UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

February 24, 2017

To: Julian Hayward, GHD

From: Leslie Patterson, U.S. EPA LP

Subject: Comments on the draft *Remedial Investigation/Feasibility Study (RI/FS) Work Plan for Operable Units 1 and 2*, dated July 26, 2016
South Dayton Dump & Landfill, Moraine, Ohio
Administrative Settlement Agreement and Order and Consent V-W-16-C-011

EPA, in consultation with the Ohio Environmental Protection Agency (OEPA), has reviewed the document referenced above. EPA disapproves the workplan as submitted, and requires the respondents to the ASAOC referenced above to amend the document in accordance with the attached comments. All of the enclosed comments must be addressed. If all comments are not adequately addressed, EPA may exercise its right to modify the document and provide the revised document to you for implementation or to direct you to make specified modifications to the document. If you believe that any changes are necessary other than those directed by EPA's enclosed comments, those changes must be discussed with, and approved by myself, in consultation with OEPA, prior to re-submittal of the document. Those discussions may be memorialized in a progress report or other communication to me. In addition, all changes made to the document, other than those made specifically at the direction of EPA, must be specified in writing to EPA upon re-submittal of the document.

As we discussed today, EPA may have a few additional comments on the RI/FS workplan that I will send to you next week. A revised workplan must be submitted within 30 days of your receipt of those comments, as specified in Exhibit A of the ASAOC. If you have any questions concerning this matter, or would like to discuss these comments in detail, please contact me at (312) 886-4904.

Comments

1. Ensure that changes in the text required in the comments below are reflected in the corresponding appendices and DQO tables.

2. Support the discussion of data gaps, conceptual site model, and proposed groundwater investigation strategy by including boring logs and test trench logs.

3. Based on Tables B1-B28 in Appendix B, detection limits exceeded applicable criteria in data from VAS, soil sampling, ground water sampling from monitoring wells, and indoor air sampling. Discuss this data to support whether or not resampling should occur, especially considering that some of the detection limits were above maximum contamination levels (MCLs).

4. **Section 1.2.1 Ownership, Pg. 5, ¶2, last sentence:** EPA notes that while it is correct that "Parcel 3274 is not part of the Site as defined in the ASAOC and SOW," it is necessary to determine whether waste and contamination may have migrated to this part of the Quarry Pond through surface water, sediment, waste placement, and ground water migration.

5. **Section 1.2.1.1 Site Businesses, Pg. 6:** Clarify if the last sentence beginning with "There were residences in a trailer park (Parcel 2943) to the southeast across Dryden Road…" means that all of these residences are no longer present.

6. **Section 1.2.2 Site History:**

    a. **Pg. 7, ¶3**. The eastern portions of the Dryden Road Business Parcels are described as not having accepted waste materials, but Figure 2.2 indicates that the depth of native soil on these properties is 10 to 25 feet, so it would appear the properties have non-native material present. Describe the non-native material on those properties and the sampling conducted to support that characterization.

    b. **Pg. 9, ¶1, 4th Sentence:** Delete the word "small", because Parcel 5177 is the majority of the Central Area.

7. **Section 2.2.1 Waste and Fill Material Investigation, Waste and Fill Material Limits and Types:**

    a. Add a discussion of the near-OU1-boundary test trenches TT-4, -5, and -19. Address whether the edge of waste was encountered, and whether there is any reason to believe that the waste extends beyond the boundary of OU1 on to the floodplain.

    b. This section states that the lateral and vertical limits of waste have been determined, but Section 5.2 and DQO Table 5.1 include the objective to determine of the lateral and vertical extent of the contaminated soil, fill and waste material and to refine the OU1 boundary. Either Section 2.2.1 needs to identify where there is uncertainty that has yet to be determined, or Section 5.2 and Table 5.1 need to be revised to delete this objective.

    c. Summarize the areas where waste is expected to be in direct contact with the upper ground water zone.

8. **Section 2.2.4 Leachate Investigation, Pg. 26, 3rd Bullet:** Clarify the discussion, as it would seem that high permeability would allow more discharge to the surface water as water levels recede.

9. **Section 2.2.5 Landfill Gas and Soil Vapor Monitoring, Pg. 29, Top partial bullet, Last sentence:** Change this sentence to "Therefore, based on intrusive investigations, significant decomposing organic material that would readily produce methane is not expected. However, a source exists for the high levels of methane detected in these gas probes, which has not been determined."

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10. **Section 2.2.5.1 Vapor Intrusion Study and Mitigation:**

    a. Identify the buildings where completed exposure pathways were not found in previous sampling. Because the workplan does not propose any additional subslab/indoor air samples for these buildings, discuss previous sampling and explain why it is sufficient to preclude the need for additional subslab/indoor air sampling for these buildings.

    b. Figure 3.2 appears to show a building in EU 6 that was not part of the vapor intrusion studies. Describe any VI investigation performed on this building (if any), or describe why no VI investigation was performed (if none), and identify additional investigation (if needed).

    c. **Pg. 30, footnote 14:** Add a reference to the document in which the conclusion that the indoor air TCE concentration of 50 ppbv was anomalous and not due to vapor intrusion is made.

    d. **Pg. 31, ¶1**: Add a few sentences summarizing the O&M activities being performed and refer to the document(s) that more fully describe(s) those activities. Add a statement about why only seven buildings were mitigated when 13 buildings exceeded screening levels in the sub-slab.

    e. **Pg. 32, ¶1:** Change the sentence to "…evaluation of the sub-slab and indoor air results."

