THE MEMPHIS DEPOT
TENNESSEE

ADMINISTRATIVE RECORD
COVER SHEET

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DEFENSE LOGISTICS AGENCY
DEFENSE DISTRIBUTION DEPOT MEMPHIS
2163 AIRWAYS BOULEVARD
MEMPHIS, TENNESSEE 38114-5210

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IN REPLY REFER TO DDMT-DE

July 18, 1995

SUBJECT: Response to EPA's, TDEC's, and Corps Huntsville's Comments on DDMT's Draft Final OU-1, 2, 3 & 4 and Screening Sites Field Sampling Plans and Generic Health and Safety Plan

TO: Mr. Joseph R. Franzmathes, Director
Waste Management Division
U.S. Environmental Protection Agency
345 Courtland Street, NE
Atlanta, GA 30365

Dear Mr. Franzmathes:

1. I submit herewith three copies each of our responses for your review. Consistent with the schedule conceived during our June 1995 RPM meeting, we plan to resolve all comments no later than July 25, 1995. It is my understanding that we three RPMs have agreed to finalize the documents' text on or before that date. Should you note any necessary changes, your immediate phone call, fax or letter will enhance plan execution.

2. Should you have questions or require additional information, please contact me at 901-775-6372.

Frank Novitzki

FRANK NOVITZKI
DDMT Project Manager

cc:
TDEC, Jordan English
DDRE-WP
DDMT-D
CEHND-PM-MD, John Romeo
ME3, Sue Estes

Response to Comments

Contents

Section 1
Response to EPA/TDEC/Mid South Peace and Justice Comments on OUs-1, 2, 3, and 4 FSPs

Operable Unit 1 Field Sampling Plan, March 1995

EPA Comments

1. A table listing which sites have been moved into the "Early Removal" stage would be useful.

DDMT Response:

Table 1-1, found on pages 1-3 through 1-6, lists the "Current Disposition" of each site within OU-1, including sites proposed for early removal. Therefore, no changes are proposed to the text.

The following additional changes will be made to the document:

1) Table 1-1, page 1-4, Site 8, the word "site" will be written as "Site."
2) Table 1-1, page 1-4, Site 13, the compound "AL2SO4" will be written as "Al_2SO_4."

Mid-South Peace and Justice Comments

Water samples should be taken from existing wells, including wells MW 33, 32, 35, and 37, which are apparently located off the facility but in line with the plume direction. Some surface samples also should be taken. These wells should be considered as part of OU-1 in light of the data they can offer and their proximity to the nearby residents.

DDMT Response:

Monitoring wells 32, 33, 35, and 37 will be sampled as part of the overall groundwater investigation. This investigation is presented in detail in Section 4 of the OU-4 field sampling plan (FSP). Furthermore, during the installation of the proposed monitoring wells located west of Dunn Field (presented in Section 4 of the OU-4 FSP), soil samples will be collected and chemically analyzed. Therefore, the concerns presented above are addressed as part of the OU-4 FSP. No changes to the OU-1 FSP text are proposed.

Additionally, to provide cross referencing and to clarify possible confusion between the OU FSPs, a paragraph will be added to the OU-1, 2, and 3 FSPs explaining that the overall groundwater strategy is found in the OU-4 FSP, Section 4.

Operable Unit 2 Field Sampling Plan, March 1995

EPA Comments

1. A table listing which sites have been moved into the "Early Removal" stage would be useful.

DDMT Response:

Table 1-1, found on page 1-3, has a column that lists "Document Addressing Future Work" for each site within OU-2, including the sites proposed for early removal. Therefore, no changes are proposed to the text.

Mid-South Peace and Justice Comments

Metal Shop Area

Delete the words "or if contamination found in wells located in the vicinity of a site cannot be attributed to off site sources." (Executive Summary, page iv, last line) The overlap in materials stored and used by off site companies and the Depot facility would make this determination very difficult and arbitrary at best. Regardless of the suspected source of contamination, information regarding the extent of contamination needs to be known. The installation of down gradient monitoring wells should not be dependent on the suspected source of the material.

OU-2 also has a gap in the data provided by the Law Environmental study. They did not test the area nearest the large drainage ditch which drains nearly 2/3 of the Depot's surface area. This needs to be done.

DDMT Response:

The intent of a Remedial Investigation is to assess whether contamination is present (and to what extent) as a result of past practices or activities conducted by the facility. The DDMT facility believes that their activities have been limited to within their boundaries; therefore, they are responsible for contamination within their boundaries (unless contamination offsite is directly attributable to contaminants from the facility). Contaminants that are upgradient from an investigation site and are outside of the facility boundary (such as those resulting from offsite companies) are not within the scope of this investigation. The approach to using upgradient and downgradient wells is an accepted technical approach to assess the source of contaminants.

The intent of the last sentence on page iv is to indicate that DDMT is accepting responsibility for contamination that cannot be attributed to other sources, and will pursue the investigation further when data indicate that DDMT may be the source. The last line will be modified to read:

". . . found in wells located in the vicinity of a DDMT site that may be a source. Contaminants from potential offsite sources will be assessed as part of the sitewide approach for groundwater investigation."

The ditch that conveys the majority of the storm water from the facility is listed as a "Screening Site" (Site 56) and is discussed in the Screening Sites FSP in Section 4.4.9. It will be investigated as a potential source of contamination.

Operable Unit 3 Field Sampling Plan, March 1995

EPA Comments

1. Page 4-5, Section 4.2.6, Site 25: It is EPA's understanding that the reason for investigating Area A is to attempt to determine whether runoff from this area is/has adversely affected the Golf Course Pond. Given the fact that six surface soil samples will be composited into one from each section of Area A, EPA is concerned that contaminants may be diluted down to levels below that which will be detected by the Level 2 field screening techniques.

DDMT Response:

The objective of the composite sampling is to obtain an average concentration of contaminants within an area. That is, all data will be used as a population for the site, and the site data can be compared as a whole to background, PRGs, or other criteria to be used in the baseline risk assessment (Guidance for Data Usability in Risk Assessment, pg. 55, [Part A]). Additionally, the detection limits for Level 2 quality data will be equivalent to the detection limits for Level 3 quality data. We believe that the areas proposed for composite sampling have been equally affected by surface runoff; therefore, all samples will be contaminated above the detection limits (if a source has affected the area). Using composite sampling has reduced the sampling costs. No changes to the text are proposed.

2. Page 4-12, Section 4.3.6, Site 26: EPA raises the same concern as it did in Comment 1 on the OU3 FSP.

DDMT Response:

See the response to Comment 1.

Mid-South Peace and Justice Comments

Delete "It is not known whether contamination is being transported from the industrial areas Defense Depot Memphis, Tennessee by the storm water collection system or from areas surrounding the surface water bodies." OU-3 receives little or no off site storm water runoff. The Depot as a whole is at the very top of the drainage basin. Additionally the area where the cafeteria now stands was once a pesticide mixing area. These two facts alone and the fact that this statement appears in none of the other summaries raises a question in the author's mind as to why it is there at all. I thought that the only place on the facility which received off site runoff was a small ditch near the corner of Hays and Person that only flowed a short distance through the Depot's property.

DDMT Response:

This comment relates to the Executive Summary, page v. The comment is intended to differentiate source areas on the facility, not offsite. The sentence will be modified to read as follows:

"The potential source areas (onsite industrial area or onsite areas adjacent to surface water bodies) have not been characterized; therefore, the source of contaminants has not been identified."

Operable Unit 4 Field Sampling Plan, March 1995

EPA Comments

1. Page 4-13, Section 4.3.4, Facility Groundwater Investigation: In the original set of EPA comments on the draft OU4 FSP, EPA requested that pesticides be added to the list of PCOCs. Given that pesticides are on the list of PCOCs for the soils and sediments of a number of the sites at DDMT, please clarify why pesticides were not included for the groundwater.

DDMT Response:

Pesticides are a PCOC throughout the groundwater at DDMT and will be added to the list of PCOCs. The last sentence of Section 4.3.4 on page 4-13 will be modified as follows:

"Therefore, the PCOCs for this portion of the investigation are VOCs, metals, and pesticides."

Mid South Peace and Justice

This OU contains the hazardous waste storage area in the northeast area of the OU. Surface water samples should be taken in the drainage ditch which leave this OU and flows north. It flows through a small industrial area, but there is also a day care center located in this group of businesses. Surface and subsurface soil samples should also be taken in the areas surrounding the hazardous waste storage area. This area is also used as a storage area for surplus material. This material could have been the source of spillage in the past.

DDMT Response:

The four areas used for hazardous waste storage are designated as Sites 36 through 39 and are being investigated as screening sites in the SSFSP. Also, the east north drainage ditch is being investigated as Site 54 in the SSFSP.

TDEC Comments on Operable Units 1, 2, 3, and 4 Field Sampling Plans

General Comments:

1. All of the OU-FSPs are well organized and easily read. Good job!

DDMT Response:

DDMT appreciates your positive response.

2. The phased sampling approach (i.e.–biased sampling first followed by probabilistic sampling, if warranted) as stated in the Section 3 is to be sufficient in scope to support final site status decisions (e.g. upgrade, downgrade, and IRAs). While there is no doubt that the scope of the sampling as proposed in these documents will attain this objective for all the sites, TDEC has noted that in some instances the phased approach is not always followed. An example of the phased approach not being followed is Site 6 in OU#1 (Eye Ointment Burial Site) where 19 samples are proposed for a site that is not known or suspected to contain any hazardous substances. A more appropriate phased sampling approach for this site would be to first confirm the presence hazardous contaminants with a few biased samples in the known burial area and then, if warranted, probabilistic sampling. Since DDMT is slated for BRAC, a second alternative to probabilistic follow-up sampling would be confirmatory sampling upon removal. It is TDEC's opinion that given the present climate of austerity in our government, remedial dollars should be spent as wisely as possible while accomplishing our objectives.

DDMT Response:

We understand TDEC's concern that the phased sampling approach may be interpreted as leaning toward more intensive sampling and that you recommend that a minimum number of samples be collected to confirm the presence of contamination. While your specific example is correct, TDEC should remember that the assumption of the presence of contamination is inaccurate. There will be sites with no contamination, and we have developed an approach that should be acceptable to show that No Further Action is the recommended action rather than confirmation of contaminant release. It only takes one sample to show contamination, but it generally requires a more intensive sampling effort to support a risk-based decision for No Further Action. However, we have reviewed the sites, one by one, and have considered your comment as it relates to the objective of the sampling objectives. The proposed changes are presented in Attachment 1 for the project team's consideration at the July 24 meeting.

Additionally, at the June RPM meeting, a group decision was reached that to clarify the intent of the sampling approach, each of the figures would have a note indicating that biased sampling will occur first, followed by probabilistic sampling.

The following note will be added to each appropriate figure in the FSPs, as follows:

"NOTE: Biased sampling occurs first, followed by probabilistic sampling as necessary."

We agree with TDEC's concern about developing a more cost-effective approach; however, it is premature at some of the sites to assume that an initial early removal is appropriate. We have conducted an exhaustive early removal evaluation that led to the current sites being proposed for removal. Sites that did not meet the criteria for removal were not selected.

However, given the BRAC status, presumptive remedies (including removal actions) should be reconsidered. Consistent with the observational approach, we anticipate continuous evaluation of the sites and their status in the RI program to elect remedial activities that will expedite cleanup or will result in overall cost savings. These activities will occur upon completion of the work plans and under a new BRAC initiative.

3. With regard to the previous comment and being that DDMT is probably going BRAC, it is TDEC's opinion that biased sampling followed by confirmatory sampling is appropriate and preferred at sites when removal actions are initially considered (e.g. Golf Course Pond and Lake Danielson). Please keep in mind that FOSTs and FOSLs of DoD properties are the primary goals of BRAC.

DDMT Response:

The logic diagram presented in the work plans is consistent with the approach presented in this comment. We have allowed an option for early removal of sites in the logic diagram when site contaminants exceed the removal action levels (RALs) and when the removal action criteria are met. The RALs are going to be developed as part of the next phase of work, prior to the individual site investigations.

Your concern regarding BRAC status is accurate. We anticipate conducting continuous evaluations once the facility has been officially listed for BRAC. However, we propose to complete the work plans as written. Amendments to the work plans may be necessary at a later date to accommodate BRAC implications. FOSTs and FOSLs will be considered during the Work Plan amendment phase.

Specific Comment:

1. Section 4.3.6 Soil Sampling and Analysis, page 4-13. Please clarify and explain the rationale for using an OVA as the primary screening instrument to determine extent of contamination when an acid spill is being investigated.

DDMT Response:

Although trichloroacetic acid will not be detected on the OVA, there is some concern that this site is a source of the nearby VOC contamination (see MW-7 in Figure 4-4). The soils also will be screened using field pH methods to assess whether a release of trichloroacetic acid has occurred.

These sections are perhaps a bit too generic in places (see Comment 7). Also, there is still no resolution as to the type of drilling method to be used. This will be required before TDSF can approve the work plan and certainly before any contracting can occur.

DDMT Response:

Where identified, general discussions will be made specific. See the response to Comment 7.

CH2M HILL and CEHND typically select drilling contractors during the bidding process. This is a typical process with all previous investigations we have conducted. We are unfamiliar with the state authority for approving drilling methods. Because this is an important issue to the team, we would like to discuss the issue of drilling method approval further at the July 24 meeting.

Specific Comments

1. Section 4.3.1, page 4-8, last paragraph–This paragraph alludes to a recovery well that has not been formally identified. Please correct.

DDMT Response:

The following phrase will be added to the end of the second sentence of Section 4.3.1, page 4-8, last paragraph:

". . . which includes the proposed installation of a recovery well for testing purposes."

2. Section 4.3.2, page 4-8 & Table 4-2, page 4-9–This narrative passage and the table should identify the aquifer in which this contamination is associated.

DDMT Response:

The following phrase will be added to the end of the first sentence of Section 4.3.2 on page 4-8 to identify the aquifer with which the contamination is associated:

". . . and screened within the Fluvial Aquifer."

Additionally, the tite of Figure 4-2 will be changed to the following:
"Maximum Concentration of Contaminants Found in Dunn Field Fluvial Aquifer Groundwater"

3. Tables 4-3 & 4-4, pages 4-10 & 4-11–Where do the TN Guidance levels come from? Tennessee groundwater guidance is consistent with MCLs. Tennessee doesn't have promulgated soil standards, but is considering the draft EPA guidance for soil

screening levels. Are these PRGs based on residential or industrial standards? PRGs should use a worst case scenario for the PRG determination and correct as circumstances warrant for actual/observed conditions.

DDMT Response:

The label "TN Guidance Levels" will be replaced with "PRGs." The values will be changed and the table will be consistent with PRGs presented in Table 3-3. The basis for establishing the PRGs is presented in Section 3 of the document. The PRGs are based on conservative assumptions using the residential standards (See section 3).

4. Section 4.3.3, page 4-13, last paragraph–TDSF suggests that only one well may be necessary. If, in the course of putting a shallow monitoring well, you do not encounter a confining layer there will be no reason to have a nested pair. It would be reasonable to continue the process of installing a Memphis Sand monitoring well. Rotosonic® methods would be an effective way of determining the nature of the lithologies. Also, if no significant clay layer is encountered, appropriate sampling analyses should indicate the presence of recent water (tritium, iron, manganese, hardness, dissolved solids, etc.).

DDMT Response:

The proposed nested pair of monitoring wells will provide valuable vertical hydraulic gradient information even if there is no confining clay. Therefore, we still propose to complete two wells. The text (last sentence) was changed in response to Comments 19 and 20 of CEHND/SB to more clearly define the criteria used to decide when the Memphis Sand aquifer well would be constructed.

Section 4.6.2, page 4-18, describes the analytes mentioned in the comment. Magnesium will be changed to Manganese on page 4-18.

5. Section 4.3.4, page 4-13–TDSF suggests referring to the proposed monitoring wells rather than saying ". . . these wells . . .".

DDMT Response:

The word "these" will be changed to " the proposed" in the first sentence of Section 4.3.4 on page 4-13.

6. Table 4-5, page 4-14–What does the column A1 represent? Please explain the need for this column.

DDMT Response:

Aluminum (Al) will be deleted as an analyte from Table 4-5 on page 4-14. Aluminum will not be sampled for in the groundwater or soils. Aluminum is a contaminant of concern in surface water and sediments at DDMT.

7. Section 4.3.6, page 4-16–It is within this section that you should describe the potential slug test methods that may be decided upon in the field.

DDMT Response:

The pneumatic slug test method will be used to conduct the slug tests in the highly transmissive aquifers. The following paragraph will replace the paragraph in Section 4.3.6 on page 5-17 (and elsewhere in the work plans):

"The hydraulic conductivity of the water-bearing zone in which each monitoring well is screened will be estimated using a pneumatic slug test method. This slug test method will allow testing to be performed quickly, and the results will eliminate much of the noise in the very-early-time data that is often present in manual slug test methods."

8. Section 4.4.1, page 4-16–How do you know when you get to the top of the Jackson/Upper Claiborne Group? This should be a decision of <u>probable</u> Jackson/Upper Claiborne based on clay color, stiffness, etc. Once again, TDSF suggests that the Rotosonic® drilling method may provide higher quality information with which to base a decision upon. When will a decision be made regarding the type of drilling that will be undertaken? This work plan makes no mention of any type of drilling technique. This will be required for TDSF review and approval prior to on-site drilling activity.

DDMT Response:

The onsite geologist will have at his or her disposal the boring logs of adjacent wells, geologic cross sections, and Figure 2-17 of the Generic RI/FS Work Plan. This figure has compiled all the existing data in the near vicinity of DDMT into a structure contour map of the top of the Jackson Formation/Upper Claiborne Group. This information will give the onsite geologist an idea of anticipated depth to the top of the unit prior to drilling.

The geologist will also examine the drill cuttings as they are recovered, and make an immediate determination of where the borehole is within the stratigraphic section. As the borehole is penetrated through the three members of the Fluvial Deposits, the geologist will be watching for a coarsening of the sand sequence with the characteristic gravel lenses. This indicates the base of the Fluvial Deposits. The geologist will then look for the distinctive stiff, grey to orange, low to high plasticity lignitic clay.

Clay lenses or seams within the gravelly sand sequence may be distinguished from the clay of the Jackson Formation/Upper Claiborne Group by color, absence of lignite, and possibly by plasticity.

The Rotosonic® drilling method will be considered for the DDMT field investigation, as described in the QAPP. The decision will be made at the time the contract is negotiated between CEHND and CH2M HILL. As previously mentioned, we are unfamiliar with state approval of a drilling method, and request that this topic be discussed on July 24.

9. Section 4.4.2, page 4-16–TDSF is concerned that apparently no provision is being made for contingency of high solvent levels requiring alternate casing material. The analysis result of 5,100 µg/L TCE at MW-12 suggests DNAPL presence.

DDMT Response:

DNAPLs are not expected to be encountered at DDMT. However, if DNAPLs are encountered, stainless steel wells will be installed in those areas. The following sentence has been added to the end of the third paragraph of Section 5.4.2.5 in the QAPP:

"However, if DNAPL concentrations are detected, stainless steel will be used as the well construction material in the area of DNAPL concentration."

It was also agreed at an RPM meeting that the driller's subcontract would be written to require him to either have stainless steel casing onsite or have the capability to quickly have it delivered onsite.

10. Section 4.6.3, page 4-18–If the Rotosonic® method is employed double casing may not be required.

DDMT Response:

The comment is noted. The Rotosonic® drilling method will continue to be evaluated as the project continues.

Also, the following will be added to the document. On page 4-8, second bullet, the first word "Delineate" will be changed to "Evaluate."

