

Missouri Department of dnr.mo.gov

NATURAL RESOURCES

Eric R. Greitens, Governor

Carol S. Comer, Director

August 30, 2017

Ms. Christine Jump, Project Manager
Superfund Division
United States Environmental Protection Agency, Region 7
11201 Renner Boulevard
Lenexa, Kansas 66219

RE: Comments on Remedial Investigation Addendum, West Lake Landfill, Operable Unit 1

Dear Ms. Jump:

The Missouri Department of Natural Resources' Federal Facilities Section has reviewed the revised Remedial Investigation Addendum, West Lake Landfill, Operable Unit 1, dated June 16, 2017

Based on our concise review, it appears that many of the global issues identified during our review of the preliminary draft version are still pervasive throughout the document, and we have provided general comments defining the major issues remaining. At the request of EPA, we have also included specific comments with proposed appropriate modifications to existing language in the report in order to expedite resolution of the specific comments that were generated.

The Federal Facilities Section is also coordinating review with the Department of Health and Senior Services on the following separately received documents:

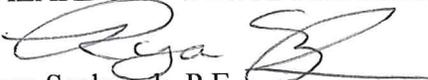
- Revised Baseline Risk Assessment, dated June 2017;
- RAGS Part D Tables, received August 9, 2017;
- Errata pages, received August 16, 2017; and
- Responses to previous comments received August 16, 2017.

Feedback on these documents will be provided separately.

Thank you for the opportunity to provide comments on the draft Remedial Investigation Addendum documents. If you have any questions pertaining to these comments please contact me by phone at (573) 751-8628, or by written correspondence at P.O. Box 176, Jefferson City, MO 65102.

Sincerely,

HAZARDOUS WASTE PROGRAM


Ryan Seabaugh, P.E.
Federal Facilities Section

RS:rl

Enclosure

c: Tom Mahler, EPA Region 7

Second Draft Remedial Investigation Addendum

West Lake Landfill Operable Unit 1

August 30, 2017

General Comments

Core elements of the document are incomplete or missing:

The Conceptual Site Model, and other core elements continue to be insufficiently developed and inconsistently applied throughout the report.

Related specific comments: 7,15,18,19,20,21,22,24,27,30,38,52,55,56, 60,62,63,67,69,84,85,86,87

Comment: Please revise the report to adequately include and discuss core elements of a remedial investigation.

Missing and insufficient discussion of historical studies:

Some past studies, investigations, and information have not been addressed in this document. Further, many of the ones that are acknowledged in this report are simply referenced or given varying degrees of discussion with no consistency in the type or relevance of information discussed.

Related specific comments: 6,8,9,10,11,12,17,54

Comment: Please revise the report to adequately utilize and discuss past studies to support interpretation of results.

Support, accuracy, and placement of statements and conclusions:

Starting with the Executive summary and pervasive through the entire report are statements that continue to be unsupported, selectively supported, inaccurate, too generalized to provide any value, or not relevant to the investigation.

Related specific comments: 1,2,3,4,5,13,14,16,23,25,26,28,29,34,46,47,48, 49,50,51,53,57,58, 61,65,66,68,70,71,72,73,77,78,79,80,81,82,83,88

Comment: Please revise the report to provide full discussion that supports statements and conclusions in appropriate sections.

Groundwater and OU-3:

Related specific comments: 59

Comment: If OU-3 for groundwater is being addressed separately, all interpretive or subjective statements regarding groundwater should be removed or a very explicit statement should be added to state that all interpretations and conclusions will be revisited for the OU-3 investigation.

Section 4:

This section of the report continues to present information from each document in a selective and inconsistent manner. The amount of, relevance, type, and depth of information being presented for each study continues to vary widely. Some descriptions contain conclusions or condensed conclusive statements with limited, if any discussion later in the report regarding assumptions, limitations or potential data gaps, usability of information, or current applicability.

Related specific comments: 31,32,33,35,36,37,39,40,41,42,43,44,45

Comment: Please revise and improve Section 4 to better support the overall remedial investigation for OU-1 and provide sufficient groundwork for discussion on nature and extent, and fate and transport.

Geostatistical Estimate of extent of RIM:

Related: 74,75,76

Comment: The geostatistical estimate of RIM discussion and report is not transparent in the series of decisions that were made leading to the results. Some issues that will need to be resolved before detailed review of the statistical model include:

1. How does the geostatistical model quantify RIM concentrations through gamma readings
2. Discuss and include details on sensitivity analyses, or perform sensitivity analyses
3. How were the boundary conditions defined?
4. How does the model treat gamma counts that are not flagged as RIM?
5. Where is the QAPP for RIM versus non-RIM designations using alpha and gamma screening tools?

Specific Comments

Executive Summary

1. *“The Site has been the subject of extensive investigation, monitoring and sampling activities over the course of forty (40) years, and has been studied...”*

and

“This extensive sampling and analysis of the Site has included four overland radiation surveys; 314 soil borings, hand augers and GCPT soundings; analysis of approximately 500 soil/waste samples; and sampling and analysis of other media, including radon, air/dust, surface water/stormwater, sediment, and groundwater.”

These statements create a false picture of a site that has been continuously and extensively studied for 40 years when consistent sampling and monitoring of some media including groundwater, air, storm water and sediment are very recent activities. In some of these media, the investigation has been deficient, undeveloped, or not finalized as of the date of this draft report.

Comment: Remove this and all other subjective, misleading, or unsupported statements throughout the document.

2. *“In addition, the potential migration pathways (air, stormwater, and sediment) have been extensively studied, and the data collected to date shows that results are generally below regulatory standards. For example, perimeter monitoring of radon levels in the ambient air around the perimeters of Areas. For example, perimeter monitoring of radon levels in the ambient air around the perimeters of Areas 1 and 2 indicate that radon levels at the Site perimeter were less than the standard of 0.5 pCi/L above background concentrations, and stormwater monitoring performed in 2015-2017 from Areas 1 and 2 indicated that levels of radium and uranium were below drinking water standards.”*

Comment #2-1: Delete “extensively”

Comment #2-2: Explain in the report what the relevance of drinking water and regulatory standards is in this context or delete the statement.

3. *“The results of the extensive investigations described in this RI Addendum demonstrate that there are no current exposures to radionuclides...”*

Comment: delete “extensive” and replace “current” with “unacceptable” – or delete entirely since data gaps still exist.

4. Comment: Add a section describing future risks.

Section 1 Introduction

5. Section 1.1, page 2: *“Therefore, this RI Addendum addresses all media at the Site including soil/waste, rainwater/stormwater runoff, surface water, sediment, air and groundwater.”*

Comment: Replace “addresses” with “discusses”

6. Section 1.2 Report Organization, page 2: Appendix O also contains a brand new draft document that should be noted in the description.

Comment: Please describe the contents of the Appendices in enough detail to understand everything contained in each appendix.

