



ENERGY AND ENVIRONMENT CABINET

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Leonard K. Peters
Secretary

September 30, 2015

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

RE: Submittal of comments to the Soils Operable Unit Remedial Investigation 2 Report (DOE/LX/07-2306&D1)
Paducah Gaseous Diffusion Plant
Paducah, McCracken County, Kentucky
KY8-890-008-982

Ms. Duncan:

Attached please find Kentucky's comments on the *D1 Soils Operable Unit Remedial Investigation 2 Report*, which was received on July 2, 2015. Kentucky would like to congratulate the Department of Energy on the quality of this document, which resulted in very few substantive comments. The Cabinet for Health and Family Services (CHFS) did not have any additional comments on the document.

If you have any questions or require additional information, please contact Gaye Brewer at (270) 898-8468, or e-mail gaye.brewer@ky.gov.

Sincerely,

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

AJW:gb:lww

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DWM File: #1110; Graybar: AIN20150008 (Soils OU Remedial Investigation 2 Report)

**Kentucky Division of Waste Management Comments to the
Soils Operable Unit Remedial Investigation 2 Report
Paducah Site, Paducah, Kentucky**

DOE/LX/07-2306&D1

September 29, 2015

General Comments:

1. C-613 Basin Statement:

For all the SWMUs/AOCs that discharge through the C613 basin to outfall 001, a statement is included in the Fate and Transport Section to the effect of “The discharge of the C-613 basin is monitored and never has had concentrations exceeding limits.” The 2015 Environmental Monitoring Plan states in Table C.29 that the C-613 basin is sampled for pH and turbidity. The quoted statement from RI2 implies the C-613 basin is sampled for chemical constituents. This statement is misleading and should be removed, wherever it occurs.

2. Appendix C, Attachment C2 Bar Graphs:

Several of the bar graphs are presented at a scale where it is impossible or extremely difficult to see if samples exceed the various screening criteria (colored-horizontal lines). Revise the bar graphs, so that the screening criteria are discernable in relation to the sample concentrations being depicted. If the revision of the bar graphs in question by this comment is deemed as a laborious effort, please contact KY for further consideration.

Specific Comments:

1. Section 5.1.7, Pg. 5-34:

For EU 4 Subsurface, “PCBs” is listed twice. Please revise.

2. Section 5.2.2, Pg. 5-39:

Please elaborate on the discussion of RI2 work by including the information about SWMU 15, contained in Worksheet 10 of the QAPP for the RI2 Sampling Plan. This is a concise description of what was planned for SWMU 15. It should be modified to address the work that was actually able to be performed.

3. Section 5.3.2, Pg. 5-93, Figure 5.3.1:

Please check the map, it looks like SWMU 26 lies on the south side of the old north-south diversion ditch. Please revise the document if warranted.

4. Section 5.5.3, Pg. 5-152:

Grid 001O exceeded the action level for PCBs, but was not stepped out further. This leaves a question as to whether the extent of contamination was defined in this area. Please provide an explanation in Section 5.5.3 of how extent of contamination was addressed at this location.

5. Section 5.7.2, Pg. 5-224, second bullet:

Please include a parenthetical at the end of the second bullet or in some other way indicate that Figure 9 is in the 2014 work plan addendum.

6. Section 5.9.7, Goal 1, Pg. 5-279:

The first sentence states that spills and releases from loading of tank cars could have contributed to the contamination at SWMU 225. This is certainly true for 225-A, but it does not really explain the uranium contamination at 225-B, which is some distance away from 225-A. Please revise.

7. Section 5.9.7, Goal 1, Pg. 5-279:

Looking ahead to the FS and other future documents, would it be better to discuss the nature and extent of contamination separately for 225-A and 225-B? The idea is that one area might require a different clean-up strategy than the other.

8. Appendix C, Section C.3.2, Pg. C-11, Table C.3.2:

There is potential confusion when the number of analytical detects is reported as '0' when there are no samples present at a specific depth. Please consider changing the value in the 'number of analytical detects' column to reflect that '0' actually means there were no samples analyzed at this interval.

9. Appendix C, Section C.3.2, Pg. C-11, Table C.3.2:

Please explain the footnote below the table. It is not clear how the 'actual number of soil samples in the database is greater than what is reported in the tally.' Why were the additional samples excluded from the tally? Are all of the additional samples, not included in this tally, associated with a duplicate sample?

10. Appendix C, Section C.3.2, Pg. C-12, Table C.3.3 & C.3.4:

The tables are misleading because they are reporting an 'average concentration' and 'contaminated area,' respectively, of '0' for depth intervals for SWMU 13 from 5'-10' and SWMU 15 from 5'-10' and 10'-15.' These intervals do not have soil data (Table C.3.2) to support that the average concentration or contaminated area is equal to '0.' For a specific depth interval where data does not exist, report it differently.

