AR-1

SUBJECT: Response to review comments for the Draft Site Characterization Report, Remedial Investigation Part 1, at Reservoir No. 2 Burning Ground, Former Plum Brook Ordnance Works (PBOW), Sandusky, OH, September 2004, Prepared by Jacobs Engineering Group, Inc., Contract Number DACW62-03-D-0004-0002

Reviewers: USACE - Nashville

1. Executive Summary, Page viii, 1st Paragraph, 1st Sentence. Suggest adding "This report addresses the findings of *sampling conducted as part of* a remedial investigation...at the Reservoir No. 2 Burning Ground Site (2BG). Also mention somewhere in this paragraph that human health and ecological risk assessments will be performed later.

Response: The recommended changes have been incorporated.

2. **Executive Summary, Page viii, 1st Paragraph, Last Sentence. Suggest changing incineration to burning.**

Response: The suggested change was incorporated to read as follows: " to an outdoor facility for burning"

3. **Executive Summary, Page ix, 1st Paragraph, Last Sentence: Revise reference to surface water sampling as appropriate relative to our current position.**

Response: The text has been revised to indicate the current status.

4. Executive Summary, Page ix, 4th Paragraph: "dioxins" is misspelled.

Response: The spelling has been corrected.

5. Executive Summary, Page x, Last Sentence: May be able to revise this after the 2 December 2004 PBOW Team Meeting which will include the OEPA.

Response: The text has been revised to indicate the current status.

6. Section 1.0, Page 1-1, 1st Paragraph, 1st Sentence. Suggest deleting the reference to hazardous waste site in this paragraph.

Response: The phrase "hazardous waste site" has been deleted.

7. Section 1.0, Page 1-1, 1st Paragraph, Last Sentence: Change "Corps of Engineers Lakes and Rivers Division – Huntington (CELRH)" to "Corps of Engineers, Huntington District (CELRH)" and "Corps of Engineers Lakes and Rivers Division – Nashville (CELRN)" to "Corps of Engineers, Nashville District (CELRN)".

Response: The recommended changes have been incorporated.

8. Section 1.1.2, Page 1-1, 3rd Paragraph, 2nd Sentence: Change "facility was constructed" to "site began being used for burning purposes".

Response: The recommended changes have been incorporated.

9. Section 1.1.3, Page 1-2, 3rd Bullet. Clarify that PCBs were not sampled for in the subsurface during the 1996 IT investigation.

Response: Further clarification has been added to indicate that PCB contamination was detected only at the surface and that subsurface soil was not analyzed for PCB.

10. Section 1.3.1, Page 1-3, 5th Line: Change "surface and surface" to "surface and subsurface".

Response: The correction has been made.

11. Section 1.3.3, Page 1-4: Separate surface water discussion to its own paragraph and revise based on agreements/understandings established at or before PBOW Team Meeting December 2, 2004. In addition throughout the document, revise as necessary other references to the surface water sampling/characterization.

Response: The surface water discussion has been isolated to a separate paragraph and the text revised to address the current status.

12. Section 1.3.4, Page 1-4, IDW: Revise to report what was actually done, (may only need to change "will be" to "was").

Response: The text has been revised to indicate that all IDW was transferred to an off-site approved facility on 26 October, 2004.

13. Section 2.4.1, Page 2-4, 3rd line: Add a period after "PBOW" and preceding "Sandusky Bay".

Response: The correction has been made

14. General Comment. I would like to see a figure showing the conceptual site model for this site.

Response: The requested figure has been provided and a corresponding section included in Section 7.0 to address fate and transport.

15. General Comment. One of the Project Objectives was to evaluate and use existing data appropriate to the investigation area. Was an evaluation of the existing analytical data (generated by IT Corp) performed? If not should one be performed and included in this report?

Response: The data validation summary included as Appendix F to the IT SI report was evaluated and the data determined to be adequate for incorporation into a future risk assessment. A discussion specific to the data quality and data assessment has been incorporated into Section 1.1.3.

16. Page 3-3, 1st Line. Please clarify that these samples were taken at an area where the burn layer was not present.

Response: As stated in the second sentence, four of the borings were placed within the boundary of the burn layer, where burn layer material was present. The following sentence discusses the location of the remaining eight borings being placed outside of the burn layer boundary.

