KyPSC Case No. 2024-00152
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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 supplemental 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 24th day of October, 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)

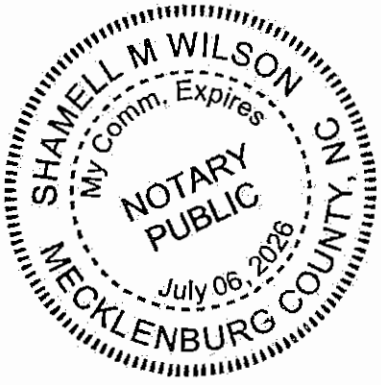
The undersigned, John Verderame, VP Fuels & Systems Optimization, being duly sworn, deposes and says that he has personal knowledge of the matters set forth in the foregoing supplemental data requests, and that the answers contained therein are true and correct to the best of his knowledge, information and belief.

John Verderame, Affiant

Subscribed and sworn to before me by John Verderame on this 25th day of October, 2024.

NOTARY PUBLIC

My Commission Expires:



VERIFICATION

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

The undersigned, J. Michael Geers, Manager EHS Energy Transition Group, being duly sworn, deposes and says that he has personal knowledge of the matters set forth in the foregoing supplemental 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 28TH day of OCTOBER, 2024.

Adele M. Frisch
NOTARY PUBLIC

My Commission Expires: 1/5/2029

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 supplemental data requests, and that the answers contained therein are true and correct to the best of his knowledge, information and belief.

Ryan Trogstad, Affiant

Subscribed and sworn to before me by Ryan Trogstad on this 24th day of October, 2024.

NOTARY PUBLIC

My Commission Expires: June 5, 2029

Duke Energy Kentucky
Case No. 2024-00152
SIERRA First Set of Data Requests
Date Received: September 20, 2024

PUBLIC SUPPLEMENTAL SIERRA-DR-01-007

REQUEST:

Please refer to the Direct Testimony of Chad M. Donner, at page 8, and answer the following requests:

a. Please provide the 2023 Request for Proposal (RFP) documents and responsive bids.

b. If the Company has issued an RFP for the MEL product since 2023, please identify each such RFP and provide RFP documents and responsive bids for each such RFP.

c. Please provide details of the evaluation that Duke conducted about "the possibility of mixing standard high calcium quicklime and magnesium hydroxide"

d. The Direct Testimony of J. Michael Geers, page 12, line 20, suggests that actual procurement and mixing occurred. Did this evaluation entail actual mixing of these components or was the evaluation limited to a paper study? Please provide any documents, results, reports, etc. pertaining to these studies.

ORIGINAL RESPONSE:

CONFIDENTIAL PROPRIETARY TRADE SECRET (As to Attachments only)

a. Please see SIERRA-DR-01-007(a) Confidential Attachments 1 and 2.

b. While the Company has not issued an RFP for the MEL product since 2023, the Company has actively continued to have discussions with numerous lime suppliers over the last year and a half looking for additional/alternative supplies.

c. The evaluation consisted of a simple mass balance to supplement the deficient amount of magnesium content provided in standard high calcium quicklime by means of adding magnesium hydroxide to match the magnesium content of the base MEL product.

d. Yes, actual mixing has been performed. There are two different approaches, and both have been used in the past for East Bend. First, dolomite (dry) which consists of approximately 50% magnesium oxide is blended with standard high calcium quicklime to net the correct blended percentage of magnesium. This process is a dry material handling process that requires multiple conveyors and belt scales that must be done at the lime supplier's facility. The result is a barge of pre blended product to the appropriate magnesium content that is then unloaded by the station into their existing process. Second, a magnesium hydroxide slurry is added directly to the station reagent slurry storage tank that is then fed directly into the WFGD absorbers. The first approach is more of a continuous production process and the latter is more of a batch process, however, the amount required by both addition methods are determined by the process outlined in the previous request answer. Both approaches are acceptable but one must be done offsite and the other can be done onsite.

SUPPLEMENTAL RESPONSE:

CONFIDENTIAL PROPRIETARY TRADE SECRET

b. As discussed in Company's confidential supplemental response to STAFF-DR-01-005 after Duke Energy Kentucky filed its Limestone Conversion CPCN Application, its current MEL supplier became interested in discussing a potential

supply offer that attempted to address the pricing and supply issues raised in the CPCN Application. As a result, the Company has updated the modeling in the lime scenario based on the [redacted]

PERSON RESPONSIBLE: John A. Verderame – a., b.
Chad Donner – c., d.