7. Section 1.2 Report Organization, last paragraph, page 4:
“An updated Baseline Risk Assessment is being prepared separately by Auxier & Associates, Inc., for submittal concurrently with this RIA. A report discussing the results of laboratory testing and modeling of potential leaching of radionuclides is also being prepared by S.S. Papadopoulos & Associates and is expected to be submitted separately shortly after submittal of this RIA.”

Core elements of this report continue to be produced and revised on separate tracks and are still subject to extensive revisions. Core elements of the RI are necessary in order to support statements and conclusions drawn in the report body.

Comment: Please revise the report to adequately include and discuss core elements of a remedial investigation.

Section 2 Summary of Investigations

8. Section 2.1.1 Pre-RI Reports, page 6: The list is missing 1984 "Survey for Berm Erosion" West Lake Landfill, St. Louis County, Missouri April 6, 1984, Oak Ridge Associated Universities under agreement DOE No. 40-770-80, NRC Fin. No. A-9093-0. This report could provide additional detail on portions of the Area 2 berms and improve the conceptual site model.

Comment: Add this report and incorporate into the RI as appropriate.

9. Section 2.1.1 Pre-RI Reports, page 7: The list is missing "Site Characterization and remedial Action Concepts for the West Lake Landfill", Docket No. 40-8801, 1989, Office of Nuclear Material Safety and Safeguards (NRC). This report could provide additional information relevant to the RI.

Comment: Add this report and incorporate into the RI as appropriate.

10. Section 2.2.1 Post ROD OU-1 Reports and Evaluations, all “West Lake Landfill Perimeter Air Monitoring Quarterly Reports”

Comment: Have all of these reports been approved? If not, it should be noted.

11. Section 2.2.2 Post-ROD Bridgeton Landfill Reports, first paragraph, page 14:

“In addition, in response to the occurrence of a subsurface exothermic (heat-generating) reaction (SSR) within a portion of the South Quarry of the Bridgeton Landfill,¹⁰ Bridgeton Landfill, LLC has performed numerous investigations and evaluations, including:”

Comment: Delete the extraneous text *“in response to the occurrence of a subsurface exothermic (heat-generating) reaction (SSR) within a portion of the South Quarry of the Bridgeton Landfill,¹⁰”* and the corresponding footnote.

Section 3 Site Background

12. Section 3.2 Land Use Restrictions, page 23:

“Certain types of scavenging birds (e.g., gulls, crows) are attracted to exposed putrescible wastes at landfills, and accordingly can present a bird strike risk to passing aircraft. Similarly, bird flocks also pose a serious risk to aircraft from the potential of being sucked into the jet engines of commercial aircraft, thereby causing complete engine failure.”

Comment: This level of detail is inappropriate for the remedial investigation. Delete the portion of the section quoted above.

13. Section 3.3.1. Landfill Permit History, Page 24

“No active landfilling has occurred at the Site since 2004, although ongoing activities related to closure and maintenance and monitoring of the Bridgeton Landfill continue to be conducted.”

Comment: Insert “pursuant to orders from the state Attorney General’s Office, EPA Region 7 and Missouri Department of Natural Resources” after “activities” then delete “closure and”

14. Section 3.3.2 West Lake Landfill Areas 1 and 2, first sentence, page 25:

“Based on visual inspection and geologic logging of drill cuttings and core samples...”

Comment: Delete, and discuss later in the report using all available information.

15. Section 3.3.2.1 West Lake Landfill Radiological Area 1, first paragraph, page 26:

“This area was part of the unregulated landfill operations conducted up through 1974, although the southwestern portion of what is currently identified as Area 1 was historically included under permit No. 218903 (Figure 3-7)²⁴.”

Comment #15-1: Provide discussion in the report describing when landfilling operations in parts of Area 1 started.

Comment #15-2: Based on elevational comparison and other available information, describe in the report approximately how full the “unregulated landfill” units were around the time material arrived from Hazelwood Interim Storage Site.

Comment #15-3: Include in the report whether thicker or “final” cover was typically placed over unregulated landfill units prior to overlaying permitted units or grading the area with additional fill that would be recognizable in boring logs.

Comment #15-4: If the answer to comment #15-3 is affirmative, provide discussion in the report whether the CSM indicates if final cover was placed before, during, or after material arrived from Hazelwood Interim Storage Site.

Comment #15-5: Provide discussion in the report whether remedial investigation activities such as core inspections or GCPT were conducted sufficiently to determine whether different periods of landfill operations could be differentiated from visual evidence.

Comment #15-6: If the discussion leads to affirming differentiation of waste layers, indicate where it will be further discussed in the report.

Comment #15-7: Bring the footnote into the body of the report.

Comment #15-8: Expand discussion on Area 1 to be more useful in developing a conceptual site model.

16. Section 3.3.2.1 West Lake Landfill Areas 1 and 2, first paragraph, page 26:

“Based on the drilling cores and samples obtained as part of the RI/FS and subsequent investigations for OU-1, the waste materials within Area 1 consist primarily of municipal refuse (sanitary wastes).”

Comment: Delete, and discuss later in the report using all available information.

17. Section 3.3.2.1 West Lake Landfill Radiological Area 1, first paragraph, page 26:

“Pursuant to a Materials Management Plan (EMSI, 2006b) approved by MDNR, inert fill material (concrete rubble and brick) was placed over portions of Area 1 between 2006 and 2008.”

Comment: Actions performed in Areas 1 and 2 are under EPA jurisdiction. Indicate in the report whether EPA approved the Materials Management Plan.

18. Section 3.3.2.1 West Lake Landfill Radiological Area 1, second paragraph, page 26:

“Remnants of an asphalt entrance road and parking area are located on the northwestern border of Area 1 to the south of the landfill office building.”

Comment 18-1: Provide discussion in the report indicating approximately what time period the asphalt entrance road and parking area within Area 1 were used.

Comment 18-2: Provide discussion in the report whether or how installation and use of this road potentially affected fate and transport of RIM, and further develop the conceptual site model.

19. Section 3.3.2.1 West Lake Landfill Radiological Area 1, second paragraph, page 26:

“An abandoned underground diesel tank is also located beneath the asphalt-paved area. The tank is no longer in use but has not been removed because it is within the boundaries of Area 1.”

Comment 19-1: Provide discussion in the report when the diesel tank was installed based on available information.

Comment 19-2: Provide discussion in the report what time period the diesel tank was in use, based on available information.

Comment 19-3: Describe in the report if or how installation and use of the diesel tank potentially affected fate and transport of RIM.

20. Section 3.3.2.1 West Lake Landfill Radiological Area 1, page 26:

Comment: Include in the report any time there were any other structures above or below ground constructed on or near Area 1 during or after arrival of material from Hazelwood Interim Storage Site? (example, stormwater drainage structures, fences, transfer stations, etc.)

21. Section 3.3.2.1 West Lake Landfill Radiological Area 1, page 26:

“The southeastern portion of Area 1 was covered beneath the above-grade portion of the North Quarry portion of the Bridgeton Landfill in approximately 2002-2003 (Figure 3-8).”

