UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

December 8, 2021

VIA ELECTRONIC MAIL

Mr. Roger B. Petrie
Federal Facility Agreement Manager
Oak Ridge Office for Environmental Management
Department of Energy
Post Office Box 2001
Oak Ridge, Tennessee 37831

Dear Mr. Petrie:

The U.S. Environmental Protection Agency has completed review of the *Zone 1 Groundwater Plumes Remedial Investigation Work Plan, East Tennessee Technology Park, Oak Ridge, Tennessee* (DOE/OR/01-2903&D1) received by EPA on September 21, 2021.

This document describes the remedial investigation that will support the eventual development of a groundwater Record of Decision for Zone 1 at the East Tennessee Technology Park (ETTP). The work plan describes the conceptual site model and identifies the need for additional site-specific groundwater characterization at some of the Zone 1 groundwater plume source areas such as the K-770 Scrap Yard, K-1085 Old Firehouse Burn Area, K-1070-F Construction Spoil Area, K-1070-A Burial Ground, Contractor's Spoil Area, and Blair Quarry. Further groundwater sampling from existing monitoring wells is needed at the K-720 Fly Ash Pile and from existing monitoring wells and seeps/springs across Zone 1.

This work plan is part of DOE's current three-pronged effort at investigating groundwater sources and plumes across the ETTP (the other two projects being the K-31/K-33 Area groundwater project and the Main Plant Area groundwater project). The EPA also recognizes the considerable work that DOE has conducted prior to starting the groundwater work at ETTP, through actions taken to remove principal threat soils and sources. Completion of the remaining environmental assessment for surface water, aqueous-deposited sediment, and its possible effects on ecological receptors across ETTP will be addressed in the document titled *Remedial Investigation Work Plan for Remaining Ecology/Surface Water/Sediment at East Tennessee Technology Park, Oak Ridge, Tennessee*.

Comments specific to the Zone 1 Groundwater Plumes Remedial Investigation Work Plan are attached and must be resolved before a revised document is submitted.

Received 12/20/2021

If you have any questions or concerns regarding this matter or require additional information, then please contact me electronically at froede.carl@epa.gov.

Sincerely,

CARL FROEDE Digitally signed by CARL FROEDE Date: 2021.12.08 09:11:50 -05'00'

Carl R. Froede Jr.
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EPA Comments on the Zone 1 Groundwater Plumes Remedial Investigation Work Plan, East Tennessee Technology Park, Oak Ridge, Tennessee (DOE/OR/01-2903&D1)

General Comments

1. On February 27, 2019, the EPA approved the document *Supplemental Sampling and Analysis Plan for the ETTP Main Plant Groundwater Feasibility Study Well Installations at the East Tennessee Technology Park, Oak Ridge, Tennessee* (DOE/OR/01-2802&D2). This document included the installation of four new groundwater monitoring well pairs requested by TDEC. One of the well pairs (TDEC-01) is located in ETTP Zone 1 and was found to contain regulatory exceedances of trichloroethylene (TCE = 12 ppb in bedrock; 5 ppb in unconsolidated zone) and other contaminants. The DOE has presented this location as a TCE contaminanted monitoring well on several subsequent groundwater plume maps shared during project team meetings. However, it is not mentioned in this document. This location must be added for further groundwater contaminant characterization. Questions to be addressed include the location of the source, possible plume geometry, and its trajectory of movement.

2. In accordance with the EPA Guidance on Systematic Planning using the Data Quality Objective Process, (EPA/240/B-06/001) dated February 2006 (EPA QA/G-4), development of DQOs is a seven step process. These steps include the following: 1) State the Problem, 2) Identify the Goals of the Study, 3) Identify Information Inputs, 4) Define the Boundaries of the Study, 5) Develop the Analytic Approach, 6) Specify Performance or Acceptance Criteria, and 7) Develop the Plan for Obtaining Data. The Work Plan refers to EPA Data Quality Objectives Process for Hazardous Waste Site Investigations (EPA/600/R-00/007), dated January 2000 (EPA/600/R-00/007), which is outdated guidance for the development of DQOs. However, it appears the Work Plan partially follows the seven step DQO process. Revise the document DQOs consistent with the seven step process outlined in EPA QA/G-4.

3. Most of the transect lines that show the location of the site-specific cross-sections are not shown on any figures. For example, the cross-section transect line associated with Figure 4.35 (North-South cross section through the Contractor's Spoil Area) is not depicted on a figure. Revise the site-specific plan view figures to include transect line locations for all cross-sections.

4. The Work Plan states in several locations that groundwater will be analyzed for dissolved oxygen (DO) and oxidation reduction potential (ORP); however, these parameters should be measured in the field as soon as the sample is exposed to the environment since DO and ORP will change. Revise the Work Plan to state that DO and ORP will be measured in the field as soon as the sample is exposed to the environment.

5. Several acronyms and abbreviations are used throughout the document but are not defined the first time they are used. For example, "Chapter" is shortened to "Chap." in the Executive Summary (page ES-3, first paragraph) but is not defined the first time it is used. As another example, Table ES.1 (Summary of the proposed sampling approach to address the Zone 1 groundwater data gaps) includes several acronyms that are not defined at the bottom of the table, including, but not limited to, total dissolved solids (TDS), total organic carbon (TOC) and polychlorinated biphenyls (PCBs). Revise the Work Plan to define acronyms and abbreviations the first time they are used in the document and add to acronym table as appropriate.