11. Appendix C, Section C.3.2, Pg. C-12, 2nd paragraph, last sentence:

"To overcome this limitation, SWMU 1 SESOIL and AT123D ..." If SWMU 1 parameters were utilized for depths >15ft and presented in Table C.3.5, then please mention SWMU 1 somewhere in that table to reflect the text.

12. Appendix C, Section C.3.3, Pg. C-13, 1st paragraph:

“SESOIL uses the same contaminated soil area as an input parameter for all depth intervals in a given SWMU; however, as shown in Table C.3.4, the contaminated soil area in the Soils OU SWMUs varies with depth.” ... “Table C.3.7 lists the area-adjusted soil contaminant concentrations used in the SESOIL modeling.” For the three depth ranges specified in Comment 10, assigning an average concentration of zero in deeper intervals, does not make sense since Tc-99 is likely present (at concentrations > 0) at these depths. If concentrations >0 would have an impact on the outcome of modeling results, consult the modeling project team for consideration to change SESOIL model inputs to reflect a value other than ‘0.’

13. Appendix C, Section C.3.3, Pg. C-14, Table C.3.8:

The sources are too vague for nearly all of the input parameters. Please provide additional support for these sources (year, document). Were these parameters presented to the modeling project team and agreed upon? If so, please state as such in a footnote below the table.

14. Appendix C, Section C.4, Pg. C-14, 2nd paragraph:

The model-predicted time to reach each SWMU Boundary is presented in Table C.4.1 and described in the preceding paragraph. How is the number of years interpreted in the decision process since these source areas have been in the ground for decades. Does the model account for the time period that contaminants have been in the ground and the migration that has occurred since then?

15. Appendix C, Attachment C1, Section C.1.3, Pg. C1-15:

Consider broadening the C-400 Tc-99 language to also include the area south of C-400.

16. Section E,2,3, Pg. E-19, second paragraph:

The second sentence states that ecological risks associated with exposure to surface water **were** assessed in this SERA. If this is not a correct statement, please revise.

**Kentucky Risk Assessment Section Comments to the
Soils Operable Unit Remedial Investigation 2 Report
Paducah Site, Paducah, Kentucky**

DOE/LX/07-2306&D1

September 25, 2015

The Risk Assessment Section (RAB) has completed its review of the Soils Operable Unit Remedial Investigation 2 Report. RAB's concerns with the previous version of the document have largely been addressed, but some new concerns and corrections are discussed in the following comments.

General Comment:

Most of the issues noted in the following comments can be resolved by comment responses, and corrections can be made in the Feasibility Study, so a revision of the RI may not necessarily be required.

Specific Comments:

Section 4.6 Risk Assessment

1. Historical results should be included in the explanation of results used in (2)(a), (2)(b), (4)(a), and (4)(b).
2. The explanation in (4)(a) (and in the Figure 4.1 Flowchart) should indicate that if the fixed-based laboratory or historical result is a nondetect, then the grid is assigned a **nondetect** flag.
3. On page 4-13, it is stated that "if results from ten or more grids are available, then a distribution check was performed, and the EU EPC was the lesser of the maximum detected concentration and the 95% upper confidence limit (UCL) on the mean of the appropriate distribution." However, it appears that some EU EPC values are 95% UCLs that are above the maximum detected (or nondetect) concentrations (see Specific Comment #8 for an example).
4. It appears that no distinction was made between detected and nondetected values when calculating an EPC for each EU. According to the ProUCL Version 5.0.00 User Guide (USEPA, 2013), "[a]ll ND observations in ProUCL are identified by the value '0' of the indicator variable used in ProUCL to distinguish between detected (=1) and nondetected (=0) observations. It is the users' responsibility to supply correct numerical values for NDs (should be entered as the reported detection limit or RL values) and not as qualifiers (e.g., J, U, B, UJ, ...) for ND observations in the data set." Although this may be due to the way some of the grid values were derived (e.g., as an average of the grid values present), it results in considerable uncertainty.

Table 4.2, Exposure Factors Used for Intake Calculations in the BHHRA

5. The footnote “^b” does not seem to apply to any of the factors in the table.

Section 5, Tables 5.X.1 Surface Soil Data Summary: SWMU XX and Tables 5.X.2 Subsurface Soil Data Summary: SWMU XX

6. The blue color in the tables is supposed to indicate that “[o]ne or more samples exceed SSLs of RGA and UCRS groundwater protection.” However, many boxes are highlighted blue in the AL column for the Industrial Worker (all are N/A), as well as in columns marked N/A in the GW Protection Screen columns for RGA and UCRS. This makes the tables visually difficult to interpret and should be revised.