Duke Energy Kentucky
Case No. 2024-00152
SIERRA First Set of Data Requests
Date Received: September 20, 2024

PUBLIC SUPPLEMENTAL SIERRA-DR-01-025

REQUEST:

Please explain how Duke's modeling in support of this CPCN application incorporates the EPA's updated Mercury Air Toxics Standards ("MATS") rule, if at all.

ORIGINAL RESPONSE:

The limestone conversion's design incorporates the measures necessary to maintain compliance with the MATS rule as the unit converts from using quick lime to limestone. As a result, there are no additional costs modeled as part of this conversion. The measures required that will be implemented in the years leading up the compliance date of the revised MATS rule are outside the scope of this project and would be required regardless of whether lime or limestone is used. No additional modeling is required.

SUPPLEMENTAL RESPONSE:

CONFIDENTIAL PROPRIETARY TRADE SECRET

After Duke Energy Kentucky filed its Limestone Conversion CPCN Application in late July 2024 and provided its initial response to SIERRA-DR-01-025, its current MEL supplier approached the Company to discuss the potential for [redacted] The Company has updated its response to this data request as a result.

As discussed in the Company's original response to SIERRA-DR-01-025 above, the Limestone Conversion project includes upgrades to the existing scrubber units that would meet the new MATS standard for fine particulates. Should the Company not perform

the Limestone Conversion Project, it would still have to undertake a project to upgrade the scrubbers to comply with MATS. The Company has not performed the engineering for the upgrades required to provide the same MATs benefits as the Limestone Conversion Project but estimates its scope is approximately 25% of the current CPCN project, which would equate to an approximately $25.0 to $30.0 million stand-alone project.

PERSON RESPONSIBLE: J. Michael Geers

Duke Energy Kentucky
Case No. 2024-00152
SIERRA First Set of Data Requests
Date Received: September 20, 2024

PUBLIC SUPPLEMENTAL SIERRA-DR-01-040

REQUEST:

Please refer to the Direct Testimony of Witness Verderame, page 7, lines 6-7, where it states "The Company reached an interim agreement, but at more than double the price of the prior contract."

a. Please state the term of the interim agreement that the Company reached with the supplier.

b. Before the interim agreement was reached, how often was the Company contracting with this particular supplier? (*i.e.*, were contracts entered into for one year, five years, etc.)

c. Please explain how long the Company has been contracting with this supplier.

ORIGINAL RESPONSE:

CONFIDENTIAL PROPRIETARY TRADE SECRET

[redacted]

b. Duke Energy Kentucky has historically entered into [redacted] supply agreements with this supplier.

c. The supplier has been the provider of the MEL lime product to East Bend since the plant began operations in the early 1980's.

SUPPLEMENTAL RESPONSE:

CONFIDENTIAL PROPRIETARY TRADE SECRET

a. As discussed in the Company's confidential supplemental response to STAFF-DR-01-005 and SIERRA-DR-01-007 the Company's current MEL supplier is now negotiating on an [redacted]

PERSON RESPONSIBLE: John A. Verderame

Duke Energy Kentucky
Case No. 2024-00152
SIERRA First Set of Data Requests
Date Received: September 20, 2024

PUBLIC SUPPLEMENTAL SIERRA-DR-01-047

REQUEST:

Please refer to the Direct Testimony of Witness Verderame, page 13, lines 16-19, where it states, "Finally, as discussed below and not included in the $166.1 million impact above, the project saves $6.1 million in fuel and purchase power costs, $18.6 million in reagent costs, and $3 million in additional non-native off-system sales margin on average per year."

a. Please explain how the fuel and purchase power costs, reagent costs, and additional non-native off-system sales margin were calculated.

b. Please explain the difference between the $3 million in additional non-native off-system sales margin and the energy market impact of $15.8 million per year referenced on page 13, lines 5-6 of Witness Verderame's testimony.