Specific Comments

1. Executive Summary, Page ES-3, Second Paragraph: This paragraph states the Work Plan only addresses groundwater; however, this is inconsistent with the remainder of the Work Plan, which proposes surface water, sediment, and soil sampling. Revise this paragraph and document as necessary to acknowledge that soil, sediment, and surface water will also be sampled.

2. Executive Summary, Page ES-3: The Executive Summary indicates that Appendix C to the Work Plan is the Quality Assurance Project Plan. This is misleading since Appendix C is actually the U.S. EPA Region 4 Superfund Division Final Uniform Federal Policy SAP/QAPP Checklist. Revise the Executive Summary to clarify that Appendix C is the SAP/QAPP Checklist. Note that other references to Appendix C as containing the Quality Assurance Project Plan made throughout the document may also need to be revised.

3. Executive Summary, page ES-5. In the first paragraph of the K-770 Scrap Yard discussion, the text includes some wording with a smaller font size than the rest of the wording. Please correct.

4. Executive Summary, K-770 Scrap Yard, Page ES-6, First Paragraph, Last Sentence: The text states groundwater samples collected from the K-770 Scrap Yard will be analyzed for metals but does not mention filtering; however, according to Table ES.1, unfiltered and filtered samples will be submitted for metals analysis. Clarify if samples submitted for metals analysis will be filtered in the field, and revise the Work Plan accordingly.

5. Executive Summary, K-1070-F Construction Spoil Area, Page ES-7, Third Paragraph, Last Sentence: The text states that groundwater samples collected from the K-1070-F Construction Spoil Area will be analyzed for metals and does not mention filtering; however, according to Table ES.1, unfiltered and filtered samples will be submitted for metals analysis. Clarify if samples submitted for metals analysis will be filtered in the field, and revise the Work Plan accordingly.

6. Executive Summary, Contractor's Spoil Area, Page ES-8, Third Paragraph, Last Sentence: The text states groundwater samples collected from the Contractor's Spoil Area will be analyzed for metals, but does not mention filtering; however, according to Table ES.1, unfiltered and filtered samples will be submitted for metals analysis. Clarify if samples submitted for metals analysis will be filtered in the field, and revise the Work Plan accordingly.

7. Executive Summary, Blair Quarry, Page ES-9, First Paragraph, Last Sentence: The text states groundwater samples collected from Blair Quarry will be analyzed for metals, but does not mention filtering; however, according to Table ES.1, unfiltered and filtered samples will be submitted for metals analysis. Clarify if samples submitted for metals analysis will be filtered in the field, and revise the Work Plan accordingly.

8. Table ES.1, Summary of the proposed sampling approach to address the Zone 1 groundwater data gaps, Page ES-9; Table 6.1, Summary of the proposed sampling approach to address the Zone 1 groundwater data gaps, Pages 6-2 and 6-3; and Appendix B, Field Sampling Plan, Table B.3.1, Summary of the proposed sampling approach to address Zone 1 groundwater data gaps, Pages B-14 and B-15: Under the "Analytical Parameters" column, the horizontal lines that separate sampling locations make it difficult to determine what analyses are required for each sampling location. For example, at the

K-770 Scrap Yard, it appears that monitoring well UNW-015 will only be sampled for radiological parameters. However, this is not the case as UNW-015 will also be sampled for metals. EPA recommends removing the horizontal lines located between sample locations to avoid confusion.

9. Table ES.1, Summary of the proposed sampling approach to address the Zone 1 groundwater data gaps, Page ES-9, K-720 Fly Ash Pile: According to the text of the Executive Summary, monitoring wells at the K-720 Fly Ash Pile site will be sampled for alkalinity; however, alkalinity is missing from the Analytical Parameters column. Add alkalinity to the Analytical Parameters column.

10. Table ES.1, Summary of the proposed sampling approach to address the Zone 1 groundwater data gaps Page ES-10, Blair Quarry: The "Number of samples" column of the Blair Quarry states that four samples will be collected if a spring is identified; however, this is not mentioned in the text of the Executive Summary. Add this information regarding the possible presence of a spring in Blair Quarry to the description in the text.

11. Table ES.1, Summary of the proposed sampling approach to address the Zone 1 groundwater data gaps Page ES-10: The table lists metals analysis; however, specific metals analytes are not listed in footnotes at the bottom of the table. Include the list of the metals analytes proposed for analysis in the table footnotes.

12. Section 1.2 ORR REMEDIATION PROGRAM, first paragraph, p. 1-4. The last sentence of the paragragh states:

> The final annual sampling event will be conducted in Quarter 2 of FY 2021; **a final report** will summarize the results. [Bold and underlining added]

The DOE-ORR Federal Facility Agreement lists "Remedial Site Evaluation Reports" as primary documents to be reviewed and approved by the regulators. Please clarify this within the context of this sentence and elsewhere as necessary.

13. Section 1.2 ORR REMEDIATION PROGRAM, third paragraph, p. 1-4. The text states:

> Quarterly sampling begins in Quarter 1 of FY 2022 (Fall 2021).

