Ohio Environmental Protection Agency

John R. Kasich, Governor
Mary Taylor, Lt. Governor
Craig W. Butler, Director

September 1, 2016

Ms. Leslie Patterson
Remedial Project Manager
U.S. EPA, Region 5
Superfund Remedial Response,
SR-6J
77 West Jackson Boulevard
Chicago, IL 60604

Re: South Dayton Dump & LF, Moraine
Remediation Response
Correspondence
Remedial Response
Montgomery County
557000752003

Subject: Ohio EPA Review of Remedial Investigation/Feasibility Study (RI/FS) Work Plan for Operable Units 1 and 2, South Dayton Dump and Landfill Site, Moraine, Ohio

Dear Ms. Patterson:

On July 26, 2016, the Ohio Environmental Protection Agency (EPA) Division of Environmental Response and Revitalization, received the Remedial Investigation/Feasibility Study (RI/FS) Work Plan for Operable Units (OU) 1 and 2 submitted by GHD, on behalf of Hobart Corporation, Kelsey-Hayes Company, and NCR Corporation, for the South Dayton Dump and Landfill Superfund Site (Site) located at Dryden Road, Moraine, Ohio. Ohio EPA is providing the following comments in the attachment to assist in the completion of an approvable document.

Because of the size of the document and the limited review time, Ohio EPA was not able to do a thorough review of the appendices to the work plan. Some comments were able to be provided on the appendices as they related back to the work plan text. However, there may be remaining issues that Ohio EPA will have comments on in the future upon the review of an updated work plan.

Due to the breadth of the attached comments, it will be beneficial to have a conference call to discuss Ohio EPA's fundamental concerns. Please contact me to set up this discussion at (937) 285-6456 or Madelyn.Adams@epa.ohio.gov.

Sincerely,

Madelyn Adams

Madelyn Adams
Site Coordinator
Division of Environmental Response and Revitalization

Southwest District Office • 401 East Fifth Street • Dayton, OH 45402-2911
www.epa.ohio.gov • (937) 285-6357 • (937) 285-6249 (fax)

[Attachment]

ec: Leslie Patterson, U.S. EPA
Kevin Adler, U.S. EPA
Brett Fishwild, CH2M Hill
Katie Heyob, DDAGW, SWDO
Allison Reed, DDAGW, SWDO
Randy Kirkland, DERR, SWDO
Sarah Beal, DERR, CO
Tim Christman, DERR, CO

General Comments

1. The proposed investigations focus only on collecting data to run a risk assessment and do not focus on delineating the nature and extent of contamination. This is a fundamental flaw. Because the investigations proposed are only in response to running a risk assessment, the information gathered will not be enough to fully delineate the nature and extent of contamination within and beyond the boundary of the landfill. In accordance with the Statement of Work, the focus of the RI should be 1) to determine the nature and extent of contamination at the Site; 2) to support the human health and ecological risk assessments; and 3) to provide sufficient data for the identification and evaluation of remedial alternatives for the Site. The proposed investigation will not satisfy objective one or three.

2. Identified potential remedial technologies for the landfill all include a cap; however, there is no proposal in the work plan to fully delineate the lateral and vertical extent of waste material for the purposes of implementing a cap remedy. Table C.1 of the work plan lists Ohio Administrative Code (OAC) 3745-27, which specifies the requirements for construction, operation, and closure of solid waste disposal facilities, as a potential Applicable or Relevant and Appropriate Requirement (ARAR). In addition to this ARAR, the U.S EPA Guidance for Conducting Remedial Investigation/Feasibility Studies for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Municipal Landfill Sites (CERCLA Landfill Guidance) directly applies to the Site given that the Site was licensed as a solid waste facility and the documented disposal of municipal, industrial, residual, and construction and demolition debris throughout the Site. The CERCLA Landfill Guidance states that, *"the most practicable remedial alternative for landfills is containment, which may be achieved by installing a cap to prevent vertical infiltration of surface water."* Furthermore, Figure 2.5 (Identification of Remedial Technologies) of the CERCLA Landfill Guidance shows that the best remedial technology for preventing direct contact, minimizing erosion, and preventing infiltration is a landfill cap.

   Based on the ARARs and U.S. EPA guidance documents, at a minimum, a cap remedy is needed at the Site for areas where waste was disposed. Investigatory work should determine the lateral and vertical extents of waste material for the purpose of implementing a cap remedy. Additional investigatory work that will be necessary at the Site is outlined in Table 2-3 of the CERCLA Landfill Guidance and includes the investigation of potential hot spots, groundwater, leachate, landfill gas, vapors, surface water, and sediments.

   Ohio EPA reviewed the text of the work plan and general outline of the proposed media investigations with the holistic view that a cap remedy is the most appropriate remedy for all waste disposal portions of the Site as it will prevent

infiltration of surface water, reduce leachate contamination to ground water, protect against direct contact with landfill wastes, and comply with applicable state ARARs.

3. The CERCLA Landfill Guidance discusses streamlining the risk assessment to identify pathways that are an obvious threat to human health or the environment by qualitatively identifying concentrations of contaminants of concern in affected media that may pose a risk through various routes of exposure. Preliminary information, with the addition of toxicity information or ARARs, is considered to initiate remedial action since options for remedial action at landfill sites are often limited. This approach could help determine problem areas where there is a basis for remedial action and facilitate possible early action, and determine when a more thorough risk assessment should be conducted where an exceedance is not readily evident based on available data. For example, previous investigations have identified exposed waste at the surface. In areas where exposed waste has been identified at the surface, it may be determined that provisions for a landfill cover are necessary, and conducting a quantitative risk assessment of direct contact exposure pathways would not be necessary. In areas where a layer of soil is present, it may be necessary to evaluate direct contact and leaching pathways to evaluate the adequacy of existing soil for incorporation into a final cover for the landfill if other remedial options (*i.e.*, removal, consolidation, and treatment) are not feasible.

   Currently, the work plan inconsistently attempts to streamline portions of the risk assessment. For example, the conceptual site model (CSM) indicates that an institutional control will be used to restrict residential use within OU1. However, there has been no assumption that institutional controls will be necessary as part of a final remedy. Also, existing pavement is proposed to be used to preclude direct contact to underlying soil/fill, though the inclusion of existing pavement has not been assumed to be part of a final remedy. In addition, consideration should be given to the fact that the direct contact investigation is proposed over a landfill with heterogeneous waste placement, and it may be technically infeasible to fully characterize the risks due to the heterogeneity of the waste placement and potential migration. Considering this, Ohio EPA recommends that consideration be given to streamlining the risk assessment for obvious completed pathways and remedial options.

4. Data gap investigations on the ground water, landfill gas, and Great Miami River (GMR) depend on the first phase of soil/fill sampling. Due to the data that has already been collected on the landfill, these data gaps should be addressed, regardless of the limited sampling proposed on soil/fill.

5. In order to support the scope of the proposed ground water investigation, additional information must be provided as part of the work plan. Comments

regarding the ground water investigation have been generated based on information provided in the work plan. Given that some information was missing and/or inconsistent, there may be more recommendations to come once this information is provided. Ohio EPA recommends that this information is provided prior to the approval of the work plan:

a) No potentiometric maps were provided for the upper or lower aquifer. Figures 2.20a-2.20d indicate general flow direction, however, Ohio EPA requests that GHD submit 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. In addition, water level measurement events should be included as a part of the investigation.
b) Only one cross section (Figure 2.3b) was included in the work plan. Ohio EPA requests that GHD include additional cross-sections in order to better illustrate the geologic and hydrogeologic characteristics of the site.
c) Boring logs and test trench stratigraphic logs should have been included in the work plan. Please provide this information to support the proposed investigation strategy.
d) Please provide more information (cross-sections, geologic description, etc.) to distinguish whether the upper ground water zone is hydraulically connected to the lower ground water zone or whether there is a significant till-rich confining layer in portions of the Site. This information is needed in order to understand the potential for contaminant migration from the upper ground water zone to the lower ground water zone and to evaluate the effectiveness of proposed monitoring well locations on the Site. If this demonstration cannot be made using historical data, Ohio EPA recommends that the work plan be updated to include investigations that will help determine the continuity of the confining layer.
e) Figures 2.8a-2.8c show locations where soil screening levels (SSLs) are exceeded in northern, central, and southern areas of the Site. However, the specific contaminants above leaching standards were not identified and soil concentrations were not provided. Ohio EPA requests that GHD 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.
f) Isoconcentration maps that show the distribution and type of COCs in both the upper and lower ground water zones across the entire Site should be included in the RI work plan. The submitted contour maps (2.20a-2.20d) only show COC distribution in the shallow aquifer in portions of the central and northern parcels. In addition, the maps do not include COC concentrations in the lower aquifer zone.

g) Ohio EPA requests that a summary table be submitted listing all active monitoring wells on Site and off-property in the vicinity of the Site. Please 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.
h) Please clarify if metals, particularly arsenic and lead, are considered COCs in ground water. Metals are not discussed as COCs, despite being present at very high concentrations in ground water samples collected from vertical aquifer sampling (VAS). Ohio EPA recommends that total and dissolved metals be analyzed in all soil, sediment, and ground water samples and that plume contour maps be provided for these constituents.