11. **Section 2.2.6 Surface Water and Sediment Characterization:**

    a. State the source of the Ecological Screening Values.

    b. It is not appropriate to use data collected in the 1990s to evaluate exposure.

12. **Section 2.2.10 Groundwater:**

    a. Discuss concentrations of metals in ground water and whether metals are considered COCs in groundwater.

    b. Describe and provide supporting information on the extent and/or locations of hydraulic communication and/or confinement between the upper and lower ground water zones. If the available data are not sufficient for this assessment, propose an investigation to collect these data.

13. **Section 2.2.10.2 Water Supply Wells, Pg. 43**: In addition to the water supply wells on the Valley Asphalt property, provide additional information regarding the number and intended use of water wells within the vicinity (0.25 mile, 0.5 mile, 1 mile) of the Site.

14. **Section 2.3 Data Gaps, Pg. 43:**

    a. Add the lack of recent soil gas data from soil gas probes as a data gap.

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b. **¶3:** Add the areas around BH70-13 and around VAS-24 to the two other locations with elevated TCE identified as data gaps.

c. **¶3:** Samples of OU2 shallow groundwater are needed to evaluate migration of contamination above acceptable levels offsite, and migration above Vapor Intrusion Screening Levels (VISLs) is also of interest. Therefore, change the 3rd sentence to "Additional investigation of OU1 and OU2 shallow groundwater is recommended…acceptable risk range, MCLs, or VISLs."

15. **Section 2.3.1 Northern Parcels Data Gaps:** The vinyl chloride and benzene plumes in the area around MW-219 are not adequately delineated to the north and northwest, as shown by the dashed contour lines in Figures 2.20b and c, to evaluate contaminant migration to the Great Miami River. Add this data gap to the list and propose phase 1 groundwater sampling to address these gaps in Section 5.7.1.

16. **Section 2.3.3 Quarry Pond Data Gaps:** Add the following three data gaps and propose activities to characterize them: 1) the lack of sediment data from deep parts of the Quarry Pond, which may be a depositional area and is relevant to evaluate ecological risk; 2) the foreign objects in the pond; and 3) characterization of Quarry Pond fish tissue (Figure 3.1a shows ingestion of fish from the Quarry Pond as potentially complete exposure pathway).

17. **Section 3.1 Conceptual Site Model:**

    a. **Pg. 44, ¶3 ("Sources"):** Discuss the basis for characterizing OU2 as not having landfilled waste, and whether an investigation to confirm this is needed.

    b. **¶1 "Receptors":** Include uptake by biota in ponds.

    c. **Pg. 45, 4th bullet:** It is unclear here whether GMR/floodplain includes both the GMR and the floodplain, or if it means the floodplain of the GMR. However, Figure 3.1a, which is referenced, does not seem to include the GMR. Contaminated soil and/or groundwater may have migrated in the past to the GMR and caused sediments to be contaminated. Include this as a potential exposure route in the CSM here and in Figure 3.1a.

18. **Section 4.2.2 Preliminary Remedial Technology Types, Pg. 52:**

    a. "Institutional Options" appears to be a header for the five bullets below it; if so, it should be in unbulleted, bold and italic font similar to the other headers.

    b. Add air stripping under the Removal and Extraction Technologies.

    c. For all general alternatives except the "no action" alternatives, unless the alternative will eliminate the need for institutional controls (ICs), add ICs to the alternative.

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19. **Section 4.2.3 Preliminary Remedial Alternatives:** Consider adding a general alternative for OU1 that would consolidate material under a smaller cap. If added, ensure that the volume and type of material to be consolidated will be characterized sufficient to evaluate this alternative.

20. **Section 5 Proposed Field Investigation Activities:** No investigation is proposed on the East River Road properties adjacent to EUs 3, 4, 5, 6, and 8, or on parcel 3274 (Figure 5.1c). Because these properties are directly adjacent to the site, and because exposure routes may exist for receptors in these properties (as shown in Figure 3.1a), the workplan must propose an investigation to determine if site contaminants have come to be located on these properties.