ORIGINAL RESPONSE:

a. Please see STAFF-DR-01-021 Confidential Attachment. Specifically, see the Duke Energy Kentucky Cost Breakdowns tab for the calculation of the annual average savings of $6.1 million in fuel and purchase power expense as well as the $18.6 million in reagent cost savings and the Off System Sales tab for the calculation of the $3 million in additional non-native off-system sales margin.

b. The energy market impact of $15.8 million per year referenced on page 13, lines 5-6 of Witness Verderame's testimony refers to the estimated cost of replacement energy incurred should the limestone conversion project not take place and the Company be unable to purchase the MEL reagent causing East Bend Station to be

forced off-line. Please see Verderame Direct Testimony Footnote 7 Replacement Energy calculation at the bottom of page 13. The projected $3 million in additional net non-native sales revenue is based on the forecasted increase in economic generation at East Bend Station should the limestone conversion project take place.

SUPPLEMENTAL RESPONSE:

CONFIDENTIAL PROPRIETARY TRADE SECRET

After Duke Energy Kentucky filed its Limestone Conversion CPCN Application in late July 2024, its current MEL supplier approached the Company to discuss the potential for a [redacted]

The Company has updated its response to this data request as a result.

a. Please see STAFF-DR-01-021 Confidential Supplemental Attachment for the changes in projected impacts from the proposed reduction in MEL commodity costs. Specifically, see the Duke Energy Kentucky Cost Breakdowns tab for the resulting changes in the calculation of the annual average savings in fuel and purchase power expense from $6.1 million to $3.1 million as well as the change in reagent cost savings $18.6 million to $11.6 million. Finally, see the Off System Sales tab for the calculation of the additional non-native off-system annual average sales margin going from $3 million to $500 thousand.

PERSON RESPONSIBLE: Ryan Trogstad – a.
John Swez – b.

Duke Energy Kentucky
Case No. 2024-00152
SIERRA First Set of Data Requests
Date Received: September 20, 2024

PUBLIC SUPPLEMENTAL SIERRA-DR-01-048

REQUEST:

Please refer to the Direct Testimony of Witness Verderame, page 14, lines 5-7, where it states, "Stochastic production cost modeling shows that conversion to a limestone reagent process is economic in most future scenarios with reduced variable operational costs of ~$12.03/MWh reducing dispatch cost …."

a. Please confirm if the stochastic production cost modeling was performed using the EnCompass software. If the EnCompass software was not used, please provide the name of the software used.

b. Please provide, in machine readable format, the hourly market price forecasts modeled for each scenario.

c. Please provide the modeling period for the stochastic production cost modeling.

d. Please provide the modeling input and output files, in machine readable format, used to perform the stochastic production cost modeling.

e. Please explain what modeling inputs were modeled with stochastic inputs.

f. Please explain how the stochastic inputs were developed.

g. Please explain which scenarios are included in the "conversion to a limestone reagent process is economic in most future scenarios."

h. Please provide the scenarios in which the conversion to a limestone reagent process is not economic.

i. Please provide the off-system sales and purchases for the scenarios evaluated in the stochastic production cost modeling.

ORIGINAL RESPONSE:

CONFIDENTIAL PROPRIETARY TRADE SECRET (As to Attachments only)

a. Stochastic production cost modeling was performed using PowerSIMM, a product of Ascend Analytics.

b. Objection. This request is overly broad, unduly burdensome, and otherwise unreasonable as it would require the Company to provide millions of data points with hourly data in files too large to transfer. Without waiving said objection, and to the extent discoverable, the Company is able to provide the information on a monthly basis. Please see SIERRA-DR-01-048(b) Attachment 1 for the monthly power, natural gas and fuel oil market price inputs. Please see STAFF-DR-02-001 Confidential Attachment 1 and STAFF-DR-02-001 Confidential Attachment 2 for the monthly coal market price inputs.

c. Dispatch was simulated hourly from 1/1/26 through 12/31/2029, with the evaluated period being from 1/1/2027 through 12/31/2029.

d. Objection. This request is overly broad, unduly burdensome, and otherwise unreasonable as it would require the Company to provide millions of data points with hourly data in output files too large to transfer. Without waiving said objection, and to the extent discoverable, the Company is able to provide monthly average output files. Please see SIERRA-DR-01-048(d) Confidential Attachment 1 for additional key modeling assumptions for East Bend, modeled in these scenarios. Please see SIERRA-DR-01-48(d) Confidential Attachment 2 for the monthly mean output file.

e. Market prices (power, gas, and coal), Duke Energy Kentucky load, and forced outages were modeled with stochastic inputs.

f. Please see SIERRA-DR-01-048(f) Confidential Attachment.

g. All modeled scenarios were economic. The phrase "most future scenarios" was not intended to imply other portfolios were analyzed and would have been better stated by omitting "most."

h. No modeled scenarios were uneconomic. Please see response to (g) above.

i. Please see response to (d) above.

