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January 31, 2020

Mr. Gary Revlett  
Director, Environmental Affairs  
LG&E and KU Energy LLC  
220 West Main Street  
Louisville, Kentucky 40232

RE: Corrective Action Investigation, Source Assessment, and Risk Assessment Report  
E.W. Brown Generating Station Agreed Order Case No. DOW-170001  
Agency Interest No. 3148, Mercer County

Dear Mr. Revlett,

The Department for Environmental Protection (Department) has reviewed the Corrective Action Investigation, Source Assessment, and Risk Assessment Report (ISARA) dated June 2019. Comments are attached. The Department envisions that these comments will be addressed in the form of an errata to the ISARA. Comments that do not require a response should simply be acknowledged. Please provide responses to the Cabinet within 45 days of receipt of this letter. A conference with the Cabinet prior to submittal of an erratum will help to avoid further comments. The attached comments should not prevent LG&E and KU Energy from proceeding with the Supplemental Remedial Alternatives Analysis Report (SRAA).

The Department appreciates your cooperation in this matter. If you have any questions concerning this matter, please contact me at (502) 782-6702, or Todd Powers with the Division of Waste Management at (502) 782-6434.

Sincerely,

Jon Maybriar, Director  
Division of Waste Management

Enclosure

EC: Tony Hatton, KDEP Comm. Office  
Paul Miller, DOW  
Chris Fitzpatrick, OLS

1. Executive Summary, Section 1.2 mentions a key project will provide enhanced physical/chemical treatment of wastewaters, including groundwater collected from the toe drain of the closed Main Ash Pond. At the time the ISARA was written the physical/chemical treatment system was not installed. Had the system been installed prior to drafting the ISARA the design and operating parameters as well as treatment efficiencies would have logically been presented in the ISARA. To fully inform the decision making associated with the Supplemental Remedial Alternatives Analysis (SRAA), please describe the treatment technology, the CCR constituents removed and the removal efficiencies, the waste streams treated, and the fate of CCR pollutants collected by the technology. Finally, state whether the employed technology is sufficient to meet the goals in the Agreed Order or if a follow-up technology is needed.
2. Executive Summary, 1.4.6 Adult Small Fish Whole-Body Tissue from the Ash Pond. The words written as a quote from Fish tissue results from the auxiliary fly ash pond E.W. Brown, Mercer County, Kentucky, prepared for E.ON U.S. Louisville, Kentucky, are not a quote and the error has a nuance not found in the Stantec quote. The quote should be corrected in the errata.
3. Executive Summary, Section 1.5, the last paragraph. Kentucky no longer has an egg/ovary water quality standard for selenium. Kentucky's proffered standard was not approved by the US EPA, and so it was removed from 401 KAR 10:031 in January 2020. DEP would recommend that the 19.3 mg/g egg/ovary threshold not be used in future evaluations or documentation. No change is necessary in the ISARA as the change in regulation occurred post drafting the ISARA and as future actions proposed in the ISARA include ovary tissue sampling.
4. Section 3.1.1 discusses and Figure 3-1J shows runoff collection for the coal pile along the northern edge of the stored coal. The ISARA asserts that drainage from the coal pile is collected in the coal pile runoff and settling pond. It is, however, unclear whether runoff shedding towards the south, for example, would be captured by this collection system. Additionally, it is unclear whether groundwater infiltration from this area is important to decision making in the SRAA. Ensure all potential runoff from the stored coal is adequately described and the basis of that description documented and presented to support the SRAA. Efforts such as, but not limited to, human reconnaissance of the area and drone or remote sensing photography of potential flow paths may be useful. Please provide a response in the errata.
5. The Executive Summary and Section 3.1.1 describes the Toe Drain water collection system, stating that the bottom of the pumping chamber is at an elevation of 730 feet above sea level which is typically below the summer pool elevation. Please discuss if the collection system experiences infiltration from the summer pool of the lake and if so propose steps to ameliorate this interface with the lake. A response should be provided in the errata.



6. The 2018 second quarter selenium concentration in Table 3-3A is 21.7  $\mu\text{g/L}$ . The KPDES permit renewal listed the value as 55.9  $\mu\text{g/L}$ . After recalculating the average and conducting a t-test on the dataset, it was determined that the correction does not alter the conclusion that mass loading has decreased post-IRMs. No specific response is needed.
7. Section 2.2.7, Human Health Risk-Based Concentration for Fish Ingestion, the RBC formula. The formula is incorrect. No change in the document is necessary as the values given in Table 4-3 are correct within rounding error. Provided a corrected formula in the errata.
8. Section 3.4.1.2. Monitoring well (MW) 106 was omitted from the groundwater analysis of Section 3.4.1.2 due to other wells being located between MW-106 and the lake; however, due to karst and fracture flows it should not be assumed that flow from CCR disposal areas must migrate in a single direction past MWs-109, 110, 111. Please include MW-106 in the evaluation of pollutant loading due to groundwater in future analyses. No change is required to the ISARA.
9. Section 3.4.2.2, final paragraph. It is stated that MW-116 is the furthest well south and closest to Hardin Inlet (HI) and that the lack of arsenic in the well “demonstrates” no apparent migration of CCR-related constituents via groundwater to the well. The lack of arsenic in an “indication”, not a “demonstration”. No response is required.
10. Section 3.5, 2<sup>nd</sup> to the final bullet. It is stated that “Atmospheric deposition of CCR constituents in particulate emissions ... is not a likely source of CCR-constituents to the lake.” This assertion is made multiple times in the document, but it is not supported by any information in the document. While this reviewer similarly surmises that atmospheric deposition is an unlikely significant source of CCR-constituents to the lake, the document provides no support for the assertion. No response is required as the point is not relevant to the data collected and analyzed in support of the ISARA.
11. Section 4.3.2, 3<sup>rd</sup> paragraph, 1<sup>st</sup> sentence. Table 4-6 lists the arsenic RSL value for residential soil as 1 mg/Kg. The value cited in section 4.3.2 is correct, that is, 0.68 mg/Kg. This is one example of multiple occurrences in the document where numbers listed in tables are slightly inaccurate. This reviewer conjectures that the problem is associated with rounding errors or possible default settings in Excel. Please check the “significant factors” setting in Excel to possibly avoid this issue. No response is required as the error does not change any conclusions or recommendations in the ISARA.
12. Section 4.4, SA – Surface area of skin employed in the analysis is 2,373  $\text{cm}^2$ . Kentucky typically uses 3300  $\text{cm}^2$  for 1-6 years and 7500  $\text{cm}^2$  adolescents. The 50th % for 3 to 6 year-olds is 0.74  $\text{m}^2$ . The head, lower legs, feet, forearm, feet make up 35% of the body's surface area. So, 0.74m X 10,000 cm/meter X 0.35 =2590  $\text{cm}^2$  the 95th % is 0.95 X 0.35 X 10,000 = 3325  $\text{cm}^2$ . These values are provided for context. On the other hand, it is difficult to imagine getting the head wet without getting the neck wet. Perhaps only considering the forearms, calves, and feet as wet in wadding is sufficient. If the head is not considered part of wadding then the number cited is appropriate. No response is required as the various options in