6. 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. An evaluation should be conducted of this data to determine whether resampling should occur, especially considering that some of the detection limits were above maximum contamination levels (MCLs).

7. Please ensure that changes in the text are reflected in the correspondence appendices and data quality objective (DQO) tables.

Specific Comments

8. Section 1.2, page 4, first paragraph. The parcels to the south of the landfill have now been developed. Please ensure updated maps are being used and update the text.

9. Section 1.2.1, page 5, second paragraph. The text discusses that the southern part of the Quarry Pond, parcel 3274, is not considered part of the Site. There is not enough information 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. Please revise this language to indicate that the OU2 investigation has not been performed and that it is necessary to confirm that this parcel is not contaminated or affected by waste. Please also propose such an investigation in the work plan.

10. Section 1.2.2, page 7, third paragraph. The text discusses that some portions of the Dryden Road Business Parcels do not appear to have been excavated or filled. There has been a lot of sampling performed on these parcels. To confirm that there is not waste present on these parcels, please provide evidence of the lack of filling through the monitoring well, VAS, soil, test trenching and pitting, and vapor intrusion work performed on these properties

11. Section 2.2.10.2, page 43. This section discusses water supply wells on the Valley Asphalt property but does not discuss nearby off-property wells that could be impacted from on-Site sources. To ensure off-property wells have not been affected, please provide additional information regarding the number and intended use of water wells within the vicinity (0.25 mile, 0.5 mile, 1 mile, etc.) of the Site.

12. Section 2.2.4, page 26, second bullet. The text discusses perched ground water encountered in saturated soil at some previous sample locations. It is not clear whether perched ground water has been sampled to evaluate leaching. It appears that this may be a data gap that should be addressed. Please revise the work plan to propose sampling perched ground water to evaluate leaching. This is further discussed in comment 49(k).

13. Section 2.2.4, page 26, third bullet. The text discusses that the high permeability of the fill and waste underlying the overburden allow the ground water at the site to quickly respond to changes in the GMR water levels and that during significant flooding events, the ground water elevation can surpass the ground surface elevation at some parts of the Site. The text then discusses that this phenomenon minimizes the threat of 'rapid discharge' in the GMR. Please provide further discussion on this as it would seem that high permeability would allow more discharge to the surface water as water levels recede.

14. Section 2.2.4, page 27, first bullet. The text discusses that composite samples on various parts of the landfill contained lead at concentrations above acceptable toxicity characteristic leaching procedure (TCLP) levels and that 20 out of 41 samples had concentrations of COCs greater than SSLs protective of ground water. However, the text then discusses that filtered ground water samples did not exceed MCL regional screening levels (RSLs), except at VAS-11, 24, 26, and 27 and because of that, leaching of arsenic and lead is not a significant issue at the Site.

    Limited characterization of the nature and extent of lead has been conducted, and the TCLP testing that has been done does not appear to be representative of the highest lead concentrations from previous sampling. This is a data gap that should be addressed by conducting additional TCLP testing and leachate sampling. Please delete the statement about leaching of lead not being a significant issue, and revise the work plan to include additional characterization of lead concentrations.

    It was also noted that ground water samples were filtered. Filtering of ground water samples is not acceptable, unless proper well development and sampling procedures have been followed. Please follow Ohio EPA's Technical Guidance Manual for Hydrogeologic Investigations and Ground Water Monitoring (February

1995). The appropriate approach to sample filtration is discussed in chapter 10 of the guidance.

15. Section 2.2.5, pages 28-29, second bullet. The text discusses that little putrescible waste was found throughout the borings in the landfill areas and that there is little decomposition of organic material to be a source/sources of high levels of methane. The text discusses that the source of the methane is unknown. A landfill gas investigation is needed to determine the source of the methane. This is discussed further in comments 36, 43, and 44 below.

16. Section 2.2.10. This section discusses an upper and lower aquifer zone. Please provide reasoning for the split (for example the presence of a continuous aquitard or information showing there is no connection between the two). Please provide depths of the zones.

17. Figures 2.18a, b, and c show contamination in the "deep" aquifer. For clarity, please remove boring locations, monitoring well locations, and VAS locations that were not completed to the "deep" zone.

18. Section 2.2.10, page 41, paragraph 2 and Figures 2.20 a, b, c, and d show ground water volatile organic compound (VOC) plumes. However, the figures do not show the entire Site. Please provide site maps that show the entire Site with relation to ground water plumes and flow direction, including VOC isoconcentration contours for the lower aquifer zone.

19. Section 2.2.10.1, page 42, second paragraph. The text discusses that the Sudan IV dye test, which was used to screen soil to determine the presence of non-aqueous phase liquids (NAPL), was not able to detect NAPL concentrations to the screening levels. The screening levels ranged from 45 mg/kg to 350,000 mg/kg and the lowest the dye test could detect to was 500 mg/kg. Is there a better screening tool that can be used to reach the screening level for determining the presence of NAPL? Is there a way to ensure NAPL is not being missed? This is discussed further in comment 19.

20. Section 2.2.10.1, page 42, first bullet. The bullet point discusses that the available data does not allow quantification of light non-aqueous phase liquid (LNAPL) recoverability in a standardized manner. However, the bullet then states that the LNAPL is likely to be considered de minimis and concludes that LNAPL is present at residual saturation levels and will remain immobile and unrecoverable. This is not justified by the data that has been collected (as noted in the text). Whether or not it is feasible to recover NAPL should be evaluated in the Feasibility Study (FS). Please indicate in the text that additional data will be collected to further evaluate the nature and extent of NAPL.

21. Section 2.3.1, page 43. This section discusses data gaps identified for the Northern Parcels. Additional data gaps for the Northern Parcels have been identified as follows:
    a) Lack of shallow ground water data down-gradient of MW-219, BH33-13, and BH46-13 to evaluate potential contamination migration toward the GMR. Benzene and vinyl chloride were detected above their MCL in this area.
    b) Limited characterization of the nature and extent of lead concentrations detected at test trench (TT) -5, TT-7, TT-19, TT-20, TT-21, TT-22, and TT-23.
    c) Limited characterization of asbestos identified at VAS-05.
    d) Limited characterization of polychlorinated biphenyls (PCBs) detected at TT-7 and TT-19.
    e) Limited characterization of ethylbenzene, PCBs, pesticides, and lead at TT-9.
    f) The most recent sub-slab concentrations at SS-14-E were higher than previous results, and the nearest soil vapor probe hasn't been sampled since 2009. Elevated concentrations of ethylbenzene have also been detected in soil in the vicinity of building 14 at BH66-13, BH67-13, and TT-9 to the south/southwest. There is a lack of soil, ground water, and soil gas data near SS-14-E. Soil, ground water, and soil gas sampling should be conducted near building 14 to address this data gap.

    Please revise Section 2.3.1 to include these data gaps, and add additional proposed sample locations, as necessary, to address these data gaps.

