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THE MEMPHIS DEPOT
TENNESSEE

ADMINISTRATIVE RECORD
COVER SHEET

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

AUG 24 1994

4WD-FFB

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RETURN RECEIPT REQUESTED

RECEIVED
AUG 29 1994

C. Michael Rust, Colonel, USA
Commander
Defense Distribution Depot, Memphis
2163 Airways Blvd.
Memphis, Tennessee 38114-5000

SEP 16 1994

SUBJ: Notice of Technical Inadequacy (NOTI) of Draft RFI Workplan; Defense Distribution Depot Memphis, Tennessee (DDMT); EPA I.D. No. TN4 210 020 570

Dear Colonel Rust:

The United States Environmental Protection Agency (EPA) has received and reviewed the following documents:

- Field Sampling Plan for Operable Unit 2, February 1994;
- Field Sampling Plan for Operable Unit 3, March 1994;
- Field Sampling Plan for Operable Unit 4, May 1994;
- Field Sampling Plan for Screening Sites, March 1994.

EPA's reviews of these documents have determined that they are inadequate. The comments are enclosed. EPA has reviewed these documents for compliance with the requirements of a RCRA Facility Investigation (RFI) Work Plan pursuant to the RCRA HSWA permit and a Remedial Investigation (RI) Work Plan pursuant to the National Oil and Hazardous Substances Contingency Plan (NCP).

The submittal for the OU4 FSP was significantly better in both its presentation and organization of the material and in its scope of proposed sampling activities. When revising these documents as required, DDMT should apply the same scoping process to the other FSPs.

As has been stated in earlier NOTIs, EPA intends to follow the review and revision procedures outlined in Section XV (Consultation Process for Primary and Secondary Documents) of the Federal Facilities Agreement (FFA) in finalizing these documents. Therefore, a written response to our comments must

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be submitted to this office as soon as possible and no later than sixty (60) days from your receipt of this letter. A revised version "draft final" version of these documents must be received no later than one hundred and twenty (120) days from the date on which DDMT receives final comments from all Parties to the FFA.

Note that until all of the RFI(RI) and CMS(FS) Work Plans are approved, DDMT has not fulfilled the requirements for permit condition II.E.1 and II.G.1 of the EPA RCRA permit effective September 28, 1990. Seven (7) copies of each document must be submitted to:

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

ATTN: Federal Facilities Branch

Failure to comply with any permit condition may result in sanctions pursuant to Section §3008(a) of the RCRA, 42 U.S.C. 6928, as amended by the Federal Facility Compliance Act of 1992, under which EPA may seek the imposition of penalties of up to $25,000 for each day of continued non-compliance.

Should you have any questions on the review comments, please contact Martha Berry of the Federal Facilities Branch at (404) 347-3016, vmx. 6431. For questions regarding compliance and enforcement, please contact Kris Lippert of the RCRA Compliance Section at (404) 347-7603, vmx. 6400.

Sincerely,

James S. Ritzman for

Joseph R. Franzmathes, Director
Waste Management Division

Enclosure

cc: Christine Kartman, DDMT-DE
Frank Novitski, DDMT-DE
Bill Forrester, TDEC
Jordan English, TDEC

EPA COMMENTS
OPERABLE UNIT 2
FIELD SAMPLING PLAN, FEBRUARY 1994
DEFENSE DISTRIBUTION DEPOT
MEMPHIS, TENNESSEE

GENERAL COMMENTS

EPA has the following general comments to make on the Field Sampling Plan for Operable Unit 2 (OU2):

- The presentation of the site data on figures is neither organized, nor presented well and requires transposing information from various figures in order to achieve a clear understanding of site conditions. For example, a figure of OU2 needs to be presented which includes the potentiometric surface contours, existing monitor wells and site locations in order to facilitate data gap identification.

- The FSP needs to include figures showing the following features:

- Topographic contours, including drainage ditches;

- Storm and sanitary sewers, including outfall locations;

- Potentiometric surface map utilizing all the monitor wells in OU-2; and

- Detailed maps of each site under investigation (e.g., Figure B-4); these maps should include the previous and the proposed sample locations.

- The FSP should evaluate the groundwater flow direction for OU-2 and determine if the existing monitor wells are properly located to monitor the groundwater contamination at each of the sites under investigation. The potentiometric surface map (Figure 2-11) for DDMT presented in the Generic Remedial Investigation (RI)/Feasibility Study (FS) Work Plan, dated January 1990, shows the groundwater flow direction in the southeast corner of DDMT as moving west to east towards a water-table trough. If groundwater flow at OU-2 is to the east, then three of the four existing monitor wells at OU-2 (MW-21, 22 and 23) are upgradient of the sites under investigation (sites 27, 29, 32, 87, 88 and 89) and are not adequately monitoring the groundwater for those sites.

SPECIFIC COMMENTS

EPA has the following specific comments to make on the OU2FSP:

1. Page 2-3, Figure 2.2: Site Number 73 is shown on Figure 2.2 between Ball Road and Building S970; however, there is no discussion in the text referencing this site. Since this site is identified in the draft SMP as a site screening site, EPA's comments on the sampling rational will be made on the Screening Sites FSP. However, since the site is identified on this figure, some explanation concerning this site should be made in the text of this FSP.