17. Section 3.3.4, Page 3-4: In addition to a table presenting the topographic survey data, usually once the State Plane survey data is available the information is entered onto the boring logs with the horizontal control information in log block 8 (Hole Location) and elevation information in block 9 (Surface Elevation). This simplifies things if we need to return to a specific sample location.

Response: The survey information has been included on the boring logs.

18. Section 3.4 and elsewhere if necessary: Check spelling of "piezometer".

Response: The spelling has been corrected.

19. Section 3.8: Revise according to current status of IDW including changing verb tense from present to past in 2nd paragraph.

Response: The text has been revised to indicate that all IDW was transferred to an off-site approved facility on 26 October, 2004.

20. Page 3-9, Section 3.9.3.1, 1st Paragraph, Last Sentence. Edit this sentence.

Response: The sentence was edited to remove the extra word "than".

21. Page 3-9, Section 3.9.3.2. Suggest adding a recommendation to the conclusions section that identifies the issues related to PAH analytical difficulties. While these values are biased high – they could impact the risk assessment or future remedial efforts and the Project Delivery Team should be aware of this issue.

Response: A discussion regarding the PAH results has been included in the conclusions section, which includes recommendations.

22. Section 5.1.2, Page 5-1: October groundwater level information should be available by the time this document is revised so an addendum shouldn't be necessary, simply revise this section accordingly.

Response: Water level information collected during October has been included in the final version. Any additional sampling or development activities will be addressed in a quarterly report.

23. Section 7.0, Page 7-1: If necessary, revise reference to "additional sampling" based on outcome of discussions at PBOW Team Meeting December 2nd.

Response: The text has been revised accordingly based on the decisions from the referenced meeting.

24. Section 7.0: Should there be a recommendation for further action section? I suggest a bulleted item including risk assessment of soils and sediment, agreement that there is no further action for the perched water layer, no further action of bedrock groundwater due to geologic conditions, no further sampling or action with surface water in the ditch, etc.

Response: A section has been included to present recommendations for future action.

25. Figures, "Sources" notes: Change "Stateplane" to "State Plane".

Response: The figures have been revised.

26. Figure 5-2. The 635.5' Groundwater contour is mislabeled on the right hand side (635).

Response: Figure 5-2 has been corrected.

27. Tables 4-1 through 6-4 organization of data: It would be helpful to have the data organized in a different way, with each column representing a sample, and the rows representing a chemical. It will become important later to know the non-detects of the detected chemicals in other samples of that media (for example antimony is detected but not in all samples) listed. It would helpful to differentiate and compare between the primary and duplicate sample results easily. See the following table as an example (note values in sample results are not real, just for illustration):

			Sample ID	BH09 PBOW-04-so-2BG-BH09A(3-5)	BH09 Duplicate PBOW-04-so-2BG-BH09D(3-5)	BH0 PBOW-04-so-2BG-BH09A(8-10)
			Sample Time	10:05	10:05	10:15

all in mg/kg	Region 9	Background	Sample Date	5/26/2004	5/26/2004	5/26/2004
Chemical	PRG (a)	(b)	Depths	3 - 5 ft	3-5 ft	8 - 10 ft
Aluminum	76000	15500		15750	16490	12060
Antimony	31	9.3		0.4 U	0.4 U	0.519 BJ
Arsenic	0.39	36.5		**21.7 J**	**16.4**	**40**
Barium	5400	826		263 J	128	71.1 J
Beryllium	150	1		0.946	0.942	0.577 J
Cadmium	37	NA (c)		1.74 J	0.223 BJ	.0335 J
...						

a. Region 9 PRGs are concentration equivalents for carcinogenic risk of 10E-6 or hazard quotient of 1 in residential soil, U.S. EPA Region 9 October 2004.
b. Background statistic is the 95% UTL
BJ: estimated value biased high
J. estimate value
U. Non-detect value seen is the detection limit
(c) NA - Not applicable, chemical was not detected in background samples
BOLD: detected value is greater than EPA Region 9 PRG
Shaded: detected value is greater than Background value

Response: The Chemical Data Quality Report already contains a presentation of the data as requested in the comment. The Chemical Data Quality Report is located in Appendix G and the tables are located in Attachment 2. A reference to these tables has been added to the text.