22. Section 2.3.2, page 43-44. This section discusses data gaps identified for the Central and Dryden Road Businesses Parcels. Additional data gaps for the Central and Dryden Road Businesses Parcels have been identified as follows:
    a) Limited characterization of the nature and extent of waste/contamination in the vicinity of the ACD, Large Pond, and Small Pond. Sampling from the 1990s has identified polyaromatic hydrocarbons (PAHs), lead, and PCBs.
    b) Limited characterization of the nature and extent of PCBs and pesticides detected at S3, S7, S09, TP-05, and TT-4.
    c) Limited characterization of the nature and extent of lead detected at S3, S4, S7, S8, S10, S11, TP-1, TP-3, TP-4, and TP-5.
    d) Lack of ground water data to evaluate the nature and extent of trichloroethene (TCE) detected at BH90-13.
    e) TCE has been detected at VAS-15 above an industrial vapor intrusion screening level (VISL), and soil gas sampling has not been performed in this area. Section 2.2.5.1 also indicates that TCE was detected in indoor air at a concentration of 50 parts per billion by volume (ppbv) in building 16, and a mitigation system was not installed as part of the

removal action. A soil gas probe should be installed near VAS-15 to address this data gap.

Please revise Section 2.3.2 to include these data gaps, and add additional proposed sample locations, as necessary, to address these data gaps.

23. Section 2.2.3, page 44 and Section 5.4, page 61, fourth bullet. These sections discuss the data gaps for the Quarry Pond. The proposed investigation only aims to identify human health and ecological risks and fails to determine nature and extent of contamination. The investigation limits the characterization of sediment in the Quarry Pond to areas that are easily accessible to humans and with evidence of use. This may be acceptable for human health exposures but will not determine the nature and extent of contamination in the Quarry Pond sediments. In addition, this approach does not consider ecological risks as fish and other animals in the Quarry Pond do not limit their movements to areas that are easily accessible to humans. The Quarry Pond investigation will need to consider determining the nature and extent of contamination, the human health risks and pathways, and ecological risks and pathways. This is further discussed in comment 32.

24. Section 2.2.3, page 24. This section discusses data gaps for the Quarry Pond. In earlier sections, the text discussed unidentified objects in the Quarry Pond that may be from waste disposal in the landfill. These objects represent a data gap but are not listed to be addressed. Please add this data gap to the list and propose a method for identifying these objects.

25. Section 2.2.5.1, page 30, first bullet. The work plan indicates that 13 non-residential buildings had sub-slab TCE levels greater than the Ohio Department of Health (ODH) screening level, 20 ppbv. However, mitigation systems were installed in only 7 buildings during the removal action, and the work plan only included data for buildings where a mitigation system was installed. Therefore, it is not clear if data gaps may exist, additional vapor intrusion assessment of these buildings may be warranted. Please provide all sub-slab and indoor air data collected.

26. Section 2.2.5.1, page 30. A footnote indicates that one indoor air sample collected from building 16 in August 2012 contained TCE at a concentration of 50 ppbv, but a confirmatory sample collected in September 2012 contained TCE at less than the ODH screening level. Section 2.2.5.1 also indicates that the August 2012 indoor air TCE concentration of 50 ppbv appears to be anomalous, and does not appear to be due to vapor intrusion, based on multiple lines of evidence. However, the sub-slab and indoor air data obtained from building 16 was not included in Appendix B. Please provide clarification regarding the multiple lines of evidence, including the sub-slab and indoor air data for building

16. Further vapor intrusion investigation of building 16 may be necessary to determine current conditions and evaluate potential temporal variation.

27. Section 2.2.5.1, page 32, paragraph 1. The work plan states that the indoor air and methane screening levels issued by ODH in 2012 continue to apply for evaluation of analytical results. Also, the data quality objectives for the soil gas investigation indicate that ODH Residential and Industrial Acton Levels will be used. While ODH screening or action levels may be applicable when determining if there is an immediate concern to a receptor that may need a prompt response, the ODH screening and action levels have no bearing on investigating and evaluating subsurface conditions for the purposes of implementing a final remedy. Please revise applicable DQOs and text to discuss appropriate action levels for evaluating subsurface conditions for the vapor intrusion pathway for the purposes of implementing a final remedy.

28. Section 2.2.6, page 36. This section indicates that previous investigations conducted in the 1990s have produced analytical data for surface water and sediment sample locations in the Quarry Pond and GMR. This data may be useful for determining proposed sample locations. However, it would not be appropriate to use this data to evaluate exposure due to its age. Please revise the text to indicate that this data will not be used to evaluate exposure.

29. Section 2.2.6, page 36, first bullet. This bullet indicates that Table 21 of Appendix B provides sediment sample results compared to U.S. EPA RSLs, U.S. EPA Ecological Screening Levels, and Ecological Screening Values. However, neither Section 2.2.6 nor Table B.21 indicate the source(s) of the Ecological Screening Values. Please clarify the source(s) of the Ecological Screening Values.

30. Section 3.1, pages 45-47. This section discusses the CSM. One potential scenario missing from the discussions of source areas is the potential for landfill material to be located on OU2. How will this be evaluated and if waste material is found in OU2, what will be done? Please revise the text to address this data gap.

31. Section 3.1, page 46, second bullet. The text indicates that the indoor air pathway is to be addressed as part of vapor intrusion studies including workers and residents associated with various buildings within and outside of OU1 as discussed in Section 2.2.5. The work plan indicates that some areas that were part of the vapor intrusion studies haven't been sampled since 2009. Additional vapor intrusion sampling may be necessary to evaluate current conditions and potential temporal variation. Areas where additional sampling may be necessary include, but are not limited to, building 16, building 23, and the trailer park. More

data gaps regarding vapor intrusion are discussed in comment 20. Also, Figure 3.2 appears to depict a building in exposure unit (EU) 6 that was not part of the vapor intrusion studies. Additional information is needed to determine if additional vapor intrusion sampling is necessary.

32. Figure 3.1a depicts the CSM. Ohio EPA has noted inconsistencies in the CSM as follows:
    a) If no remedy presumptions are to be made, a residential receptor will need to be evaluated in the baseline risk assessment in order to demonstrate the need for an activity and use limitation in an institutional control. The CSM will need to include exposure pathways for a residential receptor for OU1.
    b) The CSM indicates that direct contact to surface soil as well as surface water and sediments from contaminated storm water is not applicable to temporary workers and trespassers for the Quarry Pond. These pathways should be identified as potentially complete exposure pathways based on access to the Quarry Pond. This is further discussed in comment 32.
    c) The CSM indicates that direct contact to surface soil is not applicable to temporary workers and trespassers for the floodplain. Previous scoping discussion have indicated that recreational users access portions of the site from the recreational trail. This pathway should be identified as a potentially complete exposure pathway.
    d) Residents/workers, temporary workers, and trespassers have not been identified as potentially complete exposure pathway for effects by the Quarry Pond at properties outside of OU1. Part of the Quarry Pond is outside of OU1, therefore these pathways need to be evaluated.
    e) Effects of the Quarry Pond on Recreation users and temporary workers on the GMR/floodplain have not been identified as potentially complete exposure pathways. The Quarry Pond may overflow into the GMR and floodplain and there may be ground water influence from the Quarry Pond to the GMR and floodplain. Please include these pathways as necessary to evaluate.

    Please revise the CSM to include the above exposure pathways.

33. Figure 3.1a shows ingestion of fish from the Quarry Pond as potentially complete exposure pathway for trespassers that is to be evaluated/addressed as part of OU1. However, Section 2.3.3 does not identify the lack of data characterizing fish tissue in the Quarry Pond as a data gap. Please revise the work plan to propose sampling to characterize fish tissue in the Quarry Pond.

34. Figure 3.2 depicts the proposed EUs. The proposed EUs do not appear to take into account how trespassers may access the Quarry Pond and how receptors may traverse the entire length of the site along the recreational trail. EUs are risk

assessment areas that are determined on the basis of land use and how the receptor is expected to move and be exposed to media, rather than on sources of contamination. Therefore, the very nature of EUs implies little to no movement between different EUs. While ownership may play a role in how some parcels are used, it may not be the sole factor that influences land use and receptor movement, especially in areas where a trespasser receptor is more likely (*i.e.,* in areas around the Quarry Pond and along the recreational trail). Risk Assessment Guidance for Superfund (RAGS) A indicates that risk assessment may need to consider cumulative risk across multiple exposure pathways if there is a potential for exposure to multiple media at the same time. It is reasonable to assume a trespasser would be exposed to contaminated soil in parcels surrounding the Quarry Pond as well as to contaminated surface water and sediment in the Quarry Pond. Therefore, the hazard and risk of these exposure pathways should be summed in the baseline risk assessment to determine the cumulative risk to a trespasser receptor. It also does not appear to be appropriate to evaluate the large and small pond (*i.e.,* EU 18) or the access road area (*i.e.*, EU 9) separate from the central portion of the landfill (*i.e.*, EU 19), because receptors would have to traverse through EU 9 to get to EU 19 and through EU 19 to get to EU 18.