Attachment 1

Attachment 1 Proposed Changes to Sites Defense Depot Memphis- Tennessee			
OU Location	**Site #**	**Description**	**Proposed Change**
1/RI	6	Eye Ointment Burial	Reduce initial sampling to 1 boring to 20' and 3 SS samples.
1/RI	11	Trichloroacetic Acid	Same as Site #6 above.
1/12.1/RI	12/.12.1	Sulfuric and Hydrochloric Acid Burial	Early Removal
1/RI	14	Municipal Waste Burial	Same as Site #6 above.
1/RI	16	Unknown Acid Burial	Early Removal
1/SS	19	Former Tear Gas Canister Burn Site	Reduce to two borings.
1/SS	20	Probable Asphalt Burial Site	Reduce borings to 20' depth.
1/SS	21	XXCC-3 Burial	Reduce borings to 20' depth. Remove 4 SS samples.
1/SS	60	Pistol Range Impact Area	Reduce borings to 10'.
1/SS	62/64	Bauxite Storage	Conduct SW and Sediment samples only. No PRGs for soil or GW for Aluminum.
2/RI	34	Underground Waste Oil Tank	Reduce to 3 borings to a depth of 20' and 3 SS samples.
2/SS	82	Flammables Building 783	Reduce borings to a depth of 20'.
2/SS	84	Building 782	Reduce borings to a depth of 20'.

Attachment 1 Proposed Changes to Sites Defense Depot Memphis- Tennessee			
OU Location	**Site #**	**Description**	**Proposed Change**
3/RI	25	Golf Course Pond	Feasibility Study Sample collection only. Revise plan to reflect FS samples only.
3/RI	26	Lake Danielson	Same as Site #25 above.
3/RI	48	Former PCB Transformer Storage Area	Reduce sampling to 5 SS samples only. No borings.
3/RI	58	Pad 267-Herbicides and Pesticides	Reduce sampling to 9 SS samples only. No borings.
3/SS	65	XXCC-3 Building 249	Reduce borings to 20'.
3/SS	69	Flamethrower liquid fuel	Reduce borings to a depth of 10'.
3/SS	75	Unknown Wastes Building 689	Reduce borings to a depth of 20'.
3/SS	76	Unknown Wastes Building 690	Reduce borings to a depth of 20'
3/SS	77	Unknown Wastes Building 689/690	Reduce borings to a depth of 20'
3/SS	78	Building 689	Reduce borings to a depth of 20'
4/RI	57	Building 629	Reduce borings to 10' initial depth. Clarify text to read wells are optional.
4/SS	28	Building 863	Reduce borings to a depth of 20'
4/SS	35-39	HW Storage Areas	Reduce borings to a depth of 10'.

Attachment 1 Proposed Changes to Sites Defense Depot Memphis- Tennessee			
OU Location	**Site #**	**Description**	**Proposed Change**
4/SS	70/71	RR Tracks	Reduce borings to a depth of 10'.
4/SS	72	Waste Oil Application	Reduce borings to a depth of 10'.
4/SS	74	Flammables Building 319	Reduce borings to a depth of 20'.
4/SS	79	Building 702	Reduce borings to a depth of 20'.
4/SS	80	Building 720	Reduce borings to a depth of 20'.
4/SS	83	Dried Paint Disposal Area	Reduce borings to a depth of 10'.

These sections are perhaps a bit too generic in places (see Comment 7). Also, there is still no resolution as to the type of drilling method to be used. This will be required before TDSF can approve the work plan and certainly before any contracting can occur.

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DNAPLs are not expected to be encountered at DDMT. However, if DNAPLs are encountered, stainless steel wells will be installed in those areas. The following sentence has been added to the end of the third paragraph of Section 5.4.2.5 in the QAPP:

"However, if DNAPL concentrations are detected, stainless steel will be used as the well construction material in the area of DNAPL concentration."

It was also agreed at an RPM meeting that the driller's subcontract would be written to require him to either have stainless steel casing onsite or have the capability to quickly have it delivered onsite.

10. Section 4.6.3, page 4-18–If the Rotosonic® method is employed double casing may not be required.

DDMT Response:

The comment is noted. The Rotosonic® drilling method will continue to be evaluated as the project continues.

Also, the following will be added to the document. On page 4-8, second bullet, the first word "Delineate" will be changed to "Evaluate."

Section 2
DDMT Response to TDEC Comments on the HASP

Generic Health and Safety Plan, February 1995

EPA Comments

EPA will not be reviewing this document.

TDEC Comments

General Comments

TDEC is confused as to the format used in this document (or these documents). A Generic HASP should act as a primary guidance document for all anticipated Site Specific HASP issues. (i.e. A Generic HASP should incorporate and address all potential health and safety concerns encountered during multi-phased investigations that would impact site workers, casual observers and surrounding resident populations.)

This document appears to be presented in three (3) sections that refer back and forth to one another with no clear hierarchy of authority.

- The first section (Health and Safety Plan) appears to be a broad overview as to what is to be contained within the HASP. However, in some sections it goes into specific detail (e.g. decontamination procedure).

- The second section (Appendix D) is much more detailed while being broad in scope. Although this section is titled CH2M HILL Site Safety and Health Plan, it truly approaches what should be considered a Generic HASP, however, it still lacks completeness due to cross referencing.

- The third section (Attachment 1–El Dorado's Contingency Plan for Non-Chemical Warfare Material Sites) wholly lacks completeness and is premature as to its OU referencing. Although this is titled as a Contingency Plan, it looks more like a hastily thrown together HASP. Furthermore, the only contingency noted in this plan was to blow a hand held air horn and instruct every one to run upwind. While this will hopefully protect the workers, there is nothing discussed regarding warning or notification of potentially impacted local residents. Additionally, there is no indication in any of these three sections, that local fire departments, emergency response personnel, and hospitals are equipped to handle hazardous chemical exposures let alone CWA exposures.

If the OSHA rules are truly adhered to, workers should be allowed to read and understand the HASP fully for their safety and protection. A statement (Appendix A) signed by a worker that indicated he or she read and understood it when in actuality they did not, is not legally binding. Furthermore, it is not in keeping with the spirit or the intent of the law (OSHA). Please remember DDMT has the potential for exposure of workers to UXO and CWA. TDEC strongly suggests reorganizing and simplifying

this document for clarity and brevity while being as complete as possible. Get rid of the redundancy.

DDMT Response:

We propose to change the document to account for TDEC's concerns about public health and safety and document readability. First, the issue related to public safety is based on the support we will be provided by the United States of America Chemical Destruction Remediation Activities and the Army Technical Escort Unit. DDMT has experienced some difficulty in receiving this support in a timely manner. As a result, the project team decided at the June 1995 RPM meeting to complete the existing Health and Safety Plan (HASP) to account for issues related only to hazardous and toxic waste (HTW), and to reference the Chemical Warfare Management Plan (CWMP), which will be provided by El Dorado Engineering. The HASP will be applicable to and the sole document to be used on the main plant. The CWMP will be supplemental to and will supersede the HASP at Dunn Field.

To improve document readability and to remove redundancy, we propose to complete the existing plan as an HTW plan in the format of Appendix D, which is currently provided.

All work related to intrusive investigations at Dunn Field will be delayed until a complete CWMP is prepared that addresses public health and safety. However, the completed HTW HASP will allow the facility to proceed with investigations at the Main Installation and offsite locations where chemical warfare materials are believed to be absent. Also, the CWMP will be expanded to include a UXO component for all activities that are conducted at Dunn Field.

Also, see the response to Comment 8.

Specific Comments

Note: Comments 1 through 7 below refer to Sections that will be incorporated into a different format (see response to General Comments above). The information contained in the comments and responses, however, will be included in the new format.

1. Section 1.1, Purpose, Second para. page 1-1. Misspelled word "Company" should be "Company".

DDMT Response:

The misspelling of the word "Company" will be corrected in the second sentence of the second paragraph of Section 1.1 on page 1-1.

2. Section 2.1, Project Manager, page 2-1.
Please specify which PM has the overall responsibility for performance of project in a safe manner.

DDMT Response:

The intent is to identify the subcontractor's (CH2M HILL) project manager as the primary responsible party. The text will be corrected to indicate this point.

3. Section 4.2, Training Documentation, page 4-1.
Please expand on what is considered "the requisite training" required for this job. There is no mention of three (3) day OJT documentation for site workers.

DDMT Response:

The requisite training refers to 40-hour OSHA training according to 29 CFR 1910, a first aid course and emergency response course, and 3 days of specific on-the-job training. The text will be modified to indicate this training.

4. Section 5.1.2 Level C, fifth bullet, page 5-2.
Please include parenthetically "intrinsically safe in hazardous atmospheres". This phrase should be included where appropriate under all subsequent sections.

DDMT Response:

The following will be added to the fifth bullet of Section 5.1.2 on page 5-2, the sixth bullet of Section 5.1.3 on page 5-2, and the fifth bullet of Section 5.1.4 on page 5-3:

"... (intrinsically safe in hazardous atmospheres)"

5. Section 7.1.1, Direct Read Air Monitoring, page 7-1.

A generic HASP should offer guidance as to the frequency, where, when, and who. Please expand.

DDMT Response:

A new third sentence will be added:

"Perimeter monitoring is conducted by the SSO when breathing zone action levels are exceeded. It will be conducted at the same frequency as the breathing zone monitoring."

"Each specific work site . . . " begins a new paragraph.

The third sentence of Section 7.1.1 states "Each specific work site will be continuously monitored for the presence of organic vapors in the exclusion zone using appropriate direct reading instrumentation as determined by the SSO." Also, refer to Section 6.0 of Appendix D.

This sentence seems to answer the following TDEC concerns of "frequency," "where," and "when." If there is a miscommunication regarding those three aspects of direct air monitoring, please clarify.

To respond to the concern of who will do the monitoring, the following will be inserted in the third sentence of Section 7.1.1 on page 7-1 between "monitored ( ) for":

". . . by a member of each field crew who has been trained in the use of the instrument."

6. Section 7.2.2, Cold Injury, 7-3. There is no mention of signs or symptoms of cold injury. Since this is a generic HASP, all potentially necessary information should be included for guidance purposes. Additionally, there are no references to any potential biological hazards (i.e. poison ivy/oak, snakes, etc.).

DDMT Response:

These hazards are addressed in Section 3 of Appendix D, page D-8 and page D-23. The new format will include cold hazards and biological hazards.

7. Section 8.1, General Work Zone, page 8-1.
A generalized map of a hypothetical site should be included here indicating all work zones and wind direction.

DDMT Response:

A generalized map of a hypothetical site will be presented in the newly formatted document.

8. Appendix A, page A-1.
See general comment.

DDMT Response:

The concern TDEC raised in the general comment (third paragraph), combined with verbal clarification provided by Jim Morrison during the May 1995 RPM meeting, was that a worker would not read and understand the HASP as currently organized, but would sign the statement anyway. TDEC's concern in requesting a reorganization was to produce a document that was more "user-friendly" that promoted user understanding.

The reorganization will enhance the readability of this document by eliminating the redundancy and the need for numerous cross references. A more usable document will also promote the user's understanding of it, thereby more closely meeting the spirit and intent of the law.

In addition, only highly trained professionals will be onsite and have to read the document closely enough to sign a certification statement.

9. Appendix B, page B-1.
See general comment.

DDMT Response:

Because no specific reference is made to Appendix B in TDEC's general comment, we are assuming that Appendix B is mentioned as an example of redundancy. This same material, and the route to the hospital, are also found in Appendix D. The emergency information will be combined in Sections 11, 12, and 13 of the reorganized document.

10. Appendix D, Section 2.3, Description of Subcontractors, page D-14.
See general comment regarding hierarchy of authority. Please elaborate who the HSM will be and what is their authority?

DDMT Response:

CH2M HILL's Health and Safety Manager for this project is Mr. Dan Locke, who is the Montgomery office's corporate representative for Health and Safety. His responsibilities are to ensure that, in the case where CH2M HILL controls its subcontractors' work and the subcontractor submits its own SSHP, that this plan meets OSHA requirements.

A project organization chart will be included that shows the hierarchy of authority. The organization chart will indicate lines of authority for Health and Safety positions for the field activities. It will be added to Section 2.1, page D-14, along with the description of the HSM.

11. Appendix D, Table 3, page D-15. Please update the following:

~~Jim Morrison, P.G.~~ TDEC/BRAC Project Manager - delete "(?)"
Jordan English, P.G. Environmental Field Office Manager
Delete "Lauranda Redmond and phone number"

DDMT Response:

The question mark will be deleted from Table 3 on page D-15, which is included in the "Phone" column.

The "Responsibility" column in Table 3 on page D-15 will be updated for Jordan English, P.G., by replacing "TDEC Project Manager" to "Environmental Field Office Manager."

Lauranda Redmond and the phone number will be deleted from Table 3 on page D-15.

Additionally, the most recent version of this chart (June 1995) will replace the February 1995 version of this chart.

12. Appendix D, 4.1, CH2M HILL Employees, page D-36.
Please clarify, will there be any SSO's present?

DDMT Response:

There will be an SSO present at the facility during the investigation. The SSO's name will be added to Section 4.1, page D-36, and Section 13.0, page D-49, as well as to the project organization chart referenced in Section 2.1. The SSO will also be present at specific sites where heavy equipment is used.

13 Appendix D, Section 6.0, Air Monitoring Equipment.
Please clarify (add column) the location of monitoring equipment with regard to contaminants specific gravity.

DDMT Response:

For toxic chemicals, the immediate concern is worker exposure. Therefore, the location of air monitoring equipment is generally in the worker breathing zone, regardless of the contaminant specific gravity. When action levels are exceeded (Column 3 on page D-39) in the breathing zone, the source of emissions is also monitored (to account for any contaminant, regardless of specific gravity) periodically (monitor and record every 30 minutes).

When breathing zone results exceed action levels, then the edge of the exclusion zone is monitored. If results at the edge of the exclusion zone indicate concentrations of contaminants above background, then work is halted until the readings at the edge of the exclusion zone are below background. This information will be incorporated into the HASP.

14. Appendix D, Section 8.0, page D-41.
Please add a section or bullet that briefly describes how IDW will be managed.

DDMT Response:

Investigation-derived waste (IDW) will be managed according to the methods outlined in Section 4.0 of the QAPP. This section will be expanded by including a fourth bullet that reads:

- IDW will be managed in DOT-approved drums, stored onsite temporarily, sampled and analyzed, and disposed of in accordance with applicable regulations. See Section 4.9 of the QAPP.

15. Appendix D, Section 12.0, page D-47. See general comment with regard to the verification of hospitals to handle chemical and CWA contaminated workers.

DDMT Response:

The issue of whether or not hospitals are equipped to handle CWA exposures will now be covered under the separate CWMP. The two hospitals identified on page D-47, Methodist Hospital Central and Regional Medical Center, were contacted concerning their ability to handle chemical exposures. Methodist Hospital Central is equipped to handle hazardous chemical exposures to all parts of the body; Regional Medical Center only has a burn unit. Therefore the HASP will be amended to direct emergencies to Methodist Hospital Central.

16. Attachment 1, El Dorado's Contingency Plan for Non-Chemical Warfare Materiel Sites. This section is wholly deficient. See general comment.

DDMT Response:

See the response to general comments.

Section 3.0
CH2M HILL Response to CEHND/SB Comments on Field Sampling Plans

MRW

U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS — PROJECT CN: 5-350, S: 10 JUL 95, ODMT, FIELD SAMPLING PLANS

- ☐ SITE DEV
- ☒ ENVIR PROT&UTIL
- ☐ ARCHITECTURAL
- ☐ STRUCTURAL
- ☐ MECHANICAL
- ☐ MFG TECHNOLOGY
- ☐ ELECTRICAL
- ☐ INST & CONTROLS
- ☐ SAFETY
- ☐ ADV TECH
- ☐ ESTIMATING
- ☐ SPECIFICATIONS
- ☐ SYSTEMS ENG
- ☐ VALUE ENG
- ☐ OTHER

REVIEW Draft-Final Field Sampling Plans
DATE 10 Jul 95
NAME SBradley/1ft

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
		ODI FSP:	
1.	Page 3-1	At the eighth line in section 3.1, remove the sentence beginning "Therefore, and attempt...". Replace with "This workplan is intended to implement RI/FS activities on a cost and time effective basis. Field screening procedures and statistical evaluations will be used to facilitate decision making as defined by figure 3-1."	
2.	Page 3-4	Add to the last sentence to section 3.1.4 "... according to criteria defined in sections 3.2 and 3.3.	
3.	Page 3-6	At first bullet, reference section 3.5 and 3.6.	
4.	Page 3-9	Second paragraph of section 3.5.2 is confusing. Please rephrase.	
5.	Page 3-18	TN soil guidance is not an ARAR.	
6.	Page 4-4	The information in section 4.1.1 should be revised to reflect information on the eye ointment contained in the Archive Search Report.	
7.	Page 4-13	In section 4.3.5, ensure that the number of samples in the text is consistent with Tables and remainder of text.	
8.	Page 4-21	In section 4.5.5, correct reference to section 3.5 to section 3.7.	

ACTION CODES:
A - ACCEPTED/CONCUR
D - ACTION DEFERRED
W - WITHDRAWN
N - NON-CONCUR
VE - VE POTENTIAL/VEP ATTACHED

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS — PROJECT CN: 5-350, S: 10 JUL 95, DDMT, FIELD SAMPLING PLANS

☐ SITE DEV	☐ MECHANICAL	☐ SAFETY	☐ SYSTEMS ENG	REVIEW Draft-Final Field Sampling Plans
☒ ENVIR PROT&UTIL	☐ MFG TECHNOLOGY	☐ ADV TECH	☐ VALUE ENG	DATE 10 Jul 95
☐ ARCHITECTURAL	☐ ELECTRICAL	☐ ESTIMATING	☐ OTHER	NAME SBradley/lft
☐ STRUCTURAL	☐ INST & CONTROLS	☐ SPECIFICATIONS		

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
		OU 2 FSP	
9.	General	Revise section 3 as appropriate in accordance with comments 1 through 5.	
10.	Page 4-11	Surface soil samples from beneath pavement are only appropriate if subsurface samples from nearby indicate contamination sufficient to potentially impact groundwater. There is no reasonable exposure pathway for surface contamination under impervious material. Please revise this section as appropriate.	
11.	Page 5-2	In the last paragraph of section 5.2.1, rephrase reference to a groundwater OU. Since actions are being performed according to the existing OU workplans, statements such as "...groundwater at DDMT will be evaluated facility wide..." could motivate regulators to conclude that the workplans as written do not have proper objectives. It is DDMT's intent to address groundwater remediation facility wide but to complete investigations according to the current OU structure.	
		OU3 FSP	
12.	General	See comment 9.	
13.	Page 3-3	For the third line on this page, reference comment 11.	
14.	Page 3-5	In section 3.1.6, at the third line, reference location of IRA criteria.	

ACTION CODES: W - WITHDRAWN
A - ACCEPTED/CONCUR N - NON-CONCUR
D - ACTION DEFERRED VE - VE POTENTIAL/VEP ATTACHED

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS

PROJECT CN: 5-350, S: 10 JUL 95, DDMT; FIELD SAMPLING PLANS

- ☐ SITE DEV
- ☒ ENVIR PROT&UTIL
- ☐ ARCHITECTURAL
- ☐ STRUCTURAL
- ☐ MECHANICAL
- ☐ MFG TECHNOLOGY
- ☐ ELECTRICAL
- ☐ INST & CONTROLS
- ☐ SAFETY
- ☐ ADV TECH
- ☐ ESTIMATING
- ☐ SPECIFICATIONS
- ☐ SYSTEMS ENG
- ☐ VALUE ENG
- ☐ OTHER

REVIEW Draft-Final Field Sampling Plans
DATE 10 Jul 95
NAME SBradley/lft

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
15.	Page 3-7	In the first line, background sampling and analysis will be part of the early removal field work.	
16.	Page 4-15	In 18th line, delete sentence beginning " The lake may now serve as a point sources..." since this conflicts with the statements in section 4.3.7.	
17.	Page 4-25	For last sentence, see comment 11.	
		OU 4 FSP	
18.	General	See comment 9.	
19.	Page 4-13	Final paragraph of section 4.3.3 should more completely discuss intent of well U. Clarify if installation is dependant on decision for Memphis Sands well(s).	
20.	Page 4-17	completely describe criteria for decision on need for deep wells.	
		SS FSP	
21.	General	Comments provided 21 Jun 95 at RPM meeting, DDMT.	

ACTION CODES:
A - ACCEPTED/CONCUR
D - ACTION DEFERRED
W - WITHDRAWN
N - NON-CONCUR
VE - VE POTENTIAL/VEP ATTACHED

1127 37

Operable Unit 1 Field Sampling Plan Responses

CH2M HILL Response to Comment 1:

The last sentence beginning with "Therefore, an attempt. . . " of the last paragraph of Section 3.1 on page 3-1 will be replaced with the following two sentences:

"This work plan is intended to implement RI/FS activities on a cost- and time-effective basis. Field screening procedures and statistical evaluations will be used to facilitate decision making, as defined by Figure 3-1."

