VERIFICATION

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

The undersigned, Adam S. Deller, Senior 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.

Adam Deller

Adam S. Deller, Affiant

Subscribed and sworn to before me by Adam S. Deller, on this 31 day of January, 2022.

NOTARY PUBLIC

NICOLE MCCLURE Commission Expires 06-04-2022 NOTARY PUBLIC Notary ID # 602221 STATE AT LARGE, KENTUCKY

My Commission Expires:
06-04-2022

VERIFICATION

STATE OF OHIO)
) SS:
COUNTY OF HAMILTON)

The undersigned, Tammy Jett., Subject Matter Expert in Quality attests that she has personal knowledge of the matters set forth in the foregoing data request and that they are true and correct to the best of her knowledge, information and belief.

Tammy Jett

Tammy Jett, Affiant

Subscribed and sworn to before me by Tammy Jett, on this 27th day of January, 2022.

JENNIFER HERNANDEZ
Notary Public, State of Ohio
My Commission Expires 11-19-2022

NOTARY PUBLIC

My Commission Expires: 11/19/2022

KyPSC Case No. 2021-00290
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Duke Energy Kentucky
Case No. 2021-00290
STAFF Third Set Data Requests
Date Received: January 12, 2022

STAFF-DR-03-001

REQUEST:

Refer to the Direct Testimony of Adam S. Deller (Deller Testimony), page 5. Provide a description of how bids will be solicited under the East Landfill closure plan.

RESPONSE:

Duke Energy Kentucky's Sourcing Team working with the Project Management issues a Request for Information (RFI) to companies known to have relevant experience in the specific field of the project; soliciting information includes relevant work experience, capability, and availability. This information is then typically parsed and evaluated to determine a list of qualified bidders with availability for a Request for Proposal (RFP) process. Company Sourcing then issues a request for proposals to that list of bidders initiating the competitive bid process.

PERSON RESPONSIBLE: Adam Deller

Duke Energy Kentucky
Case No. 2021-00290
STAFF Third Set Data Requests
Date Received: January 12, 2022

STAFF-DR-03-002

REQUEST:

Refer to the Deller Testimony, page 7, lines 6-12.

a. Describe all alternatives to the East Landfill closure methods proposed by Duke Kentucky.

b. Explain why Duke Kentucky did not evaluate closure of the East Landfill by removal of coal combustion residuals (CCR) and decontamination, as allowed by 40 CFR § 257.102(a).

RESPONSE:

a. Duke Energy Kentucky is unable to consider alternatives to closing the East Landfill with the CCR in place for regulatory reasons explained further in part b. of this response. Closure is a requirement in the site Solid Waste Permit, due to the landfill reaching waste disposal capacity and thus the end of its useful life. Both the CCR rule and the Kentucky state rules require closure when the landfill has reached waste disposal capacity in the permitted footprint. The timeframes for closure in both the CCR Rule and the Kentucky standards for the disposal of coal combustion residuals (CCR), as explained in part b. below, do not provide timeframes which allow for any other closure alternatives than the closure in place as proposed by Duke Energy Kentucky in the CPCN filing.

b. Duke Energy Kentucky did not evaluate closure of the East Landfill by removal of coal combustion residuals (CCR) and decontamination because it is not a

feasible option that complies with the CCR Rule timeframe requirements for closure of landfills in 40 CFR § 257.102(f)(i) even if the extensions of closure timeframes in 40 CFR § 257.102(f)(2)(i) were sought. Kentucky's 401 KAR 46:110 Section 9, standards for the disposal of coal combustion residuals (CCR) in CCR units, mirrors the CCR Rule requirements. 40 CFR § 257.102(f)(i) specifically requires CCR landfills to complete closure within six months of commencing closure activities. The extensions allowed in 40 CFR § 257.102(f)(2)(i), assuming the required demonstrations are made that it was not feasible to complete closure in the six month timeframe, only permit a total of two one-year extensions per 40 CFR § 257.102(f)(2)(ii)(B). Based on the narrow timeframes allowed by the Rule, it seems clear the EPA expected CCR landfills to be closed in place. This is further evidenced in the preamble to the Rule on page 21423, in the first full paragraph in the middle column. In the preamble, the EPA states,