Please indicate when the *Phase 1 Melton Valley/Bethel Valley Exit Pathway RI Report* will be issued with the first round of data results. The originating document is an FFA primary document.

14. Section 1.3, Facility-Specific Remediation Program, Page 1-5, First Bullet, and Section 4.2.7, Blair Quarry, Page 4-53: The text states that 12,733 cubic yards of soil were removed from the Blair Quarry; however, text in Section 4.2.7 indicates that an additional 45 cubic yards of soil was removed and a two-foot cap was installed at Blair Quarry. Revise the text on Page 1-5 or Page 4-53 to consistently describe the remedial activities conducted (including quantities of soil removed) at Blair Quarry.

15. Section 1.3, Facility-Specific Remediation Program, Page 1-5, Fourth Bullet, and Section 4.2.3, K-1085 Old Firehouse Burn/J.A. Jones Maintenance Area, Page 4-17: The text states that soil in the K-1085 Old Firehouse Burn Area was excavated to a depth of eight feet, and removed soil was reused as backfill; however, the text in Section 4.2.3 states that the excavation was seven feet deep and was backfilled with clean fill. Revise the Work Plan to resolve this discrepancy.

16. Section 1.3, Facility-Specific Remediation Program, Page 1-8, Eighth Bullet: The text states that at the K-770 Scrap Yard, 66,800 cubic yards of soil were removed during the remedial action; however, it

does not mention that 48,100 tons of waste materials were also removed. Revise the text in Section 1.3 to clarify the amount of waste materials that were removed during the remedial action.

17. Section 1.4, Intent and Scope of the RIWP, Page 1-10, Second Paragraph: The text cites an annotated outline written as a guide for Remedial Investigation Work Plans (RIWPs); however, this guide is not included in the reference section. Include a reference to the guide that is cited in the text.

18. Section 1.7, Data Quality Objectives, Page 1-14, First Paragraph: The text refers to an EPA guidance for developing DQOs; however, this guidance is dated January 2000 (EPA/600/R-00/007), which is not the most current guidance for developing DQOs. The current EPA guidance for deriving DQOs is dated February 2006 (EPA QA/G-4). Revise the Work Plan to indicate that DQOs will be developed in accordance with EPA QA/G-4. Alternatively, revise the Work Plan to include the rationale for using older guidance to develop DQOs.

19. Section 1.7, Data Quality Objectives, Page 1-14, Last Paragraph: The text states that a Sampling and Analysis Plan (SAP) was prepared and is included as Appendix B; however, Appendix B contains the Field Sampling Plane (FSP). Revise the text to refer to the FSP, rather than a SAP.

20. Section 3.2, Climate, Page 3-3, First Paragraph, and Figure 3-2, Mean annual rainfall from five rain gauges in the ORR area, FY 2001−2020, Page 3-3: Section 3.2 states that Figure 3-2 shows the average rainfall collected from four rain gauge stations throughout the Oak Ridge Reservation (ORR); however, Figure 3.2 indicates that five rain gauges were used. Revise the Work Plan to resolve this discrepancy.

21. Section 3.3, Demography, Page 3-3, First Paragraph: The text states that a buffer zone surrounds the East Tennessee Technology Park (ETTP), but no specific buffer distance is discussed. Revise the Work Plan to specify the buffer zone distance in the text.

22. Section 3.5, Geology and Soils, Page 3-5, Second Paragraph, and Figure 3.3, Geology of the Zone 1 Area at ETTP, Page 3-7: The text states that the Rome Formation is present in the southernmost portion of Zone 1; however, according to Figure 3.3, the Conasauga Group is situated in the southernmost portion of Zone 1. Update the text, and include a discussion of the Conasauga Group in the applicable sections of the text.

23. Section 3.5, Geology and Soils, Page 3-5, Last Paragraph: The discussion of the geology of the area incorrectly refers to the mean average rainfall data figure (Figure 3.2); however, the correct reference is Figure 3.3. Revise the text to refer to the correct figure (Figure 3.3).

24. Section 3.6, Radiological Survey, Page 3-11: This section is vague and does not appear relevant since radiological surveys are not planned for this remedial investigation. Provide more details regarding the previous radiological surveys conducted at the site, include a reason why this information is relevant to the Work Plan or remove this discussion.

25. Section 3.7, Groundwater, Page 3-11, Fourth Paragraph: This paragraph asserts that primary groundwater flow in carbonates is along downward dipping bedding planes, but no site-specific examples or citations are provided to support this statement. Revise the text to provide an example at the site where this groundwater migration mechanism has been observed.

26. Section 3.7, Groundwater, Page 3-13, Second Paragraph: This paragraph refers to a site-wide groundwater contour map (Figure 3.5) but does not explain how the map was generated. For example, it is unclear if the groundwater contours are interpreted based on topography or if groundwater level data was used. Provide a discussion for how Figure 3.5 was generated.

27. Figure 3.5, Generalized potentiometric surface for Zone 1, Page 3-13; Figure 4.30, TCE concentrations in the unconsolidated zone at the K-1070-A Burial Ground, Page 4-43; and Figure 4.31, TCE concentrations in bedrock at the K-1070-A Burial Ground, Page 4-44: The groundwater flow direction at the K-1070-A Burial Ground depicted on Figure 3.5 is inconsistent with Figures 4.30 and 4.31, and the flow direction arrow depicted next to the K-1070-A Burial Ground plume on Figure 3.5 is not perpendicular to groundwater contours. Revise the groundwater contours on Figure 3.5 to more accurately represent the groundwater flow direction(s) at the K-1070-A Burial Ground.