CH2M HILL Response to Comment 2:

The last sentence of Section 3.1.4 on page 3-4 will have the following added:

"according to the criteria defined in Sections 3.2 and 3.3."

CH2M HILL Response to Comment 3:

The first bullet on page 3-6 will have Sections 3.5 and 3.6 referenced. The following will be added to the first sentence of the first bulleted paragraph between the words "PRGs ( ) for."

"(Sections 3.5 and 3.6)"

CH2M HILL Response to Comment 4:

The third sentence in the second paragraph will be modified to read as follows:

"For screening sites, a limited number of samples are being collected as a result of the selected approach to screen the site. As a result, a Baseline Risk Assessment (BRA) cannot be conducted because adequate data for the site may not be available. Once a contaminant release has been identified, additional sampling will occur. After the additional samples are collected, an accurate description may be obtained, a BRA assessment can be conducted, and the remedial goal options (RGOs) can be identified."

CH2M HILL Response to Comment 5:

We understand that TDEC Guidance is an ARAR. We consider them to be relevant and appropriate because their use is well suited to the particular sites. See the definition on page 3-8. However, we would like to obtain TDEC's input on the subject.

CH2M HILL Response to Comment 6:

The appropriate information from the archives search will be included in Section 4.1.1.

CH2M HILL Response to Comment 7:

The number of samples for Site 11 in Section 4.3.5 is consistent with regard to the text and table. The remainder of the text has been evaluated with regard to this matter, and the text is consistent with the table.

CH2M HILL Response to Comment 8:

The reference at the end of the first sentence of the second paragraph of Section 4.5.5 on page 4-21 will be modified as follows:

"(see Section 3.7)."

Operable Unit 2 Field Sampling Plan Responses

CH2M HILL Response to Comment 9:

The last sentence beginning with "Therefore, an attempt . . . " of the last paragraph of Section 3.1 on page 3-1 will be replaced with the following two sentences:

"This work plan is intended to implement RI/FS activities on a cost- and time-effective basis. Field screening procedures and statistical evaluations will be used to facilitate decision making, as defined by Figure 3-1."

The last sentence of Section 3.1.4 on page 3-5 will have the following added:

"according to the criteria defined in Sections 3.2 and 3.3."

The first bullet of Section 3.3 on page 3-6 will have Sections 3.5 and 3.6 referenced. The following will be added to the first sentence of the first bulleted paragraph between the words "PRGs ( ) for."

"(Sections 3.5 and 3.6)"

CH2M HILL Response to Comment 10:

The third sentence of the second paragraph of Section 4.3.6 on page 4-11 beginning with "Samples will be . . . " will be deleted from the text. The second sentence of the same paragraph will be revised as follows:

"Samples will be collected as close to the foundation as possible at biased locations, at a depth of zero to 12 inches to assess whether a contaminant release has occurred."

CH2M HILL Response to Comment 11:

The final paragraph of Section 5.2.1 will be revised as follows:

"Evaluation of remedial alternatives for groundwater will occur during a later phase of site investigation. After this initial phase of the investigations at OU-2 is completed, groundwater at DDMT will be evaluated facilitywide. To improve the efficiency of the groundwater remediation process, remedial strategies for groundwater will be implemented for the entire facility, and for those sites that are sources of potential groundwater contamination. The facilitywide strategy for groundwater is discussed in the OU-4 FSP."

The regulators concur with the objectives of the RI and with the concept of facilitywide groundwater investigation.

Operable Unit 3 Field Sampling Plan Responses

CH2M HILL Response to Comment 12:

The last sentence beginning with "Therefore, an attempt . . . " of the last paragraph of Section 3.1 on page 3-1 will be replaced with the following two sentences:

"This work plan is intended to implement RI/FS activities on a cost- and time-effective basis. Field screening procedures and statistical evaluations will be used to facilitate decision making, as defined by Figure 3-1."

The last sentence of Section 3.1.4 on page 3-5 will have the following added:

"according to the criteria defined in Sections 3.2 and 3.3."

The first bullet of Section 3.3 on page 3-7 will have Sections 3.5 and 3.6 referenced. The following will be added to the first sentence of the first bulleted paragraph between the words "PRGs ( ) for."

"(Sections 3.5 and 3.6)"

CH2M HILL Response to Comment 13:

It is assumed that the sentence in question is the last sentence of the first (partial) paragraph on page 3-3, because of the nature of the comment. If that is the case, the sentence will be modified as follows:

"If required, they will be installed and sampled in the next phase of field investigation (see Section 4 of the OU-4 FSP), when groundwater at DDMT is addressed on a facilitywide basis."

The regulators concur with the objectives of the RI and with the concept of facilitywide groundwater investigation.

CH2M HILL Response to Comment 14:

The IRA criteria have not been identified in the work plans. Early removal selection criteria are summarized in the Early Removal Memorandum dated March 17, 1995. IRAs generally contain exhaustive criteria too cumbersome to mention here. No changes to the text are proposed.

CH2M HILL Response to Comment 15:

Background sampling is an RI activity; however, we have contracted for this work along with the Early Removal Effort. Modification to the work would only account for contracting issues. Therefore, we propose to leave the text unchanged.

CH2M HILL Response to Comment 16:

The second sentence of the second full paragraph on page 4-15 beginning with "The lake may now serve . . . " will be deleted from the text.

CH2M HILL Response to Comment 17:

The following sentence will be added to the final paragraph of Section 4.5.7 on page 4-25:

"The facilitywide groundwater investigation is discussed in Section 4 of the OU-4 FSP."

CH2M HILL Response to Comment 18:

The last sentence of the last paragraph of Section 3.1 on page 3-1 will be deleted. The first sentence beginning with "An attempt . . . " of the last paragraph of Section 3.1 on page 3-1 will be replaced with the following two sentences:

"This work plan is intended to implement RI/FS activities on a cost- and time-effective basis. Field screening procedures and statistical evaluations will be used to facilitate decision making, as defined by Figure 3-1."

The first bullet of Section 3.3 on page 3-7 will have Sections 3.5 and 3.6 referenced. The following will be added to the first sentence of the first bulleted paragraph between the words "PRGs ( ) for."

"(Sections 3.5 and 3.6)"

CH2M HILL Response to Comment 19:

Insert to page 4-13 after the first sentence of the third paragraph:

"The purpose of Well U is to assess stratigraphy and groundwater quality in the immediate vicinity of the area of suspected hydraulic interconnection. The absence or presence and elevation of the Jackson Formation/Upper Claiborne Group at this location also will be evaluated. Evaluation of both water quality and stratigraphy at this location will provide critical information concerning the probability of DDMT activities affecting the Memphis Sand Aquifer."

Change the last sentence of this paragraph to:

"The proposed deeper Memphis Sand Aquifer well, discussed in Section 4.6, will only be installed if Well U does not encounter the Jackson Formation/Upper Claiborne Group, or if the groundwater is found to be contaminated at Well U."

CH2M HILL Response to Comment 20:

On page 4-17, Section 4.6.1, after "Aquifer" on the third line, a period will be placed and the rest of the sentence will be deleted. A new sentence will be added:

"One of two criteria will be used to decide if the Memphis Sand well is needed. It will be installed under the following conditions:

- If Well U is contaminated; or
- If no Jackson Formation/Upper Claiborne Group is encountered in drilling well U, it will be completed as a Memphis Sand Aquifer well."

Additionally, the following new text will be added to the end of Section 4.6.1:

"Two scenarios will develop when drilling begins, which are that the Jackson Formation/Upper Claiborne Group will be encountered, or it will not. In the first case, when the clay is encountered, the well will be completed as a Fluvial Aquifer well seated at the top of the clay. This Fluvial Aquifer well will be sampled and if the groundwater is not contaminated in Well U, no Memphis Sand well will be constructed under this scenario.

"The second scenario occurs if the Jackson Formation/Upper Claiborne group is not encountered. Before drilling, a range of expected depths to the top and bottom of the Jackson Formation/Upper Claiborne Group will have been projected at the drilling site based on existing data. As drilling progresses and no clay is encountered, as long as the borehole is still within the expected range of the clay unit, drilling will continue. When the borehole is advanced to the bottom of the expected range, plus whatever contingency was previously agreed upon, the borehole will be in the Memphis Sand Aquifer, and therefore, it will be concluded that the clay bed is missing there. At this point, the most cost-effective solution would be to complete the well as a Memphis Sand well. CH2M HILL recommends this approach, using a construction essentially as shown in Figure 5-1 of the QAPP, only deeper. The second part of this scenario is that a Fluvial Aquifer well also would be also necessary at this location, to provide the data to determine the potentiometric head differences between the aquifers at this point of interconnection.

CH2M HILL Response to Comment 21:

The response to this comment has been provided in the response to comments package to the SSFSP issued on June 30, 1995 (see the last comment in the package).

Section 4

Response to CEHND/JD Comments on Field Sampling Plans

U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS

PROJECT DDMT Memphis (5-350, S: 10 Jul 95)

☒ SITE DEV & GEO	☐ MECHANICAL	☐ SAFETY	☐ SYSTEMS ENG
☐ ENVIR PROT&UTIL	☐ MFG TECHNOLOGY	☐ ADV TECH	☐ VALUE ENG
☐ ARCHITECTURAL	☐ ELECTRICAL	☐ ESTIMATING	☐ OTHER
☐ STRUCTURAL	☐ INST&CONTROLS	☐ SPECIFICATIONS	

REVIEW AE's Draft Submittals
DATE 10 July 1995 TYPE
NAME Denton/tlb

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
1.	General	The AE was initially tasked to complete several draft work plans for the RI/FS. Emphasis was placed on addressing and incorporating comments received from the regulators and customer. In the course of events, the investigative strategy was modified, but the goals remain the same - delineate the contaminant plume, identify contaminant source areas and finally, select and implement appropriate remedial actions. The AE has suggested good ideas such as the observational approach and early removals. These have enhanced the performance of the work. However, the ideas have not carried through to the workplans. The AE's approach appears to be "bigger is better". The impression is, if the sites are covered with monitoring wells and borings, the investigations have to be sound." Considering the manpower and expense devoted to these documents, it is our opinion that the documents have not been significantly improved from the originals. In some places the text are repetitive and vague. Our overall comments are stated below, to avoid "nit-picking", others are omitted.	
2.	General	These comments apply to all the workplans: a. At all sites, soil borings (from which surface samples will be collected) plus additional surface samples are proposed for collection and analysis. No attempt is made to distinguish between the number of surface samples collected from the borings and the "surface only" samples. As currently written, one gets the "impression that the additional samples are being disguised. Where surface samples are being collected in addition to those from the	

ACTION CODES:
A - ACCEPTED/CONCUR
D - ACTION DEFERRED
W - WITHDRAWN
N - NON-CONCUR
VE - VE POTENTIAL/VEP ATTACHED

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ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
		borings, it should be stated clearly in the text that these are "additional" samples. In all cases, the total number of samples to be collected from each boring plus any excess surface shall be clearly stated and justified. b. We agree that there should be general guidelines for sample collection in the QAPP. However in the FSPs, sample collection should be site specific. Sample depths and proposed analyses must be justified. Consideration should be given to the nature of the potential contaminant and the groundwater depth at the site. In the preparation of the FSPs, we recommended that the AE consult past reports such as the EM survey performed by WES, the water data from ESI and drill logs from the Law report. On several occasions we were assured that this was being done, however, in reviewing these documents it is obvious that little consideration was given to anything other than aerial photos. <u>SCREENING SITES</u>	
3.	Page iv	a. Clarify the first sentence to state that surface water and sediment samples will be collected where surface water is present and not at every site. b. Clarify that the optional field activities are either additional sampling or early removal.	

ACTION CODES:
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U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS — PROJECT DDMT Memphis (S-350, S: 10 Jul 95)

☒ SITE DEV & GEO	☐ MECHANICAL	☐ SAFETY	☐ SYSTEMS ENG	REVIEW AE's Draft Submittals
☐ ENVIR PROT&UTIL	☐ MFG TECHNOLOGY	☐ ADV TECH	☐ VALUE ENG	DATE 10 July 1995 TYPE
☐ ARCHITECTURAL	☐ ELECTRICAL	☐ ESTIMATING	☐ OTHER	NAME Denton/tlb
☐ STRUCTURAL	☐ INST&CONTROLS	☐ SPECIFICATIONS		

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
4.	Page 1-2	Clarify the sources identified in the second paragraph. The RI report is listed, however, this should be referenced or clarified as Law's 1990 Report, avoiding confusion with the ongoing RI. Also, clarify with whom the "ER site meetings" were conducted.	
5.	Table 1-1	Clarify the "Law number and TDEC-Scn" in the footnotes.	
6.	Sec 2.2	Same as #4 Comment regarding the reference to RI.	
7.	Sec 2.2.1	Clarify that the plume, as currently defined, extends beyond the western boundary of Dunn Field.	
8.	Sec(s) 2.6 & 2.7	a. Add that all available historical data on site use, types, and quantities of material stored, managed, disposed are presented. Where no information is presented, it is either unknown or unavailable. b. Change "applicable" to "available".	
9.	Table 2-1	Filling Groundwater data gaps is not the intended purpose for the screening sites.	
10.	Sec 3.1.1	Delete the second sentence. As previously stated, groundwater evaluation is not a part of the screening site activities. Please make changes in Section 3.2 (DQOs) to reflect this. If there is information to indicate that a site has impacted groundwater, the site should be included in either the early removal or RI activities.	

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS — PROJECT DDMT Memphis (5-350, S: 10 Jul 95)

☒ SITE DEV & GEO	☐ MECHANICAL	☐ SAFETY	☐ SYSTEMS ENG	REVIEW AE's Draft Submittals
☐ ENVIR PROT&UTIL	☐ MFG TECHNOLOGY	☐ ADV TECH	☐ VALUE ENG	DATE 10 July 1995 TYPE
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ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
11.	Table 3.1 & Sec 3.3	a. Clarify if the nine samples have any bearing on the size of the site. It would appear that some of the very small sites may not need as many whereas, the larger sites may require all nine. A more flexible statement such as "a maximum of nine" seems appropriate. b. Clarify the difference in turnaround time between Level 2 and Level 3 data. Also, clarify when and how Level 3 data will be developed.	
12.	Sec 3.5.3	Clarify that the PRGs must be protective of Human Health and the environment.	
13.	Sec 3.5.3.1	Same comment on groundwater as in Item #9 above.	
14.	Sec 4	The following comments apply to almost every screening site discussed in the workplan and, therefore, will not repeated on an individual basis: a. The AE proposes conducting both Level 2 and 3 analyses at some sites. At sites where Level 3 is required, Level 2 appears as a waste of the Government's time and money. State clearly, the conditions that will require Level 3 data to confirm Level 2 and what percentage of each type of analysis will be used. b. Please note that the purpose of this workplan is to determine if a release occurred at a particular site, and if the release is significant to require further work at the site. Therefore, unless there is evidence that the	

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DESIGN REVIEW COMMENTS

PROJECT DDMT Memphis (5-350, S: 10 Jul 95)

- [x] SITE DEV & GEO
- [ ] ENVIR PROT&UTIL
- [ ] ARCHITECTURAL
- [ ] STRUCTURAL
- [ ] MECHANICAL
- [ ] MFG TECHNOLOGY
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- [ ] SPECIFICATIONS
- [ ] SYSTEMS ENG
- [ ] VALUE ENG
- [ ] OTHER

REVIEW AE's Draft Submittals
DATE 10 July 1995 TYPE
NAME Denton/tlb

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
		release may have migrated to depths beyond 10 feet, or a liquid waste was released at the site, there appears to be little justification to make the soil borings deeper than 10 feet.	
(1)		c. Where monitoring well analyses are shown (such as Figures 4-2 and 4-4) use the 1993 RI/FS sampling results instead of the 1990 results.	
2 15.	Sec 4.0.1	Same as Comment #9 regarding the number of samples.	
2 16.	Sec 4.0.2	Same as 12b. regarding sampling depth.	
1 17. 17a 2 17b	Sec 4.1.2 & Figure 4-3	Same comment as #12 on data levels. As previously stated groundwater is not a part of this process. Eliminate the center surface sample. Move one of the external borings to the center and eliminate the second external boring. Three soil borings should be sufficient for screening this site.	
1 18.	Sec 4.1.5	Clarify the relationship between Site 85 and Site 60, the site in question. We suggest that the AE rewrite the third paragraph for clarity. Sites 85 and 20 and MW-9 do not appear on the site maps (Figures 4-4 and 4-5).	
1 19.	Sec 4.1.6	Clarify that the soil boring will be installed near the outfall of the pipe.	

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DESIGN REVIEW COMMENTS — PROJECT DDMT Memphis (5-350, S: 10 Jul 95)

☒ SITE DEV & GEO ☐ MECHANICAL ☐ SAFETY ☐ SYSTEMS ENG
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REVIEW AE's Draft Submittals
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ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
1 20.	Sec 4.1.7	See previous comments regarding Level 2 and 3 data and groundwater sampling. Eighty feet sampling depths are excessive for screening sites, please note previous comments. State exactly how many samples will be collected from the site and from where.	
1 21.	Sec 4.1.8 & Figure 4-7	Clarify the relationship between Site 64 and Site 70. EPA and DDMT do not want the word "elevated" used in the workplans when referring to contaminant levels. Show the proposed sediment location on the map.	
2 22.	Sec 4.4.10	Please review the excessive sampling strategy for Site 70. Also, it appears that 40% of the Level 2 data is targeted for Level 3 analysis. This is overkill when the expense and duplication of Level 2 and 3 are taken into account.	
1 23.	General	The comments for the remaining sites are similar to those above. We strongly recommend that the AE review all the sites with these comments in mind.	
1 24.	Figure B-1	Red and blue sample points are not shown. Make the necessary corrections to reflect what is presented on the figure.	
		<u>Operable Unit (OU)-1</u>	
2 25.	Page iii	Please note that an IRA (interim remedial action) is exactly that ... an <u>INTERIM</u> measure. The intent is to use it until a permanent remedial action is selected and implemented. In some cases, the interim becomes the final	

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- [x] SITE DEV & GEO
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- [ ] VALUE ENG
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ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
		solution but this is not always the case. Please modify the third paragraph and the last bullet on this page to reflect this.	
26.	Page iv	Please give a brief overview of the differences between Level 2 and 3 analyses. Remember that lay persons from the community will also be reviewing the documents. Rewrite the third paragraph to reflect that monitoring wells will not be installed at all locations where there is a potential release. If this occurs, the Installation would be turned into "Swiss Cheese" with more avenues for contaminant migration. Any new proposed well will be on a site-by-site basis.	
27.	Sec 1.2	Please note the investigation is being performed to satisfy the requirements of CERCLA (because of the NPL status) and the RCRA Part B permit. The RFA was only a report based on the review of historical records and reports. This document is not the driver for the investigations, although it has some impact on the sites selected.	
28.	Sec 1.3	In the second paragraph, change "falls into" to "are proposed for". Until the work is complete, any of the sites can change categories. This comment also applies to Section 2.2.	
29.	Figure 2-3	Add scale and clarify the purple and yellow highlighted areas.	

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- [x] SITE DEV & GEO
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	ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
1	30.	Figure 2-11	Please use ESE's 1993 water level measurements to update this figure.	
1	31.	Table 2-1	a. Please note that the text immediately below the table contradicts the table. The monitoring wells that will be installed to the west of Dunn Field are not to "evaluate the potentiometric surface of Fluvial Aquifer". Their main purpose will be to track and characterize the contaminant plume.	
1	31a			
2	31b		b. All the wells to the west of Dunn Field should be addressed in this work plan since they are affected by OU-1 related activities.	
2	32.	Sec 2.11	a. The Generic QAPP, RI/FS WP, and HASP are work plans and not technical studies. Please correct the text to reflect this.	
			b. We agree that the Pump Test Report produced by Engineering Science was flawed. However, the fact remains that a well and three piezometers were installed. This work has been the source of some data. It should be cited even if an explanation is added that the report is deficient.	
			c. There is no mention of the EM and magnetic surveys performed by the Waterways Experiment Station. This is evidence that the report was not consulted in the site sampling strategy.	