> "Overall, the closure of CCR landfills is less complex than the closure of CCR surface impoundments. Portions of the CCR landfills that reach final grade can be closed as other areas of the CCR landfill continue to receive CCR, which is typically not possible at CCR surface impoundments. Nor does the owner or operator need to dewater the unit, which appears to be the aspect of closure most likely to be a source of unanticipated circumstances. Finally, there is substantially less uncertainty with respect to the timeframes to complete the closure of CCR landfills, which are not all that different (in this respect) than other landfills containing other

> forms of solid or hazardous waste, EPA therefore has greater confidence that a fixed period of two years will be adequate to account for the vast majority of circumstances."

In the above referenced preamble section, EPA acknowledged that a CCR landfill is like other solid and hazardous waste landfills in that those landfills are closed in place, as the landfill cells or phases are constructed. In other words, the material is expected to stay in place as opposed to be excavated for closure. In addition, this section of the preamble, along with the separate and distinct closure timeframes listed for landfills in 40 CFR § 257.102(f)(i) vs. the timeframes required for CCR surface impoundment closure in 40 CFR § 257.102(f)(ii), make it clear that EPA contemplated different closure expectations for landfills versus impoundments. Both the timeframes allowed for closure of CCR surface impoundments (five years) and the extensions allowed for CCR surface impoundments (up to 10 additional years), also speak to EPA's expectations that surface impoundments might be closed by excavation (and might also be more complicated even if closed in with CCR in place) as opposed to the short timeframe allowed for the closure of landfills, thus almost forcing the closure of landfills to be in place closure. Closing the East Landfill by removing all CCR material and transporting that material to another permitted CCR facility would require excavation, transport and placement of approximately 22,000,000 cubic yards(cy) of CCR and spoils. Even at an aggressive transport rate of 1,000,000 cy per year; which could require a 24-hour operation 365 days per year; this still equates to approximately 22 years to remove the waste from the East Landfill and complete closure. Based on the closure by removal timeframe of an estimated 22 years, Duke

Energy Kentucky cannot comply with the maximum 2.5 years closure completion timeframe in 40 CFR § 257.102(f)(1)(i) and 40 CFR § 257.102(f)(2)(ii)(C) and Kentucky's 401 KAR 46:110 Section 9. For these reasons, closure by removal is not a feasible closure method for the East Landfill at East Bend and this closure method was not evaluated.

PERSON RESPONSIBLE: Adam Deller/Tammy Jett

Duke Energy Kentucky
Case No. 2021-00290
STAFF Third Set Data Requests
Date Received: January 12, 2022

STAFF-DR-03-003

REQUEST:

Discuss the risks to Duke Kentucky's ratepayers of closing the East Landfill by leaving the CCR in place and installing a final cover system.

RESPONSE:

The risks to Duke Energy Kentucky's ratepayers of closing the East Landfill by leaving the CCR in place and installing a final cover system are negligible for a multitude of reasons. Landfilling of the CCR has already occurred. The CCR, which will be left in place, will not result in CCR being left in direct contact with groundwater because the landfill is separated from the aquifer. The minimal groundwater issues which do exist are consolidated directly around the landfill itself. A plan is already in development to address those issues. Installing a final cover system in compliance with the CCR rule is expected to have a positive impact toward groundwater issues. The groundwater issues appear to be generally stable in that they are not expanding or worsening. There are no risks to offsite drinking water supplies due to the close proximity of the existing groundwater issues to the landfill itself and the lack of residential drinking water wells in the vicinity of the East Bend Generating Station property. Leaving the CCR in place in the East Landfill will avoid potentially more expensive groundwater issues by ceasing contact of surface water with and through landfill areas at least 20-years faster than removing the CCR for disposal elsewhere. Leaving CCR in place will avoid the extensive costs to move the CCR either to the other landfill onsite landfill or an offsite landfill (see details in Staff-DR-03-005 and

