	Bottom Ash	CCR/ELG	East Bend	$0 (E)	$0 (E)	$0 (E)	$0 (E)
2.	EB020745 Lined Retention Basin East	Bottom Ash	CCR/ELG	East Bend	$0 (E)	$0 (E)	$0 (E)	$0 (E)
3.	EB020298 East Bend SW/PW Reroute	Bottom Ash, misc., CCR runoff	CCR/ELG KY groundwater regulations	East Bend	$0 (E)	$0 (E)	$0 (E)	$0 (E)
4.	ARO for Pond Closure	Bottom Ash	CCR/ELG, KY Ground water regulations	East Bend	$0.1 (E)*	$0.1 (E)*	$0.1 (E)*	$0.1 (E)*
5.	EB021281 East Bend Landfill Cell 2	Bottom Ash, FGD, Fly Ash	CCR/ELG/KY CCR regulations	East Bend	$0 (E)	$0 (E)	$0 (E)	$0 (E)
6.	ARO for East Landfill Closure; and	East Landfill Closure	CCRKY Coal Combustion Residuals	East Bend	$0.5 (E)	$0.4 (E) **	$0.4 (E) **	$0.4 (E) **
7.	ARO for West Landfill Ongoing Maintenance; and,	West Landfill Routine Maintenance, Groundwater and Well Monitoring Costs	CCR, KY groundwater regulations	East Bend	$4.4 (E)	$4.2 (E)	$4.3 (E)	$4.2 (E)
8.	Limestone Conversion	SO_2, mercury	CSAPR, MATS	East Bend	$0 (E)	$0 (E)	$0 (E)	$0 (E)
9.	Consumables (Emission Allowances, Reagents, etc.)	SO_2, NOx, CO_2	CAIR	East Bend	$26 (E)	$9 (E)	$8 (E)	$9 (E)

*O&M estimates represent post-closure maintenance costs related to all four bottom ash projects listed above: EB020290, EB020745, EB020298 and the ARO for Pond Closure.

** O&M estimates represent post-closure maintenance costs related to the East Landfill closure.
*** O&M estimates represent on-going maintenance costs related to the Ash Maintenance, Groundwater, and Wells.

Duke Energy Kentucky
Case No. 2024-00152
STAFF First Set of Data Requests
Date Received: August 23, 2024

STAFF-DR-01-011

REQUEST:

Refer to the Direct Testimony of J. Michael Geers (Geers Direct Testimony), page 13, lines 18-19.

a. Provide the latest status of the filed application.

b. Provide a monthly update on the status of this application during the tenure of this case.

RESPONSE:

a. The application was received by KDAQ on July 17, 2024. KDAQ has 60 days to determine if the application is complete. If the KDAQ does not respond within 60-days, the application for a minor permit revision is deemed complete and the company is authorized to construct and operate. The 60-day period expires on September 15th. As of September 3rd, the KYDAQ has not responded.

b. The Company will provide updates.

PERSON RESPONSIBLE: J. Michael Geers

STAFF-DR-01-012

REQUEST:

Provide a copy of the current Duke Kentucky Integrated Resource Plan.

RESPONSE:

Please see Case No. 2024-00197. The Company filed its IRP with the Commission on June 21, 2024.

PERSON RESPONSIBLE: Matthew Kalemba

Duke Energy Kentucky
Case No. 2024-00152
STAFF First Set of Data Requests
Date Received: August 23, 2024

STAFF-DR-01-013

REQUEST:

Explain, in detail, the current planned retirement date of the East Bend Station.

RESPONSE:

The 2024 IRP plan with EPA CAA Section 111 Update rules in place plans for an East Bend Station retirement date of 12/31/2038 while the plan without the EPA CAA Section 111 Update rule in place plans for an East Bend Station retirement date of 12/31/2035.

PERSON RESPONSIBLE: Matthew Kalemba

Duke Energy Kentucky
Case No. 2024-00152
STAFF First Set of Data Requests
Date Received: August 23, 2024

PUBLIC STAFF-DR-01-014
(As to Attachment only)

REQUEST:

Provide a copy of the Engineering, Procurement and Construction (EPC) contract with AECOM.

RESPONSE:

CONFIDENTIAL PROPRIETARY TRAD SECRET (As to Attachment only)

The Duke Energy project team is currently working with AECOM to get an EPC contact in place. Expected execution date for the EPC contract is November 2024. The current PO in place with AECOM is for engineering services only. Please see STAFF-DR-01-014 Confidential Attachment.

PERSON RESPONSIBLE: Chad Donner

CONFIDENTIAL PROPRIETARY TRADE SECRET

STAFF-DR-014
CONFIDENTIAL ATTACHMENT

FILED UNDER SEAL

Duke Energy Kentucky
Case No. 2024-00152
STAFF First Set of Data Requests
Date Received: August 23, 2024

STAFF-DR-01-015

REQUEST:

For the past five years, provide a performance profile for the East Bend Station outlining the following:

a. Equivalent availability factor.
b. Equivalent forced outage rate.
c. NERC GADS reports.
d. List of the top 10 major availability detractors.
e. Capacity factor.
f. Heat rate.
g. Variable Operating and Maintenance costs $/MWH.
h. Rated maximum load capability.
i. Rated dependable minimum load capability.