2. Chapter 3, General: The FSP proposes no analyses for volatile organic compounds for any of the surface soil samples (Table 3.1A). This decision may have been made because of the assumption that volatile organic compounds would either have leached or volatilized from surface soil. While this assumption may generally be correct, it is unconfirmed. Volatile organic compounds should be analyzed for surface soil samples, to provide information necessary for the OU2 risk assessment.

   The FSP refers to field screening which will be used during the soil boring sample collection. The FSP should note in the appropriate location(s) exactly what field screening activities are contemplated for the soil boring investigation.

   As a general comment, this FSP should discuss background soil and ground water sampling and sample analysis which will be done to characterize these media where they are unaffected by sites in OU2. While background refers to samples unaffected by any part of the Defense Depot, sampling of wells upgradient of OU2 should be used to investigate any ground water contamination that is unrelated to OU2 contaminant sources, but which may be detected in OU2 area wells. The FSP should discuss this upgradient well sampling. Also, collection of background soil samples to define soil properties related to subsurface contaminant fate and transport should be discussed in the FSP.

3. Site #27: Figure 3-1 shows that five near-surface soil samples are proposed for the area to the southeast of building S873 (Site 27). Previous soil samples collected from this area have indicated the presence of some low levels of volatile organic compounds and semivolatile organic compounds, as well as some near-surface concentrations of pesticides (these pesticide-contaminated soils have been removed). The previous data also indicate a generally higher concentration of metals at the one-foot depth in the two soil samples collected closest to the

building (Appendix B, Table B-3, data for samples SS26 and SS27), compared to soil samples collected further from the building. Thus, sample collection focused in areas closer to the building, as proposed, appears to be reasonable. However, the proposed sample locations shown on Figure 1 are clustered very tightly together, with no proposed sample location further than approximately 50 feet from the existing two data points. This clustering of samples appears to be likely to generate redundant sample data. The ground water samples from monitoring well MW-23 southwest of building S873 indicate a probable nearby source of ground water metals contamination. This metals contamination source has probably not been located, based on the available soil sample data. The proposed soil sampling locations should probably be spaced somewhat further apart, to get soil sample coverage closer to MW-23. If there are compelling reasons for locating the five soil borings where they are now proposed, the FSP should propose two additional soil borings south of SS-203, to have soil sample data closer to the well showing the metals contamination.

The FSP proposes to collect only shallow subsurface soil data for Site 27. The FSP should either propose some deeper soil samples, or should briefly present a plan for a subsequent sampling round for collection of deeper soil samples, if the shallow soil samples have levels of contamination which indicate a need for such deeper soil sampling. This comment also applies to soil sampling at sites #87 and #89.

The FSP needs to address whether additional samples should be collected between the foundation of Building S872 and the railroad spur at Site 27. The information provided in the text and Appendix B of the FSP does not clearly indicate whether the area excavated and sampled included the area between the building and the railroad spur. This area is of concern since spillage from repackaging hazardous waste in Building S873 could potentially result in high contaminant concentrations in the soils adjacent to the building.

A figure showing the previous area of excavation, as described in Section 3.1.2, should be presented either here or in the appropriate appendix. In addition to the surface soil samples, soil samples should be collected in this area at a depth of 18" to 24". Also, the FSP should propose samples to be collected from underneath the shed.

The text states that existing monitor well MW-23, which is located south of Site 27, is sufficient to monitor the groundwater quality for this site. However, the potentiometric surface map presented in the Generic RI/FS Work Plan shows an eastward groundwater flow direction at

OU-2. Therefore, monitor well MW-23 would be cross-gradient of Site 27 and would not be likely to detect potential groundwater contamination from Site 27.

The FSP also proposes installing and sampling additional monitor wells MW-55, MW-56 and MW-57 to assist in characterizing the groundwater at Site 27. However, the three proposed monitor wells are "off-post" and could be affected by other sources of contamination. Furthermore, these proposed well locations are upgradient or cross-gradient from the site and are as much as 1,500 to 2,500 feet away from Site 27. The FSP needs to reevaluate groundwater monitoring at Site 27 and recommend additional monitor wells which are closer and are located downgradient with respect to the site.

4. Figure 3-1: The proposed soil boring SB-205 is apparently labeled as SB-209.

5. Table 3.1A: This table presents some information in the "Water Characterization Data Points" column which is somewhat misleading with respect to the various OU2 sites. The table implies that ground water from wells MW-55, MW-56 and MW-57 will be useful for evaluating ground water quality impacts from specific OU2 sites. However, in the ground water part of the FSP, it is apparent that these proposed off site wells are probably much too far away from the potential contaminant source areas to provide anything more than a general assessment of far-field ground water quality impacts resulting from OU2.

   A definition for each of the acronyms (e.g., ONOP) presented in the "Key" section of this table should be provided.

6. Table 3.1B: A definition in the table for each of the EPA SW-846 analytical methods (e.g., Method 6010) presented in the "Required Analysis" of this table should be provided.