006) The East Landfill exists on what is currently an industrial property owned and controlled by Duke Energy Kentucky. This allows Duke Energy Kentucky to more easily oversee the required post-closure care activities than removal of the CCR to an offsite landfill. Closure in place allows the ability for Duke Energy Kentucky to comply with closure timeframes in federal and state CCR rules as set forth in Response to Staff-DR-03-002). This assures less risk to rate payers from the lack of EPA and KDEP enforcement actions against Duke Energy Kentucky for violations of the CCR rules.

PERSON RESPONSIBLE: Tammy Jett

Duke Energy Kentucky
Case No. 2021-00290
STAFF Third Set Data Requests
Date Received: January 12, 2022

STAFF-DR-03-004

REQUEST:

Discuss the risks to Duke Kentucky's ratepayers of closing the East Landfill be removal of the CCR and decontamination.

RESPONSE:

The risks to Duke Kentucky's ratepayers of closing the East Landfill by removal of the CCR and decontamination are numerous. Costs have already been incurred for landfilling. Closure by removal would require unnecessary and exorbitant removal of an estimated 22,000,000 tons of material from the landfill but could also result in worsening groundwater conditions at the site. The minimal groundwater issues which do exist are consolidated directly around the landfill itself. A plan is already in development to address those issues. The groundwater issues appear to be generally stable currently in that they are not expanding or worsening.

Closure by removal, contrary to mainstream belief, is expected to have a negative impact toward groundwater issues. Excavating the CCR from the East Landfill could potentially increase the risk of groundwater issues by expanding contamination zones and releasing additional constituents that are currently bound in the landfill. This could require additional and more expensive environmental remediation (compared to closure in place) by increasing contact of surface water with and through landfill areas. Excavating the CCR will come at an extensive cost, as well as transporting to move the ash another onsite or offsite landfill. The East Landfill exists on what is currently an industrial property owned

and controlled by Duke Energy Kentucky. Closure by removal to an offsite landfill will remove the Company's ability to more easily oversee the required post-closure care activities than closure in place of the CCR. Closure by removal to the onsite East Bend Generating Station West Landfill will put rate payers in a position to incur costs to develop new landfill cells more quickly than they would if only newly generated CCR was placed in the West Landfill as currently planned and approved. If the West Landfill is not developed quickly enough, and reaches capacity too soon, the risk to ratepayers is the inability of Duke Energy Kentucky to properly operate the East Bend Generating Station and properly and economically dispose of newly generated CCR from the Station. Closure by removal would negate the ability for Duke Energy Kentucky to comply with closure timeframes in federal and state CCR rules (see details on Staff-DR-03-02 answer). This will bring much greater risk to rate payers and increase the risk of EPA and KDEP enforcement actions for violations of the CCR rules.

PERSON RESPONSIBLE: Tammy Jett

Duke Energy Kentucky
Case No. 2021-00290
STAFF Third Set Data Requests
Date Received: January 12, 2022

STAFF-DR-03-005

REQUEST:

Provide estimates of the following:

a. Tons of CCR and contaminated soil in the East Landfill;

b. Distance to nearest facility permitted to accept CCR;

c. Per ton transportation rate; and

d. Per ton disposal rate at a third-party landfill.

RESPONSE:

a. The capacity of the landfill is measured and tracked in volume of airspace, not necessarily in mass as requested. As such, the estimated measured volume of waste at initiation of closure in the landfill will be approximately 22,00,000 cubic yards (cy). The industry typically uses a density conversion rate of 1.2 tons/cy for CCR materials. If that conversion rate is applied; it equates to approximately 26,400,000 tons of CCR in the East Landfill.

b. The East Landfill at East Bend Station is a permitted CCR facility and as such is the nearest facility. The next nearest facility permitted to accept CCR, is the West Landfill at East Bend Station, which is approximately 1.2 miles away from the East Landfill onsite. The nearest offsite facility is over 15 miles away.

c. The current onsite landfill transportation cost to the two landfills onsite averages about $2.25/ton. It is estimated that transportation costs to a third party offsite landfill over 15 miles or about 30 minutes away could cost $20/ton or more.

d. The most recent inquiry into a third-party offsite landfill vendor occurred prior to 2014. At that time the company had performed informal market inquiries to third parties owning and operating landfills, Duke Energy Kentucky estimated the costs of disposing the generator waste material in a commercial landfill to be approximately $33-$35 per ton.