RESPONSE:

a. Please see STAFF-DR-01-015 Attachment 2.

b. Please see STAFF-DR-01-015 Attachment 2.

c. No specific report is available for easy viewing. Coded files are generated via the PowerGADS application and are provided to NERC via an import to their NERC OATI filing system. These files are not easily decipherable as the NERC OATI tool modifies the data upon import. Specific data such as that being requested in this data request can be provided upon request.

d. Please see STAFF-DR-01-015 Attachment 2.

e. Please see STAFF-DR-01-015 Attachment 2.

f. Please see STAFF-DR-01-015 Attachment 2.

g. Duke Energy Kentucky does not maintain this information. Please see STAFF-01-015 Attachment 1 for Fixed O&M costs.

h. Please see STAFF-DR-01-015 Attachment 2.

i. Please see STAFF-DR-01-015 Attachment 2.

PERSON RESPONSIBLE: Daniel Sympson

Duke Energy Kentucky
2024 Case 2024-00152
STAFF DR-01-015

(g.)

Station Name	Fixed O&M				
	2019	2020	2021	2022	2023
DEK Other	($13,039)	($88,286)	($311,722)	$240,828	($43,564)
East Bend Coal	$50,360,969	$47,008,576	$50,281,246	$46,528,830	$47,434,646
Regional Services & Other	$23,217	$40,403	$73,749	$149,611	$145,136
Total O&M	**$50,347,930**	**$47,008,576**	**$50,281,246**	**$46,528,830**	**$47,434,646**

NOTES:

DEK Other and Regional Services line costs are associated with the entire Duke Energy Kentucky region. Duke Energy Kentucky does not track Fixed and Variable O&M Costs separately.

Duke Energy Kentucky
2024 Case 2024-00152
STAFF DR 1.15

	(a.)	(b.)	(e.)	(f.)	(h.)	(i.)
All Data for East Bend Station	**Equivalent Availability Factor (EAF)**	**Equivilent Forced Outage Rate (EFOR)**	**Net Capacity Factor (NCF)**	**Net Heat Rate (Btu/kWh)**	**Maximium Load Capacity Rating**	**Dependable Minimum Load Capabiltiies**
2019	73.61	2.95	60.31	10994	600	425
2020	77.66	1.71	43.30	11205	600	340
2021	58.42	11.62	48.53	11010	600	340
2022	71.80	5.18	52.94	10508	600	340
2023	61.81	5.34	42.15	11075	600	340

(d.)	
List of the top 10 major availability detractors (2019-2023)	
Cause Code	**Cause Description**
4212	Buckets or blades
8560	Electrostatic precipitator problems
8230	Ducting
4230	Rotor shaft
3998	Balance of plant overhaul/outage
8265	Scrubber booster I.D. fan dampers
1488	Air heater (regenerative)
1455	Induced draft fans
590	Desuperheater/attemperator valves
8200	Piping

***Note**: Listed are the top 10 availabilty detractor cause codes for all outages and derates for requested period

Duke Energy Kentucky
Case No. 2024-00152
STAFF First Set of Data Requests
Date Received: August 23, 2024

STAFF-DR-01-016

REQUEST:

For the past five years, provide a summary of any major forced outages at the East Bend Station and provide the associated root cause analysis for each.

RESPONSE:

Duke Energy Kentucky is unfamiliar with the term of "major forced outage" and for purposes of this response is using a 7-day forced outage for the definition of a "major" forced outage. In the past 5 years, there have been two such forced outages at East Bend:

Event Start	Event End	Event Type	Cause Code	Cause Description	Event Description	Event Duration (Hours)	Event Duration (Days)	Equivelant Hours (Hours)	Equivelant MWh Lost (MWh)	Derate (MW)
8/28/21 11:00 PM	9/5/21 2:30 PM	U1	4520	Stator windings, bushings, and terminals	Generator Flex Links and A-phase Bushing	183.50	7.6	183.5	110,100	600
12/19/21 2:28 AM	12/26/21 2:40 AM	U1	4609	Other exciter problems	Exciter repairs	168.20	7.0	168.2	100,920	600

- For the 2021 generator bushing and link failure we performed a causal failure analysis checklist. This is a similar investigation and process to a root cause analysis (RCA) but technically not an RCA. Please see STAFF-DR-01-016 Attachment 1 for the brushing failure analysis.
- The 2021 exciter forced event was a delay to startup following a major planned outage. Since we had multiple outage delays the excitation issue was part of the overall causal analysis to capture corrective actions to improve outage performance.

Please see STAFF-DR-01-016 Attachment 2 for the Fall outage startup delay casual analysis.

PERSON RESPONSIBLE: John Swez
Brett Riggins

Checklist Summary Report
Page 1 of 4

Event#: 1180841	**Event Date: 08-25-21**	**Sponsor Name/Approval Date: Brett Riggins - 02-24-22**
Investigator(s): Sandie Hall, Eric White, Doug Coleman,		**OE Oversight: Jamie McDaniel**
Checklist(s) Performed: ☒ Equipment ☐ Human Performance ☐ Organizational and Programmatic		
Common Cause Analysis: ☐ Yes ☒ No		
Other Cause Evaluation Tools Used (e.g., Why Analysis and Event and Causal Factor Chart): Support/Refute Document		

Problem Description

Deviation Statement: Isophase bus to generator flexible link connection and bushing connections overheating and loosening.

Consequence: Failure of flex links will result in fire at the flex link box below the generator and resulting in a generator ground trip.

Extent of Condition

Extent of Condition Required: ☒ Yes ☐ No

Basis for Decision/Conclusion: An Extent of Condition was conducted on B & C phase and the contact area on B phase was resilver plated and C phase was replaced..

