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Department for Environmental Protection

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300 SOWER BOULEVARD  
FRANKFORT, KENTUCKY 40601

June 1, 2018

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

RE: Herrington Lake Corrective Action Plan  
E.W. Brown Station Phase I Technical Memorandum  
Phase II Proposed Field Sampling Plan  
Agreed Order Case No. DOW-170001  
Agency Interest No. 3148, Mercer County

Dear Mr. Revlett:

The Kentucky Department for Environmental Protection (Department) has completed its review of the Phase I Technical Memorandum for the Herrington Lake Corrective Action Plan submitted by Kentucky Utilities (KU) on May 2, 2018.

The Department's comments on the report are provided below with specific comments on Section 6 of the Technical Memo, Phase II Proposed Field Sampling Plan outlined first. The proposed schedule for implementing the Phase II Sampling Plan is in mid to late June to allow for optimal collection of the Young of Year (YOY) samples during spawning season. Provided the Department's questions and comments on the Phase II plan are adequately addressed by KU, the Phase II plan can be approved and implemented to meet this timeline.

The Department's comments on the rest of the Phase I Technical Memorandum report are primarily related to clarifications and requests for additional information on the Phase I sampling and data, and have no technical impact on the proposed Phase II sampling. Therefore the remaining items included as an attachment can be addressed by KU while allowing the Phase II sampling to be implemented.



### **Phase II Proposed Field Sampling Plan**

1. The Department is aware that the water level in Herrington Lake has been kept below normal summer pool over the last several months due to construction on the Kennedy Bridge. At one time the water level was approximately 20 feet below normal level, and it is our understanding that the level is now at 734 feet above sea level, and will remain at that level for the immediate future, which is approximately 6 feet below normal summer pool. With the upcoming Phase II YOY sampling which is tentatively scheduled for June, please provide information as to any potential changes either in methods or in timing the change in water level might require for the Phase II plan related to the YOY sampling.
2. It is requested that fish tissue sample location LHL-2 be resampled. This would add an additional three (3) composite fish tissue samples.
3. The field sheets must be updated to reflect the actual measurements that are taken for Phase II sampling. For the fish sampling, a column should be added for the weight of the fish.
4. On Page 5, flathead cat fish should be listed as predator fish, not bottom feeder/scavenger fish.
5. Please clarify if the YOY fish selected for tissue analysis will be included in the deformity analysis, and if so describe the selection process. The procedure for determining which of the YOY fish will be analyzed should be specified in the SOP.

### **SOP: Herrington Lake YOY Bass Assessment and Phase II Fish Tissue Sampling**

1. The Department notes that the preservation methods for the fish-- , 95% ethyl alcohol or Formalin, (which the Division of Water uses for fish preservation)-- , should be selected based on whether the fish are being preserved for laboratory analysis or for deformity analysis. Please explain how the preservation method will be determined.
2. Please specify the laboratory method to be used for fish tissue sample preparation. The Department's Environmental Services Branch (ESB) lab uses EPA 3050B (SW-846 3rd Edition).
3. Each fish selected for analysis should be photographed to show key identification characteristics.
4. For fish selected for composite samples, the length of the shortest fish should be no less than 75% the length of the longest fish.

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5. On page 7 it states that YOY and adult fish whole-body composite tissues will be analyzed by USEPA SW846 Method 6020 for selenium. Please confirm the method to be used for lab analysis and whether it is 6020A or 6020B, which reflect revisions to the SW-846 6020 method.

#### **QAPP Addendum: Herrington Lake YOY Bass Assessment**

1. Please revise the Fish Health Examination Form to include a field for the species identification of fish and columns for collection location, photo number and identification.
2. 4.1 YOY Bass Health Assessment Approach. The following statement is found near the bottom of page four, "The YOY bass identified as "normal" will be photographed in groups." Please clarify how they will be grouped. Please note that groups of fish that are photographed should still be able identify details of the fish, markings, etc.
3. Section 5.2. ESB Split Sampling. It is stated that approximately 10% of fish tissue samples will be submitted to the ESB as split samples for analysis. The Department reserves the right to request additional split samples as necessary and will notify Ramboll in advance.

Please provide responses to the Phase II Proposed Field Sampling Plan, SOP and QAPP Addendum within ten (10) days, and provide responses to the attached comments on the remainder of the Phase I Technical Memorandum within thirty (30) days. I appreciate your cooperation in this matter. Should you have questions regarding the comments you may contact me via e-mail at [peter.goodmann@ky.gov](mailto:peter.goodmann@ky.gov) or at (502) 782-6956, or Tim Hubbard, Division of Waste Management via e-mail at [tim.hubbard@ky.gov](mailto:tim.hubbard@ky.gov) or at (502) 782-6660.