PERSON RESPONSIBLE: Adam Deller

Duke Energy Kentucky
Case No. 2021-00290
STAFF Third Set Data Requests
Date Received: January 12, 2022

STAFF-DR-03-006

REQUEST:

Provide the closure and post closure activities and estimated costs, unrelated to the disposal of CCR and contaminated soil, if the East Landfill were to be closed by removal and decontamination.

RESPONSE:

This effort, as suggested in the request, to close the East Landfill by removal of CCR materials, disregarding the significant costs to excavate, transport, and place the CCR material in a permitted CCR facility; would require additional closure costs to cover engineering, and design and additional O&M to support the needed permit modifications, CCR closure plan document revisions, bidding, and construction. The Company has not conducted a detailed analysis for such additional costs, but it is estimated that this effort could cost over $1,000,000.

If the East landfill is closed by removal, the required 30-year post-closure-care requirements would not remain intact. What would remain intact is an indeterminate post-closure care period which would end when groundwater protection standards are met. During the period of remediation, post-closure care maintenance activities would need to continue. In this example of closure by removal, required tasks could include; groundwater monitoring, surface water monitoring, mowing, road and ditch maintenance, ground maintenance, and inspection and reporting. These items could cost about $200,000 per year, until it is determined that the groundwater protection standards are met.

PERSON RESPONSIBLE: Adam Deller

Duke Energy Kentucky
Case No. 2021-00290
STAFF Third Set Data Requests
Date Received: January 12, 2022

STAFF-DR-03-007

REQUEST:

Explain the permit updates that would be required to close the East Landfill by removal and decontamination.

RESPONSE:

It would not be possible to obtain permit updates that would allow closure of the East Landfill by removal and decontamination. The reason for this is that Duke Energy Kentucky could not demonstrate the ability to meet the current closure timeframe requirements in the CCR rule and the Kentucky rules. Specifically, as mentioned in the response to STAFF-DR-03-002, the CCR Rule timeframe requirements for closure of landfills in 40 CFR § 257.102(f)(i), even if the extensions of closure timeframes in 40 CFR § 257.102(f)(2)(i) were sought, require closure completion in no longer than 2.5 years. Kentucky's 401 KAR 46:110 Section 9, standards for the disposal of coal combustion residuals (CCR) in CCR units, mirrors the CCR Rule requirements. Closure by removal is estimated to take approximately 22 years (see response to STAFF-DR-03-002).

PERSON RESPONSIBLE: Tammy Jett

Duke Energy Kentucky
Case No. 2021-00290
STAFF Third Set Data Requests
Date Received: January 12, 2022

STAFF-DR-03-008

REQUEST:

Explain any barriers to or benefits from the closure of the East Landfill by removal of CCR and decontamination.

RESPONSE:

For all practical purposes, there are no benefits to closing of the East Landfill by removal of CCR. As mentioned in response toStaff-DR-03-002, the fact that the timeframes set forth by the CCR Rule and Kentucky rules for completing closure of CCR landfills cannot be met if the closure by removal option is pursued is enough to be an insurmountable barrier. Closure by removal exposes groundwater to surface water infiltration for an exponentially longer time period than closure in place. Closure by removal allows a higher probability of increasing the contaminant mass and constituents released to the groundwater. Because the CCR material currently in the East Landfill is fixated scrubber sludge, it has undergone a pozzolanic reaction and has set up like a low strength concrete. This causes several issues for the removal and handling if an excavation were to be undertaken. The excavation rate would be markedly slower than typical fly ash or bottom ash excavation. The actual excavation logistics are difficult since it would be akin to excavating blocks of low strength concrete. It would likely create dust while excavating and loading, as one would expect when excavating and loading concrete. The shape and size of the excavated material would create challenges for the loading and transport of it. If the material were taken to an off-site landfill, there would be large trucks transporting