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DESIGN REVIEW COMMENTS — PROJECT DDMT Memphis (5-350, S: 10 Jul 95)

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NAME Denton/tlb

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
2 33.	Sec 3.1	Change "Interim Remedial Actions (IRA)" to "Remedial Actions (RA)". The ultimate goal is permanent cleanup.	
2 34a	34. Sec 3.1.2 & Figure 3-1	a. The AE appears to be using Interim Remedial Action (IRM) and Remedial Action interchangeably. There is a difference. One is permanent, the other is a temporary stop gap measure. Interim actions are used to mitigate significant adverse risk to life and property until a permanent solution is implemented. In the case of the groundwater, our goal is permanent remediation. However, until the contaminant plume is fully defined, an interim action (IRA) is being considered.	
1 34b		b. The AE's assumptions for the installation of soil borings are also flawed. Two monitoring wells or three soil borings will not be automatically installed every time additional data is needed. According to the text, monitoring wells could conceivably be located every 100 feet between sites.	
1 35.	Sec 3.1.3	Define "real time", "so on", and "so forth" as used in the text. State the difference between FBL SVOCs and VOCs for Level 2 and 3 analyses.	
2 36.	Sec 3.1.4	Clarify what is meant by "10 percent or more". This could conceivably mean 100 percent.	
A 37.	Sec 3.1.5 1	a. See previous comments on Interim Remedial Actions. Remove "Interim" from the title.	

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS — PROJECT DDMT Memphis (5-350, S: 10 Jul 95)

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ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
	1	b. Clarify if IRA as used in this paragraph was intended to be Removal Actions.	
38.	Sec 3.1.6 1	a. Please note that Primary field activities include collection and analysis of both soil and groundwater samples.	
	1	b. One well, MW-11A will be installed near MW-11 in Dunn Field. Several monitoring wells will be installed off-site to delineate the contaminant plume migrating to the west of Dunn Field. Others will be installed to provide background or control data. Existing wells will be used in conjunction with newly installed wells.	
39.	Sec 3.3 & Table 3-1 1	a. Modify the table to reflect that monitoring well installation is also included in the primary field work.	
	1	b. Define "real time".	
	2	c. Clarify briefly how Level 3 data will be completed and also state where in the QAPP the information can be found.	
1 40.	Sec 3.4	State where in the Generic QAPP background information can be found. In the last sentence, add that early removals may be considered in some instances.	
2 41.	Sec 3.1.6	Even though these are standard equations, add explanations for the letters used.	

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS — PROJECT DDMT Memphis (5-350, S: 10 Jul 95)

☒ SITE DEV & GEO	☐ MECHANICAL	☐ SAFETY	☐ SYSTEMS ENG	REVIEW AE's Draft Submittals
☐ ENVIR PROT&UTIL	☐ MFG TECHNOLOGY	☐ ADV TECH	☐ VALUE ENG	DATE 10 July 1995 TYPE
☐ ARCHITECTURAL	☐ ELECTRICAL	☐ ESTIMATING	☐ OTHER	NAME Denton/tlb
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ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
42.	Sec 4.0.1	1 a. Clarify the relationship between the sampling approach at the screening sites and this section of the document.	
		2 b. Clarify what will be gained by extending a boring to 80 feet regardless of PCOC. What if the release is only at 20 feet? In most instances in Dunn Field, ground water is above 80 feet.	
		1 c. Page 514 of the QAPP identifies the required Geotechnical analyses. The appropriate reference should be included in the FSPs to aid the reviewer.	
1 43.	Sec 4.0.2	Please note that there will be no blanket installation of monitoring wells just because soil data exceeded Level 2 analysis. We know that the groundwater below Dunn Field is already contaminated. Additional wells will not solve the problem. Our goal should be source identification and removal. This section should be rewritten to reflect that monitoring wells will be installed at sites selected by DDMT and agreed on by the regulators. Most of these wells are to the west of Dunn Field to track and delineate the contaminant plume. Other wells will be located in areas to fill in data gaps on background information. Depending on the results of the soil boring analysis and the data gap needs, DDMT may choose to install additional wells at selected locations.	
3 44.	Sec 4.1.4	The AE has not justified the need to analyze for Chemical Warfare products at this site. Also, it would appear that four 20 feet borings would be more useful than two 40 feet	

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS — PROJECT DDMT Memphis (5-350, S: 10 Jul 95)

☒ SITE DEV & GEO ☐ MECHANICAL ☐ SAFETY ☐ SYSTEMS ENG
☐ ENVIR PROT&UTIL ☐ MFG TECHNOLOGY ☐ ADV TECH ☐ VALUE ENG
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REVIEW AE's Draft Submittals
DATE 10 July 1995 TYPE
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ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
		borings in locating the burial site. Clarify why seven additional surface samples are needed. Where surface samples are proposed in addition to those taken from the borings, they should be clearly noted as such. Please note that because of the nature of eye ointment, this site was originally considered for NFA by the Government.	
45.	Sec 4.2.5 3	a. There is evidence to support the horizontal extent of the soil contamination from this site. The site was discovered during the installation of MW-10, debris was discovered at a depth of 3.5 feet. No such evidence was found during the installation of STB-6 and MW-2. We can, therefore, assume that the site did not extend to those areas.	
	2	b. In Section 4.2.2, it was previously stated that drilling mud may have transferred contaminants within the bore hole. Therefore, to conclusively state that data indicates that a release has occurred from the site is not true. This statement does not justify the installation of four 80-ft. borings.	
	2	c. Please justify the need to extend all four borings to 80 feet. Note that the water table is between 50 and 60 feet in this area. Clarify what will be gained even if contaminants are found at this depth below the groundwater?	

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS — PROJECT DDMT Memphis (5-350, S: 10 Jul 95)

☒ SITE DEV & GEO	☐ MECHANICAL	☐ SAFETY	☐ SYSTEMS ENG	REVIEW AE's Draft Submittals
☐ ENVIR PROT&UTIL	☐ MFG TECHNOLOGY	☐ ADV TECH	☐ VALUE ENG	DATE 10 July 1995 TYPE
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ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
	2	d. Clarify which geotechnical analysis will be performed. Please note that it was not intended for triaxial compression test to be performed on all geotechnical samples.	
	2	e. Please remember that EPA wants unfiltered groundwater samples for metals. Please ensure that this correction is made throughout the text.	
	2	f. Clarify the need for five additional surface samples when surface samples are also being analyzed from the proposed soil borings. All the samples around STB-2 and, also, those between STB-6 and MW-3 do not appear to be warranted.	
2	46. Figure 4-5	The six surface samples and three borings appear excessive. Also, according to this figure, samples will be taken at the surface and between 1 and 3 feet. The text states that samples will be collected at the surface and at 5 feet. Please correct the discrepancy.	
2	47. Sec 4.4 & Figure 4-7	Clarify what will be gained to hand auger to only 4 or 5 feet "to avoid hitting acid jars" when the reported depth of burial is reported to be 8 feet. Also, justify the need for four additional subsurface when six are being collected from the borings for VOC analysis.	
2	48. Sec 4.4.5	State the need for three 80-foot borings when groundwater depth is approximately 75 feet in this area.	

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS

PROJECT DDMT Memphis (5-350, S: 10 Jul 95)

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ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
49.	Sec 4.6.5 1	a. Justify the need to extend all the borings to 80 feet when groundwater is between 70 to 75 feet. Also, state why the surface samples from the soil borings are not sufficient.	
	2	b. State the purpose of the geotechnical samples. Please note the previous comment regarding triaxial samples.	
1 50.	Sec 4.7.5 & Figure 4-7	Please correct the discrepancy between the figure and text. The Figure shows one soil boring and two surface samples. The text states four soil borings and five surface samples will be collected. Clarify if this means one extra surface sample in addition to the four collected from the soil borings, or are these actually five additional samples?	
2 51.	Page 5-4	Please note the Semi-annual sampling is currently our preference and all OU-1 wells will be sampled in conjunction with the other DDMT installed wells.	
52.	Drawing 1 & 1 Figures 1	a. Please note that MW-11A is a proposed well.	
		b. Identify the soil boring and surface sample locations as "past" or "previous" to differentiate between these and the proposed ones in the Figures.	

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DESIGN REVIEW COMMENTS

PROJECT Defense Depot, Memphis, TN

☒ SITE DEV & GEO	☐ MECHANICAL	☐ SAFETY	☐ SYSTEMS ENG	REVIEW
☐ ENVIR PROT&UTIL	☐ MFG TECHNOLOGY	☐ ADV TECH	☐ VALUE ENG	DATE 11 July 1995 TYPE
☐ ARCHITECTURAL	☐ ELECTRICAL	☐ ESTIMATING	☐ OTHER	NAME Denton/tlb
☐ STRUCTURAL	☐ INST&CONTROLS	☐ SPECIFICATIONS		

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
		OU-4	
1.	Pg(s) iii & 2-1	a. According to Page iii, the principal contaminant in OU-4 resulted from the PCP Dip Vat operation, yet on Page 2-1, the Dip Vat sites are addressed with the Screening Site. Clarify how a principal contamination is assigned to the screening sites.	
	2	b. Also, clarify the relationship between Site 57 and the various buildings mentioned on Page 2-11.	
2	2. Pg iv	No mention is made that the primary objective of the overall groundwater strategy is to track and delineate the contaminant plume migrating to the west of Dunn Field.	
1	3. Sec 1-1	Site 57 has been mentioned several times, however, there is no explanation of what this site is or why its characterization is the first objective for the FSP.	
1	4. Table 1-1	Add an explanation for LAW to the footnotes.	
1	5. Sec 2.5	Clarify the significance of Building 737 to this FSP. As previously mentioned in Comment 1, the text states that the PCP area is included with the screening sites.	
1	6. Sec 3.1.1	a. Clarify that the shallow wells will be included in the Fluvial aquifer. b. Clarify why the OU-1 contaminant plume should be investigated by this FSP.	

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS — PROJECT Defense Depot, Memphis, TN

☒ SITE DEV & GEO	☐ MECHANICAL	☐ SAFETY	☐ SYSTEMS ENG
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NAME Denton/tlb

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
		c. Please state that wells will not be installed into the Memphis Sand Aquifer without a written directive from the regulators to the Commander of DDMT.	
7.	Sec 3	Our comments for the Sampling Strategy for OU-1 (Section 3) also apply to this and all the other OUs. Please make the necessary changes. Also clarify the significance of nine samples per exposure pathway. State if this means nine samples per soil boring, nine samples per site or a total of nine samples per OU.	
8.	General	The Generic QAPP and Workplans are referenced several times throughout this FSP. The applicable sections must also be included in these references.	
9.	Sec 4.1	If the general groundwater strategy is a part of the FSP as stated on pages ii and 1-1, it should be included here.	
10.	Sec 4.2.1	If the amount of the "documented" spill is known it should be stated, if it is not known, say so.	
11.	Sec 4.2.5	a. Justify the need for 9 and "as many as 15" soil borings at this site. State what is distinctive about the proposed locations.	
		b. Clarify why the surface samples from the nine borings are not sufficient for this site. The area around this building is either covered in grass or gravel. State what 20 additional surface will accomplish.	

ACTION CODES:
A - ACCEPTED/CONCUR
D - ACTION DEFERRED
W - WITHDRAWN
N - NON-CONCUR
VE - VE POTENTIAL/VEP ATTACHED

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS

PROJECT Defense Depot, Memphis, TN

☒ SITE DEV & GEO	☐ MECHANICAL	☐ SAFETY	☐ SYSTEMS ENG	REVIEW
☐ ENVIR PROT&UTIL	☐ MFG TECHNOLOGY	☐ ADV TECH	☐ VALUE ENG	DATE 11 July 1995 TYPE
☐ ARCHITECTURAL	☐ ELECTRICAL	☐ ESTIMATING	☐ OTHER	NAME Denton/tlb
☐ STRUCTURAL	☐ INST&CONTROLS	☐ SPECIFICATIONS		

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
		c. Please also note that only two surface samples are shown of the referenced Figure 4-2.	
		d. The 6 surface samples selected for Level 3 analysis will either be 28 or 22 percent (if 9 or 15 soil borings are installed). This is twice the 10 percent target stated earlier in the DQOs.	
12.	Sec 4.2.6	Add that the locations of the two proposed wells are shown on Figure 2-3.	

ACTION CODES:
A - ACCEPTED/CONCUR
D - ACTION DEFERRED
W - WITHDRAWN
N - NON-CONCUR
VE - VE POTENTIAL/VEP ATTACHED

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Section 5

Response to CEHND/JD Handwritten Comments on FSPs

samples will be located based on the results of the field screening of the initial samples. Six surface soil samples will be selected and submitted to an offsite laboratory for Level 3 analysis, as outlined in the *Generic QAPP* (ref. 15).

4.2.6 Groundwater Sampling and Analysis

Two groundwater samples will be obtained from the Fluvial Aquifer to characterize groundwater contamination that may have been caused by a release from Site 57. A monitoring well will be installed south of MW-34 to characterize Fluvial Aquifer groundwater quality from other potential sources in OU-4. From information collected to date, ~~it appears that this well also will evaluate groundwater downgradient of OUs-2 and~~ This monitoring well, along with other Fluvial Aquifer monitoring wells, will be used to characterize the extent of the suspected area of hydraulic interconnection between the two aquifers.

On the basis of the information obtained from the groundwater investigation, the feasibility of installing an additional deep well, screened in the Memphis Sand Aquifer, will be evaluated. This decision will take into account the following:

- Nature and extent of contamination at Site 57
- Nature and extent of contamination in the Fluvial Aquifer
- Potential hydraulic interconnection between the two aquifers
- Topography of the top of the confining clay bed
- Geotechnical properties of the confining clay bed

Existing monitoring wells MW-18, MW-19, MW-20, MW-27, MW-34, MW-38, and MW-39 will be sampled according to procedures outlined in the *Generic QAPP* (ref. 15). Locations of the existing monitoring wells are shown in Figure 4-3. Groundwater samples will be screened for VOCs, SVOCs, metals, and pesticides. Ten percent of the samples, with a minimum of one sample, will be submitted to the offsite laboratory for Level 3 analysis.

4.3 Facilitywide Groundwater Investigation

4.3.1 Strategy Summary

The goal of the groundwater investigation is to achieve a better understanding of the Fluvial Aquifer characteristics, the contamination within it, and the degree of interconnection between the Fluvial and Memphis Sand aquifers. The overall objectives to meet this goal include the following:

- Prepare a current potentiometric map for the Fluvial Aquifer, based on existing and additional monitoring well locations.

- Assess groundwater quality flowing onto the facility.
- Delineate the nature and extent of the contamination plume beneath Dunn Field and offsite to the west.
- Assess the potential hydraulic interconnection between the Fluvial Aquifer and the deeper Memphis Sand Aquifer.

As part of the groundwater quality assessment at DDMT, this FSP includes the installation of up to 21 new wells in addition to two monitoring wells associated with Site 57. Nine of these wells will be place around DDMT's perimeter, 6 will be placed outside of DDMT's property west of Dunn Field, five optional wells will be placed farther west (along Elvis Presley Boulevard or at other locations if appropriate), and a final well will be placed in the suspected area of hydraulic interconnection between the Fluvial Aquifer and the deeper Memphis Sand Aquifer.

Give their # and Reference Sec 4.3.3. & Fig F-4

OU-2 FSP states that wells will be located in OU-4 FSP

For information about proposed monitoring wells associated with a specific site, refer to the OU-specific FSP for that site. Currently, known groundwater contamination at Dunn Field is being addressed through an interim remedial alternative (IRA). A technical memorandum will be issued describing the drilling and testing of the recovery well, with interpretation of results, and providing recommendations for location, construction, spacing, and pumping rates for additional recovery wells.

4.3.2 Existing Data

MWs-3 through 15, MW 28, MW 29, and MWs-30 through 35 are located in Dunn Field. VOCs and metals have been detected in the groundwater in MWs-3 through 13, MW-29, MW-35, MW-31, and MW-32 during the previous RI (ref. 5) and during investigations conducted by ESE (ref. 2). Table 4-2 presents the maximum concentration of contaminants found in Dunn Field groundwater samples. Previous sampling activities also indicate the presence of VOCs and metals in Main Installation wells MW-21, MW-22, MW-25, and MW-26. Refer to Appendix B for complete sampling data. Tables 4-3 and 4-4 show comparisons of existing data with ARARs and PRGs.

4.3.3 Monitoring Well Location and Rationale

Figure 4-4 illustrates the locations of proposed monitoring wells addressed in this FSP, as well as the potentiometric contours of the Fluvial Aquifer in November 1993. Proposed locations are in the general area of placement; the exact placement of wells depends on a field check to ensure accessibility and absence of overhead or underground barriers such as power lines, underground cables, water lines, and so forth. Proposed monitoring wells have not yet been numbered to allow for greater flexibility in placement, addition, or deletion of any wells. Proposed wells are lettered in Figure 4-4 for convenience in discussion. The proposed wells will be numbered by the field team leader (FTL) in a manner consistent with standard well numbering practices at DDMT.

Remove

Wells A through E have been placed to aid in the revision of the potentiometric surface map and to assess groundwater quality flowing onto the facility. Their positions were chosen to fill voids in water quality and water level data. Wells F, G, H, and I are upgradient from MW-26, MW-25, MW-22, and MW-21, respectively. As discussed in Section 4.3.2, these existing wells have indicated the presence of VOCs and metals in the past. Wells F, G, H, and I will therefore be useful in characterizing contamination associated with the existing monitoring wells, assessing groundwater quality flowing onto the facility, and providing the water level data necessary to update the potentiometric surface map.

Wells J through T have been placed to aid in delineation of the nature and extent of the contamination plume beneath Dunn Field and to provide water level data necessary to update the potentiometric surface map. Wells K, L, and M will be installed first, with wells A through H installed next. Chemical analyses from Wells K, L, and M will be evaluated during the installation of Wells A through H, and a round of water level readings will be taken from new and existing wells. The chemical data will be used to evaluate whether the contamination is bound on the western side of the plume. The water level data will be used to revise the potentiometric surface map. This revised map, in combination with the analytical data, will then be used to determine the location (if needed) of Wells J and N through T.

A final well, Well U, will be placed in the area of suspected hydraulic interconnection (water table low) between the Fluvial Aquifer and the deeper Memphis Sand Aquifer. Exact placement of this final well will depend on groundwater elevation data provided by the other wells. In general, the well is expected to be placed in OU-4 near the southwestern corner of OU-1. This well will be a nesting pair to the proposed deeper Memphis Sand Aquifer well discussed in Section 4.6.

4.3.4 Potential Contaminants of Concern

Previous investigations of the groundwater in the vicinity of or upgradient to these wells indicate the presence of VOCs and metals. Therefore, the PCOCs for this portion of the investigation are VOCs and metals.

4.3.5 Groundwater Sampling and Analysis

The existing monitoring wells and analytical parameters selected for evaluation (see Figure 4-4) are presented in Table 4-5. Additionally, eight of the wells will be analyzed for data collection needs for the evaluation of alternatives and to assess the risk of contamination associated with the facility. The eight wells were selected because of their location around OU-1, which will allow for a systematic sampling approach. The wells are MW-3, MW-6, MW-8, MW-13, MW-14, and MW-32. MW-34 and MW-36 and the additional analytical parameters, include total organic carbon (TOC), sulfate, nitrite/

nitrate, chlorides, ammonia, and iron. Proposed monitoring wells A through J will be analyzed for TCL/TAL and monitoring wells K through U will be analyzed for VOCs and metals.

DAPP The intention was to give the AE flexibility in planning, but in the QAPP prior to fieldwork we would like to know in advance what the AE is going to do. This is to ensure that appropriate techniques will be employed and to ensure that the AE plans and have the right equipment available. Want to also ensure appropriate mathematical formula is employed

4.3.6 Hydraulic Conductivity

The hydraulic conductivity of the water-bearing zone in which each monitoring well is screened will be estimated using an appropriate slug test method that will be determined in the field. This approach will allow the flexibility to select a slug test that will yield optimal results.

4.3.7 Monitoring Well Abandonment

Monitoring well MW-17, located in the north-central portion of OU-4, has been damaged and is no longer usable. As part of the OU-4 field activities, this well will be plugged and abandoned in accordance with American Society for Testing and Materials (ASTM) D 5299 and TDEC requirements. A new well will be drilled to replace it.

where is this well identified — clarify if the AE has inspected this well.

