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November 30, 2016

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

RE: Submittal of Comments to the Interim Remedial Action Completion Report for *In Situ* Source Treatment by Deep Soil Mixing of the Southwest Groundwater Plume Volatile Organic Source at the C-747-C Oil Landfarm (Solid Waste Management Unit 1) (DOE/LX/07-2405&D1)
Paducah Site
Paducah, McCracken County, Kentucky
#KY8-890-008-982

Ms. Duncan:

The Division of Waste Management (Division) has completed its review of the *Remedial Action Completion Report for In Situ Source Treatment by Deep Soil Mixing of the Southwest Groundwater Plume Volatile Organics Source at the C-747-C Landfarm (SWMU 1)* dated September 1, 2016. Please address the attached comments in a revised version of the document.

If you have any questions or require additional information, please contact Brian Begley at (502) 782-6317, or e-mail at Brian.begley@ky.gov.

Sincerely,

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

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DWM File: #1160-E; Graybar: ARM20160003 (RACR for Deep Soil Mixing for SW
Plume VOC Source –SWMU 1)

Attachment: Kentucky Comments

**Kentucky Division of Waste Management Comments pertaining to the
Interim Remedial Action Completion Report for In Situ Treatment Using Deep Soil Mixing
for the Southwest Groundwater Plume Volatile Organic Compound Source at the C-747-C
Oil Landfarm (Solid Waste Management Unit 1)**

Paducah Site, Paducah, Kentucky,

DOE/LX/07-2405&D1

November 28, 2016

General Comment:

1. Photographs:

Please consider adding an orientation reference to all figures with photographs so the reader understands the direction being shown. If a date for a photograph is available, then please provide it.

Specific Comments:

1. Acronyms, Page ix:

Please consider expanding the acronyms list to include BHP (appears on page 82); DAS (appears on page. 79); and RD (appears on page. ES-2).

2. Executive Summary, Page ES-2, 3rd Paragraph:

Please consider adding the total area treated (26,972 yd³) in this paragraph.

3. 1.1.2 Description, Page 3, Figure 2:

The legend includes a symbol for the ‘approximate location of fire hydrant (source water)’ which is not present in this figure. Perhaps an arrow with a distance to this feature can be added if the hydrant is located outside the aerial photo.

4. 1.1.2 Description, Page 4:

The first sentence, “Between 1973 and 1979 ... trichloroethane,” does not mention that the locations of the two plots and area of influence where plowing occurred are uncertain. The actual locations of the oil landfarm plots are not depicted in the RACR. Please include the observed locations of the oil landfarm plots in at least one figure.

5. 1.2.1 Compomemts of the Remedy, Page 4:

“The remedy was selected and documented under a CERCLA ROD signed in 2012 is In Situ Source Treatment Using Deep Soil Mixing with Interim Land Use Controls (LUCs).” This sentence needs grammatical correction, please revise as appropriate.

6. **1.2.1 Components of the Remedy, Page 7, warning sign language:**

The contact information is missing.

7. **1.2.1 Components of the Remedy, Page 9, 1st Bullet:**

Consider moving ‘performed gamma radiological walkover survey’ before mentioning ‘constructed a 1% sloped pathway ...’ to reflect the sequence that events occurred.

8. **1.2.3 Field Changes, Page 11, 1st Paragraph, 2nd Sentence:**

Consider adding the reference DOE 2015b to the end of the sentence.

9. **1.2.3 Field Changes, Pages 11 - 12:**

A modification was made to the perimeter ring and overall sequence strategy after mixing operations started that are not reflected in this section. Please add.

10. **1.2.3.2 Adjustments to Address Excessive Energy Release During Mixing, Page 13, 3rd Paragraph, 1st Sentence:**

‘During this work pause, the team evaluated ...’ Please state the number of lost mixing days during this work pause.

11. **1.2.3.4 Adjustment of Thermal Treatment Completion Criteria for Low Concentration Columns, Page 15, 2nd Paragraph, 2nd Sentence:**

‘Additional thermal passes increase the probability of generating soil burps.’ Consider removing this sentence because it appears out of place and irrelevant to the low concentration columns.

12. **1.2.3.4 Adjustment of Thermal Treatment Completion Criteria for Low Concentration Columns, Page 15, 3rd Paragraph, 1st Sentence:**

How many columns benefited or were affected by the removal of the temperature requirement? Please add the information to this sentence.

13. **Figure 6, Page 18, Legend:**

The words ‘Cad Renderer’ are located near the bottom of the legend. Please revise for clarity or remove.

14. **1.2.3.7 Elimination of Four Soil Columns Near Transuranic Contaminated Ditch, Page 19, 2nd Paragraph, 1st Sentence:**

‘The deep soil mixing technology provides capability to monitor the relative quantity of VOCs removed from a column in real time.’ This sentence may or may not be accurate; however, the ability to monitor the ‘relative quantity’ of VOCs removed from a column in real time was not used at SWMU 1. If the word ‘quantity’ was replaced with ‘concentrations’ the sentence would be acceptable.

15. 2. Chronology of Events, Page 21:

Consider revising the July 15, 2014 description for clarity.