28. Section 3.7, Groundwater, Page 3-15, Second Paragraph: A discussion of a dye test is included in this paragraph; however, specific wells that were included in the dye test are not mentioned. Revise the text to list which wells were used during the dye test.

29. Section 3.8, Surface Water and Sediments, Pages 3-15 to 3-18: The title of this section implies a discussion about sediment in Zone 1; however, there is only one sentence about sediment. Revise this section to provide a brief description of sediments that are present in Zone 1, including information about thickness, composition, and presence of contamination.

30. Section 3.9, Ecology, Page 3-19, First Paragraph: This paragraph discusses flood zones located in Zone 1; however, the text does not discuss whether any sites are located within a flood zone. Based on Figure 3.7, the K-770 Scrap Yard and K-720 Fly Ash Pile are located in flood zones. Revise the text to discuss that these two sites are located in a flood zone and the ramifications of flooding on each site.

31. Figure 4.3, Hydrogeology of the K-770 Area, Page 4-5, and Figure 6.1, Proposed groundwater sampling and new well installation locations for the K-770 Scrap Yard, Page 6-2: The majority of groundwater contours located in the southwest, northeast, and east portions of the site appear to be inferred based on topography. For example, at the K-770 Scrap Yard, there are no monitoring wells to the southwest of UNP-010, east of UNP-016, and north or east of UNW-012. Therefore, these contours should be dashed because they are not supported by groundwater elevation data. Revise the figure to dash interpreted groundwater contours.

32. Figure 4.11, Potentiometric map of the K-720 Fly Ash Pile Page 4-16: The groundwater contours located in the northeast, southeast, and southwest corners of the K-720 Fly Ash Pile appear to be inferred based on topography. For example, there are no monitoring wells to the southwest of UNW-170, east of UNW-166, northeast of UNW-172, and southeast of UNW-167. Therefore, these contours should be dashed since they are not supported by groundwater level data. Revise the figure to dash interpreted groundwater contours.

33. Figure 4.11, Potentiometric map of the K-720 Fly Ash Pile, Page 4-16: According to the groundwater elevation contours, the groundwater elevation of UNW-167 should be between 744 feet and 745 feet; however, the posted groundwater elevations are 743.92 and 742.86 feet. Revise the contours to reflect the posted elevations.

34. Section 4.2.3, K-1085 Firehouse Burn/J.A. Jones Maintenance Area, Page 4-17, and Figure 4.18, Location of the K-1085 Old Firehouse Burn Area, Page 4-24: According to Figure 4.18 and Page ES-6 of the Executive Summary, a soil removal action was conducted at the K-1085 Old Firehouse Burn Area in 2021; however, it is not discussed in Section 4.2.3. Revise the text to discuss the 2021 soil removal action.

35. Figure 4.22, Concentrations of TCE at K-1085 Old Firehouse Burn Area, Page 4-29: It appears the groundwater flow direction arrows are inferred based on topography. Indicate on the figure that groundwater flow directions are based on topography, or revise the figure to include actual groundwater elevation-based contours.

36. Figure 4.22, Concentrations of TCE at K-1085 Old Firehouse Burn Area, Page 4-29; Figure 6.3, Proposed well locations at the K-1085 Old Firehouse Burn Area, Page 6-3; and Figure B.3.3, Proposed groundwater sample and new well locations at the K-1085 Old Firehouse Burn Area, Page B-19: There is no data to support the plume boundary to the southeast of UNW-135, north of BRW-118, and southeast of BRW-118. Revise these figures to indicate that these plume boundaries are inferred or, alternatively, provide data to support the existing plume boundary designation.

37. Section 4.2.4, K-1070-F Construction Spoil Area, Page 4-30, Second Paragraph: This paragraph states that a groundwater divide is located on Duct Island; however, there is no groundwater level data to support this statement. Revise the Work Plan to include a rationale for the presence of the groundwater divide that is discussed in the text.

38. Section 4.2.4, page 4-31. The text refers to apparent groundwater contamination by bis (2-ethylhexyl) phthalate in the K-1070-F area as a sampling artifact apparently because of the belief that this contaminant would not migrate through the soil to contaminate groundwater and/or its apparent presence as a ubiquitous contaminant in the 1990s. It is disconcerting that bis (2-ethylhexyl) phthalate was apparently detected in samples from multiple wells in the K-1070-F area on at least two occasions and then apparently dropped from monitoring (Table 4.5). The presence of this compound in samples from multiple wells on multiple occasions in concentrations well above the MCL for the contaminant must be addressed. The DOE will need to check the data and resample the monitoring wells if this contamination is present and determine if there remains an ongoing source of contamination to groundwater at the K-1070-F area. An investigation of this plume is necessary if the contaminant levels occur above regulated levels.

39. Figure 4.23, K-1070-F Construction Spoil Area, Page 4-33: It appears the groundwater flow direction arrows on this figure were inferred based on topography. Revise the Work Plant to explain how the groundwater flow direction arrows were derived, and if they were inferred by topography, indicate that on the figure.