4.4 Fluvial Aquifer Monitoring Well Installation

4.4.1 Soil Sampling

Each monitoring well boring will be drilled to the top of the Jackson Formation/Upper Claiborne Group. Soil samples will be collected at 5-foot intervals from each soil boring for visual classification. Three soil samples each will be submitted for a chemical analytical scan from the two monitoring well borings at Site 57. The samples will be collected on the basis of field screening and at the discretion of the field geologist. Selected soil samples also will be submitted for geotechnical analysis. Refer to the *Generic QAPP* (ref. 15) for soil sample analyses.

any particular reason? any chemical samples

according to Fig. 4-3 only one well is proposed for this site

4.4.2 Well Design

Where?

Well and screen placement depths will be developed according to site-specific field conditions and will be determined by the onsite field geologist. Refer to the *Generic QAPP* (ref. 15) for Fluvial Aquifer monitoring well design and construction details.

The depth of these wells is approximately 100 to 150 ft, based on data from previous studies. A 15-foot polyvinyl chloride (PVC) screen will be placed at or near the base of the Fluvial Aquifer. Risers used in the construction of the wells will be PVC. Figure 4-3 shows the general locations proposed for the installation of these wells. Monitoring wells will be numbered by the FTL during field operations to allow greater flexibility in placing wells as more information is obtained.

what if the aquifer is not 15 ft thick.

?

4.4.3 Monitoring Well Development

The new monitoring wells will be developed in accordance with the procedures outlined in the *Generic QAPP* (ref. 15). In addition to the new wells installed at OU-4, all existing monitoring wells at DDMT will be re-developed in accordance with the procedures outlined in the *Generic QAPP*.

Purged

State where in the QAPP these are found

4.5 Quarterly Monitoring of Groundwater Levels

for the first year

Groundwater levels will be measured in all DDMT wells both onsite and offsite. The purpose of this quarterly monitoring will be to evaluate levels of groundwater fluctuation in the wells and to further define the direction of groundwater flow. Water levels will be measured using standard measuring techniques described in the *Generic QAPP* (ref. 15). If the fluctuation is not significant measurement may be conducted semiannually after the first year.

4.6 Memphis Sand Aquifer Monitoring Well Installation and Sampling

The following task is tentatively described, but installation will depend on the evaluation of offsite and OU-4 investigations.

This well will be installed only if the CO of DDMT is directed by the regulators ~~to~~ in writing to do so.

4.6.1 Purpose

The intent of a deep aquifer well will be to evaluate Memphis Sand Aquifer groundwater quality downgradient of the area of suspected hydraulic interconnection between the Fluvial Aquifer and the Memphis Sand Aquifer if contaminants are found within or migrating toward the depression. The location of this monitoring well will be established after the extent of the suspected area of hydraulic interconnection between the Fluvial and Memphis Sand Aquifers has been evaluated by the installation of monitoring wells west of Dunn Field and at OU-4 (as outlined in this FSP). This well will be located next to a Fluvial Aquifer monitoring well, so that a nested well pair within the suspected area can be established between the two aquifers.

4.6.2 Evaluation of Aquifer Interconnection

Nested pair monitoring wells MW-32/MW-37, located west of Dunn Field, and the new nested pair resulting from installation of the Memphis Sand Aquifer well will be sampled for water quality parameters to evaluate the degree of interconnection between the two aquifers.

Nested pair monitoring wells MW-32/MW-37 are installed outside of the suspected area of hydraulic interconnection between the two aquifers where the Jackson Formation/ Upper Claiborne Group confining unit is 90 ft thick. The head difference between these two wells is about 70 ft. This head difference indicates minimal interconnection of the

aquifers at this location. The new nested pair will be located inside the suspected area of hydraulic interconnection.

In addition to the PCOCs, the four monitoring wells and the deep well will be sampled for the following parameters:

- Aluminum
- Silica
- Iron
- Calcium
- Magnesium
- Sodium
- Potassium
- Tritium
- Bicarbonate
- Sulfate
- Chloride
- Fluoride
- Nitrate
- Total dissolved solids
- Hardness as $CaCO_3$

The concentrations of these parameters will be compared between the deep well and shallow well in each nested pair. If minimal interconnection exists between the two aquifers, there should be a significant contrast between the water quality parameters in each aquifer. If mixing of groundwater is occurring, then the concentrations of the parameters in the Memphis Sand Aquifer and the Fluvial Aquifer should be similar. This comparison of water quality parameters between both pairs of nested wells will provide a qualitative indication of the degree of interconnection between the Fluvial Aquifer and the Memphis Sand Aquifer inside the area of suspected hydraulic interconnection at DDMT.

4.6.3 Monitoring Well Installation

Memphis Sand Well

This well will be a double-cased monitoring well. The initial (surface) casing will be installed into the Jackson Formation/Upper Claiborne Group, which separates the Fluvial Aquifer from the underlying Memphis Sand Aquifer. The purpose of the surface casing is to prevent mixing of Fluvial Aquifer groundwater with Memphis Sand Aquifer groundwater inside the monitoring well borehole. The monitoring well (which is the second casing) will be installed inside the surface casing.

The surface casing will be steel and will be of sufficient inside diameter (ID) to allow drilling and installation of a 4-inch-diameter monitoring well. The surface casing will be installed a minimum of 3 ft into the top of the Jackson Formation/Upper Claiborne Group. The borehole to be drilled for the surface casing will be of sufficient diameter to allow a 2-inch annular space between the wall of the borehole and the outside of the surface casing. A drillable plug will be installed in the bottom of the surface casing before installation, thus providing a clean environment down to the top of the confining bed before drilling into the Memphis Sand Aquifer.

After drilling and placement of the surface casing to the target depth, the annular space between the borehole and outside of the surface casing will be pressure-grouted using a cement/bentonite slurry that conforms to ASTM D 5092-90. The grout will be placed

using tremie methods. The grout will be allowed to cure for a minimum of 24 hours before well installation proceeds.

After installation of the minimum 8-inch-ID surface casing, a borehole will be advanced through the confining unit, to a minimum of 15 ft into the Memphis Sand Aquifer. Relatively undisturbed samples of the confining unit will be collected for laboratory permeability testing as specified in the *Generic QAPP* (ref. 15).

After reaching the target depth, a 4-inch ID, schedule 40, PVC monitoring well will be installed in the Memphis Sand Aquifer in accordance with the procedures outlined in the *Generic QAPP* (ref. 15). Except for the ID of the monitoring well screen and casing (which will be 4 inches), the well materials and completion will the same as the materials specified in the *Generic QAPP*.

4.6.4 Monitoring Well Development

After installation, the monitoring well will be developed using the procedures outlined in the *Generic QAPP* (ref. 15).

4.6.5 Monitoring Well Sampling and Laboratory Analysis

After the well has been developed, a full scale chemical analytical scan will be run on the groundwater sample. Sampling methods will be in accordance with the procedures outlined in the *Generic QAPP* (ref. 15).

What about Bldg 319, 835 and the DRMO Sites mentioned in 2.2?

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State equivalent Section of the GAPP. Ensure that they coordinate

6.0 Quality Assurance for Field Sampling

The goal of QA in the field is to provide data of known quality to the project team to support the project decision-making process. The implementation of QA goals is the responsibility of the FTL. The FTL reports to the project manager (PM) and is responsible for the coordination of field efforts, provides for the availability and maintenance of sampling equipment and materials, and provides shipping and packing materials. The FTL supervises the completion of all chain-of-custody records, supervises the proper handling and shipping of samples, and is responsible for accurate completion of the field notebook. As the lead field representative, the FTL is responsible for consistently implementing program quality assurance/quality control (QA/QC) measures at the site and for performing field activities in accordance with approved work plans, policies, and field procedures. The *Generic QAPP* (ref. 15) provides details on meeting the goal of QA during the field investigation. This section summarizes some of the critical field QA procedures, as well as the QA/QC samples to be collected during the field investigation.

6.1 Field Documentation Summary

All field notes will be recorded in indelible ink on standard forms in bound notebooks. Section 4.3 of the *Generic QAPP* (ref. 15) contains all information that will be recorded in the field book. A daily field log will be completed by the FTL. This log will be signed and dated daily. Significant events occurring during the day will be recorded and reported to the PM. Daily communication is essential to evaluate whether timely corrective measures are necessary. The field notebooks must provide a place for the field team members to sign and date the entries. The FTL or designated representative will conduct weekly informal audits for completeness. The following items must be entered:

- Sample labels
- Chain-of-custody records
- Field notebooks
- Sampling operations
- Document control

6.2 Field Monitoring Summary

All field monitoring equipment will be calibrated according to the procedures outlined in Section 6 of the *Generic QAPP* (ref. 15); all field procedures concerning groundwater and soil sampling are described in Section 5. Additionally, Section 5 contains soil boring and monitoring well drilling procedures, geophysical survey and logging procedures, and all equipment decontamination procedures.

OU-2 Comments

Description of Operable Units 117 72

DDMT is divided into four operable units (OUs) for evaluation purposes. OU-1, north of the Main Installation, is called Dunn Field. The Main Installation is divided into three areas: the southwestern quadrant (OU-2), the southeastern quadrant including Lake Danielson and the golf course area (OU-3), and the north-central area (OU-4). Sites identified in OU-1 for investigation resulted from use of the area for landfill operations, mineral stockpiles, pistol range use, and materials storage. Potential contamination of OU-2 may have resulted from spills or releases from the hazardous material storage and recouping area, sandblasting and painting activities, or both. In the recouping area, hazardous and nonhazardous materials from damaged and leaking containers were repacked. The potential sources of contamination in OU-3 are storage of polychlorinated biphenyls (PCBs) and the use of pesticides and herbicides. Principal contamination in OU-4 probably resulted from a wood treatment operation and hazardous material storage.

EPA Wants this defined

Soil samples taken in OU-2 around the recouping area indicated metal and pesticide contamination. Low levels of toluene were also detected. In the northeastern portion of OU-2, an underground tank was used to store waste oil and has since been removed. Soil samples taken in the area have detected elevated levels of tetrachloroethene, polynuclear aromatic hydrocarbons (PAHs), and a few metals. Soil samples have also previously been collected in OU-2 around the area where sandblasting and painting activities occurred. In this area, the categories of contaminants that were detected included PAHs, pesticides, and metals.

Summary of FSP

This FSP describes the DDMT facility, history of OU-2, data gaps, and data needed for OU-2. General information is also provided on OU-2 location, geography and topography, meteorology, surface water hydrology, geology, hydrogeology, and land use. Additionally, this FSP describes the sampling strategy and sampling plan for the RI sites in OU-2. The final section of the plan describes the data needs required to propose remedial alternatives for OU-2. The purpose of the activities proposed in this FSP are as follows:

- To characterize potential releases from the site
- To assess the nature and extent of soil and groundwater contamination attributable to past operations
- To support a baseline risk assessment (BRA)
- To gather data to evaluate the feasibility of remedial actions for this site

Sampling Strategy

117 73

A cost-effective, high-quality sampling strategy has been developed to perform an RI/FS at DDMT. This FSP uses an observational approach to collecting field data and making field-based decisions to achieve the goals of the facility. The approach presented is intended to support a recommendation of one of the following options for each RI site:

- Site upgrade (FS activities)
- Site downgrade (support no further action)
- Interim remedial action (IRA) — We Want a final RA

This is Temporary

To support the development of recommendations in a timely manner, soil and water samples will be collected at OU-2 and analyzed using onsite close support laboratory (CSL) methods and quick-turnaround methods from a fixed-base laboratory (FBL). A minimum of ten percent of the CSL and quick-turnaround samples (Level 2) will be sent to an offsite laboratory for Level 3 confirmational analysis. The Level 2 and Level 3 data will be used for comparison to regulatory levels and calculated risk levels of contamination to aid in supporting the appropriate recommendation for action at a given site.

What is the difference between onsite & CSL?

Proposed Sampling

The OU-2 FSP describes RI sites that have been identified on the basis of their potential for contamination as a result of past practices. Surface and subsurface soil samples have been proposed for each site. Surface soil samples will provide information to assess the horizontal extent of contamination and will provide data to evaluate risk associated with the surface soil exposure pathway. Soil borings will also be installed at the proposed site locations. Subsurface soil samples will be collected at regular intervals from the borings to assess the vertical extent of contamination. — no surface samples from the borings?

Groundwater sampling will be conducted at each RI site in OU-2. At three of the four sites, a well is located on the upgradient side of the site. At the fourth site, an existing well is located downgradient of the site. These wells will be sampled during the field activities. Monitoring wells will be installed along the property boundary of DDMT upgradient of a number of the RI sites to evaluate whether offsite sources are contributing to contamination found at DDMT. Installing additional downgradient monitoring wells will be an optional activity that depends upon the results of the soil sampling and the results from the existing wells and the wells planned for monitoring of offsite sources. A well will be installed downgradient of an RI site if contamination detected in the deepest soil boring samples is above background concentrations and PRGs or if contamination found in wells located in the vicinity of a site cannot be attributed to offsite sources.

What will this accomplish

By implementing the OU-2 FSP, the RI/FS can be conducted in a cost-effective, timely manner. Additionally, high-quality data will be obtained to support an evaluation of remedial alternatives for cleanup of OU-2 at DDMT.

define ? [illegible]

that the investigation of all applicable sites would proceed under the CERCLA process for remediation (RI, feasibility study [FS], proposed plan, Record of Decision [ROD], remedial design, remedial action, or NFA).

1.3 Facility and Site Status

As a result of the NPL status, the required site-specific investigations, and the FFA, the facility has been geographically delineated into four operable units (OUs). OU-specific FSPs are being prepared for OUs 1, 2, 3, and 4. These OU-specific FSPs will provide guidelines for conducting the remedial investigation/feasibility studies (RI/FSs) for each of the OUs. The OU-specific plans will address sites that have been known to have past releases as a result of facility operations. Schedules for completing specific tasks during the process have been submitted separately in the *Site Management Plan (SMP)*.

DDMT is conducting RI/FS activities at OU-2 in conformance with the requirements of CERCLA and the FFA. In addition, elements of DDMT's RCRA permit dictate that DDMT undertake a study to confirm the absence or presence of contamination at locations where hazardous or toxic wastes were managed or disposed. This FSP addresses the sites within OU-2 that have been previously identified as requiring a remedial investigation (i.e., Sites 27, 32, 34, 89). The remainder of the identified sites within OU-2 fall into one of three status categories: screening site, no further action site, or early removal site (Table 1-1). Activities related to these sites will be addressed in the *Screening Sites FSP*, *NFA Report*, or *Early Removal Memorandum*. Each of these documents will be submitted to TDEC and EPA for review. Table 1-1 presents a summary of all the sites at OU-2 and cites the specific document that will address future work planned for each site.

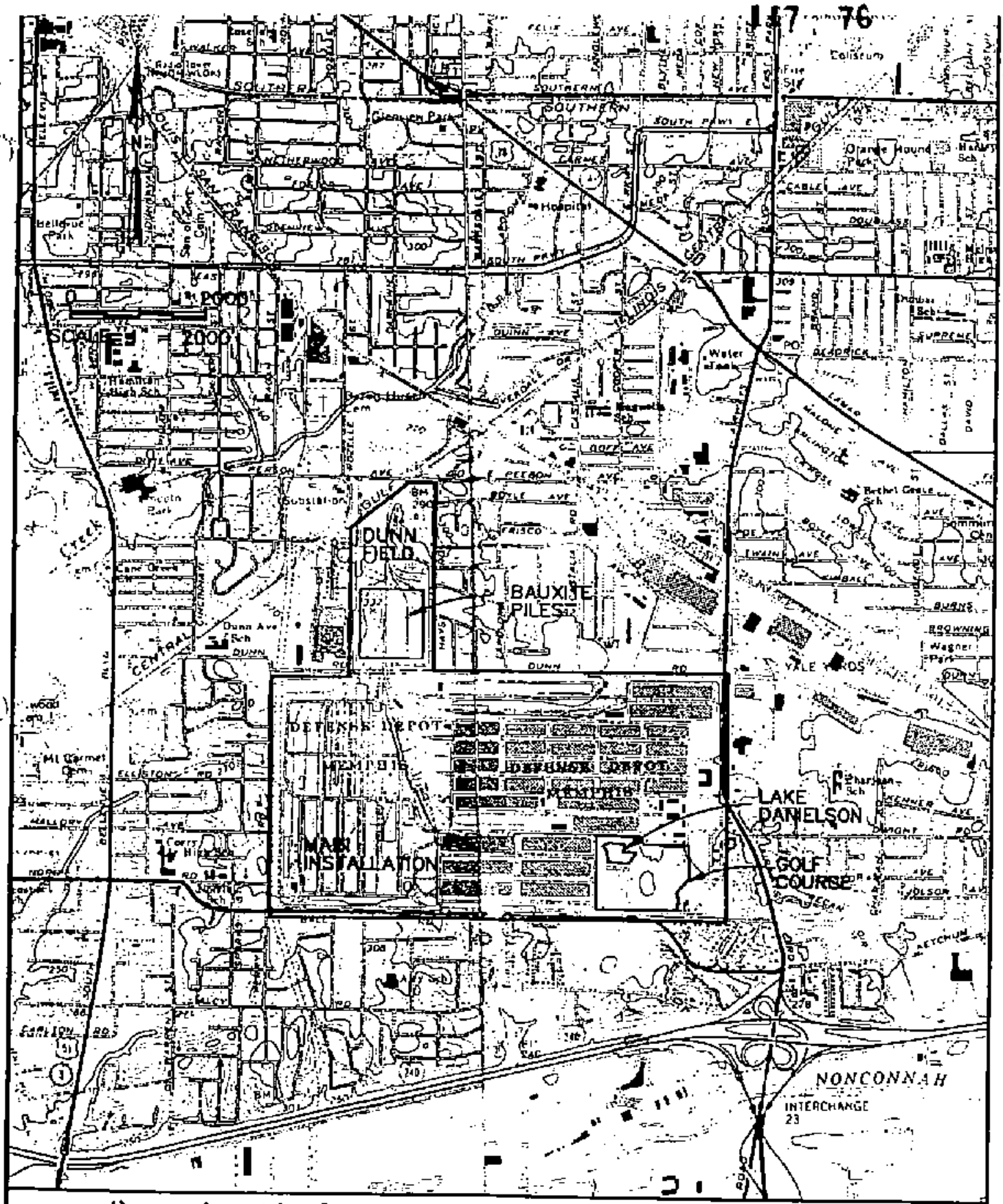
one Proposed for until the plan becomes final, nothing is cast in concrete.

1.4 Elements of the Field Sampling Plan

This FSP is written as a supplement to the generic (facilitywide) work plans for DDMT. Details not included in this plan can be found in the generic work plans. These work plans were provided as separate documents and are listed below:

- *Generic RI/FS Work Plan (Generic RI/FS WP)*
- *Generic Quality Assurance Project Plan (QAPP)*
- *Generic Health and Safety Plan (HASP)*

The FSP defines the sampling and data-gathering that will be conducted. The structure of the FSP includes all known site conditions and history; proposed site-specific sampling, analysis, intended data use, and data quality level; and a discussion of required field actions that are not site-specific. Sample designation, sample equipment and procedures, and sample handling and analysis are addressed in the *QAPP* (ref. 1).



Yellow and Purple Areas?

Source:: USGS 7.5 Series Topographic Quadrangle Maps - South West Memphis Tenn. - Ark. and South-east Memphis, Tenn,.

FIGURE 2-4
SURFACE TOPOGRAPHY OF DDMT AND SURROUNDING AREA OF MEMPHIS, TENNESSEE
Defense Depot Memphis, Tennessee

MU2-0004.DWG

Most of DDMT is level with, or above, surrounding terrain; therefore, DDMT receives little runoff from adjacent areas. DDMT does receive runoff from the property to the northeast of Dunn Field. Property to the southwest of OU-2 is also at a higher elevation than DDMT, but storm water drainage systems along the roadway would capture the majority of runoff.