Please revise the proposed exposure units appropriately to account for receptor movement and the potential for cumulative risk across multiple exposure pathways.

35. Section 4.2.3, page 53, third bullet, alternatives for OU1. Alternative three lists soil cover/capping, Landfill Gas (LFG) Venting, Monitoring and Institutional Controls (including sub-alternatives for variation in capping limits and types) as potential remedial alternatives. Under the new administrative settlement agreement and order on consent (ASAOC), the boundary of OU1 was determined because it included the northern area of the landfill that was a household waste landfill and the rest of the landfill that was licensed as a solid waste landfill. Ohio EPA considers all of OU1 to be subject to the landfill closure requirements set forth in OAC 3745-27: the closure requirements are directly applicable to the central, Dryden Road business, Quarry Pond, and Jim City and Barnett parcels as these areas were identified in the original landfill license application. The northern parcels were identified in the landfill license application but had already been landfilled, therefore the closure requirements would be relevant and appropriate as opposed to directly applicable. The closure requirements do not allow for variances in the cap based on waste type. Rather, variances can be granted if it can be shown that waste is not present on a licensed area, or if the waste is removed. In such circumstances the area in question wouldn't require the landfill cap and the capped area could be limited. The type of cap, would be required to follow the requirements under OAC 3745-27. This determination was provided through electronic correspondence by

USEPA to the potentially responsible parties on March 24, 2014. Ohio EPA provided further discussion on this topic to USEPA on September 30, 2014.

36. Section 5.2, pages 56-60. Section 5.2 states that the objective of the OU1 soil/fill investigation is to determine the *"lateral and vertical extent of the contaminated soil and fill material, and waste material, to support the overall site assessment and to refine the OU1 boundary."* Task 3 of the Statement of Work (SOW) also indicates that this must be part of the RI efforts. The intent is to conduct a full RI/FS without making assumptions regarding remedy selection, because of this it is necessary to fully characterize the waste material throughout the landfill to define sources of contamination, locate all hot spots, and determine the full nature and extent of contamination.

    Considering the CERCLA Landfill Guidance, fully delineating the characteristics of waste in a mixed waste landfill is not possible due to the heterogeneity of the waste. Nevertheless, to attempt this, the investigation required should not be based on EUs. Rather, the investigation should be a gridded approach over the entirety of the landfill to determine the lateral and vertical extent of the waste placement and should include test trenching around the perimeter of the landfill to confirm the lateral extent of waste. It is also necessary to take samples of the waste to determine chemical characteristics. This sampling effort may need to extend into OU2 depending on whether waste was placed beyond the boundary of OU1. Such an approach should produce sufficient data for a baseline risk assessment, provided that the DQOs, Field Sampling Plan (FSP), and Quality Assurance Project Plan (QAPP) are developed to ensure data of sufficient quality for risk assessment. Under the current work plan, no further waste characterization has been proposed. The proposed actions of the soil/fill investigation are based off of running a risk assessment, not fully delineating the nature and extent of waste, as required by Task 3 of the SOW.

    a) Information should be provided to show the extents of waste. If the extent has not been delineated, additional investigation as described above should be proposed to determine the waste extents.
    b) Consideration should be given to collecting data to evaluate waste consolidation or hot spot removal options in the FS.
    c) The background/historic investigation sections discuss that some waste delineation has been done through historic sampling and through depositions from previous workers. A vertical profile and contour map of waste depth and extent will help to identify areas that need further characterization.
    d) Please clarify which areas of the Site have been fully characterized for lateral and vertical extent of waste material. Based on information provided in Section 2.2.1 and in Figure 2.2, there are areas where the waste has not been delineated or where information is not provided to justify the extent of the waste. For example, it was stated in Section 2.2.1

that hazardous waste materials were identified in a composite sample from test trenches 1, 3, and 4; however, it is unclear if the trenches are considered the extent of the waste or if additional waste material is buried in the direction of the Recreational Trail and the GMR.

e) No test trench stratigraphic logs were provided in the work plan. Please provide the stratigraphic and boring logs to show the lateral extent of waste material.

37. Section 5.2, page 57, third paragraph. This paragraph discusses the sample goals for Phase IA of the soil/fill investigation on OU1 and lists direct contact, inhalation, and ingestion risks as data goals. However, later sections and corresponding DQO tables state that the soil/fill investigation will also evaluate leaching and soil vapor/landfill gas potential. The proposed sampling on the EUs does not provide justification for sample location, depth, and number and does not constitute a leaching, soil gas, or landfill gas investigation (per OAC 3745-27-12).

    There is limited waste characterization proposed in the soil/fill investigation. The proposed sample number and location are not adequate to make a determination of whether or not further ground water, soil gas, and landfill gas characterization is needed. According to the information provided in section 2, enough information exists to indicate that these investigations are necessary. Please provide a proposal for these investigations.

38. Section 5.2, page 57, first bullet. Please affirm that background soil samples will only be compared to site soils, not fill or waste. It is not appropriate to compare background concentrations to non-native material that was brought in (*i.e.* fill soils and waste).

39. Section 5.2, page 58, first bullet. The work plan indicates that if material present at the 0 to 2 ft interval is unsuitable for sampling due to the presence of pavement, then attempts will be made to re-position the sample or adjust the sample interval to collect samples at a lower depth. However, Table 5.7 indicates that direct contact exposure will not be evaluated in several EUs (*i.e.*, EU9, EU10, EU11, EU12, EU13, EU14, and EU15). If it is presumed that the pavement in these EUs will persist as a barrier to potential future direct contact exposures to contaminated soil, then the pavement in these EUs will need to be incorporated into any future cap, and it will need to be maintained under an Operation and Maintenance (O&M) Plan. Otherwise, the baseline risk assessment will need to evaluate direct contact exposure to soil under the pavement for potential future residents, commercial/industrial workers, and construction workers, as appropriate. Please revise the work plan to indicate direct contact risk will be evaluated for all EUs.

40. Section 5.2, page 58. This page discusses test trenching and pits to be performed as part of the soil/fill investigation. Figures 2.1a-2.1c depict anomalies identified in the geophysical survey. The proposed test trenches and test pits will not investigate all of the identified anomalies. The investigation of some anomalies is discussed in the text (Section 2.3), while others have been omitted from discussion and investigation (*i.e.,* certain anomalies on the Dryden Rd. business parcels). Due to the large quantity of detected anomalies depicted on Figures 2.1a-2.1c and to ensure that all potential hot spots are characterized, Ohio EPA requests that additional documentation be submitted (*i.e.,* naming the anomalies, summary table of anomalies that have been investigated, need to be investigated, *etc.*) to support the proposed soil boring and trench locations. If anomalies have not been investigated previously, they should be investigated now as part of a comprehensive effort to fully delineate the nature and extent of waste and contamination.

41. DQO Table 5.1, Phase 1B. This DQO table discusses the soil/fill investigation and proposes to take background samples and compare them to data on the southern parcels. Why have only the southern parcels been chosen for comparisons? The southern parcels were also landfilled. Please provide a rational for this limited comparison.

