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March 10, 2016

Ms. Tracey Duncan
U.S. Department of Energy
Portsmouth/Paducah Project Site Office
5501 Hobbs Road
Paducah, Kentucky 42053

RE: Submittal of Comments to the Addendum to the Final Characterization Report for Solid Waste Management Units 211A and 211B Volatile Organic Compound Sources for the Southwest Groundwater Plume (DOE/LX/07-1288&D2/A1)
Paducah Site
Paducah, McCracken County, Kentucky
KY8-890-008-982

Ms. Duncan:

The Kentucky Division of Waste Management (Division) has completed its review of the subject document. Please find the Division's comments on the document as an attachment.

If you have any questions or require additional information, please contact Brian Begley (502) 564-6716, ext. 4641 or e-mail at Brian.Begley@ky.gov.

Sincerely,

A handwritten signature in black ink that reads "April J. Webb".

April J. Webb, P.E., Manager
Hazardous Waste Branch

AJW/bb/lww

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DWM File #1160-E; TEMPO: ARM20150007 (Addendum to the Final Charc Rpt for
SWMUs 211A&B VOC Sources for the
SW Plume)

Attachment: Kentucky Comments

**Kentucky Division of Waste Management’s Comments on the
Addendum to the Final Characterization Report for Solid Waste Management Units 211A
and 211B Volatile Organic Compound Sources for the Southwest Groundwater Plume**

Paducah Site, Paducah, Kentucky

DOE/LX/07-1288&D2/R1

March 10, 2016

Specific Comments:

1. Page H-7, Acronyms:

The following abbreviations were in the report and not defined on the acronyms page; DCE, DPT, DUP, LLC, NTU, ppb, PQ, QSP, TCE. Please update the acronym page.

2. Page H-9, H.1. Project Description, 3rd Paragraph:

“The following decision rules and guidelines for evaluating the results of the RGA groundwater investigation are documented in the Appendix C sampling and analysis plan of the Addendum to the RDWP (DOE 2015).” The previous sentence implies that the decision rules and guidelines are documented in Appendix C and copied verbatim; however, after reviewing Appendix C it appears that additional language (“with interim LUCs”) was added to each of the decision rules for SWMUs 211-A and 211-B. This addition is acceptable to the Division; however, if any changes are made to previously approved decision rules, then please disclose any such changes prior to modification.

3. Page H-9, H.1. Project Description, 1st Bullet:

Footnote #10 was included on page C-8, after the ‘IF’ statement; however, the footnote is not present on page H-9. Please add the footnote to H-9, if still relevant.

4. Page H-10, H.2. Conceptual Site Models, 1st Paragraph, Last Sentence:

“Additional dissolved TCE concentrations derived from SWMU 211-A are not expected to exceed 400 ppb in the RGA on the downgradient side of SWMU 211-A.” When 400 ppb is referenced in the Sampling and Analysis Plan, it is accompanied by the word ‘approximately.’ Please add the word ‘approximately’ before 400 ppb. This comment also applies when 400 ppb is referenced in the Conclusions Section H.9.

5. Page H-11, H.3. Groundwater Sampling Strategy, 1st Paragraph, 2nd Sentence:

“At SWMU 211-B, where upgradient dissolved TCE levels were assumed to be negligible and the near-downgradient area was inaccessible because of the C-720 Building ...” Please specify the ‘near-downgradient area’ [distance] that is reported to be inaccessible. Figure H.1. depicts the C-720 building extending ~400 feet to the north of where the upgradient RGA samples were collected at location 211-B-021. It also should be noted in the text that groundwater profiling in the RGA was conducted at location 211-A-048, which is, in all

likelihood, the first accessible ‘near-downgradient’ location of location 211-B-021. Furthermore, the holistic evaluation of groundwater results was agreed upon during scoping, which the document does finally mention on page H-21. Please consider disclosing that data collected during this investigation was intended to be evaluated holistically earlier than page H-21 in Appendix H.

6. Page H-12, H.4. Investigation, 4th Paragraph, 2nd Sentence:

“In a few cases where the entrained sediment load was greatest, the discharged groundwater was first collected in a pre-cleaned, stainless steel cup and then poured into the sample vials.” List all samples that this alternative method of sample collection effects. Please specify if the modification to procedures was approved and documented, prior to using the alternative method to collect a ‘few’ samples in the field. Furthermore, the alternative method may have facilitated in the loss of volatiles, which would mean those samples warrant a qualifier (equivalent to ‘biased low’), which is not mentioned in Section H.5. Data Evaluation. Please specify the criteria used to determine when a sample receives a ‘biased low’ qualifier. If the samples collected under the alternative procedure meet the criteria for ‘biased low,’ then specify what impact they would have in the data evaluation section, if any.

7. Page H-13, H.5. Data Evaluation, 5th Paragraph, 1st Sentence:

“Level IV data validation for the 2015 groundwater investigation of the RDSI was performed at rate of 27% (12 of 45 samples³), which exceeded the requirements of the RDSI characterization plan (10% data validation).” Footnote 3 states “³ The 12 samples included 1 duplicate sample, 1 field blank sample, 1 rinseate sample, and 2 trip blank samples.” Please specify what Level IV protocol was used. Please explain why the total number of samples is considered to be 45 when 45 total groundwater samples (includes 3 duplicates) were collected and 13 water quality control samples were also collected. The total number of samples appears to be 58 and not 45. Also, please explain why the percentage of water quality control samples (4 of 13 = 31%) selected for Level IV data validation was skewed in relation to the number of groundwater samples (8 of 45 = 18%) selected for Level IV data validation. It should also be noted that Level IV data validation was reported for the previous 211-A/B investigation on Page 30 of the FCR (1288&D2) and the following statement was made: “Samples from areas with higher TCE concentrations were targeted for data validation.”