Most of the DDMT facility is grassed or paved, so the installation tends to generate significant amounts of runoff. Most Dunn Field drainage is achieved by overland flow to the adjacent properties to the north and west. The Main Installation's surface drainage is achieved by overland flow to a storm drainage system. The primary drainage directions and outfall locations are to the west (Tarrent Branch), to the east (unnamed ephemeral stream), and to the south (unnamed ephemeral stream).

The potential for flooding of DDMT is relatively low. DDMT surface elevations (276 to 316 ft NGVD; ref. 3) are well above the average Mississippi River alluvial valley flood levels (185 to 230 ft NGVD). Furthermore, the surface elevations at DDMT are equal to or higher than elevations of adjacent properties.

Two permanent surface waters exist at DDMT. The larger body of water is Lake Danielson, which is about 4 acres; it receives a significant amount of installation storm water runoff. The smaller water area is the Golf Course Pond. Overflow from both water bodies eventually discharges into Nonconnah Creek.

OU-2 has no perennial surface water bodies. More detail on the surface water hydrology at DDMT can be found in the *Generic RI/FS WP* (ref. 3).

2.6 Geology

2.6.1 Regional Geology

The area of Memphis, Tennessee, straddles two major subdivisions of the Atlantic Coastal Plain Physiographic Province. Figure 2-7 shows a general geologic cross section of the Memphis area. DDMT is situated within a major structural feature termed the Mississippi Embayment. This area is described as a youthful to mature, belted coastal plain (ref. 4).

Information describing major regional geologic units has been obtained from Wells (ref. 5), Moore (ref. 6), Nyman (ref. 7), and Graham and Parks (ref. 4). The Quaternary and Tertiary strata in the Memphis area are composed of loosely consolidated deposits of marine, fluvial, fluvioglacial, and deltaic sediments. In Tennessee, unconsolidated sediments (Cretaceous through Quaternary) reach their maximum thickness at Memphis, where they range from 2,700 to 3,000 ft. Further information on regional geology can be found in the *Generic RI/FS WP* (ref. 3).

confirmational analyses from an FBL (Level 3 data). Four sites at the DDMT facility have been identified for RI in OU-2 and are included in this work plan. Each site is evaluated to identify the quantity and quality of data needed to achieve the objectives of the RI activities. The site-specific sampling activities are included in Section 4 of this report. Figure 3-1 provides a proposed decision logic diagram.

3.1.3 Field Screening

define — REMOVE

Screening analyses will provide "real time" soil and groundwater data that can be used to investigate the site effectively. Each field sample collected will be screened for a list of compounds (see Section 4). The screening data will be coupled with offsite laboratory confirmational analyses. The confirmational analyses will provide qualitative evaluation of the data and can be used to express the level of confidence with which one data set can be compared to another. The advantages of this type of assessment, as compared with a drilling and FBL assessment, include field adaptability or flexibility to changing site conditions, reduction in investigation-derived waste, and timely contaminant delineation with reduced costs.

Where in the document

The *QAPP* (ref. 1) addresses quality assurance/quality control (QA/QC) of the sample activities and discusses data quality levels for each specific analytical constituent to be used for the screening activities. Three levels of data quality will be used during the RI activities:

- Level 1 analyses may include measurements such as field pH, immunoassay kits, and soil vapor analysis using an organic vapor analyzer (OVA).
- Level 2 analyses may include analyses such as volatile organic compound (VOC) analysis in a close support laboratory (CSL) and quick-turnaround analyses from an FBL for VOCs, polynuclear aromatic hydrocarbons (PAHs), metals, pesticides, and PCBs.

  define — as this one is to
- Level 3 analyses may include FBL analyses for VOCs, PAHs, metals, pesticides, and PCBs.

The same analytical methods will be used for the Level 2 quick-turnaround FBL analyses as the Level 3 FBL analyses. The primary difference will be the data package deliverable.

What are they?

Level 4 data may be required in the future at this facility. Samples analyzed using Level 4 quality control (QC) are analyzed using the same analytical methods as Level 3 samples, but different data package deliverables are provided. Confirmational samples will be analyzed using Level 3 QC, and no Level 4 QC is proposed at this time. However, if in the future Level 4 information becomes necessary, this information will be requested from the analytical laboratory.

concentrations and PRGs. Subsurface soil samples will be collected to further evaluate the nature of contamination and assess the vertical extent of contamination.

The existing monitoring wells will be sampled at each of the sites. Additional monitoring wells may be installed if existing data or data collected during investigation of soil contamination at the RI sites indicate the need for further groundwater monitoring.

3.1.2 Approach

A phased approach is being used to implement the observational method to the investigation of the RI sites. The RI sites to be investigated as part of this work plan are located in OU-2 in the southwestern quadrant of the Main Installation.

The focus of the approach to the RI site investigation is to assess the nature and extent of potential soil contamination and to investigate whether there may have been releases that have adversely affected the quality of groundwater. Primary soil samples that are planned with respect to location and depth will be collected at each of the sites. If these samples indicate the extent of contamination has been found, no further sampling will be performed. However, additional "optional" samples may be needed to more fully assess the extent of contamination. The extent of contamination will be evaluated based on comparison to the higher of the background or PRG concentrations of the parameters detected. Background concentrations will be developed as described in the *Generic RI/FS WP* (ref. 3). The analytical results of the primary samples will be reviewed in the field to evaluate the need for any optional samples. Use of Level 2 (quick turnaround) analyses will expedite this process. Additional samples may also be collected if field personnel discover visual evidence of contamination in areas that are not planned for sampling.

At each RI site, groundwater will be investigated through sampling of the existing wells. Upgradient wells will also be installed near the facility boundary to investigate sources of offsite contamination. Existing data from a number of the RI sites in OU-2 indicate the potential for offsite contamination entering the DDMT facility. Monitoring wells may be installed downgradient of the RI sites. If contamination is found in the deepest soil samples, it will be compared to the higher of background concentrations or PRGs. If levels are above the applicable comparison criteria, a downgradient Fluvial Aquifer monitoring well will be installed and sampled. Downgradient wells may also be installed if new upgradient wells do not indicate an offsite source for contamination found in the existing wells.

Results of the soil and groundwater sampling performed during this investigation may indicate the need for additional monitoring wells. If required, they will be installed and sampled in the next phase of field investigation, where groundwater at DDMT is addressed on a facilitywide basis.

Sample analysis activities include screening analyses using CSL analyses and quick-turnaround analyses from a fixed-base laboratory (FBL) (Level 2 data quality) and

See comments on screening sites and OU-1 regarding this section.

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3.0 Sampling Strategy for Operable Unit 2 Remedial Investigation

This section describes the sampling strategy for OU-2 RI sites. The following information is provided:

- Structure of the investigation
- Data quality objectives (DQOs)
- Data comparisons
- Background data
- Preliminary applicable or relevant and appropriate requirements (ARARs) and preliminary remediation goals (PRGs) development
- Risk-based PRGs
- Statistical data comparison

3.1 Structure of Operable Unit 2 Investigation

This section is intended to give a detailed description of the overall strategy for the investigation of each RI site in OU-2. The approach presented is intended to support a decision to recommend one of the following options:

- Site upgrade (FS activities)
- Site downgrade (support NFA)
- Interim remedial action (IRA) We want Permanent Actions!!!

The structure of the investigation was designed using the observational approach. Therefore, an attempt was made to structure the investigation cost effectively so that remedial activities and decisions could be made as soon as possible to expedite the project schedule and overall objectives of the investigations at DDMT.

3.1.1 Scope

The scope of the field investigation for OU-2 includes soil (surface and subsurface) and groundwater sampling. Surface soils will be sampled to assess the nature and horizontal extent of contamination and to provide data for statistical comparison to background

constituents, Level 2 data will be compared to the background data for each data point first, then to PRGs. (Background data are discussed in Section 3.4 of this document.) Therefore, when attempting to estimate the vertical and horizontal extent of contamination, additional surface soil samples and/or soil borings may be necessary when organic constituents exceed PRGs or when inorganic constituents exceed background and PRGs.

- Level 2 data will be compared to Level 3 data to assess the data usability. This comparison will be conducted after the Level 3 data have been completed and validated. The goal is to collect Level 2 data of sufficient quality to be used for statistics and for baseline risk assessment (BRA).

- Level 2 data will be compared to RALs for each data point. The RALs are discussed briefly in Section 3.5.

- The final data comparison will be conducted after the field investigation is complete. This data comparison will use a statistical approach to compare the data for a site to background concentrations, PRGs, and RALs. This approach is presented in Section 3.7.

3.4 Background Data

Background data for soil (surface and subsurface), groundwater, sediment, and surface water will be collected during the screening and RI field work activities. The approach to collecting this data is presented in the *Generic RI/FS WP* (ref. 3). The background data set will be used to establish individual background data numerical criteria for each constituent of concern. The method for establishing these background data numerical criteria is presented in the *Generic RI/FS WP* (ref. 3). Individual parameters detected at each location sampled as part of the RI activities will be compared to the background data set to assess whether a contaminant release has occurred. If the analytical data from the RI site sample locations do not exceed the background data, the site will be recommended for NFA. If parameters detected at a site exceed background concentrations, the site will be considered for further investigation using the optional field activities (additional surface soil samples, borings, wells, and so forth). The optional activities are described in Section 4.

3.5 Preliminary Identification of ARARs and Screening PRGs

3.5.1 Introduction

The purpose of this section is to present information in the scoping phase of DDMT projects on issues relating to compliance with ARARs, including identification of PRGs. This information guides the development of appropriate sampling and analysis plans and

3.2 Data Quality Objectives

DQOs are qualitative and quantitative statements that specify the quality of the data required to support the decisionmaking process during the sampling activities. DQOs are developed according to intended final use of the data. Specific objectives of the RI field sampling effort are divided into the following two parts: general field work DQOs and site-specific DQOS. Site-specific DQOs are presented in Section 4. The general DQOs guiding the field investigation process are the following:

- Collect soil samples (surface and subsurface) that are representative of site conditions.
- Provide reliable data results supported by QC measures implemented during sampling and analysis.
- Use Level 1 screening methods to aid in sample selection.
- Use Level 2, field, FBL, or CSL analytical methods to expedite the decisionmaking process and to collect data quickly and economically.
- Conduct sufficient Level 3 FBL analyses to support confirmation of Level 2 data and to support risk-based decisions for the NFA alternative.
- Compare the levels of contamination at sites to background concentrations, applicable regulatory levels, and calculated risk-based levels so that the appropriate recommendations can be developed.
- Provide laboratory support to produce Level 4 data to provide legally supportable documentation for decisions, if needed.

3.3 Data Comparisons

Surface and subsurface soil data and groundwater data will be collected during the primary field work investigation. The data will be collected at locations identified in Section 4 of this report. Locations have been selected by reviewing site history to determine where site activities were reported to have occurred and by reviewing existing environmental data. Once the RI field investigation is underway, data will be collected in real time through the use of the Level 2 data quality, thus expediting the turnaround time. Four data comparisons will be conducted during the RI activities as part of the ongoing investigation, as follows:

- Individual data points for Level 2 data will be compared to the PRGs for organic constituents. Contaminants that exceed the PRGs are considered to be representative of contaminated areas at a site. For inorganic

3.1.4 Fixed-based Laboratory Procedures

Because of the wide variety of sites to be investigated, a complex array of analyses will be conducted for FBL analyses. On the basis of known contaminants at each site, existing data, and level of uncertainty, each field sample will be screened using Level 2 analyses. Ten percent (or more) of the field samples collected at each RI site will be sent to an offsite laboratory for confirmational analyses. Twenty percent of the Level 3 samples, or at least one sample per site, will be submitted for a complete target compound list/target analyte list (TCL/TAL) scan. Efforts will be made to run TCL/TAL on samples from the area of highest contamination. This will allow the greatest likelihood of detecting any additional types of contamination not previously found. The list of analytical methods that will be used for offsite analysis is presented in the *QAPP* (ref. 1). The field team leader or site hydrogeologist will select the location of confirmational samples (Level 3) based on the results of the Level 2 data.

3.1.5 Interim Remedial Actions

Interim will only be when absolutely necessary to protect health and Property

This Appears as a Remedial Action or REMOVAL

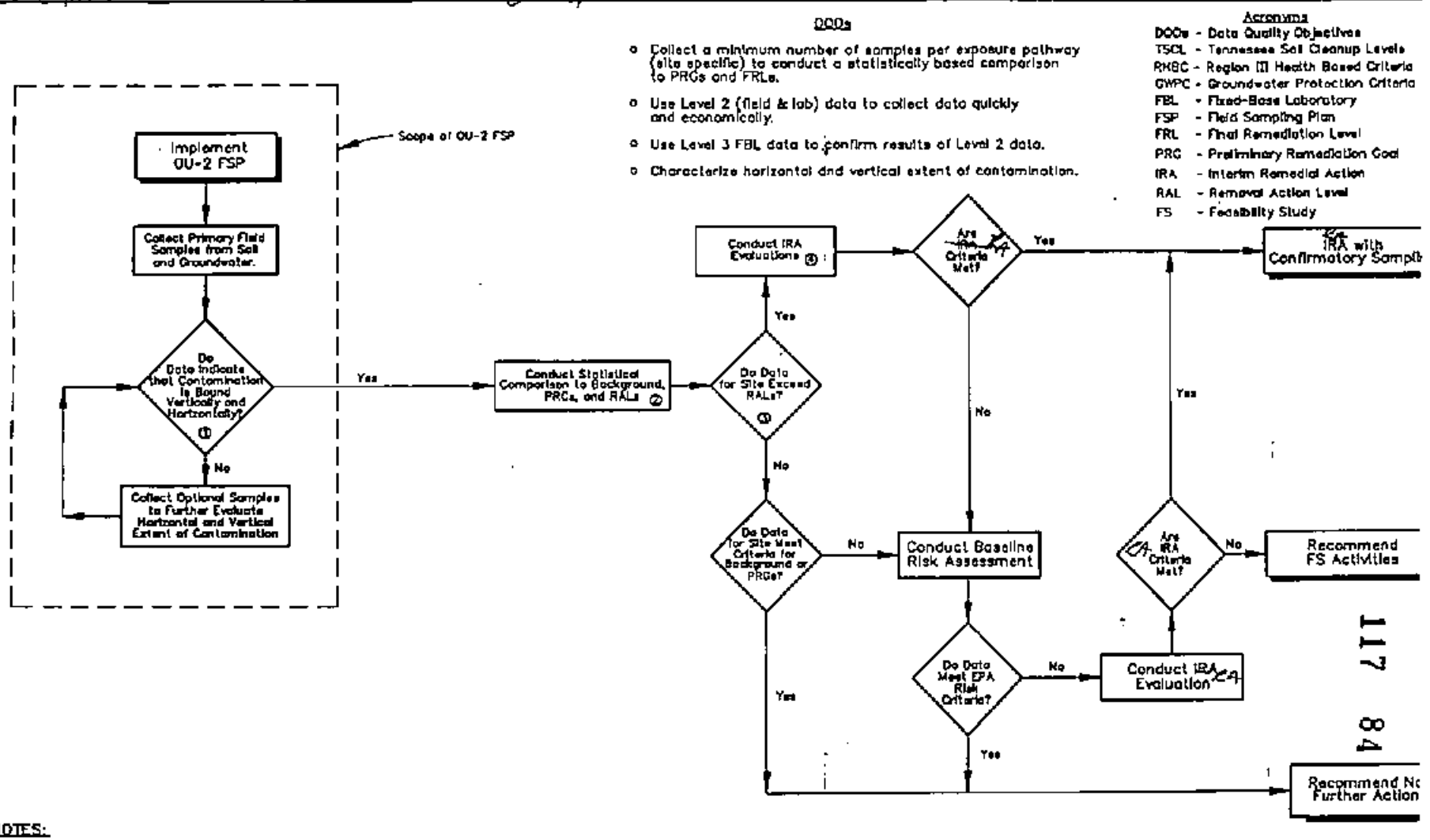
Field data can be used to support IRA evaluations. A site may be selected for IRA evaluation and confirmational sampling rather than for FS if contamination levels are found to be above removal action levels (RALs) and if the IRA criteria are met. Conducting an IRA on a site with contamination covering a limited area may reduce costs because of the reduced investigation costs associated with sites that undergo traditional FS activities. The IRA evaluation and removal action will be conducted as a parallel effort to the field effort at DDMT.

3.1.6 Primary and Optional Activities

Primary field activities include field sampling for surface and subsurface soil and initial groundwater samples. These activities are planned with respect to location, depth, and parameters to be analyzed. The analytical soil data, in comparison to background concentrations and PRGS, will be used to evaluate the need for additional field sampling. Collection of the background data set is described in the *Generic RI/FS WP* (ref. 3). Where? After the primary field work has been completed, additional investigation may be necessary when data are not bound horizontally or vertically. Optional field work could include additional surface soil sampling, subsurface soil sampling, and monitoring well installation and sampling.

By using the field analytical data, DDMT can implement optional activities to achieve the objectives of the field investigation. By using the optional activities in this manner, work can be conducted during a single field event to prevent remobilization. A field change request form will be instituted to document the description of optional activities, the reasons for implementing the change, and authorization to proceed with optional activities.

DO NOT USE IRA & RA Interchangeably



NOTES:

① The bounds of contamination refer to the extent of contamination equal to or less than background and/or PRGs.

② Background data set will be established by using criteria identified in the RI/FS WP. Comparison criteria are developed using TSCL, RHBC and GWPC, and other applicable regulatory criteria. These criteria are used as PRGs based on a conservative approach from the standpoint of risk (exposure and assessment criteria). Section 3 of this FSP discusses the comparison criteria.

③ The RALs will be established based on acute criteria of risks and economic factors.

④ The IRA evaluation will be based on early removal of a site or other IRA, meeting the overall program objectives.

FIGURE 3-1
OU-2 LOGIC DIAGRAM
Defense Depot Memphis, Tennessee

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4.0 Sampling Plan

4.1 Sampling Summary

Section 4 describes the activities that will be conducted during the field investigation at OU-2. The activities support the investigative strategy described in Section 3 of this FSP. The proposed sampling plans for OU-2 include surface soil samples, subsurface samples from soil borings, and groundwater samples from the Fluvial Aquifer. The primary Level 2 and Level 3 samples that will be collected at Sites 27, 89, 32, and 34 are summarized in Table 4-1. Further information on the samples that will be collected, including QC samples and analytical methods, is provided in the following sections and in Tables 4-2 through 4-5. A brief discussion of the types of QC samples that will be collected is provided in Section 5.4.

The proposed samples have been specified on the basis of location and sample matrix, in this case either soil or groundwater. Only the primary analytical samples are shown in the tables. Sampling at each site is specified in terms of a defined primary sampling effort, followed by an optional sampling effort, which will depend upon the results of the primary sampling. Since the optional sampling is undefined, these samples are not shown in the tables.

4.2 Site 27: Former Recoupment Area (Building S-873)

4.2.1 Site Description

Give location in the OU-

Building S-873 is an open-sided, metal-roofed shed that formerly served as the DDMT recoupment area, where damaged and leaking containers were repacked. Its location in OU-2 is shown in Figure 2-3; a detailed map of the site is provided in Figure 4-1. Site 27 includes the southeast corner of the building and the gravel parking area to the east.

4.2.2 Site History

This site was formerly used for repacking hazardous and nonhazardous materials from damaged and leaking containers. It is estimated that these practices occurred between 1942 and 1986. This practice was discontinued at this location in 1986 and moved to another building that was constructed especially for this purpose. The specific boundaries of this site are unknown, other than the knowledge that these activities occurred in the described areas (i.e., the southeast corner of the building and the gravel parking area to the east). Remediation of soil contamination from previous spills of the pesticides dichlorodiphenyltrichloroethane (DDT), dichlorodiphenyldichloroethlene (DDE), and Aldrin has been performed previously at this location, resulting in removal and disposal of contaminated soil (refs. 12 and 13).

4.2.3 Existing Data

During the RI activities performed in 1990 (ref. 8), surface soil samples (SS-26 and -27) were taken around the former hazardous materials recoupment area near the southeast corner of Building S-873, as shown in Figure 4-1. Samples were collected at a depth of 1 ft beneath the surface to evaluate residual contamination because the upper 6 inches to 1 ft had been removed and backfilled to remediate pesticide contamination in the soil (refs. 12 and 13). The sample results show that pesticides were not detected (Appendix B, Table B-3). what was detected?