42. DQO Table 5.1, Step 7, Phase 1A. The DQO table states, *"A minimum of 8 samples per exposure area, per USEPA's ProUCL Technical Guide (2013), spaced on a regular grid with random origin (i.e., systematic random sampling design), will be obtained for each exposure area identified in the risk assessment."* While it is important to ensure that a dataset meets the requirements for ProUCL for the purposes of determining an exposure point concentration (EPC), relying on these data requirements is not appropriate for determining the number of samples that will be representative for determining the nature and extent of contamination. Visual Sampling Plan (VSP) is a software program that that may be used to determine the number of samples needed to ensure a representative dataset within the sampling area and to develop a defensible sampling plan. Furthermore, a random sampling design is not appropriate for defining sources of contamination, determining the nature and extent of contamination, and defining site physical and environmental characteristics. For example, 8 randomly placed surface soil samples would not be sufficient for evaluating existing cover conditions and adequacy of existing soil material for potential incorporation into a remedy. It would be more appropriate to focus surface soil investigation on areas of potential leachate seeps, stains and other discoloration, and stressed vegetation. Collecting data based on previous investigations, historical site information, and current physical and environmental characteristic would produce data that would be more representative of potential exposure to existing conditions in a baseline risk assessment. Random samples do not take into account information from

previous investigations, which have identified exposed waste at the surface. The work plan should determine the number and location of samples to be collected in a manner that is appropriate for defining sources of contamination, determining the nature and extent of contamination, and defining physical and environmental characteristics as required by the SOW. Please revise the work plan to propose an appropriate sampling strategy for completing the requirements of Task 3 of the SOW.

43. Tables 5.1 and 5.5 Soil/Fill and Floodplain Soil DQOs. Tables 5.1 and 5.5 do not specify that soil samples will be compared to U.S. EPA SSLs and Ohio EPA leach based soil values (LBSVs). Ohio EPA recommends that laboratory results from all soil samples be compared to U.S. EPA SSLs and Ohio EPA LBSVs. For source characterization, please add these comparisons to the text and DQO tables.

44. Section 5.3, page 60. This section discusses the soil vapor monitoring investigation and states that the network of existing soil vapor probes won't be sampled, unless information from the soil/fill investigation and ground water investigation suggests an investigation is needed. Primary study question 2.i in DQO table 5.2 asks, "*Does the soil, fill, or groundwater contain Site-related contamination concentrations that indicate VOCs or methane in soil gas may pose a threat to human health?*" Based on the historic data presented in the work plan, it is apparent that the data already exists to indicate the soil, fill, and ground water contain Site-related contamination that indicate VOCs and methane in soil gas pose a threat to human health. This as evidenced by the work done under the Removal Action to install sub-slab depressurization systems (SSDS), the work Valley Asphalt has done to demolish buildings and install an SSDS, and the sampling of the landfill gas probes that have had detections of methane. While a phased or iterative investigation approach may be appropriate for determining optimum sample placement, it is not appropriate to make the landfill gas/soil vapor investigation contingent solely upon the limited results of the soil/fill and ground water investigations.

    As proposed, the soil gas and landfill gas investigation will not provide enough information to determine the need for and to evaluate a potential landfill gas system. Consideration must be given to the fact that the SSDS installed as part of the Removal Action are not permanent remedies. If the vapor intrusion issues and/or methane generation are coming from the vadose zone of the landfill a final remedy for controlling the VOC and landfill gas migration will be needed so that the SSDS will not be required in the future. If the investigation determines that ground water is a source of vapor intrusion, then a final remedy will need to address the ground water plumes with concentrations above the VISLs. It is not apparent if there will be enough information to evaluate whether or not there is a need for a landfill gas collection system or if the system will need to actively or

passively collect/vent methane and where ground water plumes will need to be addressed/controlled.

In addition, according to the information provided in the work plan, the existing soil vapor probes haven't been sampled for VOCs since 2009. The landfill gas/soil vapor investigation should include sampling the existing probes to evaluate current conditions.

Please revise the work plan to state that Phase 1 of the soil gas investigation will consist of sampling existing soil vapor probes and methane/vapor screening at proposed soil boring and test pit/test trench locations, and Phase 2 will consist of conducting additional sampling, as necessary, to fill data gaps and ensure enough data is collected to evaluate source remedies for vapor intrusion and landfill gas.

Please note that the additional soil gas sampling locations requested to address data gaps may be conducted in Phase 2 to minimize the number of mobilizations for installing/sampling soil gas probes.

45. Table 5.2 indicates that Residential and Industrial Soil RSLs for inhalation will be used as an action level for the soil gas investigation. These soil RSLs do not account for potential vapor intrusion and are not an appropriate screening level. Appropriate screening levels include VISLs. However, these do not include screening levels for soil. Section 6.3.1 of U.S. 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. Please revise the DQOs and the work plan to state that soil concentrations will be evaluated consistent with U.S. EPA's June 2015 OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air guidance document to determine if they are a potential subsurface vapor source.

46. Table 5.4 indicates that sediment data from the Quarry Pond will be compared to Residential Soil RSLs as an initial screening step to account for early-life susceptibility to mutagens for child receptors. The data would then be compared to Industrial Soil RSLs as a surrogate for human exposure risks from sediments. Comparison to the Industrial Soil RSLs would account for limited exposure frequency in the Quarry Pond as compared to a residential exposure scenario.

    It is not clear how both the Residential and Industrial Soil RSLs will be used to evaluate sediment data from the Quarry Pond, particularly when sediment results are above a Residential Soil RSL but below an Industrial Soil RSL. Therefore, it

is not clear if this is an appropriate way to evaluate trespasser exposure to sediments in the Quarry Pond. Please clarify how both Residential and Industrial Soil RSLs will be used to evaluate sediment data from the Quarry Pond.

47. Section 5.5, page 62. This section discusses the floodplain investigation. Deep soil borings (*i.e.,* to the water table) are needed as part of the GMR floodplain investigation in order to characterize the extent of waste near the Recreational Trail. The purpose of soil sampling in this area should be to determine the lateral and vertical extents of waste and not just to evaluate direct contact risk. Determining the lateral and vertical extent of waste is a data gap that must be investigated on the floodplain as historic documentation indicates waste was placed into the floodplain. Please revise this section to include this data gap and provide a sampling plan for investigation.

48. Section 5.6, pages 62 and 63. This section discusses that the need for an investigation of the GMR will depend solely on visual or olfactory observations of potential contamination on the limited sampling under the soil/fill investigation indicate that Site-related contamination extends to the floodplain and potentially impacts the GMR. While a phased or iterative investigation may be appropriate for determining optimum sample placement (*i.e.*, proposed sample locations may be adjusted based on results), it is not appropriate to make investigation of the GMR contingent upon the results of the limited sampling proposed under the soil/fill investigation. As indicated in other comments, the soil/fill investigation is based on running a risk assessment, not on determining the nature and extent of contamination. Furthermore, the data already exist to indicate that an investigation is needed to ensure the GMR has not been impacted. Please revise the work plan to propose an investigation of the GMR to fully delineate the nature and extent of contamination and to evaluate potentially complete exposure pathways.

49. Section 5.7.1, pages 63-68 and Table 5.6 – *Summary of Data Quality Objectives – Groundwater Investigation*. Section 5.7.1 describes a phased ground water investigation for which the DQOs are presented in Table 5.6. There appears to be inconsistencies between the text in section 5.7.1 and the DQOs in Table 5.6:
    a) The DQOs and phases of the proposed ground water investigation are not clear. Furthermore, the proposed ground water investigation described in Section 5.7, does not agree with Table 5.6. For example, Section 5.7 states that the respondents completed the Phase 1A Investigation in 2013, which was to address the following objectives:

        - *further refine the understanding of the nature and extent of groundwater and soil contamination,*
        - *determine any threats to public health, welfare, or the environment, and*

- *collect sufficient data to ultimately develop and evaluate effective remedial alternatives.*

Table 5.6, however, refers to *"Phase 1A-Investigation of Soil/Fill"* as an investigation to determine potential risks to groundwater from soil and fill material. Similarly, Section 5.7 describes Phase 1B as the installation of permanent wells to monitor groundwater contamination at locations selected based on the results of previous investigations, but Table 5.6 states that Phase 1B-Comparison of Soil to Background is a soil sample analysis from background locations. It appears from Figures 5.4a and 5.4b, that the current proposal is "Phase 1b;" however, Table 5.6 refers to Phase 1B as a soil investigation.