16. 2. Chronology of Events, Page 21:

Consider adding a date range that explains the delay between the September 4, 2014 site prep completion and March 9, 2015 arrival of the subcontractor crew.

17. 2. Chronology of Events, Page 21:

Consider adding additional % milestone completion (e.g. 25%, 50%, 75%) with associated dates to provide a reference in the timeline regarding progress. A plot of borings completed over time is preferred if the data is readily available, otherwise additional dates to this section will suffice.

18. 3.3.1 Post-Treatment Soil Sampling and Logging, Page 26, Last Paragraph, 1st Sentence:

Provide the applicable reference and version pertaining to the contractor sampling procedures.

19. 3.4 Basis for Determination That Standards Were Met, Page 28:

Where is the information/figure that identifies the percentage of ZVI in relation to each boring? Also, if the amount of ZVI used in each boring is known (it is noted that Table 9 records total ZVI) please add to the appropriate section in the RACR.

20. Figure 8, Page 29:

Whenever a figure conveys groundwater-related information it is preferred to see the known range of groundwater flow depicted. Please add the groundwater flow direction to this figure.

21. Figure 10, Page 33, Column F:

Please explain why rows 30 - 38 in Column F all read 100. Is this a rounding error?

22. 4.1.1 Site Preparation, Page 47, 2nd Paragraph, 2nd to-Last Sentence:

‘The discussion of the additional drilling is contained in DOE Memorandum, PPPO-02-2635172-15.’ Please add the date of the DOE Memorandum for clarity.

23. Figure 20, Page 53, Legend:

What is the significance of the ‘Perimeter Treatment Cell’ depicted in the legend and the four soil mixing borings (8, 11, 179, 262)? Please explain and modify the figure as necessary.

24. Figure 24, Page 59:

Consider revising the figure description to more clearly explain what the photograph is illustrating.

25. **4.1.4 Post-Remedial Soil Sampling and Monitoring Well Installation, Page 62, 1st Paragraph, 3rd Sentence:**

‘Six monitoring well locations were revised from those in the approved RAWP ...’ Well placement was not defined in the RAWP and deferred until after soil mixing occurred. Please revise.

26. **4.1.4 Post-Remedial Soil Sampling and Monitoring Well Installation, Page 63, 2nd Paragraph, 2nd Sentence:**

Typo ‘Fourteen total 14 ...’

27. **4.2.4 Material and Equipment Used, Page 76:**

Consider adding a picture of the multi-blade rotating mixing/injection tool (auger).

28. **4.2.6 Waste Materials Generated, Page 85:**

This section references the soils generated from the excavation of contaminated soils and alumina trap material; however, it is not clear in Table 10 if the volume of soils with alumina are represented in the waste stream description ‘Drill Cuttings/Soil, PPE, and Sampling Debris.’ Please specify the amount of soil generated and sent to the landfill during the site prep activities and modify the table if appropriate.

29. **4.5.5 Mechanical Issues During Mixing Operations, Page 90, 1st Paragraph:**

Consider adding the replacement of cutting teeth on the auger to the list of minor equipment maintenance.

30. **8.1 Final Costs, Page 99:**

The total cost for the design and implementation of the SWMU 1 RA was reported to be \$13.2 million. This section does not break down the actual project costs into the categories bulleted in Section 8.1. Please add the costs associated with the following ‘efforts’ in support of the \$13.2 million total: Design the RA; Develop the RDWP; Develop the RAWP; Prepare the site; Implement the soil mixing action; Procure Materials; Perform post-treatment evaluation through soil borings and monitoring well installation; Manage and dispose of generated wastes; Project Management; and Prepare the RACR.

- - End of KDWM Comments - -

**Kentucky Division of Air Comments pertaining to the
Interim Remedial Action Completion Report for In Situ Treatment Using Deep Soil Mixing
for the Southwest Groundwater Plume Volatile Organic Compound Source at the C-747-C
Oil Landfarm (Solid Waste Management Unit 1)**

Paducah Site, Paducah, Kentucky,

DOE/LX/07-2405&D1

November 22, 2016

General Comment:

1. There is apparently no discussion in this document of whether the project complied with the applicable air quality regulations during the remediation. Yes, the soil treatment objectives were met, but can DOE provide a definitive statement that treated off-gas discharges were below (preferably well below) those emissions predicted and modeled? From the small number (one) of air monitoring alarms during the project, it can be inferred that the process successfully remained below the predicted discharges, but some analysis should be provided.

Specific Comments:

1. 4.2.4 Material and Equipment Used, Page 84:

In the discussion of Vapor Monitoring/Testing System, the report indicates that the alarm was activated once, and that the operator evaluated the conditions and determined it was appropriate to continue operations. It does not indicate what actually caused the alarm and why it was considered acceptable to continue operating. Since the monitoring and alarm system were the only means of insuring compliance with air quality regulations and/or limitations, more information should be provided about the incident and its resolution.

2. 4.5.3 Shroud Hose Failure, Page 89:

There is a brief discussion of the failure of a hose that conveys off-gas to the treatment (and monitoring) system. There is no indication of how much untreated off-gas was released, how quickly the problem was discovered, nor how soon action was taken to stop injection. Please provide an estimate of how much off-gas, if any, may have been released?

- - End of KDAQ Comments - -