28. Tables 4-1 through 6-4: Arsenic Region 9 PRG for residential soil is 0.39 mg/kg. Mercury and compounds is 23 mg/kg. Define in a footnote - N1 and FD1. Each table should be footnoted, and see previous comment showing an example.

Response: The tables have been revised to include the correct screening value. Footnotes have been included.

29. Table 4-13: What was the depth below ground surface that the burn layer was encountered? I suggest including the depths, not 0 ft.

Response: The tables have been corrected to indicate the correct depth from which the sample was collected.

30. Table 4-18: Show the solid matrix metals results in mg/kg instead of ug/kg It would make concentrations easier to read in this case.

Response: The unit values have been changed to mg/kg

31. Table 4-18: I believe BH09(8-10) and BH15(8-10) primary or duplicate Sample IDs are mislabeled.

Response: The sample IDs were corrected to include the dash between the site ID (2BG) and the borehole ID (BH09).

SUBJECT: Response to review comments for the Draft Site Characterization Report, Remedial Investigation Part 1, at Reservoir No. 2 Burning Ground, Former Plum Brook Ordnance Works (PBOW), Sandusky, OH, September 2004, Prepared by Jacobs Engineering Group, Inc., Contract Number DACW62-03-D-0004-0002

Reviewer: Erich Guy, USACE – Huntington District

1. **Table of contents: section 5.1 heading has "characteriization" misspelled.**

   Response: The spelling has been corrected.

2. **Exec. summary, paragraph 11: define "PRGs" before use and add to report acronym list.**

   Response: PRGs has been added to the acronym list and the first usage has been defined.

3. **Exec. summary: it is stated that surface water and groundwater samples may be acquired (if possible) in the near future. If these data have already been acquired it is suggested they be added to the draft final version of this report rather than a report addendum. If they could not or have not been acquired then update the status/provide current plans.**

   Response: The text has been revised to include the most current status regarding surface water and groundwater characterization activities.

4. **Section 1.3.4, third paragraph: cite/provide reference for SAP (i.e. final version date).**

   Response: Additional reference detail has been incorporated.

5. **Section 1.4, sixth indented item: "invesetigation" is misspelled.**

   Response: The spelling has been corrected.

6. **Section 2.2.1, first and sixth paragraphs: change "PBS" to "PBOW" for consistency.**

   Response: The changes have been incorporated.

7. **Section 2.2.1, third to seventh paragraphs: the 2002 groundwater data summary report authored by Shaw contains a geologic map showing the boundaries discussed in these paragraphs. It is suggested that the map be mentioned and the report be cited.**

   Response: The suggested Figure has been referenced in this section.

8. **Section 2.2.1, third and seventh paragraphs: in the third paragraph it is stated that all mentioned formations outcrop at PBOW. It is possible, but I'm not sure that this is the case - I haven't observed all mentioned formations exposed at the surface. I suggest either removing the term outcrop, or stating that rock outcrops are sparse at PBOW. In the seventh paragraph it is stated that the Huron Shale outcrops under much of the southern and eastern site portions. In this sentence "outcrops" should be replaced with "is present."**

   Response: The term "outcrop" has been changed to "subcrop" to meet the intent of the discussion. The original intent was to define the bedrock units first encountered beneath the overburden.

9. **Section 2.2.2, second paragraph: to maintain consistency with section 2.2.1, after "the Plum Brook Member of the Olentangy Shale" add in parenthesis "(a.k.a. Plum Brook Shale)."**

   Response: The text has been revised to be consistent with Section 2.2.1.

10. **Section 2.2.2, second paragraph, last sentence: cite the 9th Quarterly (March 2004) Background Groundwater Report (Shaw, 2004) which contains research supporting this statement concerning naturally occurring oil and hydrogen sulfide gas in the Delaware l.s.**

    Response: The referenced document has been cited

11. **Section 2.3.1: Refer reader to previous groundwater report(s)/provide references in text for more detailed information concerning general PBOW hydrogeology.**

    Response: Additional references have been cited.