7. Section 3.2.3, Section 3.4.3, and elsewhere in the FSP: It is stated that surface soil (SS) samples will be taken from the upper 18 inches. It is understood that because of past soil removals deeper soil samples are needed to determine the extent of soil contamination. It is recommended that all SS samples taken in areas of past removal and fill be taken from a depth of 6 to 12 inches. This should be below most areas of clean fill but also be at a depth acceptable for human exposure to surface soils. Region IV's position is that soils deeper than 12 inches are not available for residential SS exposure.

8. Site #88: The FSP states that an angled boring (ASB-202) will be installed at this site. The FSP should explain the

rationale for and the added benefit of drilling an angled boring rather than installing a vertical boring.

9. Site #89: The FSP has not provided adequate data to conclude that monitor well MW-21 is downgradient of Site 89 (see General Comments). The FSP needs to present additional data characterizing groundwater flow in OU-2 and evaluate the possibility of installing additional monitor wells to adequately characterize groundwater contamination at this site.

   From the data presented in this FSP, it is unclear why additional soil sampling efforts for Site #89 are concentrated around the southern part of building 1089. In Section 3.4.1, the text states that spills at this site have been reported, but the specific locations of such spills are unknown. If this is the case, a more comprehensive soil sampling effort around this building appears to be needed.

   Soil samples should be collected from underneath the building itself.

10. Sites #87, #88 and 89: Since these sites have not been characterized in the past, a full scan Target Compound List/Target Analyte List (TCL/TAL) analysis should be done.

11. Site #34: The FSP needs to include a summary of the underground storage tank (UST) removal at Site 34, including any confirmation sampling and analytical results collected for the area of excavation.

    The FSP states that an angled boring (ASB-212) will be installed at Site 34. The FSP should explain the rationale for and the added benefit of drilling an angled boring rather than installing a vertical boring.

    The FSP should present additional data characterizing the groundwater flow direction at OU-2 and Site 34 and needs to propose the installation of additional monitor wells to adequately characterize this site. One monitor well is not sufficient to adequately evaluate groundwater contamination at Site 34.

12. Sites #32 and #29: The FSP has not delineated the groundwater flow direction and therefore cannot conclude that the two existing monitor wells, MW-21 and MW-22, are adequately monitoring potential groundwater contamination from sites 29, 32, 87, 88 and 89 located in the southeastern corner of OU-2 (see General Comments). Additional monitor wells north, east and west of this cluster of sites should be installed to evaluate the groundwater surrounding these sites.

13. Site # 32: The extent of metals contamination should be mapped.

14. Site # 29: The analyses to be performed on the soil boring samples for Site 29 should include the analyses for semivolatile organic compounds since the source of contamination is a waste oil UST.

    The FSP should describe in detail what has been done to date to locate the tank. If it has not yet been tried, EPA recommends the use of a metal detector.

15. Section 4.3.2 (page 4-2): It is stated that SS samples will be taken at depths of 18 inches or greater in some cases. SS samples for the BRA should be taken at depths no greater than 12 inches. Deeper soil samples may be necessary to determine the extent of contamination, but they should not be used as SS samples in the BRA.

16. Section 5, General: The discussion of off site wells in Section 5 should either provide justification for the proposed locations for these wells, or should propose off site locations consistent with the known OU2 and facility ground water contamination. Figure 5-1 indicates the proposed off site wells are at least 800 feet from the site boundary. Should one or more of these wells not detect any ground water contamination, the extent of ground water contamination between that well and the facility will remain undefined. A more appropriate approach may be to initially locate off site wells closer to the site boundary. Then, depending upon the results of that initial off site investigation, additional wells can be located further from the potential OU2 contaminant source areas.

17. Section 5.2.1: This section states that no new on site wells are proposed for the OU2 investigation. This proposal may not be acceptable, because soil or ground water monitoring data from the OU2 investigation may indicate a need for more ground water characterization than what is anticipated. The text does state that another OU2 on site well may be needed if existing well MW-39 proves to be upgradient from site 34. A more general statement in Section 5.2 is needed, to state that additional on site OU2 wells may be installed, based on the results of the proposed soil and ground water investigations (both in OU2 and elsewhere at the Defense Depot).

18. Section 5.2.2: The FSP has not provided the rationale for the location of the three monitor wells MW-55, MW-56 and MW-57. The FSP needs to discuss the criteria for selecting the locations for these three proposed wells. Based on the groundwater flow directions as presented on Figure 2-11 of

the Generic RI/FS Work Plan, these wells would appear to be upgradient of OU-2 and would not provide the data required for monitoring groundwater contamination.

19. Section 5.3.1: Some wording in this section should be modified, and more detail should be added to this section. The first sentence in this section states that samples will be collected from existing wells; however, samples from off site wells will also be collected during the OU2 investigation. The text also states that three soil samples for chemical analysis will be collected from each monitoring well boring. This approach is not unacceptable, but the only definite new wells proposed for OU2 will be constructed off site. In these off site areas, any soil samples collected from above the water table will presumably provide little or no information about off site contaminant migration. Thus, three soil samples per off site downgradient monitoring well appears to be unnecessary for definition of contaminant migration and concentration. Section 5.3.1 mentions that soil samples will be collected for geotechnical analysis. The specific proposed geotechnical analyses should be listed. Also, proposed permeability testing should be more thoroughly discussed in this section. The text implies that this work will be laboratory permeability testing. Field permeability testing (slug tests or an aquifer test) of the Fluvial aquifer wells would be more appropriate for this investigation. The FSP should also identify which wells are proposed for inclusion in the permeability testing.