21. **Section 5.2 OU1 Parcels Soil and Fill Investigation:**

    a. See Comment 7.b.

    b. **Pg. 56, 2nd Bullet:** Change this sentence to, "…direct contact, inhalation, ingestion, and leaching risks, for input…", reflecting the inclusion of leaching in the 2nd paragraph of page 57. Also add leaching after "ingestion" to the sentence in paragraph 3 on page 57. Add another objective about the soil and fill investigation being input to the soil gas investigation.

    c. **Pg. 57, ¶2, 3rd Sentence:** State the basis for not considering future exposures to 15 feet by construction workers in the undeveloped parcels in the HHRA.

    d. **Pg. 57, 2nd and 3rd Bullets:** Soil and fill sample analyses should also include chromium speciation (due to disposal of sludge wastes), asbestos (due to disposal of brake lining dust), fine fraction (<100 μm) lead (due to disposal of foundry sand, slag, and brake lining dust), and dioxins/furans (due to disposal of burned materials and incinerator ash, and on-site combustion of waste materials), as presented in Sections 1.2.2 and 2.2.3.

    e. **Pg. 58, 3rd Bullet:** Surface soil samples should be collected from EU10.

    f. **Pg. 58:** Explain why no surface soil samples are proposed for EU16.

    g. **Pg. 59, 3rd Bullet, 1st Sentence:** Because only seven surface soil samples will be collected from EU3, maximum detected concentrations will need to be used as exposure point concentrations (EPCs) in surface soil in the HHRA.

    h. **Pg. 59, ¶2, 2nd Sentence:** A minimum of 10 background samples should be collected from each soil interval of interest (0-2 ft and 2-15 ft), yielding a minimum of 20 background soil samples.

22. **Section 5.3 Soil Vapor Monitoring, Pg. 60, ¶1:**

    a. Sampling activities (soil gas, groundwater) to delineate the soil gas impacts should begin with Phase I. Use historic soil gas data, the presence of VOCs in

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soil, and groundwater above VISLs to determine soil gas sampling needs. At a minimum, Phase I should address areas of on-site volatile organic or methane exceedances where the extent and source are unknown, such as near GP09-09. In addition, an updated round of soil gas samples should be collected from existing probes in Phase I, all new soil borings should be sampled for soil gas, and locations for additional probes should be identified. Correct Table 5.2 consistent with this comment.

b. Bulk soil data is not a reliable indicator of the potential for soil gas impacts. The presence of VOCs in soil, the presence of groundwater concentrations above EPA VISLs, and the historic soil gas concentrations detected in existing soil gas probes should be used to indicate the need for soil gas sampling in areas where soil gas samples have not yet been collected.

c. It states that existing soil gas probes will be sampled for field parameters concurrent with Phase 1; however, there is no mention of this sampling in the Soil Gas Investigation DQO Table 5.2. Reconcile this discrepancy but add the soil gas sampling mentioned in the comment above.

23. **Section 5.4 Quarry Pond Investigation:**

a. Pg. 60-61.

i. Add an objective to determine whether the foreign objects in the Quarry Pond may be sources of contaminants to the Quarry Pond.

ii. The top partial paragraph of page 61 suggests that, if direct observation of the objects is not possible, surface water, sediment, and groundwater data will be used as indirect evidence to assess the nature of the foreign objects in the Quarry Pond. Discuss how these data would be used in this assessment, especially considering that sediment sampling locations will likely be selected to avoid these objects.

b. **Pg. 61, 1st Bullet:**

i. Only five surface water samples are proposed for the Quarry Pond; this is too few samples to evaluate a 10-acre surface water body. At least eight samples in total for the Quarry Pond are needed to calculate a 95% UCL on the mean concentration. Also, collect additional surface water samples in deeper locations where fish are present, not solely along the perimeter of the pond.

ii. The investigation goes not appear to evaluate the groundwater-to-surface water interface pathway. Sampling surface water alone is not sufficient because the work plan acknowledges a likelihood that some component of the Upper and possibly the Lower Aquifer Zone recharges the Quarry Pond. Primary recharge flows generally from the north/northeast (varies during year) towards the Quarry Pond; and VAS-12 located adjacent to the

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north side of the Quarry Pond had TCE detections ranging in concentrations from 2 to 6 µg/L. Additionally, the area northeast of Quarry Pond (MW-209, MW-209A, and VAS-19) detected vinyl chloride, predominantly in the Lower Aquifer Zone, with concentrations in VAS-19 ranging from 40 to 150 µg/L between the depths of 37 and 57 ft bgs. These results indicate the potential for contaminants to migrate to the Quarry Pond and therefore the pore water zone. Include sampling activities along the perimeter and down gradient of the Quarry Pond (i.e. along the northwest side near the GMR, along the southern edge between MW-218A/B and MW-214, etc.) in the first fieldwork mobilization to delineate groundwater to the degree necessary to evaluate potential contaminant migration to or from the Quarry Pond.

c. **Pg. 61, 2nd bullet:** Add methylmercury to the analyte list.

d. **Pg. 61, 3rd bullet:** Justify why nine sediment samples all located along the shoreline will be representative of and sufficiently characterize the entirety of the sediment in the Quarry Pond. State that 20 surface sediment samples will be collected, positioned both near shore and distributed throughout the Quarry Pond, to provide sufficient data to determine nature and extent of contamination for an area of this size as well as for risk assessment purposes. In addition, a subset (10 locations) of the 20 surface sediment locations should be selected for co-located core samples. The core samples will help support the evaluation of the nature and extent of contamination at depth.

e. **Pg. 61, 4th bullet:**

   i. The text states that to identify ecological risks, areas of deposition will be targeted for representative sediment sample locations. Clarify if the identification of depositional areas will be limited only to the areas along the shoreline as with the other proposed sampling, or will include the entire Quarry Pond.

   ii. Human health risk areas will be targeted as areas where sediment can support body weight. Explain the measurable criteria for sediment supporting human bodyweight and for soft sediment for ecological evaluation; and if they differ, explain how the nine sampling locations will be split up between the two classifications.

   iii. The text states that to identify risks to human health, areas easily accessible to humans, such as anglers, would be targeted. Since anglers may also consume the fish caught and that some of the fish consume benthic invertebrates, explain how sampling sediment only along the shore, line is protective of human health.

f. **Pg. 61, 6th bullet:** Add silver and methylmercury to the list of analytes.