40. Figure 4.25, Cross section A-A' in the K-1070-F Area, Page 4-35, and Figure 4.26, Cross section B-B' in the K-1070-F Area, Page 4-36: The text in Section 4.2.4 indicates a soil cover was placed on five acres of the site; however, this soil cover is not indicated in the cross-sections. Include the location and thickness of the soil cover in the cross-sections, if known.

41. Section 4.2.5, Former K-1070-A Burial Ground, Page 4-38, Second Paragraph, Last Sentence: The text states that groundwater flow in bedrock is down dip and along the strike; however, no other details

are provided. Provide the strike direction and dip angle to which the text refers.
42. Figure 4.29, Location of the K-1070-A Burial Ground, Page 4-42: It appears the groundwater flow direction arrows are inferred by topography. Revise the text to discuss how the groundwater flow direction arrows were derived, and if they were inferred by topography, indicate on the figure.

43. Figure 4.30, TCE concentrations in the unconsolidated zone at the K-1070 Burial Ground, Page 4-43; Figure 4.31, TCE concentrations in bedrock at the K-1070 Burial Ground, Page 4-44; Figure B.3.5, Proposed unconsolidated zone wells at the K-1070-A Burial Ground, Page B-24; and Figure B.3.6, Proposed bedrock wells at the K-1070-A Burial Ground, Page B-25: Portions of the plume boundary are not supported by analytical data and should be dashed. For example, there are no wells northwest of BRW-21, so the northwest boundary is inferred. Revise these figures to indicate where the plume boundaries were inferred.

44. Figure 4.30, TCE concentrations in the unconsolidated zone at the K-1070 Burial Ground, Page 4-43; Figure 4.31, TCE concentrations in bedrock at the K-1070 Burial Ground, Page 4-44; Figure B.3.5, Proposed unconsolidated zone wells at the K-1070-A Burial Ground, Page B-24; and Figure B.3.6, Proposed bedrock wells at the K-1070-A Burial Ground, Page B-25: Groundwater contours for these figures are identical, and it is unclear if both bedrock and unconsolidated zone groundwater elevations were combined to generate the groundwater contours, which is not appropriate. Figures 4.30 and B.3.5 should depict groundwater contours for the unconsolidated aquifer, and Figures 4.31 and B.3.6 should include groundwater contours associated with the bedrock aquifer. Revise these figures accordingly.

45. Figure 4.32, Cross section of the K-1070-A Burial Ground, Page 4-45: This cross-section appears incomplete as the unconsolidated zone is not hatched and was not identified in the legend. Revise the figure to hatch the unconsolidated zone and define this symbol in the legend.

46. Section 4.2.6, Contractor's Spoil Area, Page 4-47: The text mentions that the Contractor's Spoil Area is 15-acres and soil cover was present over most of the site; however, it is unclear how much of the site has a cover. Revise the text to discuss how much of the site is covered with a soil cap, and indicate this area on the figures associated with the Contractor's Spoil Area.

47. Figure 4.34, Contractor's Spoil Area, Page 4-49: It appears the groundwater flow direction arrows were inferred based on topography. Revise the text to explain how the groundwater flow direction arrows were derived, and if they are inferred by topography, indicate that on the figure.

48. Section 4.3, Site-Related Chemicals, Page 4-60, First Paragraph: The text incorrectly refers to Table 4.6 as the table showing primary groundwater contaminants detected. Table 4.6 includes the Mann-Kendall trend analysis for wells at the K-1070-A Burial ground site. Update the text to refer to the correct table.

49. Section 6.1, Data Quality Objectives, Page 6-1, Second Paragraph, Second Sentence: The text states that the DQO workshop meeting minutes are presented in Appendix A; however, only the meeting slides are presented in Appendix A. Include the meeting minutes with signed attendance sheets, or revise the text to acknowledge that no meeting minutes were produced during the DQO meetings.

50. Section 6.1, Data Quality Objectives, Page 6-1, Second Paragraph, Third Sentence: The text identifies the seven-step process required for development of DQOs; however, the steps are not listed or discussed. List and discuss the seven steps in the text and state if all seven steps were followed for each

site. Completion of this should include a table for each site listing the seven steps.
51. Section 6.2, Characterization Activities, Page 6-1, Second Paragraph, First Sentence: The text states that the outcome of the DQO meetings were used to develop the proposed field activities described in Sections 6.2.1 to 6.2.7; however, there are no meeting minutes to corroborate this statement. Provide the meeting minutes to support this statement or revise to provide justification of the statement.

52. Figure 6.1, Proposed groundwater sampling and new well installation locations for the K-770 Scrap Yard, Page 6-2, and Figure B.3.1, Proposed groundwater sampling and new well installation locations for the K-770 Scrap Yard, Page B-16: The proposed well network at the K-770 Scrap Yard does not provide adequate spatial coverage as the proposed wells are orientated in a north-south line, and per the DQO meeting slides (Page A-9), it is unclear if any proposed locations are situated at a soil hotspot. Consider moving the well couplet east of UW-014 approximately 250 feet to the east-northeast to provide better spatial distribution, or add an additional well pair in this location.