20. Section 5.3.3: This section states that wells will be sampled within 6 to 10 hours of purging, or within 10 hours for slowly recharging wells. Wells should be sampled as soon as possible after purging; for most wells at this facility, this delay should only be a few minutes. This comment was previously made about Section 4.9.2.2 of the Generic Quality Assurance Project Plan for the Defense Depot.

21. Table B-1 thru B-5 (Appendix B): These tables provide the sampling results from past studies at the Site. All of these tables have divided the inorganic data into "volatile metals" and "nonvolatile metals". EPA is not familiar with this distinction in inorganic data. If it is used in any future documents, it is recommended that the groupings should be specifically defined.

EPA COMMENTS
OPERABLE UNIT 3
FIELD SAMPLING PLAN, MARCH 1994
DEFENSE DISTRIBUTION DEPOT
MEMPHIS, TENNESSEE

GENERAL COMMENTS

EPA has the following general comments to make on the draft Field Sampling Plan (FSP) for Operable Unit 3 (OU3):

- The FSP presents no discussion of groundwater flow direction delineation at OU-3. This information is essential for providing a clear understanding of the groundwater conditions at each of the sites in OU-3 under investigation and for justifying the number and locations of additional monitoring wells proposed.

- The FSP should also include figures showing the following features: topographic contours to provide understanding of the rationale of proposed sampling for all potentially impacted media; storm and sanitary sewers, including outfall locations; and a potentiometric surface map illustrating all monitoring wells in OU-3.

- Pages containing tables or figures should be clearly numbered for purposes of convenient referencing.

- Table B-7 shows results of November 1993 monitoring at well MW24 which indicate that several very low mobility organic compounds such as benzo(a)pyrene have been found in this location. If these analyses are correct, the presence of these low mobility compounds at MW24 suggests a nearby contaminant source area with a significant impact to ground water. However, this OU3 FSP does not propose any soil or other subsurface investigation (including any further monitoring of MW24) as a part of the OU3 work. This potential problem around MW24 should be investigated.

- The OU3 FSP should address the issue of background soil and ground water analysis for comparison to the samples which will be collected to identify contamination within and attributable to sites within the OU3 area.

- The OU3 FSP does not address the collection of hydraulic conductivity data from monitoring wells within the OU3 area.

SPECIFIC COMMENTS

EPA has the following specific comments to make on the draft OU# FSP:

1. Tables 2.1 and 2.2: These two tables should be referenced and discussed in the text.

2. Section 3, General: Since most of the areas discussed in this FSP have not been fully characterized in the past, a full scan Target Compound List/Target Analyte List (TCL/TAL) analysis should be done on at least 20% (minimum of 1 per site) of the soil samples. If it can be shown that full scan TCL/TAL analysis was done at a specific site in earlier investigations, then it would be acceptable to narrow the field to contaminants of potential concern (COPC) at that specific site, based on previous detections.

3. Figure 3.1: The direction of groundwater flow at OU-3 should be discussed in the FSP and depicted on this figure to provide a clear understanding of site conditions and to justify the proposed locations of additional monitoring wells to be installed.

   Topographic contours, including drainage ditches, should also be shown on the figure to provide understanding of the rationale for the selection of surface and subsurface soil sampling locations, such as the proposed soil sampling grids.

4. Section 3.1.2: This section states that soil contamination at this site has not been investigated, yet there is no surface soil samples being proposed. Before the status of site #20 can be determined, further characterization is needed which would include the analysis of surface soil samples.

5. Tables 3.1 A and B: Since these areas have not been fully characterized in the past, a full scan Target Compound List/Target Analyte List (TCL/TAL) analysis should be done on all soil samples.

6. Section 3.1.3: This section indicates that soil contamination at this site has not been investigated, yet there is no surface soil samples being proposed. Before the status of site #21 can be determined, further characterization is needed which would include the analysis of surface soil samples.

7. Section 3.2.3: This section states "At least 4 additional surface water samples will be collected at the stormwater inlet to the lake during the course of the study." This

procedure (as well as the correlative procedure for sampling stormwater inflow to the golf course pond) should be very specific concerning the sequencing of the sample collection. From the description, it is impossible to tell if all four samples will be collected during the same rainfall event, or four individual rain events. The stormwater inlet sample location is not shown on Figure 3-1, which shows existing and proposed monitoring locations. The previous lake sediment sampling locations, in relation to the location of the stormwater inlet to the lake, may provide a clue concerning the movement of contaminants to the lake via direct runoff from the surrounding land, versus discharge via the storm water inlet. Also, if none of the previous sediment samples were collected in close proximity to the stormwater inlet (i.e. about 30 to 50 feet from the inlet, or where the principal sediment deposition from discharge through the inlet is expected), a sediment sample from Lake Danielson should be collected at that location during the OU3 investigation. One would expect this to have been a consideration in earlier lake sediment sampling, but it is not clear from the document if such was the case. The same comment generally applies to the golf course pond.