Summary of Analysis Results

Things to Consider for Checklist Summary:

At 1440 on Friday 6/30/17, East Bend 2 protective relays tripped the unit offline due to both generator and bus ground fault indications. After the trip, a fire was discovered in the lead box area of the generator. After a thorough inspection of all related components, AGT services was brought onsite and replaced the "A" phase Generator High Voltage Bushings (HVB) with a spare bushing from the Mayo plant. The Duke Energy Specialty Services Bus crew removed the damaged bus work and installed the new bus work components, and Crown electric supplied the new bus work and flexible connections. The "A" phase HVB, flexible links, and "A" phase terminations of the Isolated Phase Bus (IPB) were replaced, along with any sealing fixtures and gaskets in the heatcaffected area. All Corrective Actions were completed from the Root Cause Analysis.

During Operator rounds on 08-28-21 a burning smell was observed around the generator. Thermal imaging showed higher than expected temperatures at the flex link housing. Decision was made to remove the unit from service to perform an inspection. Worked with TGS and Regional Services to facilitate the inspection. It was decided to perform a Support/Refute document and an Equipment Reliability Checklist for this event.

After inspection the bus to bushing connection plate that was installed in 2017 did not have a good electrical contact area. The piece blue checked and there was less than 80% contact. The bushing to bus bolt stacking was changed in 2017 from the original design. The original design had a bolting collar that was eliminated during the 2017 failure repair on A phase. It was found that the hardware sizing was inconsistent across all phases. An Extent of Condition was conducted on B & C phase and the contact area on B phase was resilver plated and C phase was replaced.

Checklist Summary Report
Page 2 of 4

Causes			
Number	**Description and Cause Code**		
C1	**A2B6C01 – Damaged, Defective, or failed part -** Bushing to bus connection was unsatisfactory.		
C2	**AXB2 - Maintenance/Modification Configuration -** Bolting collar was eliminated from hardware during the 2017 failure.		
Corrective Action Plan (add rows as needed)			
Number	**Responsible Individual** Evaluator **SHALL** obtain concurrence from assignee or supervisor.	**Due Date / Completed date**	**Action Required**
Immediate / Interim Actions Addressing Condition			
COND-1	Sandie Hall	08/25/2021	Unit Shutdown and replace Flex Links
Action Plan Items Addressing Extent of Condition			
EOC-1	Eric White/Crown Electric	11/8/2021	Inspection of EBS B and C phase flex links and bushing connection
EOC-2	Doug Coleman/Chad Boncquet	11/23/2021	Replacing B & C phase generator bushings to require bushing to flex link flanges connection blue checks.
Action Plan Items Addressing Cause			
C1-1	Eric White	10/01/2021	Inspection and testing of Isophase bus and generator bushings by Crown Electric and Siemens.
C1-1	Eric White	11/08/2021	A phase Flex link inspection with TGS, Regional Services & Crown Electric
C1-1	Sandie Hall	12/17/2021	Install engineered view ports to support flex link monitoring by external portable IR camera. Engineering in progress.
C1-1	Sandie Hall	03/31/2022	Stationary IR camera monitoring options.
C2-1	Doug Coleman/Chad Boncquet	11/23/2021	A phase Generator bushing removal and evaluation of contact surface area between bushing and adaptor plate.
Fleet Actions			
FA1		MM/DD/YYYY	

Checklist Summary Report
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Equipment Reliability Checklist

Equipment Failure Description

EQUIP ID: 1964206	**Failure Description:** Isophase bus to generator flexible link connection and bushing connections on A phase overheated and loosened.	**EQUIP CLASSIFICATION:** ☒Critical ☐ Important ☐Run to Failure ☐Not Applicable

Failed Subcomponent or Part: Flex Link, bushing bolting, and bus flange

Failure Rate:
☐Non-Recurring ☒ Repeat -Repeat from 2017 and August 2021
☐Chronic (more than 3 in 2 years)

Equipment Failure Analysis Methods

Tools Used in Determination of Causes

Use of Support/Refute or Failure Mode & Effects Analysis (FMEA) recommended. Use additional causal analysis tools, as necessary

☒Support/Refute - Source: TGS
☐Cause Tree - Source:
☒Event Specific FMEA or Component FMEA - Source: Accuren NDE of bus flange
☐Other Cause Analytical Tool Used:
☐No causal analysis beyond the equipment failure analysis checklist required:

Degradation/Failure Mechanism:

If the Failure Mechanism cannot be identified, then explain why and discuss the station's risk for reoccurrence of the equipment failure:

Failure Mode:

☐ Failure mode does not meet any other criteria or is unknown, explanation:

1.0 Equipment Failure Analysis Checklist

Instructions

1. The sections in this checklist are intended to help investigate factors that lead to the event. The checklist serves to identify problems and help establish actions to resolve issues.
2. If a statement can be answered as a 'Yes', then the investigator shall document the basis for the determination and a brief explanation as to why in the appropriate field.
3. If 'No', but the investigation addresses a question asked in this section and provides a validation for a 'No' response, then consider adding comments to support the 'No' response.
4. Once the applicable sections are completed, the weaknesses identified shall be summarized in the Checklist Summary Report.

1.1 Prevention

Yes	No	N/A	Attribute	Additional Information
☒	☐	☐	Work Practices	1. **Did work practices, behavior, or training contribute to or cause equipment failure?** Hardware sizing was found to be inconsistent across all phases.
☐	☒	☐	Work Instructions, Maintenance Procedures, Post Maintenance Testing	2. **Did work instruction contribute to or cause equipment failure?**
☒	☐	☐	Parts/Vendor Quality	3. **Did the quality of parts, shipping, handling or storage contribute to or cause equipment failures?** The bus to bushing connection plate was installed in 2017 and did not have good electrical contact area. The piece blue checked and there was less than 80% contact.
☐	☒	☐	Operation	4. **Did equipment operations contribute to or cause failure?** (Review operating procedures and practices and other operations tasks that may interface or impact equipment such as operator rounds).