It appears several permits were issued over time that might improve the conceptual site model for fate and transport of RIM.

Comment: Please expand this discussion to include all permits in order to improve the conceptual site model.

22. Section 3.3.2.2 West Lake Landfill Radiological Area 2, first paragraph:

“This area was also part of the unregulated landfill operations conducted up through 1974, although a small part of the eastern portion of Area 2 was also included within permit No. 218903 (Figure 3-6)”

Comment 22-1: Provide discussion on when landfilling operations in parts of Area 2 started.

Comment 22-2: Based on aerial photos, elevational data, and all other available information, describe approximately how full the “unregulated landfill” units were around the time radiological material arrived from Hazelwood Interim Storage Site.

Comment 22-3: Provide discussion in the report whether thicker or “final” cover could be placed over any unregulated landfill units prior to overlaying permitted units or grading the area with additional fill, and whether it would be identifiable from boring logs.

Comment 22-4: If the discussion from comment 22-3 leads to affirmation, compare the result to the CSM, and indicate whether it suggests final cover would have been placed before, during, or after material arrived from Hazelwood Interim Storage Site?

Comment 22-5: Provide discussion in the report whether remedial investigation activities such as core inspections or GCPT were conducted sufficiently to determine if different periods of landfill operations could be differentiated from visual evidence.

Comment 22-6: If the discussion leads to affirming differentiation of waste layers or landfill operations, indicate where it will be further discussed in the report.

Comment 22-7: Expand discussion on Area 2 to be more useful in developing the conceptual site model.

Comment 22-8: Provide discussion in the report when the Shuman Building was constructed based on available information.

Comment 22-9: Provide discussion in the report including information on any other structures above or below ground constructed on or near Area 2 during or after arrival of material from Hazelwood Interim Storage Site? (example, stormwater drainage structures, fences, transfer stations, etc.)

23. Section 3.3.2.2 West Lake Landfill Radiological Area 2, page 26:

“Based on visual inspection and geologic logging of drill cuttings and core samples...”

Comment: Delete, and discuss later in the report using all available information.

24. Section 3.3.2.2 West Lake Landfill Radiological Area 2, page 27:

“Prior to 2015, large portions of this area were covered with grasses, native bushes and trees, while other portions were unvegetated and covered with inert fill material consisting of soil, gravel, concrete rubble and brick material.”

Prior to 2015, Area 2 supported buildings and vehicle traffic, became a waste disposal area, became part of a quarry operation, became a farmers field, became a flood plain...

Comment: Please provide a date range for when specific portions of Area 2 were abandoned and allowed to be vegetated or were covered with *“inert fill material”* and expand as necessary in order to contain useful discussion developing the conceptual site model.

25. Section 3.3.3 Inactive Landfill Operations in OU-2, page 27:

“The Inactive Sanitary Landfill is located to the southwest of the Closed Demolition Landfill. The operations performed in this area were also part of the unregulated landfill operations conducted up through 1974 that were subsequently regulated by MDNR and included within the scope of permits No. 118903, 218903, 118908, and 218912 (Figure 3-6).”

This statement appears to be referencing an incorrect figure, and the permits in the inactive sanitary landfill should be reviewed for accuracy.

Comment: Review and correct this statement as necessary.

26. Section 3.3.3 Inactive Landfill Operations in OU-2, page 27:

“Some industrial wastes may also have been disposed in this area, but based on the visual inspection and geologic logging of drill cuttings and core samples, industrial wastes do not appear to have been a major portion of the wastes disposed in the Inactive Sanitary Landfill.”

Why are conclusions for OU-2 being drawn in this report?

Comment: Delete.

27. Section 3.3.3 Inactive Landfill Operations in OU-2, page 27:

Comment 27-1: Provide discussion in the report whether landfill operations in the Inactive Sanitary Landfill affected or potentially affected OU-1. For example indicate if any portion of

Area 2 was used to stage fill material for daily cover on active portions of the Inactive Sanitary Landfill.

Comment 27-2: Discuss in the report what the status of OU-2 areas were during the period when material from Hazelwood Interim Storage Site was brought to West Lake Landfill.

Comment #27-3: Expand discussion for OU-2 that may be relevant and improve the conceptual site model for OU-1, and delete extraneous statements such as one identified in Comment #26.

28. Section 3.3.4. Bridgeton Landfill, page 28:

“Collectively, the North and South Quarry landfill areas make up the former Permitted Sanitary Landfill, also known as the Bridgeton Landfill.”

Comment: Replace “*former Permitted*” with “Former Active” to be consistent with ROD designation.

29. Section 3.3.4 Bridgeton Landfill, page 28:

“Although included within the overall scope of Operable Unit-2, the Bridgeton Sanitary Landfill is inactive and undergoing closure pursuant to MDNR supervision.”

Comment: Delete this statement and replace with “The Bridgeton Sanitary Landfill is included within the scope of Operable Unit-2, and regulatory authority has been deferred to MDNR per the selected remedy under the OU-2 Record of Decision.”

30. Section 3.5 Other Significant Features in the Vicinity of the Site, first paragraph, page 30:

“Inspection of the North Surface Water Body has not identified any outlet or pathway for discharge of water, and therefore, water that accumulates in this area appears to dissipate over time by evaporation and infiltration.”

Comment: Provide discussion in the report describing what investigation has been done to identify potential outlets, either historical or current. Alternatively, delete this conclusionary statement and discuss it in the context of the CSM using all available information.

Section 4 Site Investigation Activities

31. Section 4.1 and 4.2, pages 31 through 33:

It is noted that footnotes have been inserted in many places within the report that should be part of the main body of the document. Other summaries or past conclusions should be revisited, much like the one triggering footnote 25. As examples:

- *“During the October 1994 site reconnaissance, McLaren/Hart identified five locations where runoff from Area 2 could occur. Any such runoff would flow either to the North Surface Water Body, onto a portion of the Ford Property or out along the access road to Area 2 in the vicinity of the demolition landfill and the roll-off bin storage area;*

Has additional investigation occurred to confirm validity of this conclusion, or whether conditions have changed? If so, where has it been discussed?

- *McLaren/Hart identified potential locations for the staff gauges and surface water sampling points within the North Surface Water Body and the flood control channel located along the western portion of the Site. These locations were presented to EPA in McLaren/Hart's March 30, 1995 letter (McLaren/Hart, 1995a) and were approved by EPA on May 5, 1995 (EPA, 1995a);*"

Has additional investigation occurred to confirm validity of this conclusion, or whether site conditions have changed? If so, where is it discussed?

- McLaren/Hart inventoried all existing monitoring wells which could be located at the landfill, noted those wells with problems (such as crushed or broken casings), resurveyed the well locations and collar elevations, re-developed the existing wells, and evaluated the suitability of the existing wells for use in water level measurements and groundwater sampling;

Has a similar inventory of existing monitoring wells, and their condition been performed since 1995? If so where is it discussed?