Since the 1986 USAEHA study indicated that Lake Danielson fish tissue samples were contaminated with pesticides and PCBs, it is recommended that more analysis be done on the fish in Lake Danielson. The FSP should include a discussion on the collection and analysis of fish tissue samples from Lake Danielson.

8. Sections 3.3, 3.4 and 3.5: This comment is made in reference to the Section 3.3 discussion of proposed soil sampling at the former PCB storage area, and the Section 3.4 and Section 3.5 discussion of proposed soil sampling at the former pesticide areas. In the unlikely event that significant concentrations of pesticides or PCBs are detected at any of these locations, near-field ground water sampling may be required to determine if there is localized ground water contamination. The OU3 FSP indicates that ground water samples more or less downgradient of these potential waste disposal areas have been collected, but the mobility of several of the compounds of concern is so low that they may not have migrated very far from the source areas. The FSP should discuss monitoring well construction and ground water sampling in these potential contaminant source areas, contingent upon the results of the soil sampling.

9. Section 4.3.2: It is stated that surface soil (SS) samples will be taken from the upper 18 inches. It is recommended that all SS samples be taken from a depth of 0 to 12 inches. Region IV's position is that soils deeper than 12 inches are

not available for residential SS exposure.

10. Section 5.2, Paragraph 2: The FSP states that groundwater samples will be collected from existing monitoring wells. However, it is unclear from the statement whether these "existing wells" also include the proposed monitoring well MW-58. This should be clarified.

EPA COMMENTS
OPERABLE UNIT 4
FIELD SAMPLING PLAN, MAY 1994
DEFENSE DISTRIBUTION DEPOT
MEMPHIS, TENNESSEE

GENERAL COMMENTS

EPA has the following general comments to make on the Field Sampling Plan (FSP) for Operable Unit 4 (OU4):

- The OU4 FSP should address the issue of background soil analysis for comparison to the samples which will be collected to identify contamination around Site 57.

- The OU4 FSP does not address the collection of hydraulic conductivity data from monitoring wells within the OU4 area.

SPECIFIC COMMENTS

EPA has the following specific comments to make on the OU4 FSP:

1. Section 3.1.2: In this section, the proposal in the fourth sentence is unclear. It is reasonable to install the deep Memphis Sand monitoring wells downgradient of the depression area, but the phrase "... or any determined hydraulic connection" is confusing.

2. Table 3-1 (Note a): Please clarify the statement "For NW locations, refer to Figure 4-1.11. The only monitoring wells shown on Figure 4-1 are MW-59 and MW-60 which are "proposed sampling locations."

3. Table 3-1: Any PRG that is less protective than EPA's Maximum Contaminant Levels (MCLs) or ground water action levels will not be acceptable. The PRGs listed in this table for barium and lead should be 2,000 ug/l and 15 ug/l, respectively.

4. Section 3.3.2: It is stated that preliminary remediation goals (PRGs) which were developed by EPA Region IX were used in the FSP document. This guidance should not be used for PRGs in Region IV. Instead, EPA Region IV recommends that Region III's Risk-Based Concentration Table (updated quarterly) be used for determining PRBs at the site. Region III has developed a table for selecting contaminants of potential concern (COPCs). This table should be used for selecting COPCs and/or as a chemical screening guidance. The table is titled Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening. A copy of this has been attached to these comments.

5. Table 3-2: The PRG values listed in this table are based on an industrial type exposure to soils. At this stage of the process, since future use exposure scenarios have not been agreed upon, PRGs based on a residential type exposure to soils is the more appropriate. It would be acceptable to include both industrial and residential, but not just industrial.

   In addition, additional attention should be considered to assure that the PRGs also address ecological protection at DDMT.

6. Table 3-2 (Note a): Please clarify the statement "For sample locations, refer to Figure 3-5.11 There is no Figure 3-5 in this document.

7. Table 3-3: Analysis for pesticides should be included for characterization of ground water contamination, since pesticides have already been shown to be present in the site soils.

8. Section 4.0: Considering the proposed soil sampling plan in Section 4.0, it is recommended collection of subsurface soil samples in the location where previous surface soil samples SS-11 and SS-42 were collected. These surface soil samples contained greater than 1000 ppm total PAHS, greater than 1000 ppm lead, and elevated levels of several other contaminants of potential concern.

9. Section 4.3.2: It is stated that surface soil samples will be taken from surface to depths up to approximately 18 inches. It is Region IV's policy that surface soil samples for use in the baseline risk assessment (BRA) should be taken from a depth of 0-12 inches. Any surface soil samples taken for risk assessment purposes should follow this policy.

   It is also stated that 20 surface soil samples will be taken for field screening and 2 of these samples will also be submitted to an offsite laboratory for a chemical analytical scan. Having only two surface soil samples which can be used in the BRA is unacceptable. It is appropriate to use field screening to determine the appropriate sampling locations and possibly screen for contaminants of potential concern (COPCs), but field screening data is not acceptable for use in the BRA. An appropriate number of samples should be analyzed for the COPCs at the site and also an appropriate number of samples should be analyzed for full scan TCL/TAL.