Checklist Summary Report
Page 4 of 4

☐	☒	☐	Operation	5. **Did equipment operation contribute to or cause failure?** (Was equipment operated outside its design?)
☒	☐	☐	Design/Design Changes	6. **Did an inadequate design contribute to or cause failure?** The bushing to bus bolt stacking was changed in 2017 from the original design. The original design had a bolting collar that was eliminated during the 2017 failure repair on A phase.
☐	☒	☐	Preventive Maintenance	7. **Did the failure result from lacking or inadequate maintenance strategy?** (PM did not exist, inappropriate frequency or scope, inadequate basis or feedback not implemented, incorrect ER classification)
☐	☒	☐	Operating Experience	8. **Is there a deficiency in how OE applicable to this component was evaluated and applied?** (Both internal and industry OE)
☐	☒	☐	Risk Management	9. **Was failure due to inadequate risk management?** (Untimely or ineffective bridging, mitigating or corrective measures?)
☐	☐	☒	Long Range Plan (Power Plan)	10. **Did aging/obsolescence concerns or inadequate asset management plan contribute to or cause equipment failures?** (Were previous Business Plan related items untimely?)

1.2 Detection

Yes	No	N/A	Attribute	Additional Information
☐	☐	☒	PMT	1. **Was functional testing or post maintenance/modification testing ineffective in detecting the failure or precursors?** (Inadequate or missing PMT design is captured in Prevention.)
☐	☒	☐	Performance or System Monitoring Implementation	2. **Was system/component monitoring ineffective in identifying equipment degradation?** (Scope, frequency or implementation of PdM, Inservice Inspection, walkdowns, or operator rounds?)
☒	☐	☐	Trending and Asset Management	3. **Was system or component health monitoring deficient in identifying equipment degradation?** EMSA did not find the failure.
☐	☒	☐	Troubleshooting	4. **Was troubleshooting of a degraded condition inadequate?**

1.3 Correction

Yes	No	N/A	Attribute	Additional Information
☐	☒	☐	Untimely Action	1. **Was failure due to untimely implementation of corrective actions?** (This includes untimely Corrective Maintenance work or mitigation actions.)
☐	☒	☐	Ineffective Action	2. **Have previous issues not been adequately addressed?** (Mitigation and elimination actions.)

Checklist Summary Report
Page 1 of 6

Event#:1210280	**Event Date:** 12-08-21	**Location/Department:** East Bend/MW Regional Services
OE Oversight: Jamie McDaniel	**Sponsor Name/Approval Date:** Brett Riggins/Bill Luke	
Investigator(s): Doug Corson, Troy Wilhelm, Jamie McDaniel, Sandie Hall, Mike Hicks, Nick Sellet		
Checklist(s) Performed: ☐ **Equipment** ☒ **Human Performance** ☒ **Organizational and Programmatic**		
Common Cause Analysis: ☐ **Yes** ☒ **No**		
Other Cause Evaluation Tools Used (e.g., Why Analysis and Event and Causal Factor Chart):		

Problem Description

Deviation Statement: The East Bend Fall 2021 Outage did not meet the schedule targets, which resulted in negative impacts to reliability targets and budget.

Consequence: The outage was completed 34 days past the original date of completion, which required additional funding authorization.

Extent of Condition

Extent of Condition Required: ☒ **Yes** ☐ **No**

Basis for Decision/Conclusion: Any station in the RRE Fleet that conducts outages.

Summary of Analysis Results

The less than adequate contractor project management and skill level of the workforce led to delays with planning, logistics and execution. In addition, technical recommendations for additional turbine/generator scope were not implemented prior to scope lock and establishment of baseline schedule. This led to the Fall 2021 East Bend planned outage not achieving the outage baseline schedule or its budget target.

East Bend Fall Outage Start Date: 09/11/21
Planned Breaker Close: 11/21/21
Actual Breaker Close: 12/25
34 days late compared to baseline
Released to Dispatch 01/04/22

Key Outage Delays

Siemens Delays – 21 days

- End Winding damage, CRL events, safety standdown, COVID, oil flush and train alignment re-work
  - The PJB failed to identify the error-precursors to mitigate the critical steps and proper controls to ensure that the critical steps were performed as intended.
  - The OEM should have utilized written governance for the task.
  - Lack of peer checking for high risk work tasks
- Lack of effective contractor Project Management, schedule adherence, oversight, and quality control
  - Siemens supervisory oversight was less than adequate.
  - COVID protocols contributed to resource turnover and staffing levels
- Inexperience of the craft labor and worker inefficiencies.
  - Ratio of experienced crew versus apprentice was less than adequate

Duke Delays – 7 days

- Inadequate risk identification of equipment condition degradation prior to the outage
  - Generator Core Loop Test & Repairs
  - Generator Frame Foot Loading & Hydrogen Seal Slope Check

Unit Startup - 6 days

- Field Excitation inspection and testing due to no terminal voltage when starting the unit excitator
  - Support/Refute Document

Checklist Summary Report
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Causes	
Number	**Description and Cause Code**
C1	**A4B3C11** - *Inadequate work package preparation.* LTA Contractor project management led to insufficient pre-planning (i.e. scheduling, project plans, and logistics plans)
C2	**A4B3C05** - *Insufficient number of trained or experienced workers assigned to task.* Turbine /Generator Turn-key contractor less than adequate experience of the workforce, adherence to planned staffing levels and resource turnover.
C3	**A4B5C07** - *Effect of change on schedules not adequately addressed.* Generator vibration issues effecting equipment condition not factored into baseline outage schedule.