53. Figure 6.1, Proposed groundwater sampling and new well installation locations for the K-770 Scrap Yard, Page 6-2: There is limited groundwater quality data for the unconsolidated zone and the bedrock zone up-gradient from the K-770 Scrap Yard Area. Preferably, a well couplet should be installed in the borrow area (see Figure 4-1) since contaminated fill may have been deposited in this area when the borrow area was likely filled. To evaluate this data gap, consider installing a well couplet up-gradient of the K-770 Scrap Yard Area.

54. Table 6.1, page 6-3. The table needs reformatting to unambiguously indicate the monitoring that is intended. The dashed horizontal lines extending across the table could be interpreted as proposing to sample the wells or springs listed in the second column for the constituents inside the dashed lines that extend across the page from the second column sample location information to the third or the fourth table columns. For example, for the K-1085 Firehouse Burn Area sample locations, the table could be interpreted as proposing to only sample UNW-135 for VOCs, only sample BRW-118 for metals, only sample Spring 247 for PFOS/PFAS, and so forth.

55. Table 6.1, page 6-3. Proposed well K1085-UNC-01 may need to be slightly deeper as the proposed unconsolidated well design (20 feet total depth per Table 6.1 with a proposed 10-foot screen per Section 6.3.1 text) appears to place the upper one half to one third of the well screen above the high water level elevation for nearby bedrock well BRW-118 with an undefined (likely downward, but perhaps small to nonexistent) vertical hydraulic gradient in a silty clay. This finegrained texture could have associated significant water-level drawdown if the proposed well pumped at anything more than an extremely low rate.

56. Section 6.2.3 page 6-7. The last paragraph of Section 6.2.3 should state what constituents are proposed for monitoring at the surface water location.

57. Figure 6.2, Proposed groundwater sampling locations for the K-720 Fly Ash Pile, Page 6-8: Based on the detection of arsenic above maximum contaminant levels (MCLs) in monitoring well UNW-073, groundwater impacted with arsenic may be discharging into the K-720 Slough. Consider adding a surface water sampling location in the K-720 Slough immediately down-gradient of well UNW-073 to evaluate if surface water has been impacted by arsenic in groundwater.

58. Figure 6.3, Proposed well locations at the K-1085 Old Firehouse Burn Area, Page 6-9, and Figure B.3.3, Proposed groundwater sample and new well locations at the K-1085 Old Firehouse Burn Area,

Page B-19: The proposed monitoring well locations will not fully define the plume, and the extent of elevated trichloroethene (TCE) in monitoring well UNW-035 will not be delineated; therefore, consider the following changes to the program:

a) Install a consolidated zone well approximately 250 to 300 feet east-southeast of UNW-135 to bound the plume extent to the east.

b) Install a bedrock well between UNW-035 and UNW-134 to determine if TCE-impacted groundwater is migrating along a preferential pathway in bedrock upward in the area of UNW-035.

c) Install a consolidated zone well down-gradient of UNW-035 to determine the potential for TCE-impacted groundwater to discharge into the unlabeled water body to the north.

Additionally, the proposed surface water sample in Beaver Dam Pond appears too far away from shore, which would make it logistically hard to collect the sample, and surface water in this area is likely diluted. Consider moving the sampling location to the northeast, adjacent to the shoreline.

59. Figure 6.3, page 6-9; Figure 6.4, page 6-11; Figure 6-5, page 6-12; Figure 6-6, page 6-13; Figure 6-8, page 6-15; Figure 6.9, page 6-17. These figures showing proposed well locations should show the proposed new well IDs on the figures so the well locations shown on the figures can be readily connected to the well descriptions provided in Work Plan Table 6.1.

60. Figure 6.3, page 6-9/Section 6.2.3 page 6-7. The figure shows a surface water sampling location to the southwest of one of the proposed new unconsolidated wells near one of the beaver ponds. This surface water location does not appear on Figure 4.18 and is presumably the sample location mentioned in Section 6.2.3. That section should note that the proposed surface water sampling location is shown on Figure 6.3.

61. Section 6.2.5, page 6-10. A wording correction is needed in the first sentence of the first paragraph of Section 6.2.5.

62. Section 6.2.5, page 6-10. The second paragraph of Section 6.2.5 should provide details about the proposed soil sampling (number of samples with proposed sample depths and/or procedure for targeting depth intervals for the sample collection).

63. Section 6.2.6, page 6-10. The first sentence of the first paragraph of Section 6.2.6 states in part "…a surface water sample will be collected from the seepage area of the intermittent drainage at the toe of the slope (N LNDFLTOE) of the CSA (Fig. 6.8)…" The figure should be corrected to show this proposed sample location.

64. Figure 6.4, Proposed well locations for K-1070 Construction Spoil Area, Page 6-11, and Figure B.3.4, Proposed groundwater sample and new well installation locations for K-1070-F Construction Spoil Area, Page B-22: The text states that the K-900 bottle smasher was used to crush bottles containing organic chemicals, suggesting this area could be a potential source of TCE; however, the area around the bottle smasher is not being investigated as part of the Work Plan. Consider installing a monitoring well adjacent to the former bottle smasher to evaluate if it is a potential source of contamination.