10. Section 5.0: The area around Building 629 (Site 57) appears to be a potential source of PAHs detected in one or more

monitoring wells within the OU4 area. MW-38 is the monitoring well closest to Site 57 which is more or less directly downgradient from it. Less than 0.01 ug/L concentrations of benzo(a)anthracene, benzo(a)pyrene, benzo(b) fluoranthene, benzo(k)fluoranthene and fluoranthene were detected in the MW-38 sample. The concentrations of these PAHs in the MW38 sample are not themselves a concern. However, the fact that these are all very low mobility compounds that were detected in any concentration in a sample from a monitoring well approximately 1000 feet from the apparent source area is a concern. There is a possibility of finding much higher concentrations of these compounds in the ground water in close proximity to Site 57. The OU4 FSP should consider the implications of these low mobility PAHs in the ground water at such a distance from the site; depending upon the analytical results of soil and ground water sampling around Site 57, vadose zone contaminant transport modeling may be required to evaluate soil remediation goals protective of ground water at the Site 57 location.

11. Section 5.2.3: With regard to the proposed monitoring well locations described in this section, monitoring well MW-59 is defined as upgradient of Building 629. While the well MW-59 location may technically be upgradient, it appears to be so close to the building that any ground water quality impacts from contaminated soils around the building will likely be detected in samples collected from the well. Thus, because the intent of this well is to provide water quality data upgradient of Building 629, the well should be located further away from the building. An approximate setback distance of 100 feet is recommended.

12. Section 5.7.5: This section states that the hydraulic connection between the Fluvial aquifer and the Memphis Sand aquifer will be evaluated by comparison of major water quality constituents such as sodium, calcium, and nitrate between paired Fluvial aquifer and Memphis Sand aquifer wells. This approach is supposed to provide a qualitative indication of the degree of interconnection between the Memphis Sand and the Fluvial aquifer. The approach should be supported by some statement that the listed water quality variables are noticeably different in areas where the connection between the two aquifers is minimal. If there are no data to indicate that the water quality is very different where the aquifer connection is minimal, then the water quality comparison approach may not be viable. If this is the case, it should be backed up by a hydraulic approach for evaluation of the interconnection between the two aquifers.

13. Appendix A, Reference 14: The CLP Statement of Work needs to be updated. The correct references are: CLP SOW for Inorganic Analyses should be ILM03.0 and all revisions; the CLP SOW for Organic Analyses should be OLM01.1 and all revisions.

Periodic revisions are made to SW-846. If a particular method has been revised, the updated version should be used. The reference should indicate from which edition or update the methods are taken.

EPA COMMENTS
SCREENING SITES
FIELD SAMPLING PLAN, MARCH 1994
DEFENSE DISTRIBUTION DEPOT
MEMPHIS, TENNESSEE

GENERAL COMMENTS

EPA has the following general comments to make on the Field Sampling Plan (FSP) for the Screening Sites (SS):

- The FSP presents previous groundwater data, but does not integrate this information to show the monitoring well network with respect to the screening sites. At a minimum, at least one map should be presented that combines the locations of the screening sites, the locations of the existing monitoring wells and the potentiometric contours for the water table aquifer. Without this information it is not possible to verify some of the statements in the FSP concerning the impact of potential contaminant releases from screening sites on groundwater. For example, in the discussion of Site #19, the text compares contaminant concentrations in monitoring well MW-13, which is identified as a downgradient well, with MW-28, which is identified as an upgradient well. However, the relationship between Site #19 and groundwater flow direction cannot be verified because the site location and the monitoring well locations are on separate maps at different scales, and there is no groundwater elevation contour map in the FSP.

- Since most of the areas discussed in this FSP have not been fully characterized in the past, a full scan Target Compound List/Target Analyte List (TCL/TAL) analysis should be done on at least 20% (minimum of 1 per site) of the soil samples. If it can be shown that full scan TCL/TAL analysis was done at a specific site in earlier investigations, then it would be acceptable to narrow the field to contaminants of potential concern (COPC) at that specific site, based on previous detections.

- There are a number of inconsistencies in Table 3.1a, "Proposed Sampling and Analysis to Assess Screening Sites," and Table 3.1b, "Summary of Analytical Results for Screening Sites," regarding the analytical parameters for which samples will be analyzed. These inconsistencies should be corrected.

SPECIFIC COMMENTS

EPA has the following specific comments to make on the SSFSP:

1. Section 3.1.1: Tear gas and its constituents should be considered potential contaminants of concern.

2. Section 3.1.1.1: In this section, it would be beneficial to define the approximate extent or volume of waste materials buried at site 19. Under the heading "Recommendations for Sampling", Section 3.1.1.3, the text states that this site is an unlikely source for ground water contamination. However, it is impossible for me to determine from the information provided in this FSP if this is likely the case. Existing sampling data cited in the FSP either appear to have been collected too far from the site 19 area to define any contamination in the area, or are too far from site 19 to be obviously attributable to the site.

3. Section 3.1.1.3: The text states that surface soil samples will not be analyzed for volatile organic compounds (VOCs) because "of their volatility." Presumably, the FSP is implying that any VOCs that may have been released to the upper foot of the soil would volatilize to the atmosphere. The degree of volatilization is highly dependent on the age of the spill. Since VOCs would likely still be present in the upper 1 foot following a recent spill, surface soil samples should also be analyzed for VOCs.

   The analytical parameter list should be expanded to include pesticides since these constituents were detected in soil in previous sampling near this site.