Section 5.1.3: Nature and Extent of Contamination – Surface Soils

7. The database for SWMU 13 EU1 includes samples SOU013-125, which should be in EU11. Once that sample is removed from EU1, the EPC for PCBs becomes 6.108 mg/kg in surface soils and 9.419 mg/kg in subsurface soils, and the EPC for Uranium-238 becomes 1.203 mg/kg in subsurface soils.

Section 5.1.3: Nature and Extent of Contamination – PCBs

8. Although the maximum detected value of PCBs in surface soil at SWMU 13 is 1.25 mg/kg, the EPCs for the Exposure Units listed in Table D.06 range from 6.148 mg/kg at EU 1 (actually 6.108 mg/kg, due to error noted in Comment #5) to 10.76 mg/kg at EU 6, and includes an EPC of 10.52 mg/kg in EU 4, although there were no detects. We recognize that these values are an artifact of a high detection limit (5 mg/kg) for many nondetects, as well as the use of a 95% UCL that is above the maximum grid value. Therefore, a revision of this methodology may be advisable, particularly for COCs with many nondetects and/or high detection limits.

Section 5.5, Figure 5.5.2., SWMUs 56 and 80 Sample Locations – Surface Soil and Figure 5.5.5., SWMUs 56 and 80 Sample Locations – Subsurface Soil

9. Please clarify why sample SOU224-001 is part of SWMU 56/80 EU2 and SOU224-001L is part of SWMU 56/80 EU3. In the Appendix F Data Download document, SOU224-001 is listed in SWMU 224, and SOU224-001L is not listed at all. Do either of these samples belong in SWMU 224 or should they be renamed?

Section 6.3, Goal 3 Complete A Baseline Risk Assessment for the Soils OU, Relative Risks (ELCRs)/Hazards (HIs)

10. Inhalation of vapors emitted from soil/sediment should be added to the list of exposure routes evaluated in the BHHRA.
11. As noted in previous reviews, we disagree that the use of 95% Upper Confidence Limits (UCLs) of the mean “likely will lead to an overestimation of actual exposure.” *If there is sufficient data*, the 95% UCL should approach the mean value, which is a reasonable estimation of actual exposure. Also see Comments #3 and #8.

Appendix D.1, Results of Previous Studies

12. It is stated that “[t]his Soils OU RI 2 includes new soil data (DOE, 2010a) and up-to-date toxicity and exposure parameters (DOE, 2015a).” Additional soil data from the fall of 2014 (DOE, 2014) should be included in this sentence as well.

Appendix D.2.3.2, Evaluation of Concentrations for Soil

13. As noted in Comment #3, on page 4-13, it is stated that “if results from ten or more grids are available, then a distribution check was performed, and the EU EPC was the lesser of the maximum detected concentration and the 95% upper confidence limit (UCL) on the mean of the appropriate distribution.” However, that is contradicted in this section where is stated that “[i]n some instances, ProUCL (Version 5.0) will calculate the UCL95 as greater than the maximum value. In these cases, the UCL95 was used at [*sic*] the EPC.” We do not recommend using a 95% UCL value that is greater than the maximum detected concentration.

Appendix D.3.4.1, Potential Receptor Populations - Future Recreational Users

14. Since hunting by recreational users is considered plausible, why is consumption of wild game not included in this evaluation?

REFERENCES:

United States Environmental Protection Agency (USEPA). 2013 (Sept). ProUCL Version 5.0.00 User Guide. Office of Research and Development. Washington, D.C.

EPA/600/R-07/041

**Kentucky Ecological Risk Assessment Section Comments to the
Soils Operable Unit Remedial Investigation 2 Report
Paducah Site, Paducah, Kentucky**