12. **Section 2.3.2, second paragraph: In the first sentence add "in the vicinity of 2BG" after "through PBOW" – clarify since there is another linear feature east of this location with different trend. Also, in the last sentence of this paragraph, wording should be changed to state "500 ft northwest of <u>the axis of</u> this feature."**

    Response: The suggested revisions have been incorporated.

13. **Section 3.0, paragraph 3: Are they any updates regarding a revised groundwater sampling approach and/or surface water sampling? Same comment applies to Section 3.4.5.**

    Response: The text has been revised to include the most current status regarding surface water and groundwater characterization activities.

14. **Section 3.1, paragraph 2, second to last sentence: In parenthesis also make reference to Figure 3-3 since well 2BG-BEDMW-003 location is shown on that figure.**

Response: Reference to Figure 3-3 has been included.

15. **Section 8.0: For Jacobs 2004 references, these should be modified to the form of Jacobs, 2004a; Jacobs, 2004b, etc. - for consistency with how documents are cited in report text.**

Response: The suggested modifications have been incorporated.

16. **Figure 5-2: A 637.5 contour line runs between 637.29 (PZ-02) and 637.28 (PZ-01) values. There is no basis for the location of this line; perhaps a different set of weekly elevations (e.g. 6/19/2004 values) should be listed next to PZ-02 and PZ-01 on the figure? Also, it is not clear what the basis was for bending the 637 contour line – are they additional data from east of Reservoir Road that were considered when contouring?**

Response: The water elevation value for PZ-02 is in error on the figure. The value has been corrected to read "637.79", consistent with Figure 5-1. Because the 637.5' contour line has a bend, as defined by PZ-01 and PZ-02, the 637' likewise should follow the same trend.

17. **Appendix F: List coordinate system and units of data contained on sheets in this appendix. Coordinate system is mentioned in Section 3.4.4., but should appear with units listed on the survey data sheets also.**

Response: The data has been converted to the Ohio State Plane North NAD83 coordinate system, per comment #7 by Sam Bass – HTRW CX. The text in Section 3.4.4 will likewise be revised.

18. **Appendix I: In a couple of the photographs, e.g. I-3, it is difficult to tell from the photograph where the burn layer exists and extends too in the photograph. Please include a bit more description in the caption or label the extent of the layer on the photographs.**

Response: Additional descriptions have been provided.

SUBJECT: Response to review comments for the Draft Site Characterization Report, Remedial Investigation Part 1, at Reservoir No. 2 Burning Ground, Former Plum Brook Ordnance Works (PBOW), Sandusky, OH, September 2004, Prepared by Jacobs Engineering Group, Inc., Contract Number DACW62-03-D-0004-0002

Reviewer: Larry Tannenbaum
Environmental Health Risk Assessment Program

The US Army Center for Health Promotion and Preventive Medicine (USACHPPM) reviewed the subject document on behalf of the Office of The Surgeon General pursuant to AR 200-1 (Environmental Protection and Enhancement). Thank you for the opportunity to review this Site Characterization Report. Our minor comments appear in the paragraphs below. We look forward to providing continued technical support on this and other PBOW sites.

1. As a general comment, the subject document has no mention of ecological receptors that might be having contact with the 2BG site. Please have the revised document note at the start, that ecological receptors were considered initially but that with the 2BG site being only one-half of an acre in size, the site is ecologically irrelevant for risk assessment purposes.

Response: Text has been included to address the fact that ecological risk was not included as scope for this RI

2. Please note that the word "discreet" appearing in several places (e.g., pages viii, 1-3, etc.) and intended to refer to the case of distinct samples having been collected, is misspelled. The correct spelling in the intended usage of the word is "discrete". Please make the necessary corrections.

Response: The corrections have been made.

3. As another general comment, numerous times throughout the subject document, reference is made to the comparison of environmental media contaminant concentrations with USEPA Region IX PRGs. The specific receptor/activity pattern that corresponds to the PRGs that were applied is never stated though. In the revised report, please indicate if residential, non-residential (industrial), or some other activity pattern corresponds to the PRGS as they were used (see next Comment). Also, the specific site concentrations that were compared with the PRGs are not identified. Were maximum detected concentrations compared? Average concentrations?, etc.