Corrective Action Plan (add rows as needed)			
Number	**Responsible Individual** Evaluator **SHALL** obtain concurrence from assignee or supervisor.	**Due Date / Completed date**	**Action Required**
Immediate / Interim Actions Addressing Condition			
COND-1	RREM Regional Services	10/25/2021	Added additional Duke, TGS, & Contractor Oversight for safety and quality control. Contractor additional Quality Control resources were added.
Action Plan Items Addressing Extent of Condition			
EOC-1	Jamie McDaniel	03/31/2022	Develop an OE to share outage lessons learned across the RRE Fleet
Action Plan Items Addressing Cause			
C1-1	Doug Corson/RREM Regional Services	03/31/2022	RREM Regional services and sourcing to evaluate contract strategy to ensure both Duke & Contractor detailed outage plans are submitted and vetted per RRE Outage Management process.
C2-1	Doug Corson/RREM Regional Services	03/31/2022	RREM Regional services to work with sourcing to evaluate future contract strategy to include resource qualifications for Project Management/Supervision resources.
C2-2	Doug Corson/RREM Regional Services	03/31/2022	Implement RRE outage improvement plan to evaluate pre-outage workforce skill crew review.
C3-1	Doug Corson/RREM Regional Services	03/31/2022	Implement RRE outage improvement plan to reevaluate the risk and schedule impacts due to equipment performance issues. (i.e. Turbine vibrations)
Fleet Actions			
FA1		MM/DD/YYYY	

Instructions:

1. The sections that follow are intended to help investigate worker behaviors and other factors that lead to the event. The checklist serves to identify problems and help establish corrective actions to resolve the issues.
2. If a statement can be answered as a "Yes", then the investigator shall document the basis for the determination and a brief explanation of "why" in the appropriate field below.
3. If 'No', but the investigation addresses a question asked in this section and provides a validation for a 'No' response, then consider adding comments to support the 'No' response.
4. Once the applicable sections are completed, the weaknesses identified shall be summarized in the Checklist Summary Report.
5. In many cases it is beneficial to review the lower level questions prior to answering the higher-level question.

1.0 Worker Behaviors

1.1 Task Preparation

Was there a problem related to preparation for a task or activity? ☒ Yes ☐ No

If 'Yes', then continue with the additional questions in this section.

Yes	No	Additional Information

Checklist Summary Report
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☐	☒	1. Was a required pre-job brief NOT performed for this task?
☒	☐	2. Did the pre-job brief fail to identify error-precursors or fail to identify action to mitigate those? The pre-job brief failed to identify certain work tasks hazards. Most notably around rigging/lifting activities.
☒	☐	3. Was there a problem identifying or understanding critical steps? Yes, lift plans did not identify hazards associated with the lifts.
☒	☐	4. Was there a failure to put proper controls in place to ensure critical steps were performed as intended? The pre-job briefs did not include the proper plan or oversight for some tasks.
☐	☒	5. Was there a failure to apply relevant operating experience for this task?
☐	☒	6. Were there any other gaps to standards or weaknesses identified related to task preparation?

1.2 Task Performance

Was there a problem that occurred during the performance of a task? ☒ Yes ☐ No
If 'Yes", then continue with additional questions below.

Yes	No	Additional Information
☐	☒	1. Is this a first-time task or was the proficiency of the work performer insufficient?
☒	☐	2. Was the task initially assumed to be a simple task but turned out to be more complex during execution? A couple of the lifting/rigging event tasks were considered routine lifts and lacked detail that would have prevented the event.
☒	☐	3. Should this task have required written governance, but did not? Yes, using OEM drawings would have helped tasks that resulted in events.
☒	☐	4. Did the task occur over multiple shifts or multiple workgroups? **Day and night shifts completed similar tasks.**
☐	☒	5. Were there problems with the turnover of the task (e.g., unclear communications, information shares)?
☐	☒	6. Were there any other gaps to standards or weaknesses identified related to task performance?

1.3 Procedure Adherence

Was the condition the result of a procedure adherence weakness? ☐ Yes ☒ No
If 'Yes', then continue with additional questions below.

Yes	No	Additional Information
☐	☐	1. Was the written standard defining the task vague, confusing, or provides inaccurate information?
☐	☐	2. Would place-keeping tools or flagging have helped with task performance, but was not used?
☐	☐	3. Were there any other gaps to standards or weaknesses identified related to procedure adherence?

1.4 Verification Practices

Did the condition involve verification practice weakness? ☒ Yes ☐ No
If 'Yes", then continue with additional questions below.

Yes	No	Additional Information
☐	☒	1. Was there a failure to receive a peer-check, concurrent verification, or independent verification that was required by the written standard for the task?

Checklist Summary Report
Page 4 of 6

☒	☐	2. Would using a peer-check, concurrent verification, or independent verification for this task have resulted in a successful outcome? Yes, in most cases peer checking would have prevented rework and events.
☐	☒	3. Were there any other gaps to standards or weaknesses identified related to verification practices?

1.5 Communications Practices

Was the condition the result of communication breakdowns? ☒ Yes ☐ No
If 'Yes', then continue with additional questions below.