4. Section 3.1.2 and Beyond: For site #20, the presence of contaminant migration out of the asphalt disposal area should be assessed by soil sampling directly beneath the disposal area. Soil samples collected marginal to this location will not adequately confirm the presence and degree of soil contamination. The information provided in the FSP does not indicate that the proposed soil samples will be collected in appropriate locations to define if there has been any contaminant migration out of the disposal area. As for designating MW-4 as the downgradient well, this well is too distant from site #20 to define contamination specifically attributable to the site, and may be too far to detect any site 20 contamination whatsoever. Soil sampling should focus on defining the degree of contaminant migration in soils beneath site 20; follow-up ground water sampling close to site #20 may be indicated on the basis of this soil sampling effort.

Comments in the previous paragraph concerning site #20 apply to a number of screening sites for which proposed sampling is discussed in the FSP. For example, for site #60, all existing ground water monitoring wells described in the FSP are several hundreds of feet from the site. Ground water quality monitoring at this distance from a potential source area, where there are several potential source areas for any contaminants at the monitored location, does not adequately cover the specific potential source area. A general conceptual approach to this screening sites investigation should be to sample soil at various depths as close as possible (if considered safe, directly under) a potential contaminant source area, determine if that potential source area likely contributes contaminants to ground water, and then propose a second investigative phase with installation of site-specific monitoring wells, as appropriate. If time is a concern, a field screening soil analytical approach may be used (level II data) to define locations for additional monitoring wells. For sites where there is a low probability of any contamination, surface soil sampling can be done as a first step, followed by deeper soil sampling and well installation, if necessary.

5. Sections 3.1.2.2 and 3.1.2.3: This section states that soil contamination at this site has not been investigated, yet there is no surface soil sampling being proposed. Before the status of site #20 can be determined, further characterization is needed that would include the analysis of surface soil samples.

6. Section 3.1.2.3: Only polynuclear aromatic hydrocarbons (PAHs) will be analyzed for in soil samples collected from Site #20 based on the FSP's assertion that this area is believed to have received asphalt debris and possibly roofing gravel. Because of the uncertain disposal history of this area, and because no soil samples have previously been collected from Site #20, the parameter list should be expanded to include a broad list of parameters such as the Target Compound List (TCL) and Target Analyte List (TAL).

7. Section 3.1.3.3: Section 3.1.3.2 indicates that soil contamination at this site has not been investigated, yet Section 3.1.3.3 proposes no surface soil samples be taken. Before the status of site #21 can be determined, further characterization is needed which would include the analysis of surface soil samples.

8. Section 3.1.5.2: It is apparent that turbidity is having an impact on data quality. EPA recommends that future purging of wells be performed with low flow pumps. Sampling should also be conducted with low-flow pumps where possible.

9. Section 3.1.5.3: The text states that monitoring wells MW-28, MW-9 and MW-29 near Site #60 will be sampled and analyzed for the parameters listed in tables 3.1a and 3.1b. However, the status of MW-28 is not clear; MW-28 is not listed in either of these tables as a monitoring well proposed for sampling. Instead, MW-23 is designated for sampling at Site #60, along with MW-9 and MW-29. The status of MW-23 is also uncertain because it does not appear on Figure B-1, which shows Site #60 and nearby existing sampling points. These discrepancies should be corrected.

10. Section 3.2.3.2: The distance between monitoring well MW-39 and Site #82 (Building 783) is 600 feet, not 250 feet as stated in the text. This should be corrected because the text makes inferences from MW-39 groundwater analytical data about potential contaminant releases from Site #82. Because of this relatively large distance, constituents detected in groundwater samples from MW-39 may not reliably indicate the range of constituents or the magnitude of contaminant releases that may have occurred.

11. Section 3.2.3.3: The text states that soil samples will be analyzed according to the specifications in tables 3.1a and 3.1b, but there is a discrepancy in the parameters listed for analysis. Table 3.1a specifies the full TAL/TCL for samples SS-227 through SS-229, but Table 3.1b omits semivolatile organic compounds (SVOCs) and volatile organic compounds (VOCs). The full TAL/TCL should be included in the analyses since this analytical suite consists of a broad range of parameters, including SVOCs and VOCs, and this suite is appropriate for a site which housed flammable materials. Table 3.1b should be corrected.

12. Sections 3.3.1 and 3.3.2: For sites 51 and 52, a sediment sample should be collected concurrently with the surface water samples, if possible.

13. Section 3.2.2.3: Contrary to the text, the list of parameters which will be analyzed for in samples SW-303 and SW-304 at Site #66 was not included in either Table 3.1a or Table 3.1b.

14. Section 3.3.5.3: Insufficient justification is presented for not proposing confirmation soil sampling at Site #67. The FSP indicates that petroleum constituents were handled at this fuel dispensing and storage facility and that underground storage tanks were replaced in 1985. Consequently, past releases of petroleum constituents potentially could have occurred. The FSP should either present the results of any previous sampling and analysis that indicate contaminated media no longer remain or propose confirmation sampling.