Response: Additional information has been included to address the type of screening values used. A simple preliminary screening was performed for this RI. A formal risk assessment, which would employ screening using maximum or average concentrations was not in the scope of this RI.

4. Section 2.6.2 on page 2-6 notes that no specific future uses of the 2BG site have been identified. Presumably, the tasks covered in the subject document (sampling and

analysis, etc.) are for the purposes of supporting a forthcoming risk assessment. The subject document should therefore elaborate on the likely future site uses, or at a minimum, indicate why it is that specific future site uses could not be identified.

Response: Potential future land use scenarios for PBOW are addressed in section 2.6.1.

5. The data of the soil investigation seems to indicate that the frequency of PRG exceedance is about the same inside *and* outside the burn area, for both surface soils and subsurface soils. This would seem to indicate that the 2BG site needs very little in the way of assessment work, since the onsite condition does not appear to be different from the background condition (to the extent that samples from "outside the burn" can or were intended to serve as background samples). Please have the revised report discuss within a risk assessment context, the meaning of the similar frequencies of PRG exceedance for inside and outside the burn area.

Response: Section 7.1 summarizes the frequency of detections for both populations. The results show a significantly higher percentage of exceedances within the burn layer boundary, as discussed in section 7.1. A discussion in the context of risk was not within the scope of this report.

SUBJECT: Response to review comments for the Draft Site Characterization Report, Remedial Investigation Part 1, at Reservoir No. 2 Burning Ground, Former Plum Brook Ordnance Works (PBOW), Sandusky, OH, September 2004, Prepared by Jacobs Engineering Group, Inc., Contract Number DACW62-03-D-0004-0002

Reviewer: Chung-Rei Mao, Chemistry - HTRW Center of Expertise

Comment # 1: Page ix, 4th Paragraph: "dioins" in the last sentence should read "dioxins".

Response: The spelling has been corrected.

Comment # 2: Page 1-2, Section 1.1.3: PAH, benzo(a)pyrene, in surface soils could be a non-anthropogenic (i.e., naturally occurring) and/or anthropogenic background contaminant, resulting from nearby industrial activity or asphalt roads. Recommend that local background concentration for PAHs be considered.

Response: Background values for PAHs have not been incorporated into the background data set. Additional negotiation with OEPA would be required.

Comment # 3: Page 3-8, Section 3.9.2.1: It is not clear if SW-846 methods were used for sample preparation and analysis. Recommend that the sample preparation and analytical methods be listed in this document. It is not appropriate to apply EPA CLP National Functional Guidelines (NFGs) to evaluate performance-based SW-846 Method 8260 data, especially when the acceptance criteria for the measurement quality indicators (MQIs) are derived from the DQO process. The EPA CLP NFGs are not consistent with USACE guidance document EM 200-1-3 or DoD "Quality Systems Manual for Environmental Laboratories" in many areas. Recommend that the QC requirements prescribed in the SW-846 methods be used for evaluation of the quality of data generated with SW-846 methods in the future.

Response: The SW-846 preparation and analytical methods were added to tables 3-1, 3-2, and 3-3 referenced in Section 3.9.1 Laboratory Analysis. Table 3-4 was added to the document to list the analytical methods for the sediment samples. As per the project QAPP, the EPA NFG provided data validation guidance while the QA/QC requirements for each method were based on the SW-846 methods and USACE EM 200 1-3.

Comment # 4: Page 3-9, Section 3.9.2.2: Recommend that the analytical lab for QA samples be stated in this section.

Response: The text was amended to add the QA laboratories.

Comment # 5: Page 3-9, Section 3.9.3: Because two equivalent split samples were analyzed by both the primary and QA labs, recommend that the real cause of elevated RLs at the primary lab be investigated. Similar situations happened for many other projects, when a primary lab took a short cut to reduce matrix interferences by extract dilutions, instead of clean-ups. Recommend that future contracts require contract labs notify the client immediately for guidance on corrective actions when project-specified reporting limits cannot be met.

Response: The elevated RL situation for the PCB samples was investigated. It was determined that the laboratory simply did not re-run several of the samples at lower dilutions or undiluted. Due to high

levels of target and non-target analytes present in several of the samples, most of the samples were analyzed initially at a dilution. The laboratory has responded with corrective measures to ensure the situation is not repeated.