Yes	No	Additional Information
☒	☐	1. Was the information conveyed during this task incorrect? Yes, this resulted in rework and events.
☐	☒	2. Did the work Performer(s) fail to use station accepted clear communication practices?
☒	☐	3. Were there any gaps to standards or weaknesses identified related to communication practices? Yes, in one of the events there was a lack of communication within the work group.

Supporting Questions

1.0 Organizational/Programmatic Investigation

The section that follows is intended to help investigate organizational or programmatic contributors that lead to an event. The checklist serves to identify problems and help establish corrective actions to resolve issues.

1. If a statement can be answered as a "Yes", then the investigator shall document the basis for this determination in the appropriate field below
2. If 'No', but the investigation addresses a question asked in this section and provides a validation for a 'No' response, then consider adding comments to support the 'No' response.
3. Once this section is completed, summarize the weaknesses identified in the Checklist Summary Report.
4. It is helpful to review lower level questions prior to answering the higher-level question.

If in the course of the investigation it is believed that leadership or team weaknesses contributed to the event, then Section 2.0 establishes tools that can be used to assess those behaviors or potential vulnerabilities. Section 1.0 and 2.0 may be used independent of each other or jointly, as needed.

1.1 Process Weaknesses

Was there a problem that occurred entirely within a particular process or program? ☐ Yes ☒ No
If "Yes", then continue with additional questions below.

Yes	No	Additional Information
☐	☐	1. Are there deficiencies in the governing standard describing all activities needed to successfully complete the task?
☐	☐	2. Does the governing standard have vague or confusing steps that contributed to the problem?
☐	☐	3. Does the governing standard have excessive implementation requirements that make it hard to use?
☐	☐	4. Are there weaknesses in the governing standard that impede the implementation of regulatory or required standards?

1.2 Interface Between Controlling Processes

Was there a problem that arose during hand-offs or interfaces between procedures, policies, work orders, manuals, or other written standards? ☐ Yes ☒ No
If "Yes", then continue with additional questions below.

Yes	No	Additional Information

Checklist Summary Report
Page 5 of 6

☐	☐	1. Are interface(s) missing in all written standards when multiple standards are required to accomplish the task or goal?
☐	☐	2. Are there conflicting requirements between two or more written standards?

1.3 Organizational Problem With Program Execution

Was there a problem that occurred when a work group does not establish or implement a program properly? ☐ Yes ☒ No

If "Yes", then continue with additional questions below.

If there are cross-functions issues, then these questions may lead the evaluator to section 2.0, a Diagnostic Tool on Leadership and Teamwork behaviors.

Yes	No	Additional Information
☐	☐	1. Are there problems with clear ownership of a process or program?
☐	☐	2. Are the roles or responsibilities of the implementing organization poorly defined or not understood?
☐	☐	3. Are there insufficient resources or a lack of authority to implement the process or program?
☐	☐	4. Are there weaknesses in program monitoring (e.g., metrics, self-assessment, event reports) such that problems were not detected?
☐	☐	5. Are there difficulties in correcting known problems in the program?
☐	☐	6. Are there other challenges in program implementation?

1.4 Coordination Between Work Groups

Was there a problem that occurred when work groups had to collaborate or coordinate together to achieve a task? ☒ Yes ☐ No

If "Yes", then continue with additional questions below.

If there are cross-functional issues, then these questions may lead the evaluator to section 2.0 a Diagnostic Tool on Leadership and Teamwork behaviors

Yes	No	Additional Information
☒	☐	1. Was there a lack of effective stakeholder participation? Yes, lack of project management and supervision caused issues throughout execution.
☒	☐	2. Was there a lack of alignment around a common goal? Yes, lack of schedule adherence and recovery efforts were lacking.
☐	☒	3. Was there a lack of understanding about ownership, roles, or responsibilities between work groups?
☒	☐	4. Did resources, physical work spaces, technology, or infrastructure affect the ability for work groups to effectively interface? There was limited work spaces on the turbine deck due to not having a vetted laydown plan.
☐	☒	5. Was there inadequate communication between work groups?

1.5 Problems within a Work Group

Was there a problem in a single organization that affected broad functions within the organization? ☒ Yes ☐ No

If "Yes", then continue with additional questions below.

If there appear to be issues that cross multiple work groups, then these questions may lead the evaluator to Section 2.0, a Diagnostic Tool on Leadership and Teamwork behaviors.

Yes	No	Additional Information

Checklist Summary Report
Page 6 of 6

☒	☐	1. Is there a lack of resources? Yes, throughout the project there was a lack of resources to complete the work.
☒	☐	2. Is there inadequate supervisory oversight? Yes, PM and supervision was lacking especially during the first part of the outage.
☐	☒	3. Is there inadequate communication within the work group?
☐	☒	4. Is there a problem with the work group's vision, values or standards? (If ~~this items~~this item is marked "Yes", then continue to section 4.0)

Duke Energy Kentucky
Case No. 2024-00152
STAFF First Set of Data Requests
Date Received: August 23, 2024

STAFF-DR-01-017

REQUEST:

Provide an analysis of the impact a major forced outage of the East Bend Station has had on fuel cost and purchased power costs.

RESPONSE:

A forced outage of the East Bend Station does not have an impact on fuel cost included in the FAC because the cost of replacement power above what it would have cost to operate East Bend is excluded from FAC recovery per 807 KAR 5:056 Section 1 (3).