describing wadding behavior do not change any conclusions or recommendations in the ISARA.

13. Section 4.4, Table 4-10, Concentration of arsenic in sediments. Duplicate samples were entered into the exposure point calculation as independent samples. Duplicates are not independent samples; thus, one of a duplicate pair should be employed in the calculation of statistical parameters such as means, etc. We recommend using the data from the primary sample in the data analysis. Remove the duplicates for the dataset and recalculate the exposure point concentrations used in the HHRA. Please make the corrections and state in errata the impact of these changes on the findings and recommendations of the ISARA.
14. The Executive Summary and Section 4.6.1 state that an excess lifetime cancer risk less than the upper end of USEPA's target risk range of  $1 \times 10^{-4}$  generally requires further characterization, although it may not necessarily require remedial action or other risk reduction measures. While the statement on its face is correct, by statute, KRS 224.1-530(1), Kentucky is to use the screening levels contained in EPA's Regional Screening Level (RSL) Table, Risk-Based Concentration Table User's Guide, USEPA, Region 3, June 8, 2011, which are based on a one in one million excess risk ( $1 \times 10^{-6}$ ) for carcinogenic constituents and a hazard index of 1 for non-carcinogens. Cancer risk levels greater than  $1 \times 10^{-6}$  and hazard index greater than 1.0, which conform with the assumptions set out in the Risk-Based Concentration Table User's Guide, require a response. No change is needed in the document as the Supplemental Remedial Measures Evaluation and Report will propose responses informed by the HHRA and SERA.
15. 5.4.1.1, 1<sup>st</sup> paragraph. While mean boron concentrations are below average background according to the source cited, it should be noted that boron is highest in Curds Inlet (CI) and trends down with distance from CI. This appears true for water, pore water, sediment, vegetation, and fish tissue (adult larger fish fillet is equivocal) in phase I. Such a trend deserved comment or a bullet point. No response is required as the various options do not change the conclusions or recommendations of the ISARA.
16. 5.4.1.1, bullet points. Two bullet points are repeated. Editorial, no response needed.
17. Section 5.4.5.1 Fish. No authority is cited to indicate whether the noted deformity levels are typical or unusual. Multiple studies are available to inform an estimate of expected deformity levels. In future studies please make a statement regarding the expected numbers of deformities and provide citations to the studies employed in developing that estimate.
18. 5.4.5.3, 3<sup>rd</sup> paragraph. "Generally, methylmercury is much more toxic than inorganic mercury, but methylmercury typically comprises less than 3%, and often much less than 1%, of total mercury in soil (Davis et al. 1997; USEPA 1997b)." This sentence addresses mercury in soil, but the topic is mercury in the aquatic environment where methylmercury is more prevalent than in soil. No response is required as the assertion does not change any conclusions or recommendations of the ISARA.
19. Table 5-11. A number of the values in the table cannot be found in the cited authorities. For example, the food ingestion rate for the mallard duck cannot be reproduced using the cited



weight. How was the range for the Great Blue Heron determined? It was not based on the 10 to 15 km cited in USEPA 1993. The top foraging range provides a closer value of 2,290 acres. Similarly, the body weights for the raccoon, mink, river otter, and muskrat are close but not consistent with the cited source. The reviewer checked the calculations using values consistent with the citations and did not find the differences substantial enough to change conclusions made in the document and is, therefore, not requesting that the table be corrected. It is encouraged that in future documents all such parameters be checked and all formulas provided.

20. Section 6, ERA Summary and Conclusions. DEP agrees that future monitoring focused on Curds Inlet would be beneficial. DEP recommends including the collection of adult bluegill (especially females) prior to spawning in the spring and analyzing whole-body samples. Additionally, DEP recommends adding a middle Herrington Lake sampling site for comparison to see if Curds Inlet results decrease over time to levels similar to those farther upstream. Finally, a couple of composite largemouth bass samples from both sites could also be useful for comparison to previous Phase I and Phase II (Curds Inlet) results. Please provide affirmation in the errata.
21. Note that the ISARA on the E.W. Brown Station website <file:///U:/Asst%20Director/EW%20Brown/EW%20Brown%20Corrective%20Action%20ISARA%20Report%20ed.pdf> is not the same version as provided to the DEP for review. No response needed.