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24. **Section 5.5 Floodplain Investigation, Pg. 62:** The floodplain sampling should include discussion that sampling locations will be revised if necessary to assess drainage areas such as small ditches and topographically low areas, etc. where runoff from the levee could have preferentially deposited material.

25. **Section 5.6 GMR Investigation:** Due to the potential for historical contamination to have impacted the GMR and the potential for current groundwater contamination to migrate to the river, an investigation should be conducted to determine whether site-related impacts are present within Great Miami River that is not dependent on the presence/absence of soil/floodplain soil impacts. Propose sediment sampling in Phase I to investigate whether site contaminants have migrated to the GMR, and if so, to characterize them.

26. **Section 5.7 Groundwater Investigations:**

    a. Include water level measurement events as a part of the investigation.

    b. Analyze for total and dissolved metals in all samples.

27. **Section 5.7.1 OU1 Groundwater Investigations:**

    a. In order to characterize the current state of ground water contamination, propose to sample any existing monitoring wells on and off-property that have not been sampled since January 1, 2014.

    b. Include water level measurement at all sampling points.

    c. This section describes the Phase 1A/1B/2 investigation which began in 2013 in different terms than what is found for the Phase 1A/1B/2 investigation in Table 5.6. If these are two different things, use a different label to avoid confusion. Otherwise, make Section 5.7.1 and Table 5.6 consistent, and make clear which DQOs have been satisfied from previous investigations, which are currently being investigated, and which will be addressed in the future.

    d. **Area 1:**

        i. One VAS boring is proposed in the location of highest historical TCE detections (Figure 5.4). This will not delineate the boundary of the unbounded TCE plume in this area shown in Figure 2.20a. The plume should be delineated prior to locating monitoring wells, so VAS borings that step out from the area of highest concentration are needed, with additional locations that step further out contingent on the results.

        ii. There is insufficient data to the northwest of the vinyl chloride plume at BH43-13, BH31-13 and BH39-13 to delineate it at and beyond the perimeter of the landfill (Figure 2.20b). Propose additional VAS borings here to delineate the plume with the potential to locate monitoring wells.

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iii. Although it seems likely that the vinyl chloride plume extending south and southwest of MW-228 (Figure 2.20b) is below 2 µg/L at the landfill perimeter, there is insufficient data to demonstrate this. Add sampling to delineate the plume.

e. **Area 2 and/or 3, Pg. 64:** Consistent with comment 15, propose phase 1 groundwater sampling to address the incompletely delineated vinyl chloride and benzene plumes in the area around MW-219.

f. **Area 3, Pg. 64:** The well north of BH46-13 is proposed to be set across the water table at a depth of 25-35 feet bgs. Since the benzene occurred in the sample collected at 31-34 feet bgs in BH46-13, the well screen should be centered on the 31-34 foot interval regardless of water table depth, unless the BH46-13 boring log shows elevated PID readings above the 31-35 feet interval.

g. **Area 6, Pg. 66, ¶3:** The workplan states that no additional groundwater samples for laboratory analysis will be collected, but the intended purpose of the well as described on page 65 is to monitor groundwater quality. Clarify whether the purpose is only to determine the presence of free-phase NAPL, or whether groundwater samples will be collected and analyzed. EPA recommends collecting groundwater samples for analysis from all proposed monitoring wells (temporary and permanent).

h. **MW-210 Area:**

i. Figure 5.5b was not included (Figure 5.5 shows proposed locations at DP&L). Perhaps Figure 5.4b was intended?

ii. The two proposed monitoring wells shown in Figure 5.4b may be useful to monitor the plume in the immediate area of MW-210, but they are not sufficient to delineate the TCE plume shown in Figure 2.20a. Because this plume is already known to migrate outside of OU1, propose additional delineation activities in the first round of sampling.

28. **Section 5.7.3 OU2 Groundwater Investigation:** Existing groundwater data indicates that incompletely-defined contaminant plumes originating in OU1 are migrating outside of OU1. Revise the work plan to propose OU2 groundwater investigation activities, based on existing data, to be performed concurrently with the OU1 groundwater investigation.

29. **Section 6 Background Comparisons:**

a. The proposed background floodplain sampling area as shown in Figure 6.1 may be too close to the site since site-related airborne deposition may have affected the area. Evaluate alternative areas to sample background floodplain soil.

b. **Pg. 68:** The first paragraph and bullet says that the background comparison methodology is noted for the Site Soil, Phase 1B. The Floodplain Soil should be added, since floodplain background samples will be collected.