PERSON RESPONSIBLE: Scott Burnside

Duke Energy Kentucky
Case No. 2024-00152
STAFF First Set of Data Requests
Date Received: August 23, 2024

STAFF-DR-01-018

REQUEST:

If the completion of the Limestone Conversion project is approved, explain whether the by-products of the wet flue gas desulphurization (WFGD) will be landfilled or whether they can be beneficially utilized.

RESPONSE:

They will be landfilled.

PERSON RESPONSIBLE: J. Michael Geers

Duke Energy Kentucky
Case No. 2024-00152
STAFF First Set of Data Requests
Date Received: August 23, 2024

STAFF-DR-01-019

REQUEST:

Provide a detailed description of the East Bend Station's fly ash, bottom ash and gypsum beneficial use program.

RESPONSE:

These products are placed in an onsite landfill.

PERSON RESPONSIBLE: J. Michael Geers

Duke Energy Kentucky
Case No. 2024-00152
STAFF First Set of Data Requests
Date Received: August 23, 2024

PUBLIC STAFF-DR-01-020
(As to Attachments only)

REQUEST:

Provide copies of the most recent condition assessment of the East Bend Station WFGD Absorbers (3).

RESPONSE:

CONFIDENTIAL PROPRIETARY TRADE SECRET (As to Attachments only)

Please see STAFF-DR-01-020 Confidential Attachments 1 through 3.

PERSON RESPONSIBLE: Chad Donner

CONFIDENTIAL PROPRIETARY TRADE SECRET

STAFF-DR-020
CONFIDENTIAL ATTACHMENT 1

FILED UNDER SEAL

CONFIDENTIAL PROPRIETARY TRADE SECRET

STAFF-DR-020
CONFIDENTIAL ATTACHMENT 2

FILED UNDER SEAL

CONFIDENTIAL PROPRIETARY TRADE SECRET

STAFF-DR-020
CONFIDENTIAL ATTACHMENT 3

FILED UNDER SEAL

Duke Energy Kentucky
Case No. 2024-00152
STAFF First Set of Data Requests
Date Received: August 23, 2024

PUBLIC STAFF-DR-01-021
(As to Attachment only)

REQUEST:

Refer to the Application, page 6, paragraph 14. Provide the analysis that was conducted to support the impact the higher cost of lime-based reagent has on the unit's capacity factor.

RESPONSE:

CONFIDENTIAL PROPRIETARY TRADE SECRET (As to Attachment only)

Please see STAFF-DR-01-021 Confidential Attachment.

PERSON RESPONSIBLE: Ryan Trogstad

CONFIDENTIAL PROPRIETARY TRADE SECRET

STAFF-DR-021
CONFIDENTIAL ATTACHMENT

FILED UNDER SEAL

Duke Energy Kentucky
Case No. 2024-00152
STAFF First Set of Data Requests
Date Received: August 23, 2024

PUBLIC STAFF-DR-01-022

REQUEST:

Refer to the Application, page 6, paragraph 15. Provide a detailed financial and benefit/cost analysis for each of the three alternatives that were considered for the Limestone Conversion Project.

RESPONSE:

CONFIDENTIAL PROPRIETARY TRADE SECRET

1) **Limestone Conversion Project:** Please see STAFF-DR-01-021 Confidential Attachment.
2) **RFP exploring alternative sources**: Duke Energy Kentucky solicited the market for available lime through a Request for Proposal on March 29, 2023. The solicitation was sent to eleven potential lime suppliers which included the major known producers of the product needed for East Bend Station. In response to the RFP, Duke Energy Kentucky received two responses for potential supply to the station, however [redacted] with availability to supply the product to the station.
3) **On-site mixing of magnesium hydroxide with hi-calcium quicklime to create a replacement mag-lime product:** First, [redacted] as discussed in Verderame direct pg. 16, lines 7 through 8.

Second, [redacted] yields ~212lbs of Mg(OH)2 per ton on lime. A typical high calcium lime/low mag lime supply (Example St. Genevieve) yields ~22lbs of Mg(OH)2 for a difference/deficit of 190lbs Mg(OH)2 / TN of Lime. Commercially produced magnesium hydroxide comes in a 60% slurry by weight with a bulk density of 12.8lb/gallon, of that 7.68lbs are magnesium hydroxide due to 40% being water. Previous cost on a as delivered basis was $0.267/lb. and $0.50/lb. on a dry basis. So, multiplying the 190lb deficit of mag hydroxide by the dry mag hydroxide product cost (190lb * 0.50), would equal ~$95/TN of lime in mag hydroxide cost or an additional $5.7M/yr. in reagent cost for a 60K TN/Yr. usage rate. Breaking this down for a mag hydroxide usage, it would take ~9,522 tons of mag hydroxide / year or roughly 432 trucks / year.

Finally, no equipment renovations are needed for this alternative.

PERSON RESPONSIBLE: John A. Verderame
Ryan Trogstrad
Adam Prichard

Duke Energy Kentucky
Case No. 2024-00152
STAFF First Set of Data Requests
Date Received: August 23, 2024

STAFF-DR-01-023

REQUEST:

Refer to Geers Direct Testimony, page 13, lines 4-14. Explain whether Duke Kentucky included the beneficial use of the new by-product of the WFGD in its analysis.

RESPONSE:

No, no beneficial reuse of the new WFGD byproduct is anticipated or included in the analysis.

PERSON RESPONSIBLE: J. Michael Geers

Duke Energy Kentucky
Case No. 2024-00152
STAFF First Set of Data Requests
Date Received: August 23, 2024

STAFF-DR-01-024

REQUEST:

Refer to Geers Direct Testimony, page 8, lines 12-15. Describe how the East Bend Station will comply with the May 9, 2024, New Source Performance Standards for Greenhouse Gas emissions.