- *"Review of the U.S. Fish & Wildlife Service and Missouri Department of Conservation databases, along with the results of the field inspection, did not indicate that any threatened or endangered species (including the Western Fox Snake) were present in the vicinity of the Site; therefore, no further assessment activities were necessary."*

Has additional investigation or species analysis been conducted to confirm the validity of this conclusion? If so, where is it discussed?

Comment: Review past conclusions and statements, and describe in the report what, if anything, has been done or changed since the conclusions were made, and clearly reference where in the document that they are discussed.

32. Section 4.3.2 McLaren/Hart Overland Gamma Survey, page 35:

"Based on discussions with EPA during preparation of the RI report (EMSI, 2000), the overland gamma survey based on a background value of 15 μ R/hr (Figure 4-4) was considered representative of Site conditions."

Comment 32-1: Discuss in the report whether any follow-up investigation has been performed more recently that support or change this understanding of site conditions?

Comment 32-2: Discuss in the report whether the value of 15 μ R/hr was used as a decision point for further investigations or determination of risk.

33. Section 4.3.3 EPA ASPECT Flyover Survey, page 36:

"The purpose of the infrared survey was to identify any heat signatures associated with the ongoing subsurface reaction (SSR) in a portion of the South

Quarry of the Bridgeton Landfill, which constitutes part of Operable Unit 2 (EPAOEM- CMAT, 2013)."

The statement is inconsistent with the statement in the ASPECT report.

Comment: Modify the sentence to state "The purpose of the infrared survey was to identify any heat signatures associated with the ongoing subsurface smoldering event in one of the non-radiological cells in Operable Unit 2, and to help delineate the extent of this event." or delete the statement entirely since it is not relevant to OU-1.

34. Section 4.3.3 EPA ASPECT Flyover Survey, page 36:

"The infrared survey did not detect any heat signatures that the ASPECT team associated with an SSR. The methods used and results obtained from the infrared survey are further discussed in the ASPECT report..."

This statement is too generalized and is not relevant to OU-1.

Comment: Delete the overly-generalized and irrelevant statement quoted above.

35. Section 4.3.3 EPA ASPECT Flyover Survey, page 36:

"The radiological survey collected about 800 gamma radiation measurements, of which only 10 (or approximately 1.25%) indicated the presence of elevated Bi-214 (which likely indicates the presence of Ra-226) (EPA-OEM-CMAT, 2013). 27 According to the report of the survey results, all of the elevated radiation measurements were detected during the West Lake Landfill survey over 20 contiguous acres associated with Operable Unit 1, Area 2 (EPA-OEM-CMAT, 2013). The EPA's radiological survey results from the 2013 report are included in Appendix A- 3."

Comment 35-1: Bring footnote 27 up into the body of the report

Comment 35-2: Replace "According to the report of the survey results, all of the elevated radiation measurements were detected during the West Lake Landfill survey over 20 contiguous acres associated with Operable Unit 1, Area 2" with the actual statement in the report "All of the gamma radiation measurements that were significantly higher than background were detected at 20 contiguous acres within Operable Unit 1, Area 2."

Comment 35-3: Discuss how background was established, and if or how that compares to other measures of "background"

Comment 35-4: Describe in the report what the radiological uncertainties are and assumptions that may be associated with an airborne survey that may affect results.

Comment 35-5: Discuss in the report whether the information provided in the ASPECT report was significant, useful, or drove future investigation.

36. Section 4.3.4 Additional Gamma Surveys for OU-1 Post-ROD Investigations, page 37:
Were there any significant findings from these post ROD gamma surveys? Did it cause, for example, fencelines to be moved or non-combustible cover to be placed over more area?

Comment: Provide more discussion on investigation results and how results affect the site conceptual model.

37. 4.4.1 RMC Investigation Soil Borings (1981), page 40: There is discussion that leads the reader to conclude that some data or information was unusable.

Comment: Describe here or while presenting the conceptual site model, what information was thrown out due to unusability.

38. 4.4.2 OU-1 RI Soil Boring and Logging (1995), page 41:

“All accessible cased soil borings and monitoring wells from the earlier RMC investigation (RMC, 1982) identified in Areas 1 and 2 were also logged. McLaren/Hart used a Mount Sopris MGX digital logger and a combination Stratigraphic Gamma/Electric Probe instrument to perform the logging.”

Comment 38-1: Provide discussion in the report how the downhole gamma results compare with RMC, 1982 report qualitatively and spatially.

Comment 38-2: Discuss whether comparison performed in Comment 38-1 allows reasonable discussion on the PVC borings that were not found in terms of understanding where RIM is located and how it compares to the conceptual site model.

Comment 38-3: Discuss in the report if or how the results affect previous findings discussed in the RMC 1982 investigation and subsequent 1988 NRC Summary report and 1989 NRC Site Characterization and Remedial Action Concepts for the West Lake Landfill.

Comment 38-4: Use responses to previous comments to further develop the conceptual site model.

39. 4.4.5 Phase 1 Investigations (2013-2015), page 45: What conclusions were drawn during these investigations?

Comment: Revise each section to present each document consistently to better support the overall remedial investigation for OU-1 and provide sufficient groundwork for discussion on nature and extent, and fate and transport.

40. 4.4.5.2 Phase 1C and 1D Soil Borings and Downhole Logging, page 51:

“Thus, there are instances when the core gamma scan, downhole scan, and sampled interval depths may not coincide exactly. However, it is important to note that each core scan corresponds to the sample run number indicated on the borehole log.”

Comment 40-1: Discuss in the report how were these differences reconciled in determining extent and thickness of RIM.

Comment 40-2: If percentages of core were unobtainable, explain how any lack of data is used by the geostatistical model.

41. 4.6 OU-1 Perched Water Sample Collection and Analyses (1995), page 67:

“Based on EMSI’s experience investigating other municipal solid waste (MSW) landfill sites, including Superfund MSW landfill sites, it is presumed that the presence of perched water results from accumulation of infiltration on layers of relatively lower permeability waste materials or soil layers. Owing to the overall heterogeneous nature of MSW landfills and the limited extent and continuity of any lower permeability layers within a waste mass, occurrences of perched water within MSW landfills typically include only very thin intervals of limited areal extent.”

Comment: If this was a conclusion of a 1995 report, describe in the report what specifically was done during the investigation to support the presumption.

42. 4.6 OU-1 Perched Water Sample Collection and Analyses (1995), page 68:

“The area of the seep was inspected on May 12, 2017, and it was found that seepage was occurring in this area; however, this seepage remains localized, and no seepage or flow has ever been observed on the face of the Area 2 slope.”

This follow-on to a 1995 analyses suggests that only two observations were made 22 years apart in order to attempt to characterize seepage in this area.

Comment: Describe in the report what reports document that observations were made and when observations were made in order to support the presumption that *“seepage remains localized, and no seepage or flow has ever been observed on the face of the Area 2 slope”*?