SUPPLEMENTAL RESPONSE:

CONFIDENTIAL PROPRIETARY TRADE SECRET

After Duke Energy Kentucky filed its Limestone Conversion CPCN Application in late July 2024, its current MEL supplier approached the Company to discuss the potential for [redacted]

The Company has updated its response to this data request as a result.

b. Objection. This request is overly broad, unduly burdensome, and otherwise unreasonable as it would require the Company to provide millions of data points with hourly data in files too large to transfer. Without waiving said objection, and to the extent discoverable, the Company is able to provide the information on a monthly basis. Please see STAFF-DR-02-001 Confidential Supplemental Attachment 1 for the updated lime scenario monthly coal market price inputs.

d. Objection. This request is overly broad, unduly burdensome, and otherwise unreasonable as it would require the Company to provide millions of data points with hourly data in files too large to transfer. Without waiving said objection, and to the extent discoverable, the Company is able to provide the information on a monthly basis. Please see SIERRA-DR-01-048(d) Confidential

Supplemental Attachment 2 for the updated lime scenario monthly mean output file.

i. Please see supplemental response to (d) above.

PERSON RESPONSIBLE: As to objections, Legal
As to responses, Ryan Trogstad

CONFIDENTIAL PROPRIETARY TRADE SECRET

SIERRA-DR-01-048(d) SUPPLEMENTAL CONFIDENTIAL ATTACHMENT 2

FILED UNDER SEAL

Duke Energy Kentucky
Case No. 2024-00152
SIERRA First Set of Data Requests
Date Received: September 20, 2024

PUBLIC SUPPLEMENTAL SIERRA-DR-01-049

REQUEST:

Please refer to the Direct Testimony of Witness Verderame page 14, lines 12-14, where it states, "This modeling showed a net decrease in forecasted dispatch costs of $12.78/MWh in the 2027 through 2029 operating period when operating on limestone."

a. Please confirm that Variable Operations and Maintenance ("VOM") costs are included in the forecasted dispatch costs.
b. Please provide the forecasted VOM for East Bend from 2025 to 2029 without the limestone conversion.
c. Please provide the forecasted VOM for East Bend from 2025 to 2029 with the limestone conversion.
d. Please provide the historical VOM for East Bend from 2019 through 2024.

RESPONSE:

CONFIDENTIAL PROPRIETARY TRADE SECRET (As to Attachment 1 only)

a. Confirmed.
b. Non-Reagent VOM costs without the limestone conversion were $1.65, constant through the modeled period. Please see SIERRA-DR-01-049 Confidential Attachment 1 for annual reagent components for the periods available.
c. Non-Reagent VOM costs with the limestone conversion were $1.65, constant through the modeled period. Please see SIERRA-DR-01-049 Confidential Attachment 1 for annual reagent components for the periods available.

d. Please see SIERRA-DR-01-049 Attachment 2.

SUPPLEMENTAL RESPONSE:

CONFIDENTIAL PROPRIETARY TRADE SECRET

After Duke Energy Kentucky filed its Limestone Conversion CPCN Application in late July 2024, its current MEL supplier approached the Company to discuss the potential for [redacted]

The Company has updated its response to this data request as a result.

b. Non-Reagent VOM costs without the limestone conversion remained $1.65, constant through the modeled period. Please see SIERRA-DR-01-049 Confidential Supplemental Attachment 1 for the change in annual reagent components for the period as a result from the proposed reduction in the MEL commodity price.