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c. **Pg. 69, ¶1:** This paragraph is vague. Clearly describe the specific use of background comparison results including risk assessment application and any other use, and make the DQOs consistent with that description.

d. **Pg. 69, ¶3:**

   i. Describe how the proposed roadside background soil samples will be used. It might be appropriate to compare background and site locations that are beside roads, but it is not appropriate to compare a background roadside location to a location within the site that is away from a road.

   ii. **Sentence 4:** The northern part of Parcel 3264 may have formerly been used for agricultural purposes, and metals-based pesticides (including lead or arsenic) may have been applied on crops. In addition, it may have received airborne deposition from site activities due to its close proximity, and part of it has been developed in recent years. EPA recommends against using this area for background samples.

30. **Section 6.1 Background Comparison Approaches:**

Pg. 69, last ¶: A spatially-adjacent elevated concentration is one piece of evidence that meaningful contamination is present; however, it is not uncommon to have a multitude of exceedances of BTVs based on the 95th percentile that are not spatially-adjacent. Sometimes contamination levels of concern appear more randomly across a site, and absolving all cases of exceedances BTVs based on the 95th percentile which are not spatially-adjacent is inappropriate. Reference the document(s), presumably listed in Section 6.2, that recommend(s) consideration of the spatial patterns of sample results when determining whether concentrations are elevated above background. Section 1.5 of EPA's ProUCL 5.1 Technical Guide recommends re-sampling to confirm the sample result, but not looking at spatial distribution. The ProUCL guide also discusses comparing the frequency of exceeding values (spatially-adjacent or not) to a 5% level (when using a 95th percentile BTV) as appropriate. If no adequate documentation of this approach exists, remove it from the workplan (see also Comment 32.b and make consistent with Section 6.3 of the workplan).

a. Further, in skewed distributions (which is common in such investigations) parametric BTVs based on the 99th percentile can be much larger than those based on the 95th percentile. The use of BTVs based on the 99th percentile is not common in background comparisons and strict adherence to the strategy laid forth in the document with regards to BTVs based on the 99th percentile is not advised.

b. **Pg. 70:** The last paragraph states that it is important to try to match soil types/textures where background comparisons are to be made; however, there is no discussion about how this will be accomplished.

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31. **Section 6.2 Relevant Guidance and References:**

a. **Pg. 70-71.** Add the following relevant U.S. EPA CERCLA guidance documents: 1) EPA, September 2002. Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Site. Office of Emergency and Remedial Response, United States Environmental Protection Agency Washington, DC. EPA 530-R-01-003; 2) USEPA, April 2002. Role of Background in the CERCLA Cleanup Program. Office of Solid Waste and Emergency Response, United States Environmental Protection Agency Washington, DC. OWSER 9285.6-07P.

b. **Pg. 71, ¶2 (also on Pg. 73, last bullet):** The text states that the Mann-Whitney/Wilcoxon Rank-Sum test and the modified Quantile test will be used, but the current version of ProUCL (Version 5.1) no longer offers that strategy, or for that matter, even offers the Quantile Test. Explain the basis and strategy for the dual use of these tests.

32. **Section 6.3 Statistical Consideration:**

a. EPA's ProUCL 5.1 Technical Guide indicates that at least 10 samples should be collected (see Section 1.5 and 1.6 of the guide); specify a minimum of 10 samples for each medium and/or stratum.

b. **Last bullet:** Assuming the approach presented is supported as described in Comment 0, provide more information on the purpose of this approach. Is the goal to identify possible hot spots or to determine if site concentrations are within the range of background? If so, it may be more appropriate to use group-based comparisons. Alternatively, is the goal to reduce the chance of a Type I error? If so, does that increase the probability of a Type II error, and is this acceptable? If the purpose of using the 99th percentile BTV in addition to a 95th percentile BTV is to reduce the probability of error in making remediation decisions, then using single-sample hypotheses tests would be more appropriate with the use of appropriate background threshold values. See Section 6 of EPA's ProUCL 5.1 Technical Guide for information on the use of hypothesis tests.

33. **Section 6.4 Summary of Statistical Methods Selected for Background Comparisons:**

a. **Pg. 73, 1st and 2nd bullets:** Change the reference from EPA's 2013 ProUCL version 5.0.00 software to version 5.1, 2015.

b. **Pg. 73, 1st bullet:** Consider using the approach the Ohio EPA Division of Environmental Response and Revitalization soil-background group uses for data analyses of sites around Ohio. Before going to a nonparametric analysis, the remaining background data set (minus the outliers) is examined to see if it fits any regular distribution (i.e., normal or lognormal). If the remaining points follow a distribution to a statistically significant level, then that distribution should be applied.