Because of these inconsistencies, it is unclear which phases of the investigation are considered complete and which phases have yet to be implemented. It is also unclear which DQOs have been satisfied from previous investigations, which are currently being investigated, and which will be addressed in the future. Please clarify and revise the ground water DQOs to ensure that the investigation objectives are adequately addressed with the proposed field work.

b) The DQOs in Table 5.6 are inconsistent regarding how ground water concentrations will be evaluated. Therefore, reviewers could not evaluate how ground water EPCs will be determined, or whether sufficient data will be collected for determining ground water EPCs. The plan appears to propose using data from two rounds of ground water samples from only new wells to evaluate ground water exposure pathways. This will not produce enough data for determining ground water EPCs as this will not provide a comprehensive view of the existing ground water plumes. Consideration should be given to contaminant concentrations in existing wells, as well as the additional data that will be provided by the new wells.

   Additionally, the DQOs indicate that ground water samples will be collected from EUs. This is inappropriate as EUs were delineated based on current use and ownership, whereas the baseline risk assessment should evaluate ground water plumes holistically. Not by EU. Please update the work plan to provide an appropriate proposal for developing the ground water EPCs.

c) Insufficient and conflicting information has been provided in the ground water investigation DQO Table 5.6 regarding the use of statistical tests for the ground water investigation: Table 5.6, page 6 of 7, states that no statistical tests will be employed. However, Table 5.6, page 7 of 7, states that the calculation of 95% upper confidence limits will be used. Before the adequacy of the proposed investigation and statistical analysis can be reviewed, it is necessary to correct these discrepancies.

50. Section 5.7, pages 68. Section 5.7 provides the framework for the proposed ground water investigation. A fundamental flaw in the proposed investigation is that it only seeks to identify ground water issues for a risk assessment and is based on EUs. It is inappropriate to base a ground water investigation off of arbitrary EUs. The horizontal and vertical extent of ground water contamination across the Site (in OU1 and OU2) and off-property must be delineated, regardless of EU boundaries. This approach should follow the appropriate CERCLA Landfill Guidance.

    Figures 5.4a and 5.4b, Figure 5.5, and Section 5.7 detail proposed monitoring well locations; however, these locations do not adequately delineate the areas of known ground water contamination. Additional sampling locations should be proposed in order better delineate COC plumes in ground water that are known to exist (Figures 2.20a-2.20d), to characterize areas that have not been historically investigated, and to monitor ground water at and beyond the Site boundary. Some of these areas include:

    a) The TCE plume identified in MW-229 and BH30-13 (Figure 2.20a). There is no proposal to install permanent monitoring wells in this area, particularly north of BH30-13 in the direction of ground water flow toward the GMR.
    b) The vinyl chloride plume identified in BH43-13, BH39-13, and BH31-13 (Figure 2.20b). There are no monitoring wells in this area to delineate the vinyl chloride plume.
    c) The vinyl chloride plume south of MW-228 (Figure 2.20b).
    d) The TCE and vinyl chloride plume near BH89-13 (Figures 2.20a and 2.20b). Only one temporary monitoring well is being proposed for installation near BH88-13. Additional ground water characterization is necessary in this area to properly delineate the TCE and vinyl chloride contamination.
    e) The TCE plume near BH70-13 extending off-property toward Dryden Road (Figure 2.20a). There are not enough proposed monitoring wells (or sampling points) to delineate the west and southwest extent of the TCE contamination in this area.
    f) The TCE, lead and vinyl chloride contamination near MW-210 extending off Property to the southwest. While the Work Plan proposes installation of two monitoring wells in this area, additional investigation may be necessary to determine the extent of contamination.
    g) Parcel 5177 (EU19). This area of the Site lacks monitoring wells and the proposed sampling is insufficient to characterize the ground water contamination. For example, tetrachloroethene (PCE), TCE, vinyl chloride, 1,1-cichloroethane, chlorobenzene, arsenic, and lead have been detected in VAS-11 (Figure 2.16b and Table B23) and the extent of this contamination has not been characterized. Because it is known that

waste material was deposited on Parcel 5177 (EU19), the central portion of Parcel 5177 (EU19) may warrant additional ground water investigation.

h) The "southern" portion of the site. Ohio EPA recommends that additional monitoring wells be placed around EU4, EU6, EU7, and EU8 given the elevated soil gas results in GP09-09 and GP10-09. There should be monitoring wells placed along the property boundary in this area to monitor the potential migration of COCs off-site.

i) The Quarry Pond. Ohio EPA recommends installing additional nested monitoring wells 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.). It was stated in the work plan that the water coming into and out of the Quarry Pond is likely ground water and that components of the upper and lower ground water zone could potentially interact with the Quarry Pond. Previous investigations of the Quarry Pond have identified *"tires and 25-30 objects of sizes and shapes that may be indicative of drums."* Because the Quarry Pond could be a source of contamination, there needs to be adequate monitoring of ground water around the pond, particularly near the Site boundary.

j) Landfill waste below the water table. Please provide a summary of areas where waste is expected to be in direct contact with the upper ground water zone. The CERCLA Landfill Guidance (Table 3-1) recommends that a high number of monitoring wells be installed downgradient of landfills in a saturated zone.

k) Please provide more information and a plan to address perched ground water zones. The presence of perched ground water was discussed in section 2.2.4, but has not been included as a focus of the ground water investigation. Please revise the work plan to include an approach to investigate perched ground water zones.

To summarize, a satisfactory ground water investigation for OU1 and OU2 should include the existing and proposed monitoring wells to adequately monitor COC concentrations in shallow, intermediate, and deep ground water zones at the boundaries of the waste material and the Site, at any identified "hot spots" on Site, and at off-property areas influenced by on-Site sources.

51. Section 5.7.1 and Table 5.6. The last ground water sampling event occurred in 2015 from select monitoring wells. In Section 2.4.4, entitled Groundwater Sampling, it is stated that the ground water sampling will be completed at the newly-installed monitoring wells and, if appropriate, the existing wells. In order to characterize the current state of ground water contamination, existing monitoring wells that are present on and off-property should be sampled in addition to the newly-installed wells. Please revise this section to address this comment.

52. Section 5.7.1, Area 6, paragraph 4. This paragraph discusses investigations on "Area 6." It is stated that GHD does not propose to collect any additional groundwater samples for laboratory analysis from the temporary monitoring well at BH88-13. Ohio EPA recommends that ground water samples be collected from all proposed temporary monitoring wells. While it is stated in in Section 5.7.1 of the work plan that there is historic shallow ground water data in this area, Ohio EPA recommends sampling ground water for VOCs, benzene, toluene, ethylbenzene, and xylene (BTEX), and metals in addition to monitoring for NAPL in order to characterize the current state of ground water contamination.

53. Section 5.7.3, page 68. The text indicates that the scope of an OU2 investigation will be proposed following the completion of the ground water investigation for OU1. The SOW states that the two RI/FS for the two OUs are intended to be performed concurrently as opposed to sequentially. Previous data indicates a need for investigation in OU2. Please revise the work plan to propose an investigation for OU2 consistent with the SOW.

54. Section 6.0, pages 69 and figure 6.1. This section discusses the background investigation and the figure provides areas proposed for background sampling. Parcel 3264 is not appropriate to sample for background because it has been developed in recent years. This direction was provided to GHD through electronic correspondence from U.S. EPA on May 7, 2014.

    Please also be aware that Ohio EPA guidance states that it is generally not appropriate to sample near rail roads.

    In addition, the figure depicts proposed roadside background soil sampling areas. It is not clear why roadside background soil sampling areas are proposed. Section 6.0 of the work plan does not discuss the purpose for collecting roadside background soil samples. Furthermore, it is generally not appropriate to collect background soil samples near roads. Background data should be collected in areas not affected by the Site or Site-related activities. While it may be appropriate to determine if concentrations of PAHs near Dryden Road are due to background or Site-related activities, it would not be appropriate to compare concentrations of PAHs to soils located on the interior of the Site, particularly areas where residual waste was placed and historical burning activities occurred, to roadside background samples. Please provide clarification regarding the purpose of the roadside background sample locations and remove parcel 3264 from the background sampling areas.

55. Section 6.1, page 69, first paragraph. This section discusses the background investigation and states, *"An on-site measurement falling outside of the expected background range is identified as being potentially impacted, and is further*

evaluated to confirm this finding (e.g., using confirmatory sampling or considering the spatial patterns of results in other site samples collected nearby)."