A groundwater monitoring well (MW-23) was also installed in this area during the 1990 RI activities (ref. 8). Analysis of groundwater samples revealed concentrations of metals (Table B-1). However, the updated potentiometric surface map (Figure 2-11) from November 1993 indicates that this well is located upgradient of Site 27.

In 1985, personnel from the U.S. Army, the Tennessee Department of Health and Environment, and the O.H. Materials Company devised a sampling grid east of Building S-873 to investigate the presence of possible contamination. Each grid measured 75 ft by 75 ft (Figure B-4). Nine discrete surface soil samples from each grid were collected and composited to form a representative sample from each grid area. In Appendix B, Tables B-6, B-7, and B-8 show the results of the sampling and provide analytical results for PCBs, extraction procedure toxicity (metals only), and pesticides, respectively. The parameters were selected after investigation of the past storage history of Building S-873 during the 1985 recoupment effort (ref. 13) at this building. Results indicated metal and pesticide contamination. Some samples were not analyzed because no notable PCB or metals contamination was found in previously analyzed grids. The information provided by this sampling effort prompted excavation of the top 0.5 to 1 ft of soil in this area by DDMT (refs. 8 and 12). No documentation exists for the area where gravel was removed around the southeast portion of Building S-873. All stained gravel was removed, and no visual evidence of contamination remains.

4.2.4 Potential Contaminants of Concern

The results of previous findings and what is known about the site history indicate that the potential COCs at Site 27 are PAHs, pesticides, metals, and VOCs. Since site activities involved hazardous and nonhazardous materials, many different types of contaminants could be present.

? from There

Site 27 Data Gaps and DQOs Defense Depot Memphis, Tennessee	
Data Gaps	**DQOs**
Vertical and horizontal extent of soil contamination	Assess the vertical and horizontal extent of soil contamination Expedite the field investigation and decision process by using Level 2 analyses Confirm results of Level 2 analyses with Level 3 analyses
Data for performing a risk assessment	Collect data that support a statistically based comparison to background concentrations and PRGs
	Collect at least one TCL/TAL sample (location to be selected in the field) to assess whether other unknown contamination is present

4.2.6 Soils Sampling and Analysis

Soil samples will be collected to assess the vertical and horizontal extent of soil contamination from past activities outside the southeast corner of Building S-873 and in the gravel parking area east of the building. Spatially distributed surface soil samples will be collected to support statistical comparisons to background concentrations and PRGs. The details of the sampling plan for Site 27 are shown in Table 4-2.

Surface soil samples will be collected along the foundation of Building S-873 south and southeast of the building. Samples collected near the foundation of the building will be as close to the foundation as possible to assess whether contamination may have migrated beneath the building. Because the exact locations of releases are not known, samples will also be collected across the gravel parking area. A total of 10 locations will be sampled (Figure 4-1). At each location, a sample will be collected at a depth of 0 to 12 inches bls and at 12 to 24 inches bls. The 0- to 12-inch sample should be collected beneath any gravel that may be present. The 12- to 24-inch sample will help in assessing whether shallow contamination is present beneath the area that was previously excavated. The samples will be analyzed for Level 2 VOCs, PAHs, pesticides, and metals.

Shallow soil borings will be taken at five locations around Site 27 to help assess the vertical extent of contamination. The locations of the borings are shown in Figure 4-1. Subsurface soil samples will be collected at depths of 5 and 10 ft bls and analyzed for Level 2 VOCs, PAHs, pesticides, and metals.

should not you aim for boring @ entrances pill as well and sump inlets?

does this mean 15 surface soil samples?

Missing!

no surface?

why not do the surface from the 5 borings + 5 other surface instead of the 10

At the depth of 10 ft, a soil sample will also be collected and checked for non-methane organic vapors in the headspace of the sample using an OVA. If organic vapors are detected, the boring will continue in 10-ft increments until no non-methane organic vapors are detected. At the deepest point of the boring, an additional soil sample will be collected and analyzed for Level 2 VOCs, PAHs, pesticides, and metals. Since this is an optional sample, it is not indicated in Table 4-2.

If field screening indicates that they are warranted, up to six optional surface soil locations and four optional soil borings may be performed at the discretion of the field hydrogeologist or field team leader to further evaluate the extent of contamination. The locations of additional borings will be chosen from review of the analytical results obtained from the primary sample locations. If contaminated soils are encountered at the 10-ft depth in the primary soil borings, the optional soil borings will include an additional analytical sample from a depth of 20 ft bls. The procedure of using an OVA to check for non-methane organic vapors to determine the depth of the final sample from a boring will also be used for the optional borings. Optional surface and subsurface samples may also be collected from areas where there is visual evidence that contamination may be present. Field personnel will survey the area around the site for stained soil, dead vegetation, or other visual indicators to determine if additional sampling is warranted.

Soil samples obtained from Site 27 for laboratory analysis will be analyzed for VOCs, PAHs, pesticides, and metals. For the metals analysis, the priority pollutant metals were selected because the analyte list provides the best fit with the metals detected in OU-2. The soil sampling plan for Site 27 is detailed in Table 4-2. Duplicate samples will be collected at each sampling point to provide a sample for possible Level 3 analysis. A minimum of 10 percent of the Level 2 samples will be sent for Level 3 confirmational analysis. The field team leader or site hydrogeologist will select the samples for Level 3 analysis by using the Level 2 analytical results to select the samples with higher levels of contamination. One surface soil location will be analyzed for TCL/TAL parameters to assess the presence of any contamination not previously found. Screening results (Level 2 analysis) will be used to select a biased location so that the TCL/TAL analysis is performed near the area with the highest contaminant concentrations. QC samples will be collected in accordance with the *QAPP* (ref. 1). QC samples are indicated in Table 4-2.

4.2.7 Groundwater Sampling and Analysis

The existing monitoring well (MW-23) will be sampled in accordance with standard groundwater sampling procedures as provided in the *QAPP* (ref. 1). The sample will be sent offsite for Level 3 TCL/TAL analysis as shown in Table 4-2. Review of the groundwater flow direction in OU-2 indicates that MW-23 is upgradient of Site 27. Analytical results from MW-23 will provide information on upgradient groundwater quality.

Groundwater contamination as a result of releases from Site 27 is not suspected because of the results of previous sampling and the low mobility of the majority of the COCs.

However, if significant contamination is found in the deepest samples from the soil borings, a downgradient monitoring well will be installed. Contaminant concentrations from the deepest soil boring samples will be compared to the higher of background concentrations and PRGs; this information will be used to decide whether a new well is required and where it would be located. If required, a new well will be installed approximately 100 feet downgradient of the area where the highest contaminant concentrations are detected. The downgradient direction will be found by referring to the November 1993 potentiometric surface map (Figure 2-10) or to the most recent potentiometric surface map available. If a new well is required, the location will be selected by the field team leader or field hydrogeologist. If required, the new monitoring well boring will be drilled to the top of the Jackson Formation/Upper Claiborne Group, and the well will be constructed in accordance with the *QAPP* (ref. 1). Core soil samples will be collected at 5-ft intervals for visual classification. The core samples will provide stratigraphic and geotechnical information on the subsurface, which will assist in interpreting Level 2 site geology. Three soil samples from the boring will be submitted for chemical analysis for Level 2 VOCs, PAHs, pesticides, and metals. One sample will be collected from the saturated zone within the Fluvial Aquifer. The other two samples will be collected from the unsaturated zone, with their location to be determined by the field team leader or the field hydrogeologist by using results from the surface and subsurface soil samples.

Groundwater from the new monitoring well (if required) will be sampled in accordance with standard groundwater sampling practices as provided in the *QAPP*, and the sample will be sent offsite for Level 3 TCL/TAL analysis.

The results of the groundwater sampling near Site 27 may indicate the need for additional monitoring wells. If required, additional monitoring wells will be installed and sampled during the next phase of field investigations addressing groundwater at DDMT on a facilitywide basis.

4.3 Site 89: Building 1089 (Acid Spills)

4.3.1 Site Description

Site 89 is located on the western boundary of OU-2. The site includes Building 1089 and the immediate surrounding area. The location of Site 89 in OU-2 is shown in Figure 2-3; a detailed map of the site is provided in Figure 4-2.

4.3.2 Site History

Past uses of Building 1089 included storage of various acids. Spills have reportedly occurred at this site; however, specific spill information (e.g., location, date, amount spilled) has not been identified to date (ref. 8). In addition to acid storage, the Installation

All new wells must be developed with permeabilities determined ! ! !

5.0 Additional Data Collection

5.1 Fluvial Aquifer Characteristics

Why? All existing wells were previously evaluated - see LAW's Report.

The hydraulic conductivity of the water-bearing zone of each monitoring well in OU-2 will be estimated by using appropriate slug-testing methods. The existing wells (MW-21, -22, -23, and -39) will be tested, as will the monitoring wells planned for installation. The primary advantages of slug testing are twofold: it creates little, if any, investigation-derived wastes to dispose of, and performing the test and collecting the data is relatively simple. The values of hydraulic conductivity derived from the slug tests will provide information useful in estimating groundwater flow rates within the Fluvial Aquifer. This information will also be useful in remedial design if sampling results indicate that remedial action is needed in OU-2 to address groundwater contamination.

this was done original for exploration Wells -

Slug tests are accomplished by causing an instantaneous change in the water level in the well and observing the recovery of the water level to its static level as a function of time. Changes in water level can be accomplished by suddenly introducing or removing a known volume of water into or from the well. This can be done by suddenly introducing or removing a cylindrical object of known volume (a slug) or by using a pneumatic device to evacuate the wellbore under pressure, followed by an instantaneous release of pressure. The water level response in the wellbore is generally observed with a pressure transducer placed below the water table coupled to an automatic data logger.

What will I/ll use?

What methods Mathematical Calculations References

Because the primary purpose of a monitoring well is to provide groundwater samples for chemical analysis, methods that rely on the introduction of water will not be used. All materials used in the slug test (e.g., water level tapes, pressure transducers) will be decontaminated before use in accordance with the *QAPP* (ref. 1).

To analyze the slug test data, the project hydrogeologist will select a published, generally accepted analytical method that is appropriate for the hydrogeologic conditions at DDMT.

5.2 Preliminary Data Needs for Remedial Alternatives

After the RI field work has been completed, the data will be assessed to evaluate the appropriate future disposition of a site (NFA, FS, or IRA). Sites that require an FS to meet the objectives of the program will require additional data collection. The additional data will be used to support evaluation of remedial alternatives, to refine selection of alternatives, or to collect data to support remedial design activities.

5.2.1 Initial Alternatives

A cursory review of the RI sites at OU-2 has been conducted to develop a list of preliminary remedial alternatives. These initial alternatives have been identified from

- The samples are stored in a secured area and at a temperature of approximately 4°C, if necessary, until analyses are to begin.

- Samples are accompanied by a COC form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents transfer of custody of samples from the field sampler to another person, or to the laboratory.

- A laboratory COC form accompanies the sample or sample fraction through final analysis for control.

- Copies of the COC and request-for-analysis forms will accompany the laboratory report and will become a permanent part of the project records.

4.9 Disposal of Derived Wastes

In the following sections, the disposal of derived wastes is discussed.

4.9.1 Purged/Development Water and Decontaminating Fluids

Development and purged water removed from the wells will be placed into Department of Transportation (DOT)-approved containers and transported to a 1,000-gallon holding tank at Dunn Field for processing through an activated charcoal unit and collection in another holding tank. Samples taken of both the untreated and treated water and will be analyzed for all major constituents of concern that have been previously detected in groundwater (primarily VOCs and metals). The processed water will be collected in a 70,000-gallon storage tank for later disposal to the City of Memphis sanitary sewer system (upon written permission and provision of analytical results). Solids will be allowed to settle out of the water before being transferred to the treatment system.

No Note

4.9.2 Storage, Analysis, Treatment, and Disposal of Investigation-derived Wastes

All monitoring well and soil boring cuttings will be collected and placed in DOT-approved drums. A label will be affixed to each drum clearly indicating the boring number and depth interval from which the cuttings originated. The site geologist will maintain a log detailing the disposition of cuttings from each hole. The drums will be stored in the permitted Resource Conservation and Recovery Act (RCRA) storage area pending the results of the chemical analysis (toxicity characteristic leaching procedure [TCLP]), which will determine the disposition of the contents (if they are determined to be hazardous or nonhazardous by the toxicity characteristic).

5.0 Field Procedures

5.1 Groundwater

Groundwater sampling efforts will be conducted to identify and evaluate contaminants in the groundwater beneath and around DDMT. A summary of the quantity of samples to be collected and the parameters to be tested during chemical analysis is provided in the OU-specific FSP. Table 4-1 provides minimum laboratory QC sample requirements, including container type, container quantities, preservatives, holding times, SW-846 Methods, and extraction and preparation methods for each parameter.

5.1.1 Groundwater Sample Locations and Rationale

Groundwater samples will be collected for chemical analysis from both existing and newly constructed monitoring wells at DDMT. Collection and analysis of groundwater samples are planned for selected Memphis Light, Gas, and Water (MLGW) monitoring wells in the Allen Well Field. These samples will be collected if groundwater analysis from any of the optional wells (along Elvis Presley Boulevard) show that the contamination has migrated from Dunn Field to the wells on Elvis Presley Boulevard. In the event that recent groundwater data are not available from MLGW, efforts will be coordinated with MGLW to obtain the necessary approval to collect and chemically analyze groundwater samples from the Allen Well Field monitoring wells. Groundwater samples from the wells will be analyzed for several reasons: to characterize sites and to evaluate the nature of releases from disposal sites at DDMT; to evaluate the vertical and horizontal extent of a potential contaminant plume in the Fluvial Aquifer; to evaluate whether contaminants in the Fluvial Aquifer pose a threat to the Memphis Sand Aquifer; and to obtain background water quality data (offsite and upgradient wells) for comparative study. The specific rationale for collecting groundwater samples from each location will be provided in the OU-specific FSP. Additional samples to be analyzed will include equipment blanks, field duplicates, and samples of water from the wells. Split field duplicates and split equipment blanks will routinely be sent to the CEMRD.

5.1.2 Groundwater Sampling Procedures

Before groundwater sample collection, static water levels in ~~selected~~ the monitoring wells will be measured to calculate groundwater purge volumes and to obtain groundwater elevation data. All of the water level measurements will be conducted within 24 hours of the initial measurement. Water levels will be measured using a decontaminated, electronic water level indicator with an accuracy of +/- 0.1 foot. Groundwater levels will be used to construct a groundwater potentiometric surface map. Monitor well sampling will generally proceed from the potentially least contaminated well to the most contaminated well, according to existing data.

5.2.1 Surface Soil

Surface soil samples will be collected and analyzed to identify and to delineate contaminants in the surface soils at sites and at some offsite locations (for background sampling). A summary of the quantity of samples to be collected and the parameters to be tested during chemical analysis is provided in the OU-specific FSP. Container type, container quantities, preservatives, holding times, SW-846 Methods, and extraction and preparation methods for each parameter are provided in Table 4-1. This section of the QAPP identifies the general requirements and purposes for collection of surface samples, including the field QA/QC methods.

5.2.2 Surface Soil Sampling Procedures

Surface soil samples will be collected using a clean stainless-steel hand auger or scoop to retrieve soil from zero to 12 inches below ground surface (bgs). Any VOC samples will be placed in the appropriate jars immediately upon collection. The remaining sample will be thoroughly mixed in a stainless-steel mixing bowl before being transferred to the appropriate sample containers.

5.2.3 Subsurface Soils

We got rid of these

Subsurface soil samples from vertical and ~~angled soil borings (ASBs)~~ will be collected for chemical analyses from both soil and monitoring well borings installed for this study. Samples will generally be selected on the basis of historical data results, field screening during sampling, or both. The overall purpose of this sampling effort will be to characterize the subsurface conditions by providing soil samples for chemical analysis to determine the nature and extent of releases of hazardous substances to the environment from waste disposal sites on DDMT, as well as the vertical and horizontal extent of such contamination in the subsurface soils; to evaluate soil lithology and subsurface stratigraphy; and to help characterize the potential hydraulic interconnection between the Fluvial Aquifer and the Memphis Sand Aquifer on the Main Installation. Soil samples also will be collected for geotechnical lab analyses. Locations and justifications for sample collection, including background samples and offsite locations, are provided in the OU-specific FSPs. Additional samples to be analyzed include equipment blanks and field duplicates (to fulfill QA/QC requirements) and samples from soil cuttings to determine disposal requirements. Split field duplicates and equipment blanks will routinely be sent to the CEMRD laboratory. Trip blanks will be included with each container holding samples to be analyzed for VOCs.

5.2.4 Subsurface Soil Sampling Procedures

Three types of subsurface soil samples will be collected—vertical (shallow) soil borings, vertical (deep) soil borings, and ASBs. The specific number of samples for chemical

These were EPA's original intention, but I thought that we got away from these? Where are they to be installed? I haven't seen any in the WP.

To prevent contamination of sampling equipment by surface soils when the wells are being purged or sampled, a plastic ground cloth will be placed beneath all sampling equipment. Purging will be accomplished through the use a decontaminated stainless steel submersible pump or Teflon® bailer. The discharged water will be monitored for pH, temperature, and specific conductivity. Purging will continue until three to five well volumes have been removed and the pH, temperature, and conductivity are stabilized (three successive measurements are within 5 percent of one another).

The amount of purged fluid will be measured by filling graduated buckets or by using a stopwatch and noting the flow rate of the pump versus elapsed times. All water purged from the wells will be permitted for discharge to the city sewer. Wells will be sampled immediately after purging, if possible, but no later than 6 hours after purging. Wells that recharge slowly will be purged dry and allowed to recharge to at least 80 percent of initial well volume before sampling. If excessive time (greater than 10 hours) is required for the slow recharging wells to recharge to 80 percent, it will be documented by the FTL in the field log. To monitor that data is consistent, all wells will be sampled within ~~a 30-day~~ time frame.

Clean disposable vinyl gloves will be used to handle all samples and equipment used for purging and sample collection. Each well will be sampled with a Teflon® bailer decontaminated according to procedures described previously. Precleaned bailers will be wrapped in aluminum foil for transportation to DDMT. A clean, braided nylon cord will be used to lower each bailer into the well and will be discarded after each use. Care will be taken to prevent contact between the bailer and line and the ground. The initial volume of water obtained from the well will be used to rinse the bailer. The second volume of water obtained from the bailer will be used to collect the respective sample.

Samples will be collected in accordance with the guidelines furnished in the *Practical Guide for Ground Water Sampling* (ref. 1) and the *EPA Region IV ECBSOPQAM* (ref. 31). In accordance with EPA's Environmental Services Division guidelines, care will be taken to avoid aeration of the sample. The sample will be poured in a slow, steady stream from the bailer to the prepared sample containers. The process will be repeated as necessary to fill each container to the required volume. Field measurements of pH, specific conductance, and temperature will be conducted and recorded using instruments that have been calibrated daily and decontaminated before each use. Temperature will be measured immediately upon pouring the sample from the bailer into a glass beaker.

Samples to be analyzed for VOCs will be collected first, to minimize the effects of volatilization caused by disturbance of the water surface in the well. VOC sample containers will be filled completely to the top of the container, leaving no air space above the liquid. Before transport to the laboratory for analysis, samples will be preserved in accordance with the guidelines in Table 4-1. Trip blanks will be included with each container holding samples to be analyzed for VOCs. Groundwater samples also will be collected by EPA and state regulators on a regular basis throughout the project.

analysis and depths of collection are discussed in the OU-specific FSPs. However, in general, one soil sample will be collected from the first 12 inches for all borings, an intermediate depth based on field screening, and from the saturated zone of ~~each~~ some vertical (deep) boring. Soil samples will collected on the basis of visual or organic vapor analyzer/photoionization detector (OVA/PID) field screening. Soil samples will be stored in airtight containers and shipped daily to the laboratory for analysis. Geotechnical sample collection and analyses are discussed in Section 5.4. The general analyses include grain size, moisture content, and Atterberg limits. Grain size analysis will be performed on the aquifer material. Atterbergs will be performed on the fine silty to clay material. If the confining layer at the base of the Fluvial Aquifer is penetrated, Atterberg limits will be performed on the retrieved sample to evaluate the condition and character of the clay. The final decision to collect a sample from a certain zone will be at the discretion of the field geologist. This decision will be documented in the field log.