43. 4.6 OU-1 Perched Water Sample Collection and Analyses (1995), page 69:

“Perched water samples were then collected from four of the open borings (WL-108, WL-219, WL-220, and WL-231) using a disposable bailer or a decontaminated 5-gallon bucket attached to the bottom of the Kelly bar of the drill rig. After collection of the perched water sample, the boring was then abandoned and a new boring was drilled outside of the presumed extent of the perched water.”

Comment: Describe in the report which borings were drilled in order to move outside the presumed perched water boundaries. For example, what borings were drilled outside of the perched water boundary indicated by WL-219 and WL-220?

44. 4.7 OU-1 Geotechnical Sampling and Testing, page 70:

“Based on discussions with EPA, it was decided that rather than perform additional field work to address the stability of this slope, the Respondents would agree to regrade this slope, through either excavation or placement of additional fill materials, as part of any remedy that may be selected for OU-1. Regrading of this slope to a lower angle would...”

Other than identifying slope stability as a potential data gap for the RD/RA, this statement is largely irrelevant.

Comment: Delete or modify the statement accordingly.

45. 4.11.2 OU-1 RI Groundwater Sampling (1994-1997), page 75:

“...and re-analyzed following initial gross alpha results above the MSD standard. All three re-analyzed results were below the MSD standards.”

Comment: Incorporate into the report what the MSD standard is, and what relevance it has from a remedial investigation perspective.

46. 4.12 Surface Water and Sediment Investigation, page 81:

“Stormwater runoff samples have been and continue to be collected from OU-1, initially in conjunction with construction of the NCC on portions of Areas 1 and 2 pursuant to the UAO for Removal Action [the Surface Fire Prevention Removal Action] (EPA, 2015d) and subsequently as part of the overall OU-1 RI/FS work.”

Comment: Replace sentence with “Stormwater runoff samples have been and continue to be collected from OU-1, initially required by the UAO for Removal Action [the Surface Fire Prevention Removal Action] (EPA, 2015d) and subsequently moved to OU-1 RI Addendum work.”

47. 4.12 Surface Water and Sediment Investigation, page 81:

“These samples are analyzed for a standard list of parameters associated with municipal solid waste landfills along with radionuclides.”

Comment 47-1: Replace statement with “These samples are analyzed for radiological and non-radiological parameters.”

Comment 47-2: State in the report whether analytes tested include all identified contaminants of potential concern.

48. 4.12.2.2 Post-ROD Stormwater Sampling, page 87:

“Area 1 consists of two primary drainage basins with two potential drainage pathways that lead to two potential outfall points, OU-1-001 and OU-1-002 (initially identified as NCC-001 and NCC-002). Five distinct drainage basins were identified relative to Area 2, some of which include portions of adjacent OU-2 landfill areas (including a portion of the closed demolition landfill and the inactive sanitary landfill). Only two of these five drainage basins are expected to have the potential for off-site discharge of stormwater. Specifically, stormwater runoff from Area 2 (as well as adjacent areas outside of Area 2) could potentially flow off-site at points NCC-003 and NCC-004. Two other drainage basins appear to be completely contained, resulting in ponding of surface water without any discharge. The fifth drainage basin does not appear to have any organized drainage but instead contributes only overland flow off of Area 2 onto the adjacent Buffer Zone. The surface of the Buffer Zone is flat, and visual inspection of the perimeter of the Buffer Zone did not identify any engineered structures or erosional channels that convey stormwater off of the Buffer Zone. The elevation of the adjacent AAA Trailer property and the grade of the alignment of Old St. Charles Rock Road are higher than the surface of the Buffer Zone, effectively limiting discharge of stormwater from the Buffer Zone. Inspection and monitoring of these four outfalls began in February 2016. In accordance with EPA’s April 4, 2016 comment letter, inspection of the north and northwest slopes of Area 2 for possible stormwater discharge was initiated in April 2016.”

The portion of the section quoted above is extraneous, inaccurate, and not based on all available information.

Comment: Delete the extraneous, inaccurate and misleading portion of the section quoted above.

49. 4.12.2.2 Post-ROD Stormwater Sampling, page 89:

“In addition, the northern and northwestern boundaries of Area 2 are observed for evidence of stormwater runoff (such as erosional channels or sediment deposition areas) after precipitation events greater than 0.1 inches; however, no indication of any stormwater discharge has ever been observed in these areas.”

Comment: Replace with “Our observations during the period of <insert period of observation> have not identified erosional channels or sediment deposition areas.”

50. 4.13.1.2 Particulate Monitoring During the Phase 1 Investigations, page 93:

“Analysis of the results indicates all samples were well below the regulatory limit for workers of 5,000 mrem/y (10 CFR Part 20 Subpart C §20.1201(a)(1)(i)).”

Comment: Provide the range of results and delete “well”

51. 4.13.1.2 Particulate Monitoring During the Phase 1 Investigations, page 93:
“Analysis of the results indicates all samples were well below the regulatory limit for air effluents from NRC-licensed facilities of 50 mrem/y (10 CFR Part 20 Appendix B).”

Comment: Provide the range of results and delete “well”. Or modify the section to be consistent with information provided in other sections.

Section 5 Physical Characteristics of the Study Area

52. 5.2 Land Use, page 105:
“A Declaration of Covenants and Restrictions was recorded by Rock Road industries, Inc. on October 31, 2016 to prohibit in perpetuity use for residential purposes, commercial and industrial purposes, including but not limited to use as a storage yard, and installation of water wells for drinking water use on all portions of Areas 1 and 2 and the Buffer Zone.”

Comment: provide a figure showing the coverage of all negative easements, covenants, and restrictions in relation to areas of the Site.

53. 5.2 Land Use, page 106:
“Certain types of scavenging birds (e.g., gulls, crows) are attracted to exposed putrescible wastes at landfills, and accordingly can present a bird strike risk to passing aircraft. Similarly, bird flocks also pose a serious risk to aircraft (by, e.g., being sucked into the jet engines of commercial aircraft, thereby causing complete engine failure).”

Comment: This level of detail is inappropriate for the remedial investigation. Delete the portion of the section quoted above.

54. 5.2 Land Use, page 106:
“A Declaration of Covenants and Restrictions was recorded by Rock Road industries, Inc. on October 31, 2016 to prohibit in perpetuity use for residential purposes, commercial and industrial purposes, including but not limited to use as a storage yard, and installation of water wells for drinking water use on all portions of Areas 1 and 2 and the Buffer Zone.”

Comment: Please include copies of all covenants and restrictions.

55. 5.3.1 Topography, page 107
“A small berm exists along much of the top of the landfill slope along the northern, western and eastern sides of Area 2 such that stormwater does not run down the slope but is instead retained on the surface of Area 2 where it either evaporates or infiltrates into the underlying materials.”

Comment: The document is inconsistent regarding the historical, current, and future potential for stormwater runoff. This statement is specifically inconsistent with the findings of the NCC work and the observed and documented outfalls coming from Area 2. Please correct the document to be consistent with the current understanding as documented under the NCC work.