RESPONSE:

As described in Duke Energy Kentucky's filed 2024 Integrated Resource Plan, East Bend Station's compliance path is to co-fire coal with natural gas by January 1, 2030 and retire the station by December 31, 2038.

PERSON RESPONSIBLE: Matthew Kalemba

Duke Energy Kentucky
Case No. 2024-00152
STAFF First Set of Data Requests
Date Received: August 23, 2024

STAFF-DR-01-025

REQUEST:

Refer to the Duke Kentucky East Bend Station Title V Minor Permit Revision Table on Page 3. Provide a description of the "Baseline," "Future W – Limestone" and "Future W/O – Quicklime" operating modes.

RESPONSE:

When determining air permit requirements, it is necessary to compare the source's past emissions (baseline) to the projected future emissions if the limestone conversion project were implemented (Future W-Limestone) and to the projected future emissions if the limestone project were not implemented (Future W/O – Quicklime). This analysis is performed for each air pollutant to determine if there is an emission increase applicable to the project which exceeds the applicable threshold.

PERSON RESPONSIBLE: J. Michael Geers

Duke Energy Kentucky
Case No. 2024-00152
STAFF First Set of Data Requests
Date Received: August 23, 2024

STAFF-DR-01-026

REQUEST:

Refer to the Verderame Direct Testimony, page 10, line 8.

a. Provide specific details supporting the $166.1 million risk assessment that is utilized against the $125.8 million cost.

b. Explain what financial mechanism was used to develop this risk assessment.

RESPONSE:

a. Please see the Direct Testimony of John Verderame, starting at page 11, line 8, through page 13, line 8. Additionally, note that the original $166.1 million risk assessment was updated to $192.4 million in the response to STAFF-DR-01-007.

b. All calculations were completed using current PJM rules and PJM capacity bilaterial market prices. In addition, please see response to STAFF-DR-01-007.

PERSON RESPONSIBLE: John Swez

Duke Energy Kentucky
Case No. 2024-00152
STAFF First Set of Data Requests
Date Received: August 23, 2024

STAFF-DR-01-027

REQUEST:

Refer to the Verderame Direct Testimony, page 16, line 16. Provide details that support the $18.6 million in annual reagent savings. Include any supporting documentation or calculations.

RESPONSE:

Please see STAFF-DR-01-021 Confidential Attachment.

PERSON RESPONSIBLE: Ryan Trogstad

Duke Energy Kentucky
Case No. 2024-00152
STAFF First Set of Data Requests
Date Received: August 23, 2024

STAFF-DR-01-028

REQUEST:

Refer to the Verderame Direct Testimony, page 10, lines 15-19.

a. Explain how to avoid the approximate $166.1 million in potential penalties, capacity, and energy replacement costs.

b. Explain whether the Company has considered transitioning away from its FRR Plan to the PJM Reliability Pricing Model (RPM) to participate in the Base Residual Auction (BRA). If not, explain why.

RESPONSE:

a. Duke Energy Kentucky believes that the best way to avoid the approximate $166.1 million in potential penalties, capacity and energy replacement costs is to complete the proposed limestone conversion project outlined in its CPCN application. Note, the original $166.1 million in potential penalties has been updated using current PJM bilaterial capacity market prices to $192.4 million. Please see response to STAFF-DR-01-007.

b. Since first entering PJM, the FRR arrangement was the logical decision and has benefited Kentucky customers. However, over its time in PJM, the Company has periodically analyzed whether remaining a FRR entity continues to be in the best interests of customers. In 2024, the Company conducted a full study of participation in the RPM versus its current FRR status and on August 28, 2024, filed its notice of intent to seek Commission approval to participate in PJM's RPM in Case No 2024-000285.

PERSON RESPONSIBLE: John Swez

Duke Energy Kentucky
Case No. 2024-00152
STAFF First Set of Data Requests
Date Received: August 23, 2024

STAFF-DR-01-029

REQUEST:

Refer to the Sarah E. Lawler Direct Testimony, Attachment SEL-1, page 1, line 10. Explain how Duke Kentucky determined its Pretax Rate of Return of 8.822%. Include any supporting documentation or calculations.

RESPONSE:

This is the pretax rate of return currently used in the Company's Rider ESM filings. It is calculated by taking the after tax Weighted Average Cost of Capital (WACC) approved for the Company's Rider ESM in the Company's most recent electric rate case of 7.140% grossed up by the Company's approved Gross Revenue Conversion Factor (GRCF) of 1.3342383. The GRCF was also approved as part of the Company's most recent electric rate case and can be found on Schedule H of that filing.

The calculation of the Pretax Rate of Return of 8.822% can be found on Form 1.20 of the Company's monthly Rider ESM filings and is also shown below. In the Company's most recent electric rate case, the Commission approved an ROE of 9.65% to be used in the Company's Rider ESM filings.

DUKE ENERGY KENTUCKY, INC.
ENVIRONMENTAL SURCHARGE REPORT

Cost of Capital

Line No.	Capital Structure	Ratio	Cost	Weighted Cost (A)	Gross up for Tax Rate (B)	Pre-Tax Rate of Return (A)x(B)
1	Short-term Debt	3.780%	4.739%	0.179%		0.179%
2	Long-term Debt	44.075%	4.377%	1.929%		1.929%
3	Common Equity	52.145%	9.650%	5.032%	1.3342383	6.714%
4	Total	100.000%		7.140%		8.822%

PERSON RESPONSIBLE: Sarah E. Lawler