U.S. EPA's ProUCL Technical Guide (2015) states, *"Typically, a single exceedance of the Background Threshold Value (BTV) by an onsite (or a monitoring well) observation may be considered as an indication of the presence of contamination at the site area under investigation."* However, Section 1.5 of U.S. EPA's ProUCL Technical Guide (2015) also indicates that it is appropriate to confirm an exceedance by stating that *"the conclusion of an exceedance by a site value is sometimes confirmed by re-sampling (taking a few more collocated samples) that site location (or a monitoring well) exhibiting constituent concentration in excess of the BTV. If all collocated (or collected during the same time period) sample observations collected from the same site location (or well) exceed the BTV or PRG, then it may be concluded that the location (well) requires further investigation (e.g., continuing treatment and monitoring) and cleanup."*

Based on the guidance, the proposal to confirm an exceedance by comparison to adjacent sample location as described in the work plan is not appropriate. Instead, U.S. EPA's ProUCL Technical Guide (2015) directs to confirm an exceedance by collecting additional confirmatory samples at the same sample location of the exceedance in question. Please revise the work plan to be consistent with the guidance regarding confirmatory sampling.

56. Section 6.2, pages 70-71. This section lists relevant background guidance documents. The list does not include the following relevant U.S. EPA CERCLA guidance documents:
    a) USEPA, 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.
    b) 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.

    Please revise the work plan to include these guidance documents.

57. Section 6.3, page 72, first bullet. This section discusses statistical considerations for background sampling and states, *"Background sample size – a minimum of eight to ten background samples will be collected for each environmental medium, as applicable, and/or stratum within the medium (e.g., different soil types and/or aquifers)."* It does not appear that a sufficient number of background samples will be collected for making group-based comparisons. U.S. EPA's ProUCL Technical Guide (2015) indicates that at least 10 samples

should be collected, and larger data sets should be collected for larger sites (see Section 1.5 and 1.6 of the guide). It appears that consideration should be given to increasing the number of proposed background samples to ensure the collection of sufficient data for making appropriate background comparisons, as well as for controlling error rates. This is further discussed in comment 57.

Please revise the work plan to provide clarification regarding background comparisons, when point-based and/or group-based comparisons will be used, and the proposed number of background samples.

58. Section 6.3; page 72, fifth bullet. The work plan states, *"Where a site observation exceeds the 95th percentile BTV, it will additionally be compared to a 99th percentile BTV. If the result falls below the 99th percentile BTV, and no spatially-adjacent observations also exceed the 95th percentile BTV, the site observation will be considered to not indicate a site-related effect. However, if the site result exceeds the 99th percentile BTV or another adjacent site result also is above the 95th percentile BTV, then it will be considered to indicate an above-background condition, unless a confirmatory resample is collected and found to not be above the BTV."* The purpose of determining a 95th percentile BTV and 99th percentile BTV is not clear. Is the goal to identify possible hot spots? Or is the goal to determine if site concentrations are within the range of background? If so, it may be more appropriate to use group-based comparisons. Or is the goal to reduce the chance of remediating a sample location that may still be comparable to background levels?

    Section 6.1 also states, *"Confirmation is required due to the statistical nature of the background expected range calculations, which result in infrequent occurrence of background conditions outside of the range (e.g., 1 in 20 background samples for a 95th percentile range, or 1 in 100 for a 99th percentile range)."* This indicates that the purpose of the different confidence levels for the background levels may be to account for variability in the background data set. However, the approach of determining a 99th percentile BTV in addition to a 95th percentile BTV appears to inappropriately increase the probability of committing a Type II error.

    Step 6 iv.a) of the DQOs in Table 5.1 states, *"The Background Threshold Values will be calculated using a 95 percent confidence level, making the false positive rate no greater than 5 percent."* DQO step 6 i.a) of Table 5.1 indicates that the null hypothesis for background comparisons for the soil investigation is that soil sample concentrations from the site are no different than reference background concentrations. DQO step 6 ii.a) indicates that if a false positive (Type I) error occurs, unnecessary additional investigation (Phase 2) may occur. If a false negative (Type II) error occurs, conditions that are not due to background contaminant concentrations and pose potential health risks to receptors persist.

Section 3.2 of U.S. EPA's Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites states, *"If the probability of committing a false positive is reduced by increasing the level of confidence of the test (in other words, by decreasing α), the probability of committing a false negative is increased because the power of the test is reduced (increasing β)."* Therefore, determining a 99th percentile BTV in addition to a 95th percentile would then reduce the probability of making a false positive (*i.e.*, unnecessary remediation) while increasing the probability of committing a false negative or Type II error (*i.e.*, concluding site concentrations are within background when the site is contaminated). Section 3.2 of U.S. EPA's Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites also indicates the only way to simultaneously reduce both types of errors is to increase the number of samples. Therefore, it appears consideration should be given to increasing the number of proposed background samples.

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. Section 1.2 of U.S. EPA's ProUCL Technical Guide (2015) states, *"The use of hypotheses testing approaches can control both types of error rates (Type 1 and Type 2) more efficiently than the point-by-point individual observation comparisons. This is especially true as the number of point-by-point comparisons increases."*

The proposed approach for comparison to background data using 95th and 99th percentile BTVs has not been used on other remedial response sites subject to CERCLA within Ohio. If point-by-point comparisons are to be made to a background threshold value, Ohio EPA recommends determining a background threshold value by calculating the upper cutoff value of a background data set defined as the upper quartile plus 1.5 times interquartile range. ProUCL may be used to determine the quartile values of the background data set. Furthermore, it appears that hypothesis testing approaches may be more appropriate. Please refer to Chapter 6 of U.S. EPA's ProUCL Technical Guide (2015) for more information regarding hypotheses testing approaches in order to appropriately control error rates. Please revise the work plan to provide further clarification regarding background comparisons, and propose appropriate methods for controlling decision errors.

59. Section 6.4, pages 72-74. This section indicates that U.S. EPA's 2013 ProUCL version 5.0.00 software will be used for developing background threshold values and conducting statistical comparisons. Please revise the work plan to state that the most recent version of ProUCL (*i.e.*, version 5.1, 2015) will be used.

60. Section 6.4, page 73, method one first bullet. This bullet calls for using a nonparametric analysis of background data if one or more outliers are present in the data set. Before going to a nonparametric analysis the remaining background data set (minus the outliers) should be 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. This is the approach the Ohio EPA Division of Environmental Response and Revitalization soil-background group is using for data analyses of sites around Ohio. Please revise the work plan to include this process.

61. Section 6.4, page 73, method two second bullet point. This bullet point calls for assigning a value of one half the detection limit to non-detect samples when the fraction of non-detects is 10 to 15 percent of the total and remaining values follow a normal distribution. This is not an appropriate approach. Under such conditions the non-detect specimens should be assigned values using regression-on-statistics methods, which are included in the ProUCL software package. Ohio EPA recommends that the same approach 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. Under no circumstances should arbitrary values be assigned for non-detects.

62. Section 6.4, page 73, method two third bullet point. This bullet point discusses background data sets that have up to 50 percent non-detects. Such data sets are a major challenge for any sort of statistical analysis. If such data sets occur, Ohio EPA requests that GHD discuss the analytical approach with the agencies before proceeding. Also, in the event of high percentages of non-detects, the detection limits should be evaluated with the potential for re-analysis if necessary. Please revise the bullet point with this approach.

63. Section 7.0, page 75, first paragraph. 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. For example, a COPC infrequently detected in soil should not be eliminated if it is frequently detected in ground water. 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. Please revise this section to provide more information regarding this screening step.

64. Section 7.0, page 74, second paragraph. The work plan proposes to conduct the baseline risk assessment in accordance with RAGS Parts A-F. While these guidance documents are applicable to conducting a risk assessment, there are additional guidance documents that discuss the use of risk assessment in the RI/FS process. Please refer to U.S. EPA's guidance documents, Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites (CERCLA Landfill Guidance) and Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA regarding ways in which the baseline risk assessment may be streamlined and the baseline risk assessment may be used to streamline the RI/FS process.