56. 5.3.3.1 Current Drainage Patterns in Areas 1 and 2, page 109

“Therefore, all runoff from Area 1 ultimately flows into the Northeast Perimeter Drainage Ditch, which then flows into the surface water body located north of Area 2 on the northeastern-most corner of the Site (the North Surface Water Body).”

Comment 56-1: Describe in the report whether this been confirmed by investigation of the drop boxes along St. Charles Rock Road.

Comment 56-2: Describe in the report whether the material or sediment in the drop boxes were tested, and include the QAPP.

57. 5.3.3.4 Surface Water Bodies at or near the Site, page 111

“The North Surface Water Body receives water from the Northeast Perimeter Drainage Ditch, which separates St. Charles Rock Road from the Site.”

Comment: Replace “Site” with “Property”

58. Section 5.5.2.2 Soil Cover over Areas 1 and 2, page 126

“The total thickness of soil cover materials encountered at the four locations drilled by EMSI in Area 1 in 1997 varied from approximately 24 to 60 inches.”

Comment: Please provide copies of the boring logs or appropriately qualify the statement.

59. Section 5.6.2 Site Hydrogeology, page 129: Much of this section includes conclusionary statements that belong in OU-3.

Comment: Review these sections and remove statements that are interpretive or subjective.

60. Section 5.6.2.2 Leachate Collection, page 132

“Because the other landfill units at the Site (e.g., Area 1, Area 2, Closed Demolition Landfill and Inactive Sanitary Landfill) pre-date the formation of MDNR and the associated permitting and regulatory requirements, there are no leachate collection systems within these units.”

Portions of the other landfill units were operational after MDNR, and pre-MDNR doesn't preclude construction and operation of leachate collection systems in prior units.

Comment: Describe in the report whether leachate collection systems were historically operational, and show where.

61. Section 5.7 Subsurface Reaction in the South Quarry portion of the Bridgeton Landfill, page 149: South Quarry is OU-2.

“The current understanding of the nature of the reaction, however, is that it is occurring within saturated landfill materials in the absence of oxygen, which indicates that it is not a result of a fire or smoldering (combustion). Accordingly, current references are to an SSR, or subsurface reaction, rather than using the prior SSE terminology. Unlike a fire, the SSR has not produced visible smoke or flames.

The fill within the South Quarry of the Bridgeton Landfill is deep and, as a result, contains dense, compact waste with very little pore space. This condition results in (1) slow heat dissipation (i.e., heat is retained much in the same way insulation holds heat), (2) confinement of pressure caused by water to vapor phase changes, and (3) slowing of the movement of the heat front and propagation of the SSR.”

“Based on the sequencing of the settlement occurrences, the SSR has migrated from an initial location in the eastern portion of the South Quarry in a counterclockwise direction to the north, then to the west and, most recently, to the southern portion of the South Quarry.”

“Both of these reports concluded that the primary potential impact if an SSR or other type of heat-producing reaction were to occur in Area 1 might be a temporary, localized increase in radon exhalation (emission from the ground surface).”

Comment 61-1: Delete the extraneous and un-approved portions of the section quoted above, and globally replace “SSR” with “SSE”.

Comment 61-2: In place of the statement beginning with “The current understanding...”insert the statement “For the purposes of this RI Addendum, the subsurface event shall be referred to as an “SSE” consistent with the Statement of Work for Remedial Investigation Addendum and Final Feasibility Study dated December 9, 2015, EPA’s letter of clarification dated August 4, 2016.”

Section 6 Nature and Extent of Radiologically Impacted Materials

62. Section 6.1 Potential Sources of Radionuclides in Areas 1 and 2, page 152

This section does not describe the potential sources of thorium and radium present in Areas 1 and 2.

Comment: Please discuss potential sources of radionuclides in the report as it relates to all radiological contaminants of concern in addition to Uranium.

63. Section 6.1.1 RIM-Containing Material Sent to West Lake Landfill from Latty Avenue Site, page 154:

“Respondents cannot provide a comprehensive estimate of the volume or precise chemical nature of the contaminants found in the Latty Avenue soils, as this information is known only by Mallinckrodt and Department of Energy”

Department of Energy is a Federal Respondent for this site

Comment: Please work with Federal Respondent to provide relevant details on the nature of contaminants. If DOE does not know, then USACE should be able to provide information.

64. Section 6.1.1 RIM-Containing Material Sent to West Lake Landfill from Latty Avenue Site, page 155:

“Cotter, through its contractor, removed soil cleanup material from the AM-7 area (including soils beneath the AM-7 piles), as demonstrated by aerial photographs (Appendix O-2). Specifically, the contractor:

- *excavated a trench (see May 4, 1971 aerial photo) to establish the depth of AM-7 pile subsidence; and*
- *removed additional AM-7 materials to below grade elevations (see depressions in May 4, 1973 aerial photo) to collect remaining AM-7 material that had subsided below ground surface for transport to Cotter’s plant (Appendix O-2)”*

Comment: What does subsidence mean here? Leaching? Settlement?

65. Section 6.1.1 RIM-Containing Material Sent to West Lake Landfill from Latty Avenue Site, page 156:

“Although no items of noncompliance with NRC requirements were found during a subsequent investigation of the West Lake disposal, the agency arranged for a survey of the Latty Avenue Site by the Oak Ridge National Laboratory (“ORNL”) in June 1977.⁶⁶ At the time of that survey, the Latty Avenue Site buildings were being prepared by the current owner for subsequent manufacture of chemical coatings. The survey concluded that surface contamination of the property by radionuclides exceeded the strictest of then-applicable NRC guidelines for release of property for unrestricted use.⁶⁷”

Comment: Delete irrelevant discussions and conclusions such as the portion of the section quoted above.

66. Section 6.1.2 West Lake Landfill, page 157:

“The radiologically impacted materials within Areas 1 and 2 are intermixed with decomposed MSW within portions of the overall matrix of landfilled solid waste

materials, debris and fill materials, and unimpacted soil and quarry spoils in portions of Area 1 and Area 2.”

If decomposed MSW, debris, fill materials, and “unimpacted soil and quarry spoils” meet the criteria of Radiologically Impacted Material – it is no longer decomposed MSW, debris, fill materials, and “unimpacted soil and quarry spoils”. By definition, it’s RIM.

Comment: Delete, or revise to be accurate.

67. Section 6.1.2 West Lake Landfill, page 157

“In light of the standard MSW operating procedures at that time, it is assumed that the soil mixed with LBSR was most likely used as landfill cover material. Operation of MSW landfills requires placement of soil cover over exposed waste at the end of each day; soil is placed over the compacted but still irregular, nonuniform surface of the disposed waste, resulting in a relatively discontinuous layer of variable thickness.”

Comment 67-1: Incorporate into the report what landfill units were active during the time period during and shortly after arrival of 43,000 tons of HISS material.

Comment 67-2: Incorporate into the report what landfill units were undergoing closure during the time of material arrival.