5.3 Surface Water and Sediment Samples

Surface water samples will be collected and analyzed to determine whether storm waters are contributing to the degradation of the Golf Course Pond and Lake Danielson and to determine if sites at DDMT are affecting the quality of storm water runoff waters leaving the installation. Specific location criteria and analysis will be identified in the appropriate OU FSP. Sediment samples will be collected from the same location as surface water samples to the extent possible. Collecting sediment and surface water samples from the same location will be easily accomplished at Lake Danielson and at the Golf Course Pond. However, it may not be possible for some of the storm water drainage channels. The samples will be taken from various locations around DDMT and will be used to further define sites previously identified in the RI Report (ref. 7) and the RFA (ref. 25) and to help characterize any possible sources for contaminants found in Lake Danielson, in the Golf Course Pond, and in storm water drainage channels.

5.3.1 Surface Water Sampling Procedures

After a rainstorm with at least 0.2 inches of precipitation, when quantities of surface water/runoff are sufficient for collection, samples will be collected for chemical analysis. Sampling locations will include Lake Danielson, the Golf Course Pond, and the locations identified in the OU-specific FSPs, which are considered representative of surface water runoff from the installation. These samples will be used to determine whether storm waters are contributing to the degradation of the lakes and runoff waters leaving the installation. Samples collected from storm drainage ditches will be a single grab sample taken at mid-depth from the center of the channel. Samples collected from Lake Danielson and from the Golf Course Pond will be collected from the estimated deepest point of the lake or pond and, with the exception of the volatile sample, will consist of single vertical composite (depth integrated) samples. The vertical composite samples will be taken using a decontaminated stainless steel Kemmerer sampler or bailer. The physical water quality parameters of specific conductivity, temperature, pH, and

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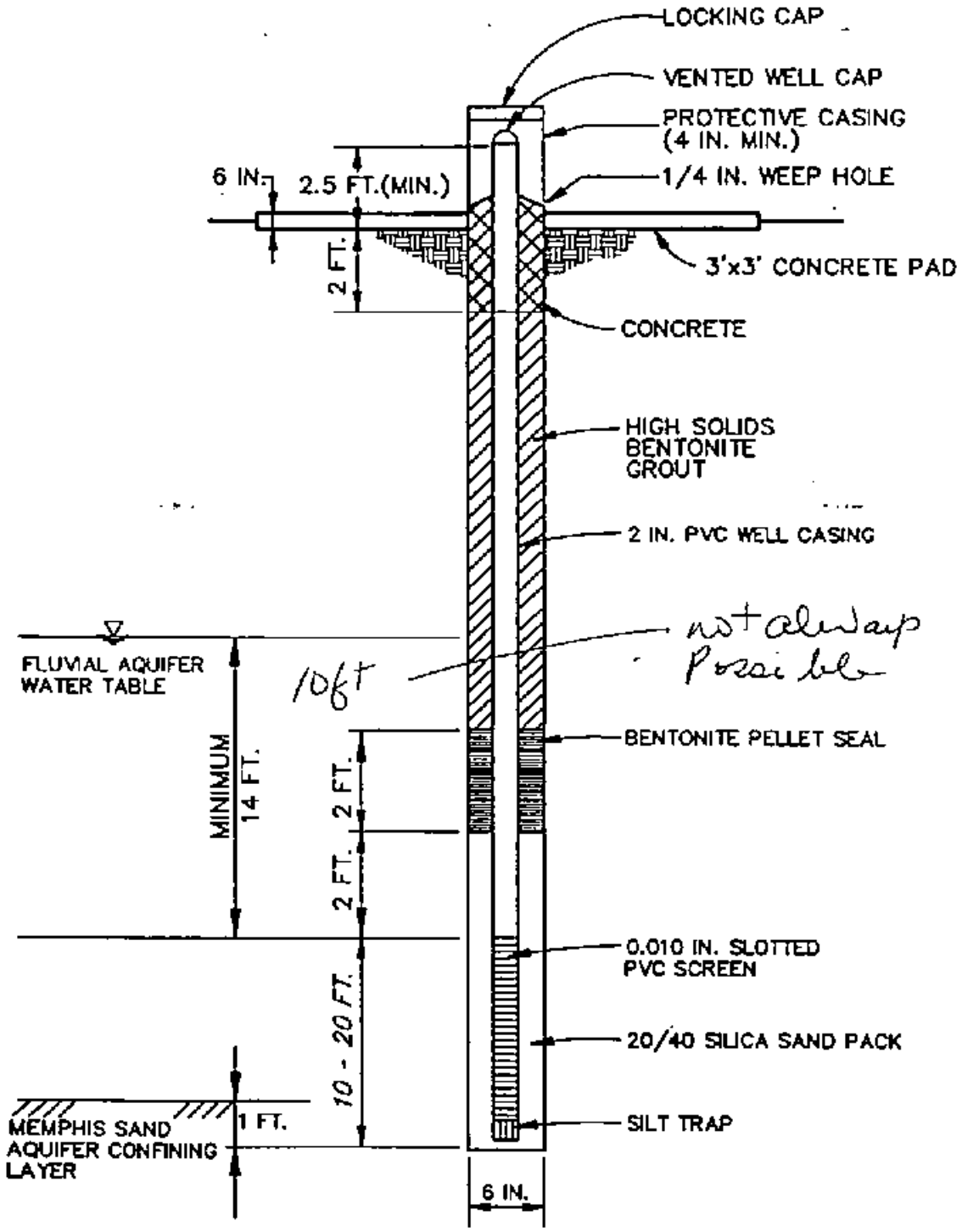

What about Diagram for Memphis Sand Well if it is installed

FIGURE 5-1
TYPICAL STICKUP MONITORING WELL
Defense Depot Memphis, Tennessee

MQP-0002.DWG 2-23-95

117 97 and want to make sure that the AE is using an appropriate technique.

5.4.2.8 *In-Situ Permeabilities*

The hydraulic conductivity of the water-bearing zone in which each monitoring well is screened will be estimated using an appropriate slug test method that will be determined in the field. This approach will allow the flexibility to select a slug test that will yield optimal results.

Why?

We need to ensure that proper equipment is available prior to field

5.4.2.9 *Decontamination Procedures*

A stringent decontamination and inspection program will be followed to prevent the introduction of any contaminants into the subsurface during drilling. A decontamination area for the cleaning of drilling equipment will be set up away from the drill site. After cleaning and decontaminating, all drilling equipment and sampling tools will remain off the ground on metal racks, metal sawhorses, or plastic sheeting until ready for use.

Drill Rig and Tools. All the drilling rigs and drilling equipment will be steam cleaned in the designated cleaning/decontamination area before entering the drill site. In addition, all downhole drilling, sampling, and associated equipment will be cleaned and decontaminated by the following procedure:

- Steam clean using a steam cleaner capable of generating a pressure of at least 2,500 pounds per square inch (psi) and producing a steam of at least 20°F. All equipment that is hollow or that has holes to transmit water or drilling fluids will be cleaned inside and outside.
- Rinse with potable tap water.
- Rinse with de-ionized water from a stainless steel container.
- Rinse with pesticide grade isopropanol from a stainless steel container.
- Air dry.
- Wrap with aluminum foil, if appropriate, to prevent contamination if equipment is going to be stored or transported.

All cleaning and decontamination will be conducted in a designated area lined with heavy-duty plastic. A catch basin will be used or constructed to contain all runoff until it can be placed into containers. The cleaning of drilling equipment (drill pipe, auger, and tools) will be conducted above the plastic sheeting on saw horses or other appropriate means.

All of the drilling equipment, including the drill rig, will be inspected before entering the site to monitor whether there are fluids leaking and whether all gaskets and seals are

If interior abnormalities are encountered, the gamma-gamma method will have to be employed.

Although MW-36 and MW-37 are double cased, there is a concern that they may represent a pathway for migration of potentially contaminated water. The outer casing is grouted into the top few ft of the Jackson/Claiborne confining unit. The construction logs of these wells indicate that the filter pack extends well above the top of the Memphis Sand Aquifer and through a large portion of the confining unit. The geophysical log also will be used to evaluate where the top of the filter pack is located (the filter pack will have a lower density than the bentonite seal). If the filter pack extends through a large portion of the confining unit, the annulus of the well would be a potential pathway for the movement of water between the Fluvial and Memphis Sand Aquifers.

Gamma logging will also be performed on 4 additional six existing wells to help identify the depth to the Jackson/Claiborne confining unit. Because the existing monitoring wells are constructed with 2-inch-diameter PVC, gamma logging is the only applicable logging method. Other viable alternatives require a larger diameter casing. These logs will be prepared by lowering a gamma radiation detector into the well or borehole and recording the amount of naturally occurring gamma radiation present as a function of depth. Clay minerals commonly contain the isotope potassium-40, which is typically the source of gamma radiation. Gamma logs will be used in determining the proportion of clay present and the depth to formation interfaces.

The six existing wells to be logged are the two wells into the Memphis Sand Aquifer (MW-36 and 37) and four Fluvial Aquifer wells (MW-19, 34, 38, and 39) in the north-central area of DDMT in the vicinity of the depression into the confining unit (see the Generic RI/FS WP, ref. 38), for a discussion of this depression). The two Memphis Sand wells will provide a clear profile of the gamma characteristics of the confining unit. The four Fluvial Aquifer wells may provide added information on clay formations in the vicinity of the confining unit. New wells will be logged on a case-by-case basis. The logging of the well will be conducted by qualified personnel. All the necessary equipment, personnel, and safety procedures will be provided by the selected contractor. A copy of the log, along with a letter report indicating the findings, will be submitted as an appendix to the RI report.

5.5.2 Electromagnetic and Magnetic Surveys

Electromagnetic and magnetic surveys were performed in Dunn Field in the vicinity of known burial sites. The survey was performed in June 1993 by the Corps of Engineers Waterways Experiment Station (CEWES). The purpose was to confirm locations of buried pits and trenches that might be burial sites of hazardous and toxic waste that could be contributing to groundwater contamination in Dunn Field. The results of the investigation are being analyzed and will be included as an appendix to the RI/FS report. Magnetometers will be used before drilling to clear drill sites of any buried metal and utilities.

Section 6.0
Response to CEHND/Healy Comments on OU-3 FSP

U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS

PROJECT DLA - DDMT OU 3 FSP ( )

☒ SITE DEV & GEO	☐ MECHANICAL	☐ SAFETY	☐ SYSTEMS ENG	REVIEW Draft Final Work Plan
☐ ENVIR PROT&UTIL	☐ MFG TECHNOLOGY	☐ ADV TECH	☐ VALUE ENG	DATE 12 Jul 95 TYPE
☐ ARCHITECTURAL	☐ ELECTRICAL	☐ ESTIMATING	☐ OTHER	NAME Healy/ED-CS-G/mp
☐ STRUCTURAL	☐ INST&CONTROLS	☐ SPECIFICATIONS		

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
1.	Section 3.1.2, Pg 3-2	In paragraph 2, collection of additional samples by field personnel is discussed. No additional/"optional" samples are to be taken without the express permission of the Huntsville Contracting Officer. The A-E is not in a position (nor is DDMT) to commit government funds for work not agreed to in negotiations.	
2.	Section 3.1.2, Pg 3-2	In Line 5, define "deepest". It is questionable to install a 70' to 100' monitoring well because of contaminant info derived from a 10' boring.	
3.	Section 3.1.3, Pg 3-5	Please clarify what requirements for record storage have been placed on the subcontract FBL.	
4.	Section 3.1.6, Pg 3-5	Delete "Additional investigation...and installation and sampling of new monitoring wells." as per Comment 1.	
5.	Section 3.1.6, Pg 3-6	Considering the amount of "optional" work added to this WP by the A-E, demobilization followed by independent scrutiny of all data and remob (if necessary) would be vastly less costly. As written, the only authorization required to perform optional work is the field crew's personal opinion.	
6.	Section 3.3, Pg 3-7	In bullet one the statement "Contaminants that exceed the PRG's are considered to be representative of contaminated areas at a site." Maybe by the A-E, they are. PRG's based on a residential use scenario and on a cancer risk of 10^{-6} (instead of 10^{-4}) and on a non-cancer HI of 0.1 (instead of	

ACTION CODES:
A - ACCEPTED/CONCUR
D - ACTION DEFERRED
W - WITHDRAWN
N - NON-CONCUR
VE - VE POTENTIAL/VEP ATTACHED

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS — PROJECT DLA - DDMT OU 3 FSP ( )

☒ SITE DEV & GEO	☐ MECHANICAL	☐ SAFETY	☐ SYSTEMS ENG
☐ ENVIR PROT&UTIL	☐ MFG TECHNOLOGY	☐ ADV TECH	☐ VALUE ENG
☐ ARCHITECTURAL	☐ ELECTRICAL	☐ ESTIMATING	☐ OTHER
☐ STRUCTURAL	☐ INST&CONTROLS	☐ SPECIFICATIONS	

REVIEW Draft Final Work Plan
DATE 12 Jul 95 TYPE
NAME Healy/ED-CS-G/mp

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
		1.0) are so conservative as to be useless.	
7.	Table 3-2	Using the lower value of two guidance values is okay. Overriding a promulgated MCL standard using an unpromulgated guidance value is baseless. Change this table to use MCL's where they exist.	
8.	Table 3-4	Verify whether the SOIL-GW PRG is based on the MCL or on the Table 3-2 GW PRG. For the latter, Comment 6 would apply. In a perfect world, the former would be used. However, the overall approach is flawed without the proper modeling and coeffient data to simulate the site-specific, soil-to-water partitioning potential. Finally, what potential for such partitioning exists between contamination in soil at a depth of 10' or less (if at all) and groundwater at 70' to 100' of depth? To make a long story short...use only the guidance values and, if non-existent, use the soil PRG only.	
9.	Section 3.6	See Comment 6, above.	
10.	Section 4	All references to "optional" or "additional" sampling should be removed as per Comment 1,above.	
11.	Section 4.4.6, Pg 4-18	In the third paragraph, the procedure recommended is overkill considering that one occurrence of two VOC's at MCL levels is all that is driving this action. Delete this paragraph. Delete the fourth paragraph as well. Taking additional samples is not up to the discretion of the field	

ACTION CODES:
A - ACCEPTED/CONCUR
D - ACTION DEFERRED
W - WITHDRAWN
N - NON-CONCUR
VE - VE POTENTIAL/VEP ATTACHED

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS — PROJECT DLA - DDMT OU 3 FSP ( )

☒ SITE DEV & GEO	☐ MECHANICAL	☐ SAFETY	☐ SYSTEMS ENG
☐ ENVIR PROT&UTIL	☐ MFG TECHNOLOGY	☐ ADV TECH	☐ VALUE ENG
☐ ARCHITECTURAL	☐ ELECTRICAL	☐ ESTIMATING	☐ OTHER
☐ STRUCTURAL	☐ INST&CONTROLS	☐ SPECIFICATIONS	

REVIEW Draft Final Work Plan
DATE 12 Jul 95 TYPE
NAME Healy/ED-CS-G/mp

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
		crews.	
12.	Section 4.4.7, Pg 4-20	In the second paragraph, would question why an additional well is contemplated. If the COC's are so immobile as to not extend to MW-26, there is no basis to suggesting that contamination has migrated 60-90 feet to groundwater. Delete this paragraph.	
13.	Section 4.4.7, Pg 4-20	Delete the final paragraph on this page. No new well is justified.	
14.	Section 4.5.7, Pg 4-25	Same as Comment , above.	
15.	Section 4.6.6, Pg 4-28	Delete the final paragraph as per Comment 11, above.	
16.	Section 4.6.7, Pg 4-29	In Line 3, define "deep".	

ACTION CODES:
A - ACCEPTED/CONCUR
D - ACTION DEFERRED
W - WITHDRAWN
N - NON-CONCUR
VE - VE POTENTIAL/VEP ATTACHED

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CH2M HILL Response to Comment 1:

A note will be added to Figure 3-1 as follows:

"Note: Additional work will not be initiated without the prior approval of CEHND."

Additionally the following sentence will be added to the end of the second paragraph of Section 3.1.2 on page 3-2:

"Additional and optional samples described above will be collected only after a field change request form is signed by CEHND."

CH2M HILL Response to Comment 2:

It was never the intent to install a monitoring well if contamination is detected at a depth of 10 to 20 feet from the surface. We will clarify the observational approach's intent to indicate the following sampling approach:

Step 1–Conduct initial sampling

Step 2–Evaluate a contaminant release

If release has occurred

Step 3–Define vertical and horizontal extent

Step 4–If contaminants extend to a depth in the soils within 20 feet of the potentiometric groundwater surface, then install monitoring wells to evaluate whether a release has occurred to groundwater, provided that a downgradient monitoring well does not already exist within 200 ft of the site.

The term "deepest" will be revised to reflect this logic.

CH2M HILL Response to Comment 3:

The following text will be added to QAPP:

"All laboratory deliverables (either hard copy or electronic) will be retained by the laboratory for a period of 7 years."

CH2M HILL Response to Comment 4:

The following sentence will be added to the end of the final paragraph of Section 3.1.6 on page 3-6:

"The field change request form will be signed by CEHND before any optional work is performed."

CH2M HILL Response to Comment 5:

The last sentence of Section 3.1.6 indicates that no optional work would be performed without authorization, because field change request forms must be signed by the client. Text has been added in Comment 4 to clarify this issue.

CH2M HILL Response to Comment 6:

The PRGs were developed in numerous group discussions with EPA, TDEC, CEHND, DDMT, and CH2M HILL. They will be used for screening only.

CH2M HILL Response to Comment 7:

We believe that PRGs are adequately developed for their intended purpose. These PRGs are not the actual remedial goal options (to be defined in the future) for each site. They only provide a conservative basis for the parties involved to have a high degree of confidence that a site may proceed to No Further Action with a limited data set. See the response to Comment 6 above.

CH2M HILL Response to Comment 8:

See the response to Comments 6 and 7 above.

CH2M HILL Response to Comment 9:

See the response to Comments 6 and 7 above.

CH2M HILL Response to Comment 10:

References to "optional" or "additional" samples will be followed by the following sentence throughout Section 4:

"Additional and optional samples described above will be collected only after a field change request form is signed by CEHND."

CH2M HILL Response to Comment 11:

The procedure recommended is the observational approach and does not require additional samples to be collected, unless field results indicate the need. We propose to leave the text unchanged.

Additionally, because organic parameters are not naturally occurring and were identified in previous groundwater samples, it is suspected that the soils around the site contain organic contaminants. Therefore, CH2M HILL is evaluating the presence and extent of possible subsurface soil contamination at the site using the procedure described in the referenced paragraph. The data collected by implementing this procedure will adequately describe the extent of detected subsurface soil contamination at the site. The following changes to the third paragraph of Section 4.4.6 on page 4-18 will be proposed:

The third sentence will be modified as follows:

"If contamination is detected within 20 ft above the water table, a monitoring well will be installed to evaluate whether a release has occurred to groundwater."

The fourth sentence will be modified as follows:

"Because subsurface soils and the monitoring well installation are optional, they will be installed only after approval from the Huntsville Contracting Officer."

The following sentence will be added to the end of the fourth paragraph of Section 4.4.6 on page 4-18:

"Additional and optional samples described above will be collected only after a field change request form is signed by CEHND."

CH2M HILL Response to Comment 12:

For all sites, optional soil samples and monitoring wells are contemplated to demonstrate how the observational approach might be implemented, if the first rounds of sampling detect significant concentrations of contaminants. We propose to leave the text unchanged.

CH2M HILL Response to Comment 13:

See the response to Comment 12.

CH2M HILL Response to Comment 14:

See the response to Comment 12.

CH2M HILL Response to Comment 15:

Changes will be made to this section of text similar to the response to Comment 11.

CH2M HILL Response to Comment 16:

The second sentence of Section 4.6.7 will be modified as follows:

"Contamination may be detected in the optional borings at the 30-foot depth. If contamination is detected, then soil borings may be installed that extend to the water table. If contamination at a site is detected in soils within 20 feet of the water table, then a monitoring well (after approval by CEHND) may be installed."

FINAL PAGE

ADMINISTRATIVE RECORD

FINAL PAGE

FINAL PAGE

ADMINISTRATIVE RECORD

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