Comment # 6: Page 3-10, Section 3.9.3.2, Last sentence of the Last paragraph: PAHs in the drainage ditch could be anthropogenic background contaminants, resulting from run-off from nearby asphalt roads. See Comment No. 2.

Response: Run-off from the asphalt service road is proposed in this section as the likely source of contamination. Further discussion as suggested is also provided in section 7.3

Comment #7: Page 4-2, Section 4.2: Recommend that background values for PAHs be also established and used to evaluate site contamination. See Comments No.2 2 and 5.

Response: Background values for PAHs have not been incorporated into the background data set. Additional negotiation with OEPA would be required.

Comment # 8: Page 7-1, Section 7.1: Please check if the "toxic equivalent factors" in the last sentence of the last paragraph is an error of "toxic equivalency concentrations (TECs)", which are calculated based on "toxicity equivalency factors (TEFs)" and "bioaccumulation equivalency factors (BEFs)".

Response: The text will be revised to indicate that TECs have been calculated for screening purposes based on TEFs.

Comment # 9. Tables 4-1 ~ 4-20 and 6 – 1 ~ 4: If the "RLs" (reporting limits) in these tables are the same as the lowest calibration standards (LCalS), the RLs were set too low versus the "DLs" (Method Detection Limits). Data quantified at the improperly low RLs would have high data uncertainties for making reliable decisions. RLs should be substantiated by its DLs, Method Quantitation Limits (MQL), and LCalS, i.e., RL ≥ LCalS ≥ MQL ≥ 5 ~ 10 × MDL. (See Section 3.3.7.2 of EM 200-1-3.) If a lab could not meet project/client required RLs, the lab should try to lower its MDL, use another method, or negotiate with its client, prior to sample analysis. In addition, DLs should be reported with single significant figure and RLs may have two or three significant figures.

Response: Methods were selected to achieve maximum sensitivity to meet as many of the Region IX PRGs as possible. The analytical subcontractors based their reporting limits on the lowest calibration standard (i.e. the MRLs are set at the MQL). For a few compounds the MDLs are not >3X the MQL. The RLs, MDLs, and methods were negotiated and agreed upon prior to sample analysis and detailed in the project QAPP.

Reviewer: Sam Bass, Geology - HTRW Center of Expertise

Comment # 1: General comment. For this document to be consistent with EPA's RI/FS guidance it will need to contain discussion of fate and transport of contamination, as well as include conceptual site models and discussion of risk. It is recommended that EM 1110-1-1200 be reviewed for guidance in preparing conceptual site models for the site and report.

Response: A section addressing fate and transport has been added to Section 7.0

Comment # 2: General comment, Figures and Tables. It would be helpful if concentrations of inorganics would be reported in mg/kg rather than µg/kg.

Response: The tables and figures have been revised to report metals in mg/kg. As requested.

Comment # 3: General comment. Suggest background concentrations be determined for PAH contaminants, which may be related to anthropogenic activities (such as road construction or lumber burning) or natural occurrences (such as incomplete combustion of wood from forest fires). This may require determination of predominant wind directions to ensure sample locations are selected that would be upwind from the site.

Response: Background values for PAHs have not been incorporated into the background data set. Additional negotiation with OEPA would be required.

Comment # 4: General comment. Verify spelling of 'piezometers' throughout the document. It is frequently spelled 'peizometers'.

Response: The spelling has been corrected.

Comment # 5: Page 2-3, Section 2.3.1, last paragraph. Please provide distance from the site to the two wells listed on Schenk Road.

Response: The distances of the two nearby off-site wells of approximately 2250 ft and 3800 ft have been included in the text.

Comment # 6: Page 2-3, Section 2.3.2, and page 5-1, Section 5.1.2. Clarify that the northeast-southwest trending feature, and the resulting ground water flow toward / along it, are regional-scale features. No water level measurements have been collected in bedrock wells at the site to confirm that bedrock ground water flows to the southeast as stated in the last sentence of the section.