68. Section 6.1.2 West Lake Landfill, page 157

“Consequently, Areas 1 and 2 are comprised of both radiologically impacted and non radiologically impacted materials that cannot be visibly distinguished, and both of which are intermixed with solid waste materials.”

Radiologically impacted material is a defined term with specific criteria to meet that definition. This statement obfuscates what RIM is versus the original radiological material that arrived at the site.

Comment 68-1: Revise the statement to “Consequently, Areas 1 and 2 are comprised of the radiological material originating from Latty Avenue, and non-radiological fill materials that, based on our observations, could not be visibly distinguished. Based on our observations and sampling, in some instances solid waste material has also been impacted by the original radiological material.” or equivalent.

Comment 68-2: Globally revise the report to make clear differentiation between radiological material and Radiologically Impacted Material.

69. Section 6.1.2 West Lake Landfill, page 157:

“In light of the standard MSW operating procedures at that time, it is assumed that the soil mixed with LBSR was most likely used as landfill cover material.”

How does this vague general assumption compare with other evidence such as photo analysis and sampling? How did this unsupported assumption compare with sampling and analysis. Does this vague general assumption mean that RIM could be found throughout the site?

Comment: Create a supported Conceptual Site Model in the report that can adequately explain where RIM has been found and that supports the limits of investigative activity.

70. Section 6.2.6 Definition of RIM, 6.3 Procedures Used to Identify RIM Occurrences,

“In particular, EPA has determined that the term “RIM” at the West Lake Landfill Site will be applied to any material containing combined Ra-226 plus Ra-228 or combined Th-230 plus Th-232 at levels greater than 5 pCi/g above background (EPA, 2010b).”

“Based on the Site background values presented above, the criteria to be used to identify RIM are as follows:

- *Radium-226+228 = 7.9 pCi/g*
- *Thorium-230+232 = 7.9 pCi/g*
- *Combined uranium = 54.5 pCi/g*

These values were used to identify the Site soil/waste that would be included within the definition of RIM for purposes of this RI Addendum.”

“Therefore, the primary criteria for identifying occurrences of RIM are the results of laboratory analyses of soil/waste samples. These analytical data are considered direct measurements of potential RIM occurrences. Indirect data potentially indicative of or helpful in identifying RIM include overland gamma survey results, downhole gamma logging, and radon flux measurements.”

“In addition to the hundreds of soil samples that have been analyzed during the various investigations, many other measurements have been performed that can be used to provide an indirect indication of potential RIM occurrences. Most notable are the results of the downhole gamma logging, which provide a continuous set of vertical measurements that can be used to identify intervals possessing elevated gamma levels that are potentially indicative of occurrences of radium or other gamma emitters.”

“As discussed above, EPA has indicated that RIM is defined based on the radium, thorium and uranium activity levels developed based on the UMTRCA standards and OSWER guidance. Therefore, the primary criteria for identifying occurrences of RIM are the results of laboratory analyses of soil/waste samples. These analytical data are considered direct measurements of potential RIM occurrences. Indirect data potentially indicative of or helpful in identifying RIM include overland gamma survey results, downhole gamma logging, and radon flux measurements.”

“In addition to the hundreds of soil samples that have been analyzed during the various investigations, many other measurements have been performed that can be used to provide an indirect indication of potential RIM occurrences. Most notable are the results of the downhole gamma logging, which provide a continuous set of vertical measurements that can be used to identify intervals possessing elevated gamma levels that are potentially indicative of occurrences of radium or other gamma emitters.”

“The downhole gamma logging, core sample gamma scan, and core sample alpha scan data were evaluated to identify intervals of elevated gamma or alpha counts (relative to instrument background and the base level gamma or alpha counts for borehole or core material from each boring) that likely reflect occurrences of RIM.”

“The top and bottom of the intervals interpreted to contain combined Ra-226 plus Ra-228 and/or combined Th-230 plus Th-232 greater than 7.9 pCi/g based on analytical laboratory data, or that are inferred to contain such levels based on interpretation of the downhole gamma logs and/or the core scans are identified on the Borehole Summary Sheets (Appendix L). The results of these evaluations are also summarized on Tables 6-4 and 6-5.”

Within a span of two sections, the definition of RIM has been altered from RIM being strictly defined quantitatively by analytical data to treating analytical data equal to or less than that of interpretations of indirect screening tools.

Comment 70-1: Please provide reference to the document that directs the alteration of RIM definition criteria to include gamma and alpha screening values, and how to quantify RIM based on screening instruments.

Comment 70-2: Please provide the QAPP that lays out the data quality objectives for utilizing screening instruments to quantify RIM.

71. Section 6.2.6 Definition of RIM, page 164: The document states:

“A uranium remediation goal of 50 pCi/g is equivalent to a mass-based uranium concentration of 71 mg/kg. EPA’s current non-carcinogenic screening levels for uranium are 230 mg/kg for residential exposures and 3,500 mg/kg for worker exposures (<https://www.epa.gov/risk/regionalscreening-levels-rsls-generic-tables-may-2016>).”

The reference provided contains a non-cancer residential screening level for “Uranium (Soluble Salts)” of 16mg/kg. We were unable to reproduce the number provided in the above referenced.

Comment: Please explain where these recommended values originate.

72. Section 6.2.6. Definition of RIM, page 165:

“The resultant levels to be used to define RIM are the sum of the representative background concentrations and the appropriate risk-based remediation concentrations listed in the OSWER directives for radium and thorium and the methodology used at the SLAPS and SLDS sites for uranium.”

The bases for the definition for RIM related to uranium is not fully justified.

Comment: Please complete the definition by showing that the proposed value is currently protective. Simply referencing a Record of Decision from a different site does not demonstrate a complete justification of protectiveness.

73. Section 6.2.6. Definition of RIM, page 165:

“Additional discussion regarding the approach used for development of the uranium remediation level is presented in the EPA-approved SFS Work Plan (EMSI, 2010) and in Section 2.8.2.1 of the ROD for SLAPS OU-1 (EPA, 2005b).”

The 50 pci/g total uranium is not consistent with the value selected and in the reference documents.

Comment: Please review and adjust as appropriate by ultimately showing that the selected screening level or Preliminary Remediation Goal is protective under site specific conditions, including a discussion of how risk from daughter products are addressed. For example: Uranium-235 daughter products, Protactinium-231 and Actinium-227.

74. Section 6.5 Areal Extent of RIM in Areas 1 and 2, page 171

“The extents of the interpolation grid used for kriging was designed on a vertical and horizontal discretization suitable for providing estimates of the extent and volume of RIM in terms of concentrations of combined radium or combined thorium exceeding 7.9 pCi/g.”