65. Figure 6.5, Proposed unconsolidated zone wells at the K-1070-A Burial Ground, Page 6-12: Figure 6.5 identifies the locations of two proposed consolidated zone wells at the K-1070-A Burial Ground, which are located immediately to the north and east of UNW-130; however, the horizontal extent of the plume will still not be defined. Consider installing three wells to the west of the depicted plume boundary, one well to the east of UNW-031, one well south of seep 21-002, and one well east of the seep to define the horizontal extent of the plume in the consolidated zone.

66. Figure 6.6, Proposed bedrock wells at the K-1070-A Burial Ground, Page 6-13: Figure 6.6 shows the location of existing bedrock zone wells and two proposed bedrock zone wells at the K-1070-A Burial Ground, which are located on the western boundary of the plume and in the core of the plume; however, the horizontal extent of the plume is not well defined. Consider installing one well to the east of the plume core (east of BRW-025), one well west of BRW-117, and one well south of seep 21-002 to better define the horizontal extent of the plume in bedrock.

67. Figure 6.8, Proposed sample locations at the Contractor's Spoil Area, Page 6-15, and Figure B.3.8, Proposed groundwater sampling and new well locations at the Contractor's Spoil Area, Page B-27: The objective of the Contractor's Spoil Area investigation is to evaluate if TCE has impacted the bedrock aquifer at the site, and if TCE is migrating to seep 10-895; however, the locations of the proposed wells do not address these objectives because only two wells are located within the Contractor's Spoil Area, and no wells are proposed between the Contractor's Spoil Area and seep 10-895. Consider moving the western well approximately 400 feet east and the southern well 100 feet north so they are located within the Contractor's Spoil Area, and consider installing a fifth bedrock well between the Contractor's Spoil Area and seep 10-895.

68. Figure 6.8, Proposed sample locations at the Contractor's Spoil Area, Page 6-15: A planned activity for the Contractor's Spoil Area is to collect a seep sample at the toe of the landfill; however, this seep location is not shown on Figure 6.8. Include the landfill toe seep location on Figure 6.8.

69. Figure 6.9, Proposed new well location at Blair Quarry, Page 6-17: Installing and sampling one bedrock well at the Blair Quarry will not be sufficient to assess the nature and extent of potential contamination associated with Blair Quarry. Groundwater is present in bedrock, and the existence of several fault traces in the vicinity of the quarry suggests that groundwater flow is complex. Consider installing one bedrock monitoring well up-gradient, one bedrock monitoring well down-gradient, and two bedrock wells cross-gradient of the quarry to develop a well configuration that can be used to generate groundwater elevation contours to assess groundwater flow directions in the vicinity of Blair Quarry.

70. Section 7, page 7-1 and 7-2. In the references section, there are several entries incorrectly identifying parts of 40 CFR as being parts of 400 CFR.

71. Appendix B, Field Sampling Plan, Table B.3.1, Summary of the proposed sampling approach to address the Zone 1 groundwater data gaps, Page B-15, and Table B.4.2, Proposed analyte list for Zone 1 groundwater samples, Page B-38: Ethane is listed twice at the bottom of each table (e.g., footnote "e" for Table B.3.1, and footnote "b" for Table 4.2), and it appears ethene has been omitted. Replace one incidence of ethane with ethene.

72. Appendix B, Field Sampling Plan, Section B.3.2, Data Quality Objectives for the Supplemental Sampling, Page B-28: This section states that supplemental sampling will focus on answering questions identified through team meetings and follow-on correspondences with the EPA and the TDEC; however, none of these questions were identified in the Work Plan. Include the meeting minutes and correspondence, or provide a summary of the questions that were identified by EPA and TDEC.

73. Appendix B, Field Sampling Plan, Section B.3.2, Data Quality Objectives for the Supplemental Sampling, Page B-28, Final Sentence: This sentence states that Table B.3.3 summarizes the focused DQO effort; however, Table B.3.3 is a summary of containers, preservation, and holding time requirements. Revise the FSP to cite the table that summarizes the DQOs.

74. Appendix B, Field Sampling Plan, Table B.3.3, Container, Preservation, and Holding Time Requirements for Zone 1 Samples, Page B-31: The table indicates that the holding time for phosphate is 48 hours; however, phosphate is not mentioned anywhere else in the document. Correct as necessary.

75. Appendix B, Field Sampling Plan, Table B.3.3, Container, Preservation, and Holding Time Requirements for Zone 1 Samples, Pages B-31 and B-32: The preservation requirement for volatile organic compounds (VOCs) in soil and groundwater is listed as <6° Celsius; however, per EPA Method 8260, soil samples for VOC analysis should also be preserved with methanol, and groundwater samples should also be preserved with hydrochloric acid. Correct the preservation requirements for VOCs. Additionally, low-level VOCs should be preserved with sodium bicarbonate, which should also be included in the table.

76. Appendix B, Field Sampling Plan, Table B.3.3, Container, Preservation, and Holding Time Requirements for Zone 1 Samples, Pages B-31 and B-32: The table indicates the bottle requirement for monitored natural attenuation (MNA) parameters as a one-liter high-density polyethylene (HDPE) bottle with no preservation; however, the analytical method used for methane, ethane, and ethene requires three 40-mililiter bottles. Correct the table to include the proper bottle requirements for MNA parameters.