the removed material on narrow, currently quiet country road for over two decades. It would be difficult, if not impossible, to compact and properly condition the removed material as is normally required for the disposal of CCR in a landfill. The inability to properly compact the material would create challenges in creating a stable landfill when attempting to place the material in another CCR landfill. Overall, the customary engineering practices one would normally implement when landfilling CCR would be difficult to employ due to the condition of the material being excavated. The closure by removal of the East Landfill does not appear to have any benefits to the public or the environment which could not be achieved by closure in place. In fact, overall, the closure by removal method has greater risk to be detrimental.

PERSON RESPONSIBLE: Tammy Jett

Duke Energy Kentucky
Case No. 2021-00290
STAFF Third Set Data Requests
Date Received: January 12, 2022

STAFF-DR-03-009

REQUEST:

Provide the deadline for the closure of the East Landfill, including all available extensions.

RESPONSE:

As stated in 40 CFR § 257.102(f)(i), the CC Rule specifically requires CCR landfills to complete closure within six months of commencing closure activities. The extensions allowed in 40 CFR § 257.102(f)(2)(i), assuming the required demonstrations are made that it was not feasible to complete closure in the six month timeframe, only permit a total of two one-year extensions per 40 CFR § 257.102(f)(2)(ii)(B). Kentucky's 401 KAR 46:110 Section 9, standards for the disposal of coal combustion residuals (CCR) in CCR units, mirrors the CCR Rule requirements. The closure timeframe does not vary between closure by removal or closure in place.

PERSON RESPONSIBLE: Tammy Jett

Duke Energy Kentucky
Case No. 2021-00290
STAFF Third Set Data Requests
Date Received: January 12, 2022

STAFF-DR-03-010

REQUEST:

Explain whether Duke Kentucky would be able to close the East Landfill by removal of CCR and decontamination before the deadline for closure.

RESPONSE:

No. As stated in 40 CFR § 257.102(f)(i), the CCR Rule specifically requires CCR landfills to complete closure within six months of commencing closure activities. The extensions allowed in 40 CFR § 257.102(f)(2)(i), assuming the required demonstrations are made that it was not feasible to complete closure in the six month timeframe, only permit a total of two one-year extensions per 40 CFR § 257.102(f)(2)(ii)(B). Kentucky's 401 KAR 46:110 Section 9, standards for the disposal of coal combustion residuals (CCR) in CCR units, mirrors the CCR Rule requirements. The closure timeframe does not vary between closure by removal or closure in place.

As previously discussed in prior data responses and in direct testimony, the East Landfill is nearing capacity of the permitted waste airspace with an estimated 6 months of airspace remaining. In order to accomplish the undertaking of closure by removal that is suggested in this request, the Company must re-design, re-permit, source and execute a competitive bid event, and undertake and gain approval of a new CPCN.; to maintain compliance with the closure requirements in the CCR rule and the Kentucky Solid Waste Permit. Moreover, as explained in responses to Staff-DR-03-002, 003, and 008, this is not a feasible undertaking in the time available left before initiation of closure.

In addition, the CCR rule and Kentucky rules, as mentioned above, require the unit to complete closure within two and half years from initiation of closure; using the available extensions. To close the East Landfill by removal of waste and transport to another permitted CCR facility would require excavation, transport and placement of approximately 22,000,000 cubic yards (cy) of CCR and spoils. Even at an aggressive transport rate of 1,000,000 cy per year; which could require a 24 hour operation 365 days per year; this equates to approximately 22 years to remove the waste from the East Landfill and complete closure, which is not within the CCR required two and half year window given in the rule.

PERSON RESPONSIBLE: Adam Deller