15. Section 3.3.7.3: There is considerable inconsistency in the lists of proposed analytical parameters for surface soil and subsurface soil samples at Site #69 both within and between tables 3.1a and 3.1b. For example, table 3.1a indicates that surface soil samples will be analyzed for chlorinated pesticides/polychlorinated biphenyls (PCBs), PAHs and organophosphate pesticides. According to the same table, subsurface soil samples will be analyzed for not only these constituents, but also base/neutral and acid extractable compounds (BNAs), VOCs and metals. In addition, tables 3.1a and 3.1b are inconsistent. As indicated previously, table 3.1a indicates that subsurface soil will be analyzed for a broad range of constituents, but Table 3.1b lists only VOCs and PAHs. All soil samples at Site #69 should be analyzed for the parameters listed for subsurface soil in Table 3.1a.

    The proposed soil sampling plan for site 69 is unclear. If two soil samples will be collected from each surface sample location, the text should clearly state this sampling is proposed. Also, the text states that samples will be collected from one soil boring but Figure 3-1 shows three soil borings around the site.

16. Section 3.3.9.3: The text indicates that analytical parameters proposed for soil samples to be collected at Site #75 are specified in tables 3.1a and 3.1b, but the tables are inconsistent. Table 3.1b omits the non-PAH SVOCs which are included in the TAL/TCL specified for the same soil samples in Table 3.1a. Table 3.1b at a minimum should include all of the SVOCs specified in Table 3.1a.

17. Section 3.3.10.3: The FSP indicates that samples SS-305 and SS-306 will be obtained at Site #76, but these sample locations are neither included in Figure 3-1 nor referenced in either Table 3.1a or Table 3.1b. This discrepancy should be corrected.

18. Section 3.3.11.3: The FSP indicates that samples SS-307 and SS-308 will be obtained at Site #77, but these sample locations are neither included in Figure 3-1 nor referenced in either Table 3.1a or Table 3.1b. This discrepancy should be corrected.

19. Section 3.3.12.3: The FSP justifies recommending no further sampling at Site #78 on the basis of "the redundancy of sampling being conducted in the area of Bldgs. 689 and 690." All of the proposed sampling (three surface soil samples) in the vicinity of Site #78 are in the extreme eastern portion of the building, which is nearly 800 feet long. Unless the site operating history indicates that

spills could only have occurred at the eastern end of the site, additional soil sampling should be conducted in the central and western portions of Site #78.

20. Section 3.4.6.3: The FSP states that "no specific sampling can be recommended for this site due to the areal characteristic of the potential contamination." This apparently implies that the site is too large to conduct soil sampling, and the text concludes that "impacts to the environment can be best assessed through the evaluation of runoff from this location." The evaluation of runoff will be highly ineffective at assessing contaminant releases to soil, a medium on which contaminants would most likely have direct impact. The FSP should propose a soil sampling program to determine whether soil is contaminated. If the site is large, confirmation sampling could combine several sampling methods including field screening, composite sampling and single-location grab sampling.

21. Section 3.4.7: Regarding site 79, there is apparently not much known about this site, except that it was a burial area for miscellaneous liquids, among other items. Because this location is not well understood, it is advisable to have at least two sampling locations in this area. Another soil boring should be considered for this location. Also, the plan to collect soil boring samples at the surface, 10 feet, and 30 feet should probably be modified. I recommend collection of an additional soil sample between the surface and the 10-foot depth.

22. Section 3.4.7.2: The analytical results for monitoring well MW-38 are in Table B-19 and not in Table B-5, as indicated in the text. The correct data set should be referenced.

23. Section 3.4.7.3: Contrary to the text, the location of Site #80 is not indicated in Figure 3-1. Although this location is indicated in Figure B-4, Figure 3-1 should be corrected in order to present a complete summary of all site locations on a single map.

24. Section 3.4.8.2: The text should be corrected to indicate that analytical results for sample SS-24 are in Table B-18, not in Table B-16 as indicated in the text.

25. Section 3.4.9, Paragraph 1: The text states that Site #83 is located adjacent to the southern perimeter of Building 949; however, Figure 3-1 shows Site #83 at two locations: on the northern boundary of Building 949 and approximately 900 feet northeast of Building 949. This discrepancy should be corrected.

26. Section 3.4.9.2: The discussion concerning the relationship

between the locations of monitoring wells and groundwater flow direction in the vicinity of Site #83 contains errors and should be corrected. The FSP assesses potential impacts to groundwater in the site vicinity by evaluating analytical results from monitoring well MW-20. The FSP implies that MW-20 is downgradient with respect to Site #83 based on a "groundwater flow to the west or west-southwest." However, Figure B-4 does not indicate that MW-20 is located in the site vicinity. Furthermore, according to the references cited in the FSP, groundwater near Site #83 flows east to northeast. Under these flow conditions, there are no downgradient monitoring wells near the site.

27. Section 3.4.9.3: Based on Figure 3-1, none of the soil sample locations recommended for Site #83 are in the site vicinity. All of the sample locations are at least 900 feet away. The FSP should be corrected to show that soil sampling will be conducted in close proximity to Site #83 in order to assess any contaminant releases which may have occurred from this site.

28. Figure 3-1: Three separate sample locations have the designation SS-118. Since all samples must have unique numbers, this should be corrected.

29. Table 3.1a: The acronym "ONOPs" should be defined.

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