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

CONFIDENTIAL PROPRIETARY TRADE SECRET

SIERRA-DR-01-049 SUPPLEMENTAL CONFIDENTIAL ATTACHMENT 1

FILED UNDER SEAL

Duke Energy Kentucky
Case No. 2024-00152
SIERRA First Set of Data Requests
Date Received: September 20, 2024

PUBLIC SUPPLEMENTAL SIERRA-DR-01-065

REQUEST:

Please refer to the Company's CPCN Application, at page 8, paragraph 19.

a. Please quantify the "reduced variable operational cost" noted.

b. Please quantify the "higher overall reagent expenditure due to the anticipated increase in economic dispatch."

c. Please quantify the expected "significantly lower" cost per ton of reagent, for each year from now through the retirement of East Bend.

d. Please quantify the reduction in "maintenance" noted.

e. Please explain how there will be "fuel cost savings" as a result of the Limestone Conversion Project that is noted on this page.

ORIGINAL RESPONSE:

CONFIDENTIAL PROPRIETARY TRADE SECRET

a. As discussed in Witness Verderame's direct testimony page 14 line 7 the "reduced variable operational cost" is ~$12.03/MWh.

b. The Company's modeling calculated a decrease in reagent expenditures of $18,644,671 following the Limestone Conversion. Please see STAFF-DR-01-021 CONF Attachment DEK Cost Breakdown tab.

c. The expected "significantly lower" cost per ton of reagent through 2029 is shown in the table in Witness Donner's direct testimony on page 9 line 2. The Company

has not quantified the cost per ton of reagent through retirement of East Bend as part of the Company's analysis.

d. As discussed in Witness Donner's direct testimony on page 8 line 19 and 20 the Limestone Conversion Project strategy would reduce total variable operating and maintenance (VOM) on the order of [redacted]

e. As discussed in Witness Verderame's direct testimony on page 17, lines 4 through 5 the Company's modeling resulted in an average annual saving of $6.1M per year in fuel and purchase power. This savings is a result of the reduction in projected purchase power expense. Please see STAFF-DR-01-021 CONF Attachment DEK Cost Breakdown tab.

SUPPLEMENTAL RESPONSE:

CONFIDENTIAL PROPRIETARY TRADE SECRET

After Duke Energy Kentucky filed its Limestone Conversion CPCN Application in late July 2024, its current MEL supplier approached the Company to discuss the potential for [redacted]

The Company has updated its response to this data request as a result.

a. Please see STAFF-DR-01-021 Confidential Supplemental Attachment for the changes in projected costs from the proposed reduction in MEL commodity costs. Specifically, see the Dispatch Cost Impact tab for the resulting changes in the "reduced variable operational cost" from ~$12.03/MWh to ~$9.95/MWh.

b. Please see STAFF-DR-01-021 Confidential Supplemental Attachment for the changes in projected costs from the proposed reduction in MEL commodity costs.

Specifically, see the Duke Energy Kentucky Cost Breakdowns tab for the resulting changes in in reagent cost savings of $18.6 million to $11.6 million.

c. With the proposed reduction in MEL commodity costs the expected lower cost per ton of reagent continues to average just over $200/TN as shown below.

Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023 (RFP)	2024 (RFP)	2025	2026	2027	2028	2029
	Current Contract Pricing											Future Projections				
Lime Cost ($/TN)	84.4	87.27	90.24	93.31	97.4	102.4	117.9	123.98	130.04	[redacted]						
Limestone Cost ($/TN)	11.96	9.89	9.4	10.15	11.21	12.92	15.21	14.27	15.37							
Difference ($/TN)	72.44	77.38	80.84	83.16	86.19	89.48	102.69	109.71	114.67							

d. Despite the tightened commodity price spread between the lime and limestone cases, the Limestone Conversion Project strategy would continue to reduce variable operating and maintenance (VOM) on the order of [redacted]

e. Please see STAFF-DR-01-021 Confidential Supplemental Attachment for the changes in projected impacts from the proposed reduction in MEL commodity costs. Specifically, see the Duke Energy Kentucky Cost Breakdowns tab for the resulting changes in the calculation of the annual average savings in fuel and purchase power expense from $6.1 million to $3.1 million. This savings continues to be a result of the reduction in projected purchase power expense.

PERSON RESPONSIBLE: John A. Verderame – a., e.
Ryan Trogstad – b.
Chad Donner – c., d.