8. Page H-14, H.7. Uncertainty Evaluation, 1st Bullet:

“• Results and frequencies of quality control samples, quality control exceedances, and qualifiers”. It is not clear why the results and frequencies of quality control samples or quality control exceedances are included in factors that may affect uncertainty with the samples collected in 2015. All quality control samples reported in Table H.2. are reported as U-qualified (non-detect below the laboratory reporting limit). The third paragraph in this section states “As documented above, there were very few quality control exceedances

...” Please clarify why multiple statements in this section imply that the quality control samples indicate uncertainty or exceedances.

9. Page H-14, H.7. Uncertainty Evaluation, 3rd Bullet:

“• Project Completeness” The second paragraph (1st sentence) on page H-14 states “The 2015 groundwater investigation of the RDSI achieved a high degree of completeness. All six of the planned soil borings were sampled for RGA groundwater beginning at 65 foot depth, as planned.” Why is ‘project completeness’ an uncertainty if “completeness is calculated as the number of samples planned to be collected divided by the number of sample results that were rejected.”

10. Page H-15, H.7. Uncertainty Evaluation, 2nd Paragraph, 3rd Sentence:

“The project schedule did not permit the targeted purge volume of three times the flooded volume of the augers, but a packer was used above the pump within the augers to minimize the effective volume to be purged.” What time limitation is being referenced that would not allow for purging more than “one to two flooded volumes of the augers?” It is not clear why time was a factor. According to Table H.2., each of the six sample locations took less than two field days to complete and the number of water samples collected at each location varied between six and nine. Please explain. It is noted that the final sentence of Section H.7. states “The demonstrated integrity of the HSA system provided additional assurance that the water column inside the HSAs was representative of the sample depth and the achieved purge volume was sufficient to provide a quality sample.” Was water quality measurement considered in the following statement; “achieved purge volume was sufficient to provide a quality sample?”

11. Page H-15, H.8. Sample Results and Assessments, H.8.1 TCE Analyses, Last Sentence:

“Sample results may be included in the average of two adjacent RGA zones (upper, middle, or lower.” There is no indication, at least in Table H.3., indicating that two adjacent RGA zones were averaged. If averaging did not occur over two adjacent RGA zones, then why is the statement being made?

12. Page H-21, Table H.3. 3rd Column –Upgradient TCE Average^a (ppb):

Consider placing the footnote^b on ‘Middle’ and ‘Lower’ ‘NA’ values for SWMU 211-B.

13. Page H-21, Table H.3. 4th Column –Difference of Averages (ppb):

Perhaps ‘NA’ or the value in the ‘Downgradient TCE Average’ column should be inserted into the ‘Difference of Averages’ column, instead of ‘--’ for SWMU 211-B.

14. Page H-21, Table H.3. Last Column –11,000 ppb > Difference of Averages > 400 ppb:

The title of this column is confusing. Previous illustrations regarding the decision rules (August 20, 2015 Weekly Groundwater Update Presentation – Slide 11 & 13) illustrate three divisions for decision rules which are clearer than what is depicted with the two decision rules columns in Table H.3. Consider using three columns in Table H.3. to

represent the decision rules. Also consider adding the associated action for each of the decision rule assessment columns (Implement LTM, Implement Bioremediation and LTM, and FFA Parties convene and discuss a path forward for the SW Plume).

15. Page H-21, H.8. Sample Results and Assessments, H.8.1 TCE Analyses, 2nd Paragraph:

“Moreover, the analysis for the sample at 65 ft depth- 10,000 ppb with a control limit range (error range) of 1,100 ppb – approximates the project criterion for recognizing the presence of DNAPL (11,000 ppb).” What is the control limit range on the other samples and would the application of an error range impact interpretation at East SWMU 211-A, specifically sample 211-A-047 (Middle RGA Average of 455 ppb) in comparison with sample 211-A-046 (74 ppb) where the difference of averages is reported to be 381 ppb? Furthermore, the decision rules refer to 400 ppb in approximate terms and it can be reasonably asserted that 381 ppb is approximate to 400 ppb.

16. Page H-22, H.8.2 Other Volatile Organic Compound Analyses:

Multiple conclusions are proposed in this section, some of which may be critical to understanding the groundwater flow system. Please expand on each of the conclusions by stating what other assumptions are being made for each statement to be valid.

17. Page H-24, H.10. References:

“Tufts, J. January 13, 2013” reference is incorrect. The correct date is January, 13, 2014. Please revise.

18. Page H1-3, Attachment Table - Field Measurements and Barometric Pressure:

Please clarify what the purge column (gal% flooded volume⁷) value represents. For example, in the first row 7.25 gal / 60% means? It is assumed that 7.25 represents the total amount purged at 65 feet bgs prior to collecting a groundwater sample. Please confirm. The 60% is assumed to represent that 7.25 gal represents 60% of three flooded volumes. Please confirm. A flooded volume is assumed to refer to the column of the HSAs below the packer. Please confirm.

19. Page H1-3, Attachment Table - Field Measurements and Barometric Pressure:

What is the relevance and significance behind the water levels in the ‘starting depth to water’ column?

- - End of KDWM Comments - -