Sincerely,



Peter Goodman, Director  
Division of Water

PG/th

Attachment

ec: Jon Maybriar, DWM  
Tony Hatton, DEP Comm. Office  
Jackie Quarles, OGC

**Phase I Technical Memorandum (Sections 1-5, Appendices)  
Herrington Lake Corrective Action Plan  
Department for Environmental Protection Comments**

**Phase I Technical Memorandum**

1. Acronyms and Abbreviations (page vi). AsIII should be Arsenite and AsV should be Arsenate.
2. Executive Summary (page ES-5). The following statement is in the “Sediment Pore Water and Sediment” section, “Phase II sediment pore water samples will be analyzed for total and dissolved metals, mercury, and methyl mercury, and speciated selenium and arsenic.” The sediment pore water samplers being used only capture dissolved metals per the SOP: Sediment Pore Water Sampling and Analysis.
3. Please describe the process of determining when to collect data for profiles in the lake. Please demonstrate that the sites in the lake represented overturned conditions during the December sampling events.
4. It is understood that the other side of the fish fillet samples not analyzed from the Phase I fish sample locations were collected and frozen. Please provide additional clarification on this method in the report and provide additional information on how whole body fish tissue calculations were completed.
5. Several edits and revisions were made to the field sheet forms from Phase I sampling. The lake profile field sheets should have fields already available for Temperature, DO, pH, and Conductivity.
6. A typo was noted on Table 4-1A as it lists sediment as being tested for Percent Lipids.
7. Table 5-1D appears to have errors related to the terminology and weight values for the duplicate samples. The QAPP states that field duplicate samples that are collected would include “Dup” in the sample ID. However the IDs for several of the field duplicates are shown as FD instead of Dup. Also CI LMB-2 weights differ from CI LMB-2 FD weights. LHL2 LMB-1 weights differ from LHL2 LMB-1 FD weights. This is also true for Table 5-1E. Please explain if the difference in weights between the sample and its field duplicate might affect any subsequent calculations for whole body analysis.
8. Please describe the process for weighing of the fish fillets both in the field and in the laboratory. Also describe how the calculations for whole body analysis were completed for the two fillets. It was noted that the field weights are higher than the Table 5-1D weights in 12 out of 15 samples. Please explain the differences. See the Table below:

Sample Location	Sample species	Field (total weight of sample)	Table 5-1D (2XFF+FWB+FO)	RPD
Curds Inlet	LMB-1	1532.8	1534	-0.07826
Curds Inlet	FHC-1	3534.6	3317	6.351801
LHL-1	LMB-1	1675	1658	1.020102
LHL-1	LMB-2	1450	1467	-1.16558
LHL-1	CC-1	1575	1470	6.896552
LHL-1	FHC-1	775	728	6.254158
LHL-2	CC-1	1150	1065	7.674944
LHL-2	FHC-1	650	580	11.38211
LHL-2	KB-1	1925	1840	4.515272
LHL-2	LMB-1	1525	1486	2.590501
LHL-4	CC-1	2270	2109	7.353277
LHL-4	FHC-1	3008	2828	6.168609
LHL-6	CC-1	6550	6120	6.787687
LHL-6	CC-2	1750	1811	-3.426
LHL-6	LMB-1	1575	1493	5.345502

9. Figure 5-3E and Section 5.3.3.2.

- a. The description of Figure 5-3E in the third sentence of Section 5.3.3.2 appears to be incorrect. Figure 5-3E shows total mercury, not total methyl mercury.
- b. The top hashed blue line in Figure 5-3E appears to be too high. It appears to be associated with 0.002. It is assumed that it should be associated with the Kentucky Acute Water Quality Standard (WQS).
- c. The fourth bullet in Section 5.3.3.2 suggests that the differences between the overturn and the stratified mercury water concentrations could reflect “influence from algae in the water sample”. Though algae was collected at other locations, very little of it appears to have been collected at Curds Inlet. Please provide evidence for the assertion or remove it.

10. Section 5.3.3.3. The third sentence of Section 5.3.3.3 incorrectly states that the USEPA R4 Ecological Screening Value (ESV) for mercury for wildlife is 0.017 mg/kg. The ESV is 0.17 mg/kg.

**Fish Tissue/Ovary Sample Preparation**

1. In several photos the fish do not look well preserved and may not have been placed on ice soon after collection. Photo #3, 23, 28, 34, 36. Care should be taken to follow the SOP on fish sample preservation and handling.

2. Fish dissections should take place on clean surfaces. Photos # 38, 42, 43 and 59 are examples of dissections which may have occurred on unclean surfaces.
3. Several ovary samples appear to be placed in the same container for photos. Photo# 13, 19, 26, 27 and 38 are examples. Each sample should be placed in a clean container.
4. Fish should be rinsed in deionized water before dissections to remove any foreign debris. See photo # 26.
5. Some composite samples appear to not meet the criteria that the shortest fish be no less than 75% the length of the longest. See photo# 1, 48, and 60 and other comments below:
  - a. The information provided in Appendix D for LHL1 (Rocky Run) indicates that the size difference between the smallest and largest bluegill in both bluegill samples is 67% and 68% rather than 75% or higher.
  - b. The information provided in Appendix D for LHL6 (Lower Herrington Lake) indicates that the size difference between the smallest and largest Kentucky bass is 68% rather than 75% or higher.
  - c. Photo 48 shows flathead catfish composite sample 1 of 2 from MHL1. The shorter fish does not appear to be at least 75% of the length of the longer fish. Furthermore, based on Appendix D field notes, the longer fish does not appear to be part of sample 1 of 2.
6. There appear to be a few inconsistencies between Table 3-1A, Appendix B1 and B2, and Appendix D and no photos of the fish collected at some of the locations. Additional related comments follow pertaining to these sections of the report:

### **Fish Misidentifications**

1. Photo 2, Appendix B1 is a spotted bass, not a largemouth bass as indicated. The key distinguishing features are the dorsal fin is not well separated (see photo #6 and fish at top of photo) and the belly has rows of dark spots.
2. Photo 3, Appendix B1 appears to be a longear sunfish and not a bluegill as indicated.
3. In Photo 14 in Appendix B2, the top fish is a spotted bass (note the maxillary not extending behind eye and the belly with rows of dark spots) and the bottom fish is a largemouth bass. Composite samples should be composed of the same species.
4. Photo 6 in Appendix B2 shows one channel catfish in Curds Inlet but the table identifies it as composite sample 1 of 2.

5. Table 3-1A lists two fish in that sample. Appendix D includes field notes for three channel catfish in that sample. It is difficult to determine how many fish were in that sample. Please clarify if fewer than three, and explain the procedure for determining what fish not to include.

#### **No Photos of Fish**

1. LHL2 (Dix Dam) sample 2 of 2 (KYB) as listed in Table 3-1A.
2. LHL3 (Lower Herrington Lake) sample 1 of 2 (KYB) as listed in Table 3-1A.
3. LHL3 (Lower Herrington Lake) sample 1 of 2 (KYB) ovary as listed in Table 3-1A.
4. LHL4 (Lower Herrington Lake) bass ovary samples (KYB and LMB) as listed in Table 3-1A.
5. LHL4 (Lower Herrington Lake) sample 1 of 2 or 2 of 2 (BG) as listed in Table 3-1A.
6. LHL4 (Lower Herrington Lake) sample 1 of 2 (KYB) as listed in Table 3-1A.
7. MHL3 (Middle Herrington Lake) bass ovary sample (LMB) as listed in Table 3-1A.
8. MHL3 (Middle Herrington Lake) channel catfish ovary sample (CHCF) as listed in Table 3-1A.
9. There does not appear to be a photo of Dix River sucker ovary sample (LMB) as listed in Table 3-1A.
10. There does not appear to be a photo of Dix River bass ovary sample (LMB) as listed in Table 3-1A.

#### **Differences in Table 3-1A, Photos and Appendix D**

1. Photo 27 shows only one channel catfish in Lower Herrington Lake composite sample 2 of 2. Table 3-1A lists two fish in that sample and one catfish in sample 1 of 2. Appendix D includes two (2) channel catfish labeled as S1. A third channel catfish and a flathead catfish is not designated as to sample. Please clarify.
2. Photo 28 shows only one largemouth bass in LHL4 (Lower Herrington Lake) composite sample. Table 3-1A lists two fish in that sample. Please clarify if the sample was composed of one or two fish.

3. Photos 42 (one Kentucky bass and ovary), 43 (one channel catfish and ovary), and 44 (one channel catfish) show partial composite samples from LHL6 (Lower Herrington Lake). It is recommended that the photo include a note that the photo was meant to show a partial sample. Appendix D includes field notes for four channel catfish but there is no designation as to sample.
4. Photo 45 shows the bluegill composite samples for MHL1 (Middle Herrington Lake). Seven fish are shown. Table 3-1A lists eight fish as does Appendix D. Please clarify why one fish was not shown.
5. Photo 46 shows the largemouth bass composite sample for MHL1 (Middle Herrington Lake). Three fish are shown. Table 3-1A lists two fish. Appendix D includes two largemouth bass samples of two fish each. Please clarify.
6. Photo 47 shows the Kentucky bass composite sample for MHL1 (Middle Herrington Lake). Three fish are shown. Table 3-1A lists two fish. Please clarify.
7. Photo 49 shows flathead catfish composite sample 2 of 2 from MHL1. Only one fish is shown, but Appendix D lists two fish in this sample.
8. Photo 57 shows eight green sunfish from Dix River with the note, "left 4 fish only". Appendix D notes "Sample 2, N = 8". Please clarify.
9. Photo 61 shows two northern hog suckers in the Dix River composite sample and Appendix D includes field notes for two hog suckers, but Table 3-1A lists only one. Please clarify.

### **Appendix E, F and G**

The Appendices are incorrectly described on page 17. Appendix E is Kentucky Environmental Services Branch Split Sample Selenium Whole-body Tissue, not reports or chain-of-custody forms (COCs). Appendix F is COCs and lab reports and Appendix G is the data validation report.

### **Appendix F**

Please provide a clear copy of the COC forms as the copy provided is not readily legible.

### **Appendix G**

Several relative percent difference (RPD) exceedances were noted in the laboratory analytical results for the duplicate samples. Please provide an explanation for the RPD exceedances.