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c. **Page 73, 2nd bullet under #2:** Under conditions when the fraction of non-detects is 10 to 15 percent of the total, and remaining values follow a normal distribution, the non-detect specimens should be assigned values using regression-on-statistics methods, included in the ProUCL software package. The same approach may be used if the detected values follow a lognormal distribution. Even in the case of larger percentages of non-detects, regression-on-statistics methods should be used instead of arbitrary substitutions, so long as the detected values fit a distribution. If the data appear to fit no regular distribution, then the nonparametric methods should be used.

d. **Page 73, 3rd bullet under #2:** EPA notes that datasets that have up to 50 percent non-detects are a major challenge for any sort of statistical analysis. If this situation occurs, the details of the dataset (e.g. the extent to which the detection limit exceeds the action level, the potential for resampling and using more sensitive analytic methods) should be considered before assigning the appropriate statistical treatment of the dataset. Also see Comment 31.b.

e. **Page 74, 1st bullet:** Tests of proportions exhibit much reduced statistical power (i.e. are much less sensitive in determining background exceedances) than tests like the Wilcoxon Rank Sum Test. Assuming sample sizes are not very high, such test output may be heavily criticized. The Gehan Test (a modification of the Wilcoxon Rank Sum Test often prescribed for use when non-detect levels carry heavy influence in comparisons) would be more appropriate in this circumstance.

f. **Pg. 74:** The last sentence of Section 6.4 states "The DQO table (Tables 5.1 to 5.6) specify whether the Respondents will apply individual-based or group-based comparisons for each study question." However, only Tables 5.1, 5.5, and 5.6 are relevant, and do not include any specification regarding individual/group-based comparisons.

34. **Section 7 Baseline Risk Assessment and Ecological Risk Assessment:**

a. **Pg. 75, top partial paragraph:**

i. This section indicates that an analyte detected in less than five percent of the samples analyzed for each medium will be eliminated as a COPC. Section 5.9.3 of RAGS A indicates that it is not appropriate to eliminate a COPC if it is detected in multiple media. It is not clear if it is appropriate to screen COPCs from soil gas or indoor air based on detection frequency. It is also not appropriate to screen out a COPC that is expected based on historic information or detected at high concentrations that may be indicative of a localized hot spot. Revise this section to address these issues.

ii. Clarify how detection limits elevated above a screening level will be evaluated in the uncertainty analysis.

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b. **Pg. 75, ¶1, "Exposure Assessment and Documentation":** The exposure assessment will need to add the risks from different exposure units if a receptor is exposed to more than one EU; e.g., a trespasser who is exposed to contaminated sediment, surface water and fish in the Quarry Pond, and floodplain soil in EU2 and EU17. Also, the estimated cancer risks and non-carcinogenic hazards for each individual exposure pathway need to be summed prior to determining whether the risks are significant. The risk may then be considered significant (i.e. providing the basis for a CERCLA remedial action) when the total site-specific risk from the sum of exposure pathways is above 10^{-4} for carcinogenic risks or hazard index greater than 1. Clarify the language in the workplan to this effect.

c. **Pg. 76, ¶1, Risk Characterization:** Despite the explanation and example provided, this section is ambiguous about how the risk assessment will incorporate a comparison to background. State more clearly that the total risk from all COPCs (including those within background) will be presented in the main set of risk estimates. Risk estimates for COPCs within background levels can be presented for comparison purposes. Clarify how the point-based and/or group-based comparison discussed in Section 6.4 will be used in the background risk comparison. Provide further clarification regarding how background data will be used for comparison to site samples and will also be used for risk assessment.

d. **Pg. 77, Ecological Risk Assessment:** State the timing for delivery of the Ecological Effects Evaluation Proposal. The problem formulation should be presented early in the process as it is the basis for designing the investigation to assess the potentially complete pathways and ecological receptors. It is also important to identify the screening values in advance of sample collection to ensure the analytical method detection limits are below the selected screening levels.

35. **Figure 2.1:** Why is Building 3 missing from the figure (and subsequent figures)?

36. **Figure 2.3b:** In addition to this cross section, include additional cross-sections in order to better illustrate the geologic and hydrogeologic characteristics of the site.

37. **Figures 2.8a-2.8c:** The specific contaminants above leaching standards are not identified and soil concentrations were not provided. Include the following on these soil leaching exceedance maps:

    - the soil sampling location,
    - the chemicals of concern (COCs) that exceeded screening levels,
    - the concentration of COCs that exceeded screening levels, and
    - the depth of COC detection.

38. **Figure 2.9:** Locations and results for GP-22-13, GP-23-13, GP-24A-13, GP-24B-13, and EPA probes GP-1 to GP-7 are missing from the figure.

39. **Figures 2.18a, b, and c:** For clarity, remove boring locations, monitoring well locations, and VAS locations that were not completed to the "deep" zone.

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40. **Figures 2.20a-2.20d:**

    a. Modify these figures or add new ones to show VOC plumes for the entire Site (rather than just a portion); VOC isoconcentration contours for the lower aquifer zone (rather than just the upper); and the potentiometric surface (rather than just flow direction).

    b. Although these figures indicate general flow direction, include potentiometric maps that show seasonal ground water flow in the upper and lower ground water zones and the interaction between surface water and ground water.