Response: The referenced linear feature is on the local scale. Sufficient water level measurements have been collected from existing bedrock wells surrounding the site to infer the generalized flow paths

Comment # 7: Page 3-4, Section 3.3.4; page 3-5, Section 3.4.4, and Appendix F. Recommend surveyed locations be listed in the report in Ohio State Plane North or UTM NAD83 coordinates. Appendix F only provides Plum Brook Coordinate System coordinates, which is not standard (i.e., there is no guarantee the baseline for this coordinate system will be maintained or locatable in the future).

Response: Appendix F has been revised to report the data in the Ohio State Plane North NAD83 coordinate system.

Comment # 8: Page 3-4, Section 3.4, general comment. For future reference it would be best not to install monitoring wells in a straight line, particularly if they will be used to determine ground water flow direction.

Response: The comment is noted and will be used for future planning. The OEPA requirement for one well upgradient and one well downgradient, coupled with a limited budget, dictated the current pattern.

Comment # 9: Page 3-5, Section 3.4.2. Text should note if plain water was used for a drilling fluid or if any additives were used.

Response: The use of potable only has been included in the text

Comment # 10: Page 3-5, Section 3.4.3. EM 1110-1-4000 allows addition of water to a well to facilitate development, provided the chemistry of any added water is known. Recommend you consider addition of water to the bedrock wells during future mobilizations and that development be completed. This assumes the State will allow addition of water to the well for this purpose; ensure you have coordinated with the State prior to adding water to a well.

Response: The comment has been noted and will be considered for future development of these wells.

Comment # 11: Page 3-5, Section 3.4.5. Recommend consideration of a HydraSleeve for future ground water sampling. HydraSleeve samples can be analyzed for all parameters, including explosives and PAHs, and do not require any purging prior to sample collection. The disadvantage is that the sampler volume can be as low as 400 mL for a one-foot-long sampler, which may require multiple sampling passes to collect sufficient volume (depending on the number of analytes).

Response: The comment has been noted and will be considered for future sampling

Comment # 12: Page 3-6, Section 3.5.1; and page 6-1, Section 6. Ultimately a decision will need to be made on whether to continue attempts at surface water sampling or to abandon efforts altogether. Things to consider in the decision include whether the stream is ephemeral or intermittent, and whether there is any potential significant exposure to surface water as a result of the short-term intermittent/ephemeral flows. This should be coordinated with risk assessment personnel as well as geotechnical personnel.

Response: The comment has been noted and will be considered for discussion with the OEPA.

Comment # 13: Page 4-2, Section 4.2.1. If future surface soil sampling events are performed, recommend a multi-increment sampling approach be used to avoid the nugget effect seen in some surface soil samples analyzed for explosives. This method has been described by Tom Jenkins and others from the Corps' Engineer Research and Development Center, as well as Chuck Ramsey of EnviroStat, Ft. Collins, CO.

Response: The comment has been noted and will be considered for future sampling

Comment # 14: Page 4-3, Section 4.3.1. The report should indicate if the extent of contamination in surface soil outside the burn area has been determined with confidence, i.e., if borings containing contamination are constrained by borings that are clean.

Response: Additional discussion has been provided to address contaminant extent outside of the burn area.

Reviewer: Mark Fisher, Health & Safety - HTRW Center of Expertise

Comment # 1: Page 3-2, Paragraph 3.2. The report authors should explain why the hydrogen sulfide detector registered such high levels when the bedrock monitoring wells were sampled. Without explanation, report reviewers (especially regulators) may interpret this paragraph to mean there may be sulfur-containing compounds (or other contaminants) in the groundwater. Realistically, the instrument was probably giving false positive readings.

Response: Additional discussion on the natural occurrence of hydrogen sulfide in the Delaware Limestone has been included.

Reviewer: Charles Coyle, Environmental Engineer - HTRW Center of Expertise

Comment # 1: 7.1, p. 7-1 Based on figure 4-2, it does not appear that the extent of surface soil contamination has been defined. DPT location BH-23, outside of the burn-pit boundary and one of the eastern-most sampling points, exhibited a TNT levels 2 orders of magnitude above the PRG. Recommend revising section 7.1 to acknowledge that the extent of surface soil contamination does not appear to have been defined, at least to the east of the burn pit area.

Response: Additional discussion has been provided to address contaminant extent outside of the burn area.