Comment: Add “interpreted” before the word “concentrations”

75. Section 6.5 Areal Extent of RIM in Areas 1 and 2, page 171

“The extents of the interpolation grid used for kriging was designed on a vertical and horizontal discretization suitable for providing estimates of the extent and volume of RIM in terms of concentrations of combined radium or combined thorium exceeding 7.9 pCi/g. The discretization of the interpolation grid was initially selected based upon UMTRCA guidance, resulting in a grid defined by square blocks of side-length 10 meters (32.8 feet) and thickness 0.15 meters (0.5 feet) consistent with the criteria specified in 40 CFR § 192.12a for cleanup of

land containing residual radioactive materials. However, the final calculations presented herein were made on a refined horizontal grid comprising square blocks of side-length 5 meters (16.4 feet) and thickness 0.15 meters (0.5 feet)."

Comment: Provide the output for the 10 meter square blocks or quantify the difference in terms of total volume so the sensitivity of altering grid size can be compared.

76. Section 6.5 Areal Extent of RIM in Areas 1 and 2, page 171

"Estimates of the areal extent of RIM, defined as above as material containing combined radium or combined thorium concentrations greater than 7.9 pCi/g, obtained using IK are shown on Figures 6-12 (Area 1) and 6-13 (Area 2)."

Comment: Where RIM concentration has been estimated or extent of RIM is described based on soft data, globally state that the quantification is subjectively interpreted using indirect measurements.

77. Section 7.2.2 NCC and OU-1 Stormwater Samples (2016-2017), page 188

"All of the stormwater samples obtained to date, contained only background levels of radium and uranium."

Comment 77-1: Provide discussion in the report on what the background is for stormwater.

Comment 77-2: Provide discussion in the report how background for stormwater was determined.

Comment 77-3: Provide discussion of alpha results in the report.

Comment 77-4: Provide discussion of Thorium results in the report.

Comment 77-5: Expand discussion to provide useful information.

78. 7.2.4 Summary and Conclusions Regarding Stormwater Transport, page 190

"In either case, depending upon the magnitude and the duration of the rainwater runoff event, the resultant surface water flow may not extend all the way to the North Surface Water Body or all the way on to the Buffer Zone or Lot 2A2."

Comment: Provide in the report what investigation has been done to determine that "surface water flow" may not extend past the North Surface Water Body or beyond Lot 2A2 and Buffer Zone."

79. 7.2.4 Summary and Conclusions Regarding Stormwater Transport, page 190

"Given the relatively low levels of radionuclides present in the rainwater/stormwater runoff and the lack of significant impacts in the surface water bodies, this pathway is not considered to be a major mechanism for transport of radionuclides from Areas 1 and 2. Further, installation of the non-combustible cover reduces the potential for stormwater contact with RIM. The results of the 2016 stormwater monitoring further support this conclusion."

Comment: Why is “surface water bodies” plural? This section only discusses one surface water body.

80. 7.3.2.1 Sediment Transport from Area 2 Slope Erosion, page 197

“The potential for future significant erosional failure of the landfill slope prior to implementation of the remedy is minimal based on the following:”

Comment: Discuss in the report whether this conclusion factors in the maintenance activity required in order to keep the rock buttress intact after rain events.

81. 7.4 Radionuclides in Perched Groundwater or the Former Leachate Seep (1995), page 197

Comment: Delete “Former”

82. 7.4 Radionuclides in Perched Groundwater or the Former Leachate Seep (1995), page 197

“The area of the seep was inspected on May 12, 2017, and it was found that seepage was occurring in this area; however, this seepage remains localized and no seepage or flow has ever been observed on the face of the Area 2 slope.”

Comment 82-1: Describe in the report if accessibility to observe seepage was hindered due to heavy vegetation.

Comment 82-2: Describe in the report what documented observation was performed to show “this seepage remains localized and no seepage or flow has ever been observed on the face of the Area 2 slope.”

83. Section 7.5.1.3.2. Radium Occurrences in Leachate, page 216:

“Prior to 2013 this involved testing of non-treated leachate. Since initiation of treatment in 2013 the samples have been of treated leachate. See Appendix F-7 for the leachate sampling data.”

Table 1 of Appendix F-7 is titled “Table 1 - Historical Untreated Leachate Bridgeton Landfill”

Comment: Please clarify in the report if the sample results in Table 1 are of untreated or treated leachate or both.

84. Section 7.6.4 Summary of Fate and Persistence of Radionuclides, page 224:

“Laboratory testing and modeling of potential for leaching of radionuclides were conducted as part of the Fate and Transport Evaluations (SSPA, 2017). Based on the laboratory testing and geochemical modeling performed for the Fate and Transport Evaluation, there is a potential for leaching of radionuclides from the RIM in Areas 1 and 2. Evaluation of potential leaching and any potential impacts from such leaching will be performed as part of the groundwater (OU-3) RI/FS.”

It is unclear how remedial alternatives can be developed for source material if the fate of that source material, including leaching, is not understood.

Comment: Please provide a clear link as to how the remedial alternatives proposed in the FS will address this gap in understanding.

85. Section 9.6.3 Leaching to Groundwater and Groundwater Transport, page 254:

“Leaching of radionuclides and transport from the RIM in the landfill mass to the groundwater and their subsequent transport, in groundwater, to off-site areas is a potential migration pathway. This pathway will be evaluated as part of the OU-3 investigation.”

It is unclear how remedial alternatives can be developed for source material if the fate of that source material, including leaching, is not understood.

Comment: Please provide a clear link as to how the remedial alternatives proposed in the FS will address this gap in understanding.

86. Baseline Risk Assessment

Section 1.2.4.2 Future Land Use, page 8:

“Because the property is a solid waste landfill, construction of structures is not expected to occur. In addition, current covenant restrictions (e.g., deed notices and negative easements) prevent the construction of structures within Area 1, Area 2, and the Buffer Zone.”

and

Section 3.1.5.3 Future Landfill Scenarios – 1,000 Years, page 60:

“Future scenarios include on- and off-site receptors and assume the fences and the noncombustible cover no longer exist 1,000 years in the future. Current restrictive covenants and deed restrictions are assumed to continue in perpetuity, as they cannot be terminated without the permission of EPA and MDNR.”

It is unclear if the Baseline Risk Assessment is consistent with OSWER Directive 9355.0-30 which states: “The cumulative site baseline risk should include all media that the reasonable maximum exposure scenario indicates are appropriate to combine and should not assume that institutional controls or fences will account for risk reduction.”

Comment 86-1: Please ensure the BRA is written consistent with this OSWER Directive.

Comment 86-2: In the past few decades there has been at least one building constructed on top of and at least one building immediately adjacent to RIM. It is not appropriate to assume that

buildings will not be constructed within RIM areas in the future, especially when predicting 1000 years into the future. Please ensure future baseline risk scenarios include construction of buildings, excavation and earth moving activities, and overall land use changes to make sure the Remedial Action Objectives in the Feasibility Study and ultimately that, the final remedy selected will be protective.

87. Appendix D-12

Comment: This untitled new report needs to be merged into the body of the RI Addendum report where specific studies, and the data they present are discussed.

88. Appendix M

The figures appear to be inaccurate.

Comment: Create accurate figures.