77. Appendix B, Field Sampling Plan, Table B.3.3, Container, Preservation, and Holding Time Requirements for Zone 1 Samples, Pages B-31 to B-33: This table indicates that the holding time for monitored natural attenuation (MNA) parameters, including ferrous iron, is 14 days (7 days for sulfide); however, according to Method SM3500-Fe-D, the holding time for ferrous iron is 24-hours. Revise Table B.3.3 to include the holding time of 24-hours for samples analyzed for ferrous iron.

78. Appendix B, Field Sampling Plan, Table B.3.3, Container, Preservation, and Holding Time Requirements for Zone 1 Samples, Pages B-31 to B-33: Groundwater samples collected from the K-720 Fly Ash Pile will also be analyzed for alkalinity, but the table does not list this analysis. Include alkalinity as an analyte for the K-720 Fly Ash Pile and specify the sample container, preservation, and holding time requirements.

79. Appendix B, Field Sampling Plan, Table B.3.3, Container, Preservation, and Holding Time Requirements for Zone 1 Samples, Page B-33: The anions analyte list is missing nitrite. Revise Table B.3.3 to include nitrite.

80. Appendix B, Field Sampling Plan, Section B.4.1.1, Soil Boring and Sampling, Page B-34, First Paragraph: The text states that soil zones with elevated photoionization detector (PID) results will be collected for VOC analyses; however, a PID result that is considered elevated has not been defined in the text. Include a definitive PID result that is considered elevated.

81. Appendix B, Field Sampling Plan, Section B.4.1.1, Soil Boring and Sampling, Page B-34, Second Paragraph: The text states that for samples submitted for VOC analysis, 50 to 80 grams of soil will be placed in a 250-milliliter bottle preserved with 100 milliliters of methanol; however, this is inconsistent with Table B.3.3, which states that five grams of soil will be collected using an Encore® sampler or equivalent. Revise the VOC sampling methodology to include use of the Encore® sampler.

82. Appendix B, Field Sampling Plan, Section B.4.2.1, Sampling of Wells, Page B-36, First Paragraph: Dedicated pumps will be installed in each well completed during the program; however, determination of the pump placement depth is not discussed. Typically, pumps are installed at the midpoint of the well screen, but this may vary depending on the static water level and/or hydraulic conductivity. Revise the text to specify the depth where the pumps will be installed and why.

83. Appendix B, Field Sampling Plan, Section B.4.2.1, Sampling of Wells, Page B-37, and Section B.5.1.1, Sampling of Wells, Page B-45, Second Paragraph: The text states that groundwater samples will be collected after stabilization is achieved; however, stabilization criteria are not discussed in the text. Revise the text to specify the required stabilization criteria.

84. Appendix B, Field Sampling Plan, Section B.4.2.2, Analytical Parameters, Page B-37, Second Paragraph, and Table B.4.2, Proposed analyte list for Zone 1 groundwater samples, Page B-38: The text states that groundwater samples collected from the K-1085 Old Firehouse Burn Area will be analyzed for PFAS; however, groundwater collected at the Blair Quarry will also be analyzed for PFAS, but this is not discussed in the text or in Table B.4.2. Revise the text and Table B.4.2 to include Blair Quarry in the discussion of PFAS sampling.

85. Appendix B, Field Sampling Plan, Table B.4.2, Proposed analyte list for Zone 1 groundwater samples, Page B-38: It appears that several analytical methods are missing from the table. For example, there is no analytical method listed for mercury or sulfur. Include analytical methods for these analytes.

86. Appendix B, Field Sampling Plan, Section B4.2.3.2, QC Trip Blank Samples, Page B-39, and Section B.5.1.3.2, Quality Control Trip Blank Samples, Page B-46: The text states one trip blank will accompany each cooler with samples collected for VOCs and PFAS analysis; however, the bottle requirements for these analyses are different. Indicate that two separate trip blanks will be required for VOCs and PFAS analysis and specify the required container type for each.

87. Appendix B, Field Sampling Plan, Section B4.2.4.4, Well Development, Page B-41: The text states that well development will be complete when the water column is free of sediment and field parameters have stabilized; however, no stabilization criteria are discussed. Revise the text to specify the stabilization criteria for well development.

88. Appendix B, Field Sampling Plan, Table B.5.1, Detailed analyte list, analytical methods, and reporting requirements for Zone 1 groundwater samples, Pages B-47 to B-50: This table includes a detailed analyte list, analytical methods, and reporting limits for groundwater samples; however, several

analytical parameters are missing, including MNA parameters, anions, TDS, TOC, and alkalinity. Revise Table B.5.1 to include these missing analytical parameters.

89. Appendix B, Section B.5., pages B-47 through B-50. Table B.5.1 needs to note that the holding times are in units of days.

MINOR COMMENTS

1. On several pages of the Work Plan, the page numbers are shown in the left margin of the page, rather than the bottom margin (e.g., Page 3-12). For consistency, show all page numbers in the bottom margin.

2. Tables and figures are embedded in the document, and in many cases, their placement does not correspond to the associated text, which makes it difficult for the reader to follow. For example, Table 4.1 is discussed in Section 4.2.1, but the table is included in Section 4.2.2. Consider arranging the tables and figures at the end of each section in which they are introduced, or move them to follow the text.

(End of Comments)