    Section 2.6 of the CERCLA Landfill Guidance indicates that it may be possible to use preliminary information, with the addition of toxicity information or ARARs, to initiate remedial action since options for remedial action at landfill sites are often limited. This document states, *"Specifically, early action may be warranted when human health or environmental standards for one or more contaminants in a given media are clearly exceeded."* The executive summary of this guidance document indicates that the CSM and investigation data may be used to qualitatively identify concentrations of contaminants of concern in affected media that may pose a risk through various routes of exposure to identify pathways that are an obvious threat to human health or the environment. This approach could help determine problem areas where there is a basis for remedial action and facilitate possible early action as well as determine when a more thorough risk assessment should be conducted (*i.e.,* where an exceedance is not readily evident based on available data). For example, previous investigations have identified exposed waste at the surface. In areas where exposed waste has been identified at the surface, it may be determined that provisions for a landfill cover are necessary, and conducting a quantitative risk assessment of direct contact exposure pathways would not be necessary. In areas where a layer of soil is present, it may be necessary to evaluate direct contact and leaching pathways to evaluate the adequacy of existing soil for incorporation into a final cover for the landfill if other remedial options (*i.e.*, removal, consolidation, and treatment) are not feasible. This approach is consistent with Section 3.4.2.1 of U.S. EPA's Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, which indicates the goal of the baseline risk assessment is to gather sufficient information to adequately and accurately characterize the potential risk from a site and conduct the risk assessment as efficiently as possible. This guidance document also indicates that the CSM may be used to focus investigation efforts, and streamline the baseline risk assessment. Ohio EPA recommends that GHD consider including a discussion of how the baseline risk assessment may be streamlined, and how the baseline risk assessment may be used to streamline the RI/FS process.

65. Section 7.0, page 75, first paragraph. The text states that analytes that are 100 percent not detected in an environmental medium, but have screening levels, will be included in human health risk assessment discussion with respect to uncertainty analysis. It is not clear how detection limits above a screening level will be evaluated in the risk assessment. Please provide clarification regarding how detection limits elevated above a screening level will be evaluated.

66. Section 7.0, page 76, first paragraph. The work plan states, *"Estimated cancer risks for identified exposure pathways will be considered significant when greater than the identified acceptable risk level or range (1.0E-04 to 1.0E-06), while non-carcinogenic hazard estimates will be considered significant when greater than 1."* Ohio EPA uses a statewide acceptable risk level of 1.0E-05 for cumulative carcinogenic risk. Please revise the work plan to state that the FS will evaluate potential remedies for exposures above a cancer risk goal of 1E-05 and a non-cancer hazard of 1, and preliminary remediation goals may be modified based on balancing and modifying criteria as well as factors relating to uncertainty, exposure, and technical feasibility during remedy selection.

67. Section 7.0, page 76, first paragraph. The text provides an example of how background data will be used for comparison to site samples and will also be used for risk assessment. However, it is not clear how the point-based and/or group-based comparison discussed in Section 6.4 will be used based on the example provided. Please provide further clarification regarding how background data will be used for comparison to site samples and will also be used for risk assessment.

FSP Comments

68. Appendix D, Section 2.3.1, page 10, second paragraph. The FSP indicates that landfill gas and soil vapor migration will occur from the shallow soil horizon, and the gas probe screen will be installed as shallow as possible within the higher permeability stratum. 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 with an impermeable surface 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. Please revise the FSP to clarify that soil gas probes will be installed as close to the potential vapor source as possible.

69. Appendix D, Section 2.3.1, page 10, second paragraph. The FSP indicates that the top of the gas probe screen will be installed a minimum of 3 ft below ground surface. Soil gas probes should not be installed at intervals above 5 feet below ground surface to minimize atmospheric influence. Please revise the FSP to

state that the top of the soil gas probe screen will be installed a minimum of 5 ft below ground surface.

70. Appendix D, Section 2.3.1, page 10, third paragraph. The FSP indicates that the maximum depth of 20 ft below ground surface for soil gas probe depth is based on the average depth of the unsaturated zone across the site. It is not clear if this will be appropriate for soil gas probes installed in OU2. As stated above, soil gas probe depth should be boring specific, dependent on the potential vapor source, and representative of a reasonable maximum exposure. Please revise the FSP to clarify that soil gas probes will be installed as close to the potential vapor source as possible.

71. Appendix D, Section 2.3.1, page 10, fourth paragraph. The FSP states, *"If gas probes are installed in the 2-foot interval above the water table, the gas probes will periodically be saturated and will not generate meaningful data."* Ohio EPA understands the need to minimize the potential for water entrainment in soil gas probes. However, shallow soil gas probes may not be representative of a reasonable maximum exposure when evaluating the potential for vapor intrusion from a ground water source. When contaminated ground water is the potential vapor source, soil gas samples should be collected directly above the capillary fringe. Please revise the FSP to clarify that soil gas probes will be installed as close to the potential vapor source as possible.

72. Appendix D, Section 2.3.1, page 10, fourth paragraph. The FSP states, *"Any proposed gas probe locations specified will address LFG/soil vapor concentrations at locations near potential receptors."* It is not clear what this statement means. Landfill gas and soil vapor sampling should be conducted to determine nature and extent of contamination as well as to evaluate potential receptors in order to ensure sufficient data for evaluating final remedial options (e.g., venting and collection) in the FS. Please revise the work plan to provide further clarification.

73. Appendix D, Section 2.3.1, page 11, second paragraph. The FSP indicates that soil samples will be collected from surface and subsurface soils for the analyses of soil physical parameters. Soil samples should also be analyzed for VOCs to determine if soil contamination may be a vapor source. Please revise the FSP to state soil samples will also be analyzed for VOCs.

74. Appendix D, Section 2.3.2, page 12, first paragraph. The FSP indicates that a gas extraction monitor will be used to measure and record methane, lower explosive level (LEL), carbon dioxide, and oxygen readings. However, the work plan and/or the FSP does not appear to discuss hydrogen sulfide. Please revise the work plan to indicate that the landfill gas investigation will include monitoring and sampling for hydrogen sulfide.

75. Appendix D, Section 2.3.2, page 12, second paragraph. The FSP indicates that one round of soil gas samples will be collected during the first round of methane measurements using a 6-liter capacity summa canister. Please 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.

76. Appendix D, Attachment A.11. The standard operating procedure (SOP) for soil gas probe sampling discusses two options for a tracer test (*i.e.*, isopropanol or helium). Please provide clarification regarding which method will be used at this site. For the helium tracer test, the SOP indicates that a shroud will be filled to a minimum of 50% helium, and a helium content of 10% or greater in the sampling assembly would indicate significant leakage such that the collected soil gas sample would not be considered reliable and representative. While a 10% helium content may be adequate for determining when to take corrective actions in the field to ensure a proper seal, it does not appear to be appropriate for determining whether the sample results are reliable and representative. Please revise the FSP to clarify that if a helium tracer test is conducted, any reported helium content changes will be assessed to determine data quality and representativeness.

    In addition, it is not clear if soil gas samples will be analyzed for fixed gases to determine helium content in collected samples. Please provide further clarification.

77. Appendix D, Section 2.4.1, paragraph 3. The FSP states that VAS samples will be analyzed for target compound list (TCL) VOCs. Ohio EPA recommends that VAS samples also 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 [TAL] metals).

78. Appendix D, Section 2.4.1, 6(ii). Please clarify whether the VAS purging procedure that applies to the use of a 10-foot well screen when sampling at 5-foot intervals will obtain ground water samples that are representative of the interval in which the pump is placed or whether there is potential for sample bias due to mixing within the water column. As pumping/purging proceeds, the extracted water becomes less and less representative of ground water near the pump and will be a flow-weighted composite of the ground water flowing into the entire well screen. If 5-foot intervals will be sampled, Ohio EPA recommends using a 5-foot well screen to prevent sample bias.

79. Appendix D, Section 2.4.1, 7. In order to ensure that ground water samples are representative of aquifer conditions, Ohio 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.

80. Appendix D, Sections 2.4.1.1 and 2.4.1.3. Please 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 (PID).

QAPP Comments

81. Appendix E, Attachment A provides detections limits for PCBs. The water detection limits for PCBs presented in the QAPP are not adequate. Considering published standards, the reporting limit and maximum detection limit presented in the QAPP are elevated above the standard. Ohio EPA recommends an alternative, congener specific analysis when evaluating water samples for PCBs, USEPA Method 1668A. This method generally has detection limits that are sufficient for risk assessment purposes.