41. **Figure 3.1a:**

    a. Soil is not anywhere mentioned. One of the tertiary sources, which lists media, is "Surface deposition"; clarify if this refers to soil. Storm water runoff is a potential release mechanism to soil as well; include this release mechanism and tertiary source and indicate that it is relevant to all receptors except the Quarry Pond.

    b. See Comment 17.b.

    c. **Footnote 1:** EPA agrees that restricting at least part of OU1 from residential use is likely to be a part of the remedy at the site. However, the RI/FS must document the risk to all current and potential future receptors in order to provide the basis for CERCLA cleanup authority, and to support the need for the planned IC on "relevant parts" of OU1. Therefore, the "residents" column must have all relevant pathways marked with an "X" and the risk assessment must evaluate residential exposure.

42. **Figure 3.1b:** Burrowing and non-burrowing vertebrates are not shown as primary receptors for soil, only invertebrates. Also this CSM only shows primary receptors from the secondary source, soil. The fill material is exposed at the surface in some areas, and as such has similar primary receptors as soil. The CSM should be revised to show this.

43. **Figure 5.1d:** Provide the rationale for why no surface soil samples are to be collected in the central portions of EU6 and EU7.

44. **Figure 6.1:** The eastern edge of the proposed floodplain soil sampling area is within 100 feet of a railroad. The exact locations within this area must be farther than X feet from the railroad.

45. **Tables:** Add a summary table listing all active monitoring wells on-site and off-property in the vicinity of the Site. Provide well construction details including the ground surface elevation, the well screen interval, the ground water zone being monitored (upper or lower), and the total depth of the well.

46. **Tables 5.1 and 5.5, Soil/Fill and Floodplain Soil DQOs:** Section 5.2 describes evaluating the potential for soil leaching, but these tables do not specify that soil samples will be compared to U.S. EPA SSLs and Ohio EPA leach based soil values (LBSVs).

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Include in the "Decision Statement" and "Basis of Action Level" steps that soil samples will be compared to U.S. EPA SSLs and Ohio EPA LBSVs. For source characterization, please add these comparisons to the text and DQO tables.

47. **Table 5.1, Soil and Fill DQOs:**

    a. See Comment 7.b.

    b. **Step 1.iv:** Include historical data, not just the data collected as described in the DQO.

    c. The workplan states that data from sampling locations will be compared to background data to evaluate if the exceedances are site-related. However, for samples collected from non-native material, any exceedances of screening levels are site-related, regardless of comparison with background data. This leaves comparison to background only relevant to soil and sediment. Revise the DQOs to reflect this.

    d. Step 1.iv, Phase 1B, seems to say that only samples from the Southern Parcels will be compared to background. It is not clear whether that is because native soil is not expected in other areas of OU1, or why the Southern Parcels are specifically identified.

    e. Step 3.i, 4th bullet: Change the middle portion of this sentence to read (**bold** indicates added language): "…geophysical anomalies, **leachate seeps, stains, discoloration, exposed waste, and stressed vegetation** have been **or are** identified, and will adjust…".

48. **Table 5.2. Soil Gas DQOs:**

    a. See Comment 22.a.

    b. **Step 2.i, Phase 2, 3rd bullet:** "Affect future use" is somewhat vague; add how soil gas concentrations may potentially impact future buildings.

    c. **Step 2.iv.a, Phase 2:** Modify to indicate that current and future on-site and off-site structures are of interest and potential risks should be based on soil gas data.

    d. **Step 3.iii:** Delete Ohio Department of Health (ODH) Industrial and Residential Action Levels from this step unless subslab or indoor air samples are proposed.

    e. **Step 3.iv:** "Appropriate Sampling and Analysis Methods" states that during soil borehole investigation methane values will be recorded in the field using a Landtec GEM-2000. Explain how these measurements will be performed on an open borehole to get representative concentrations to compare to the action level of 10/25% LEL in the soil and provide an SOP for the collection of methane samples that will not be diluted by ambient air.

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f. **Step 5.i.a (Specify Action Level):**

   i. Phase 1 does not include the LEL action levels referred to in Step 3, but they are included in Phase 2. Explain why Phase 1 and Phase 2 are not consistent.

   ii. Delete the use of EPA RSLs for inhalation to screen for soil gas impacts. Section 6.3.1 of EPA's June 2015 *OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air* guidance document discusses qualitatively evaluating bulk soil concentrations in the vadose zone to determine if they are a potential subsurface vapor source. Revise Table 5.2 to be consistent with this document.

g. **Step 5.ii.a:** Compare all soil gas samples (including those collected in undeveloped areas) to VISLs.

49. **Table 5.3, Quarry Pond Surface Water DQOs, Substep 4i:**

a. Indicate that other health-based levels will be used for chemicals with missing AWQC.

b. The text states that the target population is all water in the Quarry Pond, but surface water sampling is proposed along the shoreline only (see Figure 5.2). Consistent with comment 23.b.i, additional samples, including those away from the shoreline, are needed.

c. Provide the technical basis for the assertion in Section 5.4 that during the summer the Quarry Pond will be in equilibrium, as ponds of sufficient depth typically form temperature zones such as epilimnion and hypolimnion. It is not identified whether the Quarry Pond is deep enough for this to occur, or whether the groundwater flow-through would be sufficient to disrupt the zones. However, if the assertion of equilibrium is the justification for sampling only near the shoreline, then this assertion needs additional justification.

d. **Step 3.iv:** Perform two sampling events during two different seasons.

e. **Step 5.i:** Clarify what is meant by "near-Site."