DOE/LX/07-2306&D1

September 25, 2015

General Comments

1. Table E2.1 in the *Soils Operable Unit Remedial Investigation Report at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (DOE/LX/07-0358&D2) dated September 2012 (2012 report) contains eight columns headed, SWMU, Analysis, Unit, Bkgd, Max Result, Soil NFA, HQ(Max), and Below Bkgd? Although it was requested that the 95% UCL of the average be used as an exposure point concentration in this report, the request was declined because, “the results of the SERA (i.e., all SWMUs within the Soils OU require further evaluation in the sitewide baseline ecological risk assessment to be completed with the SWOU RI) would not change with the addition of this information” (Response to Division of Waste Management Comments Submitted December 9, 2011, *Soils Operable Unit Remedial Investigation Report Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/LX/07-0358&D1) Table E2.1 in the 2015 report contains the same eight columns plus two additional columns headed EPC and HQ (EPC). Why does the 2015 report contain these two extra columns when it was explicitly refused in the 2012 report? Why is an exposure point concentration based on the 95% UCL included in one report for a set of SWMUs/AOCs but not in another report for a larger set of SWMUs/AOCs? Also, Tables 5.1.4, 5.2.4, 5.3.4, 5.4.4, 5.5.4, 5.6.4, 5.7.4, 5.8.4, and 5.9.4 in the 2015 report list the EPC and HQ (EPC) rather than the Maximum and HQ (Max) as listed in the 2012 report.
2. In 2013, the U.S. Geological Survey published, “Geochemical and mineralogical data for soils of the conterminous United States: U.S. Geological Survey Data Series 801” (Smith et al., 2013). Data tables can be accessed at <http://pubs.usgs.gov/ds/801/downloads/>. A maximum of three “samples were collected at each site: (1) soil from a depth of 0 to 5 cm; (2) a composite of the soil A horizon (the uppermost mineral soil); and (3) a sample from the soil C horizon (generally partially weathered parent material) or, if the top of the C horizon was deeper than 1 m, a sample from about 80 to 100 cm” (Smith et al., 2013). In the absence of PGDP specific background data for lithium and molybdenum, this data set appears to be acceptable for calculating regional or statewide background values. For example, Kentucky is represented by 64 samples all of which were analyzed for lithium and molybdenum in the 0 to 5 cm depth (surface soil). The 95% UCL for lithium and molybdenum in the surface soil was calculated using Pro-UCL. The suggested 95% UCL is 33.4 mg/kg for lithium and 5.25 mg/kg for molybdenum.

3. Table A.2 in DOE (2015) lists the aluminum PGDP NFA Screening Value as being “If soil pH is less than 5.5, use 50; otherwise no evaluation needed”. Yet aluminum is listed in Table E2.1 for every SWMU except for AOC 565 with HQ (Max) ranging from 692 to 46 using a screening value of 50 mg/kg. Aluminum is not listed for any SWMU in Table E2.1 in the 2012 report. Please clarify.

Specific Comments

1. **Figure E.2., Pg. E-11: Preliminary Conceptual Site Model for Soils OU RI 2 SWMUs**

Some of the pathways designated as incomplete in Figure E.2 are actually complete. Please clarify or correct.

2. **E.2.3 Potentially Contaminated Media (page E-19)**

The last paragraph in this section reads, “Although some SWMUs/AOCs are located near drainage ways, significant surface water contamination is not expected as a result of these SWMUs/AOCs (UK 2007). As a result, ecological risks associated with exposure to surface water were assessed in this SERA.” Please correct the last sentence. Ecological risks associated with exposure to surface water were NOT assessed.

3. **Table E2.1**

Please check the Total HQ (EPC) for SWMU 13. It is listed as 575.5. It appears it should be 561.5.

4. **Table E2.1**

Please check the Total HQ (EPC) for SWMU 15. It is listed as 1199.5. It appears it should be 1128.9.

5. **Table E2.1**

Please check the EPC HQs for SWMU 26 1,2-dichlorobenzene, 1,3-dichlorobenzene, and 1,4-dichlorobenzene. They appear to be incorrect.

6. **Table E2.1**

Please check the Total HQ (EPC) for SWMU 26. It is listed as 1141.1. It appears it should be 1047.5.

7. **Table E2.1**

Please check the Total HQ (EPC) for SWMU 77. It is listed as 562.1. It appears it should be 559.2.

8. **Table E2.1**

Please check the Total HQ (EPC) for SWMU 80. It is listed as 2756.0. It appears it should be 2720.8.

9. Table E2.1

Please check the Total HQ (EPC) for SWMU 204. It is listed as 1089.5. It appears it should be 1071.2.

10. Table E2.1

Please check the Total HQ (EPC) for SWMU 211. It is listed as 900.5. It appears it should be 889.3.

11. Table E2.1

Please check the Total HQ (EPC) for SWMU 224. It is listed as 642.9. It appears it should be 616.2.

12. Table E2.1

Please check the Total HQ (EPC) for SWMU 225. It is listed as 663.9. It appears it should be 658.7.

13. Appendix F

It is not apparent how surface soil data are distinguished from subsurface soil data in Appendix F. Please clarify.

REFERENCES:

DOE, 2015. Methods for Conducting Risk Assessments and Risk Evaluations at the Paducah Gaseous Diffusion Plant Paducah, Kentucky, Volume 2, Ecological, DOE/LX/07-0107&D2/R1/V2, U.S. Department of Energy, Paducah, KY.

Smith, D.B., Cannon, W.F., Woodruff, L.G., Solano, Federico, Kilburn, J.E., and Fey, D.L, 2013. Geochemical and mineralogical data for soils of the conterminous United States: U.S. Geological Survey Data Series 801. 19 p., <http://pubs.usgs.gov/ds/801/>.