50. **Table 5.4, Sediment DQOs:**

a. **Step 1.iv:** Clarify how both Residential and Industrial Soil RSLs will be used to evaluate sediment data from the Quarry Pond when sediment results are above a Residential Soil RSL but below an Industrial Soil RSL.

b. **Step 3.ii:** Add methylmercury to the list of analytes.

c. **Step 6.iv.b:** Indicate that the data will also be used in the human health risk assessment.

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d. **Step 7.i:** Collect additional sediment samples in deeper locations which may be depositions areas, and where fish are likely to be present.

51. **Table 5.5, Flood Plain Soil, DQO Step 7.i:** Collect background samples at 10 locations (rather than 5) so that at least 10 samples are collected from each soil interval of interest (0-0.5 ft and 0.5-2 ft) for use in comparison with on-site floodplain data.

52. **Table 5.6, Groundwater DQOs:**

    a. **Step 6.ii.a, iii and iv.a:** It states that no statistical tests are employed, but Step 7.ii talks about 95% confidence UCL. Reconcile this discrepancy.

    b. **Step 7.i:** Replace the term "exposure areas" with a different term to avoid confusion with "exposure units", which would not be appropriate for groundwater.

    c. **Step 7.i, Phase 2:** Do not delete analytical parameters after only one round of sampling.

53. **Table 5.7:** Samples collected below pavement or compacted aggregate should be evaluated for potential future direct contact exposure if those materials are removed. Revise the work plan to indicate direct contact risk will be evaluated in this manner EUs 9 through 15.

54. **Appendix D, Section 2.3.1, Pg. 10:** Revise this section to be consistent with the following comments:

    a. Soil gas probe depth should be boring specific, and dependent on the potential vapor source. Soil gas probes should be installed as close to the potential vapor source as possible (i.e., near-source) in areas without an impermeable surface, if possible, to ensure that the soil gas data is representative of a reasonable maximum exposure. If a potential vapor source is encountered at depth, deep soil gas samples should be collected near the potential vapor source.

    b. Soil gas probes should not be installed at intervals above 5 feet below ground surface to minimize atmospheric influence.

    c. It is not clear if setting a maximum depth of 20 ft below ground surface will be appropriate for soil gas probes installed in OU2.

    d. When contaminated ground water is the potential vapor source, soil gas samples should be collected directly above the capillary fringe.

55. **Appendix D, Section 2.3.1, Pg. 10, ¶4:** Delete the sentence that begins, "Any proposed gas probe locations specified…".

56. **Appendix D, Section 2.3.1, Pg. 11, ¶1:** State that soil samples from the GPs will be analyzed for VOCs.

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57. **Appendix D, Section 2.3.2, Pg. 12:**

    a. **¶1:** Include monitoring for hydrogen sulfide.

    b. **¶2:** Revise the FSP to state that additional soil gas samples may be collected to evaluate seasonal and temporal variation, as necessary. In addition, 1-liter summa canisters are typically sufficient for exterior soil gas sampling.

58. **Appendix D, Section 2.4.1:**

    a. **Pg. 13, ¶3, 3rd sentence:** State that VAS samples will be analyzed for the parameters listed in Appendix D, Section 2.4.4 (TCL VOCs, TCL SVOCs, TCL pesticides and herbicides, TCL PCBs, and target analyte list metals).

    b. **Pg. 15, #6.ii:** Consider using 5-foot well screens to sample at 5-foot intervals to prevent sample bias.

    c. **Page 15, #7:** In order to ensure that ground water samples are representative of aquifer conditions, EPA recommends that pH, specific conductance, and temperature stabilize prior to sampling, regardless of the amount of removed well volumes. This is especially the case when utilizing low-flow purging techniques.

59. **Appendix D, Sections 2.4.1.1 and 2.4.1.3**: Clarify whether the soil cores collected as part of shallow monitoring well/piezometer installation operations will be field screened (headspace screening) with a photoionization detector.

60. **Appendix D, Section 2.5.2, Pg. 26:** Total and dissolved metals should be analyzed for surface water samples. Also, a surface water sampling SOP is not provided in the FSP.

61. **Appendix D, Section 2.6, Pg. 27:** Surface sediment (0-6 inches) should be collected using an Eckman Dredge sampler or similar device (e.g. Van Veen, Ponar, etc.) rather than a core sampler in order to provide a representative undisturbed sample.

62. **Appendix D, Attachment A.11:**

    a. Clarify whether the isopropanol or helium method will be used at this site.

    b. For the helium method, while a 10% or greater helium content in the sampling assembly may be adequate for determining when to take corrective actions in the field to ensure a proper seal, using a 5% threshold is more appropriate for determining whether the sample results are reliable and representative.

    c. Clarify whether soil gas samples will be analyzed for fixed gases to determine helium content in collected samples.

63. **Appendix E, Worksheet 15:** Numerous action limits are below the quantitation limit. Evaluate whether established methods exist to meet lower quantitation limits; if not, explain how the uncertainty of not being able to detect to the action limit will be addressed. EPA Method 1668A is recommended for PCBs.

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